

**Investigator's Annual Report for the period ending August 31, 2002
The Amphibian Community at the Saratoga National Historical Park
Study # SARA-00002; Dr. Lawrence Woolbright, PI**

Because of extremely dry weather during the spring season of 2001, we were unable to collect much information about patterns of amphibian movement on the site during their breeding migrations. In addition, we suspected that the reproductive output of early spring species might have been depressed because of the inability of reproductives to move to breeding sites. Therefore our primary goals for spring 2002 were to quantify movement patterns across the site, using the tour road as a driving transect, and to count the egg clutches deposited in breeding pools by woodfrogs (*Rana sylvatica*) and spotted salamanders (*Ambystoma maculatum*).

Movement Patterns.

The nights of April 9 and April 14, 2002 were the primary migration nights for early breeding amphibian species, with warm temperatures, wet roads, and numerous individuals on the move. On both nights, as well as a few others during the season, we had teams out on the tour road identifying amphibians that were crossing the road and marking their locations and directions of travel. The results, including well over 100 individual amphibians, are summarized on a map of the battlefield as Figure 1. Complete field notes are attached as Appendix A.

Results confirm that the road locations identified in 2001 based on very few individuals are, in fact, migration corridors. Amphibian movement is not uniform along the course of the road, but concentrated in a few locations. Whether those locations reflect patchy distribution of adult amphibians across the site, either for over-wintering or as year-round habitat, is not yet known. A very interesting result is that a few individuals were found at the top of the hill at stop 3 and in the stop 9-10 area, apparently in the process of moving between there and the breeding ponds in the floodplain along the river. This finding suggests the possibility of a source-sink relationship between the floodplain and the high ground.

Clutch Counts.

A total of 1994 egg clutches of the woodfrog, *Rana sylvatica*, and 374 of the spotted salamander, *Ambystoma maculatum*, were counted in the spring of 2002. This is roughly four times the woodfrog count and seven times the spotted salamander count from 2001. Indeed, more clutches of both species were counted in the vernal pools in the woods around stop 8 this year than on the whole battlefield last year. It is possible that this difference simply reflects a difference in the number of adults in the populations between the two years. However, given that both of the two preceding winters were relatively mild, we suspect that at least part of the difference is that the dry spring of 2001 prevented a portion of the existing adults from migrating to breeding sites. A list of the number of egg clutches found at each pond is shown in Table 1.

Calling Surveys.

In addition to these two main efforts, we also conducted a limited number of calling surveys. Methods followed those described in our 2001 report: after one minute of acclimation time, calling was observed for a three-minute period. During the observation period, all species heard calling were assigned a calling index value of 1 (individuals could be counted; there was space between calls), 2 (individuals could be distinguished but there was overlap between calls), or 3 (full chorus, with calls continuous and overlapping). Because calling surveys were done primarily during April, they do not reflect the full range of amphibian activity that occurred on the site in 2002. However, they may be useful as historical records confirming the presence of those species that were observed. Calling survey data are attached as Appendix B.

Siena College
Saratoga Battlefield
Egg clutch counts

Spring 2002

<u>Pond</u>	<u>Species</u> <u>Rana</u> <u>Sylvatica</u>	<u>Ambystoma</u> <u>maculatum</u>
Stop 1	393	
Service road	1	
Beaver	7	3
Stop 2		
Woolbrights pond	23	6
Sean's Pond	4	
stop 5 seepage	160	
Stop 8 John's Pond	432	
Stop 8 East		
Stop 8 west		
Stop 8 Woods	555	170
Stop 8 Roadside	220*	39
Stop 8 Fern Field	419	156
Davidson		
Burdyi		
River Road		
Canal Below Stop 10		
Vly		
Canal South of Entrance		
total for each species	1994	374

*= Estimation

TABLE 1. The number of egg clutches found in spring 2002.

FIGURE 1. Summary of data from Tour Road driving transects, 2002.



<u>Arrow Number</u>	<u>Species observed</u>	<u>Number and Sex</u>
1	<i>Rana clamitans</i>	1 immature
2	<i>Rana sylvatica</i> <i>Bufo americanus</i> <i>Pseudacris crucifer</i>	1 Male, 1 female 1 Male 3 Male
3	<i>Rana sylvatica</i> <i>Pseudacris crucifer</i> <i>Rana clamitans</i> <i>Bufo americanus</i>	3 Male, 2 Female 3 Male, 2 Female immature Male
4	<i>Pseudacris crucifer</i> <i>Rana sylvatica</i> <i>Rana clamitans</i>	many 1 1
4.5	<i>Pseudacris crucifer</i>	male
5	<i>Bufo americanus</i> <i>Rana catesbeiana</i> <i>Rana sylvatica</i> <i>Pseudacris crucifer</i>	female 1 2 several
6	<i>Pseudacris crucifer</i>	male
6.5	<i>Bufo americanus</i>	female
7	<i>Rana clamitans</i> <i>Bufo americanus</i>	male male
8	<i>Rana clamitans</i> <i>Hyla versicolor</i>	2 1
9	<i>Bufo americanus</i>	1
10	<i>Rana sylvatica</i> <i>Pseudacris crucifer</i> <i>Bufo americanus</i>	1 1 1 male, 1 female
11	<i>Bufo americanus</i>	1 female, 1 male
12	<i>Bufo americanus</i>	female
13	<i>Rana clamitans</i> spotty. AM <i>Pseudacris crucifer</i>	female ? young male
14	<i>Pseudacris Crucifer</i> <i>Rana clamitans</i> <i>Rana pipiens</i>	2 2 young female

Figure 1 - Con't.

	<i>Rana sylvatica</i>	1
15	<i>Rana pipiens</i>	Male
	<i>Eurestoma bislineata</i>	1
	<i>Pseudacris crucifer</i>	1
	<i>Rana clamitans</i>	1
	<i>Rana sylvatica</i>	2 male
16	<i>Rana sylvatica</i>	2 male
17	<i>Pseudacris crucifer</i>	1
	<i>Rana sylvatica</i>	1 male
	<i>Rana pipiens</i>	female
18	<i>Hyla versicolor</i>	female
	<i>Pseudacris crucifer</i>	2 male
19	<i>Rana sylvatica</i>	1
	<i>Pseudacris crucifer</i>	2
20	<i>Rana clamitans</i>	male
	<i>Hyla versicolor</i>	1
	<i>Pseudacris crucifer</i>	4
	<i>Rana clamitans</i>	1
	<i>Rana sylvatica</i>	2
21	<i>Pseudacris crucifer</i>	1 male, 2 ?
22	<i>Bufo americanus</i>	female ?
23	<i>Rana sylvatica</i>	male, female
24	<i>Rana sylvatica</i>	2
	<i>Pseudacris crucifer</i>	male
25	<i>Rana sylvatica</i>	1 male, 1 female
26	<i>Pseudacris crucifer</i>	2 male
	<i>Rana sylvatica</i>	1 male
	<i>Bufo americanus</i>	1 male
	?	2 male
26.5	<i>Pseudacris crucifer</i>	male, 1 ?
	<i>Bufo americanus</i>	2 male
	<i>Rana sylvatica</i>	1 male
27	<i>Rana sylvatica</i>	?
28	<i>Bufo americanus</i>	1 male, 1 ?
29	<i>Rana sylvatica</i>	f
	<i>Pseudacris crucifer</i>	1
30	<i>Pseudacris crucifer</i>	1
31	<i>Rana palustris</i>	female
	<i>Pseudacris crucifer</i>	1

Figure 1 - Con't.

32	<i>Rana sylvatica</i>	1 male
	<i>Bufo americanus</i>	1
	<i>Pseudacris crucifer</i>	1
33	<i>Pseudacris crucifer</i>	1
34	<i>Bufo americanus</i>	female
	<i>Rana sylvatica</i>	1
	<i>Bufo americanus</i>	1
35	<i>Rana sylvatica</i>	1

Figure 1 - Con't.

APPENDIX A. Data from tour road transects, spring 2002.

Siena College
Saratoga Battlefield
Amphibian Tour Road Transects

Spring 2002

<u>Date</u>	Temperature <u>Wet/Dry</u>	<u>Weather</u>	<u>Wind</u>	Time <u>Begin</u>	Time <u>End</u>	<u>Arrow</u> <u>Number</u>
8-Apr	47/54	drizzle	1	8:00	11:29	
<u>Species</u>	<u>sex</u>	(location) Ft		<u>Direction of Movement</u>		
<i>Pseudacris crucifer</i>	m	between Barber wheatfield and beaver pond		west (left to right on road)		4.5
<u>Date</u>	Temperature <u>Wet/Dry</u>	<u>Weather</u>	<u>Wind</u>	Time <u>Begin</u>	Time <u>End</u>	<u>Arrow</u> <u>Number</u>
9-Apr	63/60	rain	1	8:20	11:45	
<u>Species</u>	<u>sex</u>	(location) Ft		<u>Direction of Movement</u>		
<i>Rana clamitans</i>	immature	Just inside gate		East		1
<i>Rana sylvatica</i>	1 Male, 1 female	Before Stop 1		East		2
<i>Bufo americanus</i>	1 Male	"		West		2
<i>Pseudacris crucifer</i>	3 Male	"		East		2
<i>Rana sylvatica</i>	3 Male, 2 Female	at stop 1		East		3
<i>Pseudacris crucifer</i>	2 Male, 2 Female	"		West		3
<i>Rana clamitans</i>	immature	"		?		3
<i>Bufo americanus</i>	Male	"		West		3
<i>Pseudacris crucifer</i>	many	Adjacent to Service Road		North and South		4
<i>Rana sylvatica</i>		"		North		4
<i>Rana clamitans</i>		"		South		4
<i>Bufo americanus</i>	female	Beaver pond		West		5
<i>Rana catesbeiana</i>		"		West		5
<i>Rana sylvatica</i>	2 ?	"		East and West		5
<i>Pseudacris crucifer</i>	several	"		East and West		5
<i>Rana clamitans</i>	2	Culvert in bottom of dip just before you go uphill to stop Sign toward stop 3		left and right noth west and south east		8
<i>Rana sylvatica</i>	t ?	Stop 3 circle		north west		10
<i>Pseudacris crucifer</i>	1 ?	"		north west		10
<i>Bufo americanus</i>	1male, 1female	"		south east		10
<i>Rana clamitans</i>	female ?	bottom of hill after stop 4		South West		13
spotty AM	young	1/2 way up hill after 4				
<i>Pseudacris Crucifer</i>	2	Larry's Pond		east		14
<i>Rana clamitans</i>	2 young	"		east		14
<i>Rana pipiens</i>	Male	murphy monument		west		15
78 mm SVL	gave release call	"				
<i>Eurestoma bislineata</i>		"				15
<i>eudacris crucifer</i>	1 ?	"		west		15
<i>Rana clamitans</i>	1 ?	"				15
<i>Rana sylvatica</i>	2 male	right after monument				15
<i>Rana sylvatica</i>	2 male	Barber wheatfield sign at		East		16

		stop 5		
<i>Pseudacris crucifer</i>	1	stop 5 seepage	West Toward seepage	17
<i>Rana sylvatica</i>	1 male		East away from seepage	17
<i>Rana sylvatica</i>	1	Service Rd pond	South towards pond	19
<i>Pseudacris crucifer</i>	2		North and South	19
<i>Pseudacris crucifer</i>	4	Field curve just past	East and West	20
<i>Rana clamitans</i>	1	service Rd		20
<i>Rana sylvatica</i>	2		1 south, 1 west	20
		~~DAM~~		
<i>Rana sylvatica</i>	1	top of big ? On Rd. to 8	south	?
<i>Rana sylvatica</i>	2	even with Jori's pond	South West	24
<i>Rana sylvatica</i>	1 male, 1 female	fern field	West	25
<i>Rana sylvatica</i>	1 male	Roadside ditch	West	26
<i>Bufo americanus</i>	1 male		East	26
?	2 male		East	26
<i>Pseudacris crucifer</i>	1 male		East	26
<i>Bufo americanus</i>	2 male	British woods	North away from woods	26.5
			toward fern field	
<i>Rana sylvatica</i>	1 male	service road to british field	heading toward road	26.5
<i>Bufo americanus</i>	1 male	Walking uphill toward stop 8	uphill	28
<i>Rana sylvatica</i>	1 male	top of hill before stop 9	west	32 31
		overlook		✓ 31
<i>Bufo americanus</i>	1 male	Stop ahead sign		?
<i>Rana sylvatica</i>	1 male, 1 female	?		

Date	Temperature	Weather	Wind	Time	Time	Arrow
14-Apr	Wet/Dry			Begin	End	Number
59/58	shower	2	9:30	11:30		
Species	sex	(location) Ft	Direction of Movement			
<i>Pseudacris crucifer</i>	m	Just after stop 1	East			3
<i>Hyla versicolor</i>	?	Just before stop sign after 2	North			8
<i>Bufo americanus</i>	?	stop 3 at top of circle	North			9
<i>Rana pipiens</i>	F	middle ravine stretch	West			14
<i>Rana sylvatica</i>	?	middle ravine stretch	West			14
<i>Rana pipiens</i>	F	Stop 5 seepage	North			17
<i>Pseudacris crucifer</i>	m	just after stop 5 seepage	East			18
<i>Pseudacris crucifer</i>	m	just after stop 5 seepage	East			18
<i>Hyla versicolor</i>	?	Just past service rd at curve	South			20
		in rd at field				
<i>Pseudacris crucifer</i>	m	before stop 6	South			21
<i>Pseudacris crucifer</i>	?	before stop 6	South			21
<i>Pseudacris crucifer</i>	?	before stop 6	East			21
<i>Rana sylvatica</i>	m	Just before stop 8 area	East			23
<i>Rana sylvatica</i>	f	Just before stop 8 area	West			23
<i>Pseudacris crucifer</i>	m	just before johns pond	West			24
<i>Pseudacris crucifer</i>	m	stop 8 roadside	West			26
<i>Pseudacris crucifer</i>	m	stop 8 woods	West			26.5
<i>Pseudacris crucifer</i>	?	stop 8 woods	East			26.5
<i>Rana sylvatica</i>	?	Stop 8 parking area	West			27
<i>Bufo americanus</i>	?	Just going down hill after	East			28
		parking area				

Pond: Stop 8 John's pond

Date	Temperature		Weather	9PL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar	52/44		Partly Cloudy		1.5			3					
2-Apr	40/41		Cloudy	73	1	9:42		1					
8-Apr	47/54		Cloudy	76	3	9:52		1					
9-Apr	60/63		Drizzle	64	1	10:09		2					
10-Apr	41/47		Clear		0	9:40		3					
16-Apr	67/78		Clear	73	1							1	
23-Apr	40/46		Partly Cloudy		1								
24-Apr	43/51				0	9:28							
23-May	57/69		Partly Cloudy		1		1				1		

Pond: Stop 8 Fern Field

Date	Temperature		Weather	9PL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar	52/44		Partly Cloudy		1.5			3					
2-Apr	40/41		Cloudy	<60	1	9:47		2					
8-Apr	47/54		Cloudy	67	3	9:52		3					
9-Apr	60/63		Drizzle	69	1	9:47		2					
10-Apr	41/47		Clear		0	9:55		3					
16-Apr	67/78		Clear		1							1	3
23-Apr	40/46		Partly Cloudy		1								
24-Apr	43/51			<60	0	9:23		2					
23-May	57/69		Partly Cloudy	<60	1		3					3	2

Pond: Stop 8 Roadside

Date	Temperature		Weather	9PL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar	52/44		Partly Cloudy		1.5		3						
2-Apr	40/41		Cloudy	<60	1	9:55		2					
8-Apr	47/54		Cloudy	70	3	10:00		3					
9-Apr	60/63		Drizzle	>80	1	9:41		3					

Date	Time	Temp	Wind	Clouds	Humidity	Pressure	Notes
10-Apr	41/47			Clear	0	10:00	3
16-Apr	57/73			Clear	1		3
23-Apr	40/45			Partly Cloudy	1		
24-Apr	43/51				0		
23-May	57/69			Partly Cloudy	1		

Pond: Stop 8 woods

Date	Temperature		Weather	9PL	Wind	Time	Species <i>Pseudorasbora</i> <i>crucifer</i>
	Wet/Dry						
30-Mar	52/44		Partly Cloudy		1.6		3
2-Apr	40/41		Cloudy		1		
3-Apr	47/54		Cloudy	<60	3	10:05	1
9-Apr	60/63		Drizzle		1		
10-Apr	41/47		Clear		0	10:10	1
16-Apr	57/78		Clear	<50	1		
23-Apr	40/46		Partly Cloudy		1		
24-Apr	43/51				0	9:35	1
23-May	57/69		Partly Cloudy		1		2

Pond: Stop 8 Field North

Date	Temperature		Weather	9PL	Wind	Time	Species
	Wet/Dry						<i>Pseudacris crucifer</i>
30-Mar	52/44		Partly Cloudy		1.5		3
2-Apr	40/41		Cloudy	71	1		3
8-Apr	47/54		Cloudy	73	3	10:15	3
9-Apr	60/63		Drizzle		1		
10-Apr	41/47		Clear		0	10:36	3
16-Apr	67/78		Clear		1		3
23-Apr	40/46		Partly Cloudy		1		
24-Apr	43/51				0		
23-May	57/59		Partly Cloudy	<50	1		1

Pond: Stop 8 Field South

Date	Temperature Wet/Dry	Weather	3PL	Wind	Time	Species <i>Pseudacris crucifer</i>
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Date	Temperature		Weather	SPL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar													
2-Apr	40/41		Cloudy	<80	1		3						
3-Apr	47/54		Cloudy	<80	3	11:00	2						
8-Apr	60/63		Drizzle		1								
10-Apr	41/47		Clear		0								
16-Apr	67/78		Clear		1								
23-Apr	40/46		Partly Cloudy		1								
24-Apr	43/51				0								
23-May	57/69		Partly Cloudy		1								

Pond: Vly

Date	Temperature		Weather	SPL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar													
2-Apr	40/41		Cloudy		1								
8-Apr	47/54		Cloudy	<80	3	11:04	3						
9-Apr	60/63		Drizzle		1								
10-Apr	41/47		Clear		0								
16-Apr	67/78		Clear	<80	1		3						
23-Apr	40/46		Partly Cloudy		1								
24-Apr	43/51				0								
23-May	57/69		Partly Cloudy		1								

Pond: Burdyl

Date	Temperature		Weather	SPL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar													
2-Apr	40/41		Cloudy		1								
8-Apr	47/54		Cloudy	66	3	11:14	3						
8-Apr	60/63		Drizzle		1								
10-Apr	41/47		Clear		0								
16-Apr	67/78		Clear	61	1		2						
23-Apr	40/46		Partly Cloudy		1								
24-Apr	43/51				0								
23-May	57/69		Partly Cloudy		1								

Pond: 4B (Woolbright's Pond)

Date	Temperature		Weather	SPL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar	52/44		Partly Cloudy		1.5		3						
2-Apr	40/41		Cloudy		1		3	1					
16-Apr	67/78		Clear	<60	1		3						2

Pond: 4C (Sean's Pond)

Date	Temperature		Weather	SPL	Wind	Time	Species						
	Wet/Dry						<i>Pseudacris crucifer</i>	<i>Rana sylvatica</i>	<i>Rana pipiens</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Hyla versicolor</i>	<i>Bufo americanus</i>
30-Mar	52/44		Partly Cloudy		1.5		1	1					
2-Apr	40/41		Cloudy		1		1						
16-Apr	67/76		Clear	61	1		3						1

* = This was stop 4 from last year. Also found around this area was a new set of 2 series of small pools off the left of the road just past stop 4 and just before middle ravine. This pond was labeled as 4B (Woolbright's pond), and 4C (Sean's Pond). These dried out early on in the season.

30-Mar was a combination of data collected by Dr. Woolbright and Sean Mahar at different times.