

**Amphibian Monitoring in the Lye Brook Wilderness Region of the Green Mountain National Forest
April - October 1997**

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Update

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. Four 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 previous VForEM and VMC annual reports.

Stream surveys

The stream surveys continue to show decreasing pH, however, numbers of Spring and Two-lined salamanders were up slightly from last year. The egg-mass counts show no clear trends in populations of Wood frogs or Spotted salamanders but the pH of their breeding ponds appears to be declining.

Upper drift-fences

Three years of monitoring data have been gathered at the upper drift-fences. Indices for each species continue to show considerable annual variability but the relative abundances of each species are still maintained. Eastern newt continues to be the most frequently caught salamander, followed in order both years by Spotted salamander, Redback salamander and Northern two-lined salamander. The big surprise this year is the very unexpected occurrence of a single member of the Blue-spotted salamander group at the southernmost of the upper drift-fences. This species had not been located during surveys of this or any other mid- to high-elevation Green Mountain site. I would have predicted that it did not occur above 1200 ft. or outside of the major valleys and surrounding low-elevation hills. Since no historic data are available from the Green Mountains, it is not known whether this species was once more plentiful here than it is now or if it has existed in very low numbers for some time. In Vermont it is listed as an S3 species. Some large populations have been located in the Lake Champlain Valley. The term Blue-spotted salamander group is used since this species frequently contains genetic material from the closely related Jefferson salamander. The large size and broad head of the individual caught suggest that it is a hybrid. Wood frogs continue to be the most frequently caught frog, followed in the same order as the previous two years by Green frog, American toad, and Spring peeper.

Lower drift-fence

At the lower drift-fence Eastern newt numbers more than doubled while Redback numbers were cut to less than half of last years catch. This reverses their relative abundance at this fence from last year with eastern newt now being the most frequently caught salamander species. This may be the result of the many new beaver ponds in the area. Spring peepers were the most frequently caught frog compared to fourth in relative abundance last year. Five times as many were caught this year than last.

Malformities and deformities

One of the 51 American toads caught was missing its left year leg and one of the 47 Redback salamanders caught was missing its right hind foot. These may have been either developmental (malformities) or traumatic (deformities) in origin. No other malformities were seen out of a total of 837 (counting all nights) amphibians caught. Signs of fresh trauma were seen, usually with the probable traumatizer (shrews) still in the bucket. Most of these amphibians were dead (14), but a few survived with injuries (3). As reported in the 1995 report, newts in ponds near the upper fences have shown signs of disease.

Tables

This year's drift-fence, egg-mass count, and stream survey results are shown in Tables 1-5.

Acknowledgments

Funding for this monitoring was provided through a cost-share agreement with the Green Mountain National Forest. Colleen Jones and Maureen Rice were the local field technicians.

Table 1. Monitoring results from the upper two drift-fences in the Lye Brook Wilderness Region during 1997. The three most successful trappings per month are included (15 out of 22 trappings). Data used are from May 10,20,31; June 13,18,19; July 4,9,16; Sept. 3,12,14,29; and Oct. 15,16.

Species name	# of all ages	# of young of the year ¹	% young of the year	date of first meta-morph ²	largest adult (total length in mm)	# per trapping ³	% of group	% of total catch
Salamanders								
Eastern newt	291	179 ⁴	62%	Sept. 3	86	19.4	72%	49%
Spotted salamander	86	17	20%	Sept. 3	206	5.7	21%	14%
Redback salamander	23	1	4%	Oct. 15	93	1.5	6%	4%
Northern two-lined	<u>5</u>	<u>1</u>	20%	Sept. 29	86	<u>0.3</u>	<u>1%</u>	<u>1%</u>
Blue-spotted group	<u>1</u>	<u>0</u>	0%	N/A	147	<u>0.1</u>	<u><1%</u>	<u><1%</u>
Group totals	406	198	49%	---	---	27.1	100%	68%
Frogs and Toads								
Wood frog	90	33	37%	May 20	60	6.0	47%	15%
Green frog	46	40	87%	July 16	81	3.1	24%	8%
American toad	30	5	17%	June 13	72	2.0	16%	5%
Spring peeper	<u>27</u>	<u>4</u>	15%	Sept. 3	35	<u>1.8</u>	<u>14%</u>	<u>5%</u>
Group totals	<u>193</u>	<u>82</u>	42%	---	---	<u>12.8</u>	100%	<u>32%</u>
Amphibian totals	599	280	47%	---	---	39.9	---	100%

¹For each species, individuals under a given total length were considered potential young of the year. The chosen length was based on the timing of their appearance, gaps in their size continuum, and records in the literature. The cutoff sizes used were *A. maculatum* (70 mm), *E. bislineata* (60 mm), *N. viridescens* (45 mm), *P. cinereus* (32 mm), *B. americanus* (32 mm), *P. crucifer* (20 mm), *R. clamitans* (44 mm), *R. palustris* (34 mm), and *R. sylvatica* (33 mm). In addition, it was necessary to examine the minimum possible development time for each species. Individuals shorter than the cutoff lengths clearly overwinter (possibly as larvae for *N. viridescens* and *A. maculatum*) and show up in very early spring. These are not counted as young of the year.

²No trapping took place in August.

³Number per trapping are rounded to the nearest 0.1. All other figures are rounded to the nearest whole number.

⁴*N. viridescens* metamorphs below the 45 mm cut-off length were caught as early as May. This suggests that they either overwintered at a very small size or overwintered as larvae and metamorphosed in the spring. Three were caught in May, one in June, and one in July. On September 3, 19 metamorphs were caught and on Sept. 12, 133 metamorphs were caught. I suspect that Sept. 3 is actually the first trapping of metamorphs developed from eggs laid in 1997.

Table 2. Monitoring results from the lower drift-fence in the Lye Brook Wilderness Region during 1997. The three most successful trappings per month are included (18 out of 28 trappings). Data used were from April 13,18,29, May 2,14,31; June 13,18,25, July 4,10,16, Sept. 3,12,14; and Oct. 4,15,16.

Species name	# of all ages	# of young of the year ¹	% young of the year	date of first meta-morph ²	largest adult (total length in mm)	# per trapping ³	% of group	% of total catch
Salamanders								
Eastern newt	84	28	33%	Sept. 3	92	4.7	78%	51%
Redback salamander	19	0	0%	N/A	91	1.1	18%	11%
Spotted salamander	<u>5</u>	<u>1</u>	<u>20%</u>	Sept. 12	212	<u>0.3</u>	<u>5%</u>	<u>3%</u>
Group totals	108	29	27%	---	---	6.0	100%	65%
Frogs and Toads								
Spring peeper	20	3	15%	May 14	35	1.1	34%	12%
Wood frog	13	4	31%	June 13	65	0.7	22%	8%
American toad	12	5	42%	June 25	94	0.7	21%	7%
Pickereel frog	12	2	17%	May 31	52	0.7	21%	7%
Green frog	<u>1</u>	<u>0</u>	<u>0%</u>	N/A	---	<u>0.1</u>	<u>2%</u>	<u>1%</u>
Group totals	<u>58</u>	<u>14</u>	24%	---	---	<u>3.2</u>	100%	35%
Amphibian totals	166	43	26%	---	---	9.2	---	100%

¹No trapping took place in August.

³Number per trapping are rounded to the nearest 0. All other figures are rounded to the nearest whole number.

⁴*N. viridescens* metamorphs below the 45 mm cut-off length were caught as early as June. This suggests that they either overwintered at a very small size or overwintered as larvae and metamorphosed in the spring. One was caught in June, and one in July. In September, 13 metamorphs were caught. I suspect that Sept. 3 is actually the first trapping of metamorphs developed from eggs laid in 1997.

Table 3. A comparison of data from the upper two drift-fences in Lye Brook Wilderness, Sunderland, Bennington County, Vermont. Data are taken from the 1995, 1996, and 1997 field seasons. Fences were opened at least three times per month.

Species name	Common name	# per trapping ¹			% of total		
		95	96	97	95	96	97
Caudates (Salamanders)							
<i>Ambystoma laterale</i> group	Blue-spotted salamander group	0.0	0.0	0.1	0%	0%	<1%
<i>Ambystoma maculatum</i>	Spotted salamander	8.7	4.7	5.7			
<i>Eurycea bislineata</i>	Northern two-lined salamander	0.8	0.3	0.3			
<i>Notophthalmus viridescens</i>	Eastern newt	12.7	29.5	19.4			
<i>Plethodon cinereus</i>	Redback salamander	2.0	3.3	1.5	5%	7%	4%
Group totals		24.2	37.1	27.1	56%	74%	68%
Anurans (Frogs and Toads)							
<i>Bufo americanus</i>	American toad	4.3	2.7	2.0	10%	5%	5%
<i>Pseudacris crucifer</i>	Spring peeper	0.8	1.2	1.8	2%	2%	5%
<i>Rana clamitans</i>	Green frog	6.8	2.9	3.1	15%	6%	8%
<i>Rana sylvatica</i>	Wood frog	8.2	6.3	6.0	18%	13%	15%
Group totals		20.0	13.1	12.8	45%	26%	32%
Totals		44.2	50.2	39.9	100%	100%	100%

¹Number per trapping are rounded to the nearest 0.1. All other figures are rounded to the nearest whole number. There were a total of 18 trappings counted in 1995, 15 in 1996, and 15 in 1997. Fence-nights counted are those nights where the upper traps were opened under appropriate weather conditions for amphibian movement.

Table 4. Maximum counts of egg masses from monitoring locations in the Lye Brook Wilderness region from 1994 through 1997. 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 ± 0.4 SD (N = 3)
1997 count dates ³ : 4/27, 5/5, 5/12	16	97	6.1 ± 0.1 SD (N = 3)
North Alder Dam			
1994 count dates: 5/11, 5/25, 6/8	97	225	5.0 ± 0.3 SD (N = 2)
1995 count dates: 4/24 ² , 5/12, 6/9	292	3	5.1 ± 0.4 SD (N = 2)
1996 count dates: 5/8, 5/15, 5/25	176	3	5.0 ± 0.4 SD (N = 3)
1997 count dates ⁴ : 5/20, 5/27, 6/3	0	44	4.2 ± 0.2 SD (N = 3)
Pond Near Drift-fence #2			
1994 count dates: 5/11, 5/25, 6/9	6	3	5.7 ± 0.3 SD (N = 2)
1995 count dates: 4/24 ² , 5/12, 6/9	70	152	5.6 ± 0.4 SD (N = 2)
1996 count dates: 5/8, 5/15, 5/25	78	62	5.2 ± 0.6 SD (N = 3)
1997 count dates: 5/20, 5/27, 6/3	55	77	5.0 ± 0.8SD (N = 3)

¹Hatched by May 10

²All readings taken on April 24, 1995 were believed to be erroneous and are not included in the mean. All pH measurements taken during 1996 at the site near Benson Pond were taken in May. Each reading used in the average is itself composed of three measurements taken from different areas of the ponds. All pH means have been rounded to the nearest 0.1.

³Site has been flooded over. Three newly created adjacent puddles were included in the count along with the original site.

⁴Water level much higher due to new beaver activity. Visibility poor.

Table 5. Results of three 50-meter stream-transects in Branch Pond Brook in the Lye Brook Wilderness Region from 1994-1997. 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 ± 0.2 (N = 3)	17.4	20
1995					
(7/24/95)	6	1	4.4 ± 0.5 (N = 5)	17.4	26
1996					
(8/6/96)	3	0	4.0 ± 0.2 (N = 3)	16.1 ± 0.2 (N = 3)	21
1997					
(7/11/97)	7	3	3.8 ± 0.1 (N = 2)	15.6 ± 0.6 (N = 3)	27

¹Temperature and pH were taken two meters downstream from the downstream end of the first transect.

²Reference point is the deepest point between the two large rocks which constrict the channel approximately two meters downstream from the beginning of the first transect.