

**Amphibian Monitoring in the Lye Brook Wilderness Region of the Green Mountain National Forest
April - October 1999**

James S. Andrews and Kristianne G. Tolgyesi
Biology Department
Middlebury College, Middlebury, Vermont 05753

Background

An inventory of amphibians in the Lye Brook Region of the Green Mountain National Forest in Bennington County was begun in 1993 and completed in 1995. Monitoring of selected amphibian species began in 1994. The goals of the monitoring are to (1) establish a baseline data set of abundance indices for the amphibian species caught in the fences, (2) monitor year-to-year changes in their abundance indices, (3) compare population changes between this site and other monitoring locations in the Green Mountains, (4) look for correlations between amphibian populations and other data gathered at this site, (5) monitor changes in the number or type of obvious external deformities, (6) gather inventory data for the Vermont Herp Atlas, and (7) gather basic natural history information on the species present. Five species of salamander (Eastern newt, Northern two-lined salamander, Redback salamander, Spotted salamander, Spring salamander) and five species of frog (American toad, Green frog, Pickerel frog, Spring peeper, Wood frog) are monitored using drift-fences, egg-mass counts, and stream surveys. Six years of monitoring data have been gathered using egg-mass counts and stream surveys. Any trends suggested at this point will need to be confirmed as the number of years spent monitoring increases. For details on methods and locations see the 1995 VForEM annual report.

Stream surveys and egg-mass counts

The stream survey site resumed its decline in pH showing an all-time low of 3.4 (Table 1). The stream was also the warmest (by 5.4 degrees Celsius) and shallowest (by 1 cm) that it has ever been. The numbers of Spring and Two-lined salamanders were down slightly from last year.

Although the egg-mass count numbers vary greatly from year to year, Wood frog egg-masses have been more abundant than those of Spotted salamanders since 1997 (Table 2). The egg-mass sites seem to have resumed their downward pH trend with all three sites having a lower pH than in 1998, and two sites having all-time lows (6.7 at the site near Benson Pond, 4.1 at North Alder Dam, and 4.9 at the pond near drift-fence #2). Low pH has been shown to limit the survivorship of Spotted salamander embryos. Since the number of egg-masses is dependent on the number of breeding adult females, and because adults can live over 20 years, it could take quite a few years to see a decline in the number of egg-masses produced. However, the effect we could see immediately would be a decline in the number of metamorphs. It is therefore important that we watch the number of Spotted salamander young of the year at the fences. Generally, although the number of young of the year is down from last year, there is no downward trend yet visible at either the upper or lower fences. This year the pond near drift-fence #2 had the highest count ever of Spotted salamander egg-masses, and the second highest of Wood frog egg-masses. Wood frog egg-masses at North Alder Dam were the second highest ever. Areas near Benson Pond showed the highest numbers ever of both Spotted salamander and Wood frog egg-masses. However, results from the area near Benson Pond are not very reliable because the area surveyed each year has changed due to flooding of

the site.

In addition to graphing the upper and lower fences separately, a weighted average of all three fences was calculated for each species and graphed (Figures 11-15). Because for each species the upper two fences were already averaged into one number (total caught per trapping), and it was necessary to count all fences evenly, this number had to be multiplied by 2 (because there were 2 fences). This number (total caught per trapping at fence #1 and #2 times 2) was then added to the total caught per trapping at the lower fence. This number was then divided by 3 to come up with the weighted average caught per trapping at all fences.

Of the seven species that we catch in high enough numbers to reliably monitor, it appears that two are showing an upward trend (Spotted salamander and Green frog, Figures 11 and 13). Two (Eastern newt and American toad) are showing a downward trend (Figures 13 and 14), and three (Redback salamander, Wood frog, and Spring peeper) are not currently showing a trend in any direction (Figures 11 and 15). Eastern newts are currently showing the strongest trend (declining), followed by American toads (declining).

Abnormalities

In 1999, two abnormalities were observed in the 805 individuals caught (counting all nights) at the Lye Brook drift-fences. One Spotted salamander out of a total of 233 had a curved spine, and one Wood frog out of a total of 145 had partial paralysis in its rear legs. Both of these abnormalities occurred in adults. The incidence of abnormalities at this site remains quite low (<0.25%). Similar to last year's data, we caught very few young of the year at the lower fence (8% of the total catch), which would be expected to reduce the number of abnormalities seen. It should be noted that the low number of young of the year is more worrisome than abnormalities, and needs to be watched closely.

Summary

In 1999, a number of the trends that we hinted at in 1998 continued. First, the decline in pH at the stream survey and egg-mass count sites is important to watch, as it could affect the number of surviving young of the year. There appears to be a decline in young of the year at the lower fence, which is a more serious concern than abnormalities (which have remained quite low). The decline in Eastern newts at both the upper and lower fences has continued this year, and is something we need to pay close attention to. Finally, the decline in American toads at the upper fences is continuing, although it appears to be a local phenomenon.

Acknowledgments

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Table 1. Results of three 50-meter stream-transects in Branch Pond Brook in the Lye Brook Wilderness Region from 1994-1999. Only adult *Gyrinophilus porphyriticus* (Spring salamander) and *Eurycea bislineata* (Two-lined salamander) are included in the table.

Year	Spring salamander	Two-lined salamander	pH ¹	Water temp. in C ¹	Max. water depth ² in cm
1994					
(7/18/94)	10	11	4.9 (N = 3)	17.4 (N = 1)	20
1995					
(7/24/95)	6	1	4.4 (N = 5)	17.4 (N = 3)	26
1996					
(8/6/96)	3	0	4.0 (N = 3)	16.1 (N = 3)	21
1997					
(7/11/97)	7	3	3.8 (N = 2)	15.6 (N = 3)	27

Table 2. Maximum counts of egg masses from monitoring locations in the Lye Brook Wilderness region from 1994 through 1998. At the site near Benson Pond the entire pond is surveyed. At North Alder Dam a four-meter strip around all of the pond except the swampy north end is surveyed. At the Pond Near Drift-fence #2, a four-meter strip around the entire pond is surveyed.

Site	Spotted salamander	Wood frog	Mean pH ²
Near Benson Pond			
1994 count dates: 4/26, 5/10, 5/25	10	67 ¹	7.3 (N = 1)
1995 count dates: 4/24 ² , 5/12	3	19	6.8 (N = 1)
1996 count dates: 4/24, 4/27, 5/7, 5/8, 5/15	73	2	6.9 (N = 3)
1997 count dates ³ : 4/27, 5/5, 5/12	16	97	6.1 (N = 3)
1998 count dates ^{5,6} : 4/21, 4/28, 5/5	33	96	7.5 (N = 1)
1999 count dates: 4/12, 4/19, 4/27	85	129	6.7 (N = 3)
North Alder Dam			
1994 count dates: 5/11, 5/25, 6/8	97	225	5.0 (N = 2)

Species Name	# Per Trapping ¹					% of Total Catch				
	95	96	97	98	99	95	96	97	98	99

Table 4. Monitoring results from the upper two drift-fences in the Lye Brook Wilderness Region during 1999. Traps were opened whenever conditions were appropriate for amphibian movement from April through October.1 The three most successful trappings (2 in April and Oct.) per month (+/- 7 days) are included. Data from 16 out of 29 trap-efforts are used. Data used are from April 23

Table 5. Monitoring results from the lower drift-fence in the Lye Brook Wilderness Region during 1999. Traps were opened whenever conditions were appropriate for amphibian movement from April through October.1 The three most successful trappings (two in

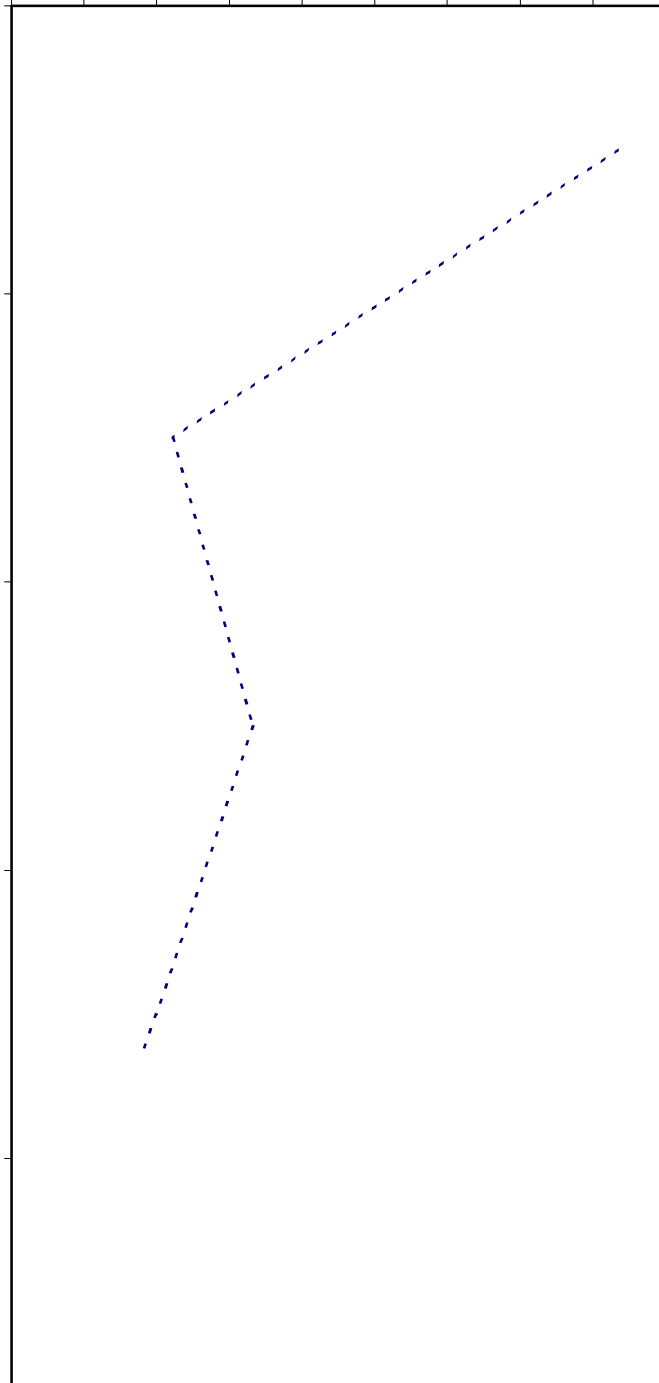
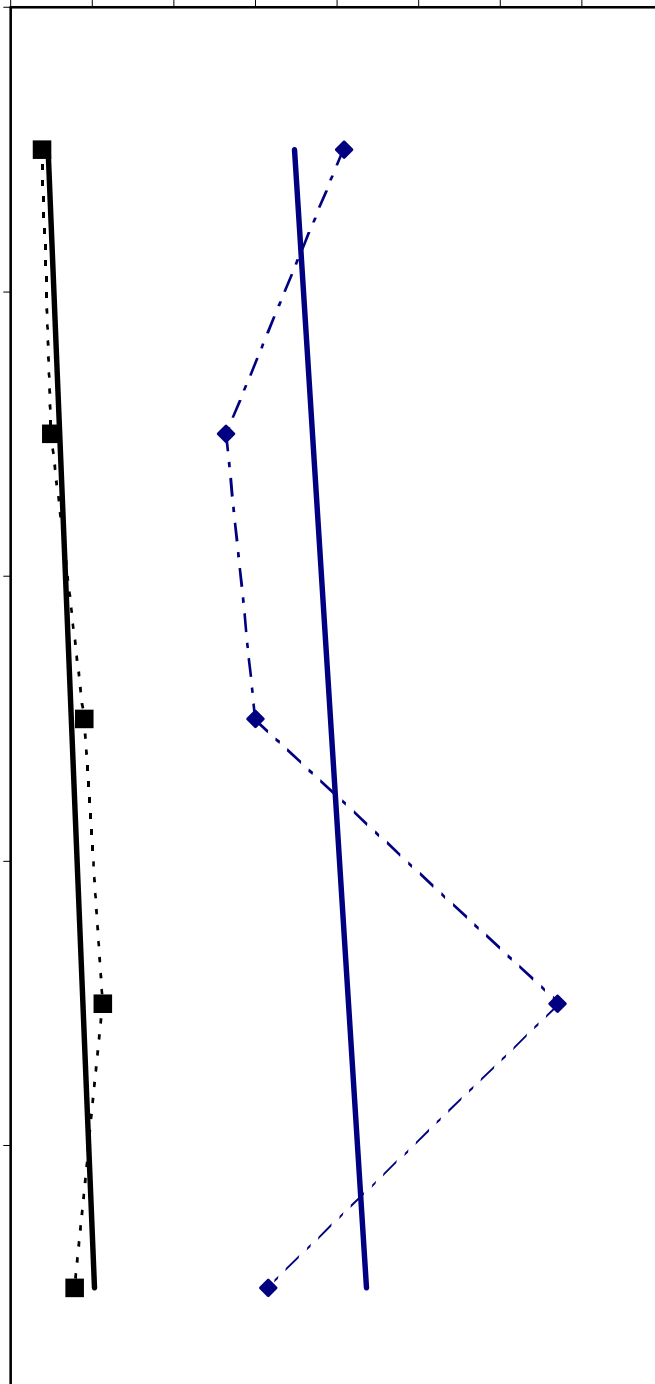
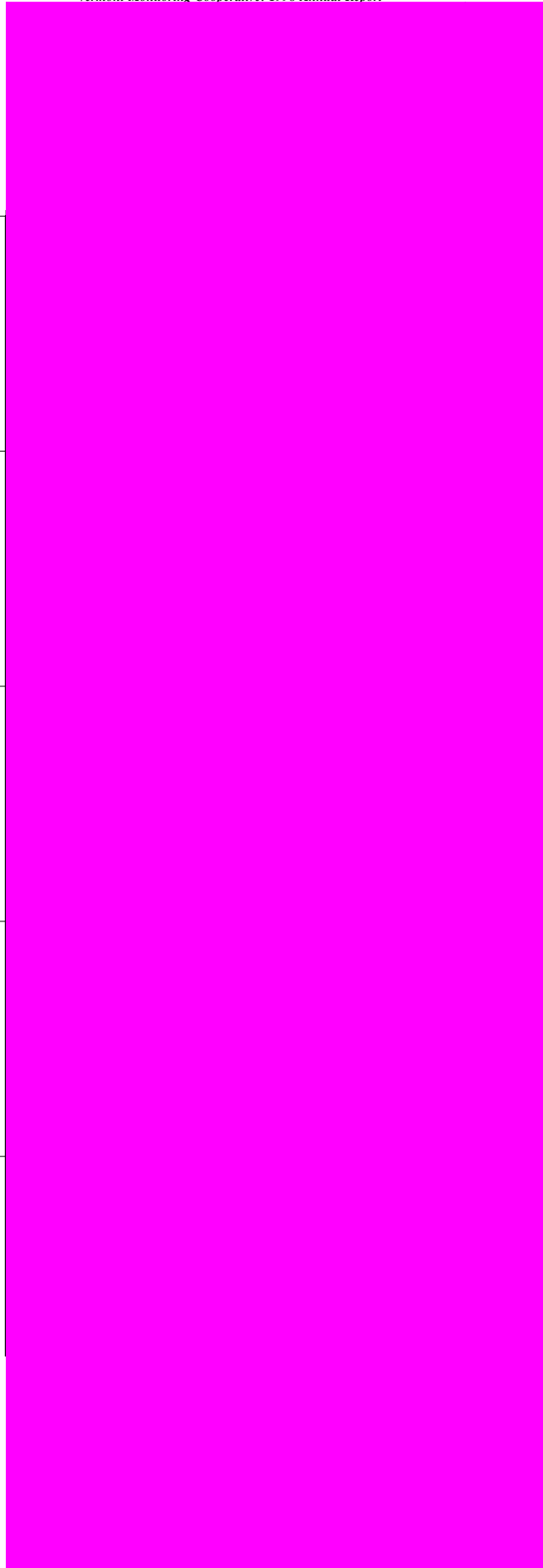


Figure 4. Wood Frog (*Rana sylvatica*) and Spring Peeper (*Pseudacris crucifera*) 9.5(a)-21.51





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