

**WARMWATER POPULATION ASSESSMENTS IN NEW HAMPSHIRE:  
BLACK BASS AGE APPENDIX  
(1997-2005)**

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## INTRODUCTION

Black bass (*Micropterus dolomieu*, smallmouth and *M. salmoides*, largemouth) fishery resources in the State of New Hampshire have experienced increased pressure from anglers in recent years. The New Hampshire Fish and Game Department (NHFGD) requires clubs and organizations to apply for permits to hold bass tournaments and a database which tracks these permits has shown an increase in tournament pressure over time (Gries and Racine 2006).

New Hampshire's black bass fish populations are highly utilized by anglers, with smallmouth and largemouth bass ranking among the top four species fished for by anglers (Responsive Management 2004). Additionally, the state's bass anglers are the most satisfied; 87% of smallmouth bass anglers and 81% of largemouth bass anglers were either very or somewhat satisfied with their fishing experiences for these species. Strong support for special black bass management regulations was also shown in the survey: 70% supported catch and release; 68% supported special length limits; 50% supported reduced bag limits; and 47% supported artificial lures and flies only (Responsive Management 1996).

According to the 2001 National Survey of Fishing, Hunting, and Wildlife Associated Recreation, 116,000 anglers fished 1.4 million days for warmwater species in New Hampshire (panfish: 19,000 anglers fished 316,000 days; black bass: 97,000 anglers fished 1.084 million days) (U.S. Department of Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau 2003). The level of angler participation in black bass fishing represented 38% of New Hampshire's freshwater anglers and 44% of the total days of fishing. Since the average trip expenditure for anglers fishing in New Hampshire is \$24 per day, the total expenditures by anglers fishing for warmwater species equals approximately \$33.6 million.

As black bass populations in the state are managed solely by natural reproduction, it is necessary to collect population assessments to monitor their status in response to existing or proposed management strategies and to ensure their continued health. Additionally, age analysis allows for growth comparisons among waterbodies and aids in making appropriate management decisions.

This report summarizes age analysis of black bass sampled in New Hampshire water bodies by the NHFGD from 1997 – 2005.

## METHODS

### *Fish Capture/Scale Collection*

Fish were sampled by boat electrofishing (Smith-Root SR18 and SR12) and/or by fyke nets. Fyke nets were set for at least 2 nights before retrieval and fish were processed after capture and released. Boat electrofishing was conducted after sunset using two or three netters. Electrofishing equipment was adjusted according to water conductivity and observed fish behavior relative to their position in the electrode's field. The study design incorporated timed

runs using the equipment's "on" meter time when sampling for target species (black bass or other pre-determined species) and random or community runs, to assess the other fish species in the lake. Black bass were captured during both target and community runs. All fish were placed in a live well upon capture, processed and then released.

Fish were measured to the nearest millimeter, total length (TL), and weighed to the nearest gram. Scales were taken above the lateral line immediately behind the left pectoral fin (DeVries et al 1996).

### *Scale Processing*

All non-regenerated black bass scales (i.e. complete and normal) were pressed on acetate slides. Each slide held images of scales from a single fish and efforts were made to fit as many scales on each slide as possible. Scale impressions were aged using a microfiche reader. Age, annuli lengths, and distance to scale edge (nearest millimeter) were recorded for each fish. Roughly one quarter of both largemouth bass and smallmouth bass were assigned a confidence rating, which acted to gauge a reader's impression of his/her aging accuracy. They are defined as:

- 1 = very confident
- 2 = confident
- 3 =  $\pm 1$  year
- 4 =  $\pm 2$  years

Data were imported into MS-Access where the Fraser-Lee method of back-calculation was performed on all fish 8 years old or younger and then were exported to MS-Excel. The Fraser-Lee equation is:

$$L_i = \frac{L_c - a}{S_c} S_i + a;$$

$L_i$  = back-calculated length of the fish when the  $i$ th increment was formed,

$L_c$  = total length of the fish at capture,

$S_c$  = radius of scale at capture,

$S_i$  = radius of scale at capture,

$a$  = intercept parameter.

The intercept parameter (i.e. correction factor; fish length at which scales begin to form) used was 20 for largemouth bass and 35 for smallmouth bass as suggested by Carlander (1982). Data from all fish without confidence ratings and from fish with ageing confidence ratings of  $\leq 3$  were used to generate average total length at age by waterbody and species. Year classes were combined due to small sample sizes. An equal weighting method was used for each mean when determining final growth rate averages. Total length versus age plots in MS-Excel used average length at age per species and plots were fitted with a logarithmic trendline. Only values for ages  $\leq 6$  were used to create the trendline in order to standardize this comparison among waterbodies. The equation for this trendline was used to obtain age at quality size (11.8 inches (300 mm) for largemouth bass and 11.0 inches (280 mm) for smallmouth bass; Gablehouse 1984).

Corresponding growth per species was characterized as “slow”, “average” or “fast” using the 25th and 75th percentiles, as breakpoints, of age at quality size (11.8 inches (300 mm) for largemouth bass; 11.0 inches (280 mm) for smallmouth bass) from waterbodies using maximum back-calculations of fish aged to 5 and 6 years old. Age at quality size determination is of interest to fisheries managers as it is the age at which bass reach a size favorable to anglers and allows comparisons to be made among waterbodies.

## RESULTS

Scales were aged from 2,394 largemouth bass, representing 80 water bodies, and 800 smallmouth bass, representing 28 water bodies.

### *Back-calculated Lengths at Age of Largemouth Bass and Smallmouth Bass*

Mean back-calculated length at age, number of fish aged, and age at quality size varied by waterbody and species (Tables 1a. – 1c., 2 and Figures 1 – 108). Average maximum aged used in determining age at quality size for largemouth bass was 5.6 (SD = 0.6,  $n = 79$ ) and was 5.4 (SD = 0.8,  $n = 25$ ) for smallmouth bass (Figure 109 and 110).

Statewide averages of back-calculated length at age (1997-2005) varied by species (Tables 3 and 4 and Figures 111 and 112).

### *Black Bass Growth Categorization*

Back-calculated age at quality size and corresponding correlation coefficients of the logarithmic trendline for largemouth and smallmouth bass are presented in Tables 1a. – 1c. Average age to reach quality size for largemouth bass was 3.74 (SD = 0.62,  $n = 79$ ) and was 4.47 (SD = 1.66,  $n = 25$ ) for smallmouth bass. All largemouth bass correlation coefficients were  $\geq 0.92$  for all water bodies. Smallmouth bass correlation coefficients were  $\geq 0.90$  for waterbodies having fish aged at  $> 4$  years. The lowest correlation coefficient, 0.89 for Island Pond, only had back-calculations from age one through four.

Largemouth and smallmouth bass growth categories of “slow”, “average” or “fast” are presented in Tables 5 and 6. The distribution of largemouth bass age at quality size values ( $n = 72$  water bodies) was normal (Shapiro-Wilk W test,  $P = 0.28$ ; Figure 113). The distribution of smallmouth bass age at quality size values ( $n = 25$  waterbodies) was not normal (Shapiro-Wilk W test,  $P < 0.0001$ , Figure 114). These growth characterizations may allow for identification of waters in need of alternative management regulations. The eight waterbodies with the fastest largemouth bass growth to 300 mm in order of increasing age were Turkey Pond, Concord (2.41), Pleasant Pond, Francestown (2.60), Crystal Lake, Gilmanton (2.70), Rainbow Lake, Derry (2.72), Bolster Pond, Sullivan (2.84), Bow Lake, Strafford (2.86), Sportsman Pond, Fitzwilliam (3.01) and Pawtuckaway Lake, Nottingham (3.06). The eight waterbodies with the slowest largemouth bass growth to 300 mm in order of decreasing age were Naticook Lake, Merrimack (5.48), Sandy Pond, Richmond (5.22), Otternick Pond, Hudson (4.99), Greenwood

Pond, Kingston (4.98), Willand Pond, Somersworth (4.94), Crooked Pond, Loudon (4.80), Lake Potanipo, Brookline (4.79) and Little Island Pond, Pelham (4.68).

The five waterbodies with the fastest smallmouth bass growth to 280 mm in order of increasing age are Clement Pond, Hopkinton (3.00), Swains Lake, Barrington (3.14), Cunningham Pond, Peterborough (3.28), Pleasant Lake, Deerfield (3.37) and Pawtuckaway Lake, Nottingham (3.38). The five waterbodies with the slowest smallmouth bass growth to 280 mm in order of decreasing age are Goose Pond, Cannan (10.77), Laurel Lake, Fitzwilliam (7.31), Skatutakee Lake, Harrisville (5.68), Highland Lake, Stoddard (5.60) and Spofford Lake, Spofford (5.41).

## **DISCUSSION**

This report summarizes age analysis of black bass sampled in New Hampshire waterbodies by the NHFGD from 1997 – 2005 by listing individual water body's length at age and age at length growth categorization by species and by also creating statewide averages by species. An important implication of this report is the potential to use the growth categorization as a screening tool to identify poor or exceptional growth waters that could benefit from alternative management strategies. There may be a need to perform more in depth studies and more detailed analyses in future years, including year class comparisons.

Attempts were made to obtain black bass back-calculated length at age from other New England states including Connecticut, Massachusetts, Maine, and Vermont. New Hampshire's average back-calculated length at age for both largemouth bass (ages 1-6) and smallmouth bass (ages 1-6) were remarkably similar to those of Connecticut (Table 3 and 4). Differences in averages by age never differed by more than 12 mm for largemouth bass and 10 mm for smallmouth bass. Massachusetts did not respond to data requests and both Maine and Vermont had average length at capture data. Therefore, no comparisons were made with these states.

Using age at length to categorize smallmouth bass growth may be premature at this time. Not only was the distribution of smallmouth bass age at quality size values not normal, but also the small sampling size of 20 waterbodies may not accurately depict the true range of bass growth in New Hampshire.

This document is intended to be a living document with updates of individual waterbody average length at age results. Statewide averages should be updated periodically as data becomes available and time permits.

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Table 1a. Mean back-calculated length at age, total number of fish aged, logarithmic trendline correlation coefficient, age at quality size, and growth categorization for largemouth bass by water body (sample year(s) combined for 1997 – 2005).

Water body	Town	Sample Year(s)	Species	Maximum Age $\leq 8$ with CR $< 4^a$	Maximum age used for back-calculations	Mean back-calculated length (mm) at age								Number of fish aged		R <sup>2b</sup>	Age at quality size 300 mm	Growth Categorization
						1	2	3	4	5	6	$\geq 1$	5-6					
Angle Pond	Sandown	2002	LMB	5	5	95	195	278	318	331		6	1	0.99	3.76	A		
Ashuelot Pond	Washington	2005	LMB	7	6	81	229	313	349	383	417	7	3	0.99	3.10	F		
Beaver Pond	Derry	2001	LMB	6	6	70	150	252	323	365	391	16	3	0.98	3.73	A		
Bellamy Reservoir	Madbury	2000	LMB	8	6	91	168	233	296	348	397	19	7	0.97	3.89	A		
Bolster Pond	Sullivan	2004	LMB	6	6	101	239	313	365	400	440	21	3	1.00	2.84	F		
Bow Lake <sup>e</sup>	Strafford	1997	LMB	5	4	88	194	323	377			8	1	0.98	2.86	F		
Brindle Pond	Barnstead	2001	LMB	8	5	76	211	291	351	382		20	5	1.00	3.17	F		
Center Pond	Stoddard	2004	LMB	6	6	95	210	288	338	377	395	29	8	1.00	3.29	F		
Contoocook Lake	Jaffrey	1997	LMB	7	5	73	184	263	308	339		18	1	1.00	3.88	A		
Country Pond	Kingston/Newton	2001	LMB	7	6	81	184	240	315	351		4	2	0.99	3.85	A		
Crescent Lake	Acworth	2003	LMB	8	6	100	194	261	309	344	361	24	5	1.00	3.87	A		
Crooked Pond	Loudon	2000	LMB	7	5	77	162	230	273	312		33	17	0.99	4.80	S		
Crystal Lake	Manchester	2001	LMB	8	6	86	176	280	325	360	381	13	3	0.99	3.61	A		
Crystal Lake	Gilmanton	2005	LMB	5	5	108	226	299	383	447		3	1	0.98	2.70	F		
Connecticut River	Hindsdale	1998, 2002	LMB	8	6	95	173	251	303	339	399	53	11	0.99	3.71	A		
Cunningham Pond	Peterborough	1997	LMB	6	6	65	158	261	344	380	396	28	6	0.98	3.53	A		
Deering Lake <sup>e</sup>	Deering	1997	LMB	4	4	79	198	265	298			40	0	1.00	3.87	A		
Dodge Pond	Lempster	2004	LMB	8	6	84	187	259	316	353	391	28	12	1.00	3.67	A		
Dorrs Pond	Manchester	2001	LMB	7	6	89	190	268	304	317	337	6	1	0.98	4.23	S		
ward McDowell Lake	Peterborough	2002	LMB	7	5	86	187	255	321	383		25	1	0.98	3.51	A		
Elm Brook Pool	Hopkinton	1998	LMB	8	6	75	199	285	339	393	426	50	9	1.00	3.21	F		
Flints Pond	Hollis	2001	LMB	8	5	82	149	235	309	333		8	1	0.97	4.33	S		
Forest Lake	Winchester	2002	LMB	7	6	83	164	286	355	396	419	47	6	0.98	3.24	F		
Goose Pond	Canaan	2004	LMB	7	5	97	187	289	335	357		6	1	0.98	3.43	A		
Gorham Pond	Dunbarton	2002	LMB	7	6	86	184	256	307	340	360	23	8	1.00	3.98	A		
Great Pond	Kingston	2001	LMB	8	6	74	163	260	315	345	374	9	3	0.99	3.87	A		
Greenwood Pond	Kingston	2001	LMB	8	6	84	178	244	258	306	323	18	4	0.99	4.98	S		
Gregg Lake	Antrim	2004	LMB	7	6	86	172	255	323	372	394	16	4	0.99	3.59	A		
Halfmoon Pond	Barnstead	2005	LMB	7	6	80	197	289	342	389	415	8	3	1.00	3.23	F		
Harrisville Pond	Harrisville	2005	LMB	6	6	72	185	277	323	353	359	15	4	0.99	3.76	A		

<sup>a</sup> Oldest fish aged with a confidence rating of 1 to 3.

<sup>b</sup> Correlation coefficient for logarithmic trendline.

<sup>c</sup> “S” represents “slow” growth, “A” represents “average” growth, and “F” represents “fast” growth. See Table 7 for age at quality size categories.

<sup>d</sup> Age at quality size values not ascertained due to insufficient data.

<sup>e</sup> Age at quality size values should be interpreted with caution as no fish over 4 years old were aged.

Table 1b. Mean back-calculated length at age, total number of fish aged, logarithmic trendline correlation coefficient, age at quality size, and growth categorization for largemouth bass by water body (sample year(s) combined for 1997 – 2005).

Water body		Sample Year(s)	Species	Maximum Age $\leq$ 8 with CR $<$ 4 <sup>a</sup>	Maximum age used for back-calculations	Mean back-calculated length (mm) at age						Number of fish aged		R <sup>2b</sup>	Age at quality size 300 mm	Growth Categorizat
						1	2	3	4	5	6	$\geq$ 1	5-6			
Harvey Lake	Northwood	2001	LMB	8	6	81	159	231	287	350	414	10	3	0.96	3.86	A
Heads Pond	Hooksett	2001	LMB	8	6	72	161	253	331	378	413	22	9	0.98	3.52	A
Highland Lake	Stoddard	1997, 2005	LMB	7	6	78	191	267	317	343	368	44	9	1.00	3.80	A
Hopkinton Lake	Hopkinton	2005	LMB	8	6	92	185	259	303	340	411	23	10	0.98	3.67	A
Kimball Pond	Hopkinton	2005	LMB	2	2	128	298					22	0	0.97	-	S
Laurel Lake	Fitzwilliam	2003	LMB	6	6	66	147	226	277	316	371	49	11	0.98	4.44	S
Little Island Pond	Pelham	2003	LMB	7	5	75	149	226	263	333		9	4	0.97	4.68	S
Long Pond	Danville/Kingston	2001	LMB	8	6	72	177	265	306	334	343	11	4	0.99	4.12	S
Massabessic Lake	Auburn	1997, 1999	LMB	8	6	71	172	263	319	359	406	137	79	0.99	3.61	A
Massasecum Lake	Bradford	1997	LMB	7	6	66	173	270	340	373	428	41	7	0.99	3.39	A
Merrimack River	-	1997	LMB	6	6	64	168	248	330	389	444	5	1	0.98	3.38	A
Monomonac Lake	Rindge	2005	LMB	8	5	102	237	309	341	374		6	2	0.99	3.07	F
Mountain Brook Res.	Jaffrey	2004	LMB	5	5	79	195	269	348	393		27	1	0.99	3.24	F
Nashua River	-	2003	LMB	5	6	84	141	216	289	348		13	8	0.94	4.38	S
Naticook Lake	Merrimack	2004	LMB	5	6	76	178	237	264	273		44	2	0.98	5.48	S
Northwood Lake	Northwood	1997, 1999	LMB	5	5	82	187	281	349	419		22	3	0.98	3.11	F
Norway Pond	Hancock	2005	LMB	6	6	77	188	274	320	346	365	43	6	0.99	3.77	A
Nutts Pond	Manchester	2001	LMB	6	6	83	179	242	275	306	345	9	2	1.00	4.61	S
Onway Lake	Raymond	2004	LMB	8	6	90	222	301	341	365	380	21	8	0.99	3.32	F
Otter Lake	Greenfield	2005	LMB	6	6	72	156	234	290	322	343	58	19	0.99	4.49	S
Otternick Pond <sup>e</sup>	Hudson	2003	LMB	4	4	81	160	221	280			11	0	0.98	4.99	S
awtuckaway Lake	Nottingham	1997	LMB	6	6	92	193	277	342	407	460	16	7	0.98	3.06	F
Phillips Pond	Sandown	2002	LMB	7	6	84	174	245	292	338	348	16	2	0.99	4.24	S
Pine Island Pond	Manchester	2001	LMB	7	6	87	174	253	324	403	434	15	3	0.97	3.32	F
Pleasant Lake <sup>e</sup>	Deerfield	1999	LMB	4	4	61	120	225	313			3	0	0.92	4.35	S
Pleasant Pond <sup>e</sup>	Fracestown	2002	LMB	4	4	113	231	342	384			7	0	0.99	2.60	F
Poole Pond	Rindge	2005	LMB	5	6	72	206	278	319	355		32	2	1.00	3.54	A
Potanipo Lake	Brookline	2005	LMB	6	6	75	162	234	285	311	322	38	3	0.99	4.79	S
Rainbow Lake	Derry	2001	LMB	6	6	91	247	335	387	412	440	5	1	0.99	2.72	F

<sup>a</sup> Oldest fish aged with a confidence rating of 1 to 3.

<sup>b</sup> Correlation coefficient for logarithmic trendline.

<sup>c</sup> “S” represents “slow” growth, “A” represents “average” growth, and “F” represents “fast” growth. See Table 7 for age at quality size categories.

<sup>d</sup> Age at quality size values not ascertained due to insufficient data.

<sup>e</sup> Age at quality size values should be interpreted with caution as no fish over 4 years old were aged.

Table 1c. Mean back-calculated length at age, total number of fish aged, logarithmic trendline correlation coefficient, age at quality size, and growth categorization for largemouth bass by water body (sample year(s) combined for 1997 – 2005).

Water body	Sample Year(s)	Species	Maximum Age $\leq 8$ with CR < 4 <sup>a</sup>	Maximum age used for back-calculations	Mean back-calculated length (mm) at age								Number of fish aged		Age at quality size		Growth Categorization
					1	2	3	4	5	6	$\geq 1$	5-6	R <sup>2b</sup>	300 mm			
Robinson Pond	Hudson	2003	LMB	5	5	81	186	251	300	348		29	0	1.00	3.92	A	
Sandy Pond	Richmond	2002	LMB	8	6	79	142	197	250	314	331	39	1	0.96	5.22	S	
Scobie Pond	Londonderry	2001	LMB	8	6	84	162	251	292	319	363	4	4	0.99	4.25	S	
Scott Pond	Fitzwilliam	2003	LMB	5	5	82	172	266	310	332		23	2	0.99	3.95	A	
Sip Pond	Fitzwilliam	2003	LMB	7	6	85	199	246	303	341	372	27	5	1.00	3.91	A	
Skatutakee Lake <sup>e</sup>	Harrisville	1997	LMB	4	4	73	201	298	357			13	0	1.00	3.08	F	
Spofford Lake	Spofford	1998	LMB	8	6	64	168	270	330	359	381	10	3	0.99	3.68	A	
Sportsman Pond	Fitzwilliam	2002	LMB	8	5	83	222	304	359	390		25	2	1.00	3.01	F	
Spruce Pond	Deerfield	2001	LMB	8	6	80	149	253	312	361	396	13	4	0.97	3.75	A	
Stevens Pond	Manchester	2000	LMB	6	6	113	193	253	277	323	359	4	1	0.99	4.25	S	
Stone Pond	Marlow	2004	LMB	7	5	89	195	277	343	359		17	2	0.99	3.41	A	
Suncook Lake	Barnstead	1997	LMB	7	6	80	182	272	337	379	416	9	2	0.99	3.36	A	
Swains Lake	Barrington	1997	LMB	6	6	71	174	282	351	392	426	21	3	0.99	3.26	F	
Turee Pond	Bow	2000	LMB	7	6	76	154	244	316	354	387	44	14	0.98	3.83	A	
Turkey Pond	Concord	2000	LMB	6	6	140	250	346	399	445	463	19	6	0.99	2.41	F	
Turtleton Pond	Concord	1997,99-02	LMB	8	6	79	195	278	328	362	401	169	44	1.00	3.47	A	
Walker Pond	Webster	2002	LMB	7	6	70	155	220	296	327	364	14	1	0.98	4.32	S	
Warren Lake	Alstead	1997, 2003	LMB	8	6	89	197	279	317	337	356	141	24	0.99	3.83	A	
Wash Pond	Hampstead	2002	LMB	7	5	73	183	270	312	362		17	2	1.00	3.64	A	
Willand Pond	Somersworth	2000	LMB	8	6	76	159	220	270	304	334	14	3	0.99	4.94	S	
innipesaukee Lake, Lees Mills <sup>e</sup>	Moultonboro	2004	LMB	4	4	80	210	270	351			25	0	0.99	3.25	F	

<sup>a</sup> Oldest fish aged with a confidence rating of 1 to 3.

<sup>b</sup> Correlation coefficient for logarithmic trendline.

<sup>c</sup> “S” represents “slow” growth, “A” represents “average” growth, and “F” represents “fast” growth. See Table 7 for age at quality size categories.

<sup>d</sup> Age at quality size values not ascertained due to insufficient data.

<sup>e</sup> Age at quality size values should be interpreted with caution as no fish over 4 years old were aged..

Table 2. Mean back-calculated length at age, total number of fish aged, logarithmic trendline correlation coefficient, age at quality size, and growth categorization for smallmouth bass by water body (sample year(s) combined for 1997 – 2005).

Waterbody	Town	Sample Year(s)	Species	Maximum Age $\leq 8$ with CR < 4	Maximum age used for back-calculations	Mean back-calculated length (mm) at age						Number of fish aged		R <sup>2b</sup>	Age at Quality	Growth Categorization
						1	2	3	4	5	6	$\geq 1$	5-6		Length 280 mm	
Angle Pond	Sandown	2002	SMB	6	6	88	154	233	284	338	393	11	4	0.96	3.61	A
Bow Lake	Strafford	1997	SMB	5	5	87	140	200	240	335		10	2	0.90	4.57	A
Center Pond	Stoddard	2004	SMB	5	5	80	153	222	279	329		21	4	0.97	4.04	A
Clement Pond	Hopkinton	2001	SMB	6	6	90	173	259	328	389	437	9	1	0.97	3.00	F
Crescent Lake <sup>f</sup>	Acworth	2003	SMB	7	6	82	161	219	276	318	339	20	0	0.99	4.13	A
Crystal Lake	Gilmanton	2005	SMB	7	5	92	131	226	307	359		4	1	0.91	3.64	A
Connecticut River	Claremont	1998, 2005	SMB	7	6	82	165	241	304	359	389	42	13	0.98	3.42	F
Cunningham Pond	Peterborough	1997	SMB	7	6	109	170	230	302	363	412	3	2	0.94	3.28	F
Goose Pond	Canaan	2004	SMB	5	5	95	142	174	197	227		18	2	0.99	10.77	S
Gregg Lake <sup>e</sup>	Antrim	2004	SMB	4	4	89	161	237	325			28	0	0.94	3.55	A
Halfmoon Pond	Barnstead	2005	SMB	6	6	88	135	208	299	330	392	15	2	0.93	3.73	A
Highland Lake	Stoddard	1997	SMB	7	6	81	129	179	232	283	298	10	6	0.95	5.60	S
Island Pond <sup>c</sup>	Washington	2002	SMB	4	4	77	137	187	292			29	0	0.89	5.37	S
Laurel Lake	Fitzwilliam	2003	SMB	7	5	89	133	187	215	254		24	3	0.97	7.31	S
Little Island Pond	Pelham	2003	SMB	6	6	79	134	195	248	291	314	8	2	0.97	5.01	A
Massabessic Lake	Auburn	1997, 1999	SMB	7	6	86	132	191	254	312	360	41	24	0.93	4.35	A
Massasecum Lake <sup>d</sup>	Bradford	1997	SMB	3	3	70	152	222				4	0	-	-	-
Merrimack River	-	1997, 1999	SMB	7	6	88	152	225	283	325	358	88	48	0.98	3.91	A
Monomonac Lake <sup>d</sup>	Rindge	2005	SMB	3	3	88	173	266				3	0	-	-	-
Northwood Lake <sup>e</sup>	Northwood	1997, 1999	SMB	4	4	78	139	218	252			43	0	0.92	3.72	A
Otter Lake <sup>e</sup>	Greenfield	2005	SMB	4	4	87	140	231	295			6	0	0.95	4.04	A
Pawtuckaway Lake <sup>e</sup>	Nottingham	1997	SMB	4	4	88	159	257	326			11	0	0.95	3.38	F
Pleasant Lake	Deerfield	1998, 1999	SMB	7	6	86	149	228	311	364	400	102	67	0.94	3.37	F
Skatutakee Lake	Harrisville	1997	SMB	7	6	80	134	185	231	268	303	41	13	0.97	5.68	S
Spofford Lake	Spofford	1998, 2000	SMB	9	6	80	131	182	232	277	314	125	60	0.95	5.41	S
Suncook Lake	Barnstead	1997	SMB	6	6	66	117	190	290	354	387	13	1	0.93	3.82	A
Swains Lake	Barrington	1997	SMB	7	5	91	178	281	327	361		9	1	0.99	3.14	F
Warren Lake <sup>d</sup>	Alstead	2003	SMB	2	2	88	160					3	0	-	-	-

<sup>a</sup> Oldest fish aged with a confidence rating of 1 to 3.

<sup>b</sup> Correlation coefficient for logarithmic trendline.

<sup>c</sup> “S” represents “slow” growth, “A” represents “average” growth, and “F” represents “fast” growth. See Table 8 for age at quality size categories.

<sup>d</sup> Age at quality size values not ascertained due to insufficient data.

<sup>e</sup> Age at quality size values should be interpreted with caution.

<sup>f</sup> 13 fish aged at age 1, 5 fish aged at age 5, and 2 fish aged at age 7.

Table 3. New Hampshire statewide average of Fraser-Lee back-calculated length at age (mm) for largemouth bass from 1997-2005 ( $n = 81$ ) and Connecticut statewide average of Fraser-Lee back-calculated length at age for largemouth bass in exploited lakes (allow fishing) from 1988-1995 ( $n = 72$ ).

	AGE																	
	1			2			3			4			5			6		
	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std
NH	80	83	13	80	185	29	79	265	29	79	320	31	72	357	33	52	387	36
CT		94			192			267			322			364			399	

Table 4. Statewide average of back-calculated length at age (mm) for smallmouth bass from 1997-2005 ( $n = 27$ ) and Connecticut statewide average of Fraser-Lee back-calculated length at age for smallmouth bass in exploited lakes (allow fishing) from 1988-1995 ( $n = 30$ ).

	AGE																	
	1			2			3			4			5			6		
	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std	<i>n</i>	ave	std
NH	28	85	8	28	148	16	27	217	29	25	277	38	20	322	43	14	364	44
CT		92			158			222			280			318			360	

Table 5. Largemouth bass growth categorization based on 25th and 75th percentiles of mean age at quality size (300 mm) for waterbodies using maximum back-calculations of fish aged to 5 and 6 years old. Number of waterbodies used in analysis was 72.

Growth Category	Mean Age at Length
Fast	< 3.33
Average	3.33 - 4.08
Slow	> 4.08

Table 6. Smallmouth bass growth categorization based on 25th and 75th percentiles of mean age at quality size (280 mm) for waterbodies using maximum age back-calculations of fish aged to 5 and 6 years old. Number of waterbodies used in analysis was 20.

Growth Category	Mean Age at Length
Fast	< 3.47
Average	3.47 – 5.31
Slow	> 5.31

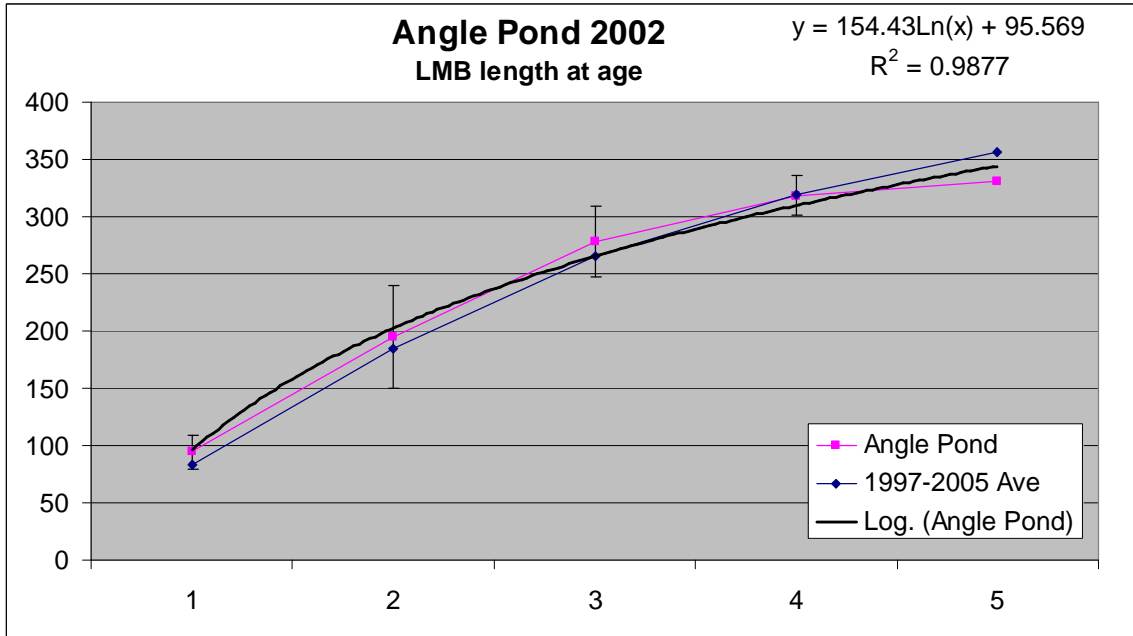


Figure 1. Average back-calculated length at age for largemouth bass from Angle Pond (Sandown) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

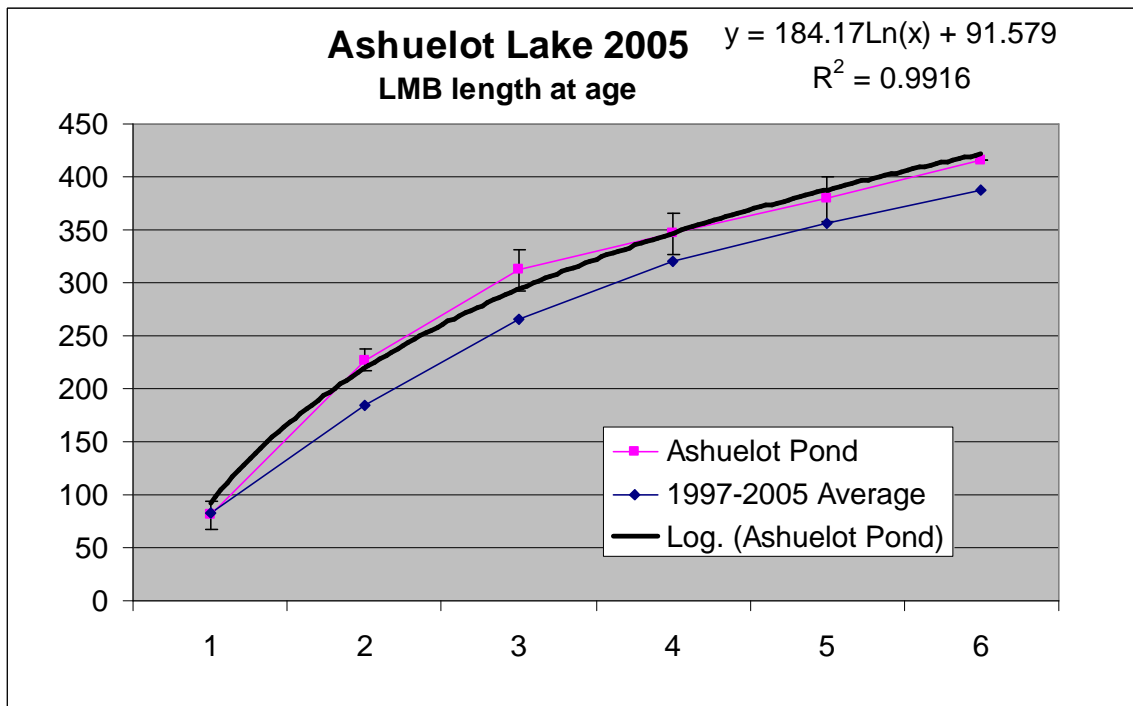


Figure 2. Average back-calculated length at age for largemouth bass from Ashuelot Lake (Washington) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

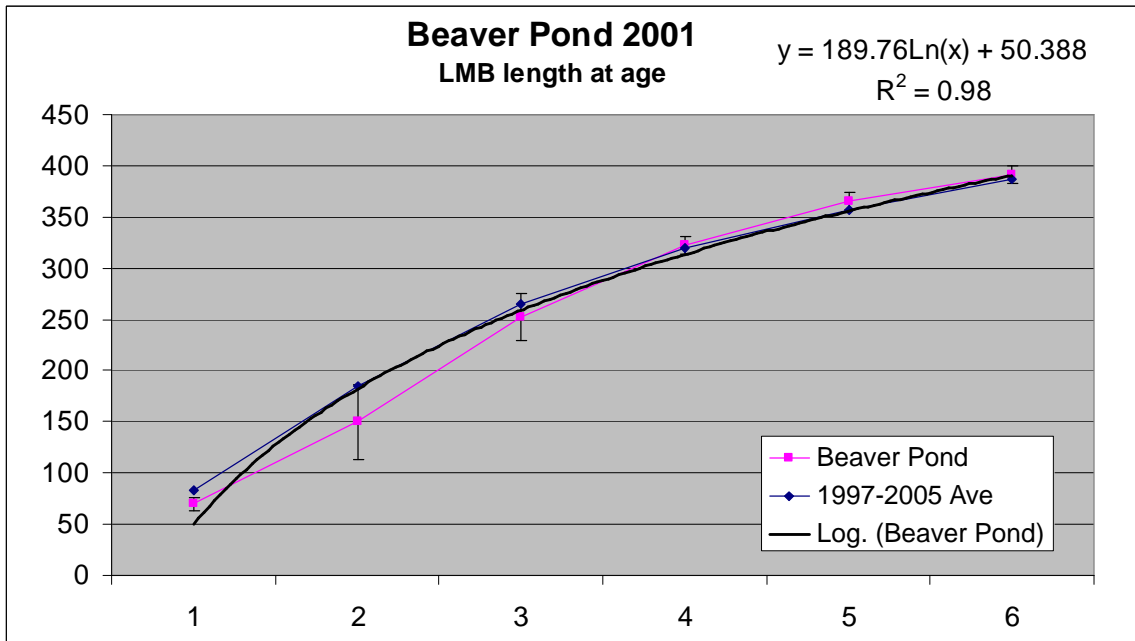


Figure 3. Average back-calculated length at age for largemouth bass from Beaver Pond (Derry) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

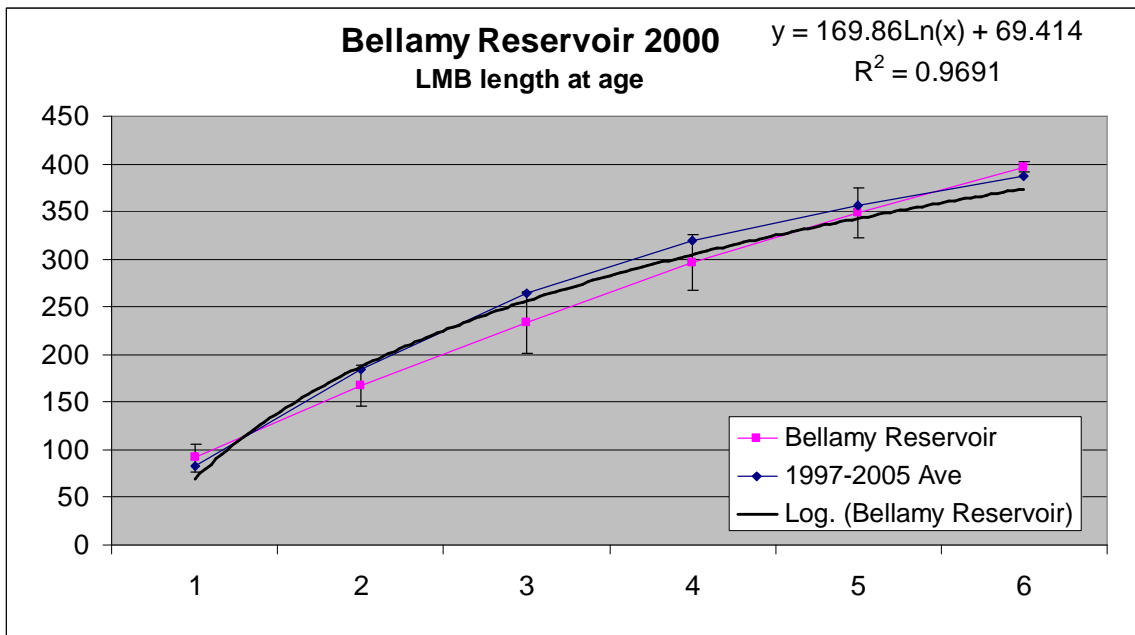


Figure 4. Average back-calculated length at age for largemouth bass from Bellamy Reservoir (Madbury) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

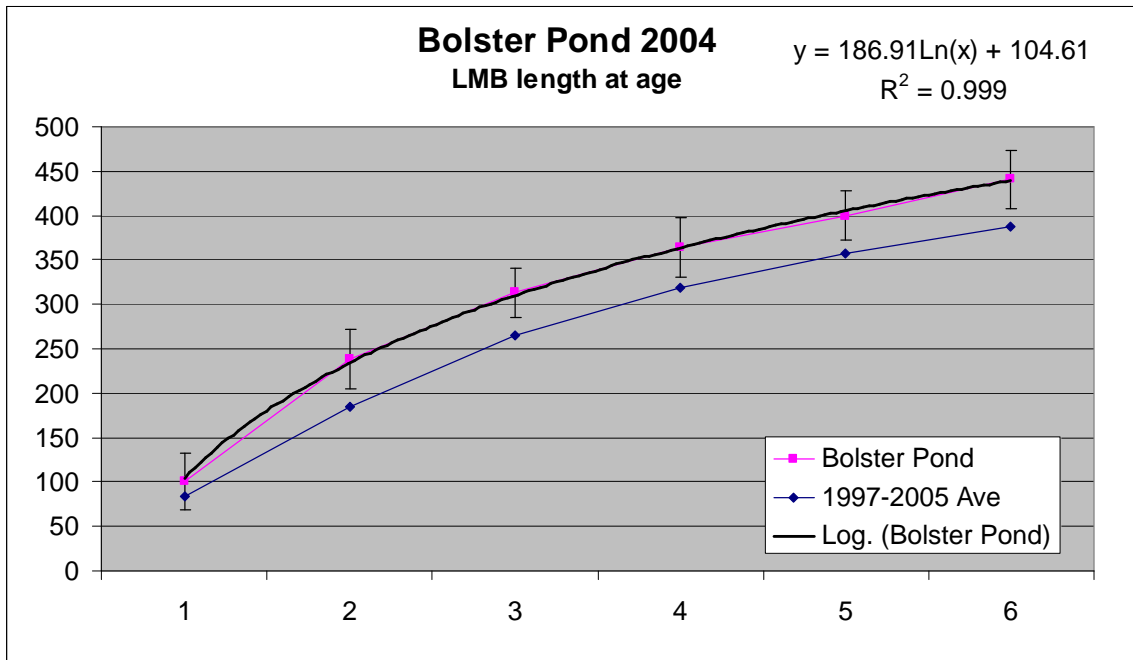


Figure 5. Average back-calculated length at age for largemouth bass from Bolster Pond (Sullivan) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

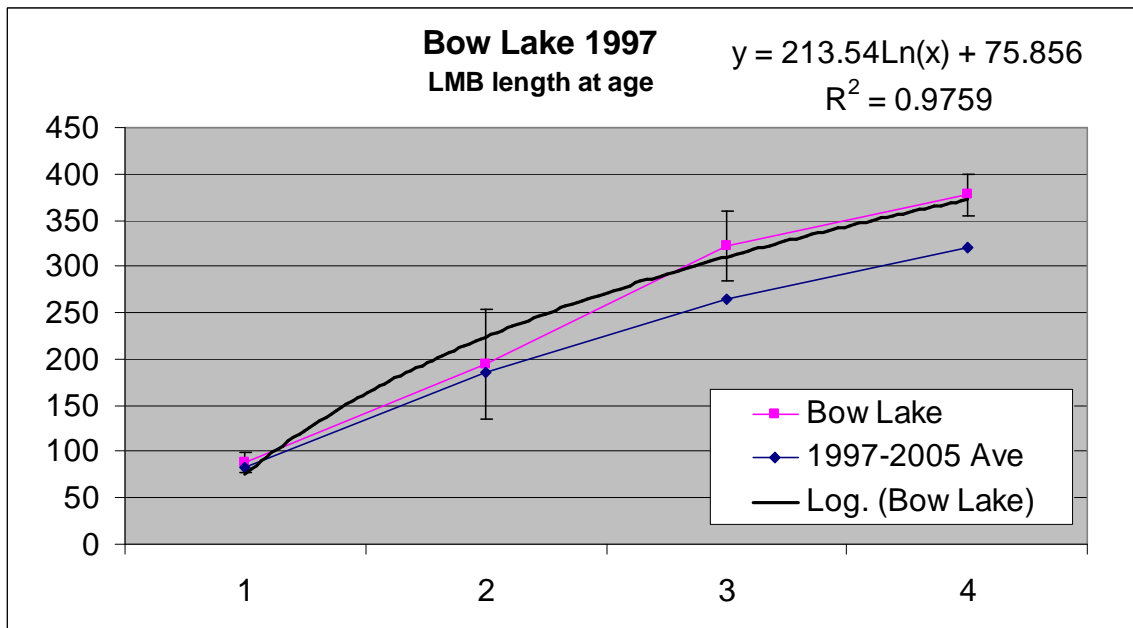


Figure 6. Average back-calculated length at age for largemouth bass from Bow Lake (Strafford) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

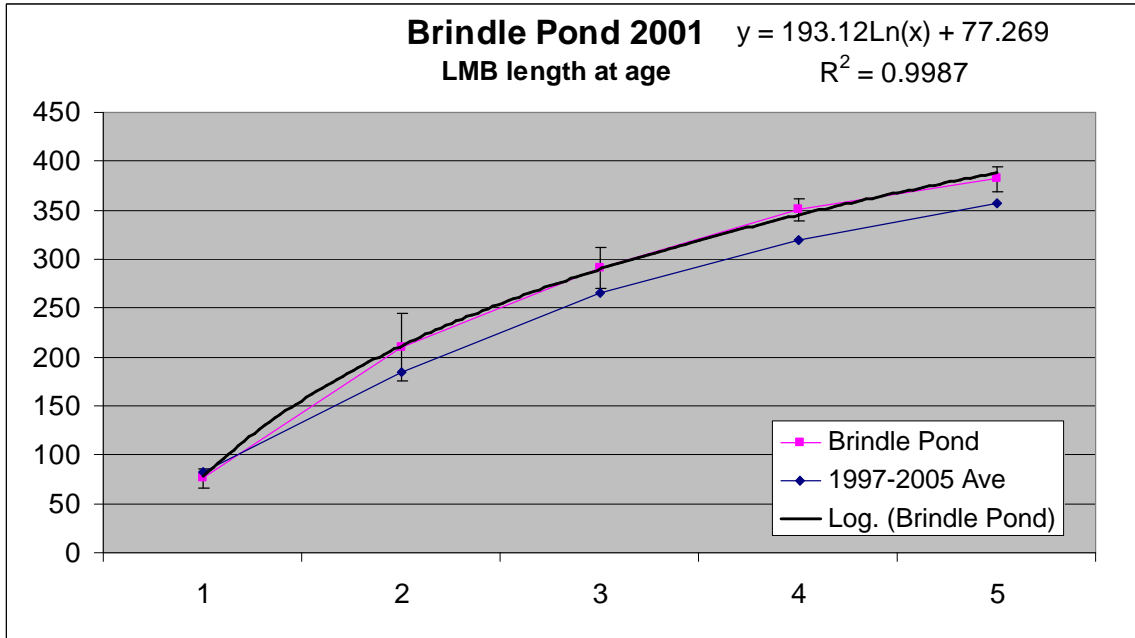


Figure 7. Average back-calculated length at age for largemouth bass from Brindle Pond (Barnstead) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

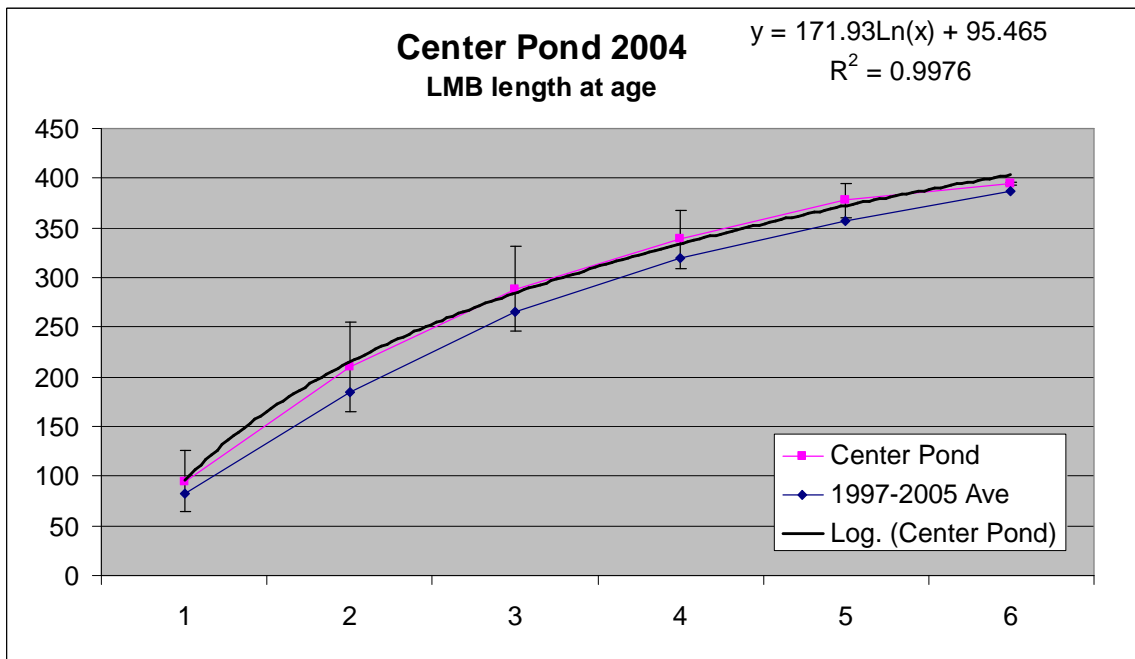


Figure 8. Average back-calculated length at age for largemouth bass from Center Pond (Stoddard) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

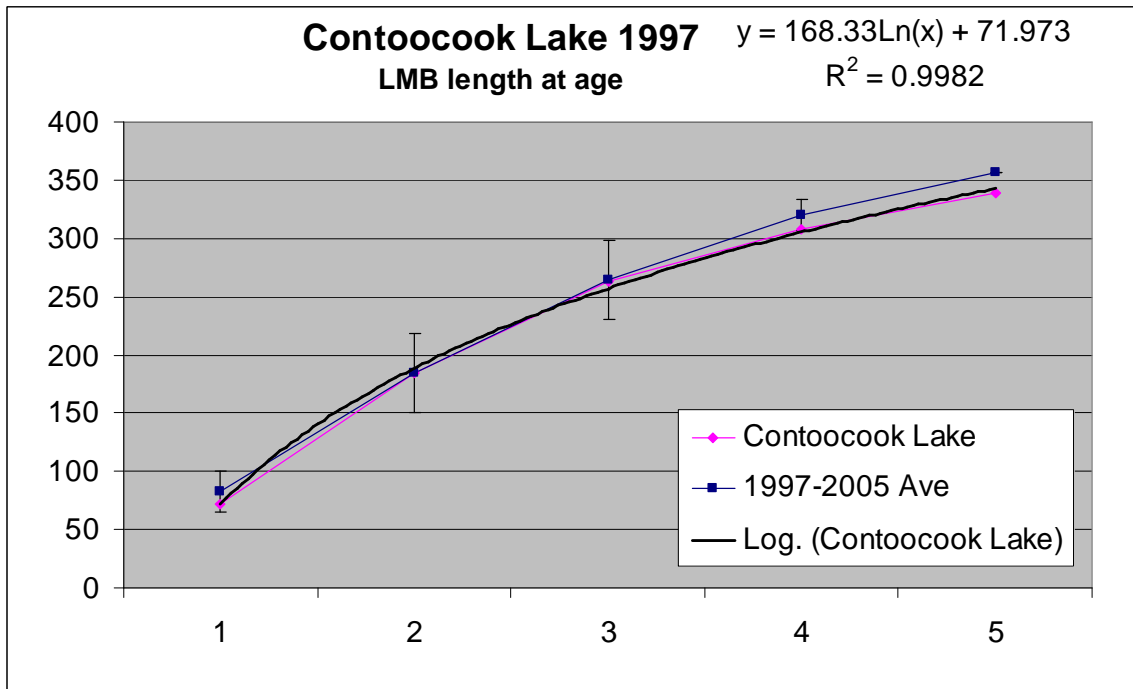


Figure 9. Average back-calculated length at age for largemouth bass from Contoocook Lake (Jaffrey) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

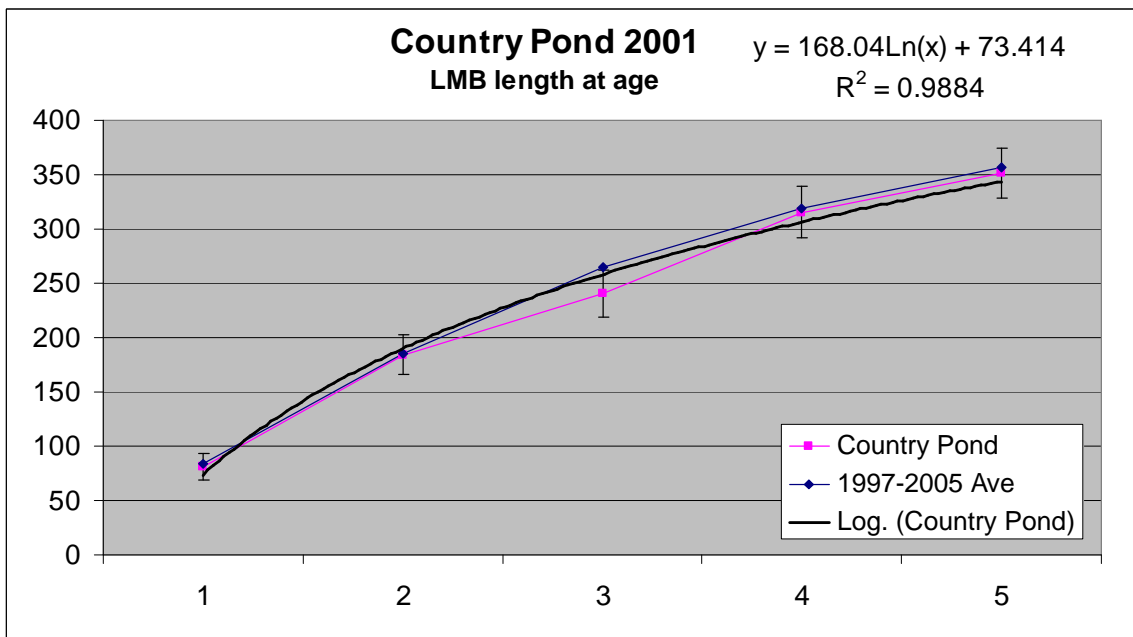


Figure 10. Average back-calculated length at age for largemouth bass from Country Pond (Kingston/Newton) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

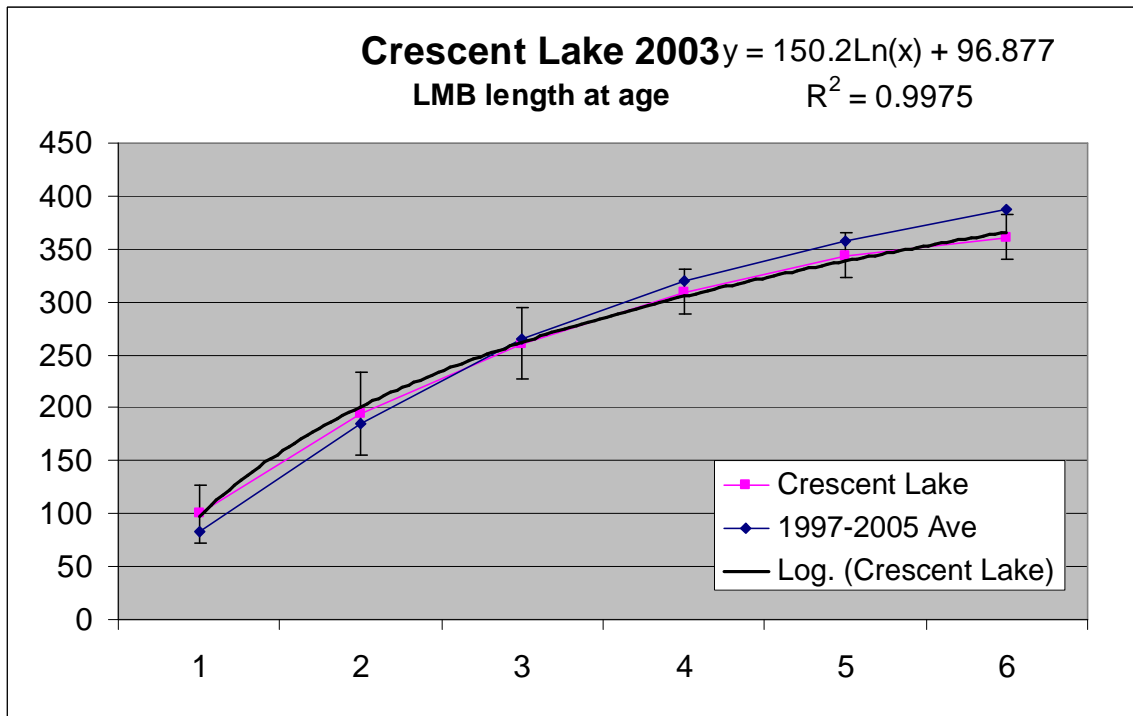


Figure 11. Average back-calculated length at age for largemouth bass from Crescent Lake (Acworth) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

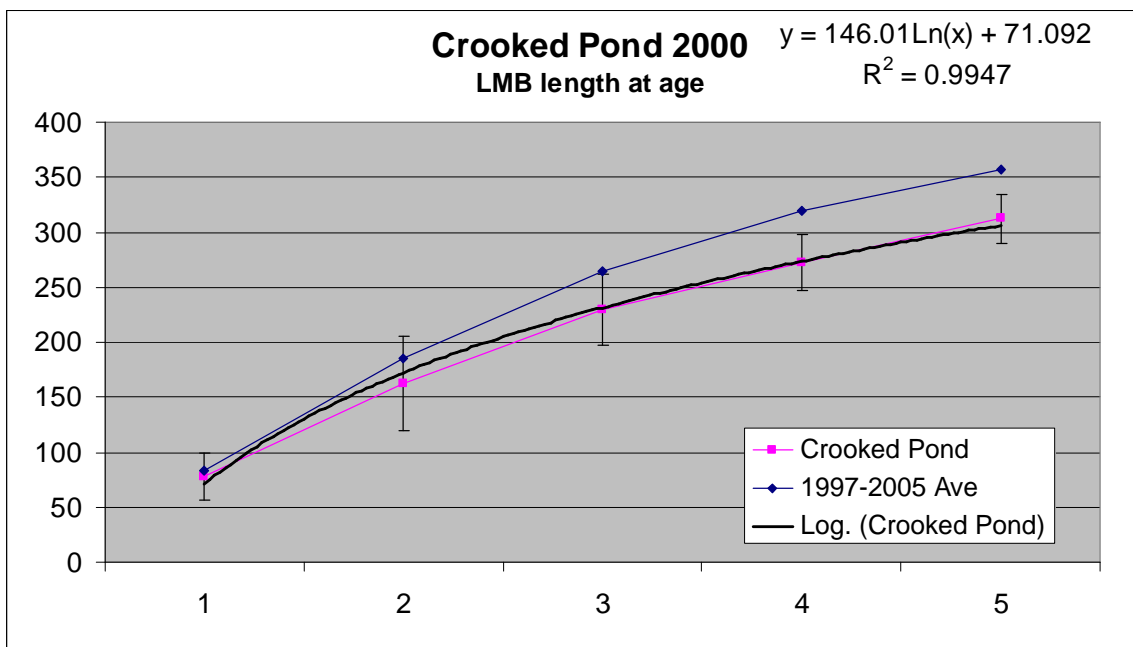


Figure 12. Average back-calculated length at age for largemouth bass from Crooked Pond (Loudon) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

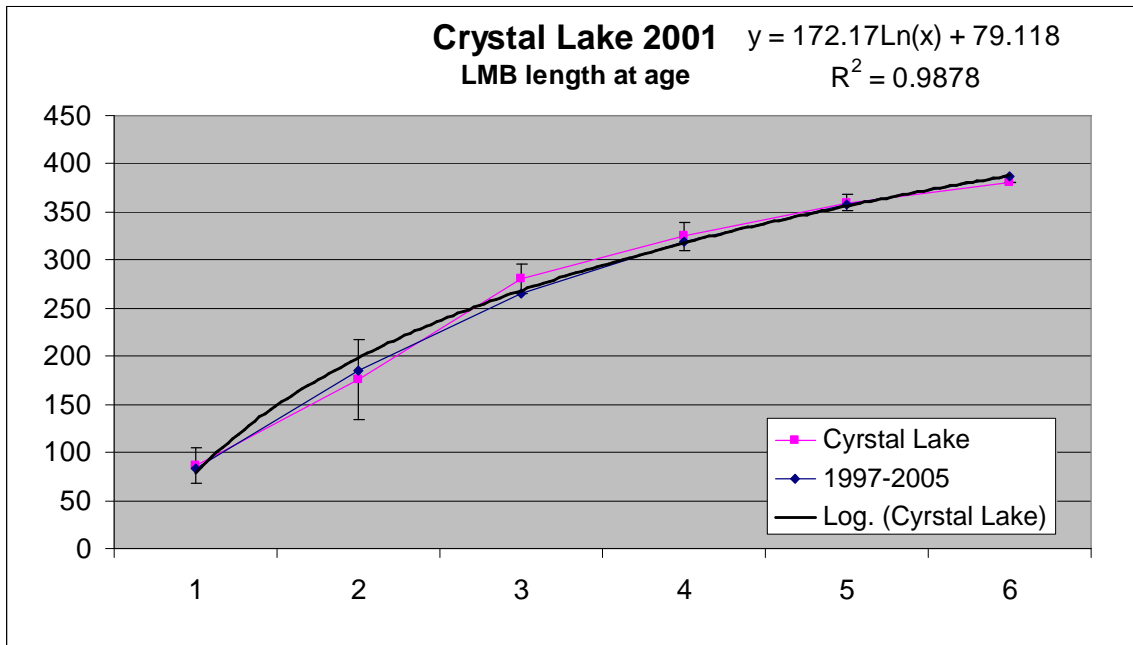


Figure 13. Average back-calculated length at age for largemouth bass from Crystal Lake (Manchester) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

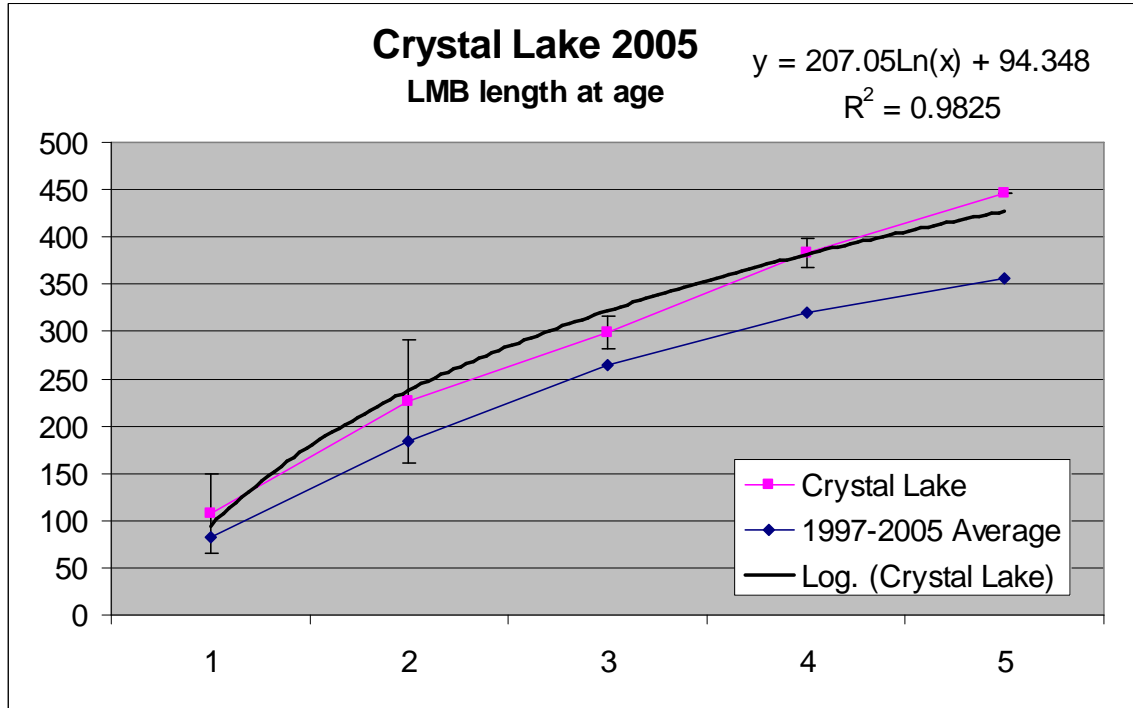


Figure 14. Average back-calculated length at age for largemouth bass from Crystal Lake (Gilmanton) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

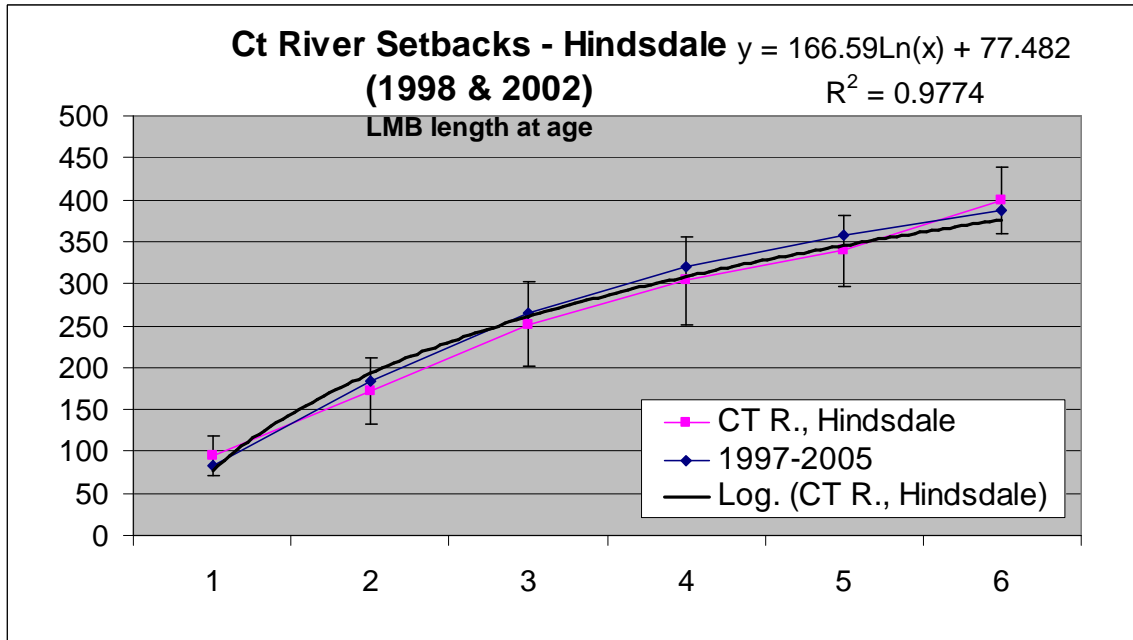


Figure 15. Average back-calculated length at age for largemouth bass from Connecticut River (Hindsdale) sampled in 1998 & 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

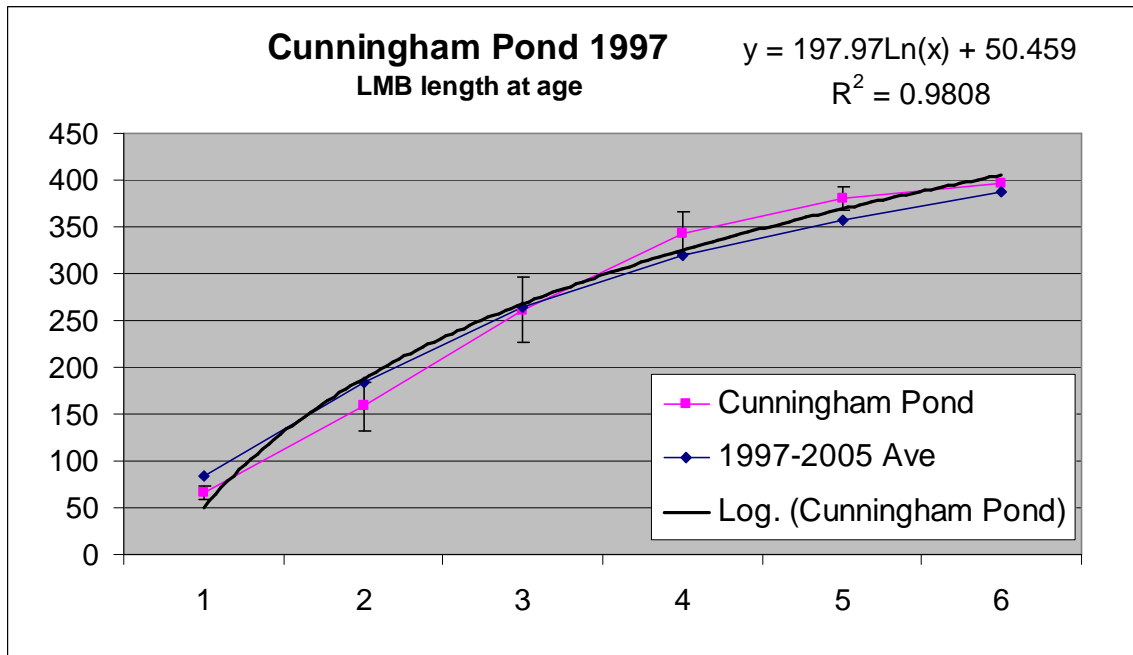


Figure 16. Average back-calculated length at age for largemouth bass from Cunningham Pond (Peterborough) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

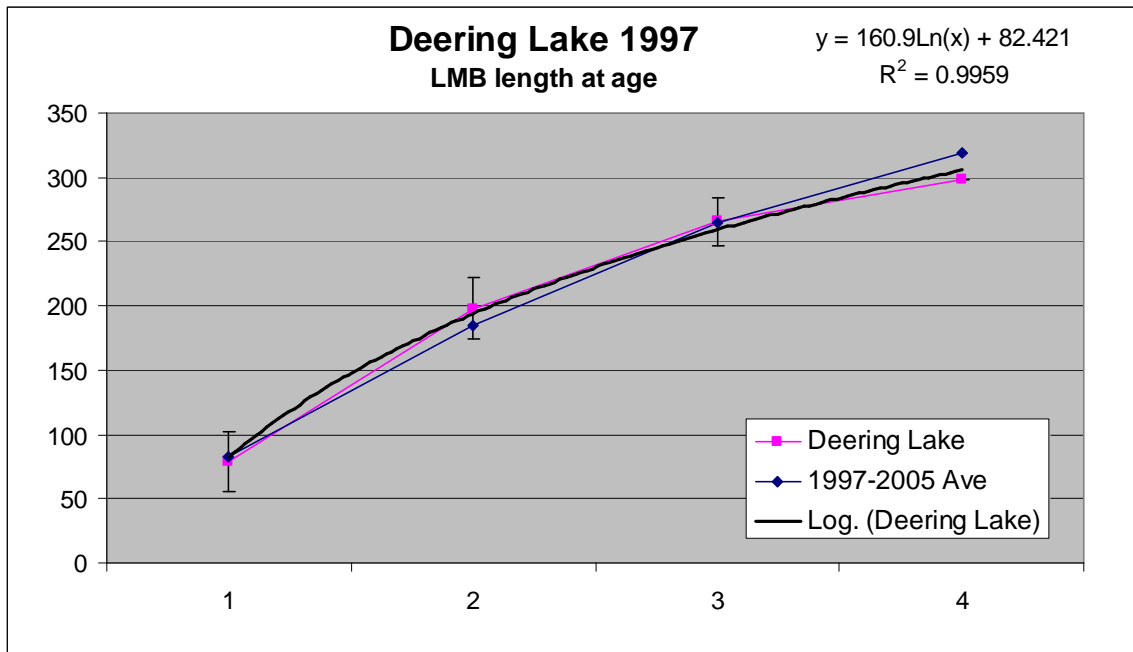


Figure 17. Average back-calculated length at age for largemouth bass from Deering Lake (Deering) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

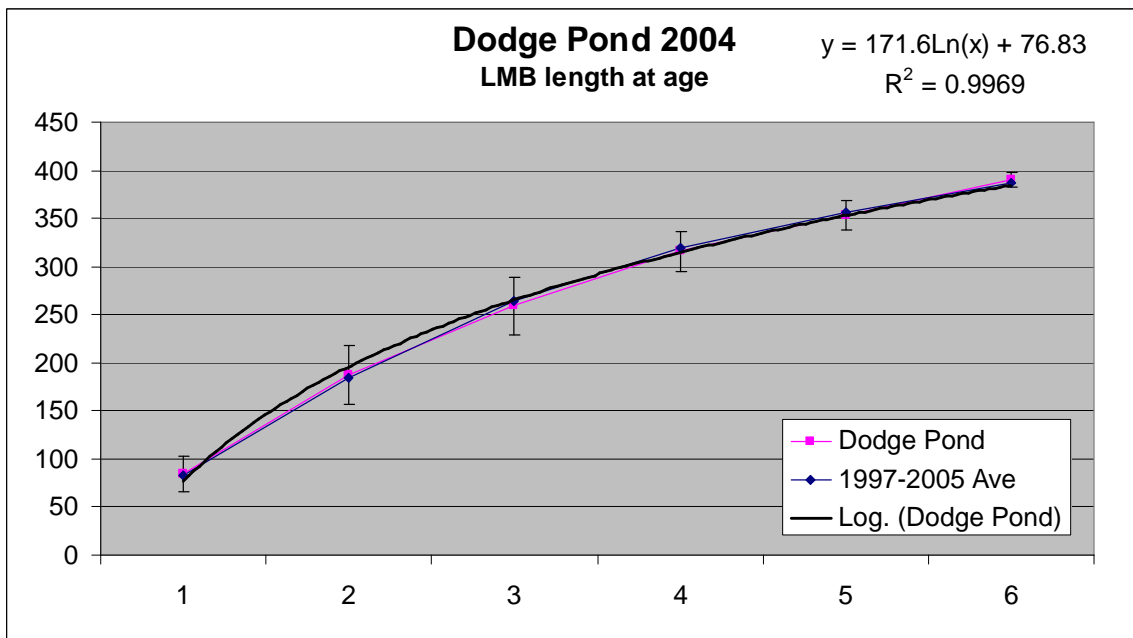


Figure 18. Average back-calculated length at age for largemouth bass from Dodge Pond (Lempster) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

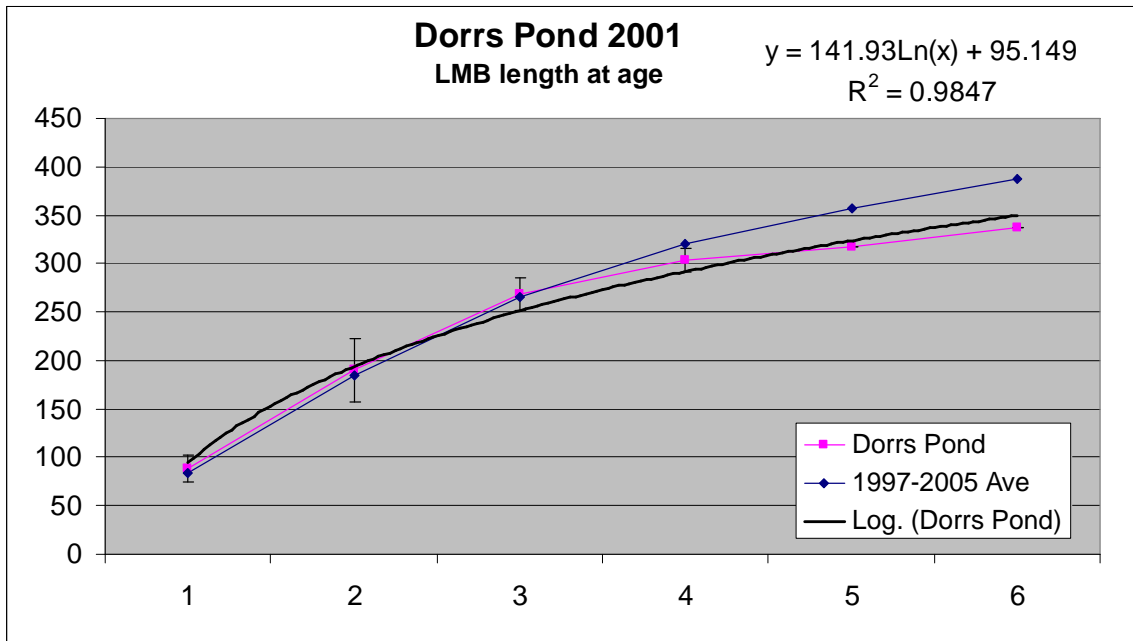


Figure 19. Average back-calculated length at age for largemouth bass from Dorrs Pond (Manchester) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

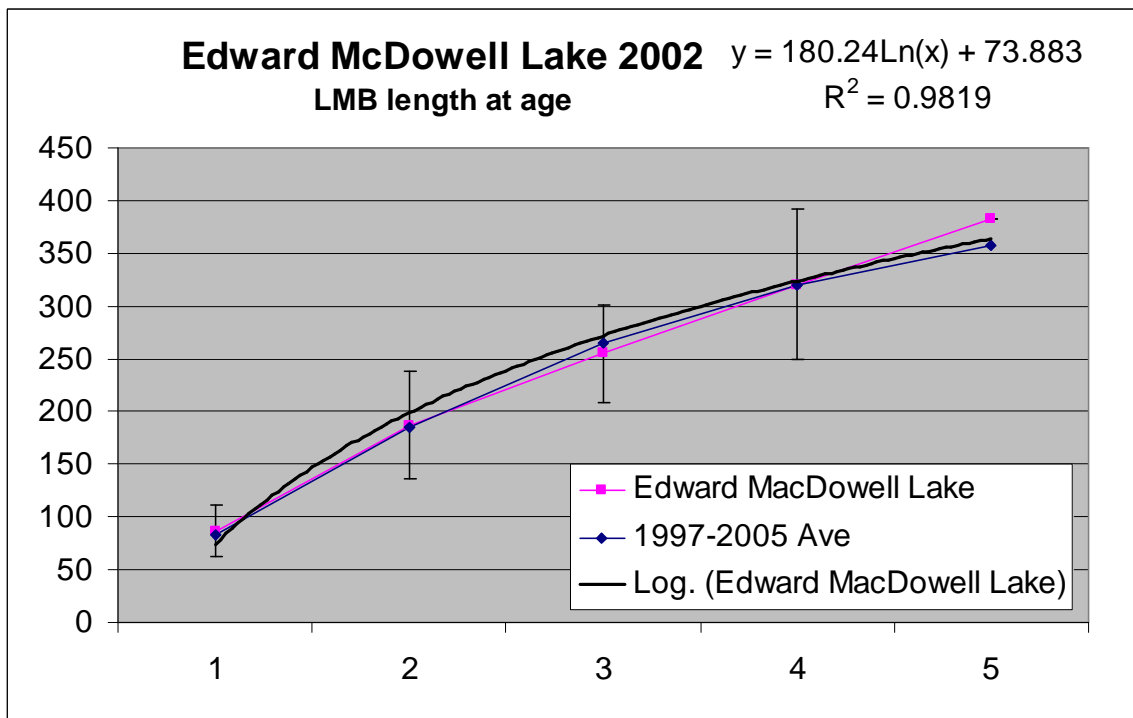


Figure 20. Average back-calculated length at age for largemouth bass from Edward McDowell Lake (Peterborough) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

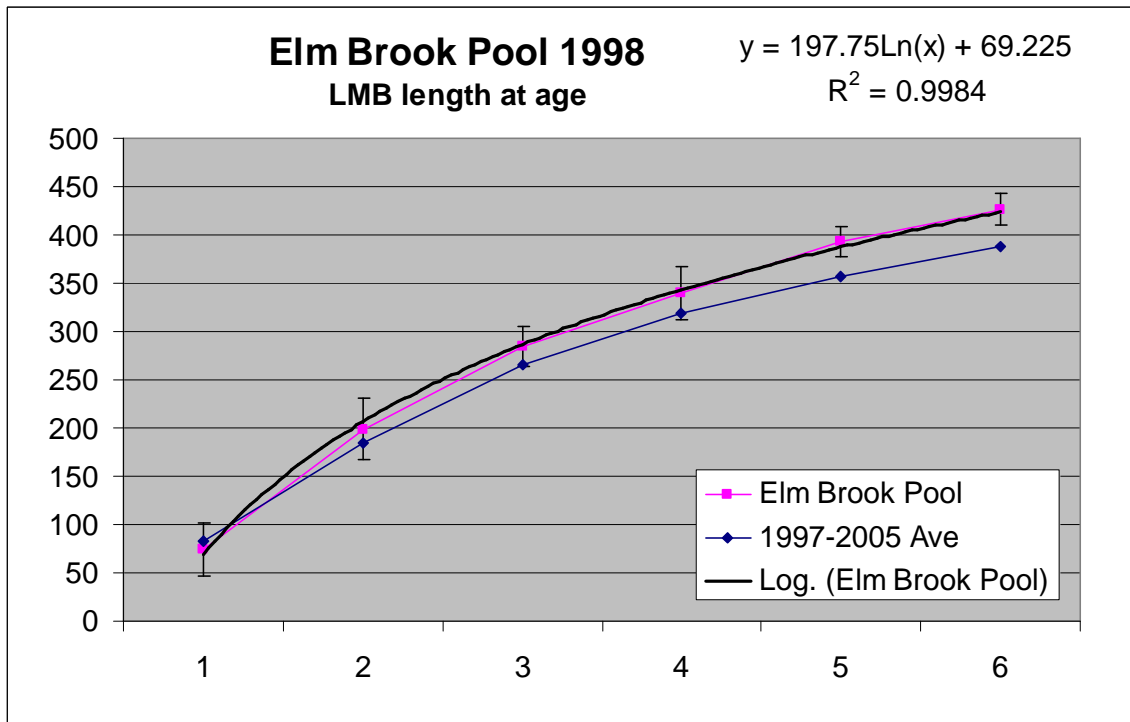


Figure 21. Average back-calculated length at age for largemouth bass from Elm Brook Pool (Hopkinton) sampled in 1998 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

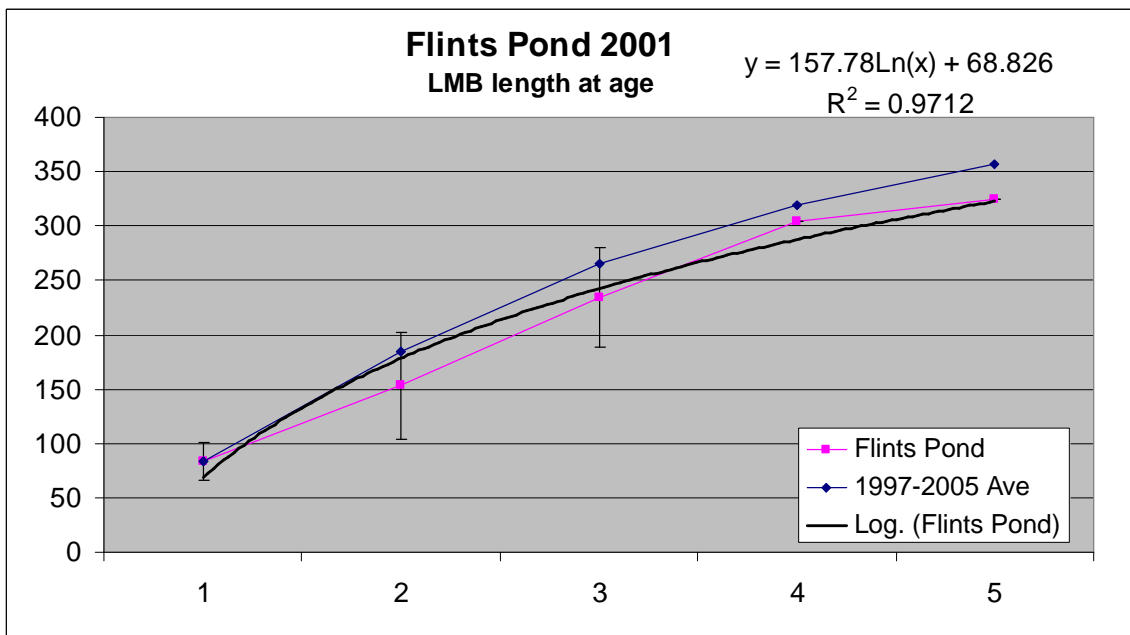


Figure 22. Average back-calculated length at age for largemouth bass from Flints Pond (Hollis) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

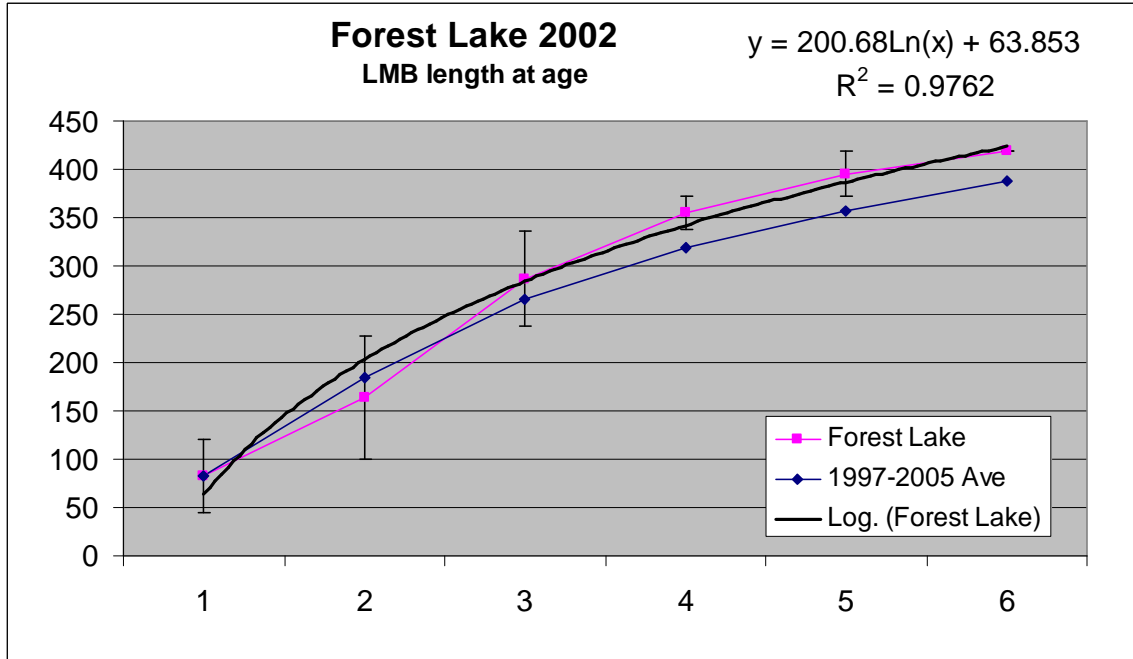


Figure 23. Average back-calculated length at age for largemouth bass from Forest Lake (Winchester) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

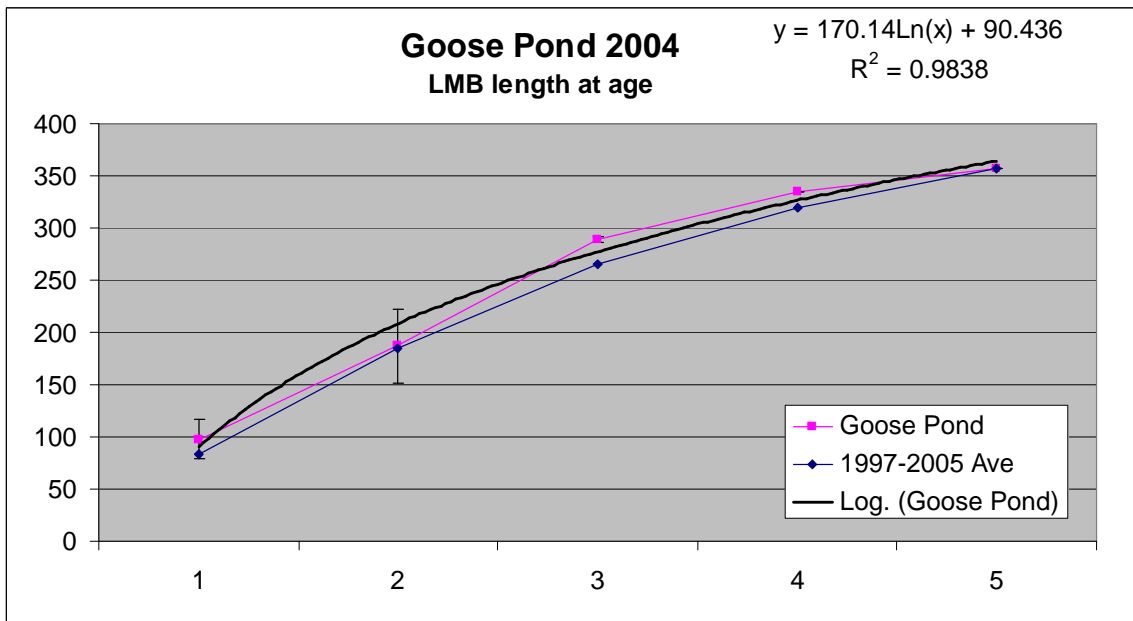


Figure 24. Average back-calculated length at age for largemouth bass from Goose Pond (Canaan) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

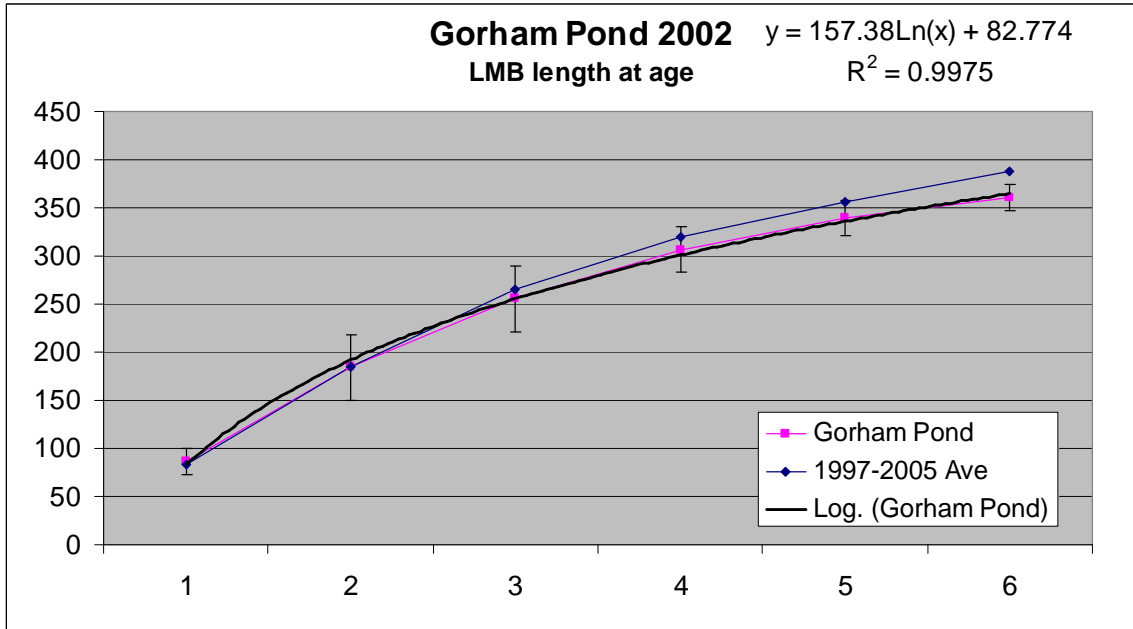


Figure 25. Average back-calculated length at age for largemouth bass from Gorham Pond (Dunbarton) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

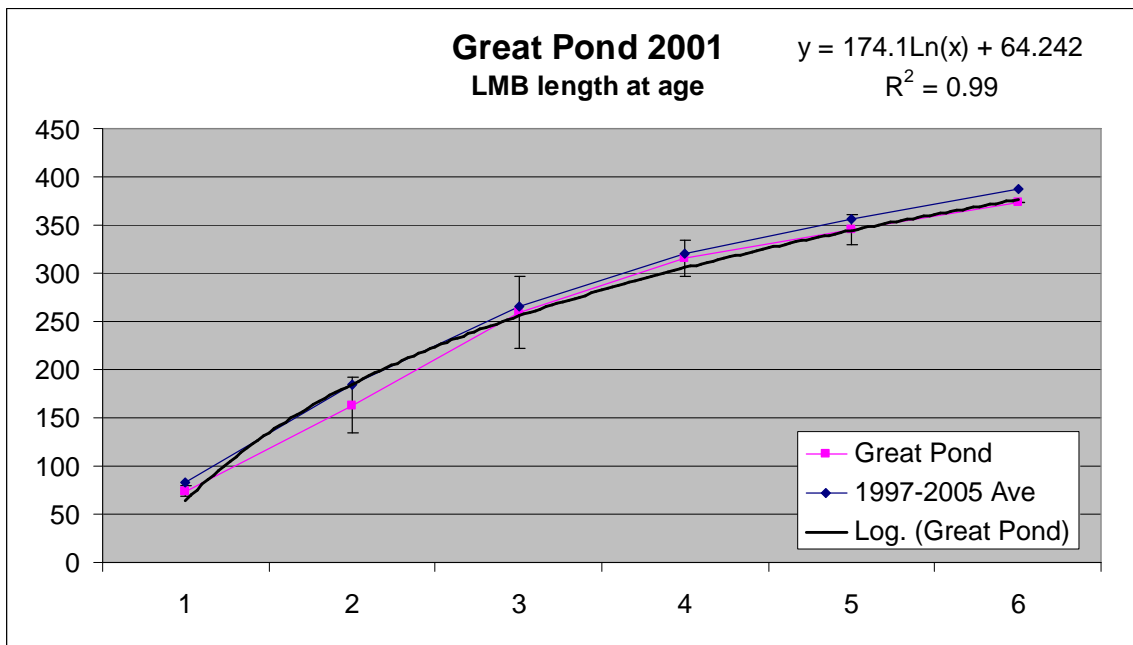


Figure 26. Average back-calculated length at age for largemouth bass from Great Pond (Kingston) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

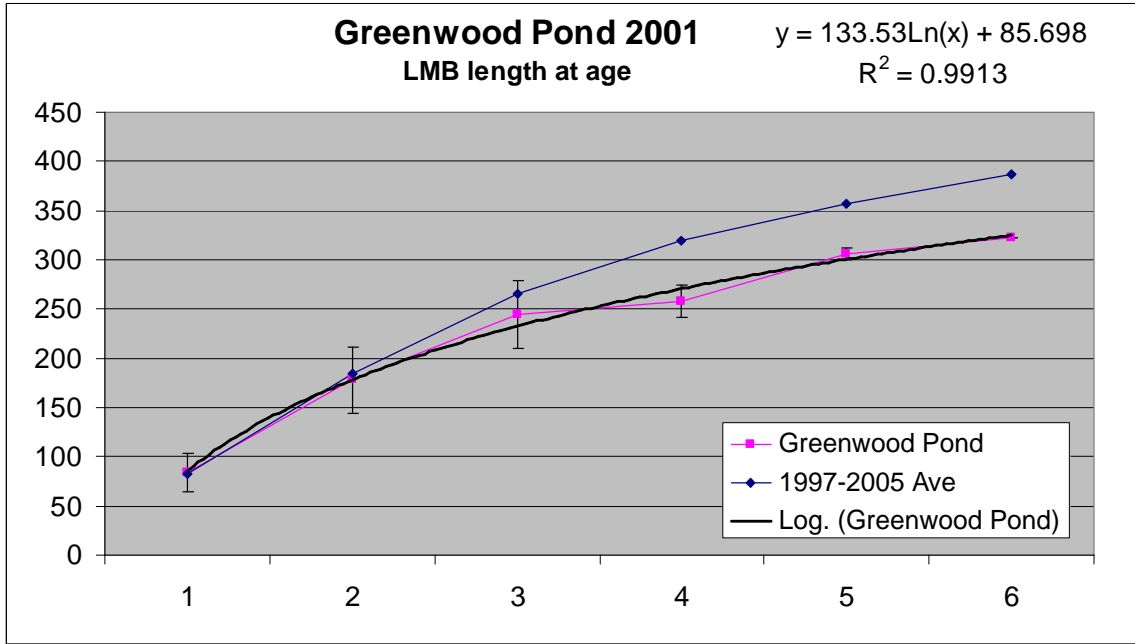


Figure 27. Average back-calculated length at age for largemouth bass from Greenwood Pond (Kingston) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

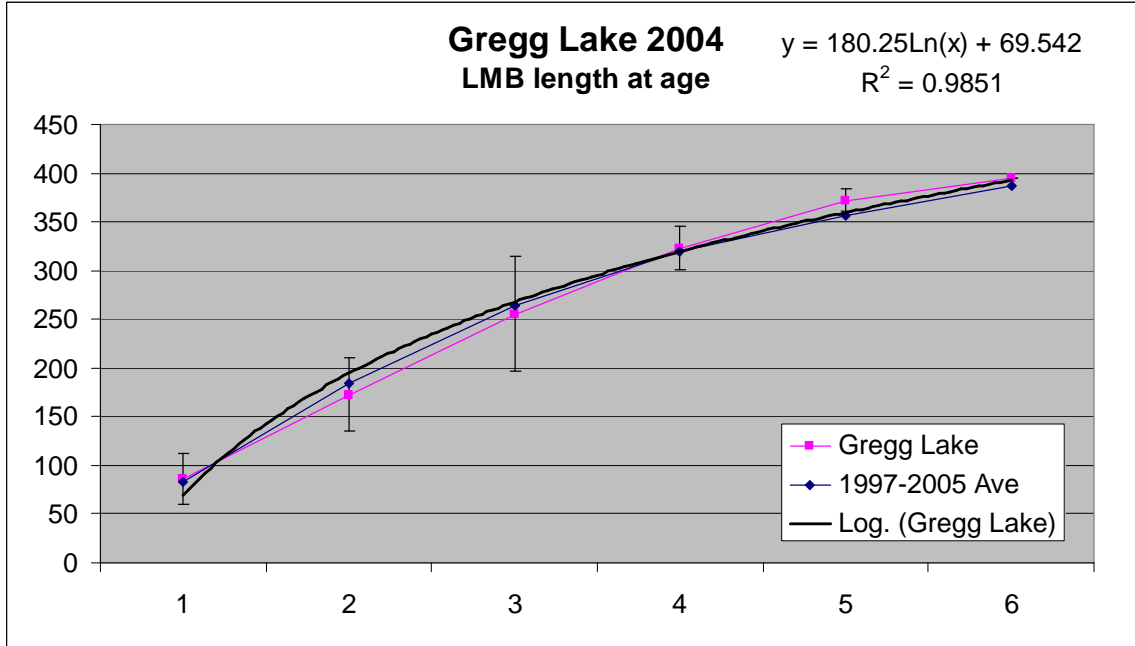


Figure 28. Average back-calculated length at age for largemouth bass from Gregg Lake (Antrim) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

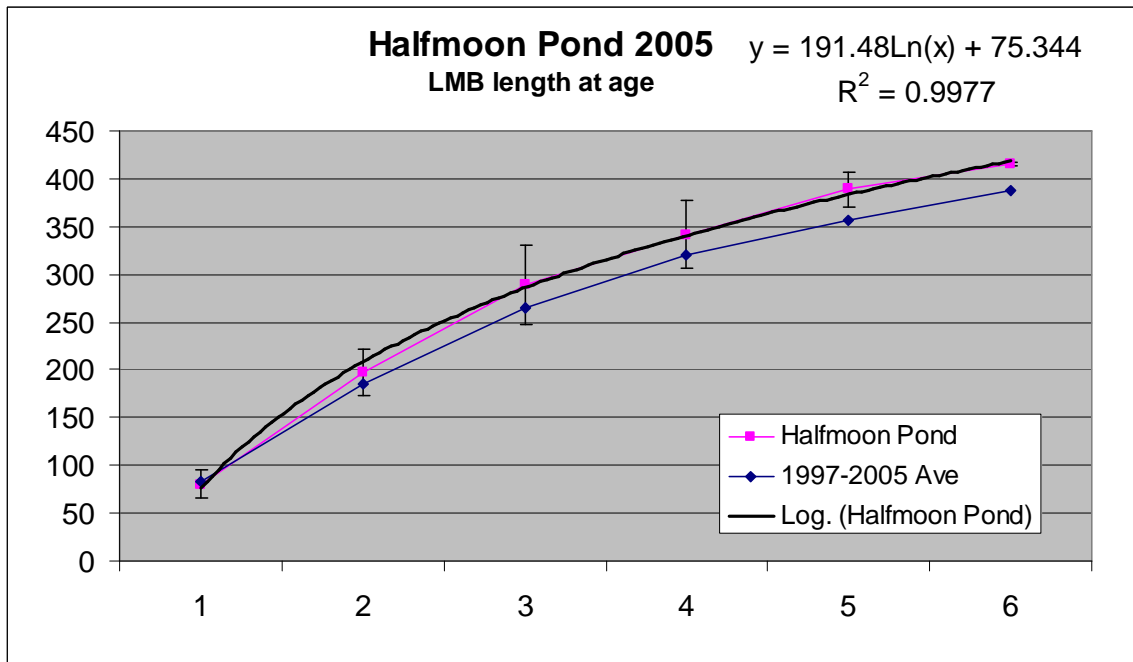


Figure 29. Average back-calculated length at age for largemouth bass from Halfmoon Pond (Barnstead) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

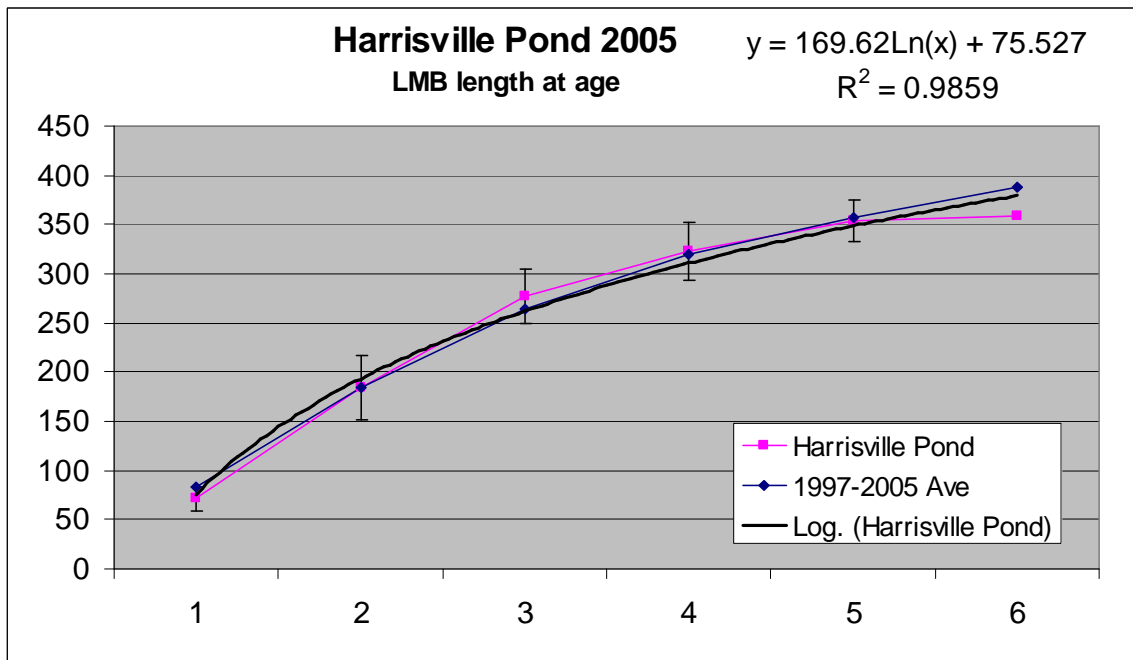


Figure 30. Average back-calculated length at age for largemouth bass from Harrisville Pond (Harrisville) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

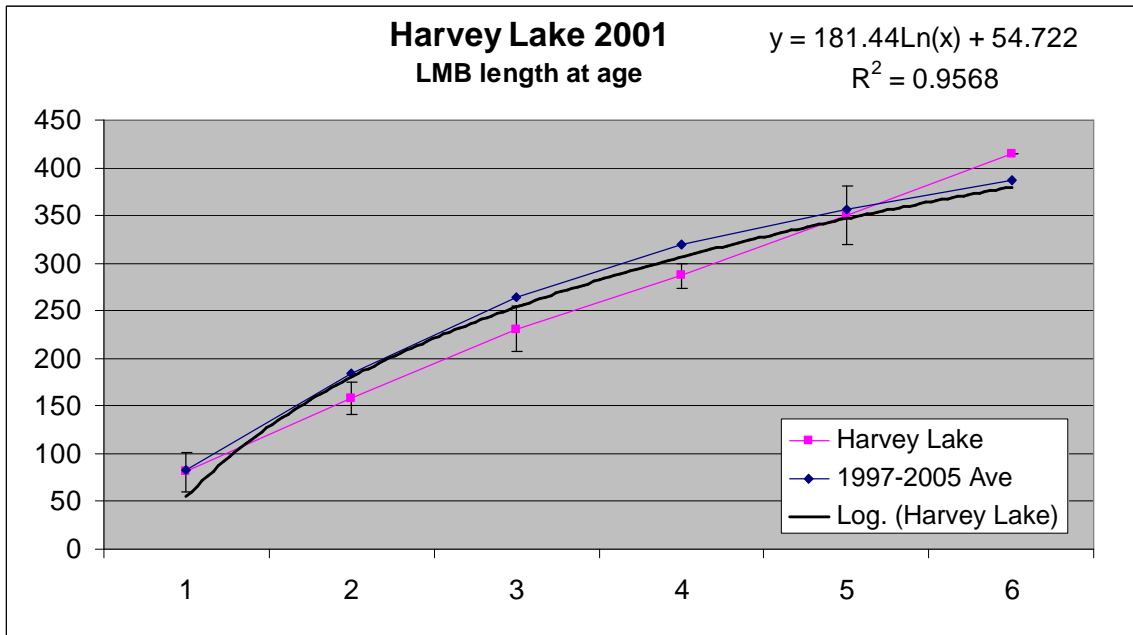


Figure 31. Average back-calculated length at age for largemouth bass from Harvey Lake (Northwood) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

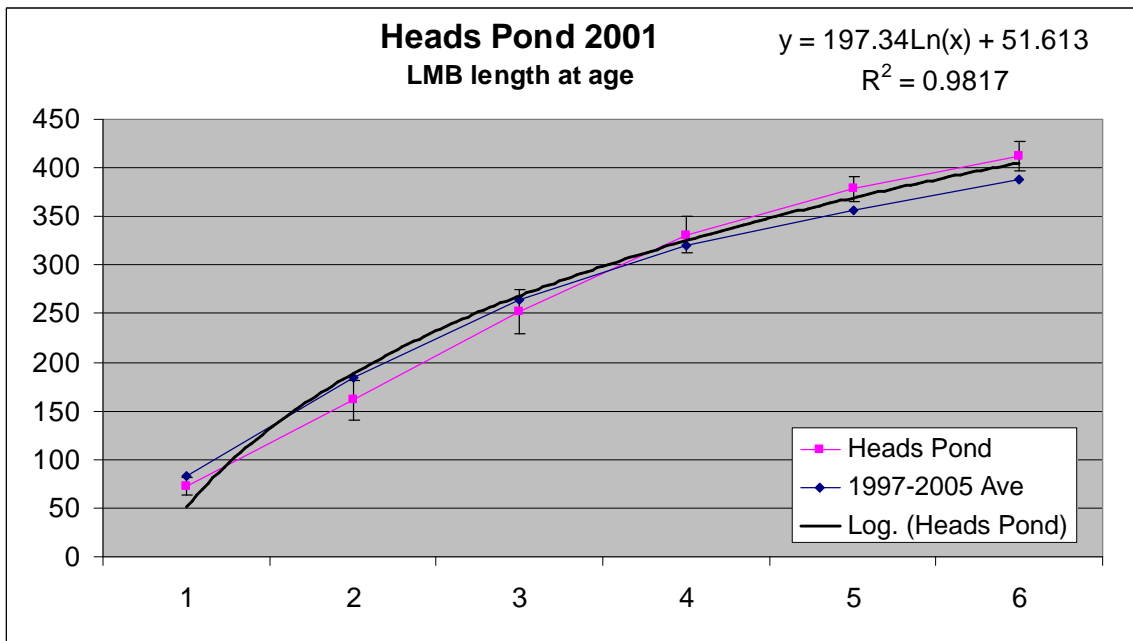


Figure 32. Average back-calculated length at age for largemouth bass from Heads Pond (Hooksett) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

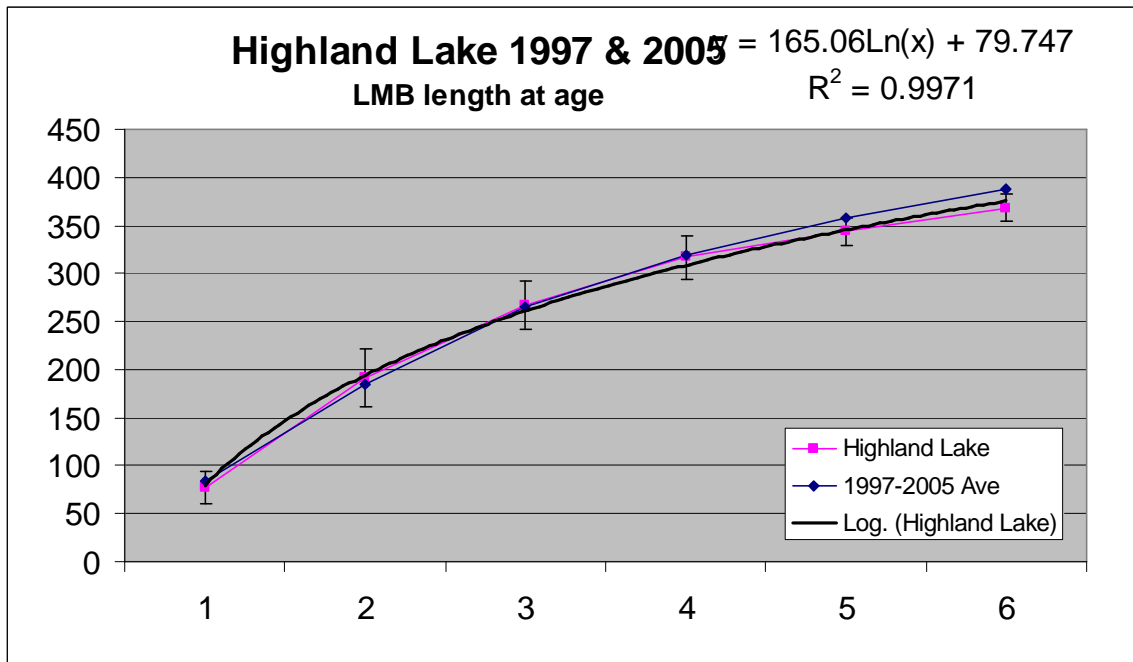


Figure 33. Average back-calculated length at age for largemouth bass from Highland Lake (Stoddard) sampled in 1997 and 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

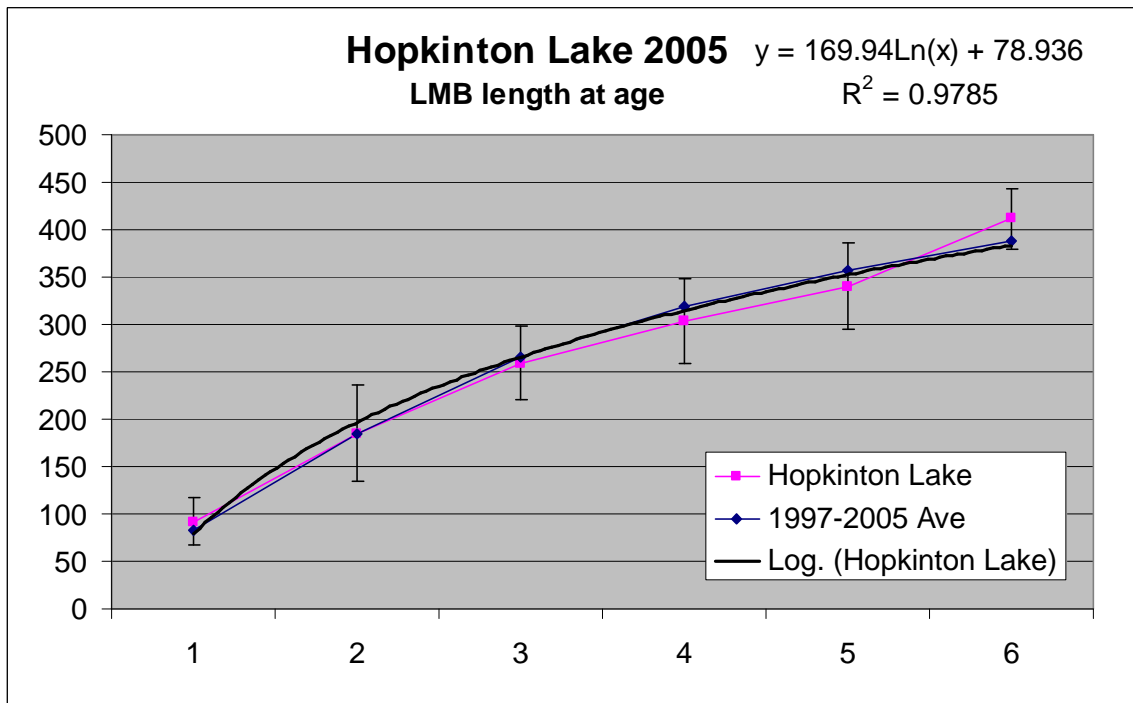


Figure 34. Average back-calculated length at age for largemouth bass from Hopkinton Lake (Hopkinton) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

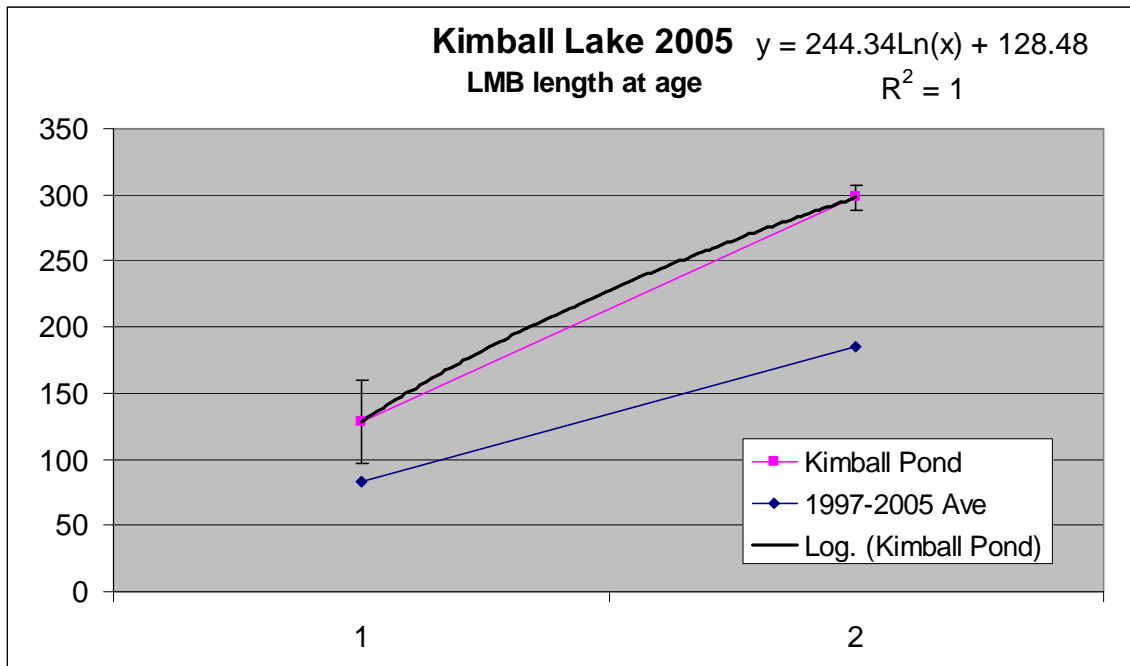


Figure 35. Average back-calculated length at age for largemouth bass from Kimball Lake (Hopkinton) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

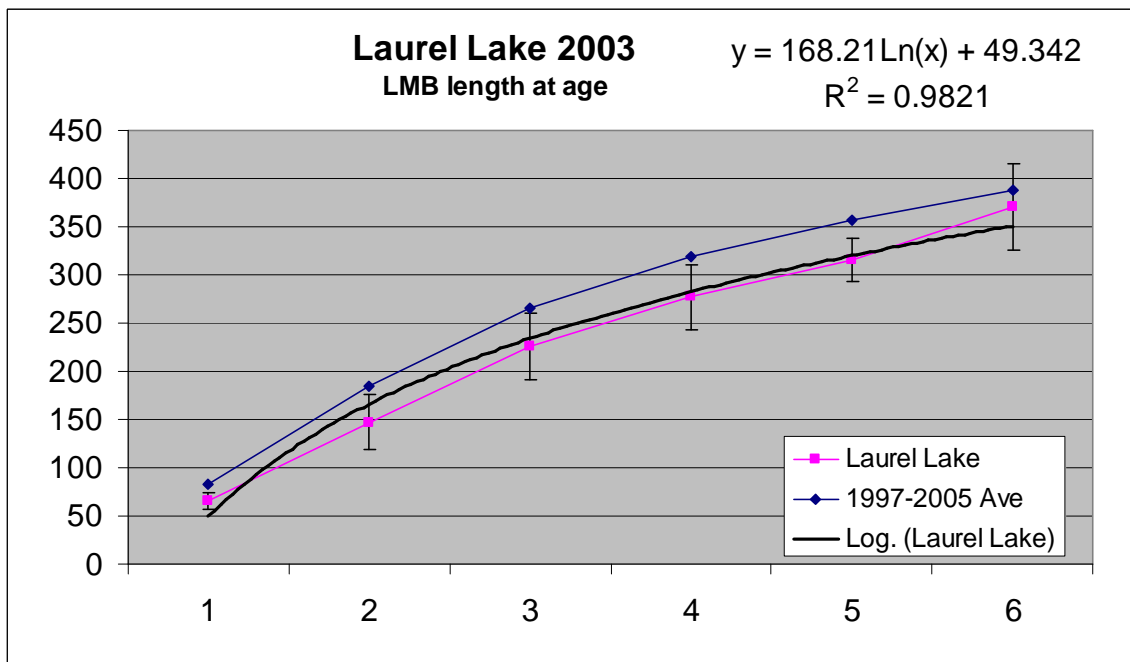


Figure 36. Average back-calculated length at age for largemouth bass from Laurel Lake (Fitzwilliam) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

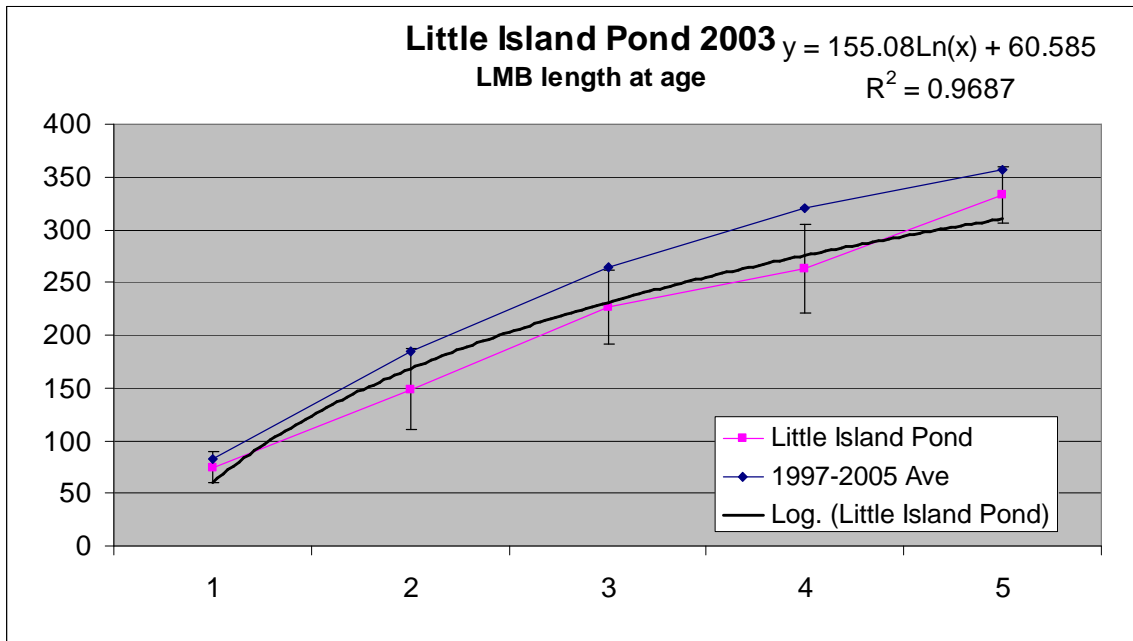


Figure 37. Average back-calculated length at age for largemouth bass from Little Island Pond (Pelham) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

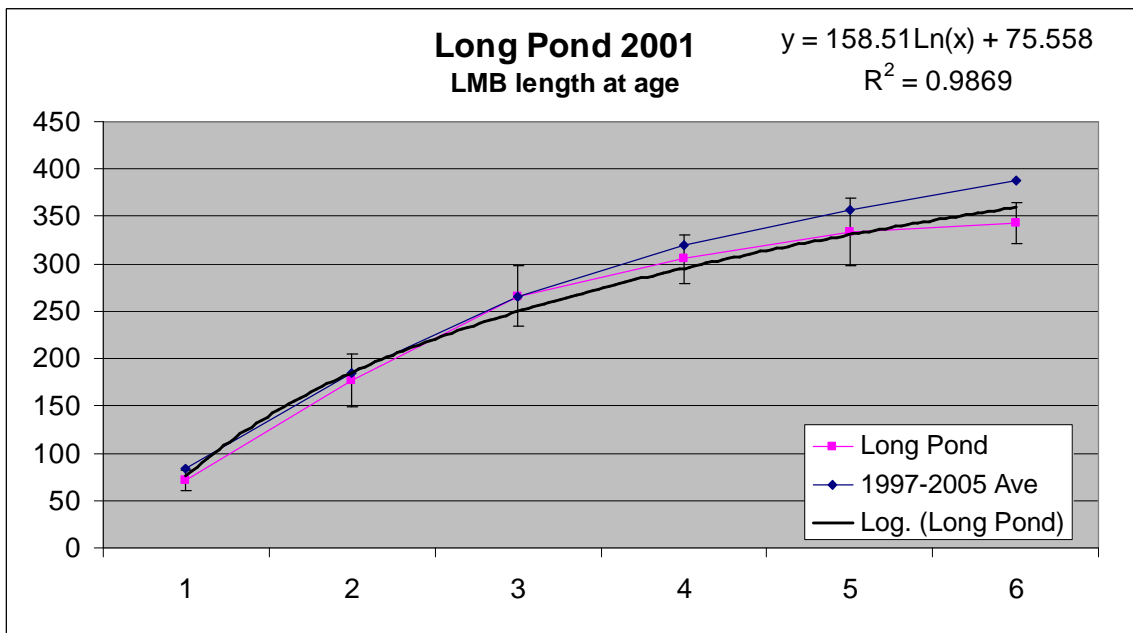


Figure 38. Average back-calculated length at age for largemouth bass from Long Pond (Danville/Kingston) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

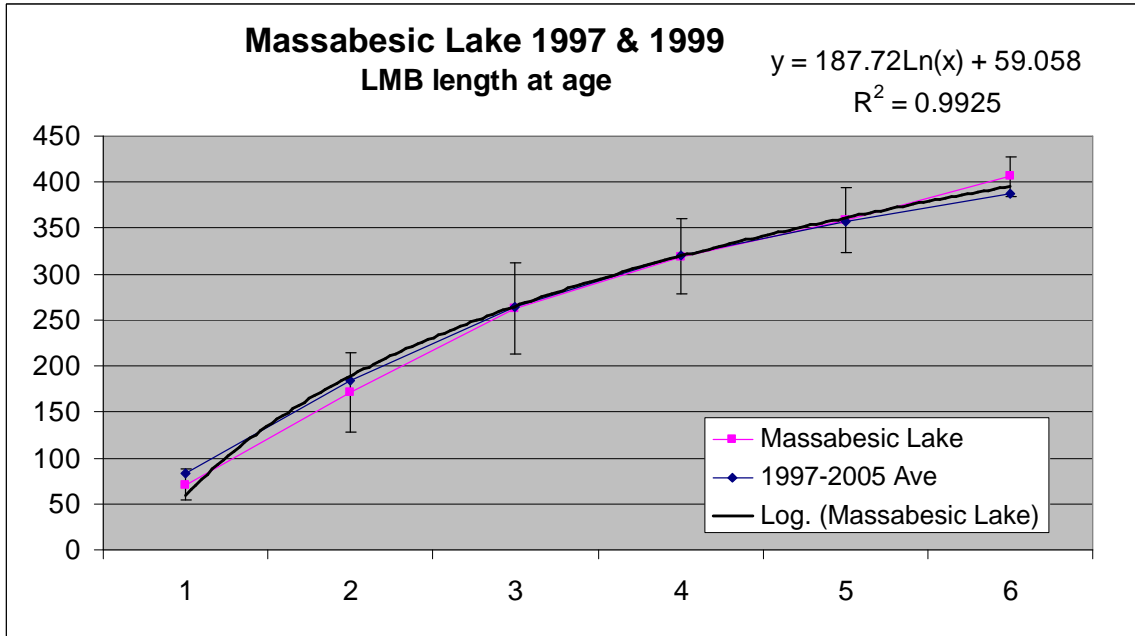


Figure 39. Average back-calculated length at age for largemouth bass from Massabesic Lake (Auburn) sampled in 1997 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

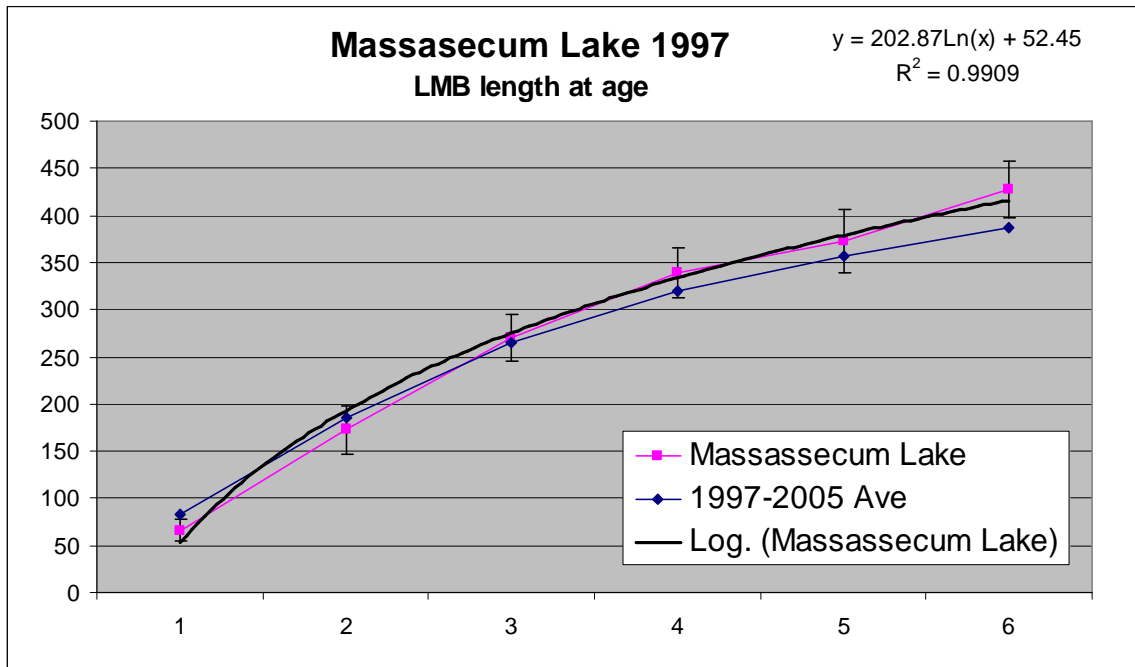


Figure 40. Average back-calculated length at age for largemouth bass from Massassecum Lake (Bradford) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

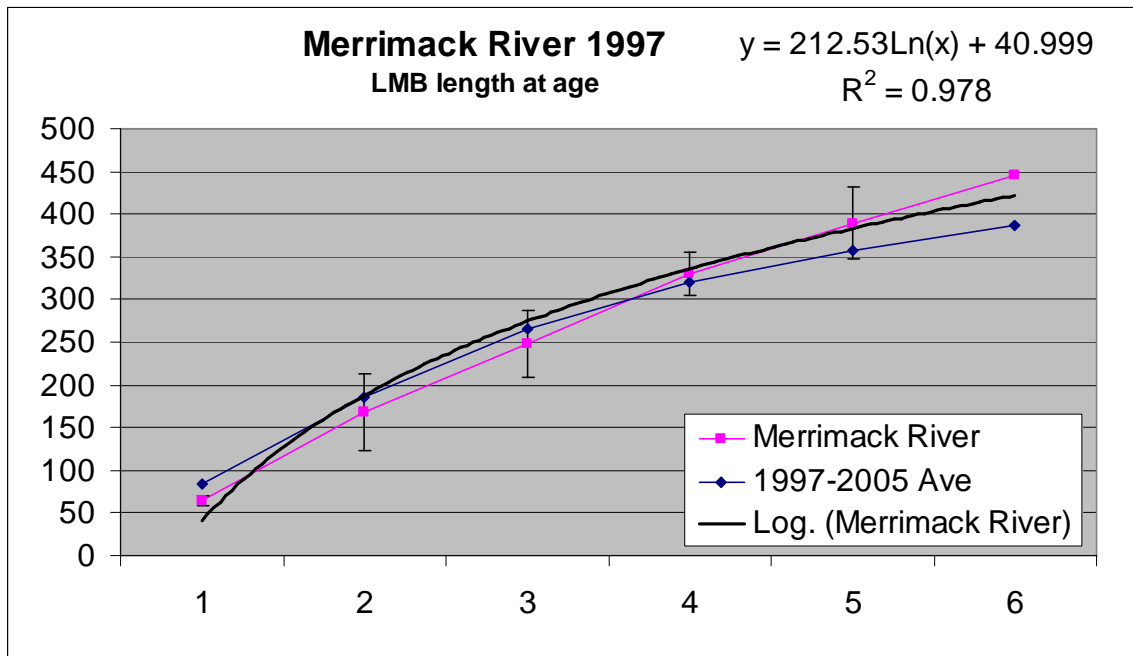


Figure 41. Average back-calculated length at age for largemouth bass from Merrimack River sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

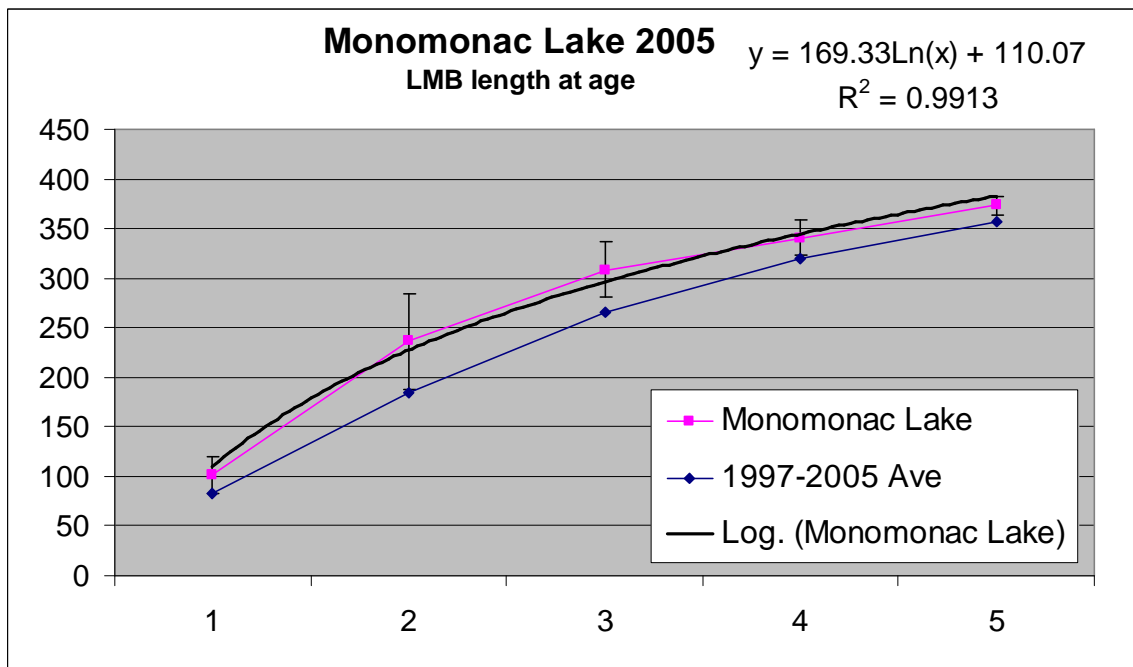


Figure 42. Average back-calculated length at age for largemouth bass from Monomonac Lake (Rindge) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

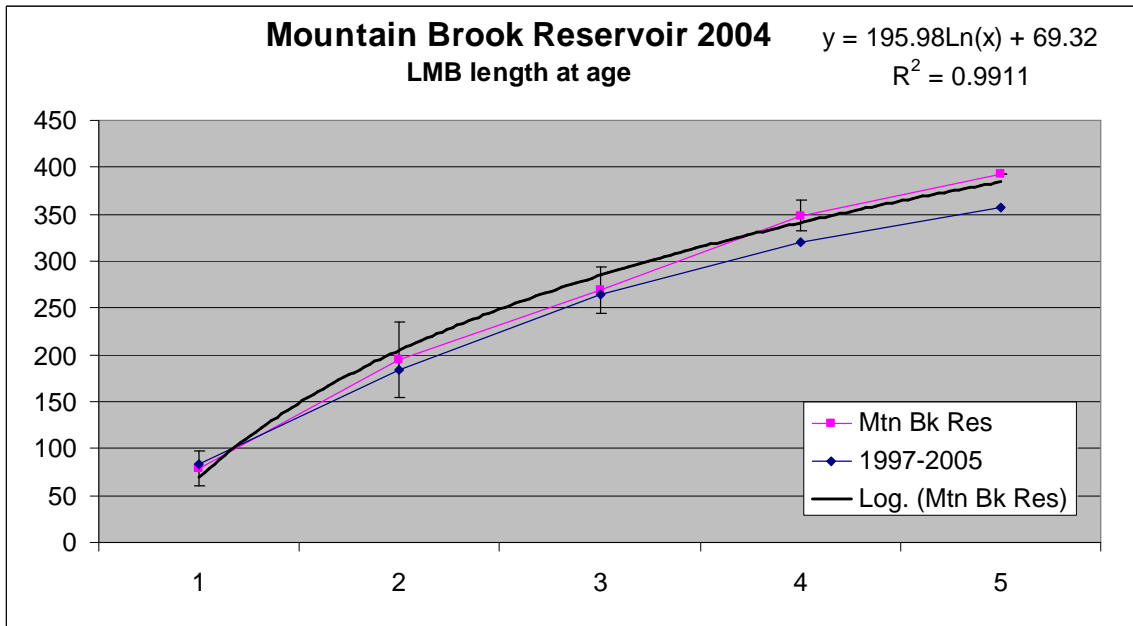


Figure 43. Average back-calculated length at age for largemouth bass from Mountain Brook Reservoir (Jaffrey) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

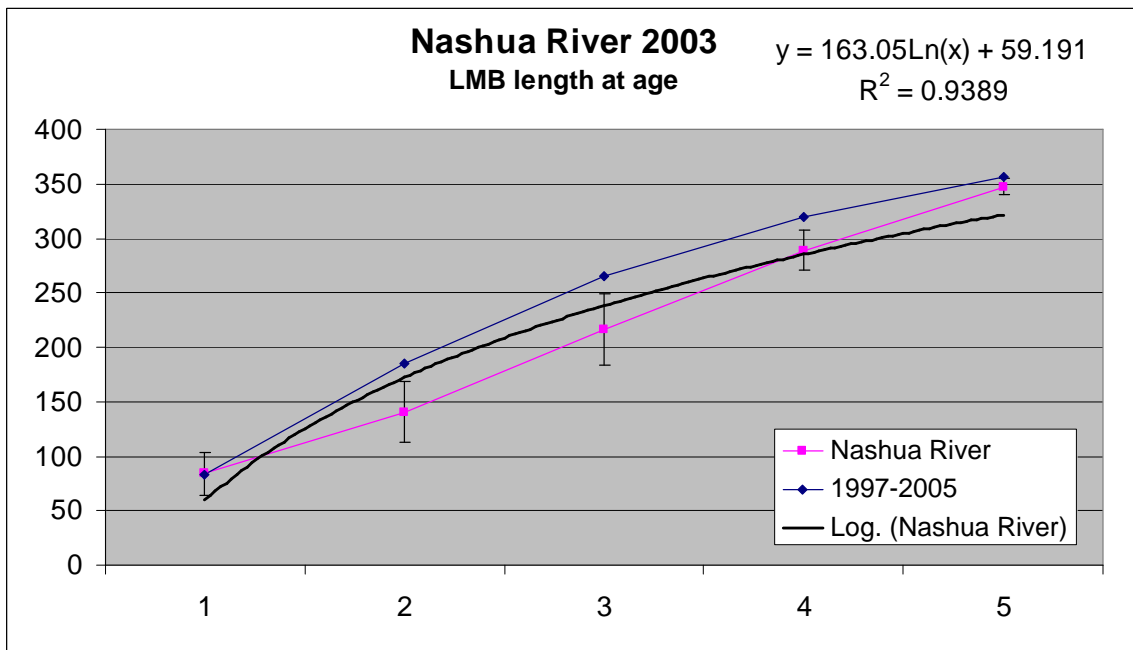


Figure 44. Average back-calculated length at age for largemouth bass from Nashua River sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

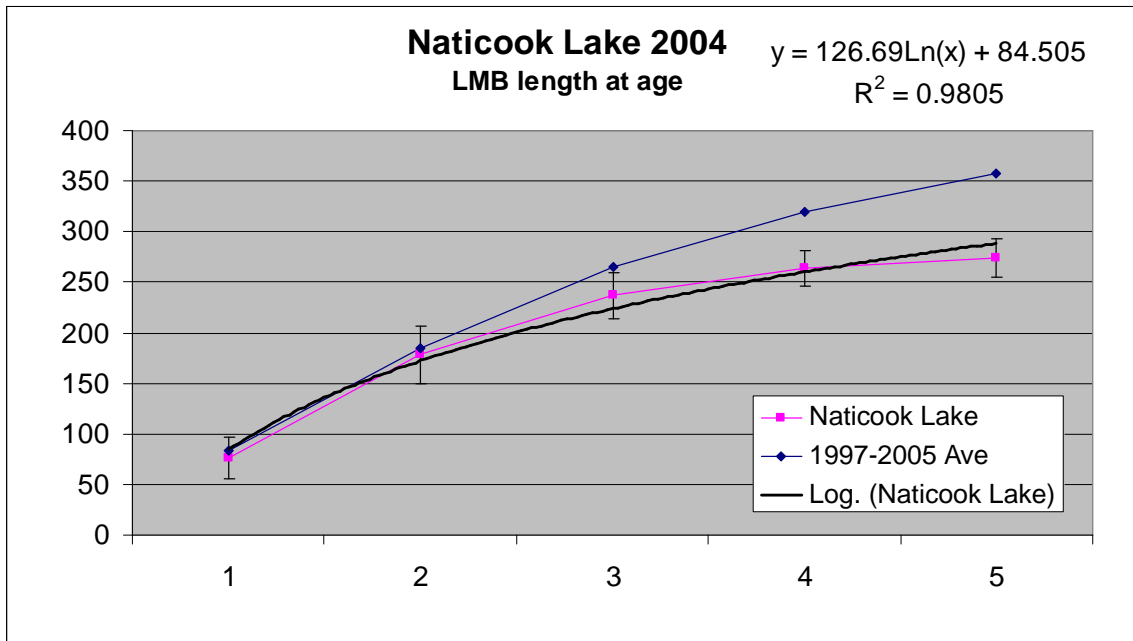


Figure 45. Average back-calculated length at age for largemouth bass from Naticook Lake (Merrimack) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

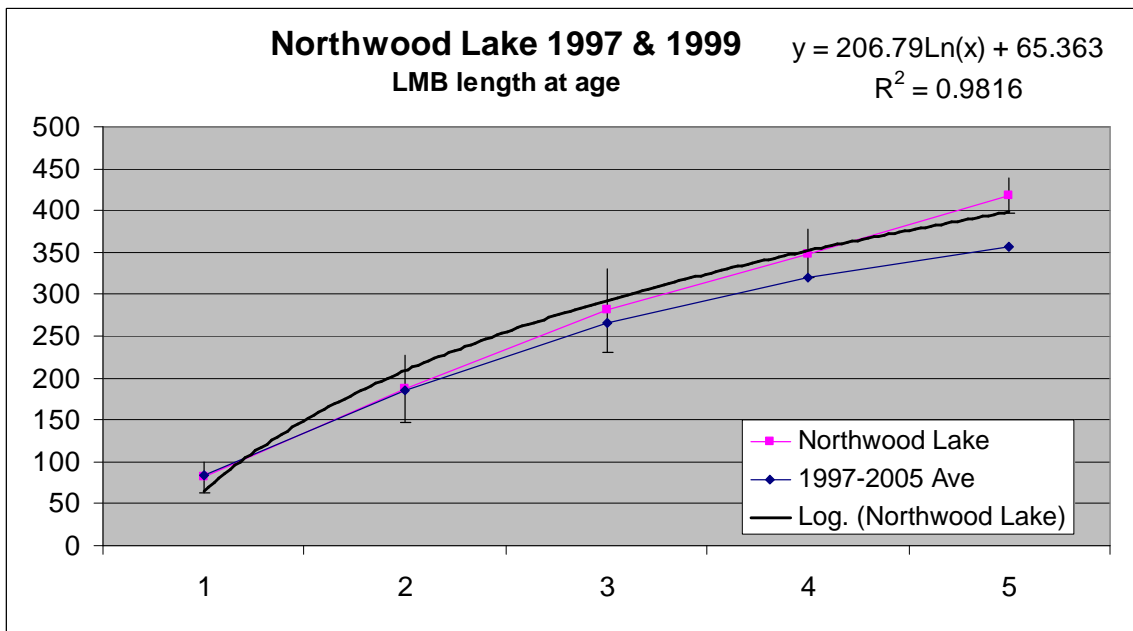


Figure 46. Average back-calculated length at age for largemouth bass from Northwood Lake (Northwood) sampled in 1997 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

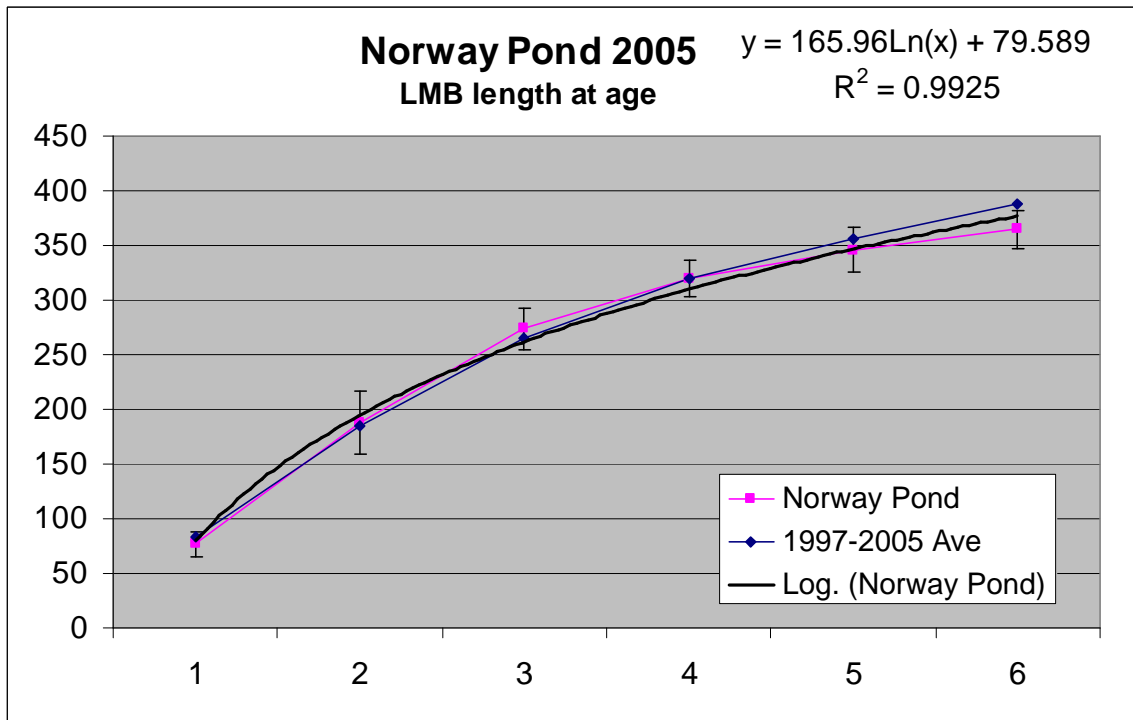


Figure 47. Average back-calculated length at age for largemouth bass from Norway Pond (Hancock) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

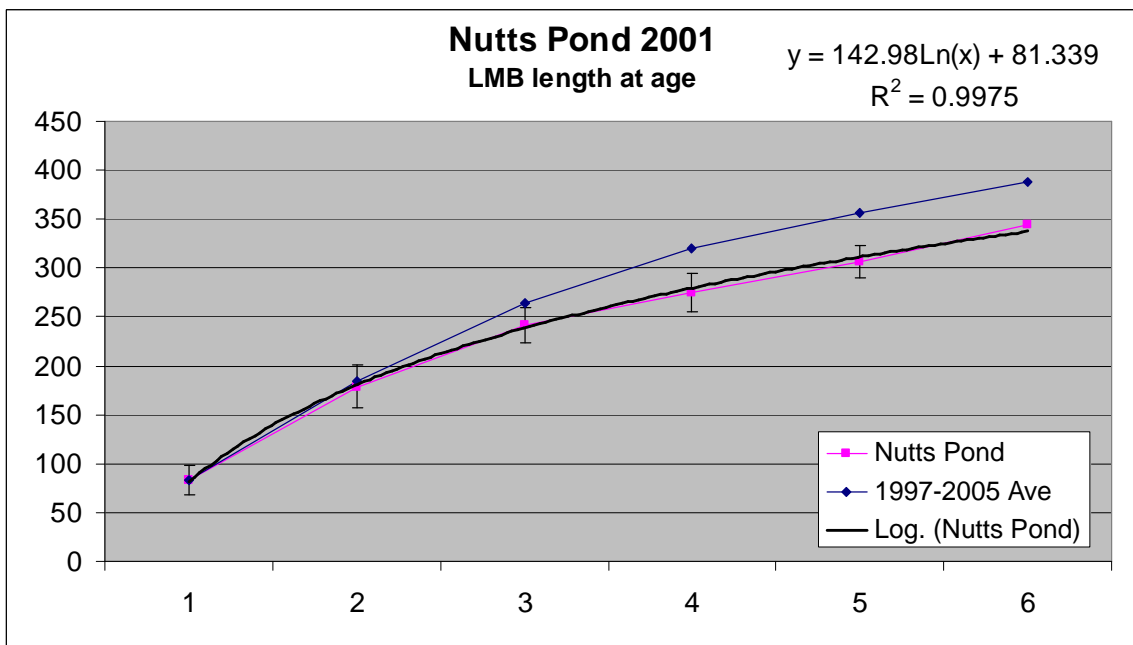


Figure 48. Average back-calculated length at age for largemouth bass from Nutts Pond (Manchester) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

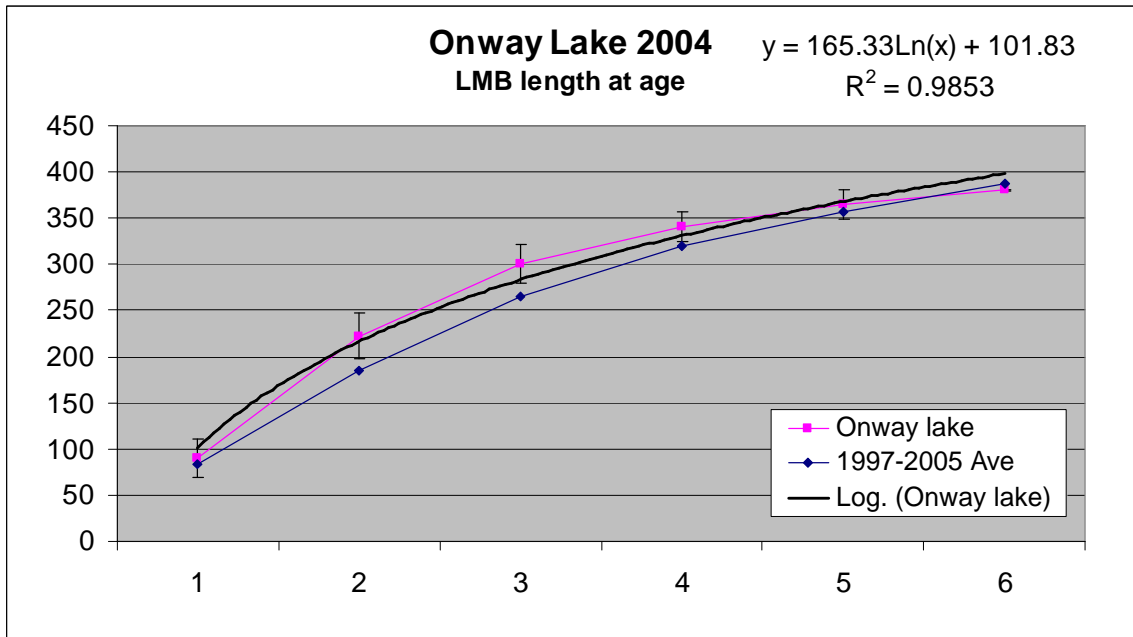


Figure 49. Average back-calculated length at age for largemouth bass from Onway Lake (Raymond) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

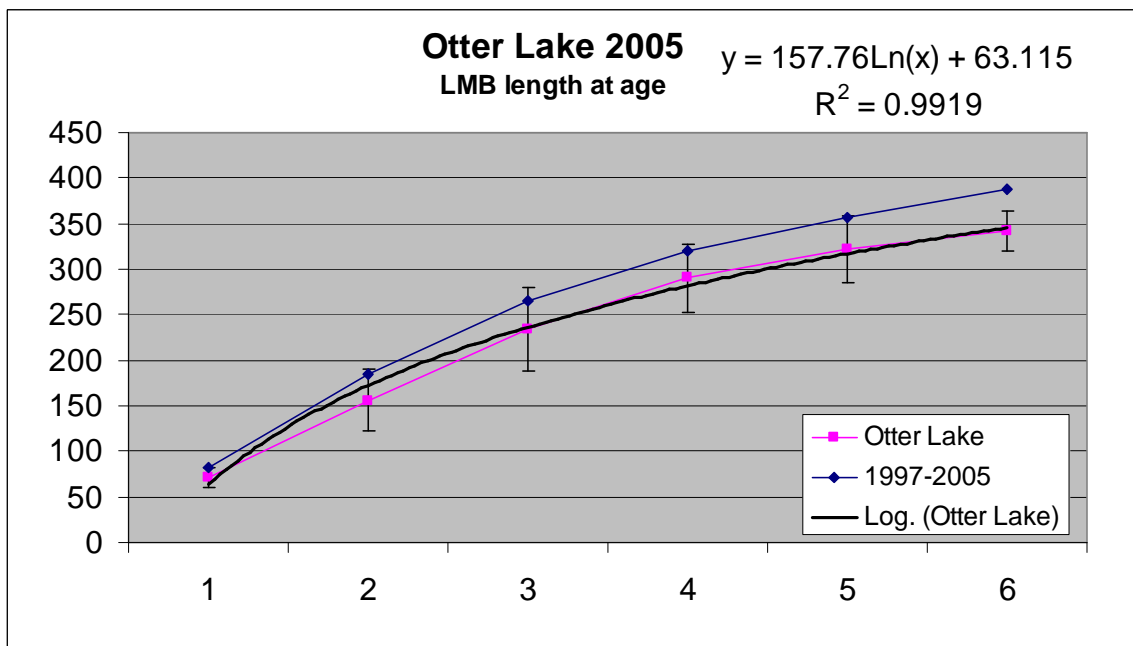


Figure 50. Average back-calculated length at age for largemouth bass from Otter Lake (Greenfield) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

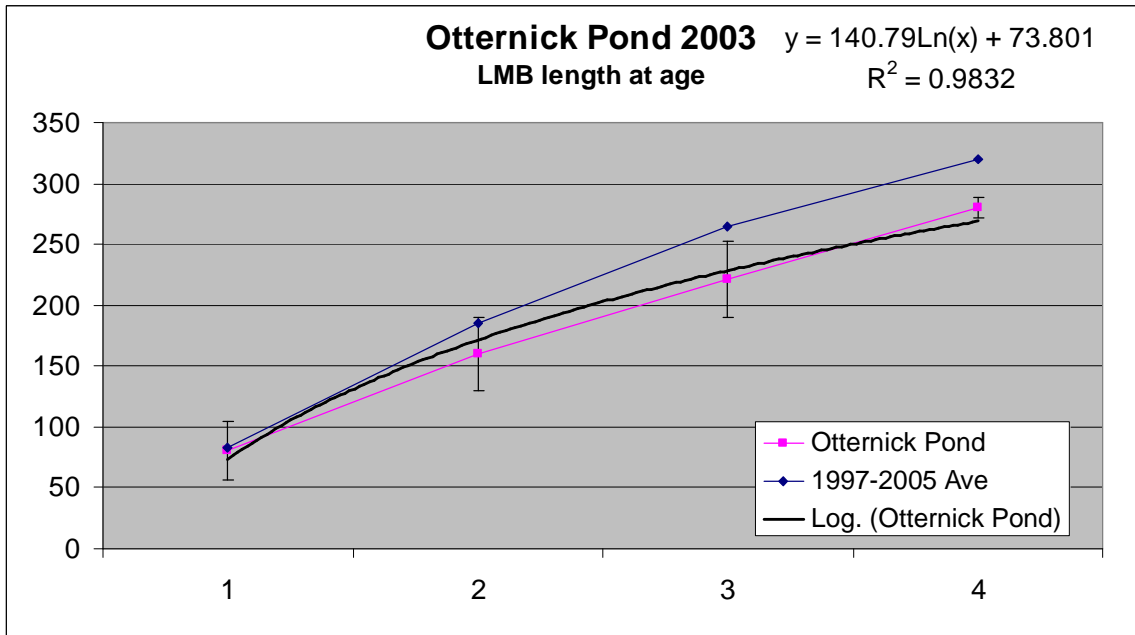


Figure 51. Average back-calculated length at age for largemouth bass from Otternick Pond (Hudson) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

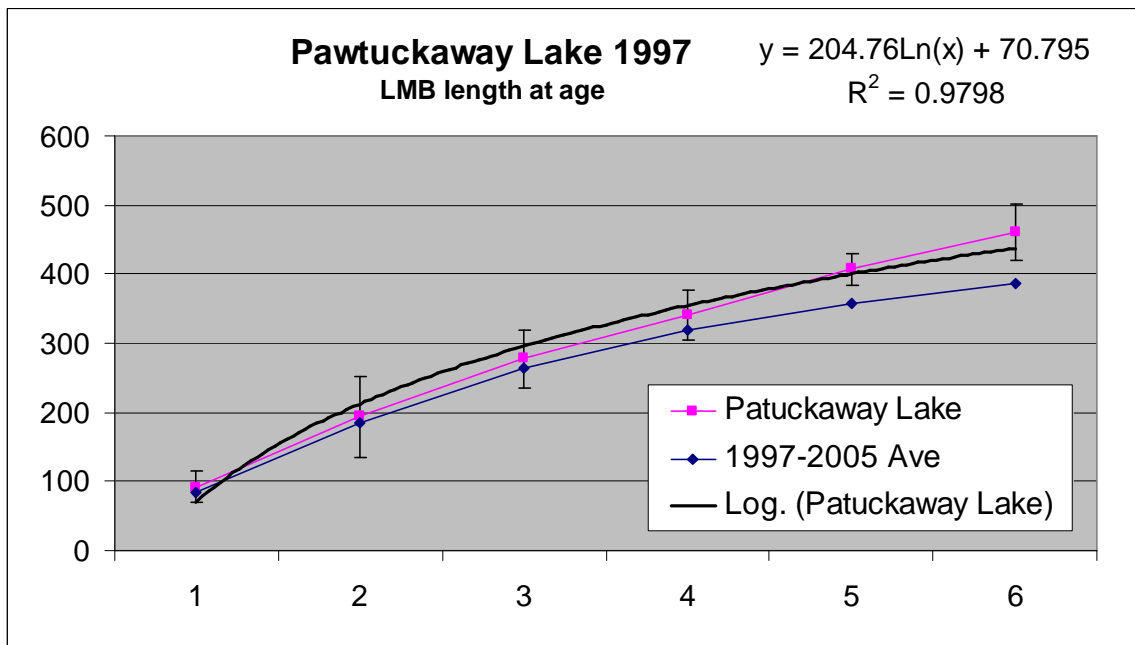


Figure 52. Average back-calculated length at age for largemouth bass from Pawtuckaway Lake (Nottingham) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

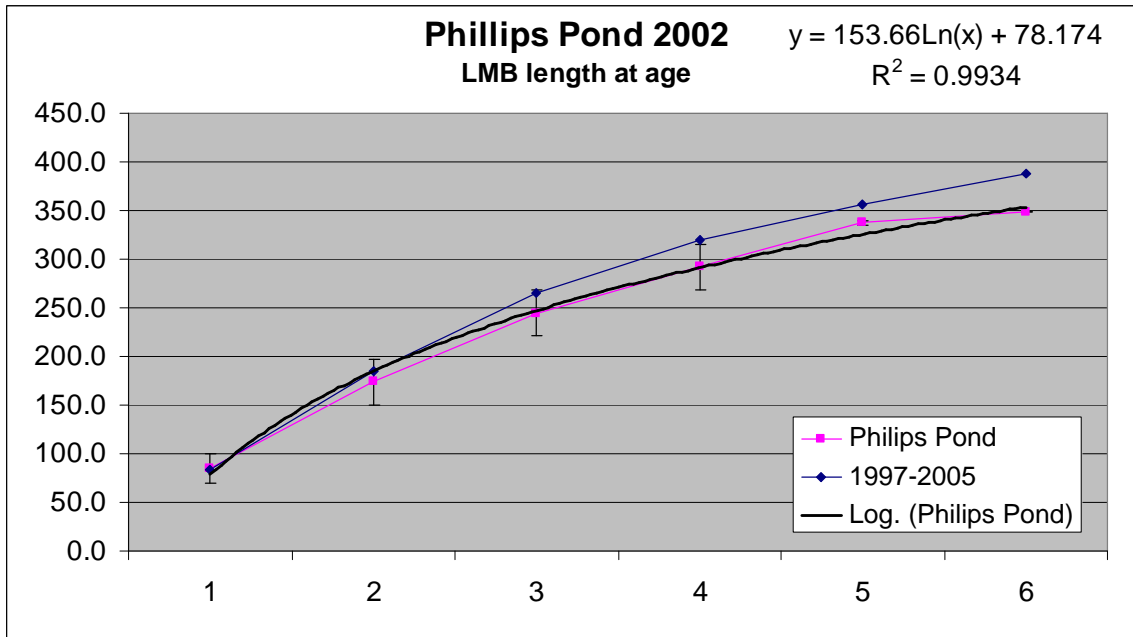


Figure 53. Average back-calculated length at age for largemouth bass from Phillips Pond (Sandown) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

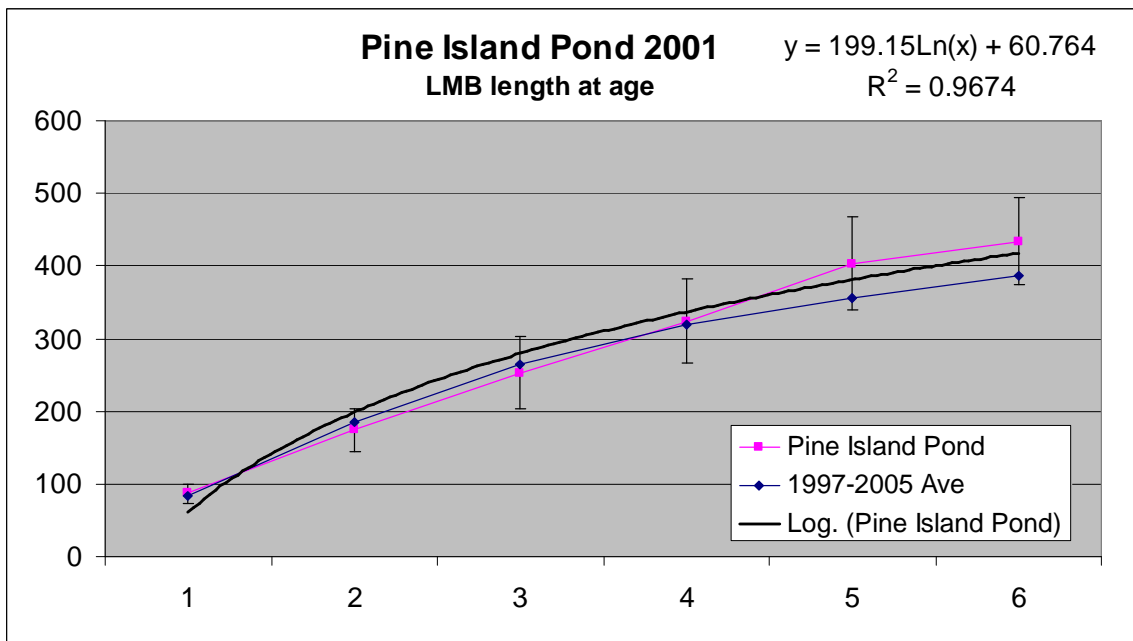


Figure 54. Average back-calculated length at age for largemouth bass from Pine Island Pond (Manchester) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

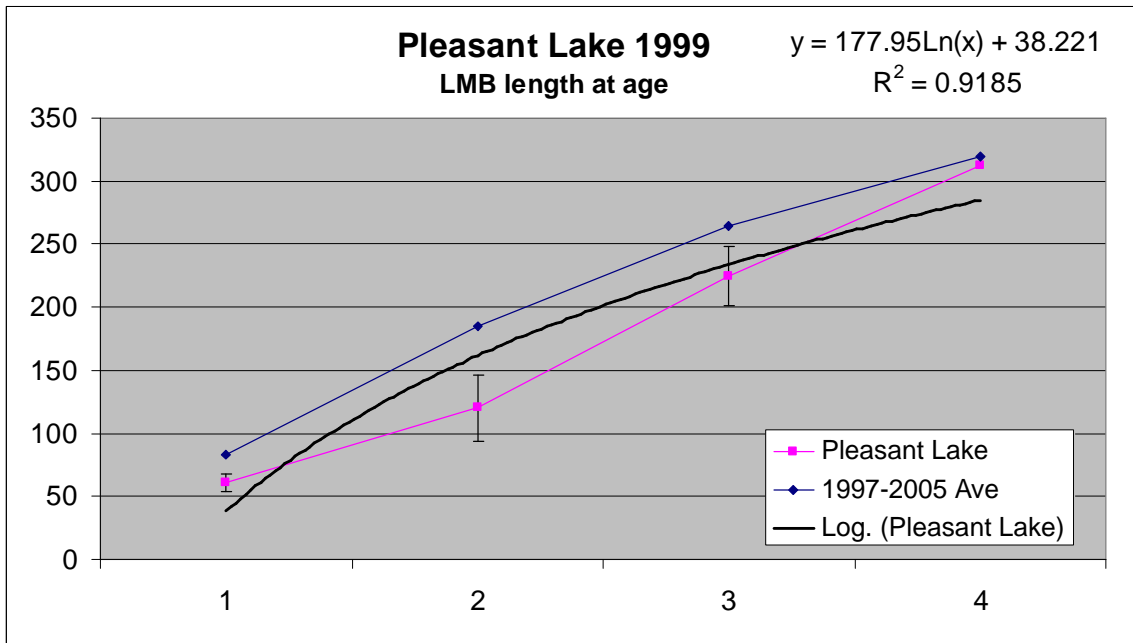


Figure 55. Average back-calculated length at age for largemouth bass from Pleasant Lake (Deerfield) sampled in 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

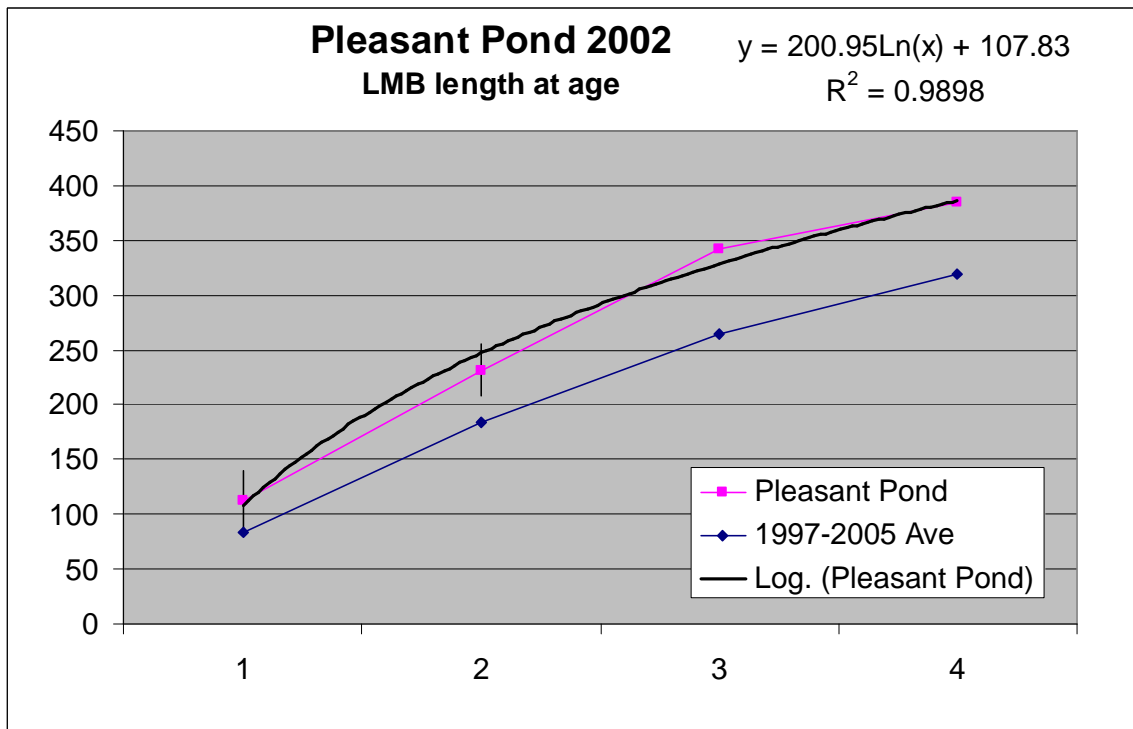


Figure 56. Average back-calculated length at age for largemouth bass from Pleasant Pond (Francestown) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

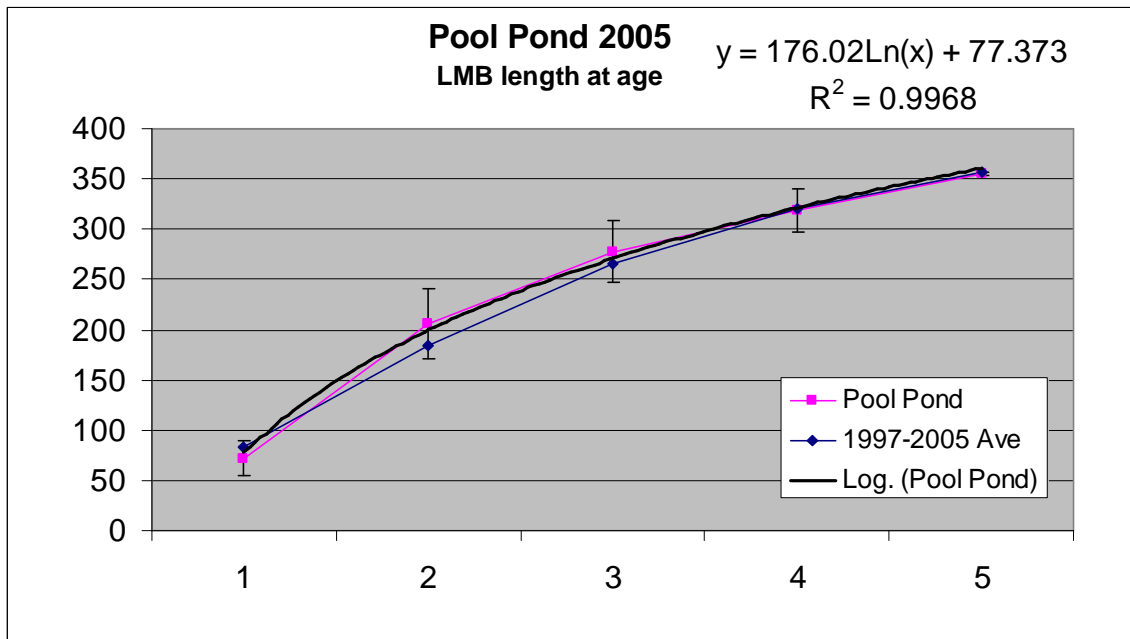


Figure 57. Average back-calculated length at age for largemouth bass from Pool Pond (Rindge) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

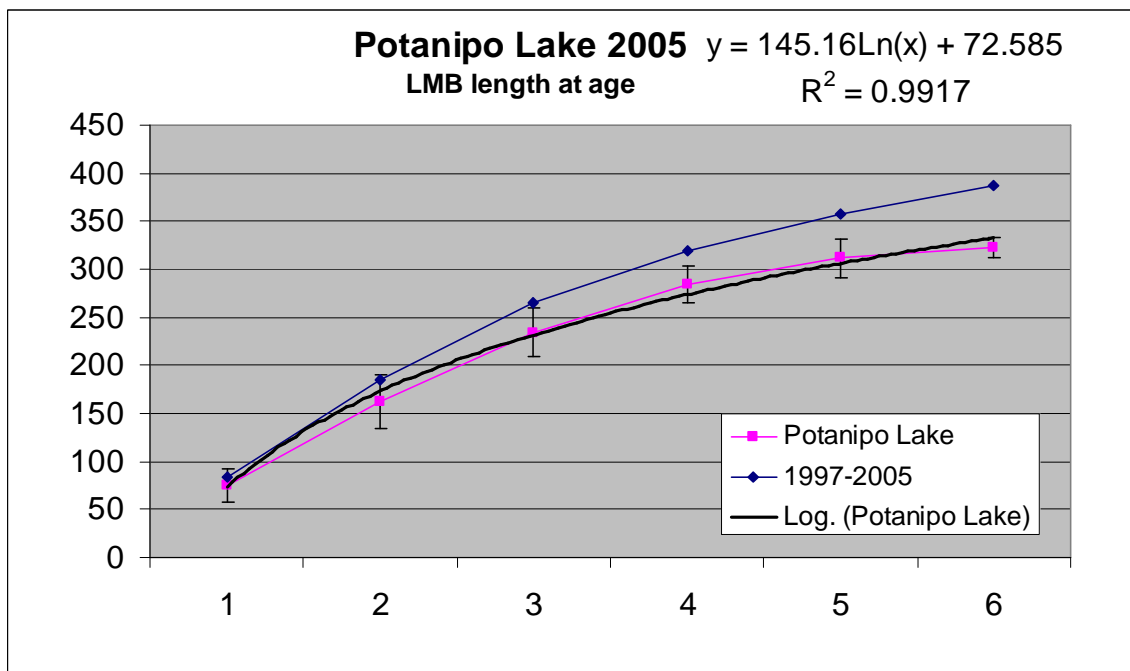


Figure 58. Average back-calculated length at age for largemouth bass from Potanipo Lake (Brookline) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

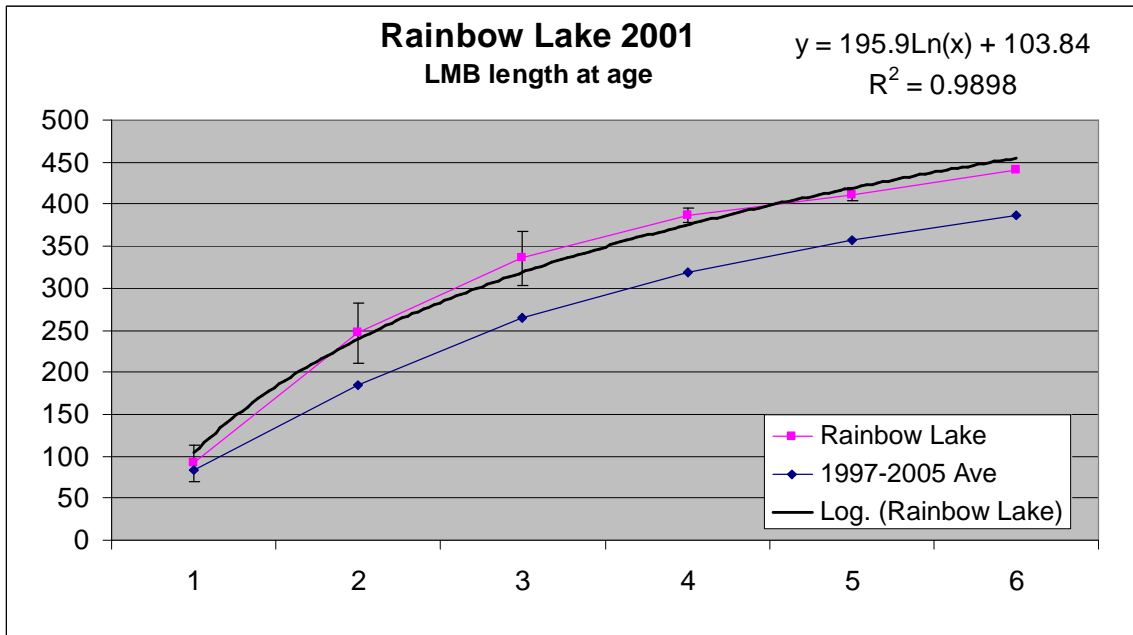


Figure 59. Average back-calculated length at age for largemouth bass from Rainbow Lake (Derry) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

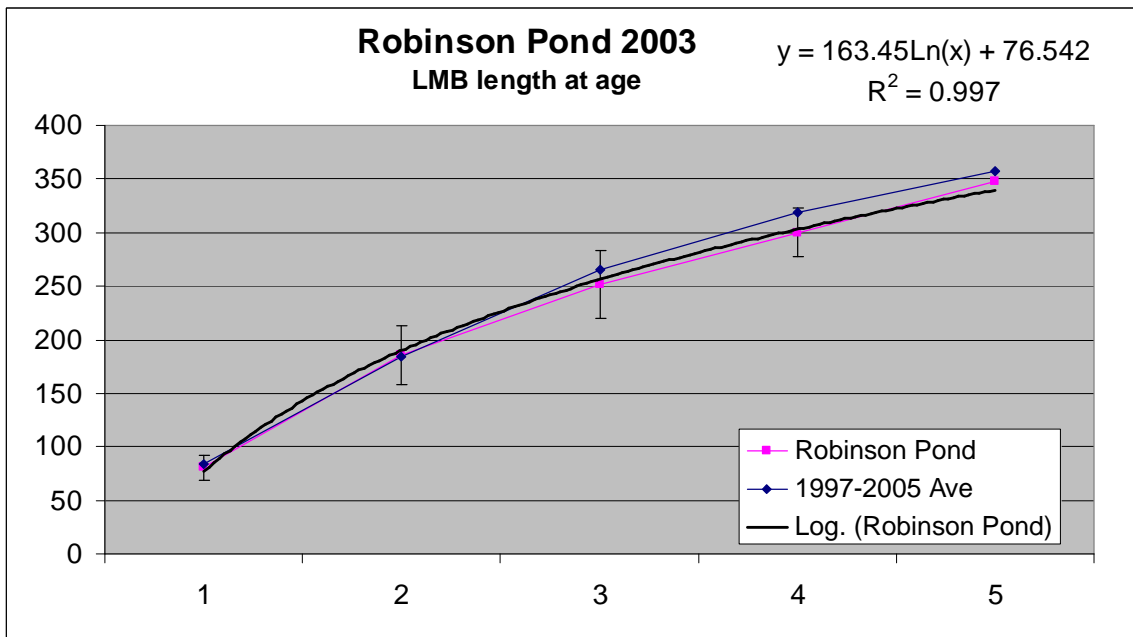


Figure 60. Average back-calculated length at age for largemouth bass from Robinson Pond (Hudson) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

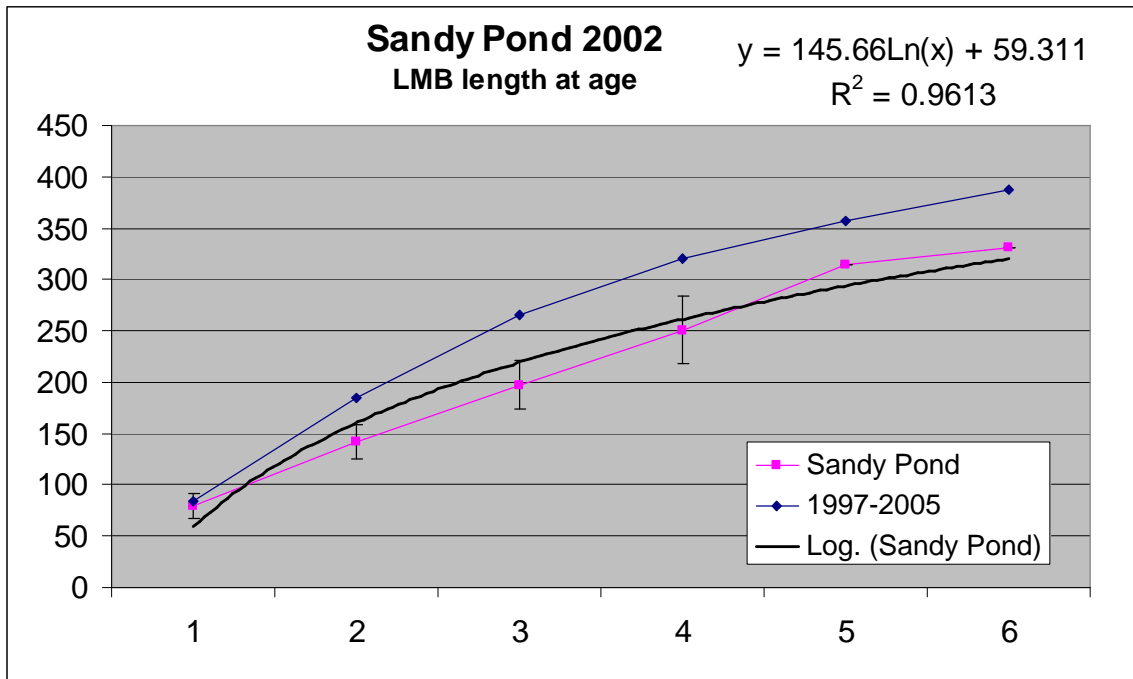


Figure 61. Average back-calculated length at age for largemouth bass from Sandy Pond (Richmond) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

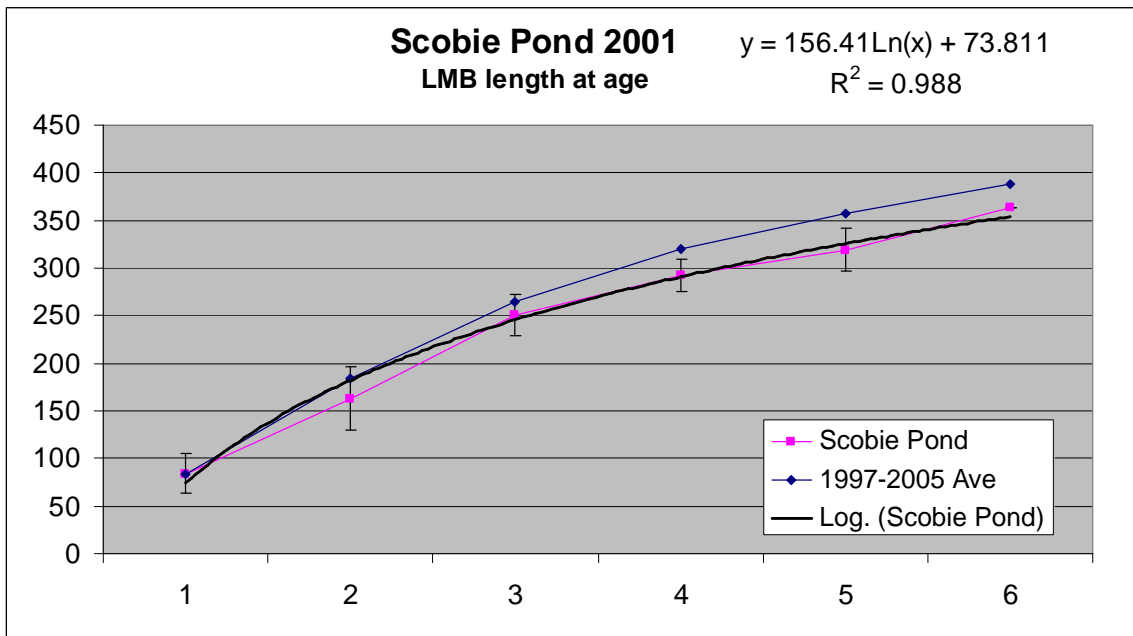


Figure 62. Average back-calculated length at age for largemouth bass from Scobie Pond (Londonderry) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

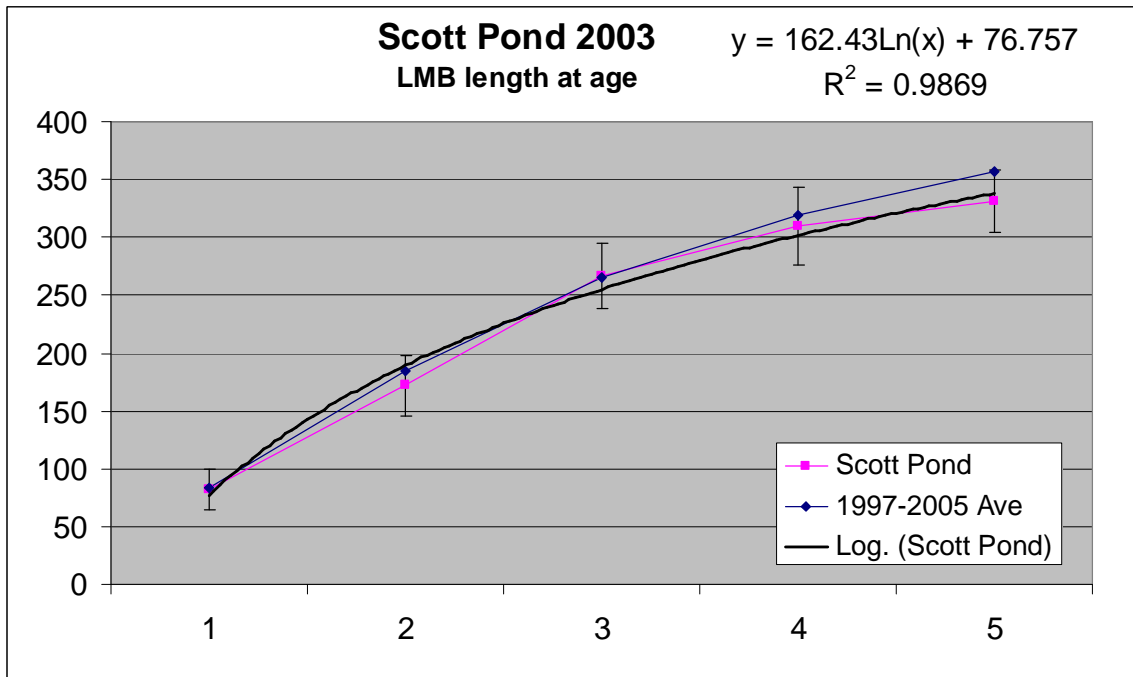


Figure 63. Average back-calculated length at age for largemouth bass from Scott Pond (Fitzwilliam) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

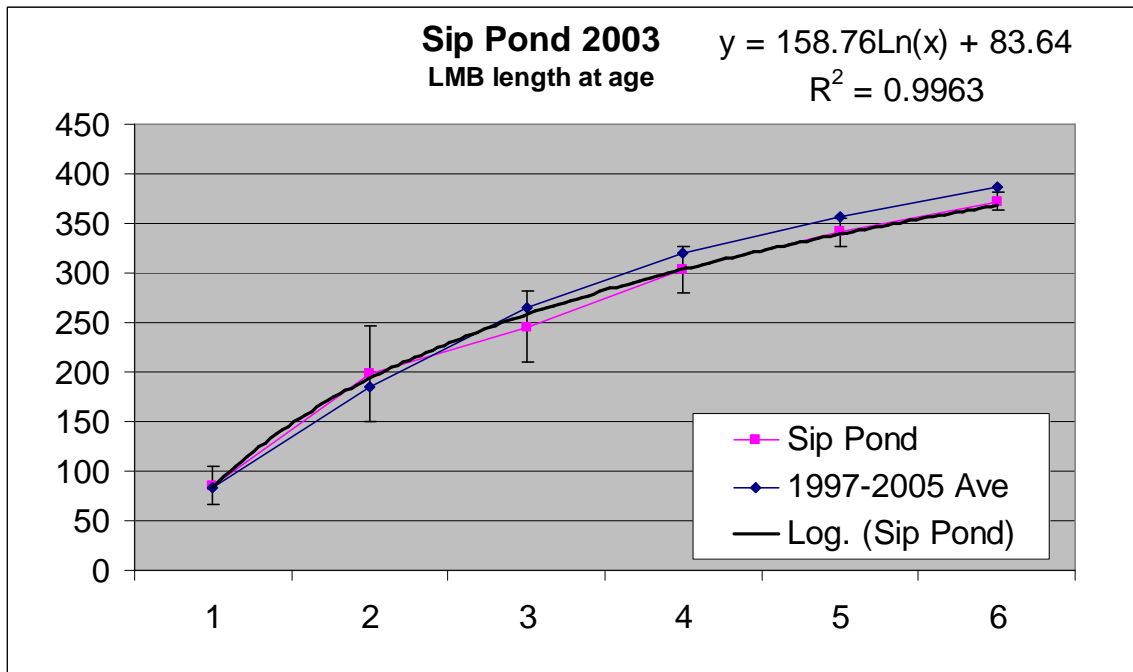


Figure 64. Average back-calculated length at age for largemouth bass from Sip Pond (Fitzwilliam) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

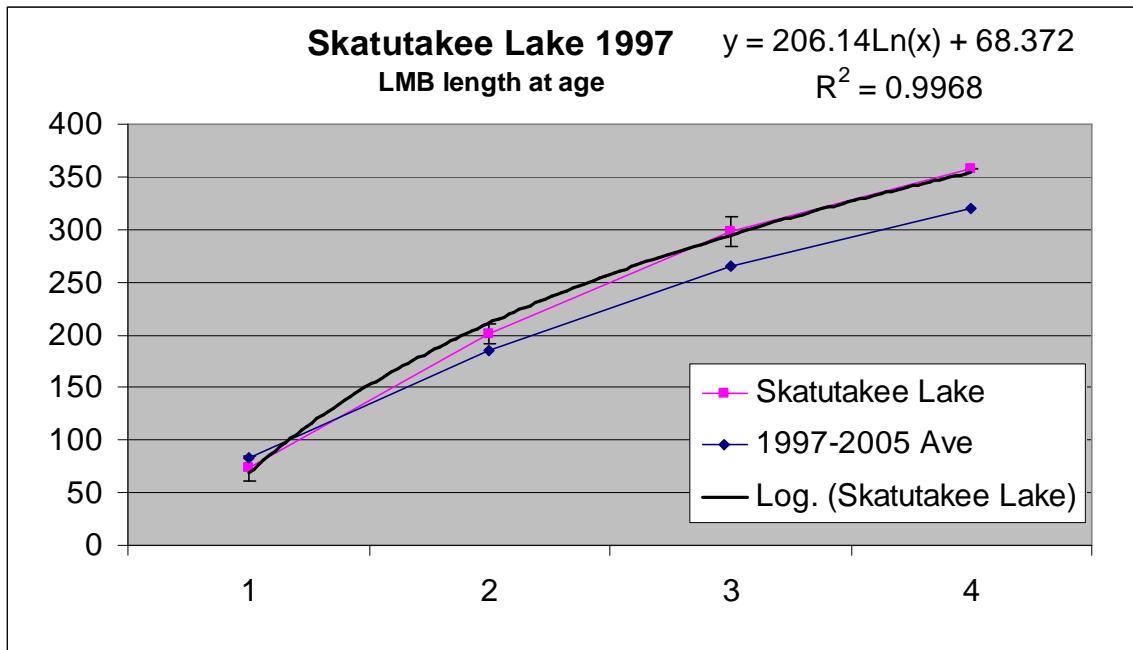


Figure 65. Average back-calculated length at age for largemouth bass from Skatutakee Lake (Harrisville) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

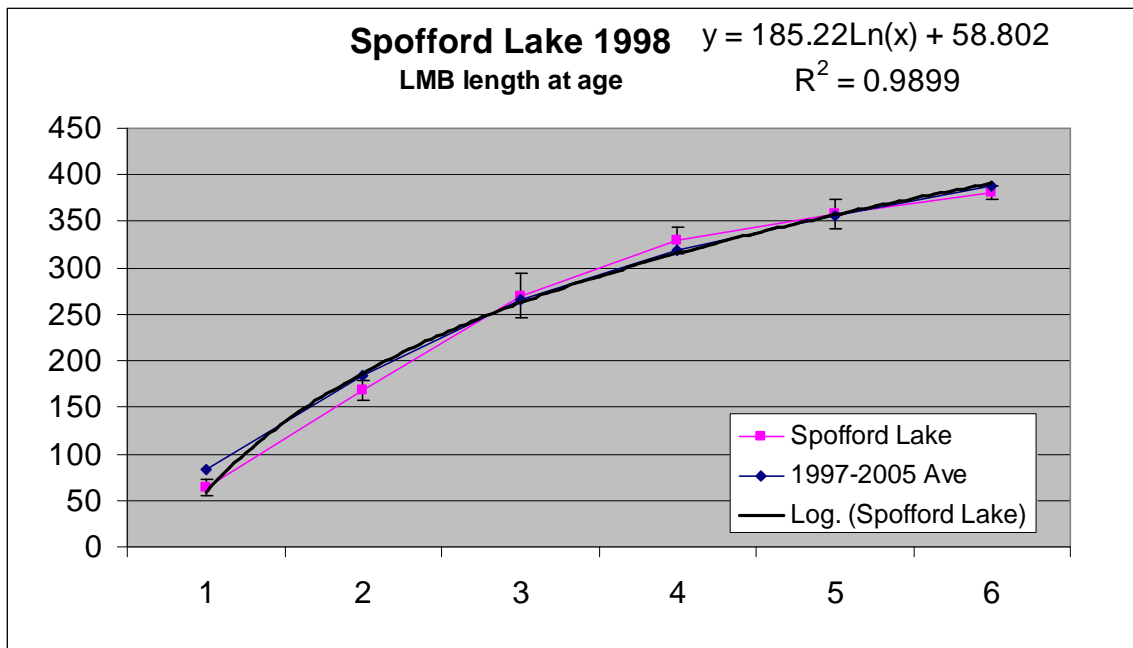


Figure 66. Average back-calculated length at age for largemouth bass from Spofford Lake (Spofford) sampled in 1998 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

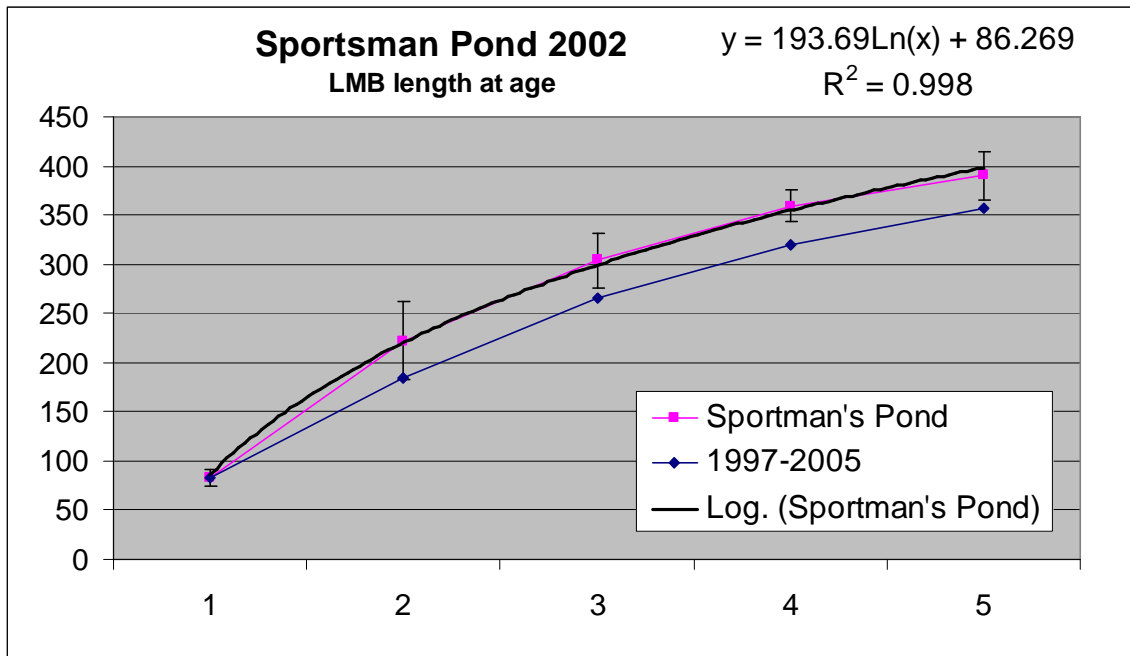


Figure 67. Average back-calculated length at age for largemouth bass from Sportsman Pond (Fitzwilliam) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

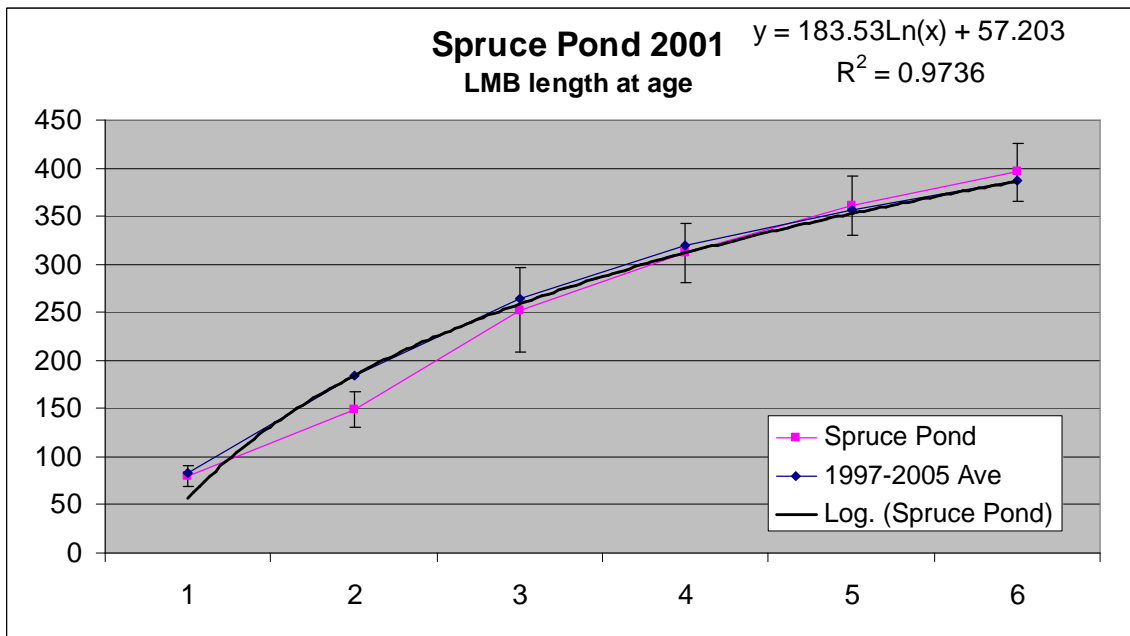


Figure 68. Average back-calculated length at age for largemouth bass from Spruce Pond (Deerfield) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

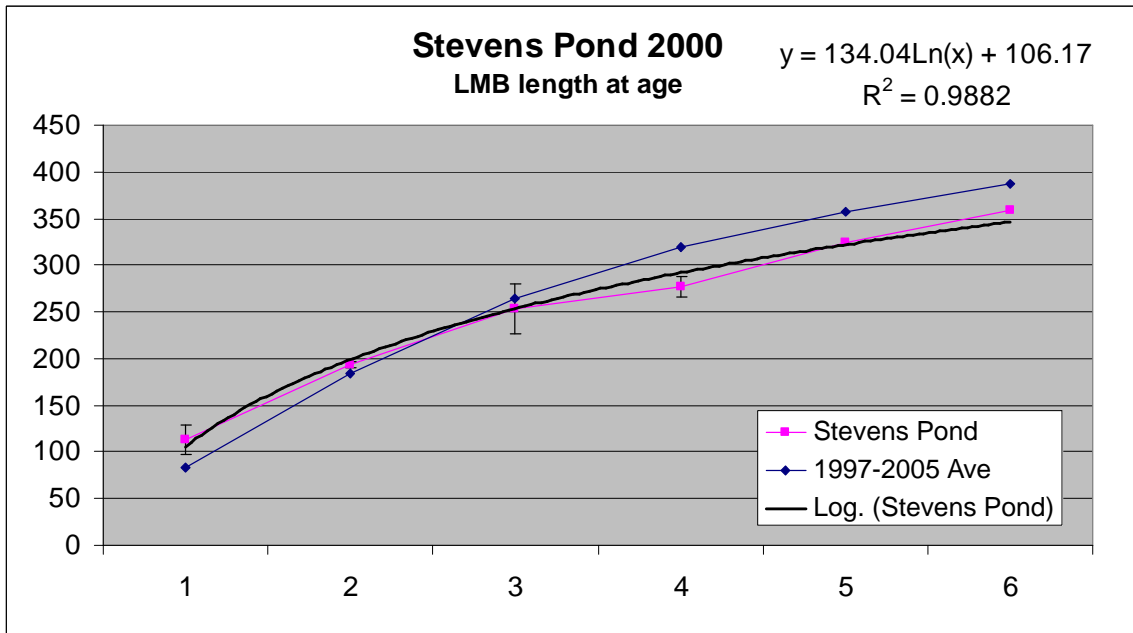


Figure 69. Average back-calculated length at age for largemouth bass from Stevens Pond (Manchester) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

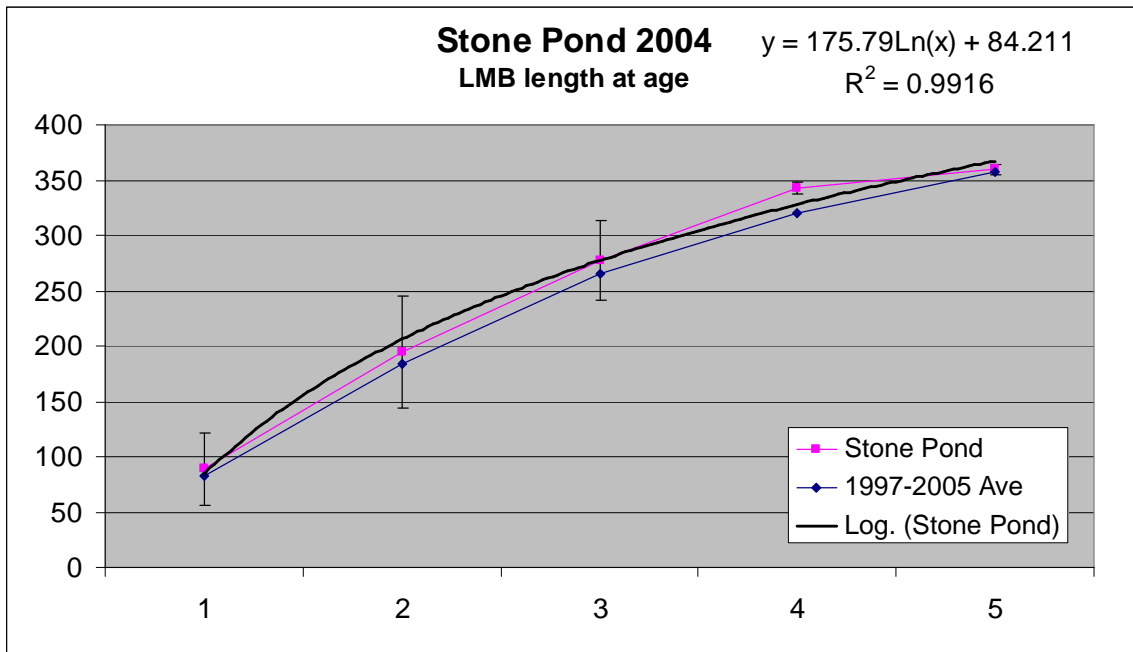


Figure 70. Average back-calculated length at age for largemouth bass from Stone Pond (Marlow) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

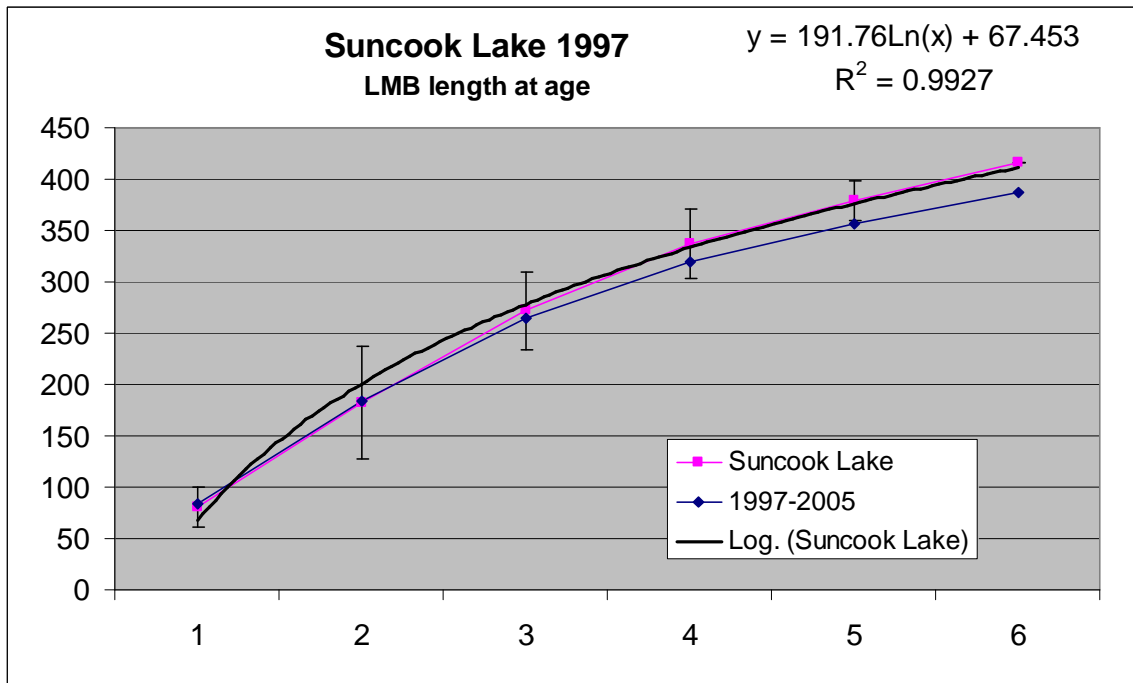


Figure 71. Average back-calculated length at age for largemouth bass from Suncook Lake (Barnstead) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

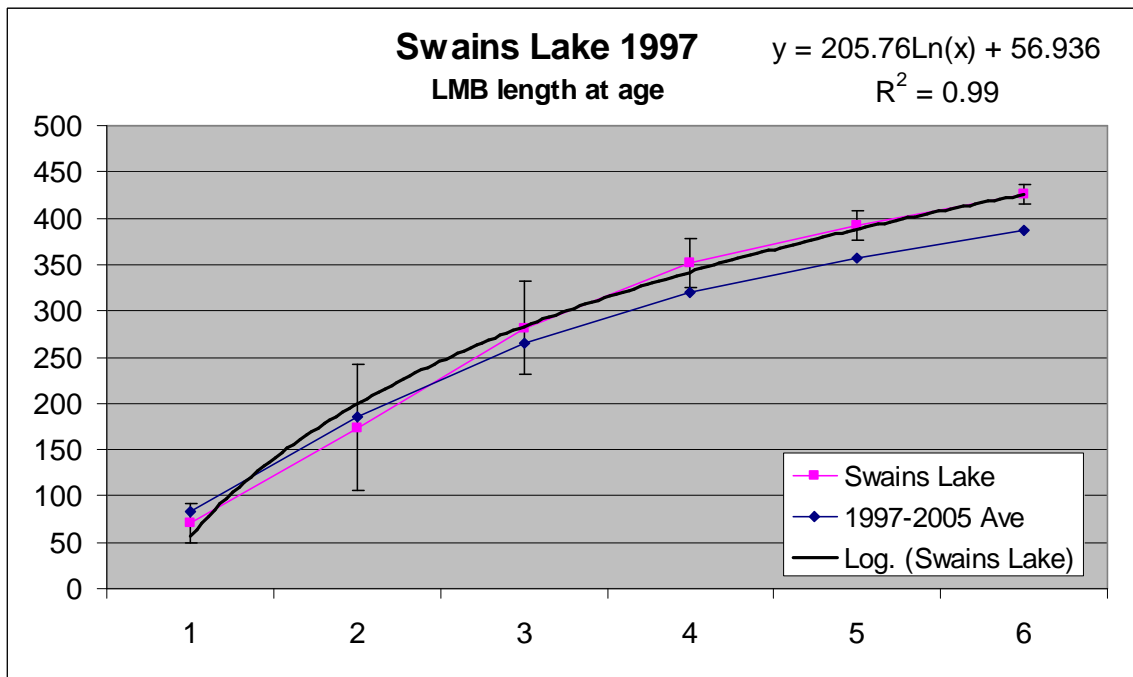


Figure 72. Average back-calculated length at age for largemouth bass from Swains Lake (Barrington) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

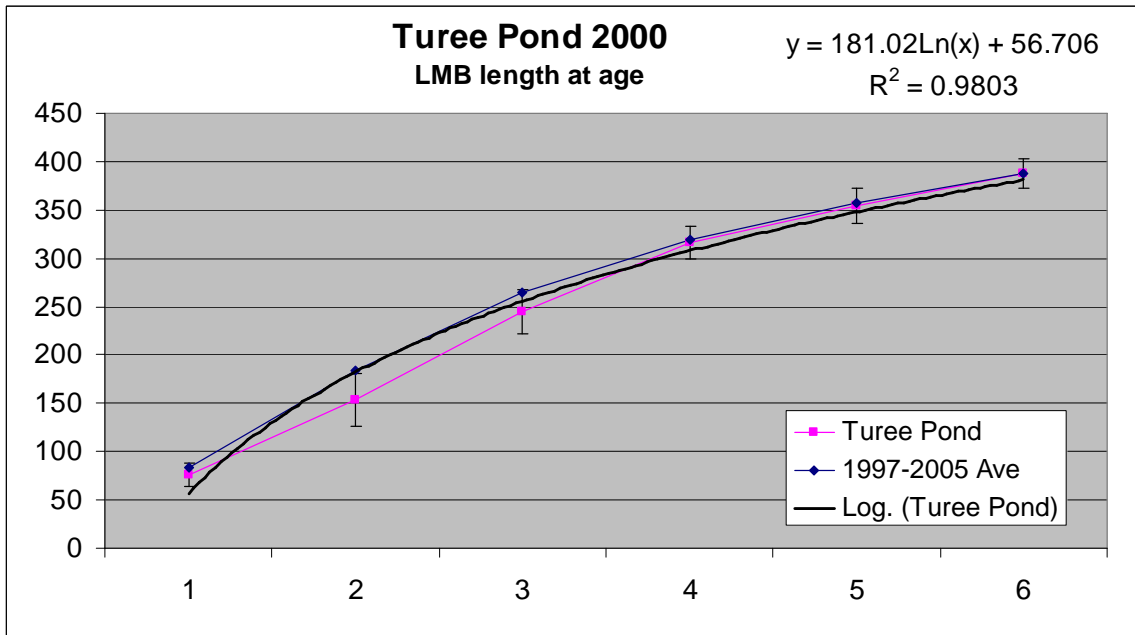


Figure 73. Average back-calculated length at age for largemouth bass from Turee Pond (Bow) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

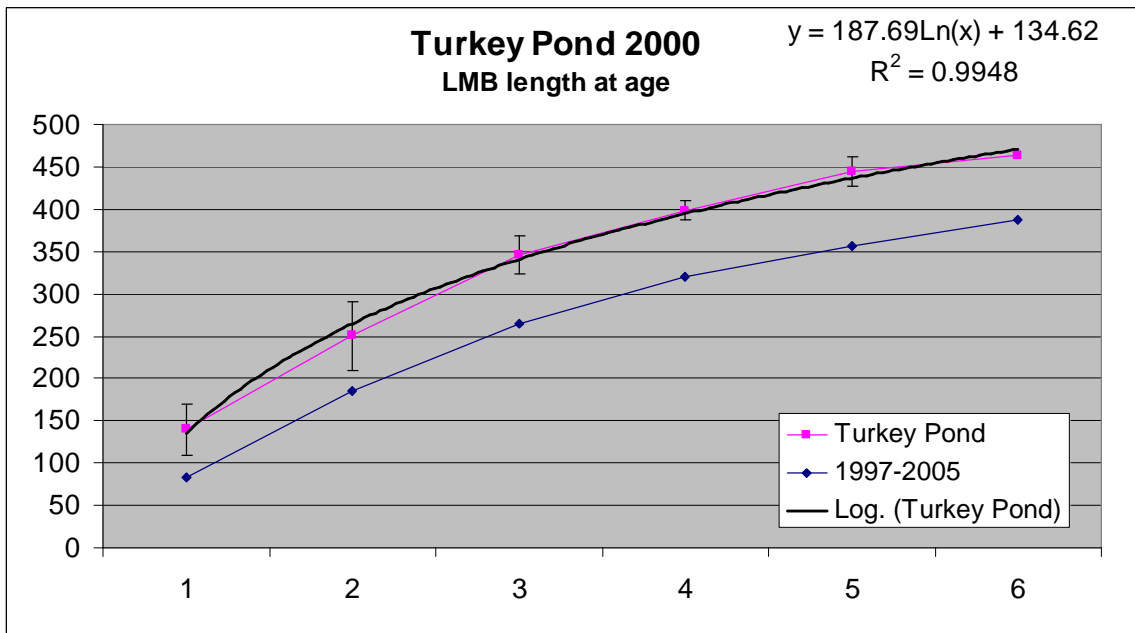


Figure 74. Average back-calculated length at age for largemouth bass from Turkey Pond (Concord) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

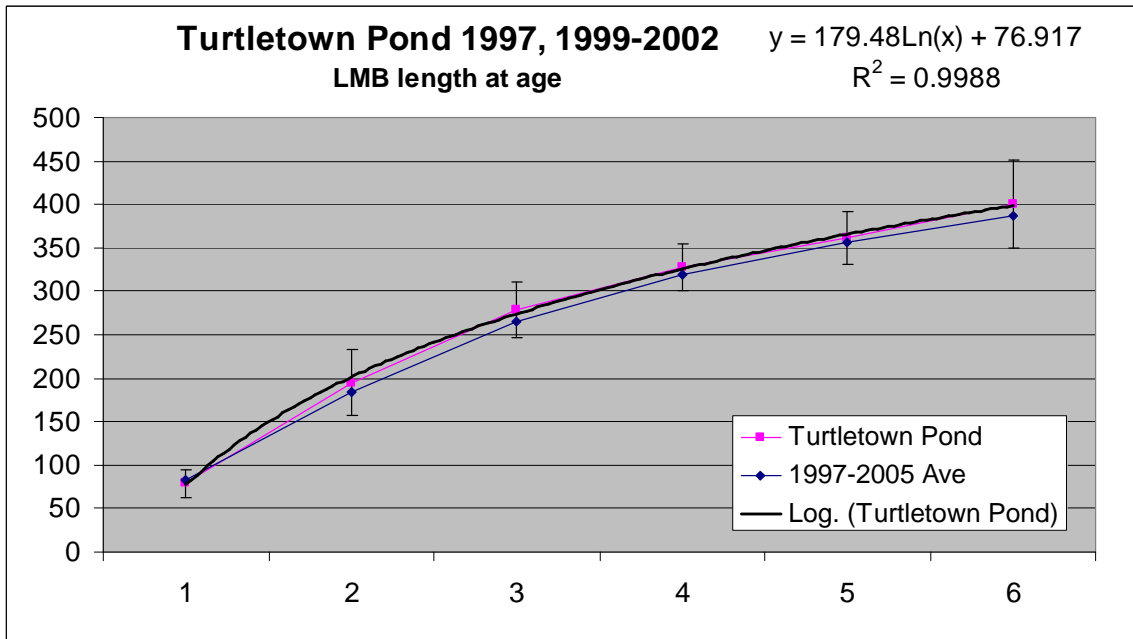


Figure 75. Average back-calculated length at age for largemouth bass from Turtletown Pond (Concord) sampled in 1997 and 1999-2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

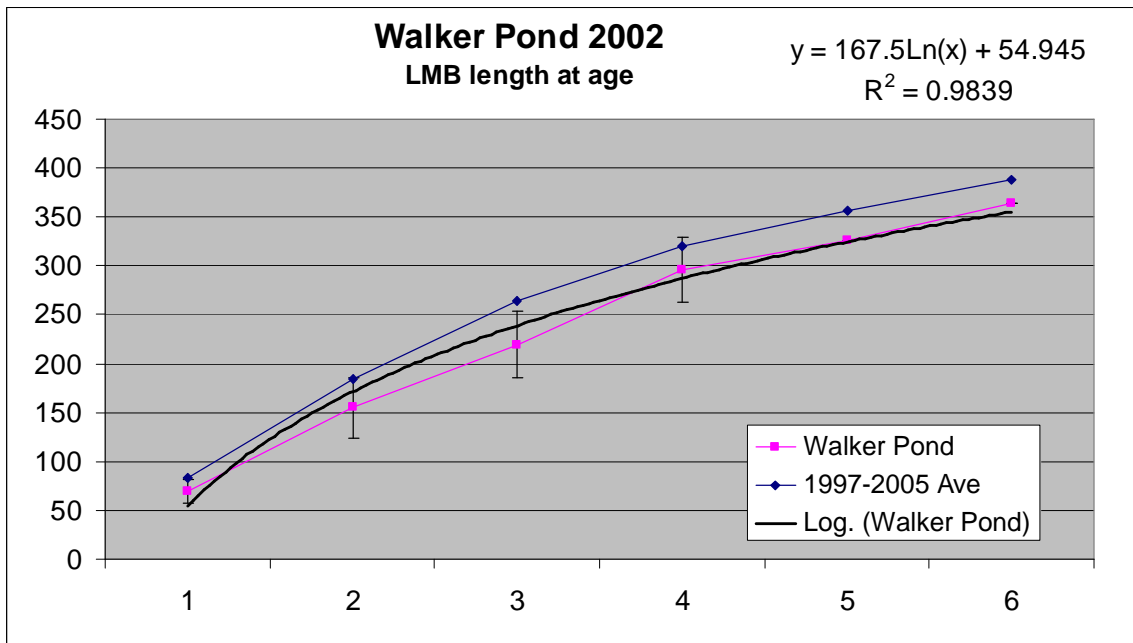


Figure 76. Average back-calculated length at age for largemouth bass from Walker Pond (Webster) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

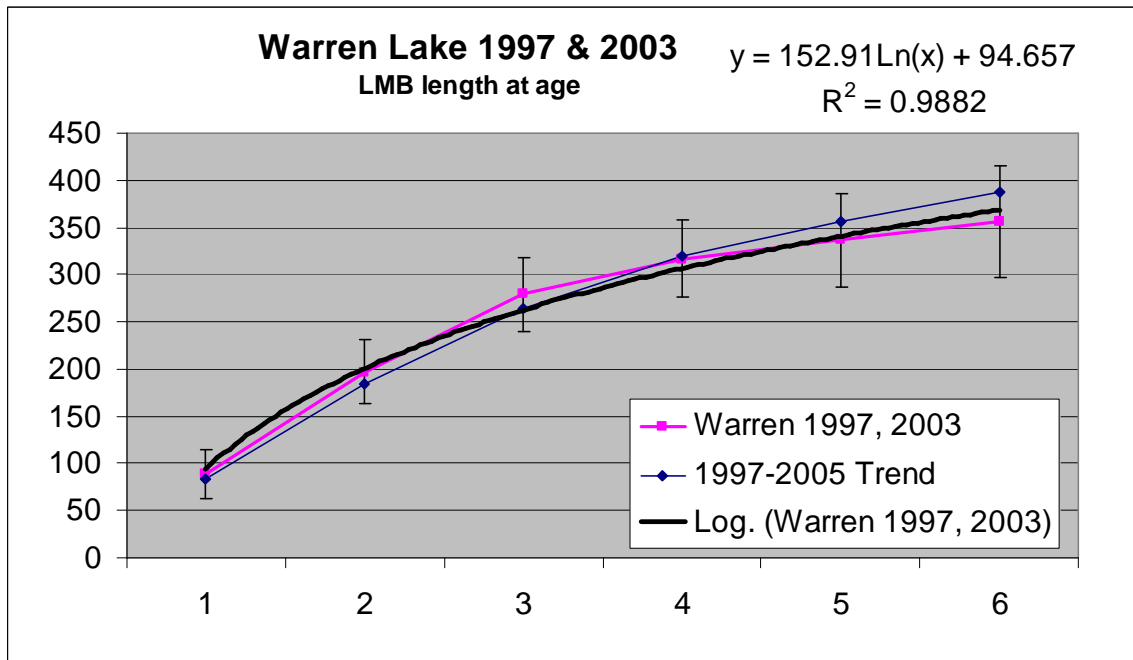


Figure 77. Average back-calculated length at age for largemouth bass from Warren Lake (Alstead) sampled in 1997 and 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

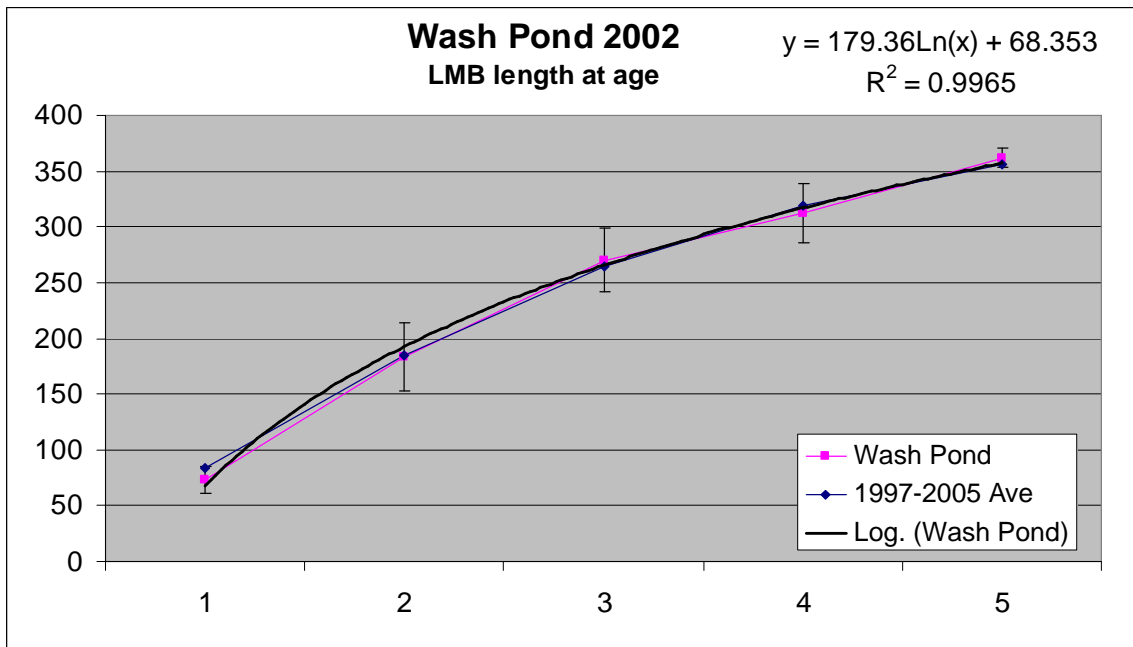


Figure 78. Average back-calculated length at age for largemouth bass from Wash Pond (Hampstead) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

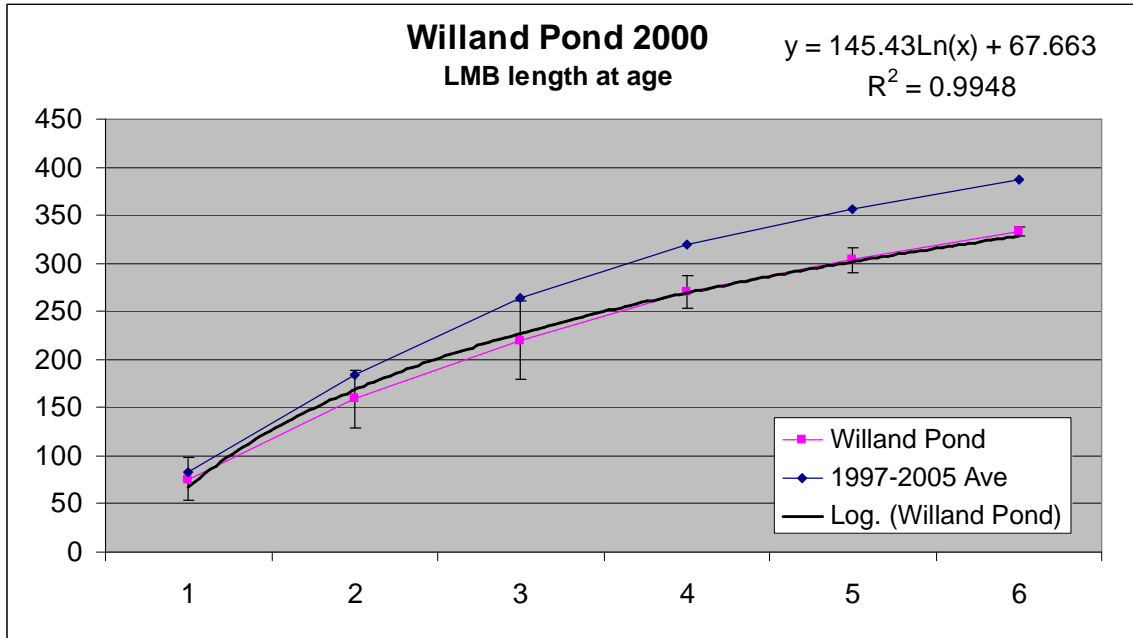


Figure 79. Average back-calculated length at age for largemouth bass from Willand Pond (Somersworth) sampled in 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

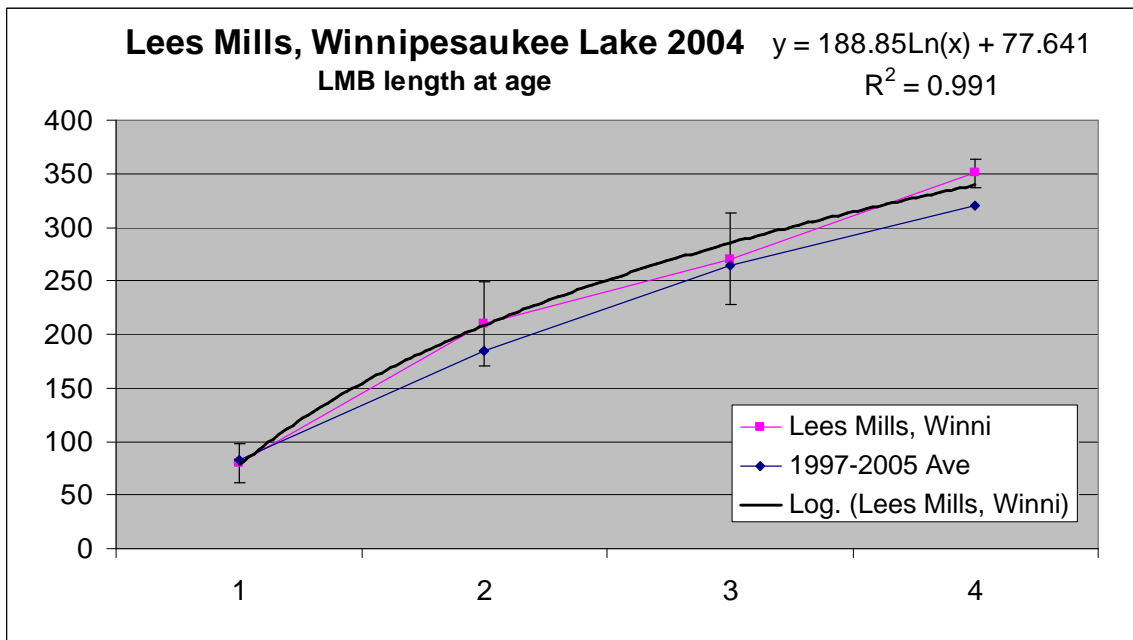


Figure 80. Average back-calculated length at age for largemouth bass from Lees Mills, Winnepesaukee Lake (Moultonborough) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

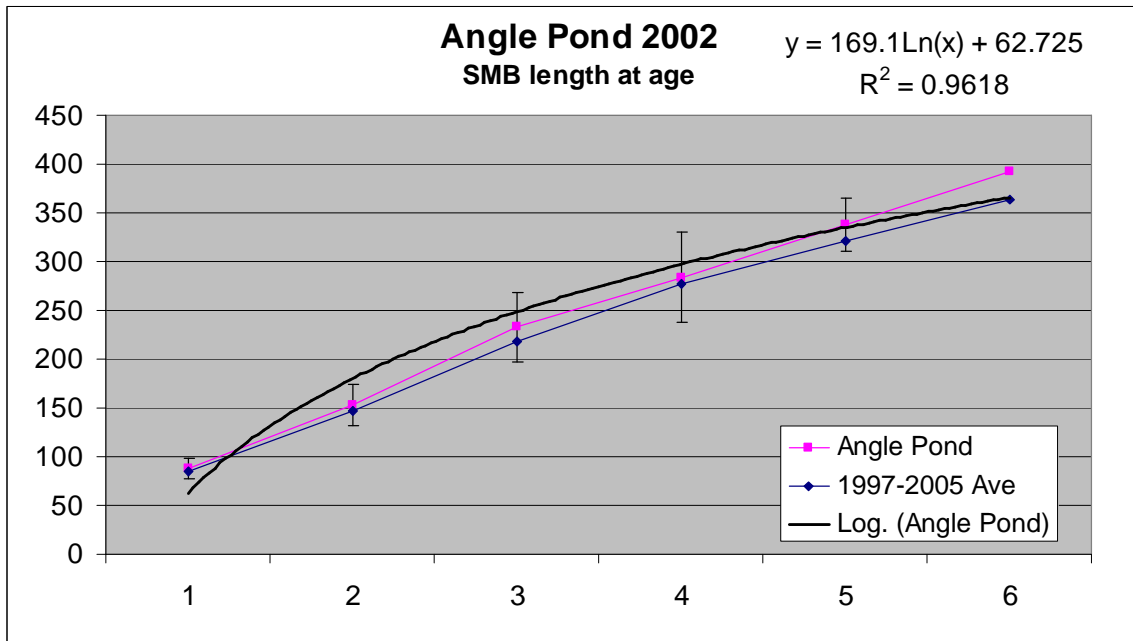


Figure 81. Average back-calculated length at age for smallmouth bass from Angle Pond (Sandown) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

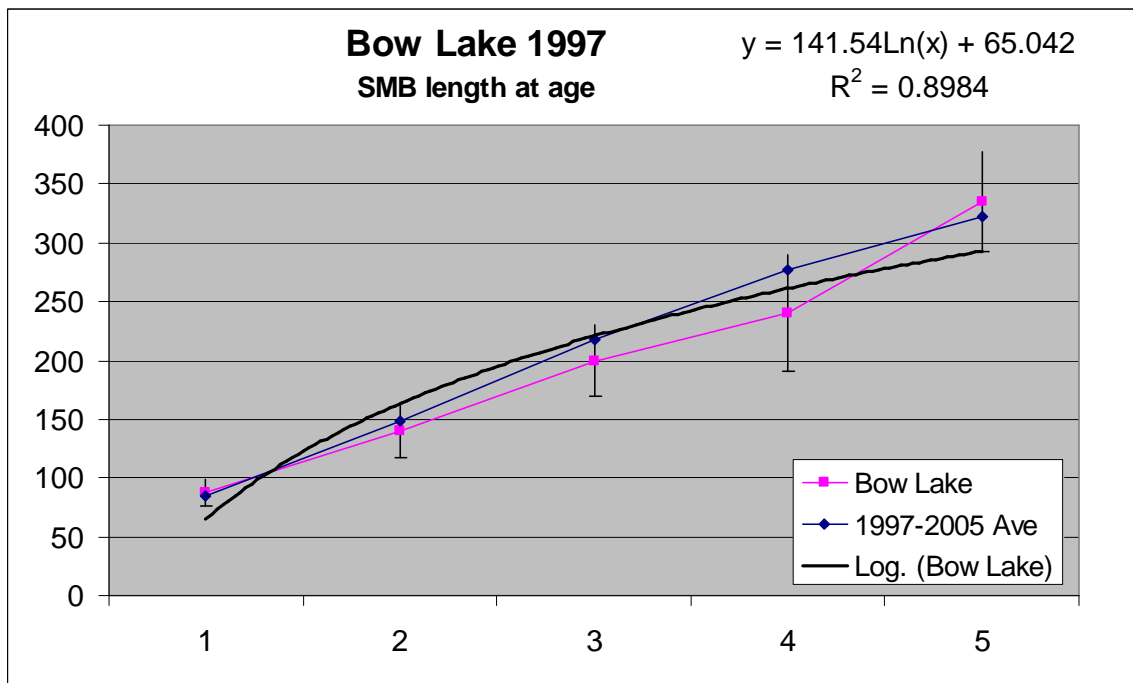


Figure 82. Average back-calculated length at age for smallmouth bass from Bow Lake (Strafford) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

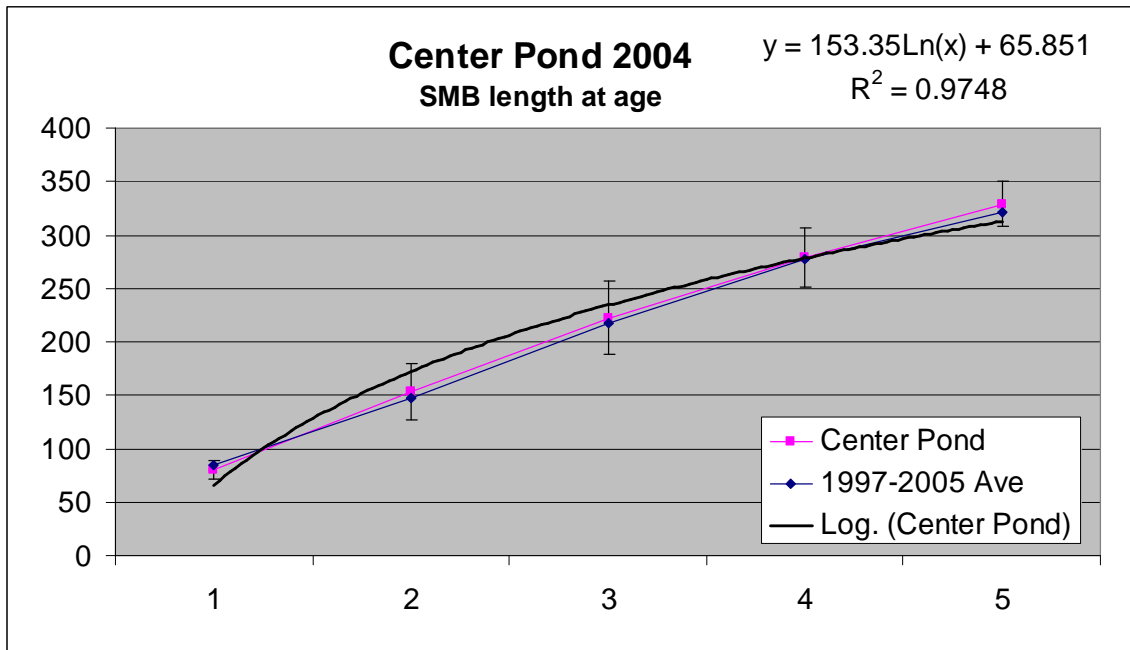


Figure 83. Average back-calculated length at age for smallmouth bass from Center Pond (Stoddard) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

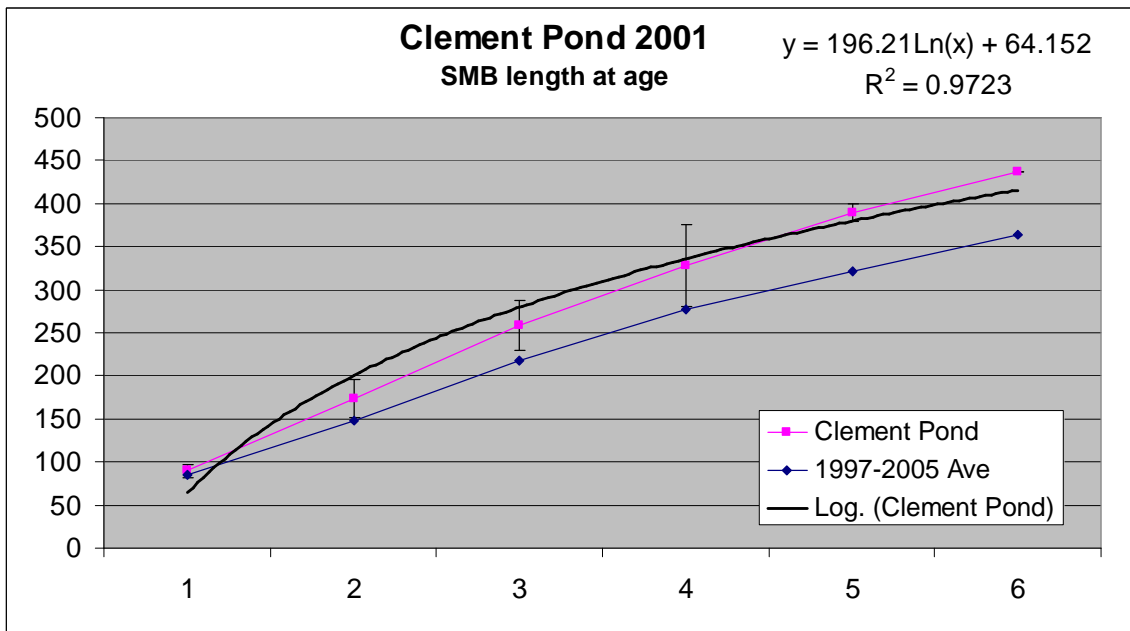


Figure 84. Average back-calculated length at age for smallmouth bass from Clement Pond (Hopkinton) sampled in 2001 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

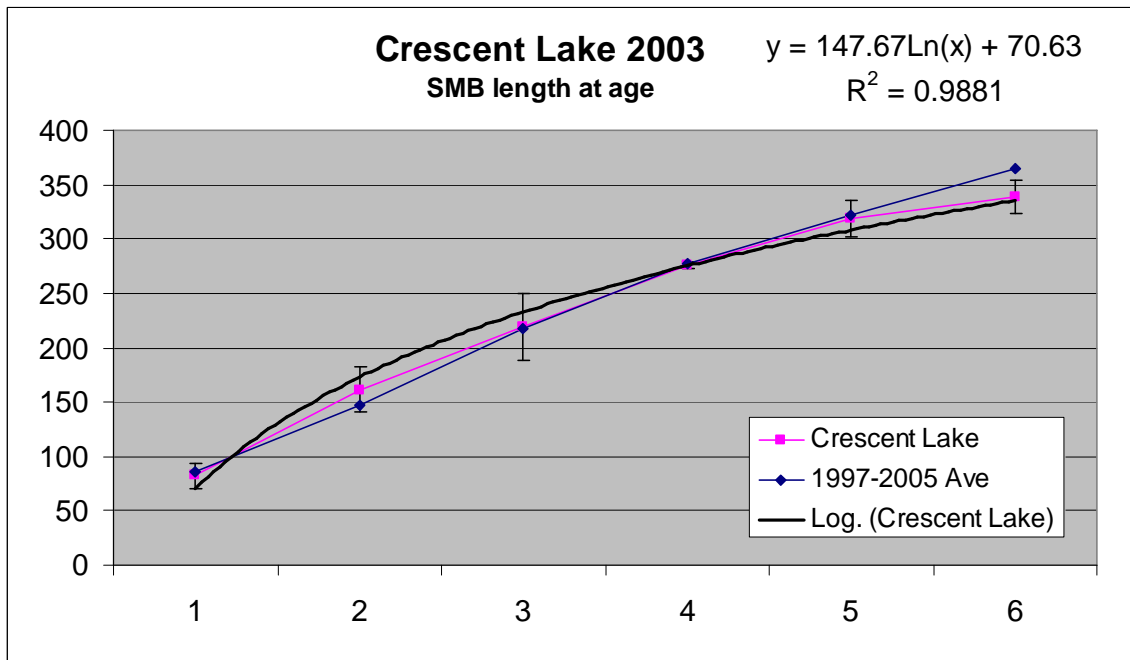


Figure 85. Average back-calculated length at age for smallmouth bass from Crescent Lake (Acworth) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

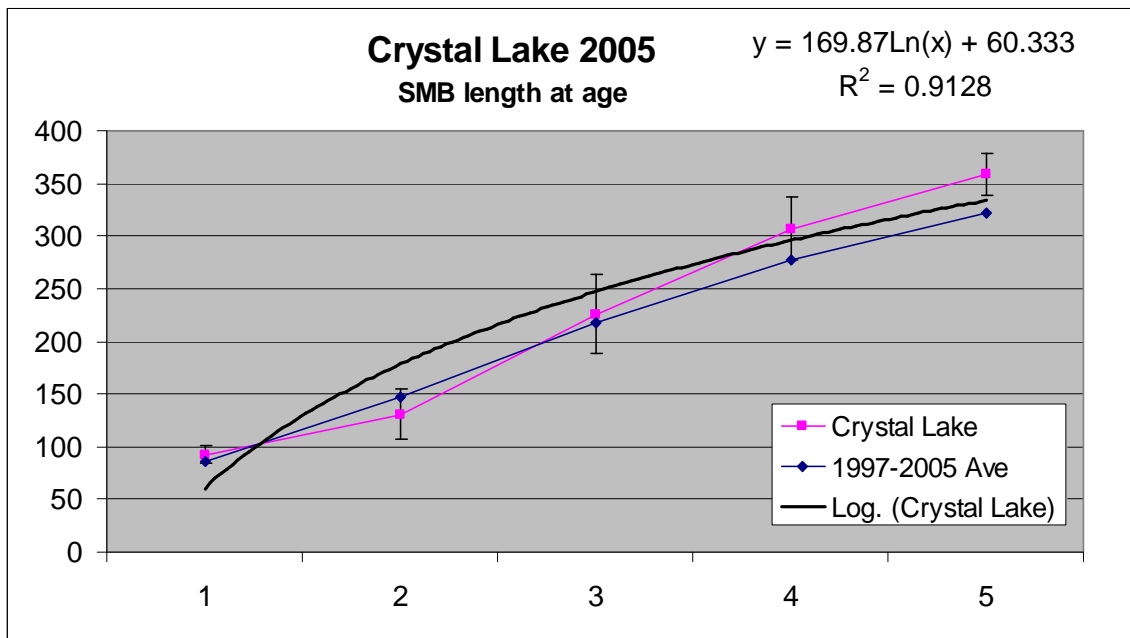


Figure 86. Average back-calculated length at age for smallmouth bass from Crystal Lake (Gilmanton) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

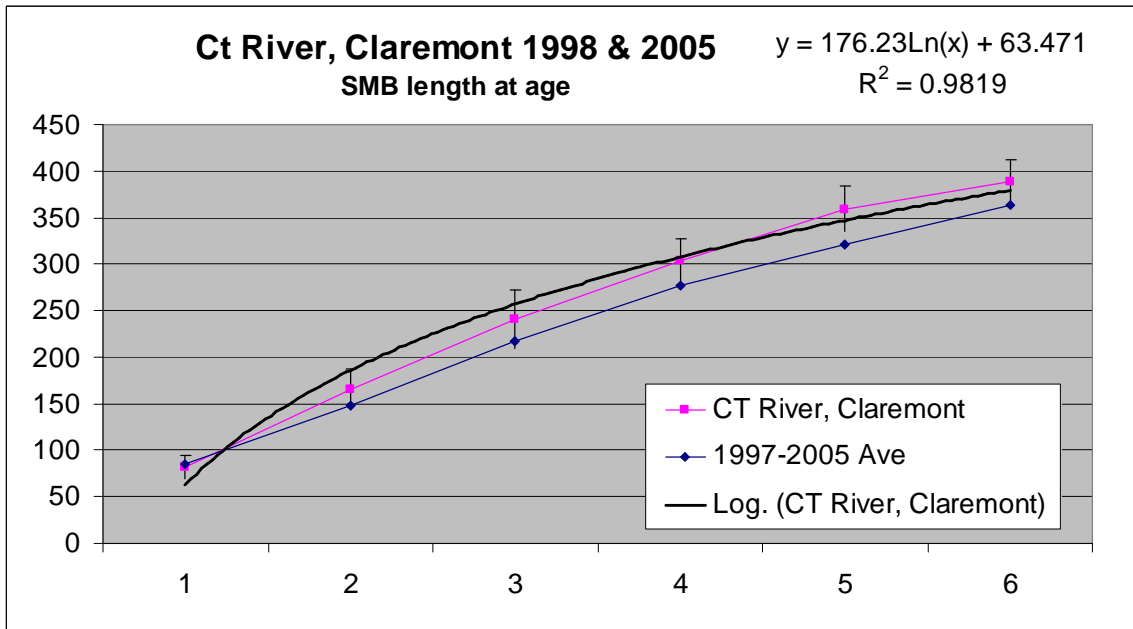


Figure 87. Average back-calculated length at age for smallmouth bass from Connecticut River (Claremont) sampled in 1998 and 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

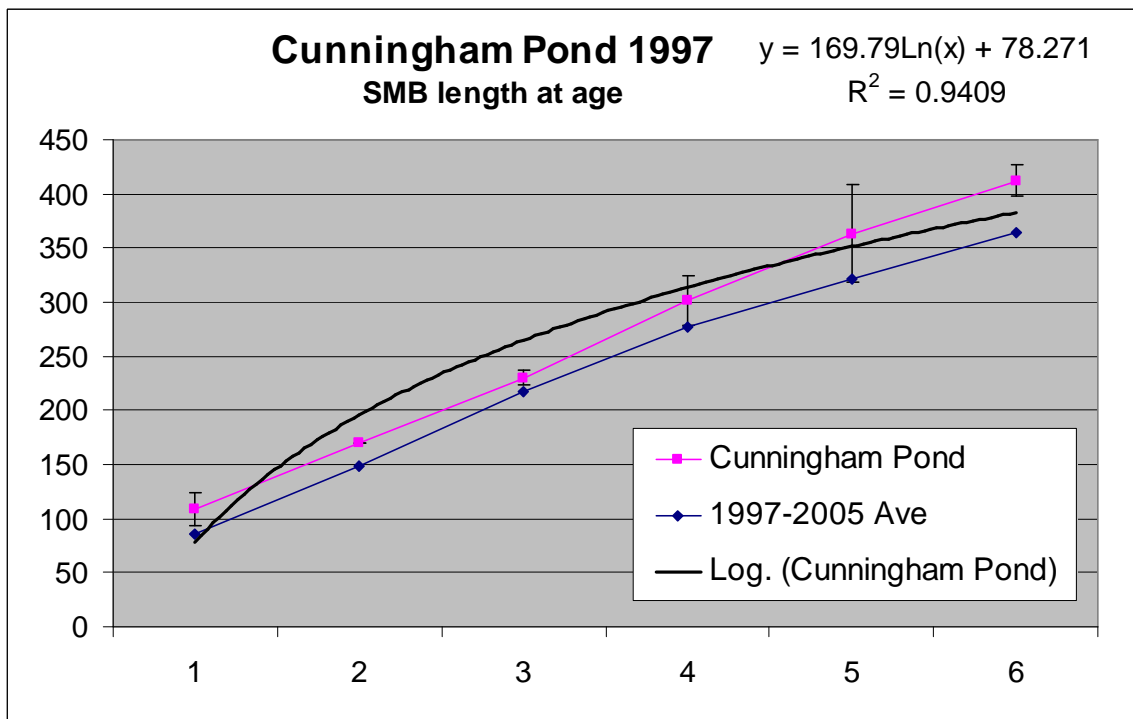


Figure 88. Average back-calculated length at age for smallmouth bass from Cunningham Pond (Peterborough) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

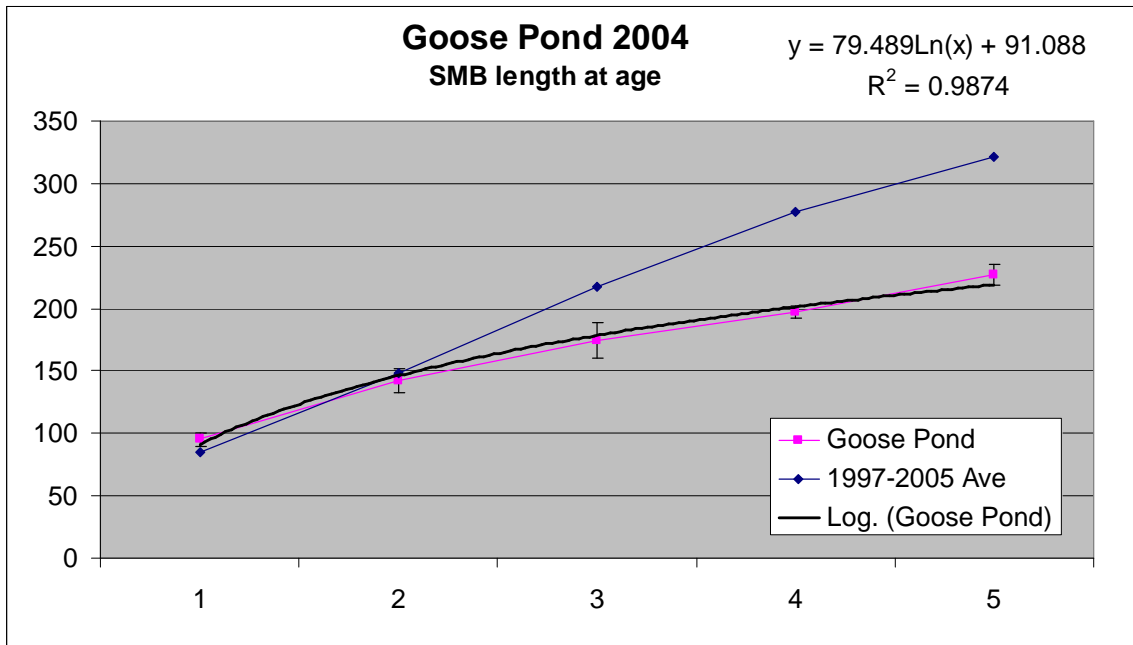


Figure 89. Average back-calculated length at age for smallmouth bass from Goose Pond (Canaan) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

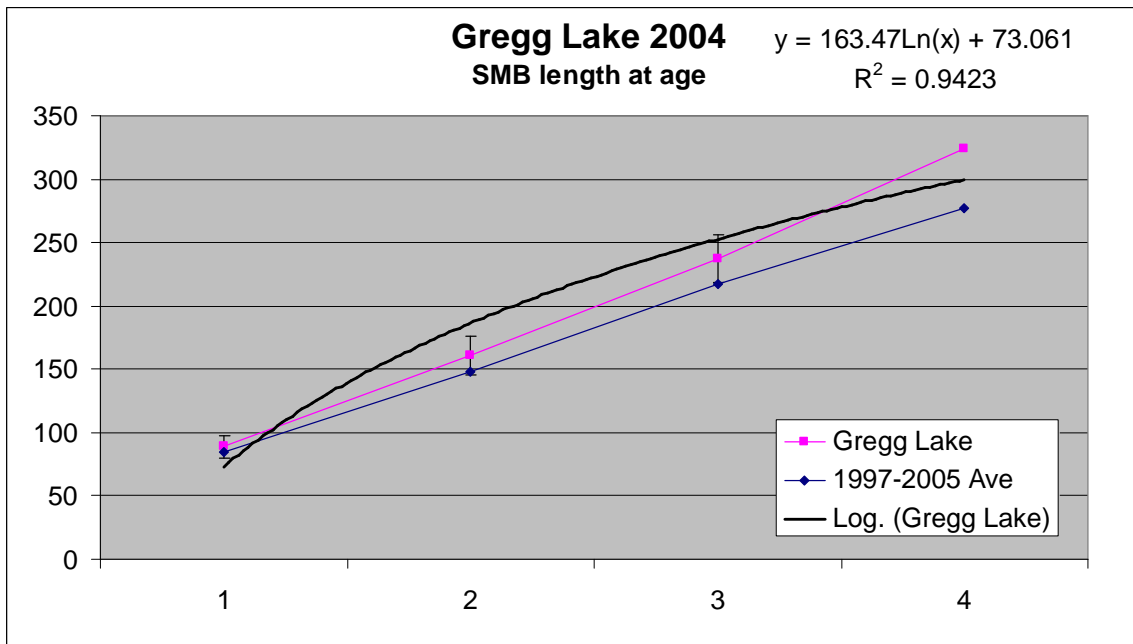


Figure 90. Average back-calculated length at age for smallmouth bass from Gregg Lake (Antrim) sampled in 2004 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

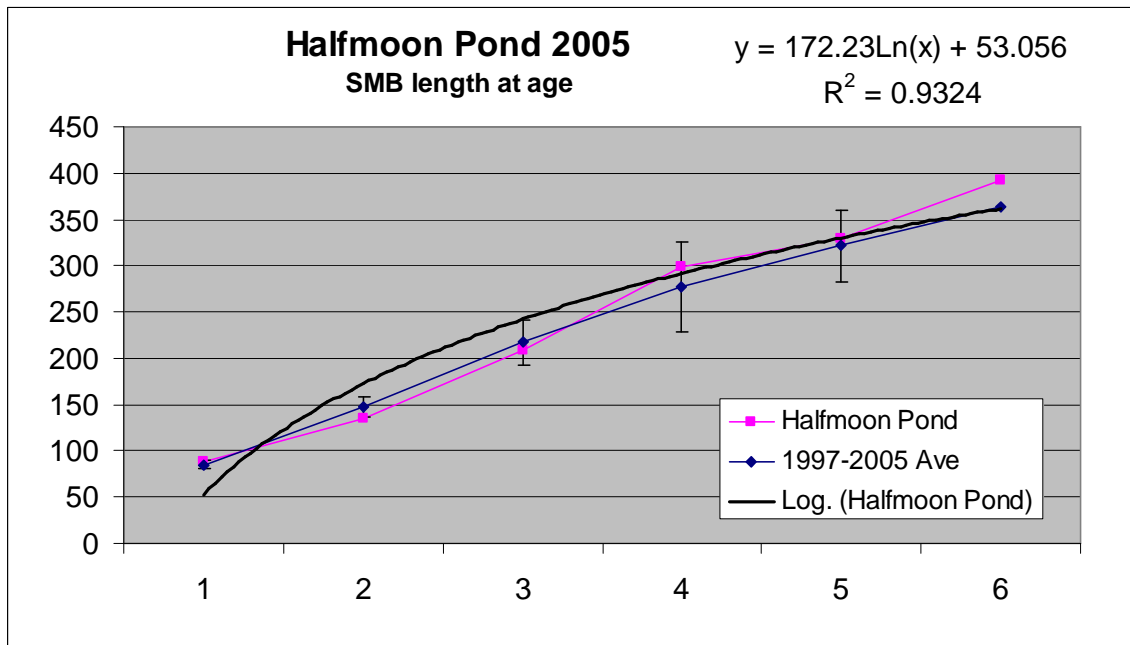


Figure 91. Average back-calculated length at age for smallmouth bass from Halfmoon Pond (Barnstead) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

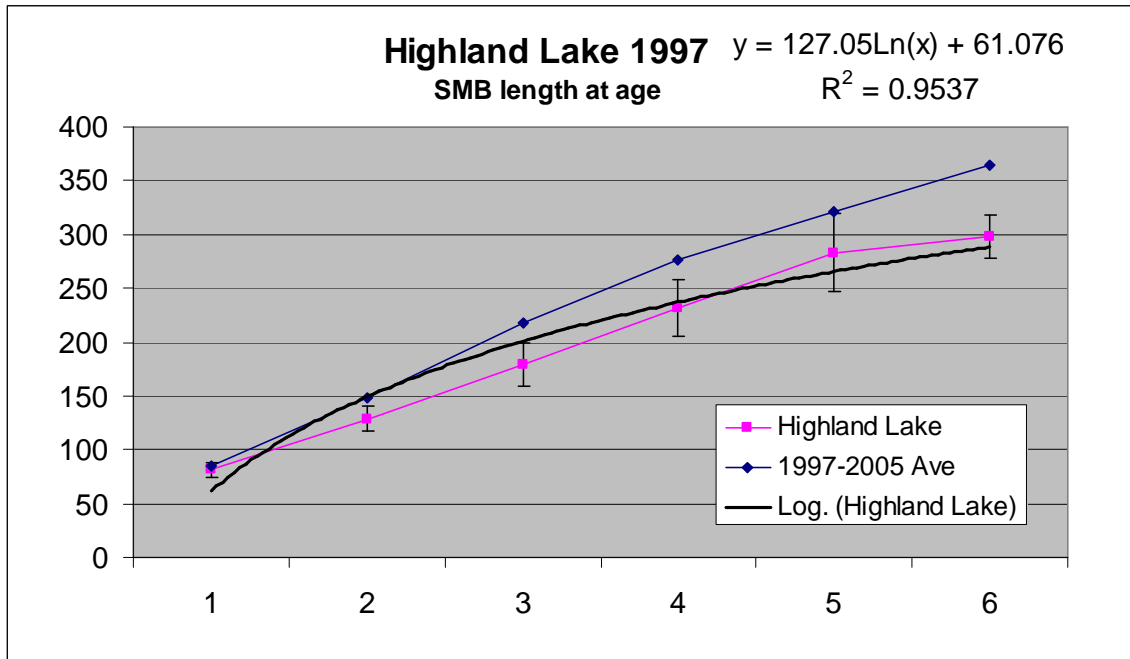


Figure 92. Average back-calculated length at age for smallmouth bass from Highland Lake (Stoddard) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

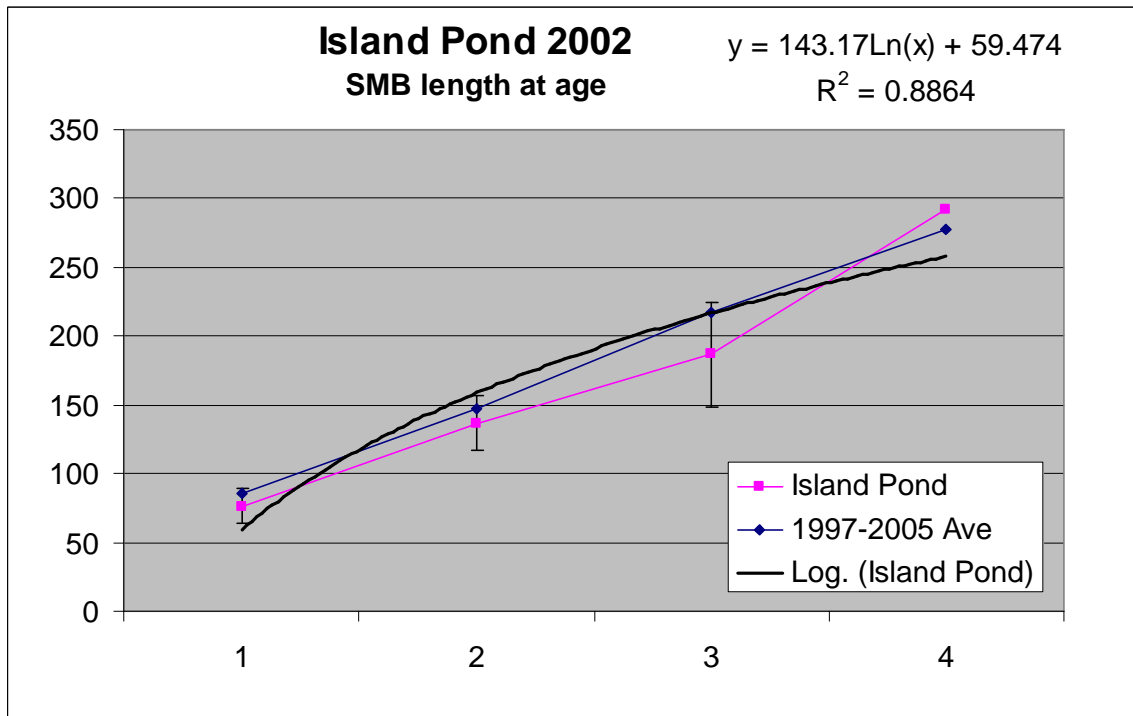


Figure 93. Average back-calculated length at age for smallmouth bass from Island Pond (Washington) sampled in 2002 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

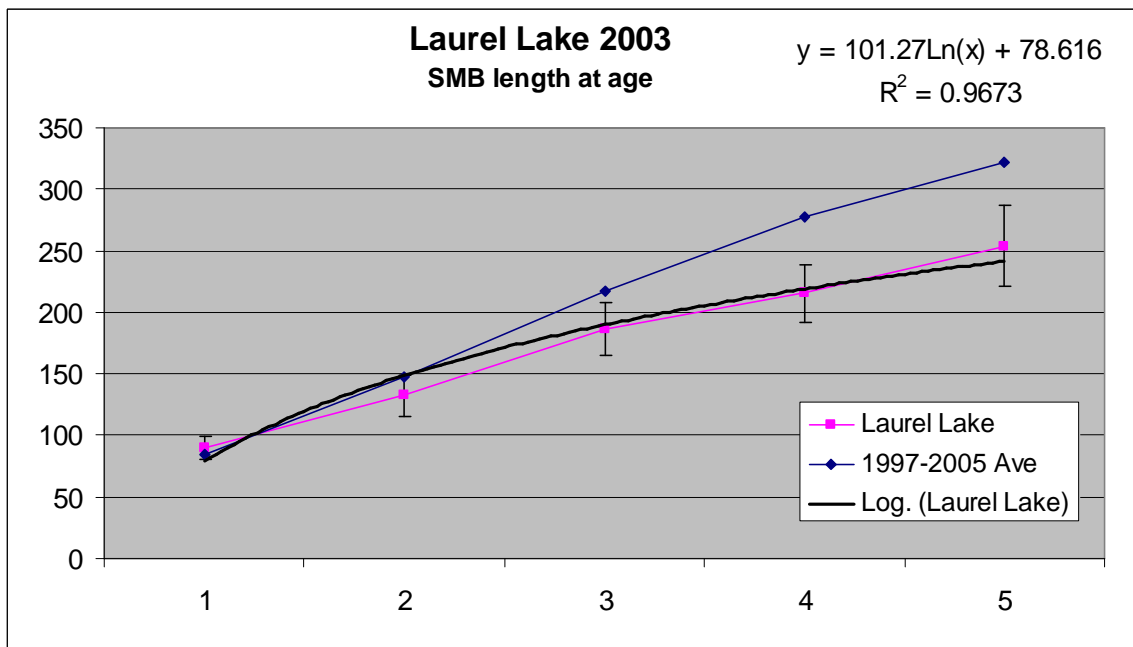


Figure 94. Average back-calculated length at age for smallmouth bass from Laurel Lake (Fitzwilliam) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

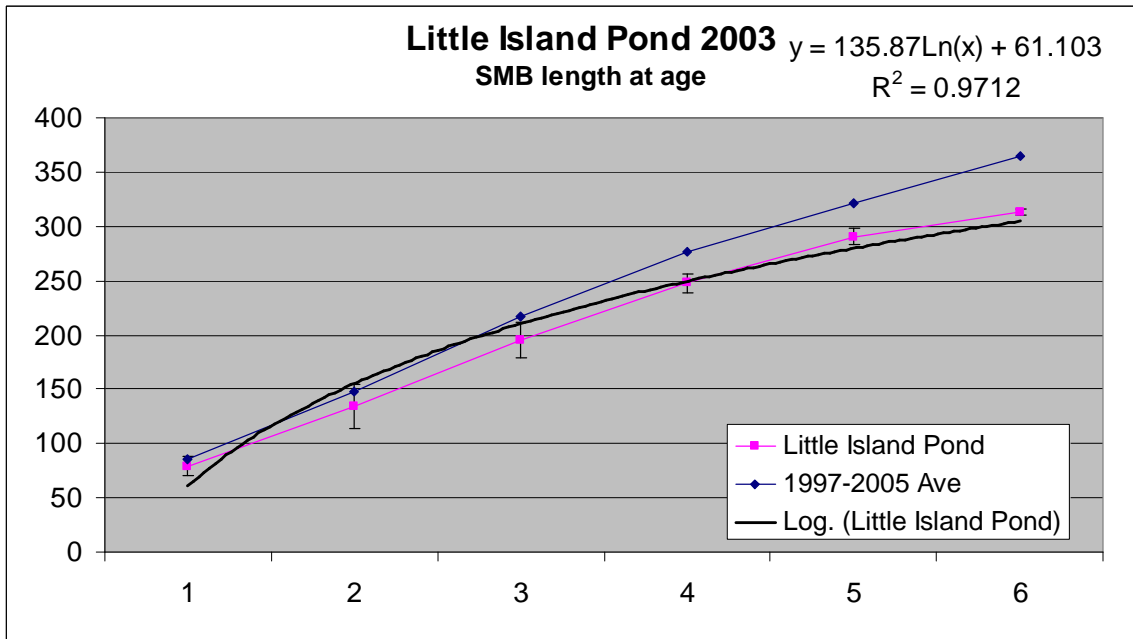


Figure 95. Average back-calculated length at age for smallmouth bass from Little Island Pond (Pelham) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

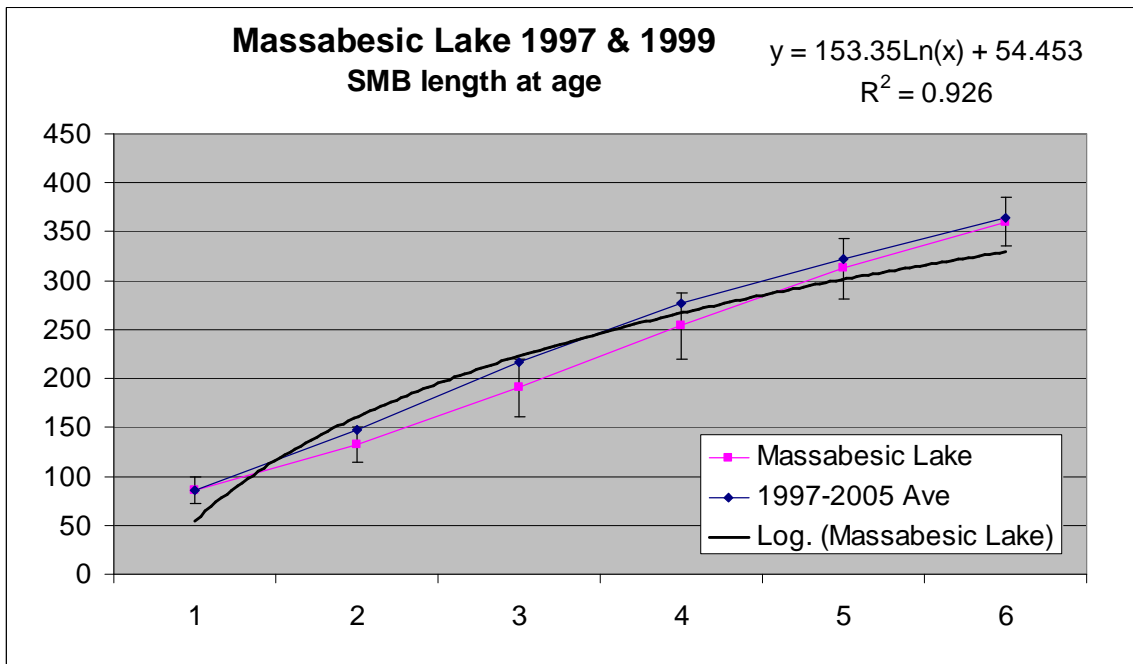


Figure 96. Average back-calculated length at age for smallmouth bass from Massabesic Lake (Auburn) sampled in 1997 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

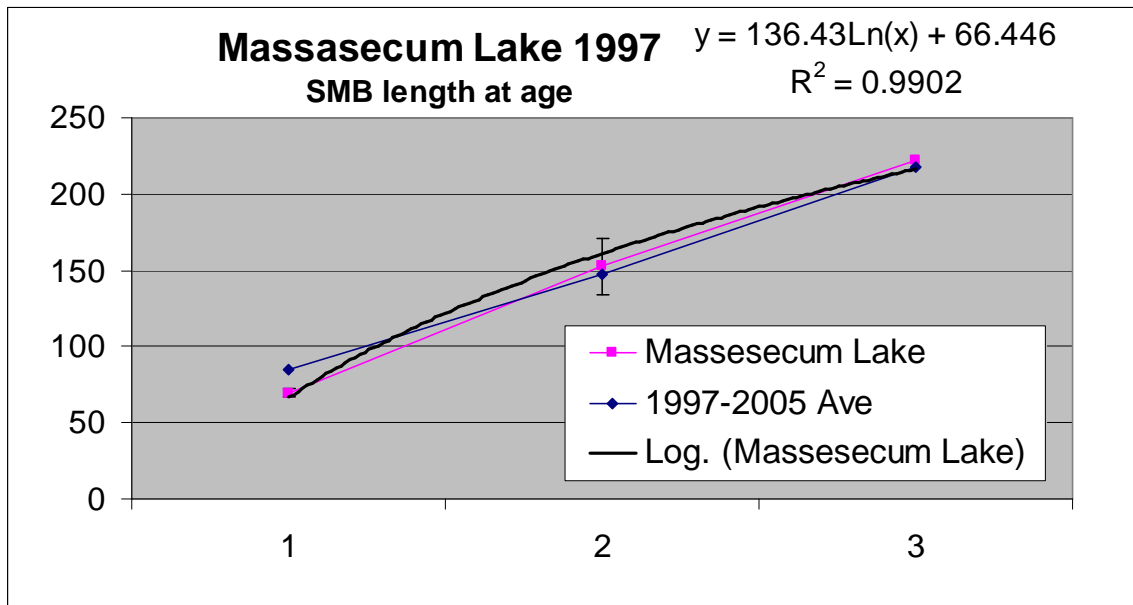


Figure 97. Average back-calculated length at age for smallmouth bass from Massesecum Lake (Bradford) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

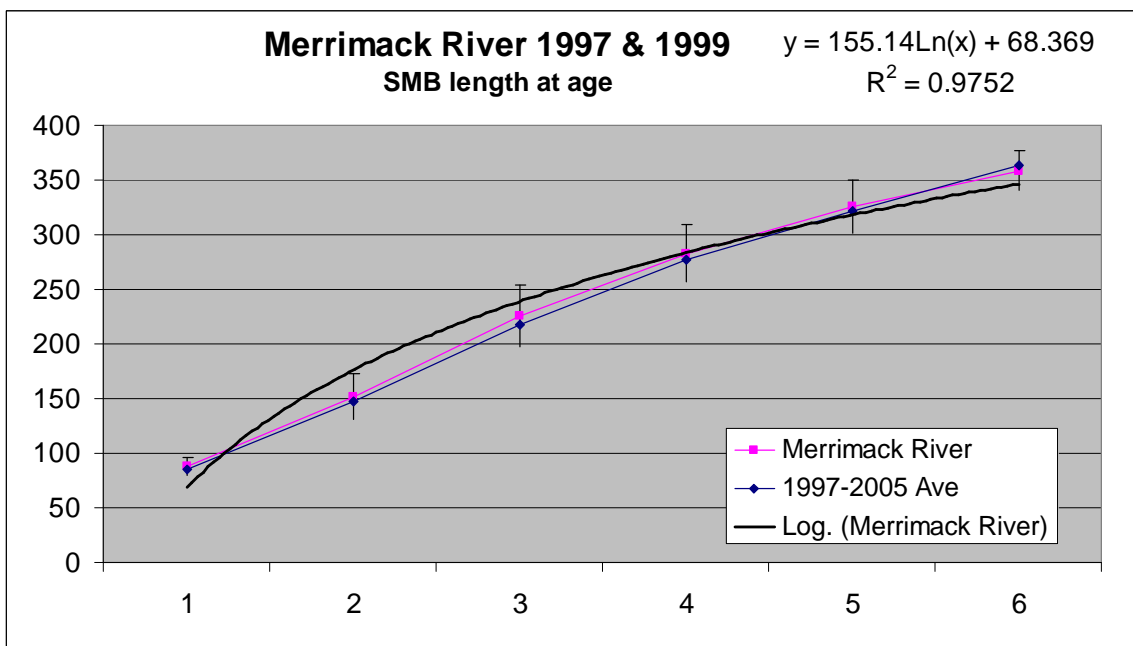


Figure 98. Average back-calculated length at age for smallmouth bass from Merrimack River sampled in 1997 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

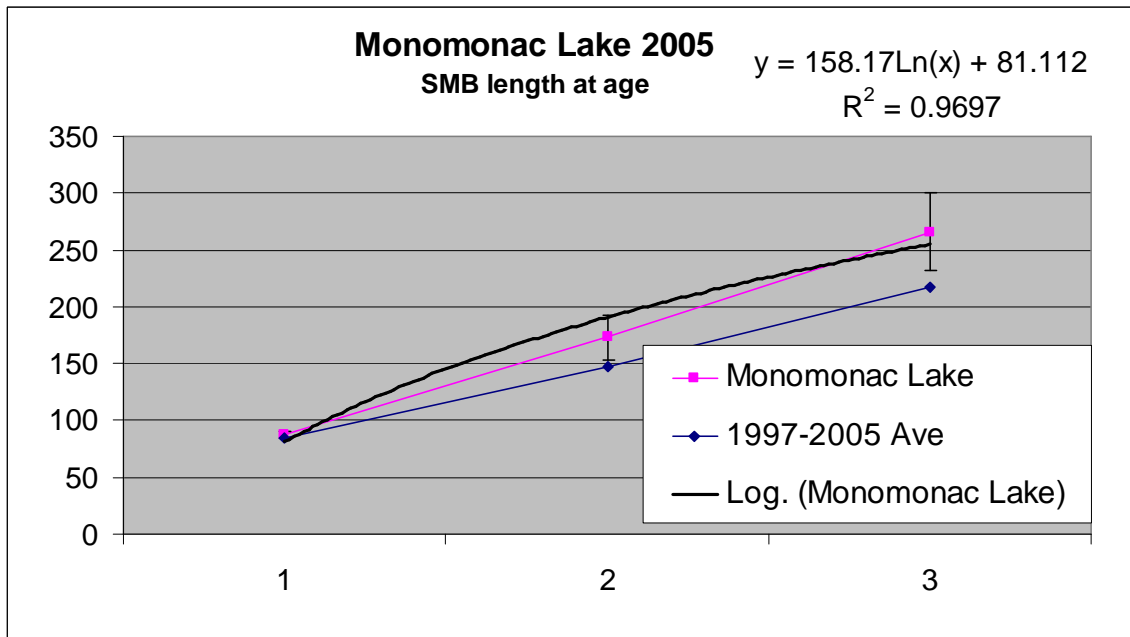


Figure 99. Average back-calculated length at age for smallmouth bass from Monomonac Lake (Rindge) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

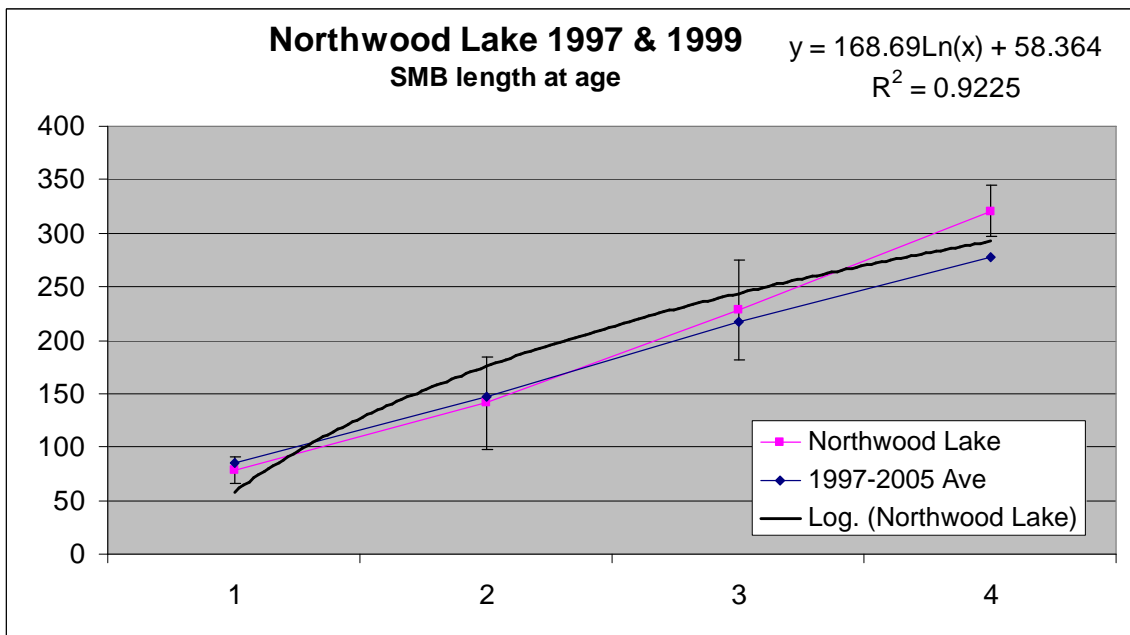


Figure 100. Average back-calculated length at age for smallmouth bass from Northwood Lake (Northwood) sampled in 1997 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

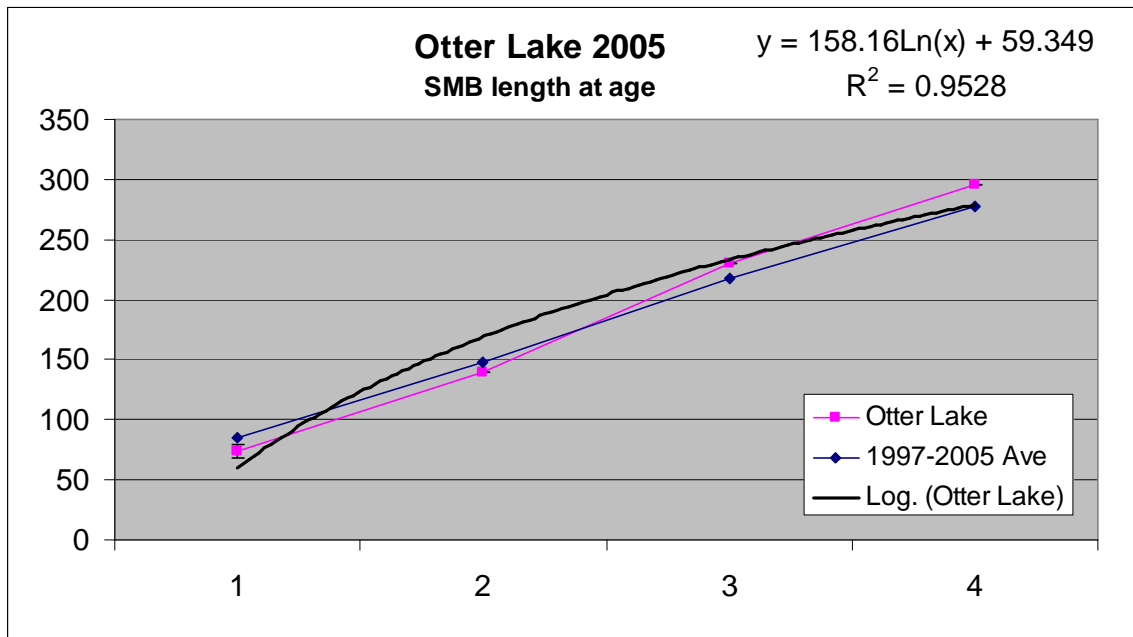


Figure 101. Average back-calculated length at age for smallmouth bass from Otter Lake (Greenfield) sampled in 2005 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

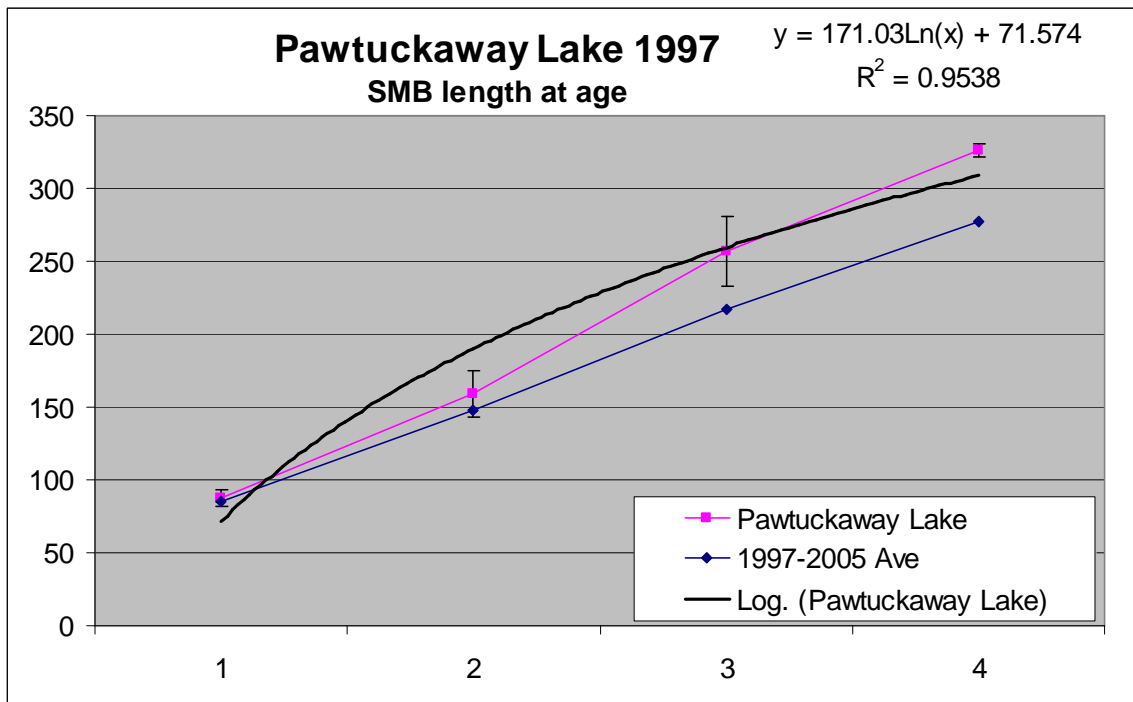


Figure 102. Average back-calculated length at age for smallmouth bass from Pawtuckaway Lake (Nottingham) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

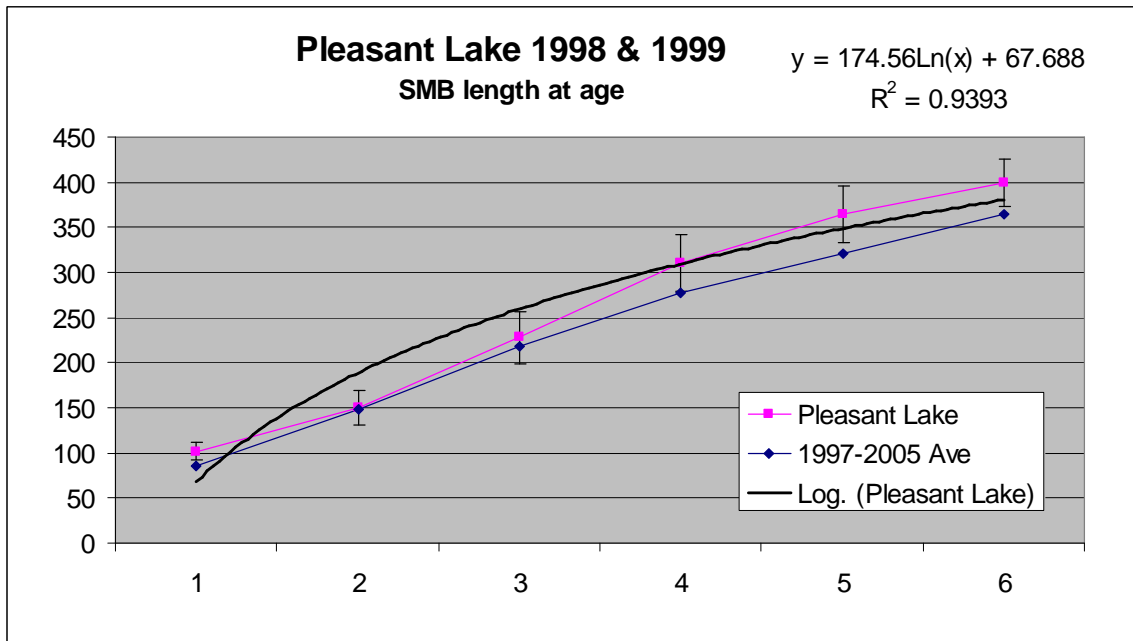


Figure 103. Average back-calculated length at age for smallmouth bass from Pleasant Lake (Deerfield) sampled in 1998 and 1999 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

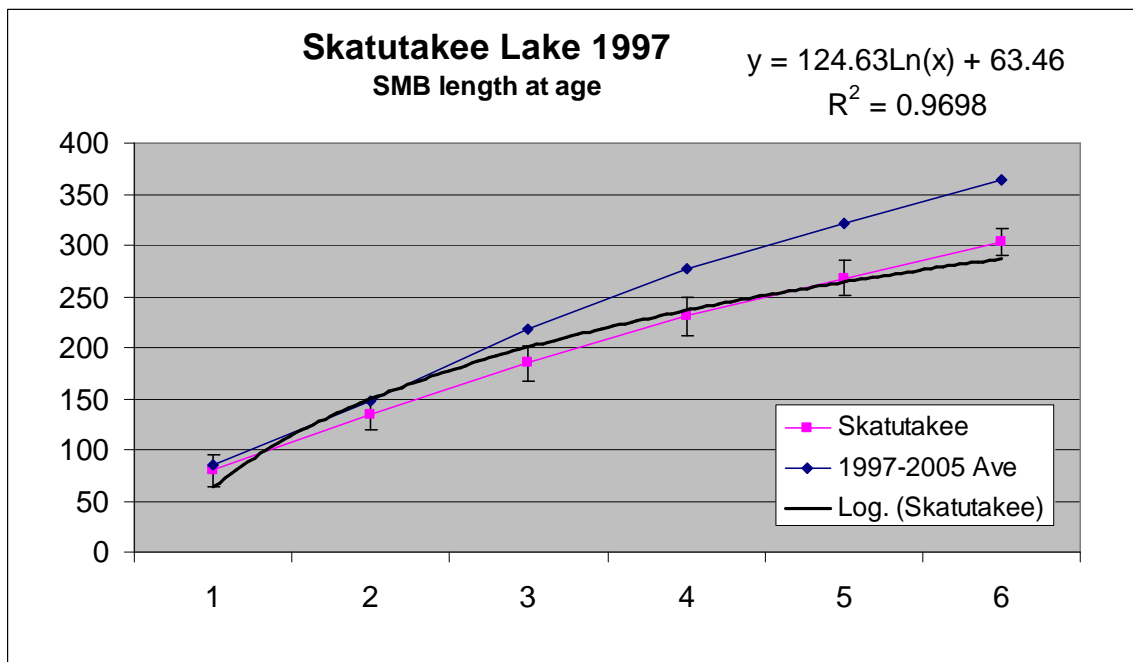


Figure 104. Average back-calculated length at age for smallmouth bass from Skatutakee Lake (Harrisville) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

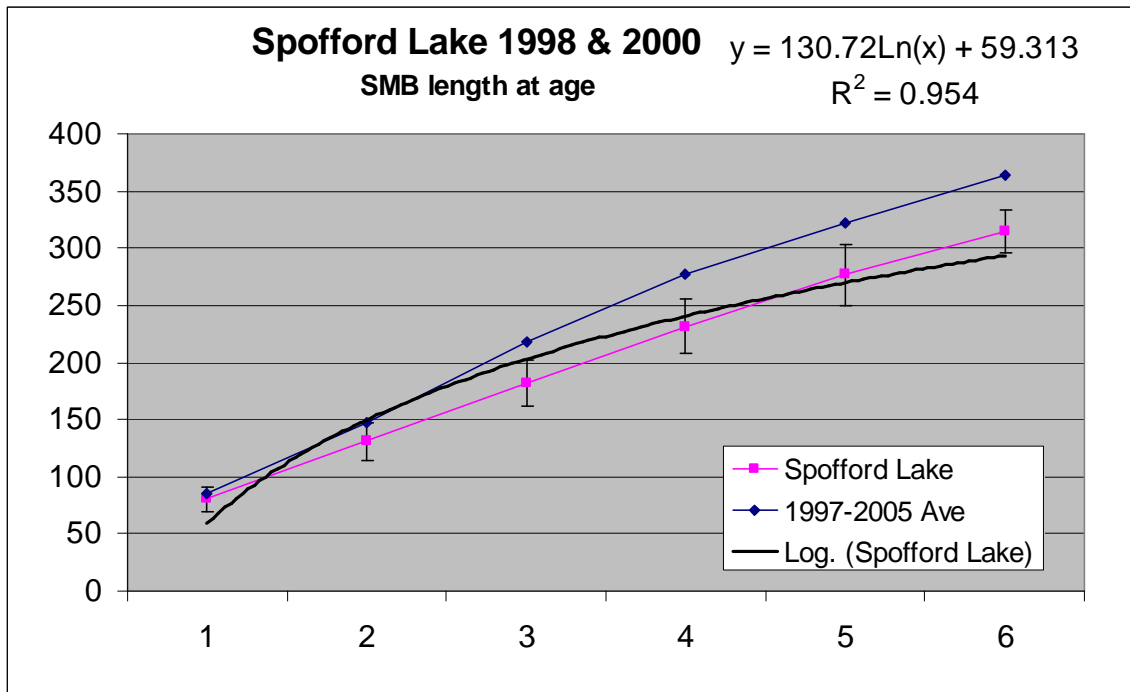


Figure 105. Average back-calculated length at age for smallmouth bass from Spofford Lake (Spofford) sampled in 1998 & 2000 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

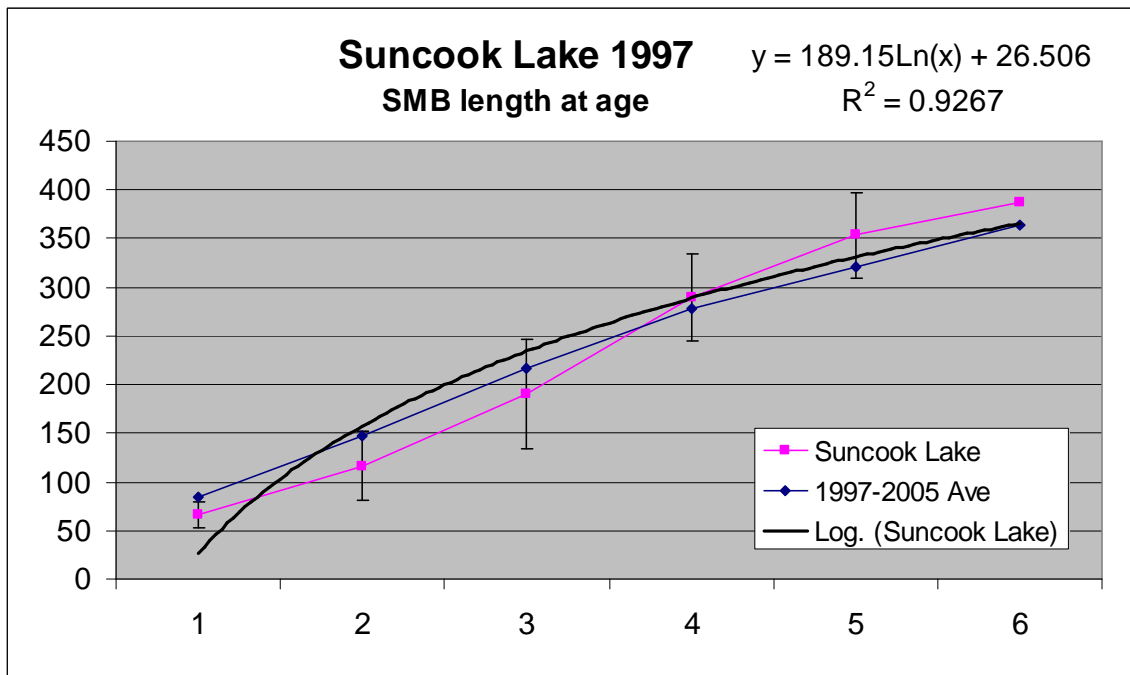


Figure 106. Average back-calculated length at age for smallmouth bass from Suncook Lake (Barnstead) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

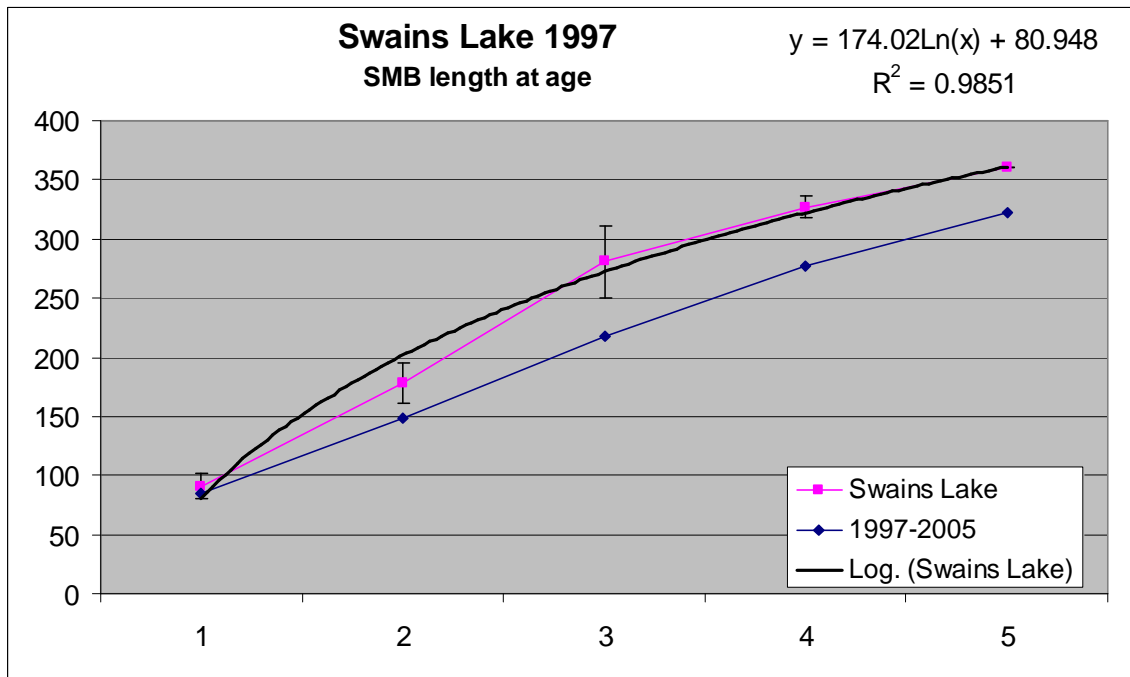


Figure 107. Average back-calculated length at age for smallmouth bass from Swains Lake (Barrington) sampled in 1997 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

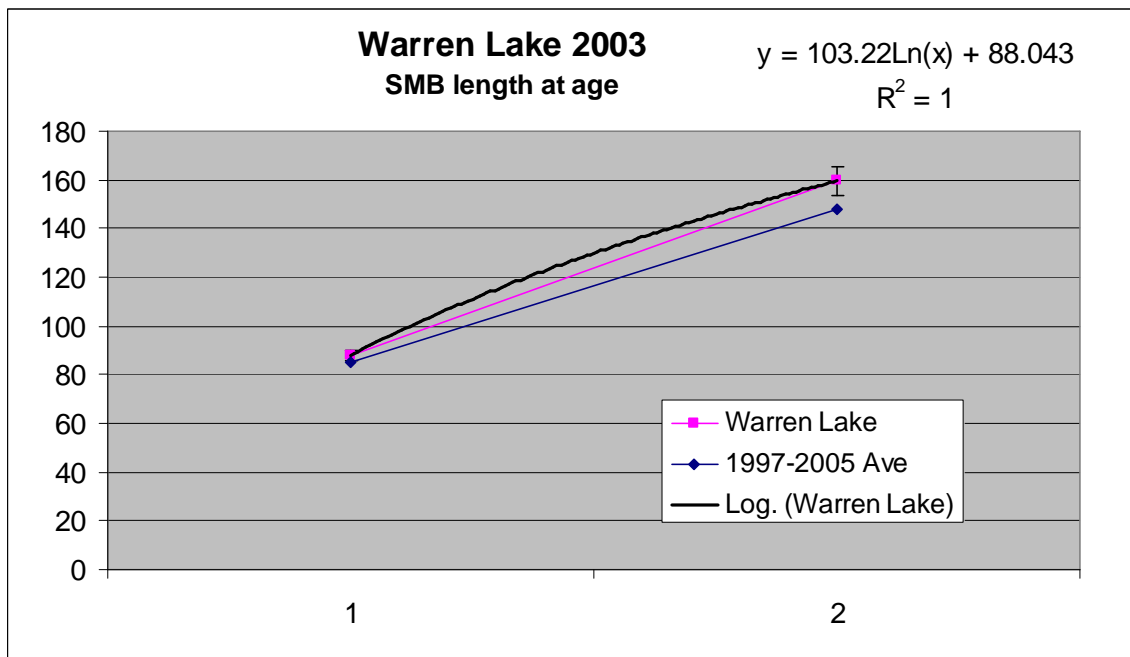


Figure 108. Average back-calculated length at age for smallmouth bass from Warren Lake (Alstead) sampled in 2003 ( $\pm 1$  SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

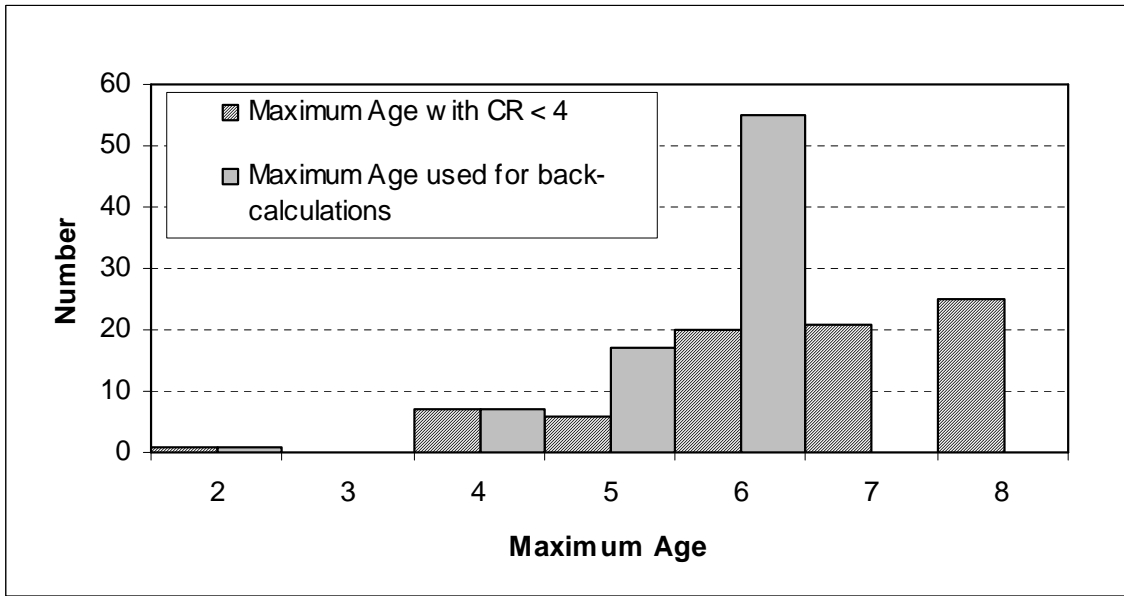


Figure 109. Length frequency histogram of water bodies having maximum aged largemouth bass with a confidence rating less than 4 and maximum age used for back-calculations ( $n = 80$ ).

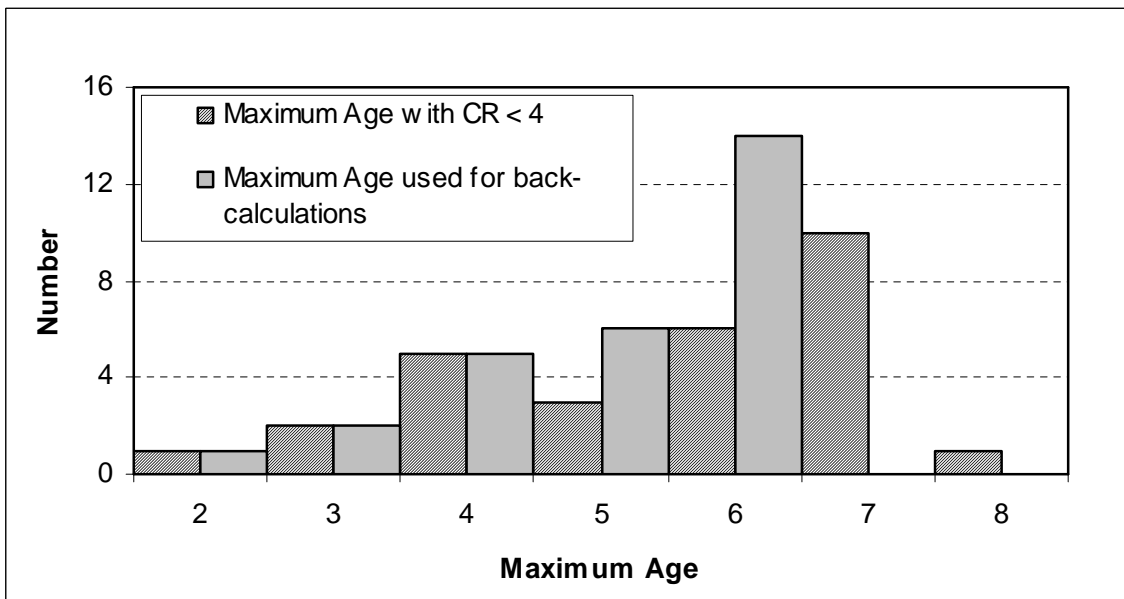


Figure 110. Length frequency histogram of water bodies having maximum aged smallmouth bass with a confidence rating < 4 and maximum age used for back-calculations ( $n = 28$ ).

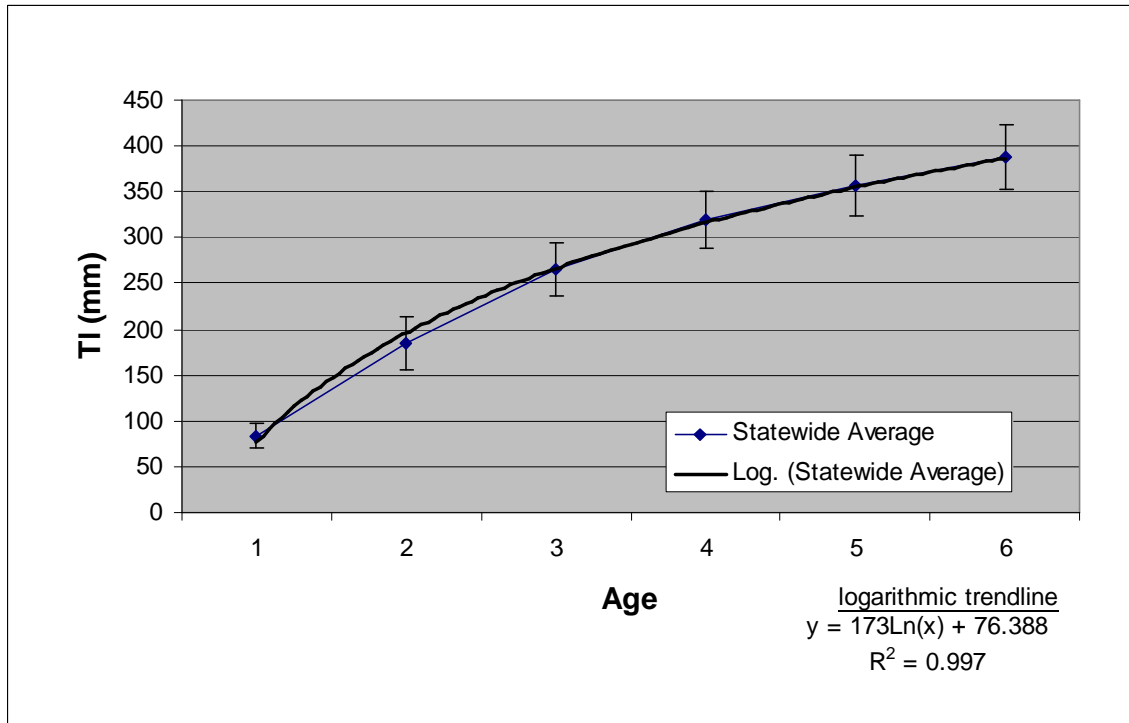


Figure 111. Statewide average back-calculated length at age for largemouth bass for water bodies sampled from 1997 through 2005 ( $\pm 1$  SD). Number of water bodies used in analysis was 81.

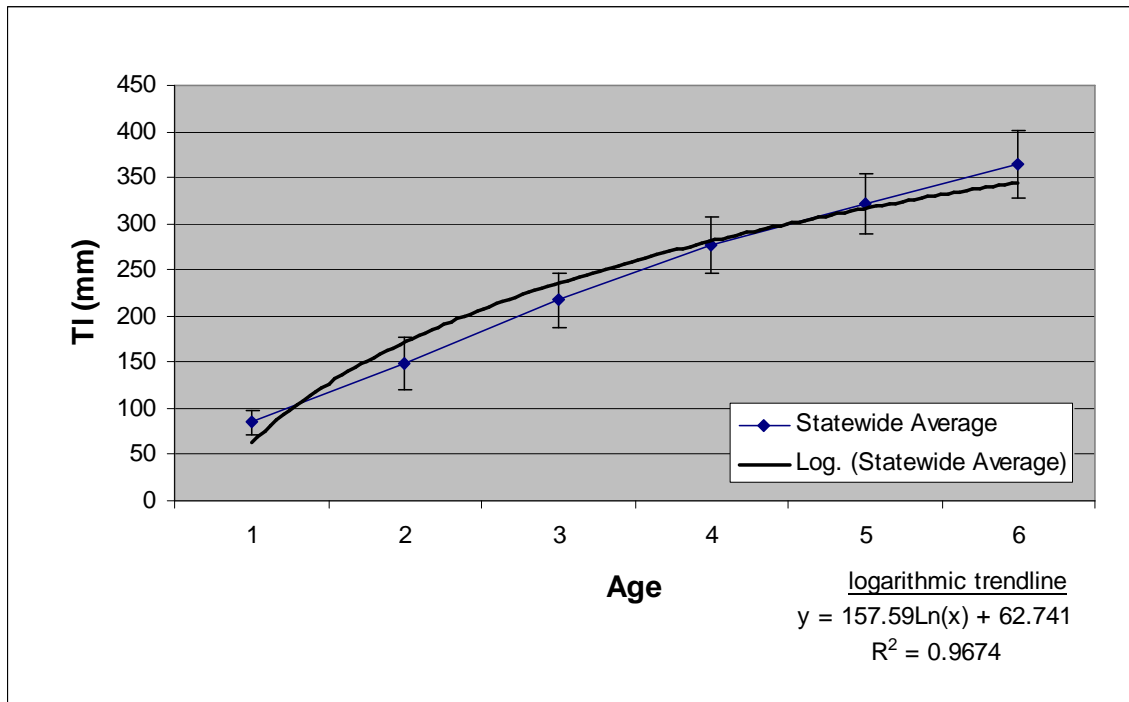


Figure 112. Statewide average back-calculated length at age for smallmouth bass for water bodies sampled from 1997 through 2005 ( $\pm 1$  SD). Number of water bodies used in analysis was 27.



Figure 113. The length-frequency distribution of age at quality size largemouth bass populations sampled during 1997 – 2005.  $n = 79$ .



Figure 114. The length-frequency distribution of age at quality size smallmouth bass populations sampled during 1997 – 2005.  $n = 25$ .

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