

**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.

### Upper drift-fences

Five years of monitoring data have been gathered at the upper drift-fences (Table 3 and 4). For the first time the relative abundances of salamanders has changed. Spotted salamanders were the most abundant in 1999, due in part to increased numbers (an all-time high of 10.5 per trapping), but also due to a decline in the number of Eastern newts (4.6 per trapping down from 10.5 in 1998). Newts have continued their decline at the upper fences this year (Figure 1). Spotted salamanders have been increasing since 1996, and have continued that trend this year (Figure 2). Redback salamanders and Northern two-lined salamanders both showed a decline in numbers, but maintained their relative abundances. The fences are not set in appropriate habitat to accurately monitor Northern two-lined salamander populations, so although there appears to be a downward trend in this species (Figure 3), it is possible that the decline is not reflective of population trends. Redback salamanders, despite their decreased numbers from last year, do not show much of a trend at the upper fences (Figure 2).

Green frogs surpassed Wood frogs for the first time due to both increased numbers of Green frogs (an all-time high of 8.2 per trapping) as well as a decline in Wood frog numbers (6.3 per trapping down from 13.4 in 1998). Despite these changes in species composition, neither of these species shows a trend over the long term (Figures 1 and 4). Spring peepers and American toads maintained their relative abundances but suffered a decline in numbers (Figures 4 and 5). Toads have continued their decline at the upper fences, showing the lowest numbers yet in 1999. This is still a local trend, however, as Toads at the lower fence are actually increasing.

### Lower drift-fence

Very few young of the year were caught at the lower drift-fence in 1999 (Table 5). The overall percentage caught (8%) was the same as last year's, but has been on the decline since 1996 (36% in 1996, 26% in 1997). This trend (declining numbers of young of the year at the lower fence) needs to be watched carefully. The Eastern newt was the most abundant salamander primarily due to a decline in Redback numbers (1.1 per trapping down from 4.9 in 1998)(Table 6). This was the lowest showing for Redbacks yet, continuing a slight decline in this species (Figure 6). Spotted salamanders and Northern two-lined salamanders maintained both their relative abundances and numbers, neither showing an appreciable trend (Figure 7).

The relative abundances of anurans was the same in 1999 as it was in 1998 with American toads being the most abundant followed in order by Wood frogs, Spring peepers, and Pickerel frogs. Green frogs were absent from the fence in 1999, but are caught in such little quantity (Figure 8) that this is no surprise. This year American toads have remained the most abundant mainly due to an increase in their numbers (1.2 per trapping up from 0.7 in 1998), rather than to a decline in other populations. They are showing a slight upward trend (Figure 9). Pickerel Frogs appear to be declining at the lower fence, but are caught in so few numbers (3 individuals this year) that this may not reflect a population trend (Figure 9). Wood frogs increased to their greatest number ever (0.8 per trapping), and Peepers have not changed much from last year. Neither of these species shows any long-term trend in population index (Figure 10).

### Combined drift-fences

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

Funding for this monitoring was provided through a cost-share agreement between the Green Mountain National Forest and Middlebury College. Colleen Jones and Maureen Rice were the local field technicians. Graphs accompanying the report were prepared by Katherine Wright.

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 <sup>1</sup>	Water temp. in C <sup>1</sup>	Max. water depth <sup>2</sup> in cm
<b>1994</b>					
(7/18/94)	10	11	4.9 (N = 3)	17.4 (N = 1)	20
<b>1995</b>					
(7/24/95)	6	1	4.4 (N = 5)	17.4 (N = 3)	26
<b>1996</b>					
(8/6/96)	3	0	4.0 (N = 3)	16.1 (N = 3)	21
<b>1997</b>					
(7/11/97)	7	3	3.8 (N = 2)	15.6 (N = 3)	27
<b>1998</b>					
(7/14/98) <sup>3</sup>	11	3	5.0 (N = 1)	16.3 (N = 3)	26
<b>1999</b>					
(7/19/99)	8	1	3.4 (N = 3)	22.8 (N = 3)	19

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

<sup>2</sup>Reference 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.

<sup>3</sup>pH measurements were taken on August 5, 1998.

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 <sup>2</sup>
<b>Near Benson Pond</b>			
1994 count dates: 4/26, 5/10, 5/25	10	67 <sup>1</sup>	7.3 (N = 1)
1995 count dates: 4/24 <sup>2</sup> , 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 <sup>3</sup> : 4/27, 5/5, 5/12	16	97	6.1 (N = 3)
1998 count dates <sup>5,6</sup> : 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)
<b>North Alder Dam</b>			
1994 count dates: 5/11, 5/25, 6/8	97	225	5.0 (N = 2)
1995 count dates: 4/24 <sup>2</sup> , 5/12, 6/9	292	3	5.1 (N = 2)
1996 count dates: 5/8, 5/15, 5/25	176	3	5.0 (N = 3)
1997 count dates <sup>4</sup> : 5/20, 5/27, 6/3	0	44	4.2 (N = 3)
1998 count dates <sup>6</sup> : 5/4, 5/12, 5/19	9	256	4.8 (N = 1)
1999 count dates: 5/11, 5/17, 5/29	120	252	4.1 (N = 3)
<b>Pond Near Drift-fence #2</b>			
1994 count dates: 5/11, 5/25, 6/9	6	3	5.7 (N = 2)
1995 count dates: 4/24 <sup>2</sup> , 5/12, 6/9	70	152	5.6 (N = 2)
1996 count dates: 5/8, 5/15, 5/25	78	62	5.2 (N = 3)
1997 count dates: 5/20, 5/27, 6/3	55	77	5.0 (N = 3)
1998 count dates <sup>6</sup> : 5/4, 5/12, 5/19	13	30	5.5 (N = 1)
1999 count dates: 5/11, 5/17, 5/29	90	119	4.9 (N = 3)

<sup>1</sup>Hatched by May 10

<sup>2</sup>All 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.

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

<sup>4</sup>Water level much higher due to new beaver activity. Visibility poor.

<sup>5</sup>Two flooded stream areas were included in the count along with the original site and the 3 puddles included last year.

<sup>6</sup>pH readings were taken on August 5, 1998.

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, 1997, 1998 and 1999.

Species Name	# Per Trapping <sup>1</sup>					% of Total Catch				
	95	96	97	98	99	95	96	97	98	99
<b>Caudates (Salamanders)</b>										
Blue-spotted Salamander Group	0.0	0.0	0.1	0.0	0.0	0%	0%	<1%	0%	0%
Spotted Salamander	8.7	4.7	5.7	7.9	10.5	20%	9%	14%	17%	32%
Northern Two-lined Salamander	0.8	0.3	0.3	0.2	0.1	2%	6%	1%	0%	<1%
Eastern Newt	12.7	29.5	19.4	10.5	4.6	29%	57%	49%	23%	14%
Redback Salamander	2.0	3.3	1.5	3.3	0.8	5%	7%	4%	7%	2%
Group Totals	24.2	37.1	27.1	21.9	15.9	56%	74%	68%	48%	49%
<b>Anurans (Frogs and Toads)</b>										
American Toad	4.3	2.7	2.0	1.1	0.6	10%	5%	5%	2%	2%
Spring Peeper	0.8	1.2	1.8	2.3	1.6	2%	2%	5%	5%	5%
Green Frog	6.8	2.9	3.1	7.3	8.2	15%	6%	8%	16%	25%
Pickerel Frog	0.0	0.0	0.0	0.1	0.0	0%	0%	0%	<1%	0%
Wood Frog	8.2	6.3	6.0	13.4	6.3	18%	13%	15%	29%	19%
Group Totals	20.0	13.1	12.8	24.1	16.6	45%	26%	32%	52%	51%
Amphibian Totals	44.2	50.2	39.9	46.1	32.6	100%	100%	100%	100%	100%

<sup>1</sup>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 18 trappings counted in 1995, 15 in 1996, 15 in 1997, 15 in 1998, and 16 in 1999.

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.<sup>1</sup> 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 and May 5; May 8, 20, and 24; June 15, July 2 and 5; July 19, 26, and 30; Sept. 7, 8, and 11; Oct. 11 and Nov. 3. Abnormality, maximum size, and first metamorph data are taken from all 29 trappings.

Common name	Scientific name	# of all ages	# of young of the year <sup>2</sup>	% young of the year	date of first metamorph <sup>3</sup>	largest adult (total length in mm)	# per trapping <sup>4</sup>	% of group	% of total catch	# abnormal/total <sup>5</sup>
<b>Salamanders</b>										
Spotted salamander	<i>Ambystoma maculatum</i>	168	47	28%	Jul-26	203	10.5	66%	32%	1/227
Eastern newt	<i>Notophthalmus viridescens</i>	74	24	32%	Aug-15	89	4.6	29%	14%	0/106
Redback salamander	<i>Plethodon cinereus</i>	12	0	0%	NA	88	0.8	5%	2%	0/14
Northern two-lined	<i>Eurycea bislineata</i>	1	0	0%	NA	95	0.1	<1%	<1%	0/2
Group totals		255	71	28%	NA	NA	15.9	100%	49%	1/349
<b>Frogs and Toads</b>										
Green frog	<i>Rana clamitans</i>	131	118	90%	Jul-2	52	8.2	49%	25%	0/149
Wood frog	<i>Rana sylvatica</i>	101	15	15%	Jun-3	64	6.3	38%	19%	1/131
Spring peeper	<i>Pseudacris crucifer</i>	25	2	8%	Jul-30	31	1.6	9%	5%	0/26
American toad	<i>Bufo americanus</i>	9	0	0%	NA	77	0.6	3%	2%	0/12
Group totals		266	135	51%	NA	NA	16.6	100%	51%	1/318
Amphibian totals		521	206	40%	NA	NA	32.6	NA	100%	2/667

<sup>1</sup>This year, fences were opened regularly in August in order to gather additional data on abnormalities and metamorphs. Data sets between August 8 and 24 are not used for calculating the index in order to maintain consistency with previous years.

<sup>2</sup>For 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), *D. fuscus* (30 mm), *E. bislineata* (60 mm), *N. viridescens* (45 mm), *P. cinereus* (32 mm), *B. americanus* (23 mm), *H. versicolor* (26 mm), *P. crucifer* (20 mm), *R. clamitans* (44 mm), *R. palustris* (34 mm), and *R. sylvatica* (27 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.

<sup>3</sup>Data from trapping that took place between August 8 and 24 were used for date of first metamorph, maximum size, and abnormality results only.

<sup>4</sup>Numbers per trapping are rounded to the nearest 0.1. All other figures are rounded to the nearest whole number.

<sup>5</sup>These may contain old deformities (traumatic) as well as malformities (developmental). Salamanders missing all or portions of their tails are not included. The total number checked may contain specimens that were caught more than once.

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.<sup>1</sup> The three most successful trappings (two in October) per month (+/- 7 days) are included. Data from 17 out of 32 trap-efforts are used. Data used are from April 4, 23, and May 5; May 8, 20, and 24; May 27, June 10 and 26; July 2, 19, and 30; Sept. 7, 8, and 11; Oct. 11 and Nov. 3. Abnormality, maximum size, and first metamorph data are taken from all 32 trappings.

Common name	Scientific name	# of all ages	# of young of the year <sup>2</sup>	% young of the year	date of first metamorph <sup>3</sup>	largest adult (total length in mm)	# per trapping <sup>4</sup>	% of group	% of total catch	# abnormal/total <sup>5</sup>
<b>Salamanders</b>										
Eastern newt	<i>Notophthalmus viridescens</i>	47	3	6%	Sep-7	88	2.8	66%	41%	0/61
Redback salamander	<i>Plethodon cinereus</i>	18	0	0%	NA	98	1.1	25%	16%	0/21
Spotted salamander	<i>Ambystoma maculatum</i>	5	2	40%	Sep-17	194	0.3	7%	4%	0/6
Northern two-lined	<i>Eurycea bislineata</i>	1	0	0%	NA	102	0.1	1%	1%	0/1
Group totals		71	5	7%	NA	NA	4.2	100%	62%	0/89
<b>Frogs and Toads</b>										
American toad	<i>Bufo americanus</i>	20	0	0%	NA	91	1.2	47%	18%	0/24
Wood frog	<i>Rana sylvatica</i>	14	2	14%	Sep-7	66	0.8	33%	12%	0/14
Spring peeper	<i>Pseudacris crucifer</i>	6	0	0%	NA	32	0.4	14%	5%	0/6
Pickerel frog	<i>Rana palustris</i>	3	2	67%	Aug-22	36	0.2	7%	3%	0/4
Green frog	<i>Rana clamitans</i>	0	0	0%	NA	69	0.0	0%	0%	0/1
Group totals		43	4	9%	NA	NA	2.5	100%	38%	0/49
Amphibian totals		114	9	8%	NA	NA	6.7	NA	100%	0/138

<sup>1</sup>This year, fences were opened regularly in August in order to gather additional data on abnormalities and metamorphs. Data sets between August 8 and 24 are not used for calculating the index in order to maintain consistency with previous years.

<sup>2</sup>For 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), *D. fuscus* (30 mm), *E. bislineata* (60 mm), *N. viridescens* (45 mm), *P. cinereus* (32 mm), *B. americanus* (23 mm), *H. versicolor* (26 mm), *P. crucifer* (20 mm), *R. clamitans* (44 mm), *R. palustris* (34 mm), and *R. sylvatica* (27 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.

<sup>3</sup>Data from trapping that took place between August 8 and 24 were used for date of first metamorph, maximum size, and abnormality results only.

<sup>4</sup>Numbers per trapping are rounded to the nearest 0.1. All other figures are rounded to the nearest whole number.



Table 6. A comparison of data from the lower drift-fence in Lye Brook Wilderness, Manchester, Bennington County, Vermont. Data are taken from the 1995, 1996, 1997, 1998, and 1999 field seasons. Fences were opened at least three times per month.

Species Name	# Per Trapping <sup>2</sup>					% of Total Catch				
	95 <sup>1</sup>	96	97	98	99	95	96	97	98	99
<b>Caudates (Salamanders)</b>										
Spotted Salamander	0.4	0.2	0.3	0.3	0.3	3%	2%	3%	4%	4%
Northern Two-lined Salamander	0.0	0.0	0.0	0.1	0.1	0%	0%	0%	1%	1%
Eastern Newt	8.3	1.9	4.7	2.1	2.8	56%	28%	51%	23%	41%
Redback Salamander	4.1	2.2	1.1	4.9	1.1	28%	32%	11%	54%	16%
Group Totals	12.8	4.3	6.1	7.4	4.3	87%	62%	65%	82%	62%
<b>Anurans (Frogs and Toads)</b>										
American Toad	0.4	0.7	0.7	0.7	1.2	3%	10%	7%	7%	18%
Spring Peeper	0.1	0.2	1.1	0.3	0.4	<1%	3%	12%	3%	5%
Green Frog	0.1	0.1	0.1	0.2	0.0	<1%	2%	1%	2%	0%
Pickerel Frog	1.1	0.8	0.7	0.2	0.2	7%	12%	7%	2%	3%
Wood Frog	0.4	0.8	0.7	0.3	0.8	3%	11%	8%	3%	12%
Group Totals	2.1	2.6	3.3	1.7	2.6	13%	38%	35%	18%	38%
Amphibian Totals	14.9	6.9	9.4	9.1	6.9	100%	100%	100%	100%	100%

<sup>1</sup>In 1995, there were only 10 successful trappings. Dates used were April 20; June 16; July 1 and 18; September 10, 14, and 15; and October 6, 15, and 28.

<sup>2</sup>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 10 trappings counted in 1995, 18 in 1996, 18 in 1997, 18 in 1998, and 17 in 1999.

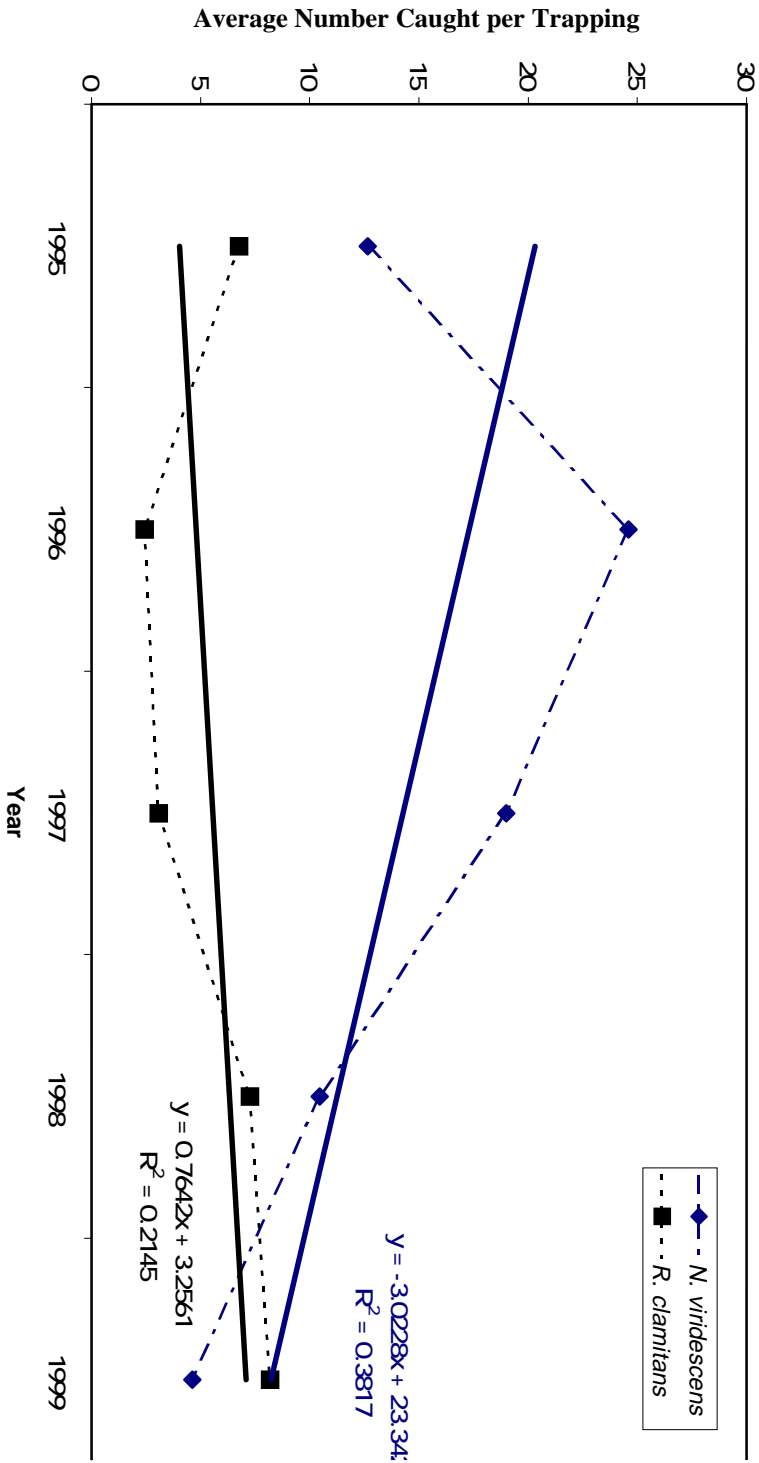


Figure 1. Eastern Newt (*Notophthalmus viridescens*) and Green Frog (*Rana clamitans*) population indices from the upper 1 fences in the Lye Brook Wilderness, Sunderland, Vermont, 1995-1999.

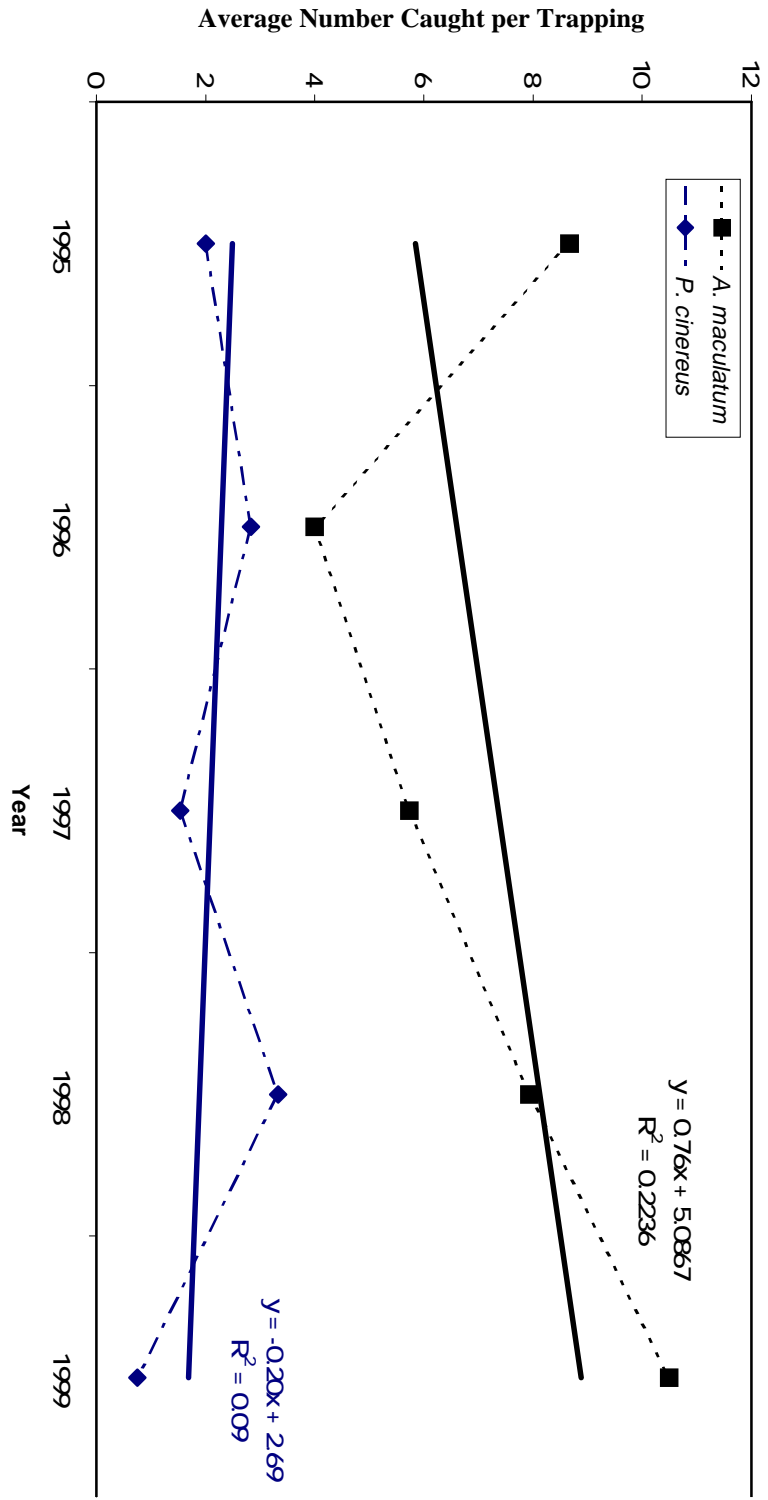


Figure 2. Spotted (*Ambystoma maculatum*) and Redback Salamander (*Plethodon cinereus*) population indices from the up] drift-fences in the Lye Brook Wilderness, Sunderland, Vermont, 1995-1999.

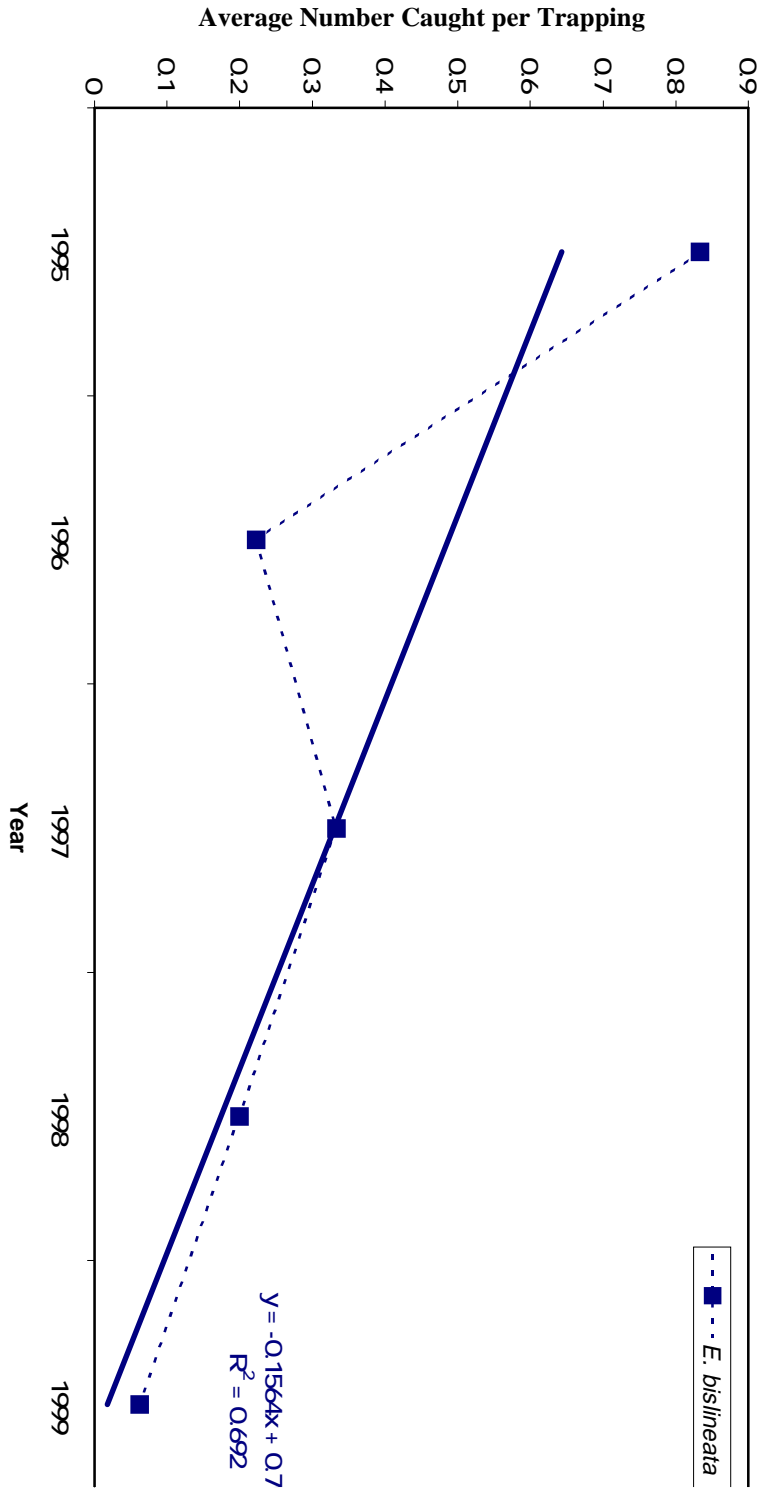


Figure 3. Northern Two-lined Salamander (*Eurycea bislineata*) population indices from the upper two drift-fences in the Lye B Wilderness, Sunderland, Vermont, 1995-1999.

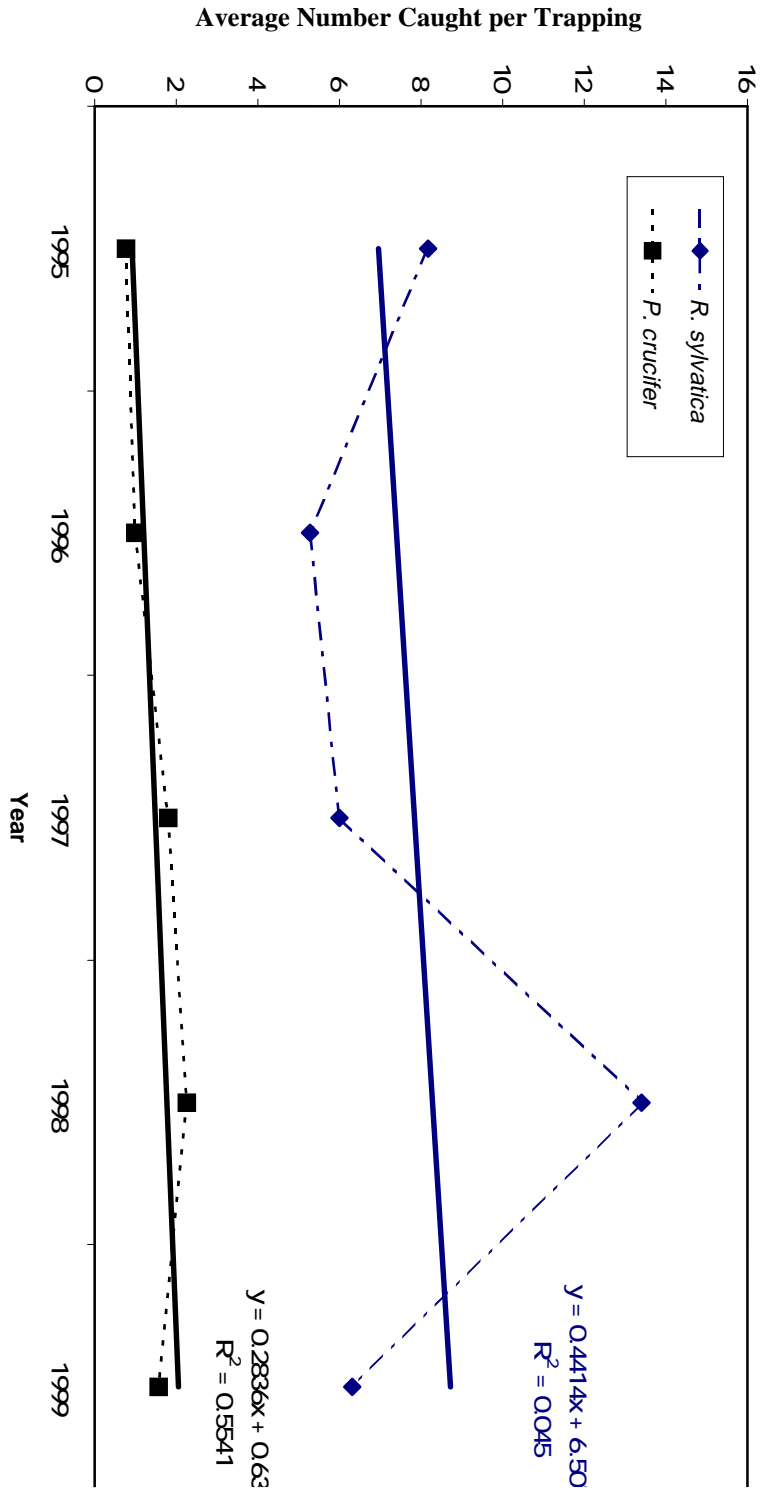


Figure 4. Wood Frog (*Rana sylvatica*) and Spring Peeper (*Pseudacris crucifer*) population indices from the upper two drift-fences Lye Brook Wilderness, Sunderland, Vermont, 1995-1999.

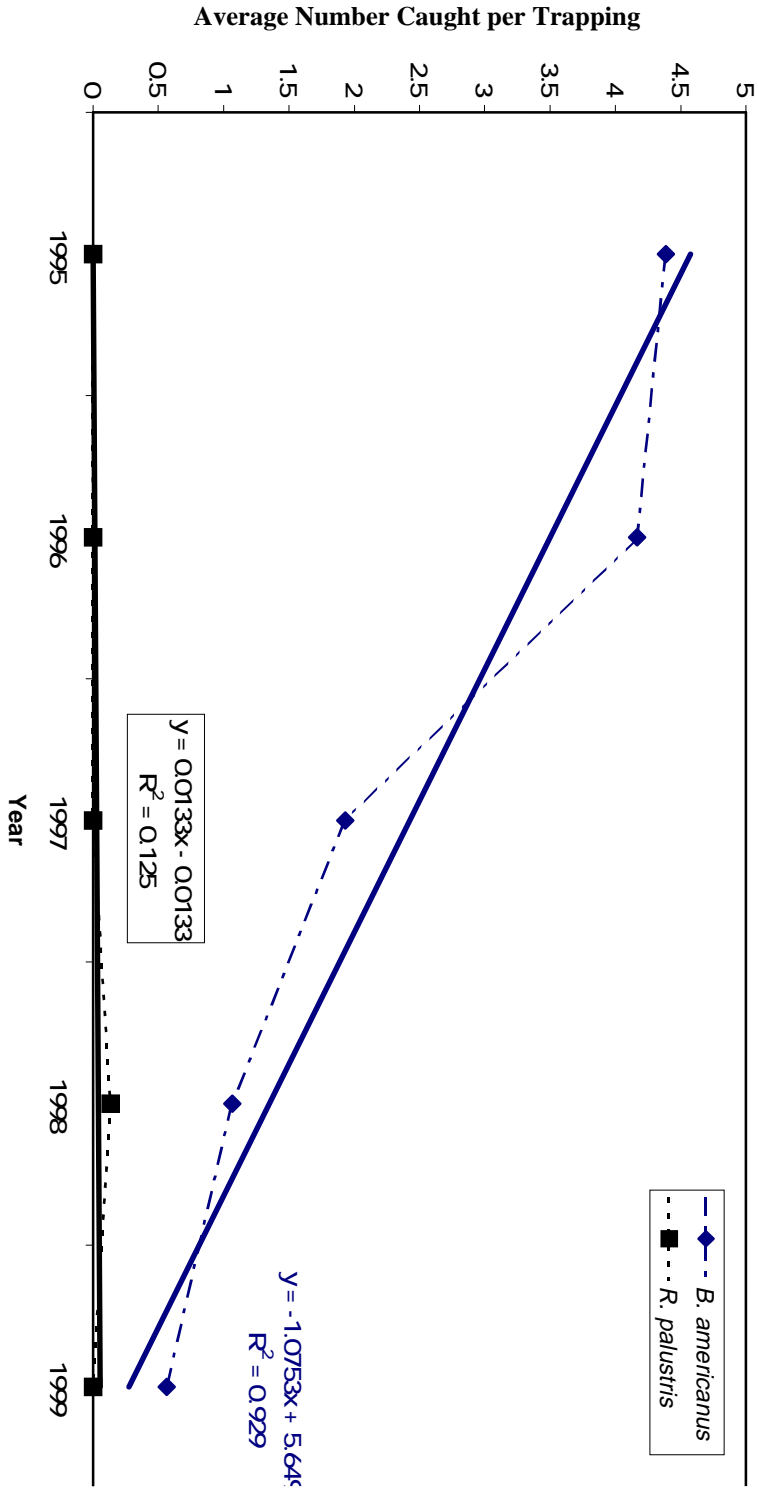


Figure 5. American Toad (*Bufo americanus*) and Pickerel Frog (*Rana palustris*) population indices from the upper two drift-fences Lye Brook Wilderness, Sunderland, Vermont, 1995-1999.

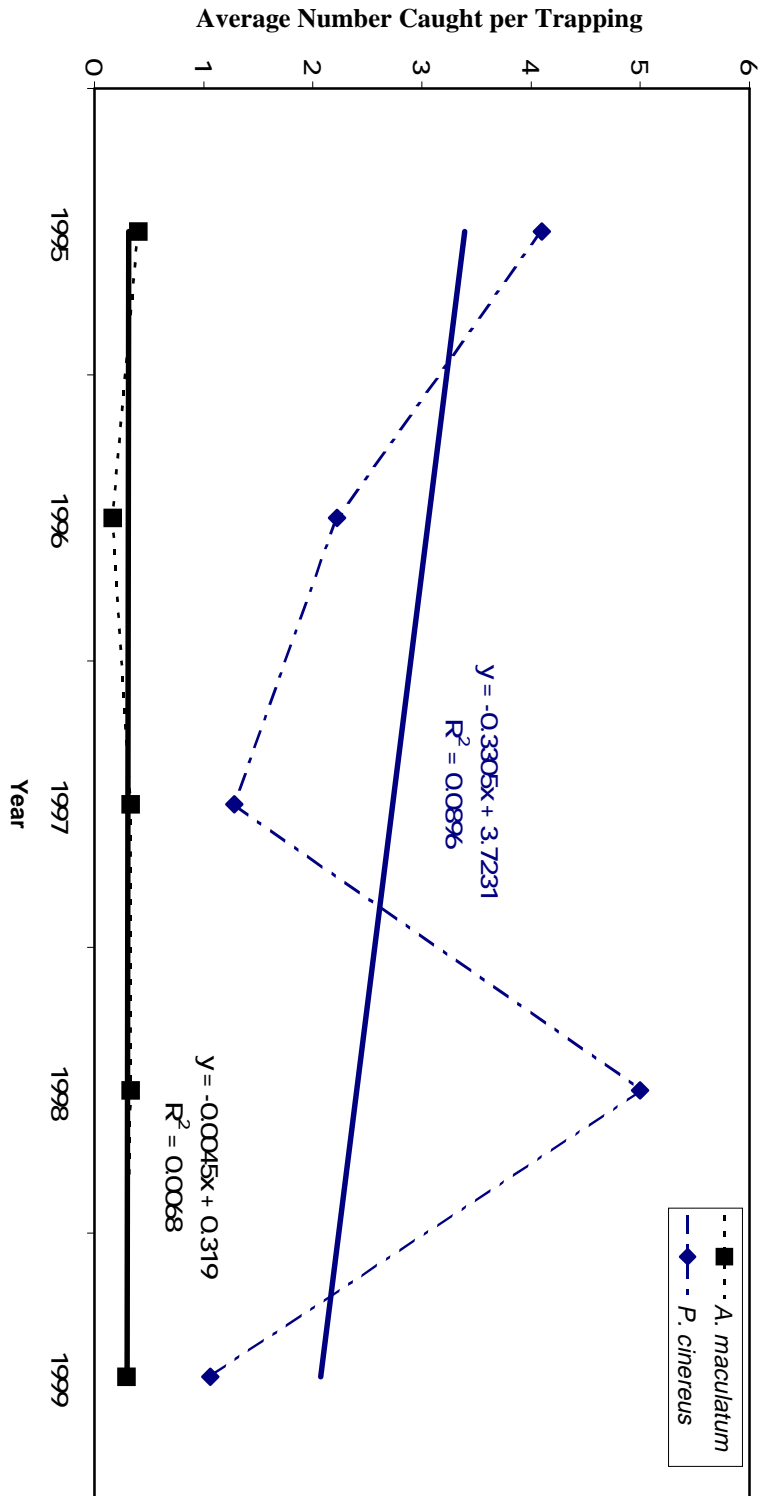


Figure 6. Spotted (*Ambystoma maculatum*) and Redback Salamander (*Plethodon cinereus*) population indices from the lower drift- the Lye Brook Wilderness, Manchester, Vermont, 1995-1999.

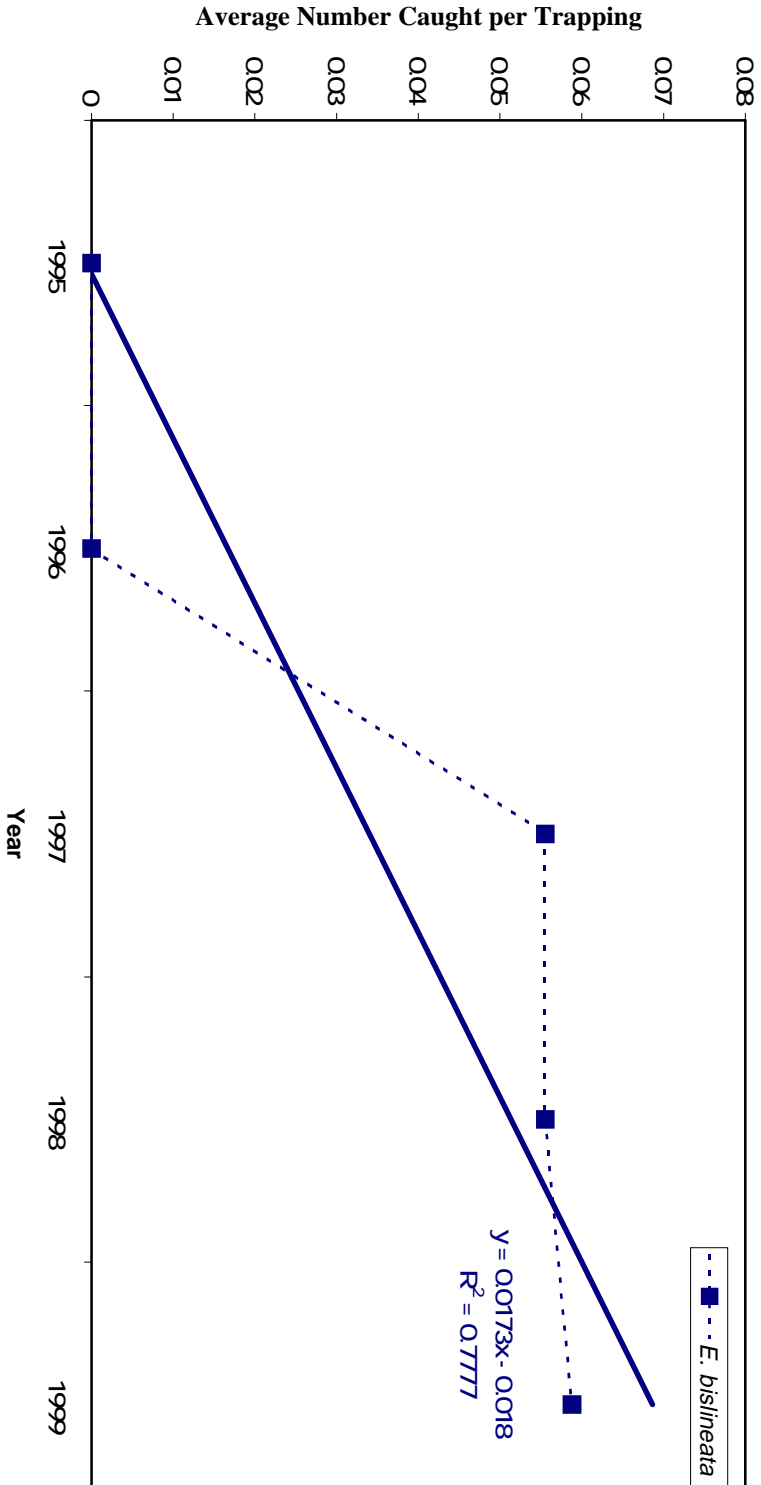


Figure 7. Northern Two-lined Salamander (*Eurycea bislineata*) population indices from the lower drift-fence in the Lye Brook W Manchester, Vermont, 1995-1999.



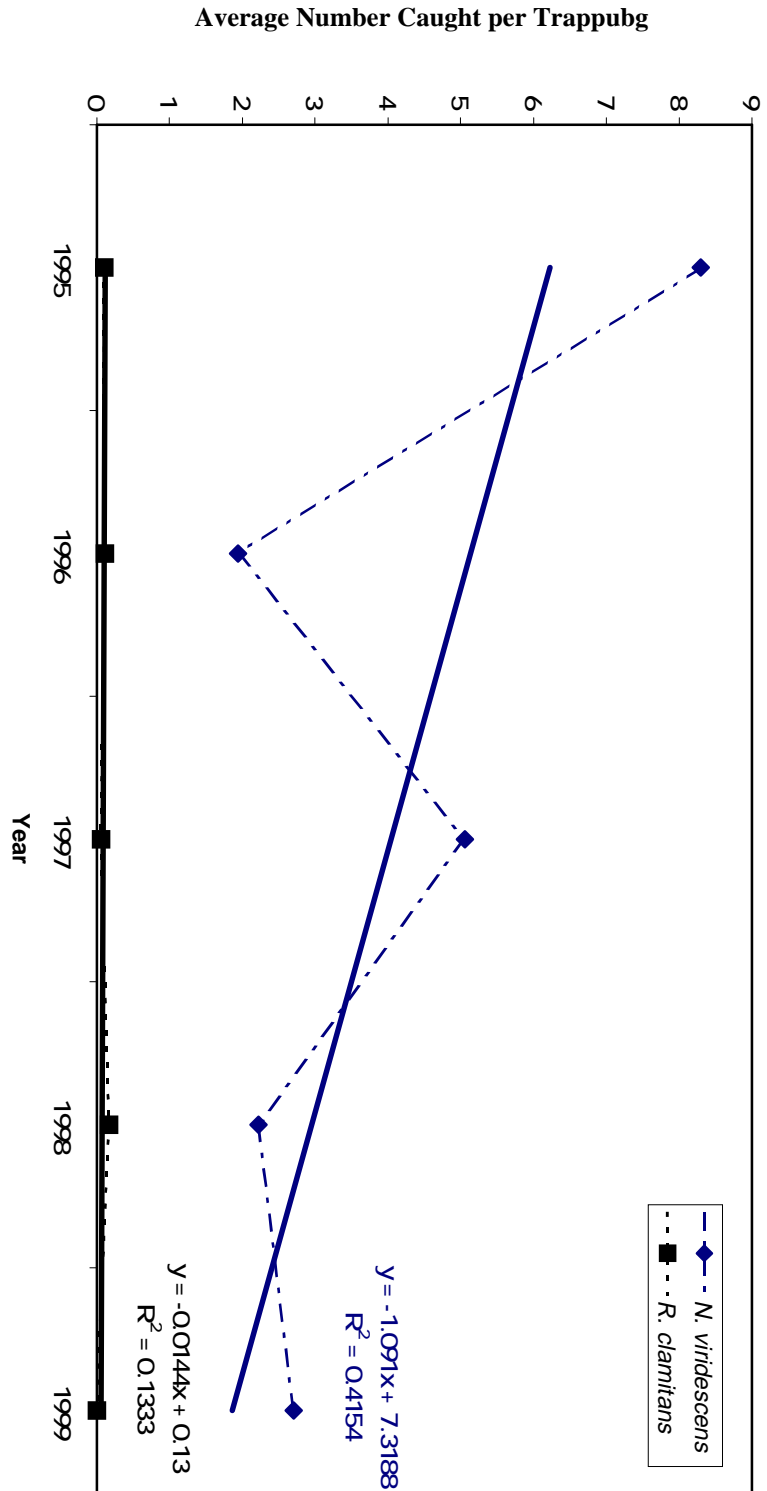


Figure 8. Eastern Newt (*Notophthalmus viridescens*) and Green Frog (*Rana clamitans*) population indices from the lower fence in the Lye Brook Wilderness, Manchester, Vermont, 1995-1999.

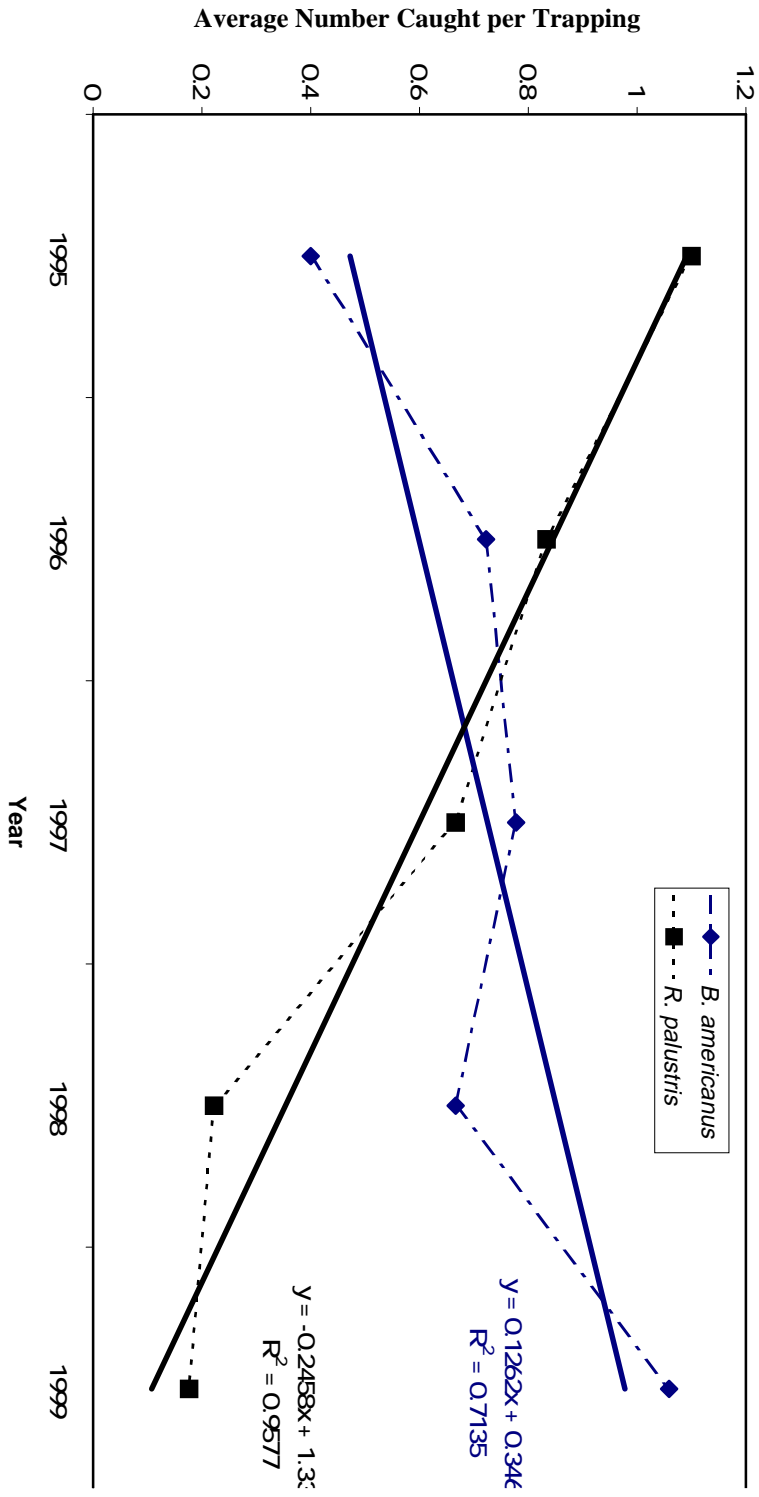


Figure 9. American Toad (*Bufo americanus*) and Pickerel Frog (*Rana palustris*) population indices from the lower drift-fen Lye Brook Wilderness, Manchester, Vermont, 1995-1999.

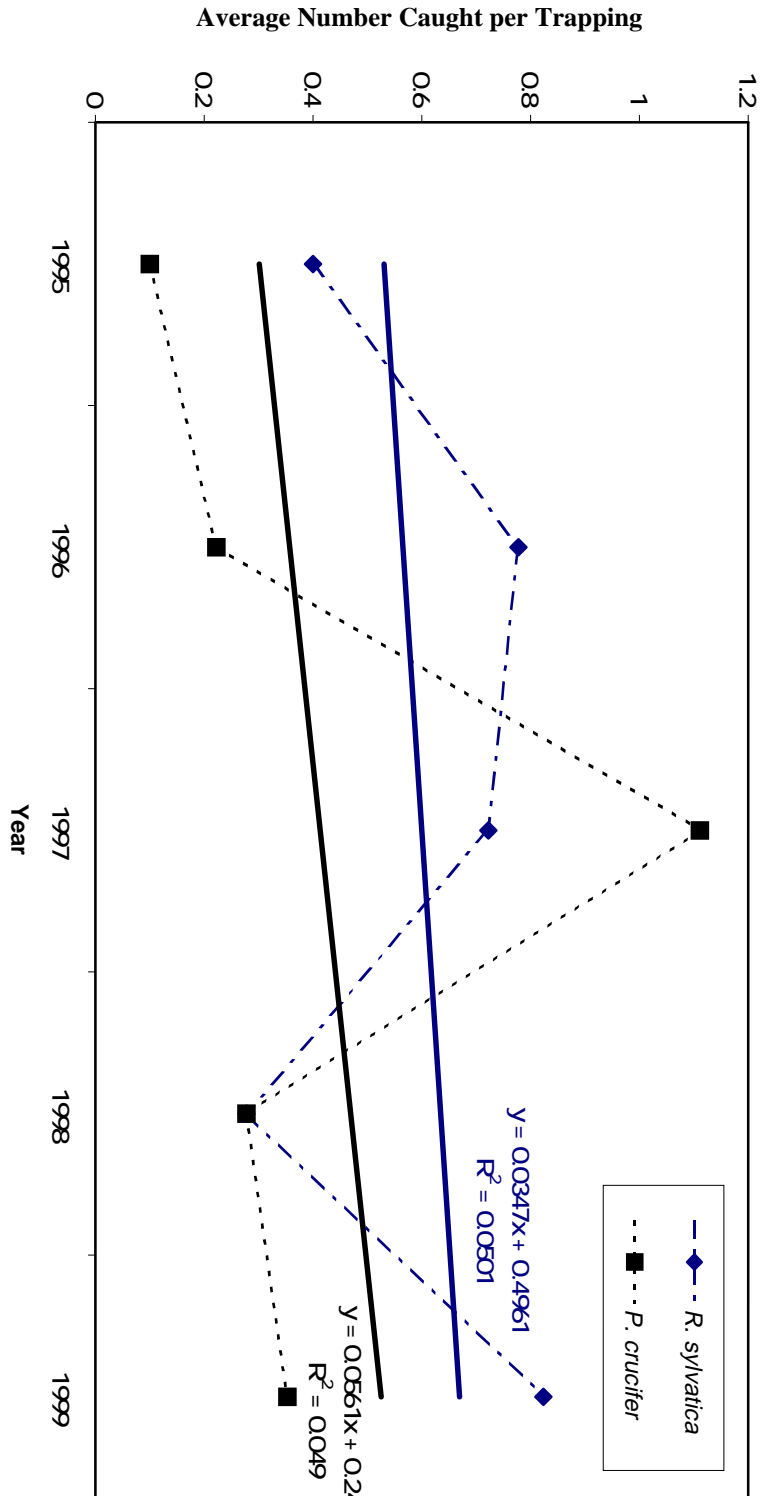


Figure 10. Wood Frog (*Rana sylvatica*) and Spring Peeper (*Pseudacris crucifer*) population indices from the lower drift-fen Lye Brook Wilderness, Manchester, Vermont, 1995-1999.

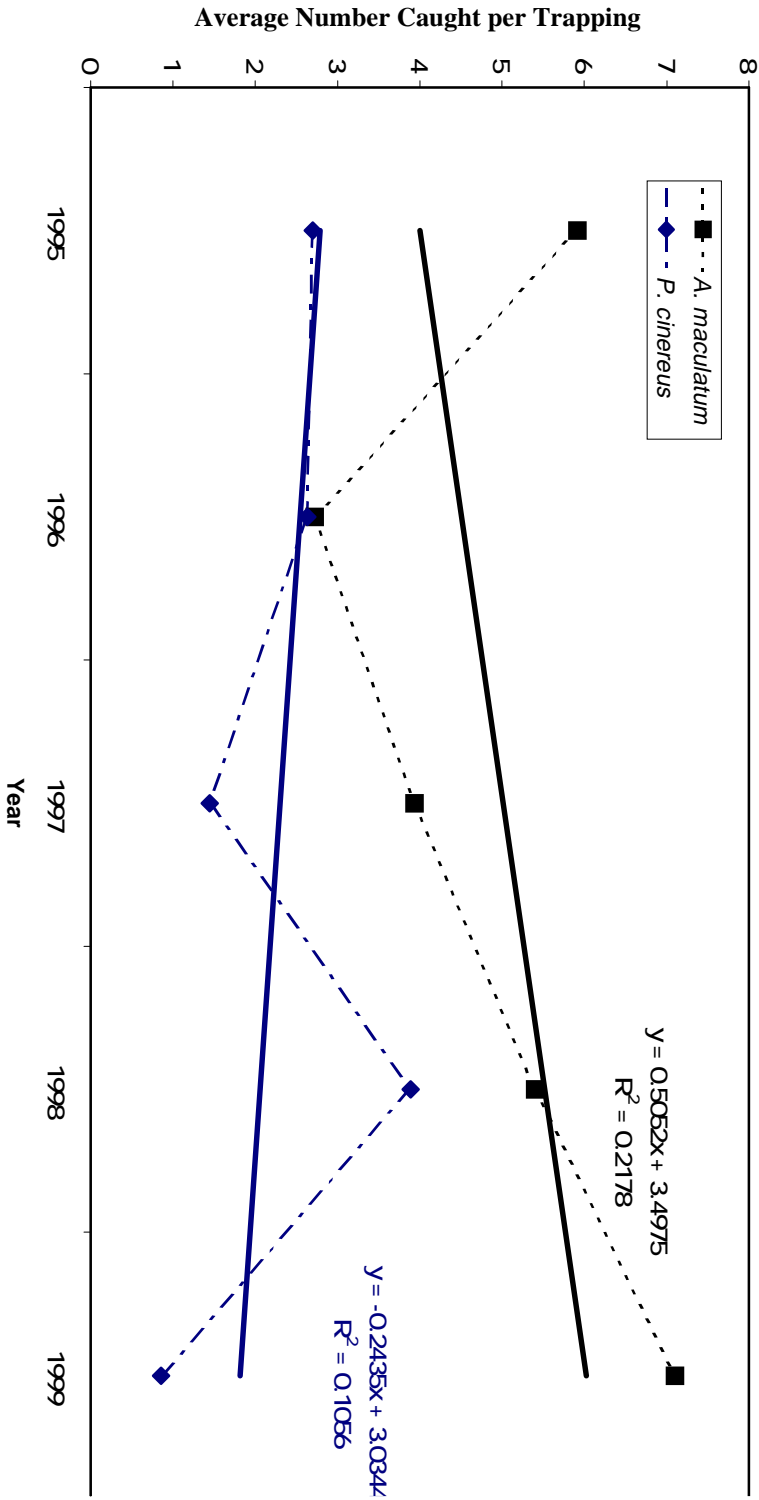


Figure 11. Spotted (*Ambystoma maculatum*) and Redback Salamander (*Plethodon cinereus*) population indices from the three fences in the Lye Brook Wilderness, Sunderland and Manchester, Vermont, 1995-1999.

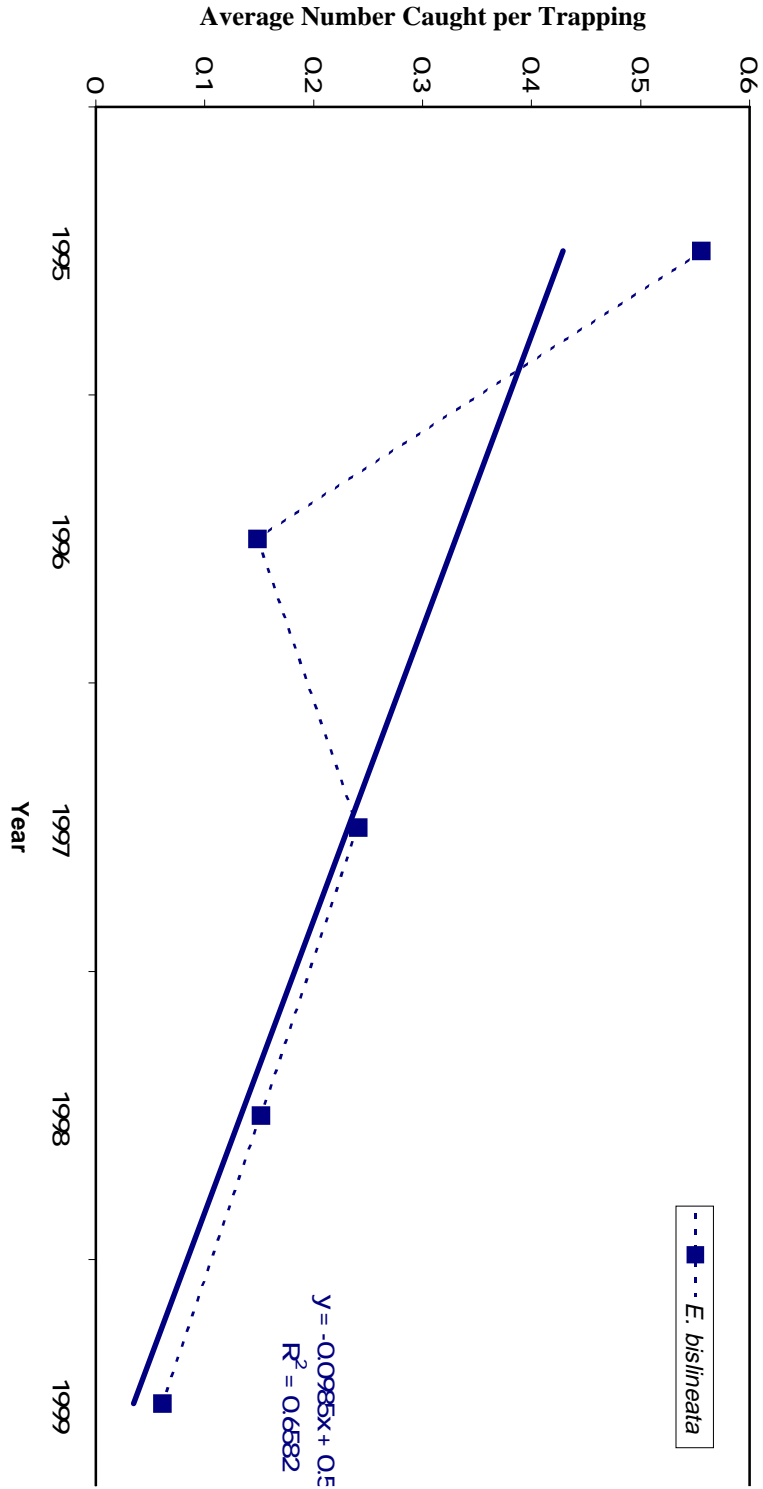


Figure 12. Northern Two-lined Salamander (*Eurycea bislineata*) population indices from the three drift-fences in the Ly Wilderness, Sunderland and Manchester, Vermont, 1995-1999.

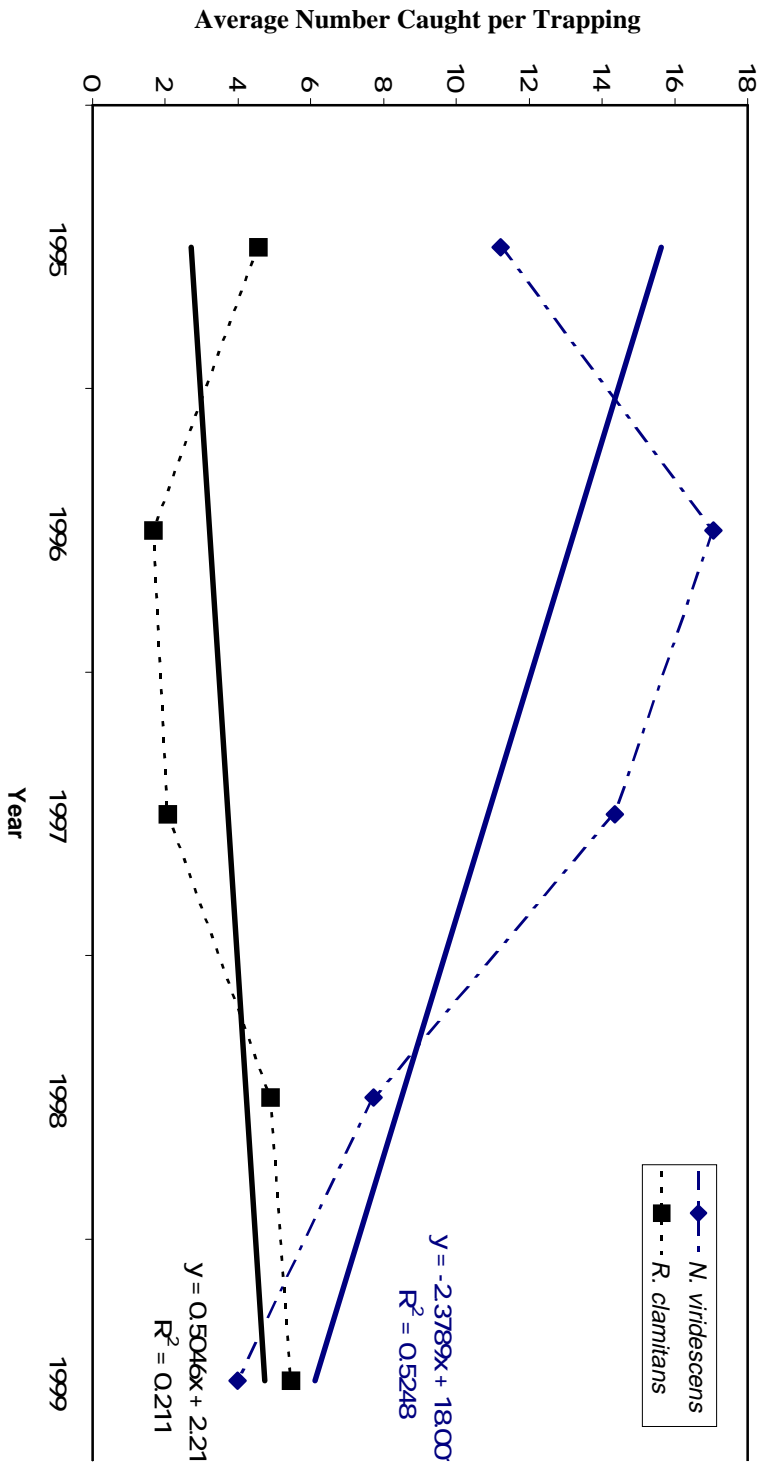


Figure 13. Eastern Newt (*Notophthalmus viridescens*) and Green Frog (*Rana clamitans*) population indices from the three fences in the Lye Brook Wilderness, Sunderland and Manchester, Vermont, 1995-1999.

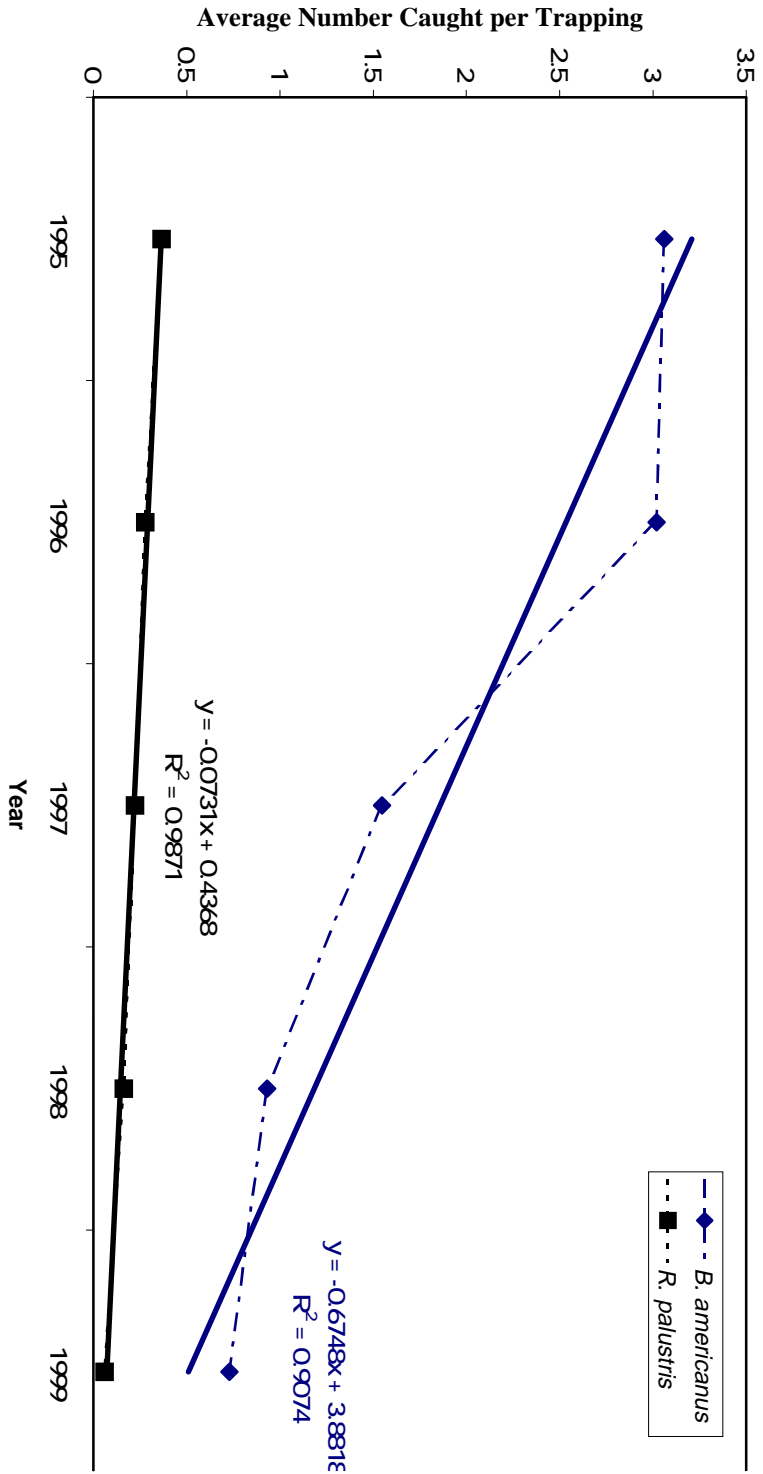


Figure 14. American Toad (*Bufo americanus*) and Pickerel Frog (*Rana palustris*) population indices from the three drift-fei the Lye Brook Wilderness, Sunderland and Manchester, Vermont, 1995-1999.

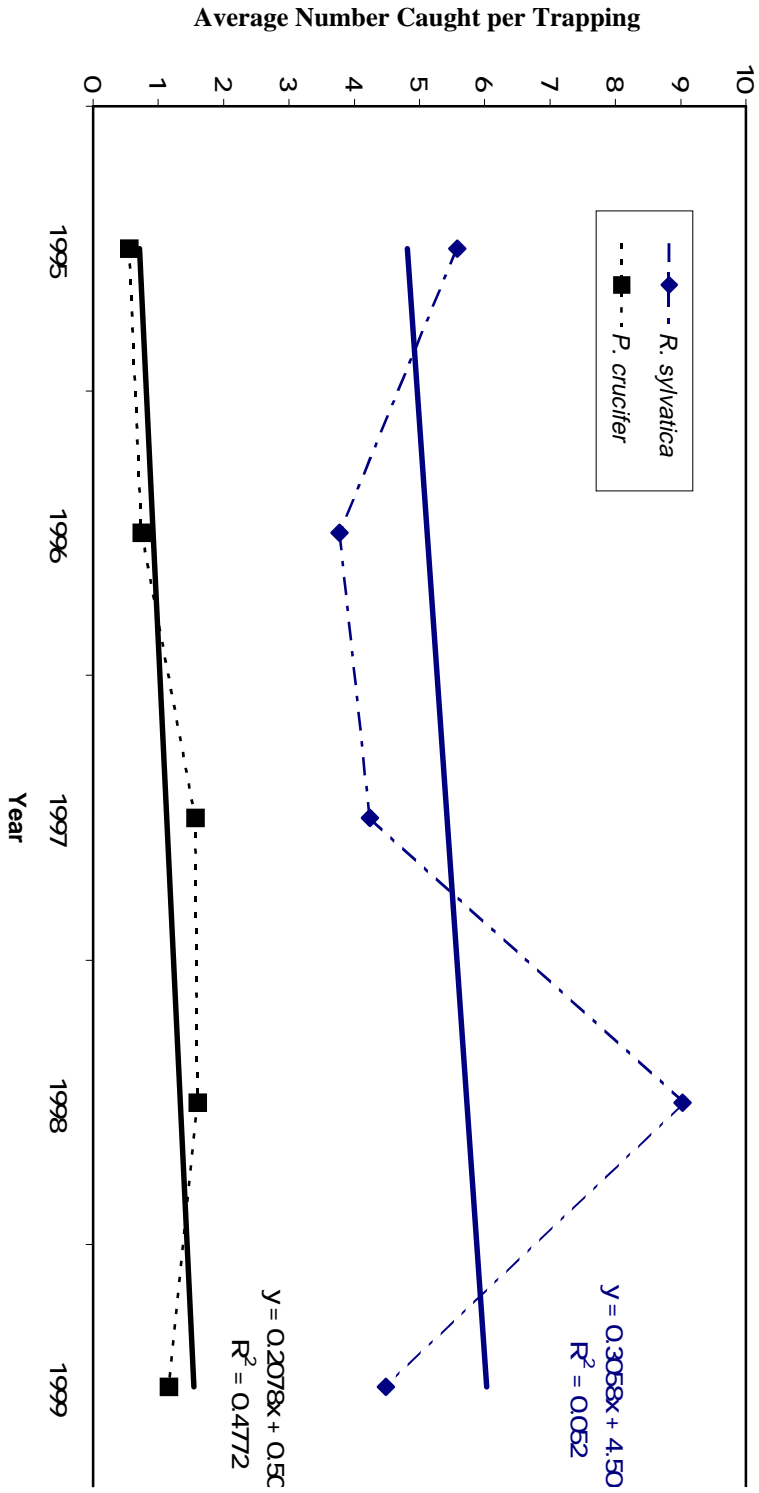


Figure 15. Wood Frog (*Rana sylvatica*) and Spring Peeper (*Pseudacris crucifer*) population indices from the three drift-fences in the Brook Wilderness, Sunderland and Manchester, Vermont, 1995-1999.