

**Amphibian Monitoring on Mt. Mansfield, Vermont
1993-1997**

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Update

Populations of amphibian species are monitored annually on Mount Mansfield using drift-fences. 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) monitor changes in the number or type of obvious external deformities, (4) gather inventory data for the Vermont Herp Atlas, and (5) gather basic natural history information on the species present. Amphibians are targeted for this kind of study because their multiple habitat usage and permeable skin make them especially sensitive to changes in environmental conditions. Five years of data have now been gathered at this site. This is the longest running set of amphibian monitoring data in the state. Three fences are opened and checked up to four times per month during rain events throughout the field season (April through October excluding August). The population indices are generated using the three most successful trap-nights per month.

An analysis of the data gathered to date suggest that seven of the eight species abundant enough to monitor have increased over the five years: American toad, Green frog, Pickerel frog, Wood frog, Eastern newt, Redback salamander, and Spotted salamander. Spring peeper is the only species whose numbers have dropped over the five-year period. However, because of the amount of annual variation in amphibian populations, eight to ten years of data will more reliably show long-term population trends. Last year (1996) I reported that among the species monitored were two groups whose populations oscillated synchronously. Eastern newt, Spring peeper, Green frog, and Pickerel frog populations all increased or decreased in the same years. Populations of Spotted salamanders and Wood frogs (both early spring breeders) were also synchronized with each other. Redback salamanders, I reported, varied in direct opposition to the Eastern newt group. None of these apparent groupings held for the fifth year of monitoring. Spring peepers continued to decline while all the others in its group increased. Spotted salamander started to decline while Wood frog continued to increase in number. No young of the year Spotted salamanders were caught, suggesting poor breeding success this year for this species. Unlike the previous four years, both Redback salamanders and Eastern newts increased in number during the same year.

As was reported last year, the malformity rate at this site is very low. None of the 217 amphibians caught during 1997 at these three fences showed any obvious external malformities. Baseline malformity rates at relatively pristine sites such as this one are tremendously important for purposes of comparison with less pristine locations.

Two tables follow. Table 1 gives the specifics of this year's trapping effort. Table 2 shows the population indices generated for all eleven amphibian species trapped over the past five years.

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Table 1. Monitoring results from the two drift-fences at 1,200 ft. and one at 2,200 ft. on Mt. Mansfield, Underhill, Vermont during 1997. Traps were opened whenever conditions were appropriate for amphibian movement. Three trappings per month in April, May, June, July, September, and October are the goal. Appropriate conditions did not occur until May. Data used are from May 12,13,31; June 13,19; July 3,5,8; September 18; and October 15, November 2, and 3. Data from 12 of 17 trap-efforts are used. Trapping in early May (through May 13) was possible at the lower two drift-fences only.

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								
Redback salamander	40	2	5%	Nov. 3	102	3.3	49%	18%
Eastern newt	22	1	5%	Sept. 18	80	1.8	27%	10%
Spotted salamander	17	0	0%	N/A	203	1.4	21%	8%
Northern two-lined	<u>2</u>	<u>0</u>	0%	N/A	73	<u>0.2</u>	2%	<u>1%</u>
Group totals	81	3	4%	---	---	6.8	100%	37%
Frogs and Toads								
Wood frog	84	34	40%	May 31	63	7.0	62%	39%
American toad	30	6	20%	Sept. 18	82	2.5	22%	14%
Green frog	15	10	67%	July 5	N/A	1.3	11%	7%
Spring peeper	4	2	50%	June 13	33	0.3	3%	2%
Pickerel frog	<u>3</u>	<u>0</u>	0%	N/A	63	<u>0.3</u>	2%	<u>1%</u>
Group totals	<u>136</u>	<u>52</u>	<u>38%</u>	---	---	<u>11.3</u>	100%	<u>63%</u>
Amphibian totals	217	55	25%	---	---	18.1	---	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.

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

Table 2. A comparison of drift-fence data from the 1993 through 1997 field seasons at Mt. Mansfield, Underhill, Vermont. Data used are from two fences at 1,200 ft. and one fence at 2,200 ft. elevation.

Species name	# per trapping ¹									
	93	94	95	96	97	93	94	95	96	97
Caudates (Salamanders)										
<i>Ambystoma maculatum</i>	1.7	1.0	1.4	2.0	1.4	12%	10%	9%	12%	8%
<i>Desmognathus fuscus</i>	0.3	0.3	0.3	0.0	0.0	2%	3%	2%	0%	0%
<i>Eurycea bislineata</i>	0.5	0.1	0.2	0.1	0.2	4%	1%	1%	1%	1%
<i>Gyrinophilus porphyriticus</i>	< 0.1	0.0	0.0	0.1	0.0	< 1%	0%	0%	< 1%	0%
<i>Notophthalmus viridescens</i>	1.3	1.2	1.7	1.4	1.8	10%	12%	11%	8%	10%
<i>Plethodon cinereus</i>	<u>1.2</u>	<u>4.2</u>	<u>1.3</u>	<u>2.5</u>	<u>3.3</u>	<u>9%</u>	<u>40%</u>	<u>9%</u>	<u>14%</u>	<u>18%</u>
Group totals	5.1	6.8	4.9	6.1	6.8	38%	66%	32%	36%	37%
Anurans (Frogs and Toads)										
<i>Bufo americanus</i>	0.7	0.6	1.5	2.2	2.5	5%	5%	10%	13%	14%
<i>Pseudacris crucifer</i>	1.7	1.1	2.2	0.9	0.3	13%	10%	14%	5%	2%
<i>Rana clamitans</i>	< 0.1	0.2	0.9	0.6	1.3	< 1%	2%	6%	3%	7%
<i>Rana palustris</i>	0.1	0.0	1.1	0.3	0.3	1%	0%	7%	2%	1%
<i>Rana sylvatica</i>	<u>5.6</u>	<u>1.7</u>	<u>4.4</u>	<u>6.8</u>	<u>7.0</u>	<u>42%</u>	<u>16%</u>	<u>29%</u>	<u>40%</u>	<u>39%</u>
Group totals	<u>8.2</u>	<u>3.6</u>	<u>10.1</u>	<u>10.8</u>	<u>11.3</u>	<u>62%</u>	<u>33%</u>	<u>66%</u>	<u>64%</u>	<u>63%</u>
Amphibian totals	13.4	10.4	15.0	16.8	18.1	100%	100%	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 15 trappings counted in 1993, 14 in 1994, 18 in 1995, 17 in 1996, and 12 in 1997. Trappings counted were on those nights when at least two of the three traps were opened under appropriate weather conditions for amphibian movement.