

Amphibian Monitoring on Mt. Mansfield, Vermont 1993-2000

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Update

Background

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 and type of obvious external abnormalities, (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. Eight 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 five times per month during rain events throughout the field season (April through October excluding August). The abundance indices are generated using the three most successful trap-nights per month. For more detailed information on methods, locations of fences, and survey results, see the 1995 VForEM annual report.

Changes in species composition

Overall, a lower percentage of anurans (frogs and toads) was caught at the fences this year than last year. Anurans continue to dominate at the fences, but only by a slim margin (57%, Table 1), as opposed to last year where they constituted 76% of the total catch. Green Frogs continue to show an increase in number caught per trapping and in percentage of the anuran population. This was the first year that Green Frogs (34% of the frog population) surpassed Wood Frogs (32%). The lower overall percentage of Wood Frogs (from 53% of anurans to 32%) is due both to the increase in the number of Green Frogs caught, and a decrease in the number of Wood Frogs caught per trapping. American Toads held relatively steady at 18% of the frog population, despite a decrease in number caught per trapping. Spring Peepers made up 14% of the anuran catch, up from last year's 4%, but still down from their high of 30% of the frog population in 1994. Pickerel Frogs, which made up 4% of the anuran catch last year, only made up 1% this year (1 individual).

As a whole, the composition of salamander species at the fences has not changed much from last year. The percentage of Eastern Red-backed Salamanders showed a slight increase from 41% to 48% of the salamander population, reversing its dramatic drop of last year. This increase drove the decline of percentages of Spotted Salamanders (22%) and Eastern Newts (18%), both of which showed an increase in numbers caught per trapping. Dusky Salamanders showed a slight increase in percentage of the salamander population from 3% to 6%, while Northern Two-lined Salamanders decreased very slightly from 6% to 5%. The fences are not in appropriate habitat to accurately monitor the populations of these latter two species, so it is probable that these slight changes do not reflect changes in the population size.

Young of the year and abnormalities

This year at the fences, five of the seven amphibian species that can be reliably monitored had a better year than last year (excluding American Toad and Wood Frog), and three of the seven appear to be increasing in population over the long term. The Green Frog population has continued its dramatic growth, while the increase of the American Toad's population is apparently at an end after two successive years of declining numbers. The downward trend for Spring Peepers is continuing, despite this year's increase in number caught per trapping. The number of abnormalities continues to decrease from its high in 1998. It will be interesting to see if the number of American Toads continues to decline next year, if the Green Frog population continues its dramatic increase, if Spring Peepers continue their slight downward trend, and if any of these phenomena are widespread enough to include other monitoring areas such as the Lye Brook Wilderness.

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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 2000. Traps were opened whenever conditions were appropriate for amphibian movement from April through October excluding August. Three successful trappings per month (± 10 days) were the goal. If there were not three successful trappings per month, two trappings per month were used. Data from 16 of 23 trap-efforts were used: April 5, May 2 and 6; May 10 and 23; June 9 and 22; July 10, 17, and 27; September 12, 13, and 24; and October 6, 19, and November 10. Trapping on April 5 and May 2 was possible at the lower two drift-fences only.

Common name	Scientific name	# of all ages	# of young of the year ¹	% of young of the year	date of first metamorph ^{h 2}	largest adult (total length in mm)	# per trapping ³	% of group	% of total catch	# abnormal/total ⁴
Salamanders										
E. Red-backed Salamander	<i>Plethodon cinereus</i>	56	2	4%	Oct. 19	94	3.5	48%	21%	0 / 58
Spotted Salamander	<i>Ambystoma maculatum</i>	26	12	46%	Sept. 13	177	1.6	22%	10%	0 / 30
Eastern Newt	<i>Notophthalmus viridescens</i>	21	5	24%	Sept. 12	83	1.3	18%	8%	0 / 22
Dusky Salamander	<i>Desmognathus fuscus</i>	7	0	0%	NA	89	0.4	6%	3%	1 / 8
N. Two-lined Salamander	<i>Eurycea bislineata</i>	6	0	0%	NA	90	0.4	5%	2%	0 / 6
Spring Salamander ⁵	<i>Gyrinophilus porphyriticus</i>	NA	NA	NA	NA	115	NA	NA	NA	0 / 1
Group totals		116	19	16%	NA	NA	7.3	100%	43%	1 / 125
Frogs and Toads										
Green Frog	<i>Rana clamitans</i>	53	42	79%	July 10	84	3.3	34%	19%	0 / 54
Wood Frog	<i>Rana sylvatica</i>									

Table 2. A comparison of drift-fence data from the 1993 through 2000 field seasons at Mt. Mansfield, Underhill, Vermont. Data used are from two fences at 1,200 ft. and one fence at 2,200 ft. in elevation.

Species name	# per trapping ¹								% of total catch							
	93	94	95	96	97	98	99	00	93	94	95	96	97	98	99	00
Caudates (Salamanders)																
Spotted Salamander	1.7	1.0	1.4	2.0	1.4	1.2	1.2	1.6	12%	10%	9%	12%	8%	6%	7%	10%
Dusky Salamander	0.3	0.3	0.3	0.0	0.0	0.6	0.1	0.4	2%	3%	2%	0%	0%	3%	1%	3%
N. Two-lined Salamander	0.5	0.1	0.2	0.1	0.2	0.2	0.2	0.4	4%	1%	1%	1%	1%	1%	1%	2%
Spring Salamander	< 0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	< 1%	0%	0%	< 1%	0%	0%	0%	0%
Eastern Newt	1.3	1.2	1.7	1.4	1.8	1.3	0.8	1.3	10%	12%	11%	8%	10%	7%	5%	8%
E. Red-backed Salamander	1.2	4.2	1.3	2.5	3.3	5.4	1.6	3.5	9%	40%	9%	14%	18%	29%	10%	21%
Group totals	5.1	6.8	4.9	6.1	6.8	8.6	3.9	7.3	38%	66%	32%	36%	37%	46%	24%	43%
Anurans (Frogs and Toads)																
American Toad	0.7	0.6	1.5	2.2	2.5	3.6	2.1	1.8	5%	5%	10%	13%	14%	19%	13%	10%
Gray Treefrog	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0%	0%	0%	0%	0%	< 1%	0	1%
Spring Peeper	1.7	1.1	2.2	0.9	0.3	1.1	0.5	1.4	13%	10%	14%	5%	2%	6%	3%	8%
Green Frog	< 0.1	0.2	0.9	0.6	1.3	0.8	2.6	3.3	< 1%	2%	6%	3%	7%	4%	16%	19%
Pickerel Frog	0.1	0.0	1.1	0.3	0.3	0.0	0.5	0.1	1%	0%	7%	2%	1%	0%	30%	<1%
Wood Frog	5.6	1.7	4.4	6.8	7.0	4.7	6.5	3.1	42%	16%	29%	40%	39%	25%	41%	18%
Group totals	8.2	3.6	10.1	10.8	11.3	10.1	12.2	9.8	62%	33%	66%	64%	63%	54%	76%	57%
Amphibian totals	13.4	10.4	15.0	16.8	18.1	18.7	16.1	17.0	100%	100%	100%	100%	100%	100%	100%	100%

Numbers 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 in 1993, 14 in 1994, 18 in 1995, 17 in 1996, 12 in 1997, 18 in 1998, 17 in 1999, and 16 in 2000. Trappings counted were on those nights when at least 2 of the three traps were opened under appropriate weather conditions for amphibian movement.



