

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

**Michael Racine
Fisheries Biologist
New Hampshire Fish & Game Department
Region 4
Keene, NH 03431**

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 = ± 1 year
- 4 = ± 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 ≤ 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 ≤ 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 ≥ 0.92 for all water bodies. Smallmouth bass correlation coefficients were ≥ 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 ≤ 8 with CR $< 4^a$ | Maximum age used for back-calculations | Mean back-calculated length (mm) at age | | | | | | | | Number of fish aged | | R ^{2b} | Age at quality size 300 mm | Growth Categorization |
|---------------------------|-----------------|----------------|---------|--------------------------------------|--|---|-----|-----|-----|-----|-----|----------|-----|---------------------|------|-----------------|----------------------------|-----------------------|
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | ≥ 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 ^e | 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 ^e | 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 | | |

^a Oldest fish aged with a confidence rating of 1 to 3.

^b Correlation coefficient for logarithmic trendline.

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

^d Age at quality size values not ascertained due to insufficient data.

^e 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 ^a | Maximum age used for back-calculations | Mean back-calculated length (mm) at age | | | | | | Number of fish aged | | R ^{2b} | 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 ^e | 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 ^e | Deerfield | 1999 | LMB | 4 | 4 | 61 | 120 | 225 | 313 | | | 3 | 0 | 0.92 | 4.35 | S |
| Pleasant Pond ^e | 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 |

^a Oldest fish aged with a confidence rating of 1 to 3.

^b Correlation coefficient for logarithmic trendline.

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

^d Age at quality size values not ascertained due to insufficient data.

^e 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 ≤ 8 with CR < 4 ^a | 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 | ≥ 1 | 5-6 | R ^{2b} | 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 ^e | 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 ^e | Moultonboro | 2004 | LMB | 4 | 4 | 80 | 210 | 270 | 351 | | | 25 | 0 | 0.99 | 3.25 | F | |

^a Oldest fish aged with a confidence rating of 1 to 3.

^b Correlation coefficient for logarithmic trendline.

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

^d Age at quality size values not ascertained due to insufficient data.

^e 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 ≤ 8 with CR < 4 | Maximum age used for back-calculations | Mean back-calculated length (mm) at age | | | | | | Number of fish aged | | R ^{2b} | Age at Quality | Growth Categorization |
|-------------------------------|--------------|----------------|---------|----------------------------------|--|---|-----|-----|-----|-----|-----|---------------------|-----|-----------------|----------------|-----------------------|
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | ≥ 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 ^f | 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 ^e | 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 ^c | 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 ^d | 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 ^d | Rindge | 2005 | SMB | 3 | 3 | 88 | 173 | 266 | | | | 3 | 0 | - | - | - |
| Northwood Lake ^e | Northwood | 1997, 1999 | SMB | 4 | 4 | 78 | 139 | 218 | 252 | | | 43 | 0 | 0.92 | 3.72 | A |
| Otter Lake ^e | Greenfield | 2005 | SMB | 4 | 4 | 87 | 140 | 231 | 295 | | | 6 | 0 | 0.95 | 4.04 | A |
| Pawtuckaway Lake ^e | 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 ^d | Alstead | 2003 | SMB | 2 | 2 | 88 | 160 | | | | | 3 | 0 | - | - | - |

^a Oldest fish aged with a confidence rating of 1 to 3.

^b Correlation coefficient for logarithmic trendline.

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

^d Age at quality size values not ascertained due to insufficient data.

^e Age at quality size values should be interpreted with caution.

^f 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 |

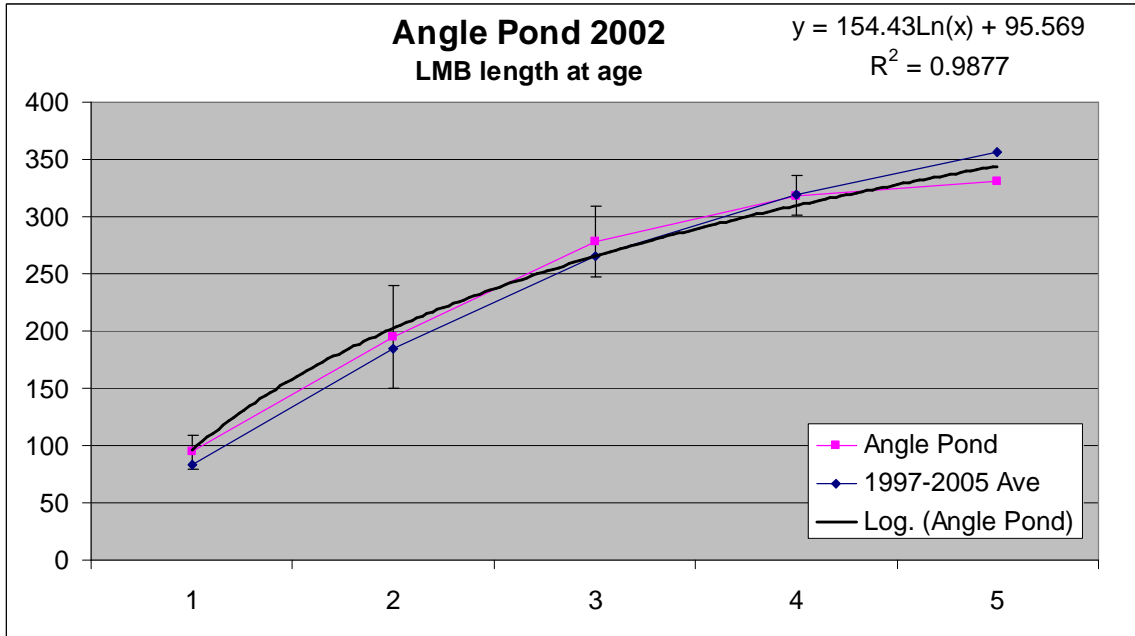


Figure 1. Average back-calculated length at age for largemouth bass from Angle Pond (Sandown) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

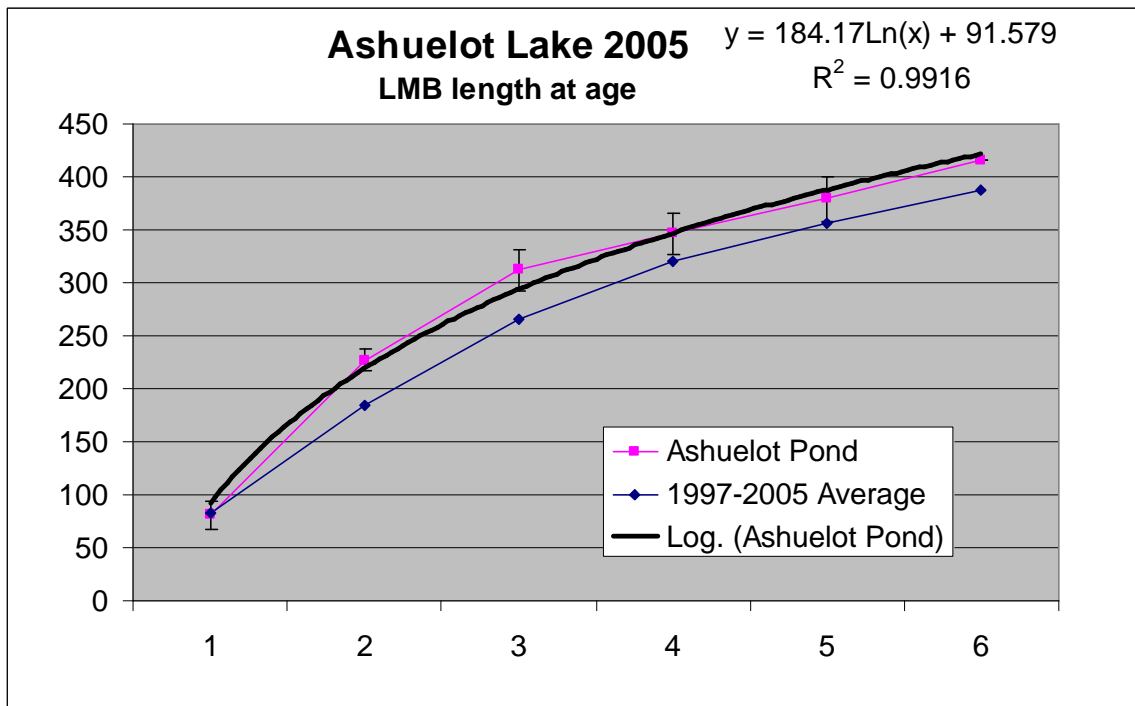


Figure 2. Average back-calculated length at age for largemouth bass from Ashuelot Lake (Washington) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

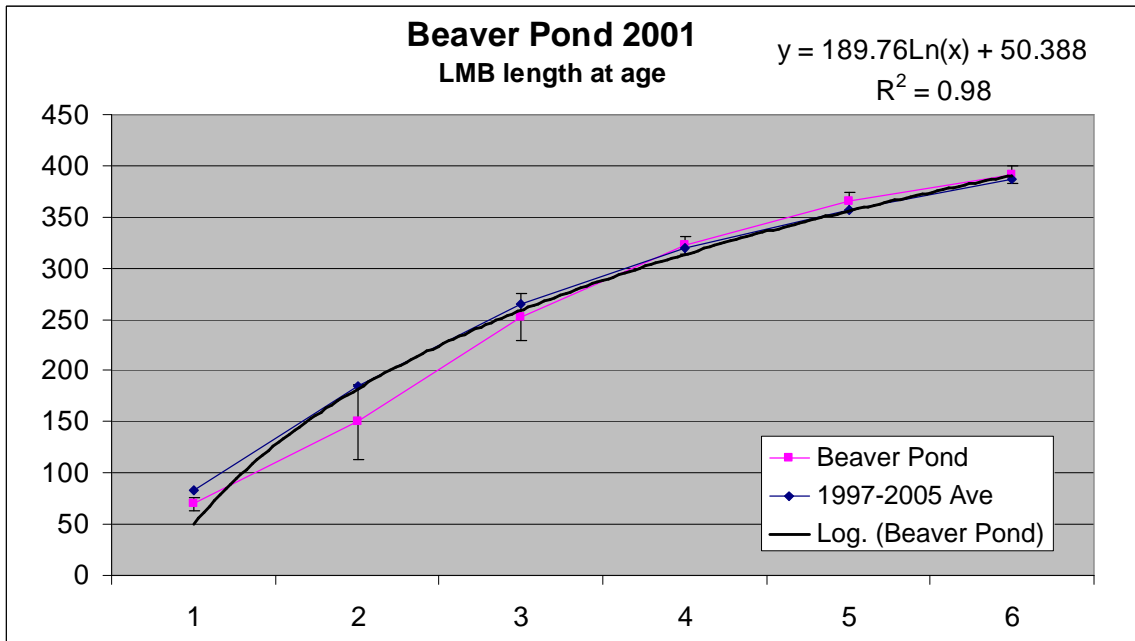


Figure 3. Average back-calculated length at age for largemouth bass from Beaver Pond (Derry) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

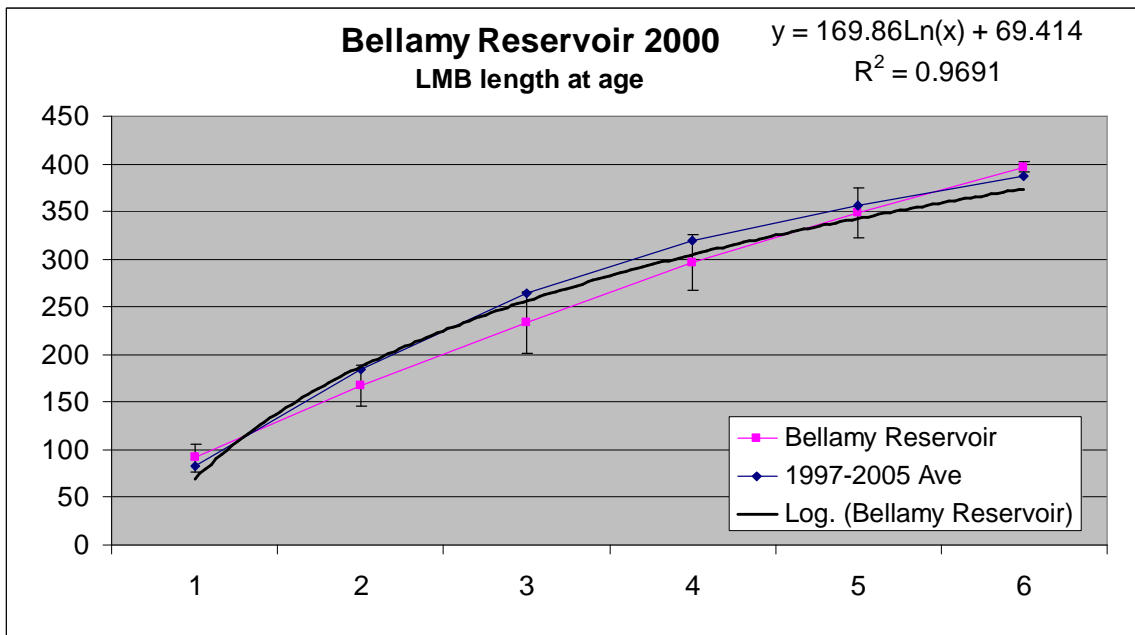


Figure 4. Average back-calculated length at age for largemouth bass from Bellamy Reservoir (Madbury) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

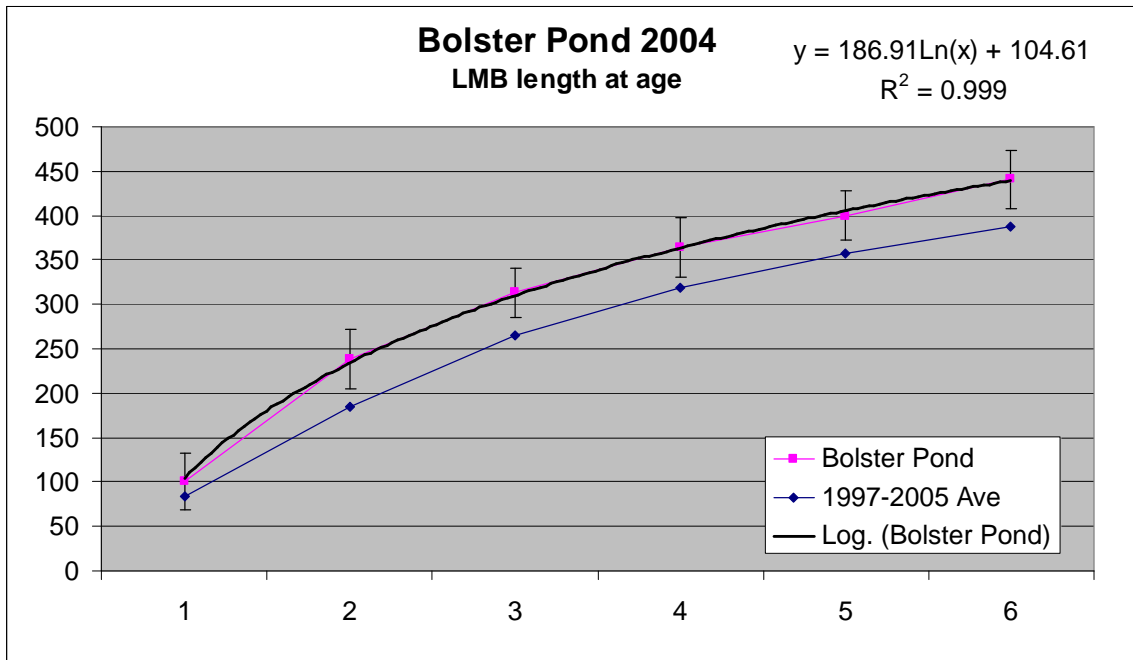


Figure 5. Average back-calculated length at age for largemouth bass from Bolster Pond (Sullivan) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

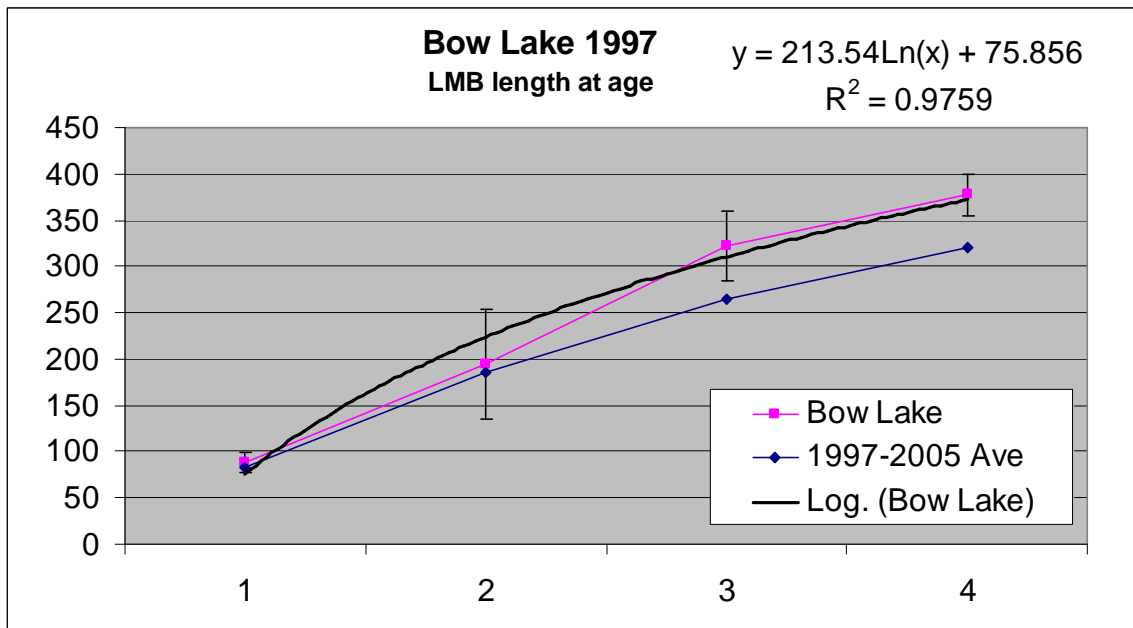


Figure 6. Average back-calculated length at age for largemouth bass from Bow Lake (Strafford) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

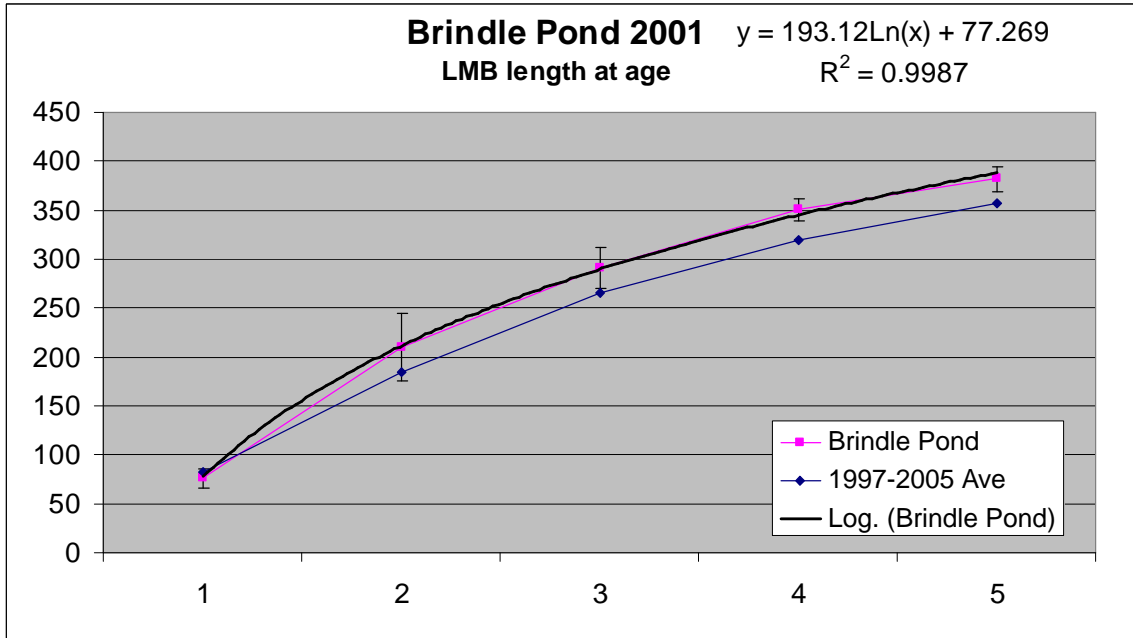


Figure 7. Average back-calculated length at age for largemouth bass from Brindle Pond (Barnstead) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

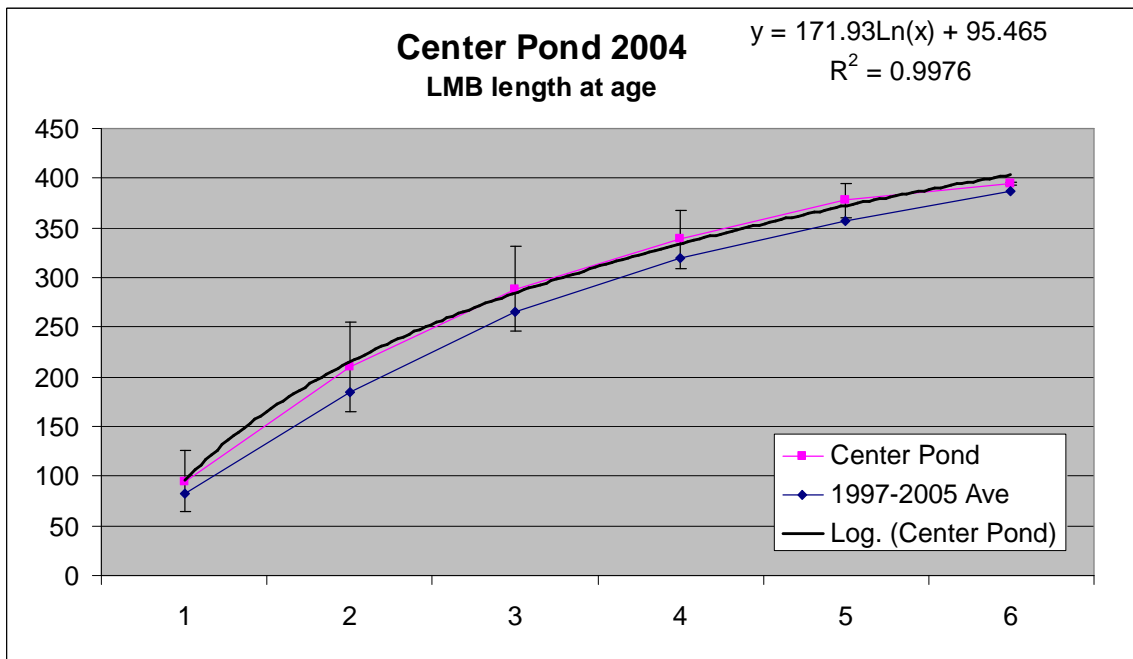


Figure 8. Average back-calculated length at age for largemouth bass from Center Pond (Stoddard) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

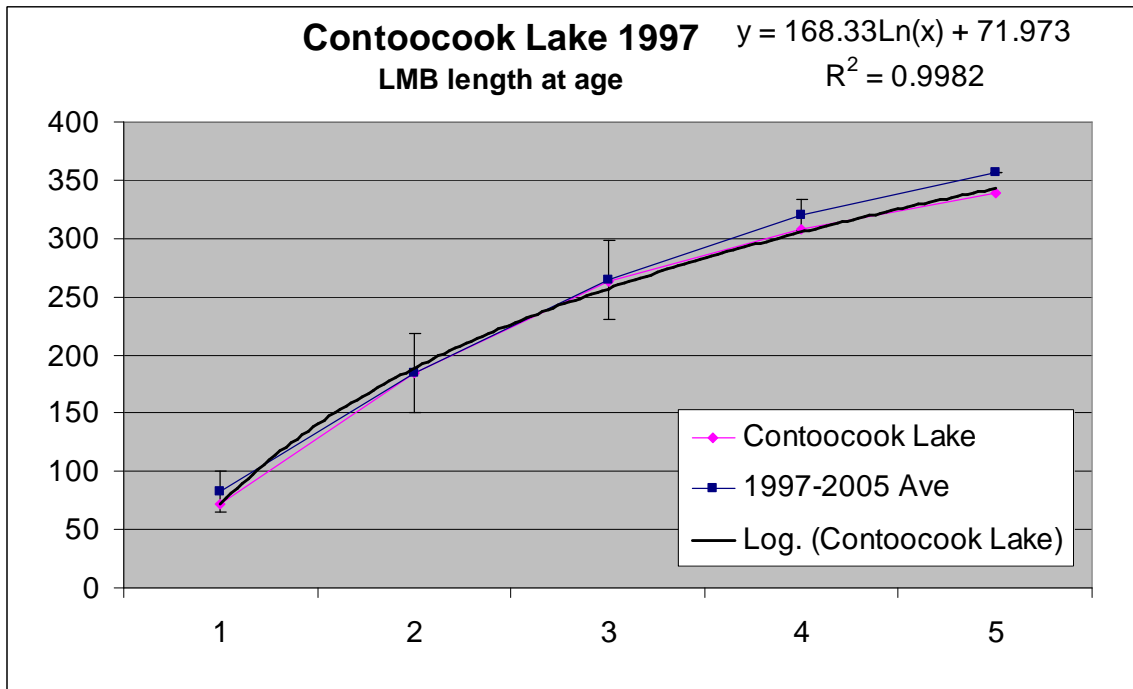


Figure 9. Average back-calculated length at age for largemouth bass from Contoocook Lake (Jaffrey) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

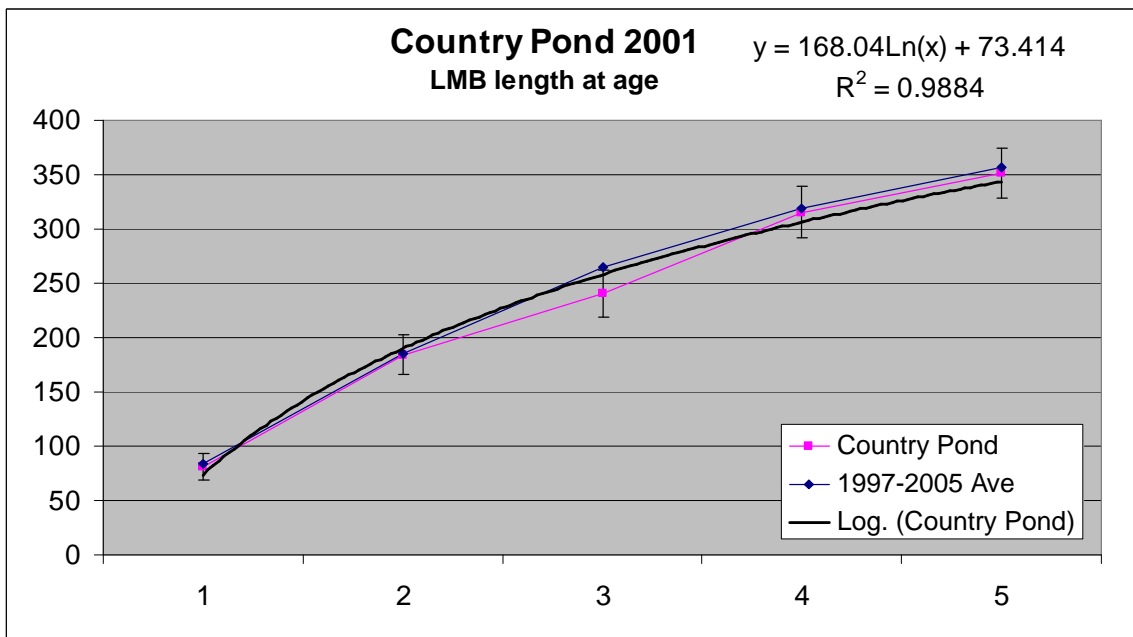


Figure 10. Average back-calculated length at age for largemouth bass from Country Pond (Kingston/Newton) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

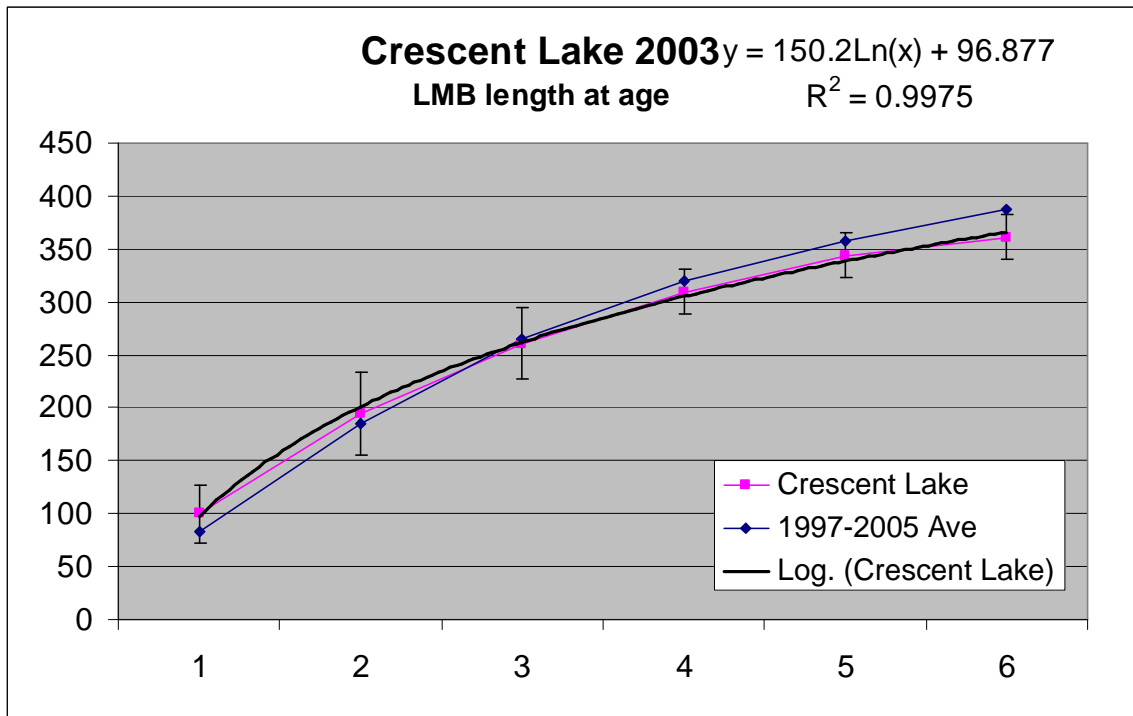


Figure 11. Average back-calculated length at age for largemouth bass from Crescent Lake (Acworth) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

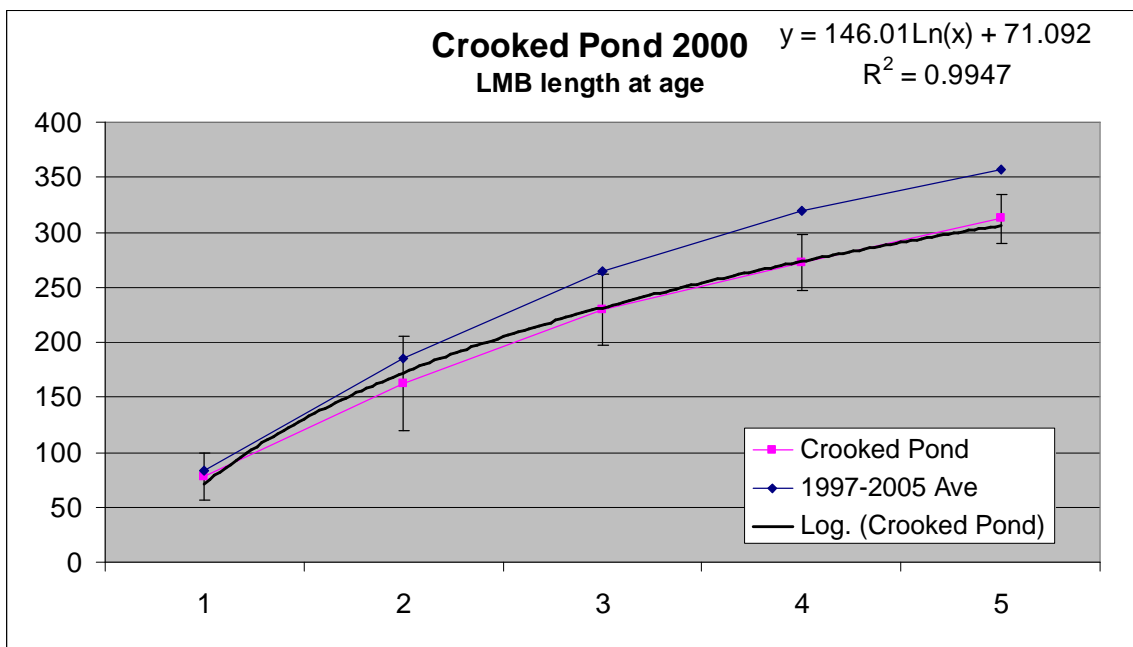


Figure 12. Average back-calculated length at age for largemouth bass from Crooked Pond (Loudon) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

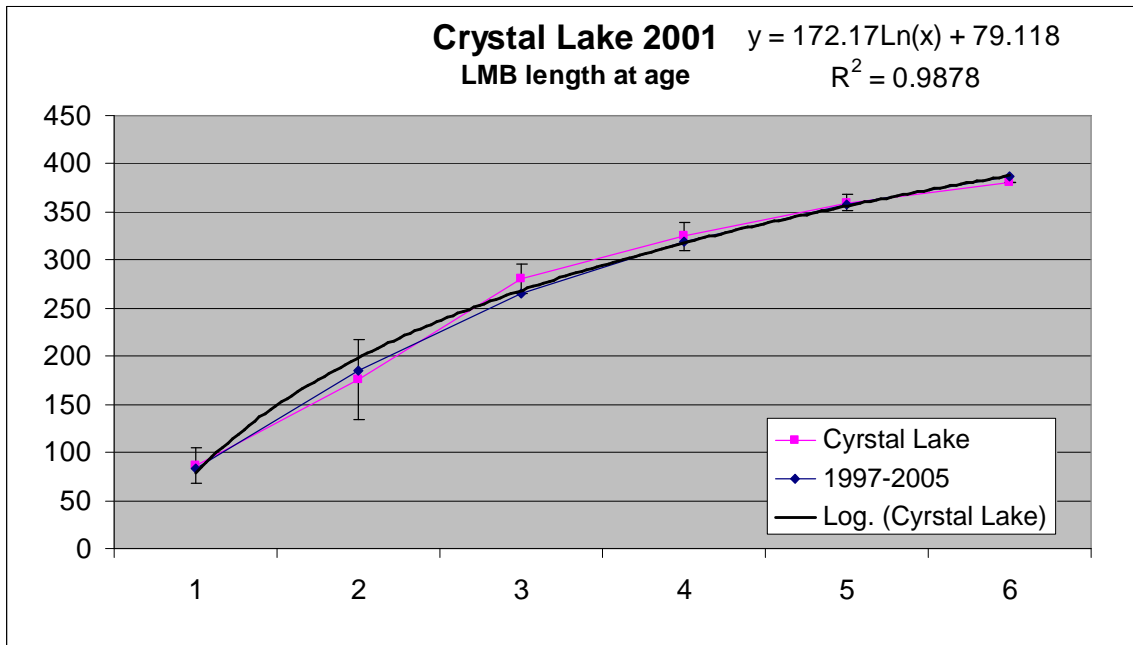


Figure 13. Average back-calculated length at age for largemouth bass from Crystal Lake (Manchester) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

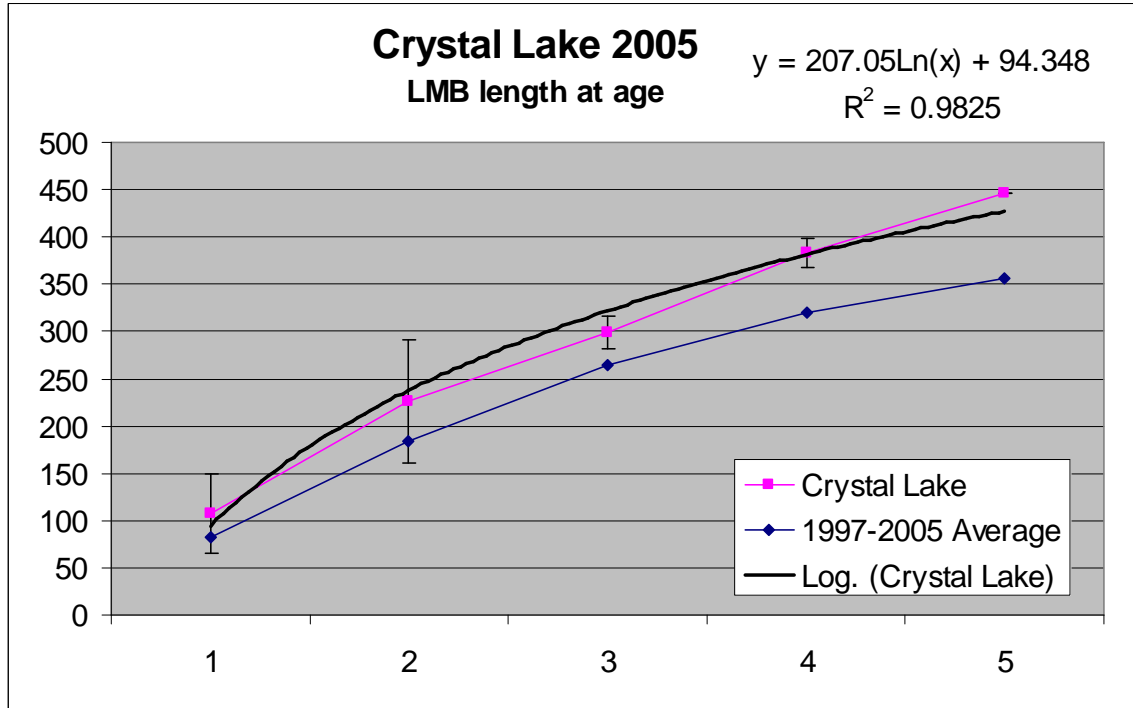


Figure 14. Average back-calculated length at age for largemouth bass from Crystal Lake (Gilmanton) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

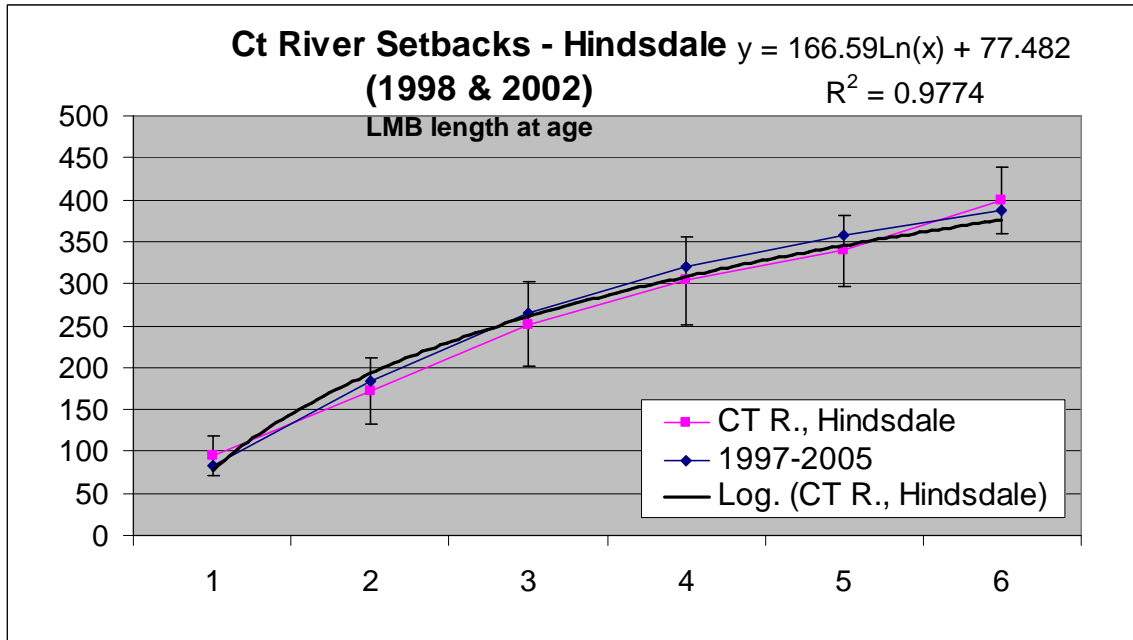


Figure 15. Average back-calculated length at age for largemouth bass from Connecticut River (Hindsdale) sampled in 1998 & 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

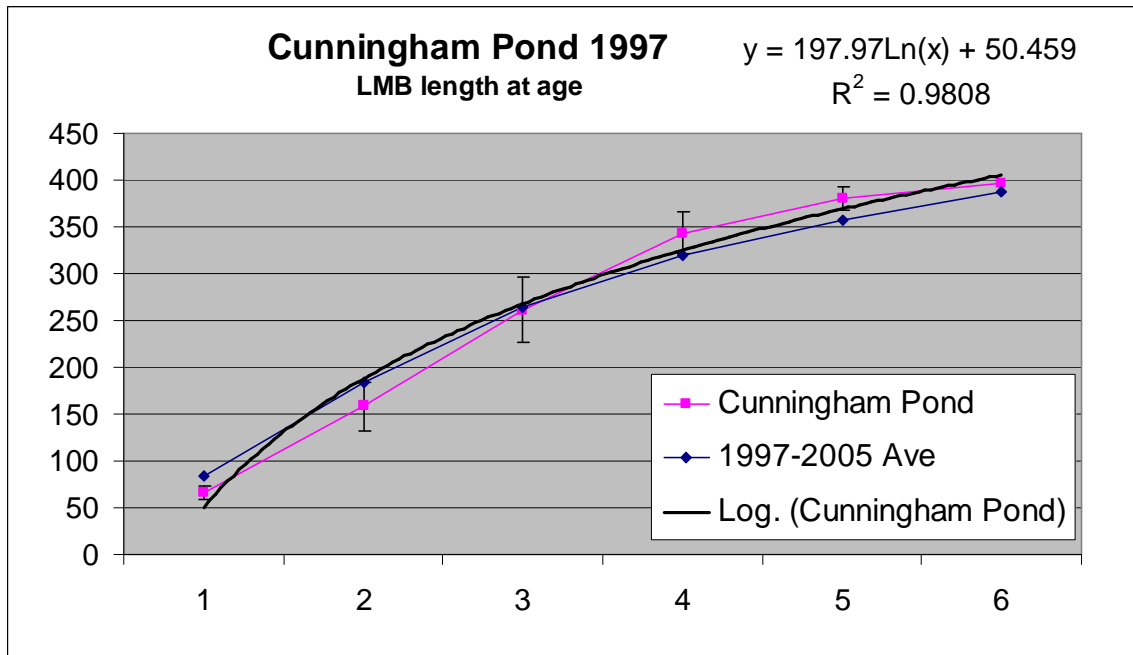


Figure 16. Average back-calculated length at age for largemouth bass from Cunningham Pond (Peterborough) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

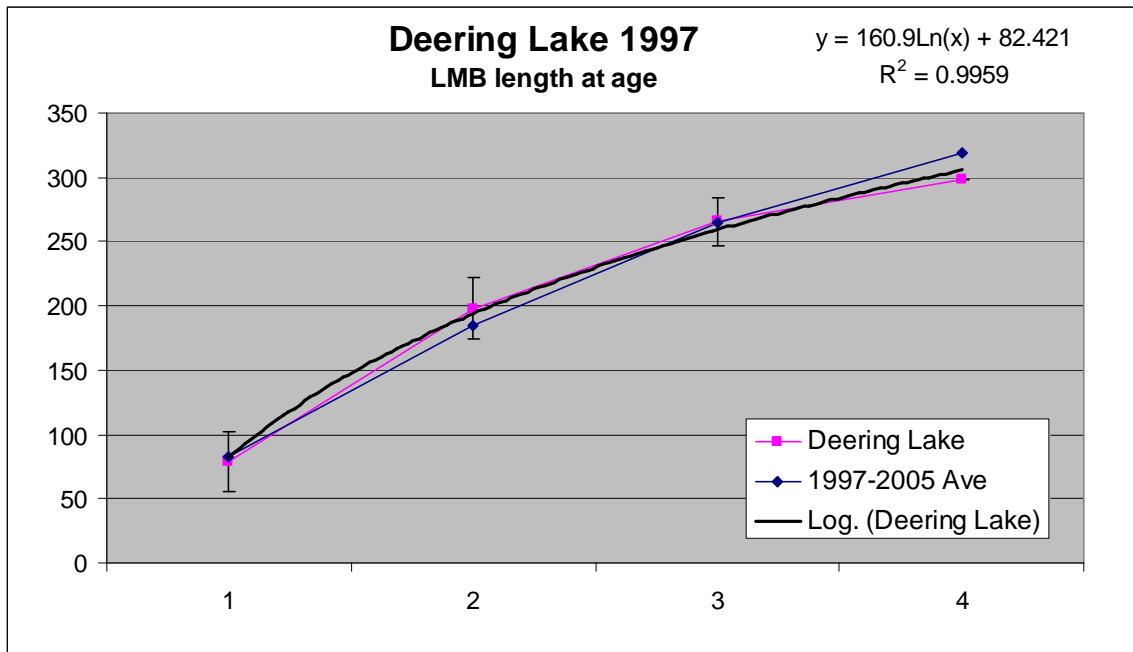


Figure 17. Average back-calculated length at age for largemouth bass from Deering Lake (Deering) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

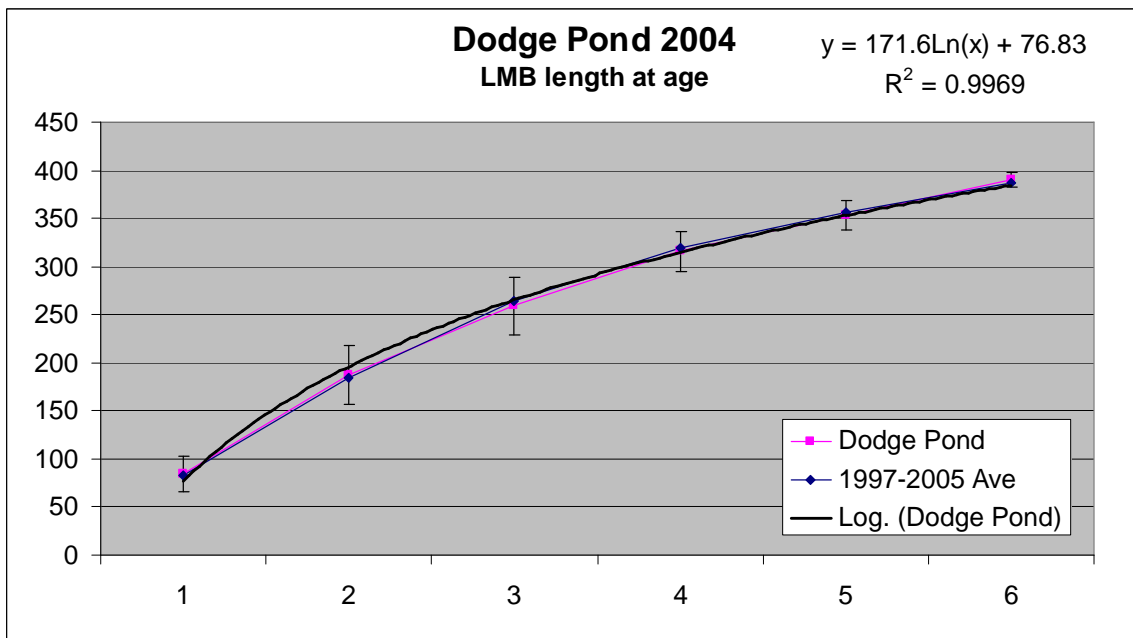


Figure 18. Average back-calculated length at age for largemouth bass from Dodge Pond (Lempster) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

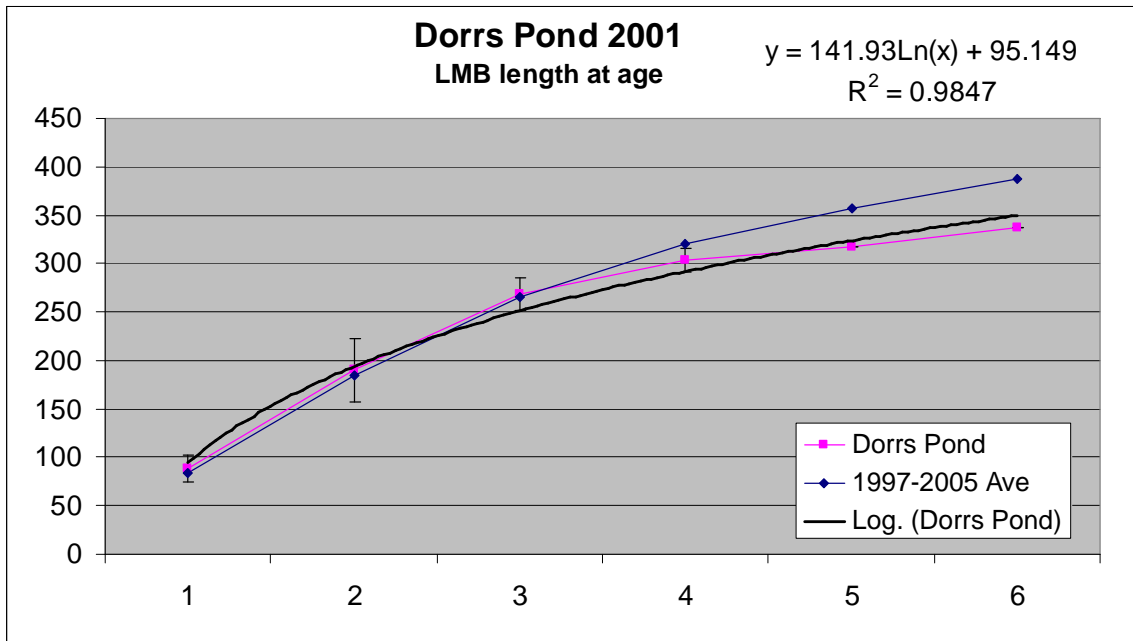


Figure 19. Average back-calculated length at age for largemouth bass from Dorrs Pond (Manchester) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

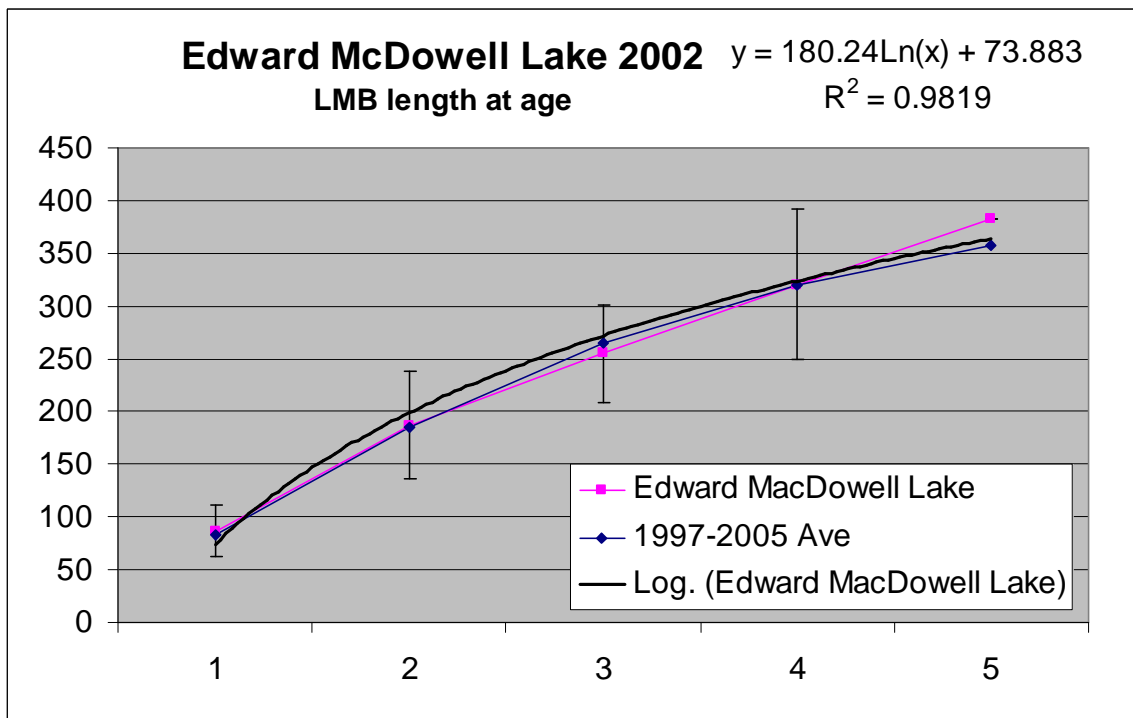


Figure 20. Average back-calculated length at age for largemouth bass from Edward McDowell Lake (Peterborough) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

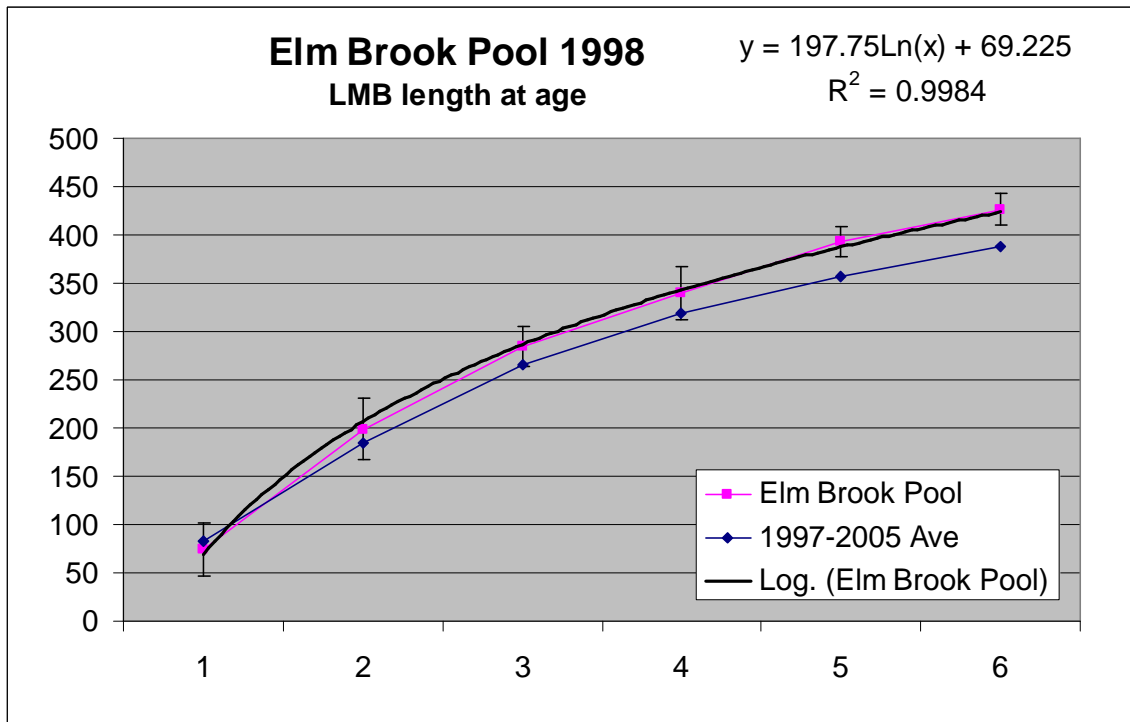


Figure 21. Average back-calculated length at age for largemouth bass from Elm Brook Pool (Hopkinton) sampled in 1998 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

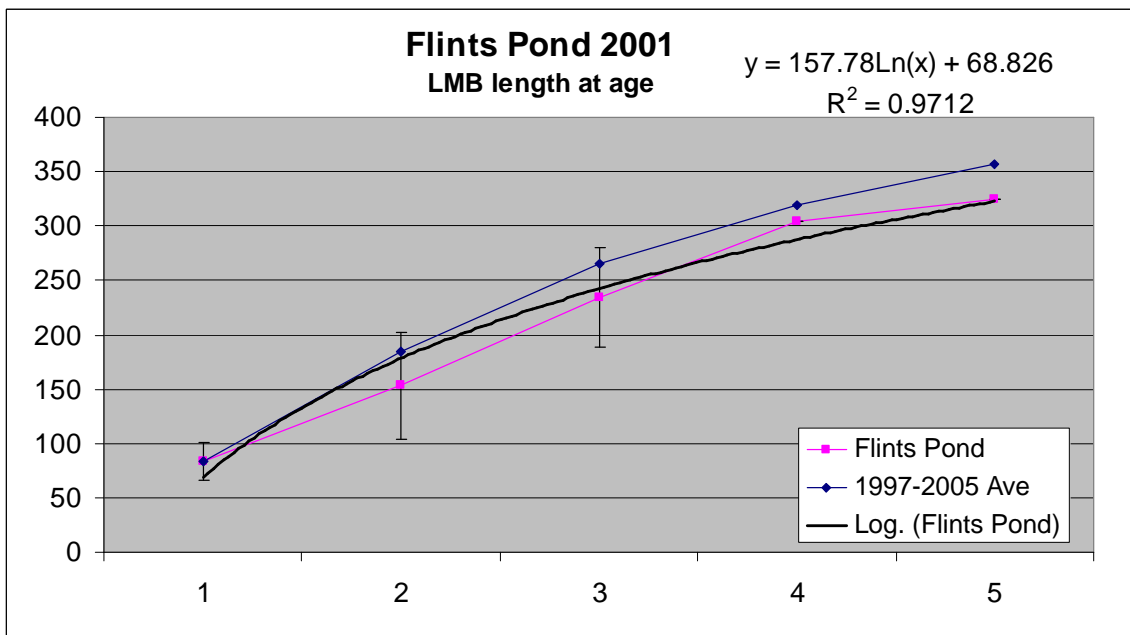


Figure 22. Average back-calculated length at age for largemouth bass from Flints Pond (Hollis) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

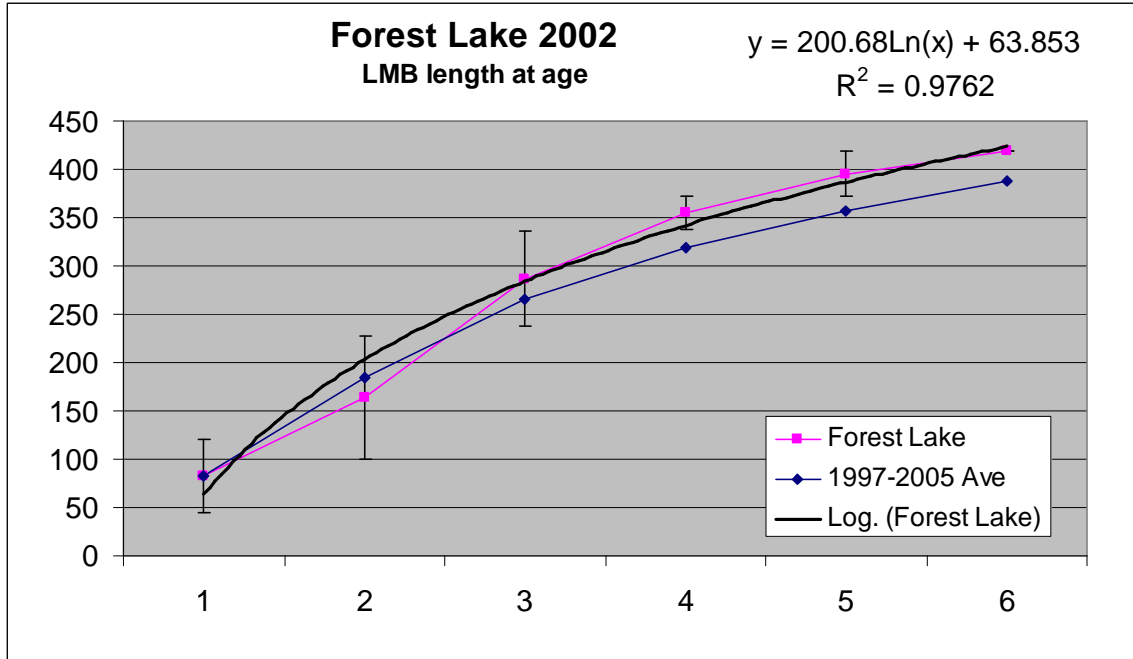


Figure 23. Average back-calculated length at age for largemouth bass from Forest Lake (Winchester) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

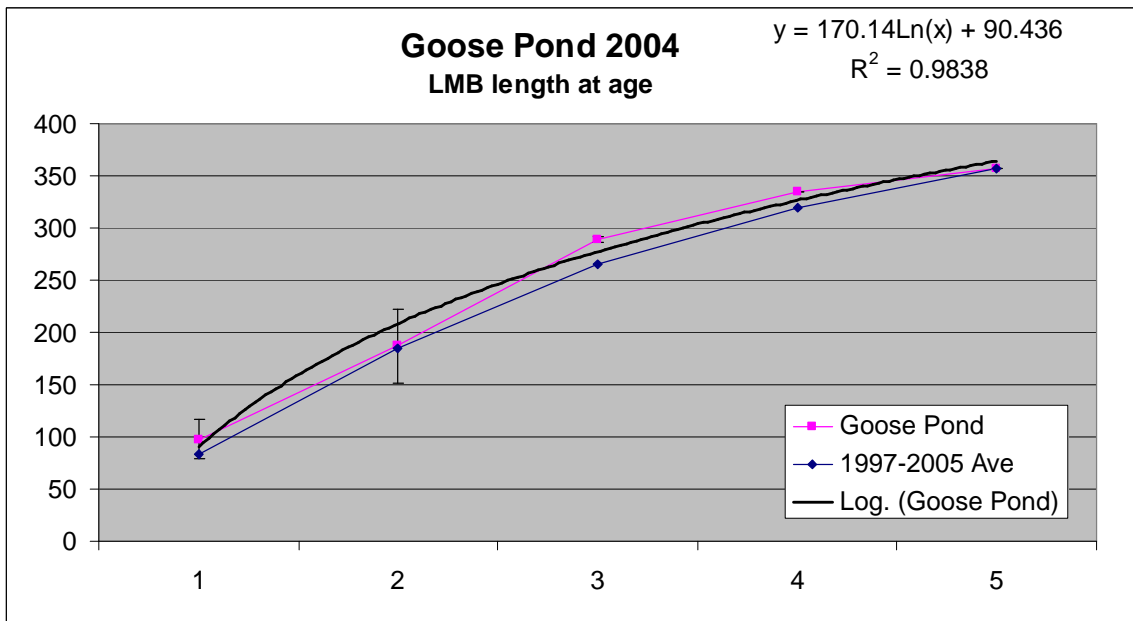


Figure 24. Average back-calculated length at age for largemouth bass from Goose Pond (Canaan) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

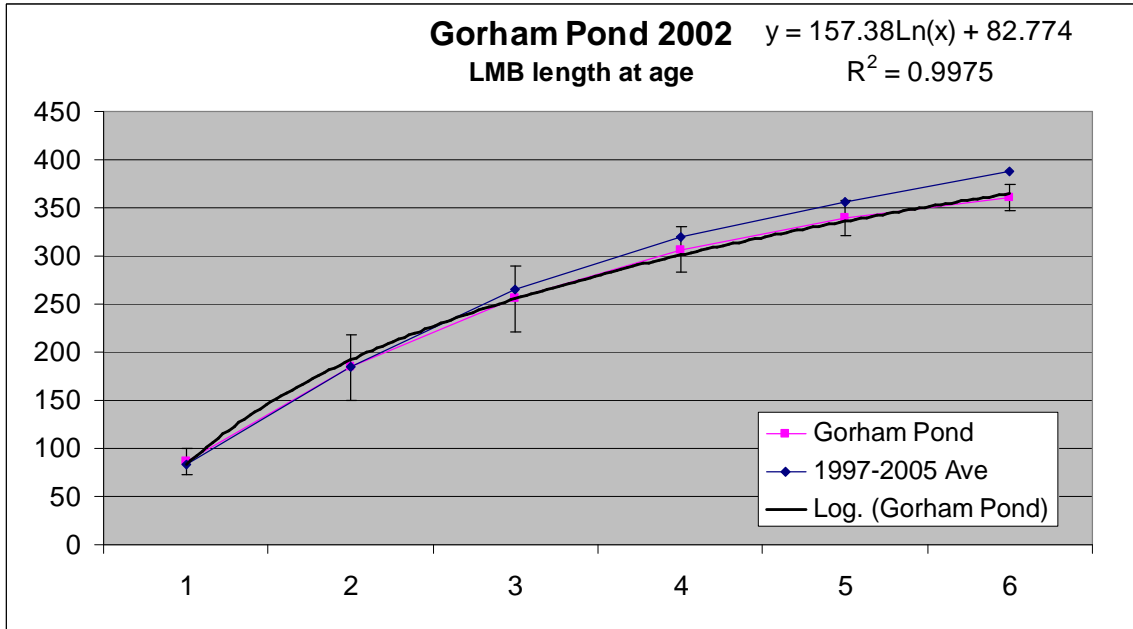


Figure 25. Average back-calculated length at age for largemouth bass from Gorham Pond (Dunbarton) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

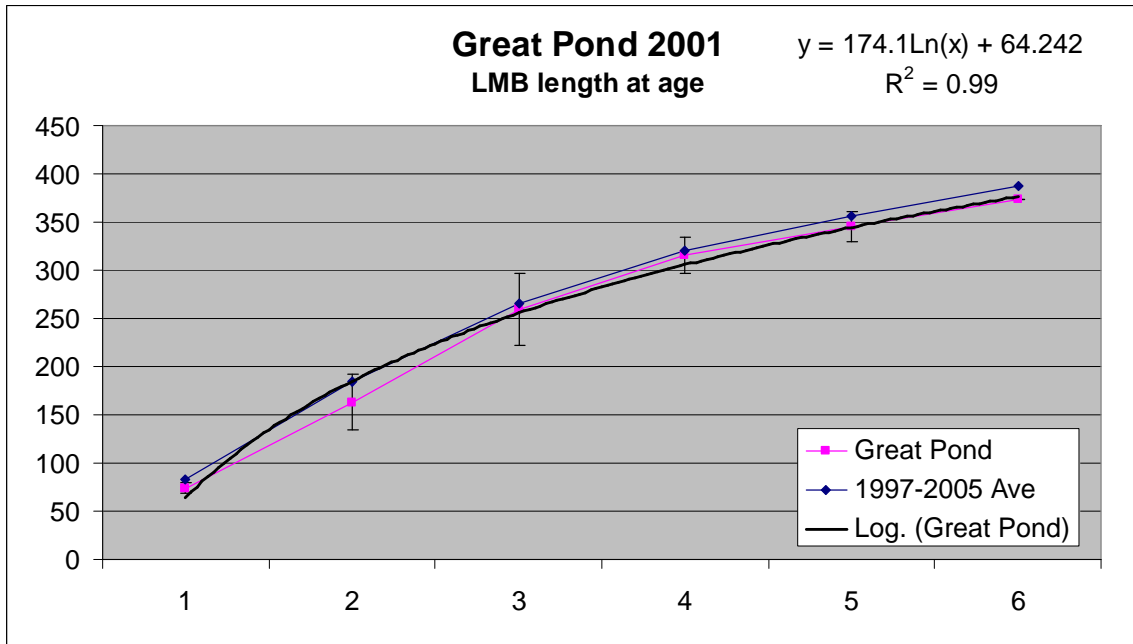


Figure 26. Average back-calculated length at age for largemouth bass from Great Pond (Kingston) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

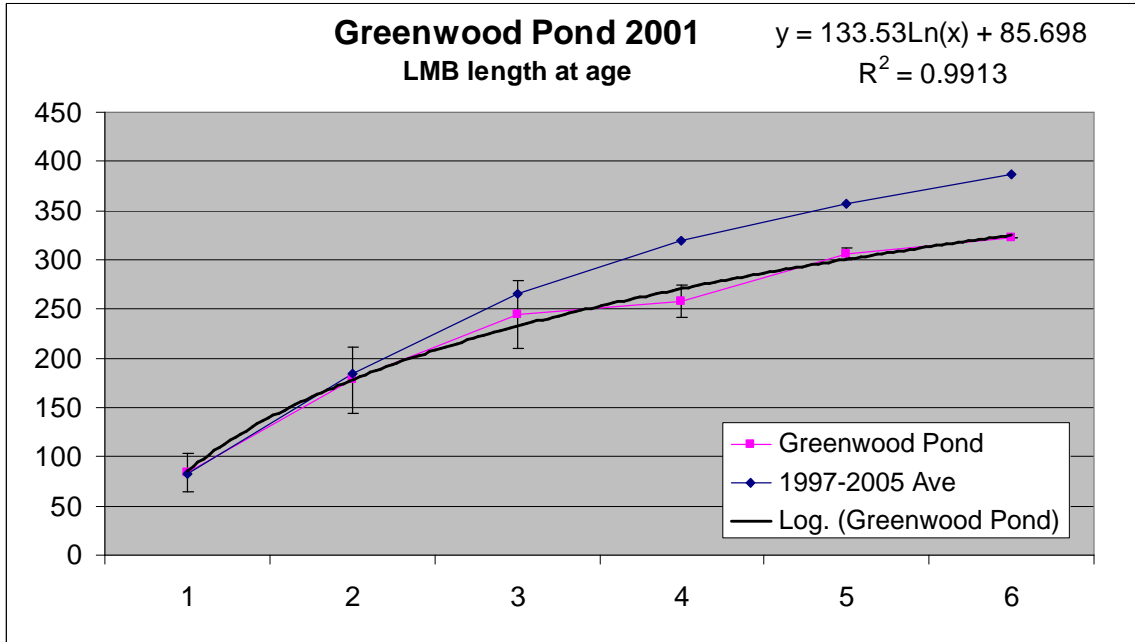


Figure 27. Average back-calculated length at age for largemouth bass from Greenwood Pond (Kingston) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

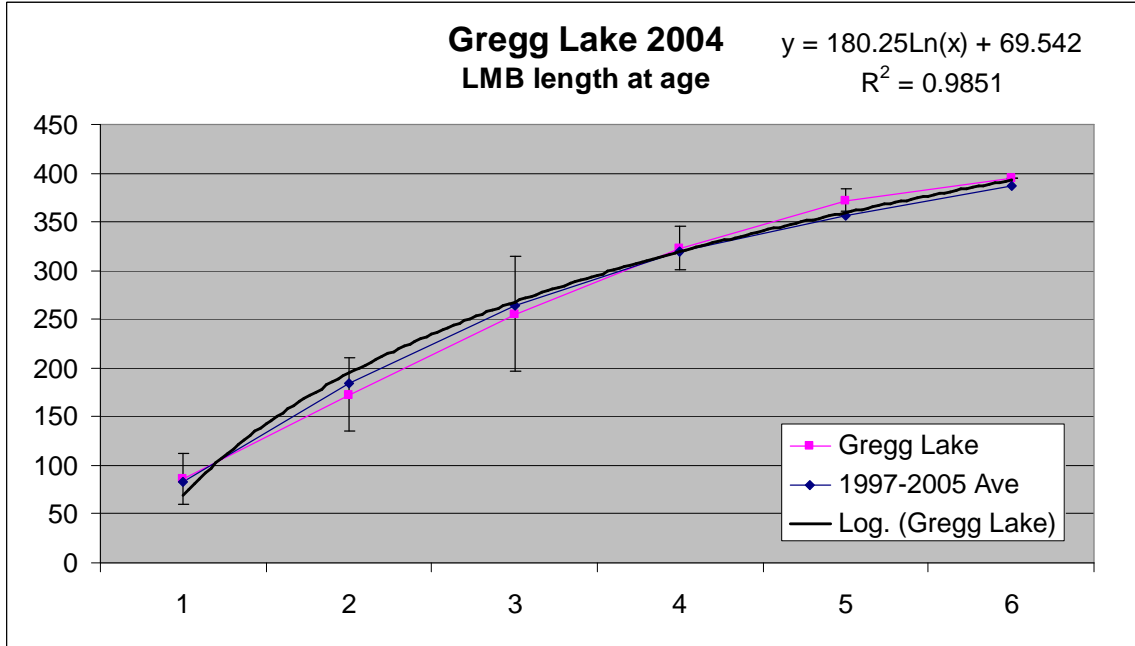


Figure 28. Average back-calculated length at age for largemouth bass from Gregg Lake (Antrim) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

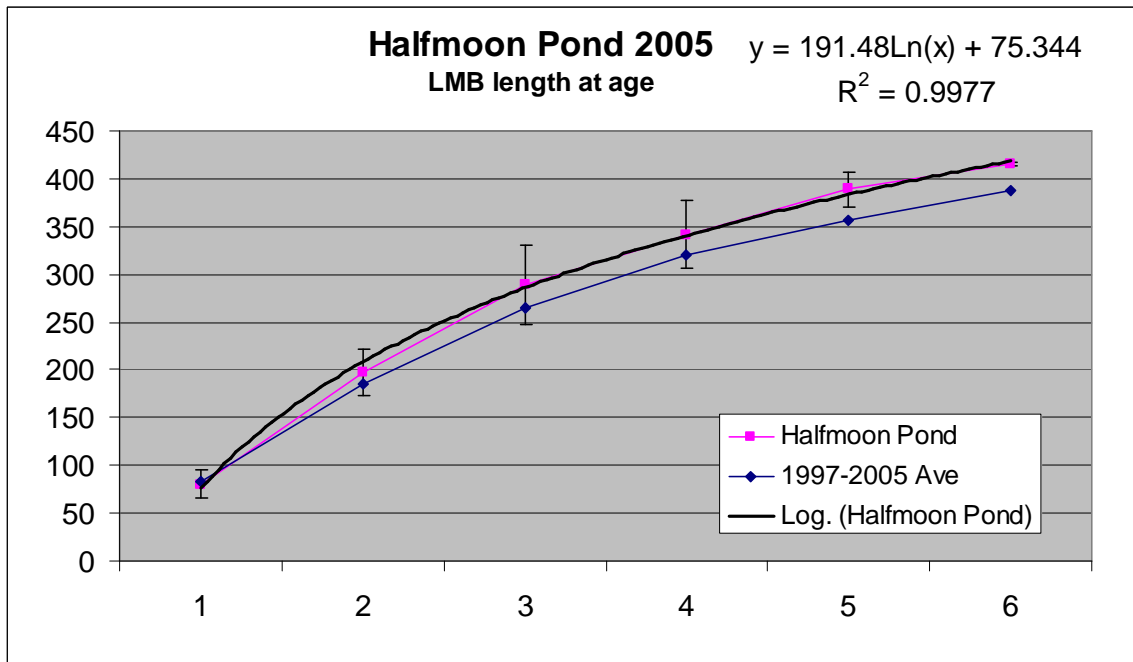


Figure 29. Average back-calculated length at age for largemouth bass from Halfmoon Pond (Barnstead) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

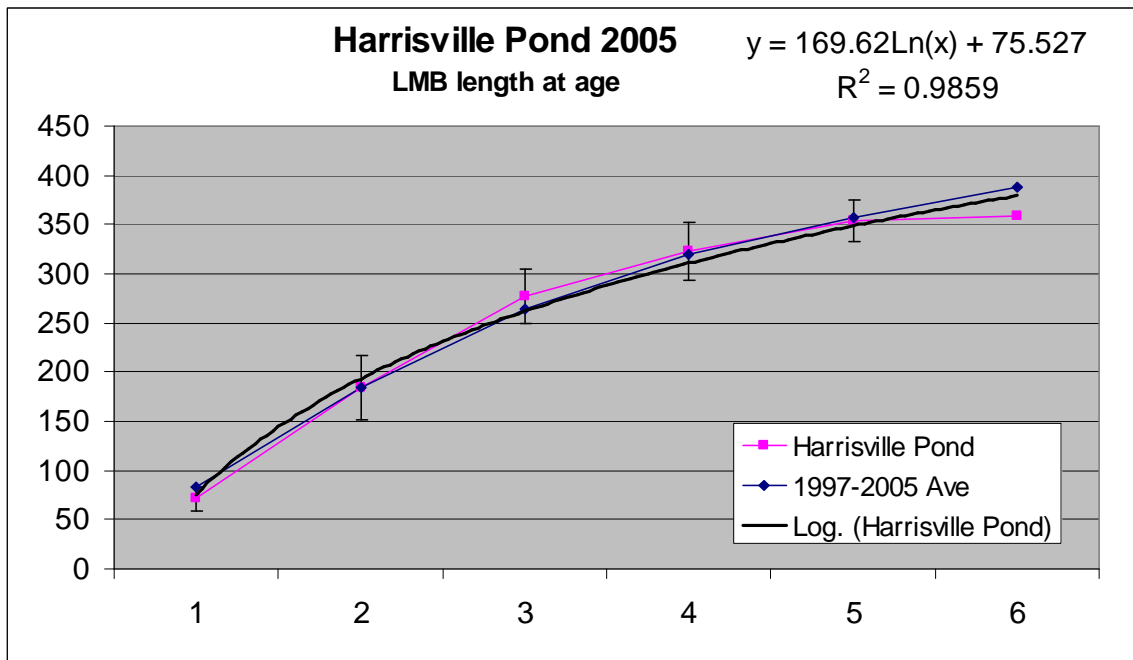


Figure 30. Average back-calculated length at age for largemouth bass from Harrisville Pond (Harrisville) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

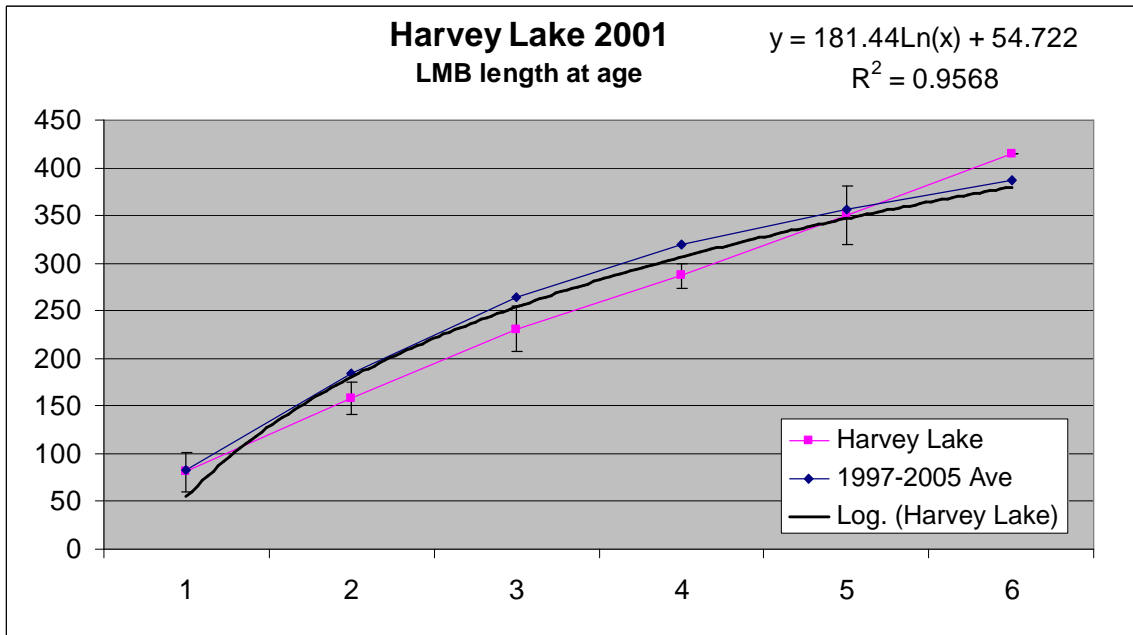


Figure 31. Average back-calculated length at age for largemouth bass from Harvey Lake (Northwood) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

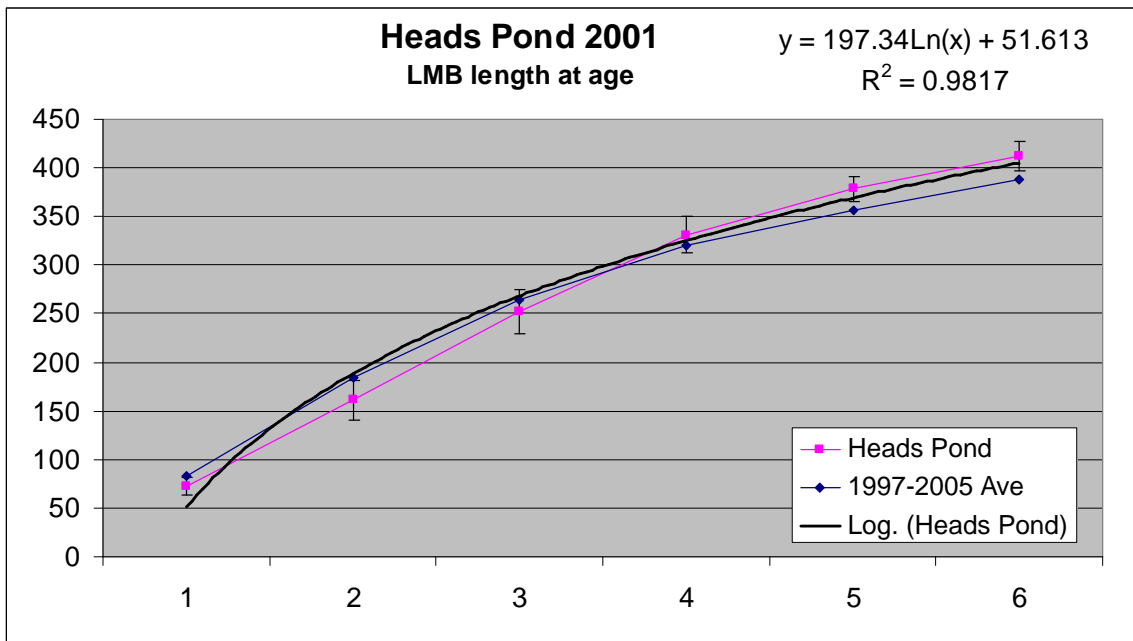


Figure 32. Average back-calculated length at age for largemouth bass from Heads Pond (Hooksett) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

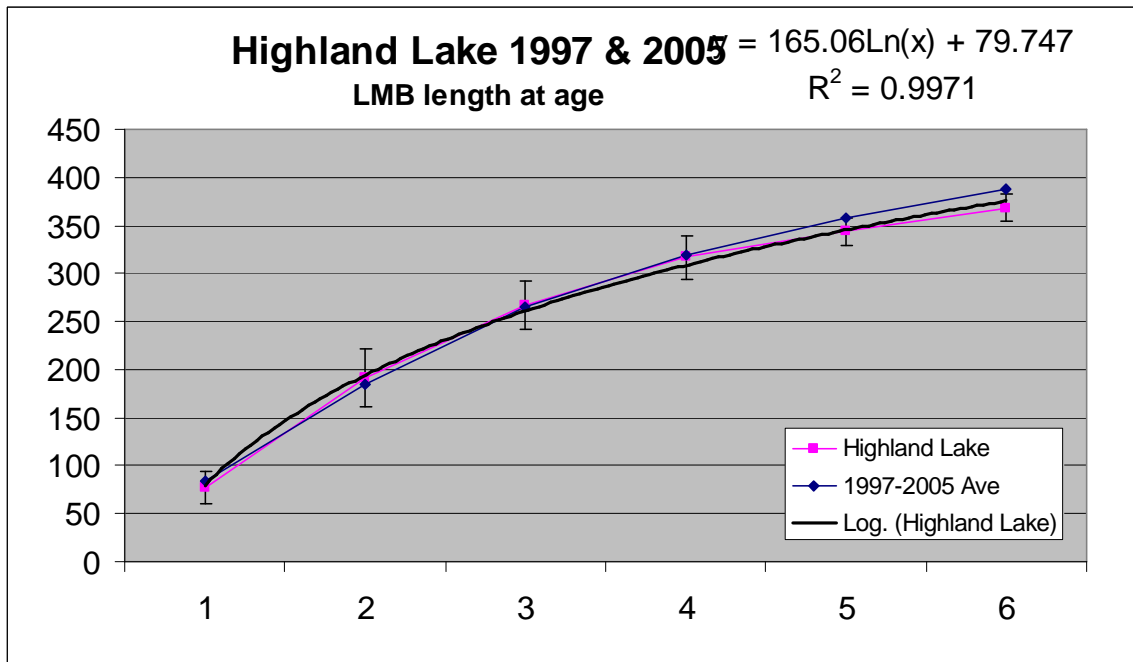


Figure 33. Average back-calculated length at age for largemouth bass from Highland Lake (Stoddard) sampled in 1997 and 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

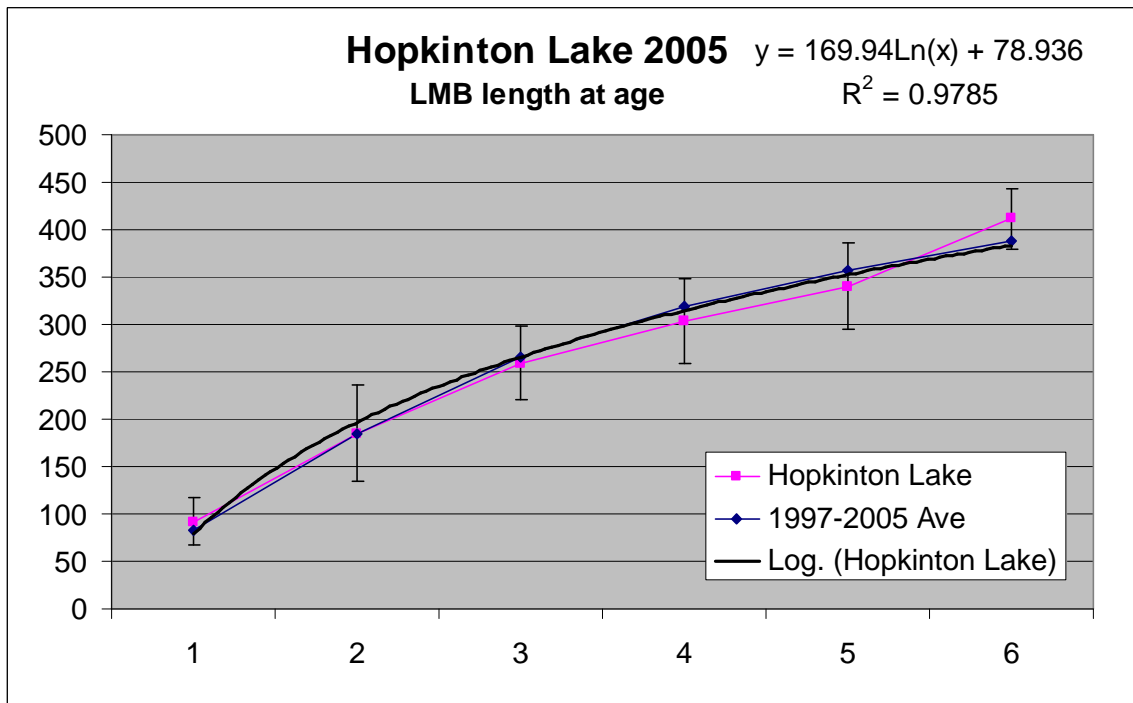


Figure 34. Average back-calculated length at age for largemouth bass from Hopkinton Lake (Hopkinton) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

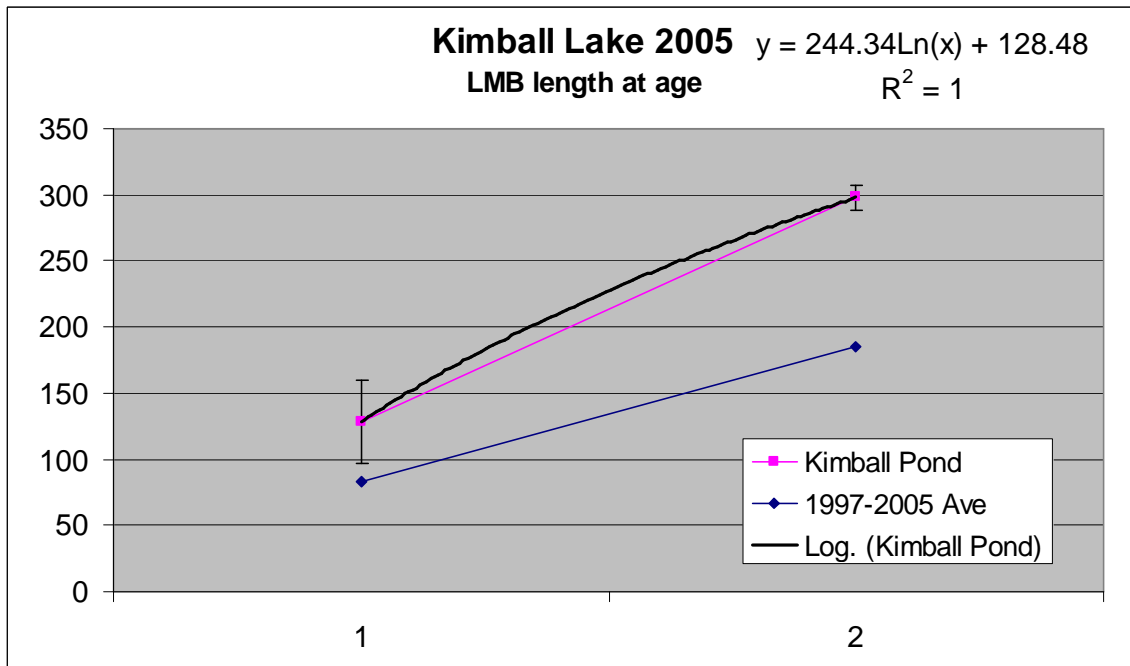


Figure 35. Average back-calculated length at age for largemouth bass from Kimball Lake (Hopkinton) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

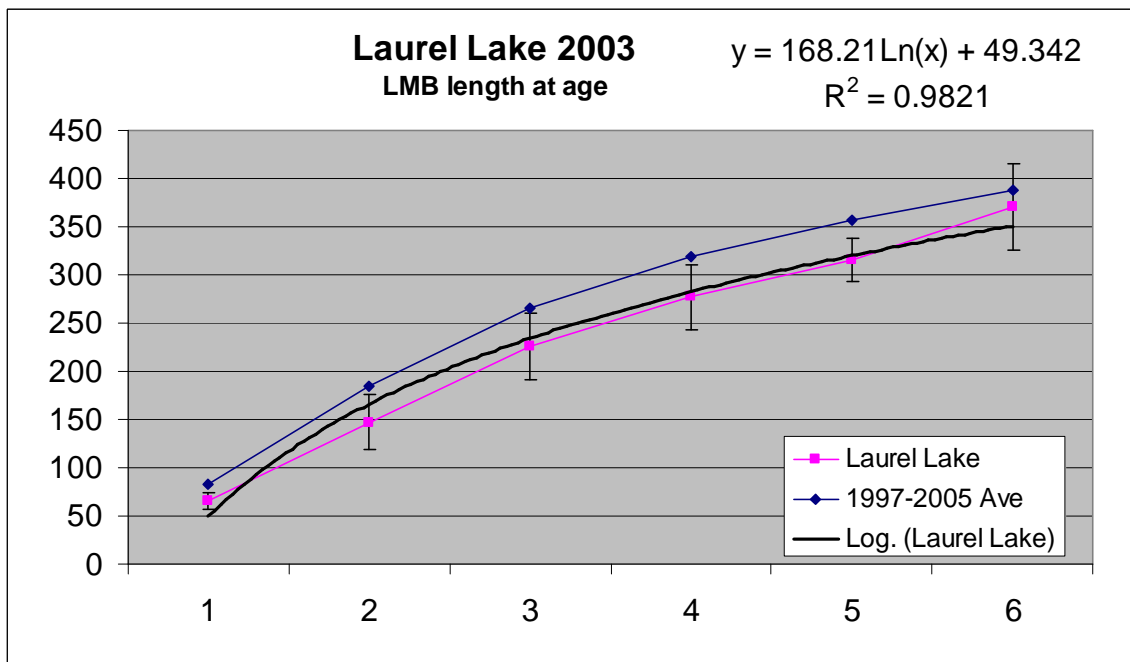


Figure 36. Average back-calculated length at age for largemouth bass from Laurel Lake (Fitzwilliam) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

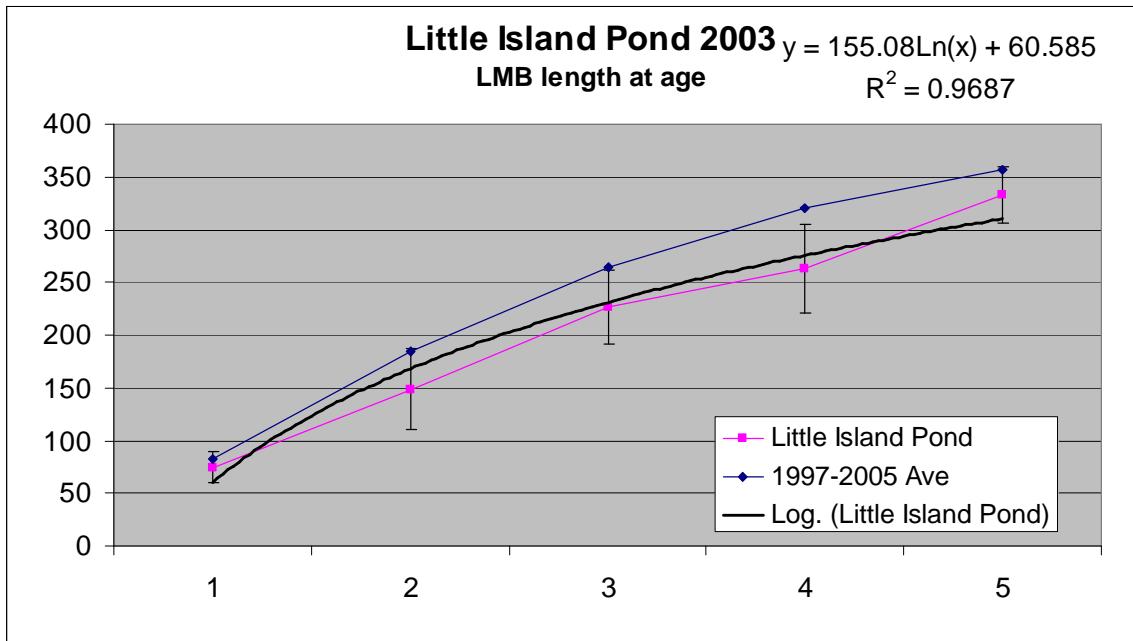


Figure 37. Average back-calculated length at age for largemouth bass from Little Island Pond (Pelham) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

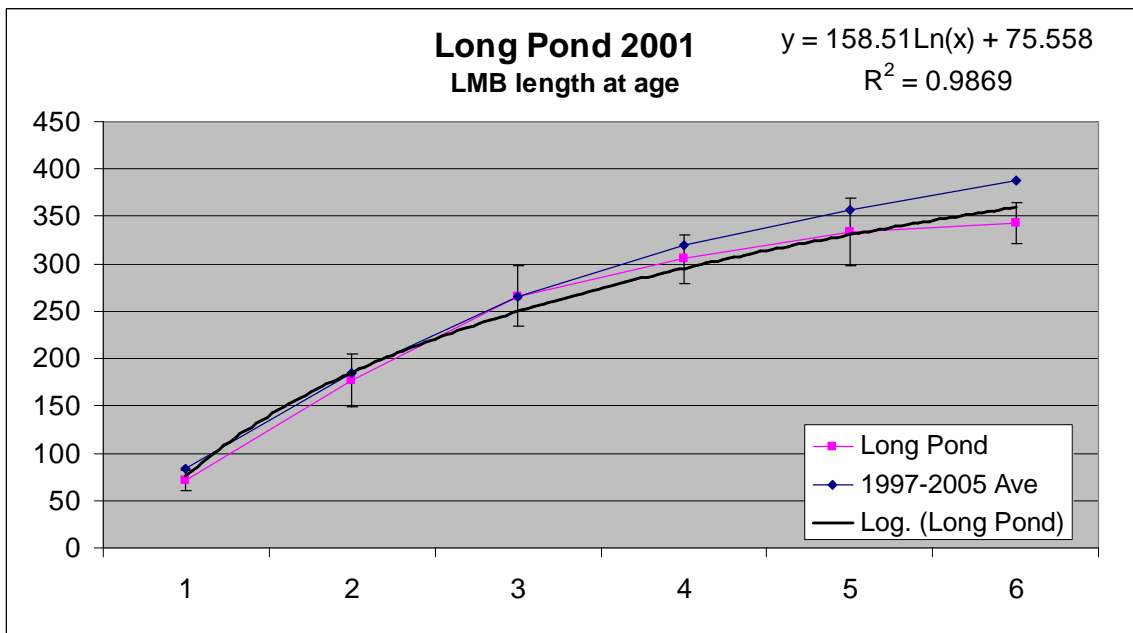


Figure 38. Average back-calculated length at age for largemouth bass from Long Pond (Danville/Kingston) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

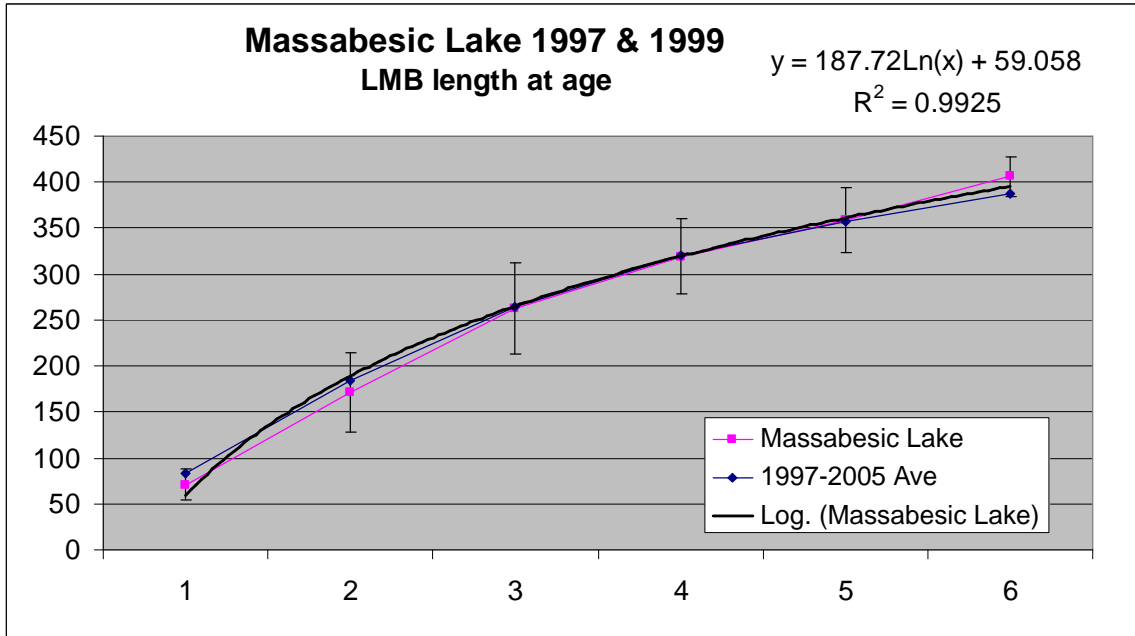


Figure 39. Average back-calculated length at age for largemouth bass from Massabesic Lake (Auburn) sampled in 1997 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

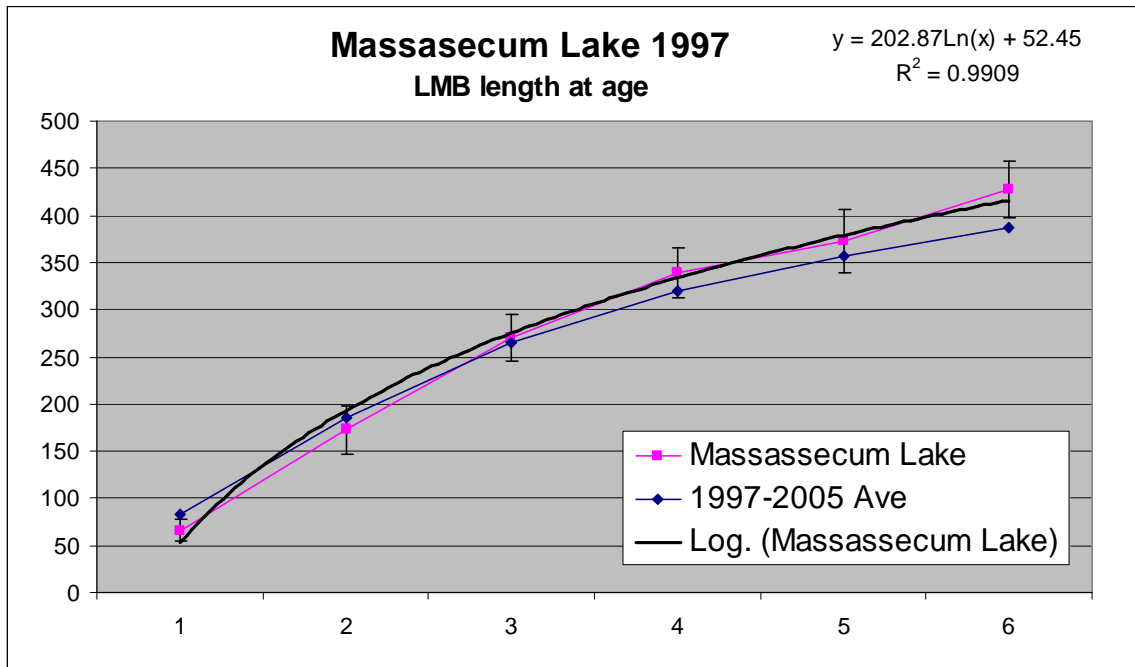


Figure 40. Average back-calculated length at age for largemouth bass from Massassecum Lake (Bradford) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

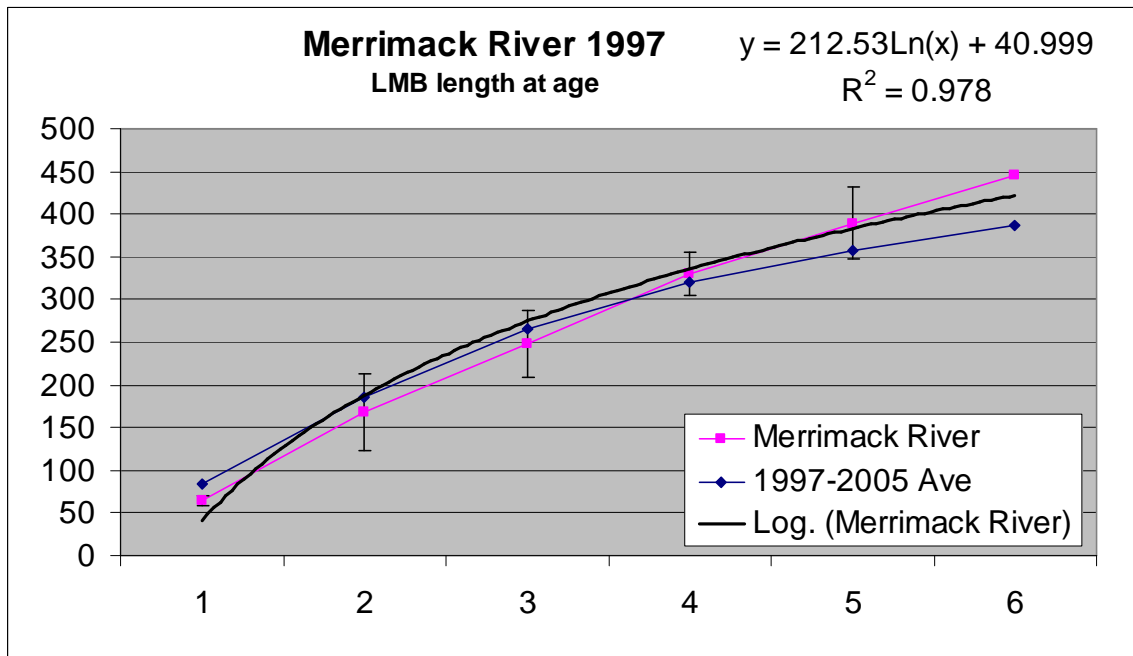


Figure 41. Average back-calculated length at age for largemouth bass from Merrimack River sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

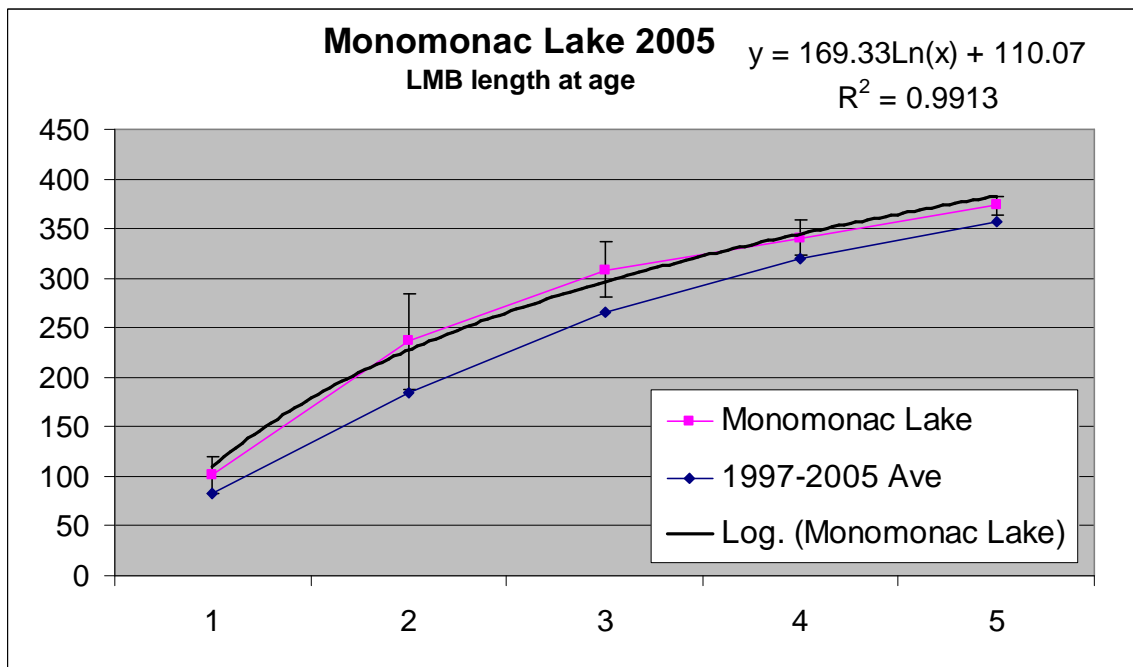


Figure 42. Average back-calculated length at age for largemouth bass from Monomonac Lake (Rindge) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

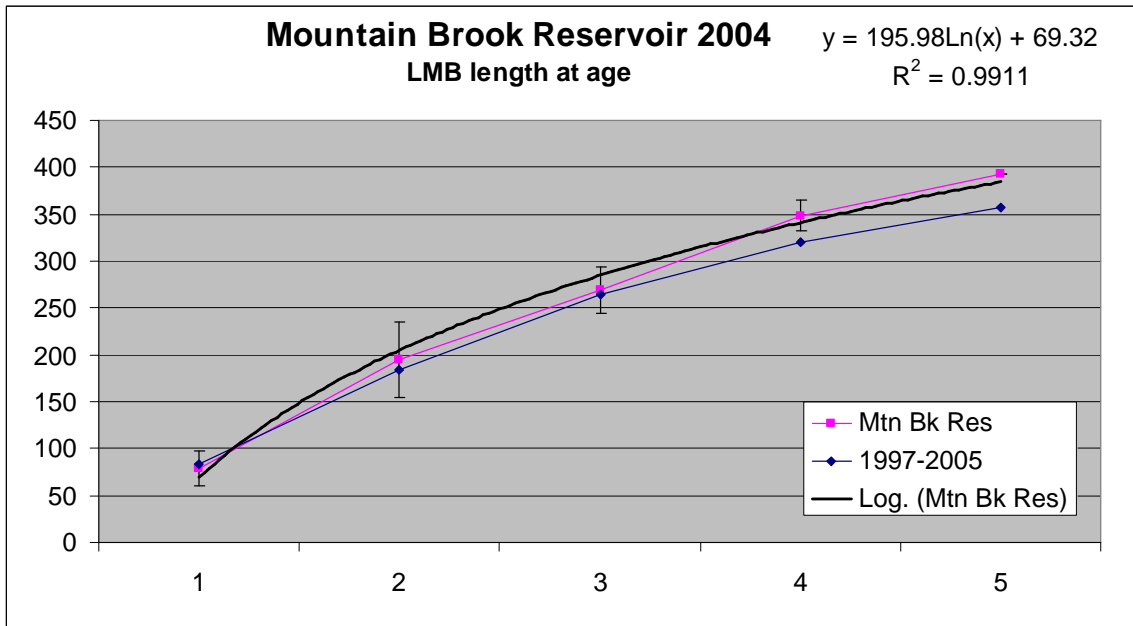


Figure 43. Average back-calculated length at age for largemouth bass from Mountain Brook Reservoir (Jaffrey) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

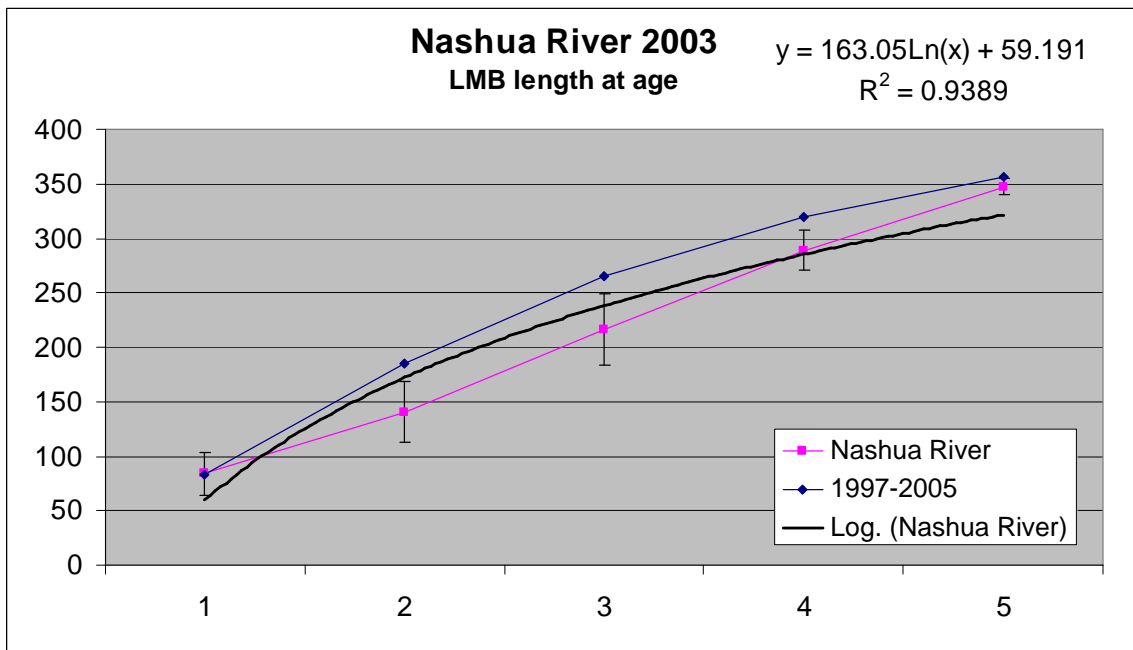


Figure 44. Average back-calculated length at age for largemouth bass from Nashua River sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

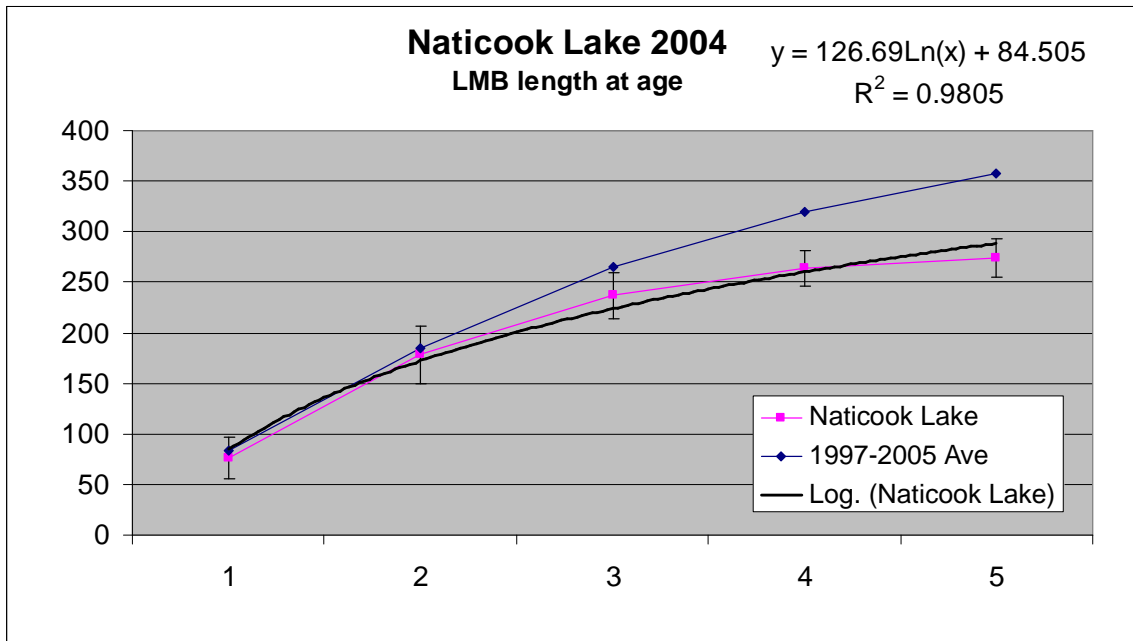


Figure 45. Average back-calculated length at age for largemouth bass from Naticook Lake (Merrimack) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

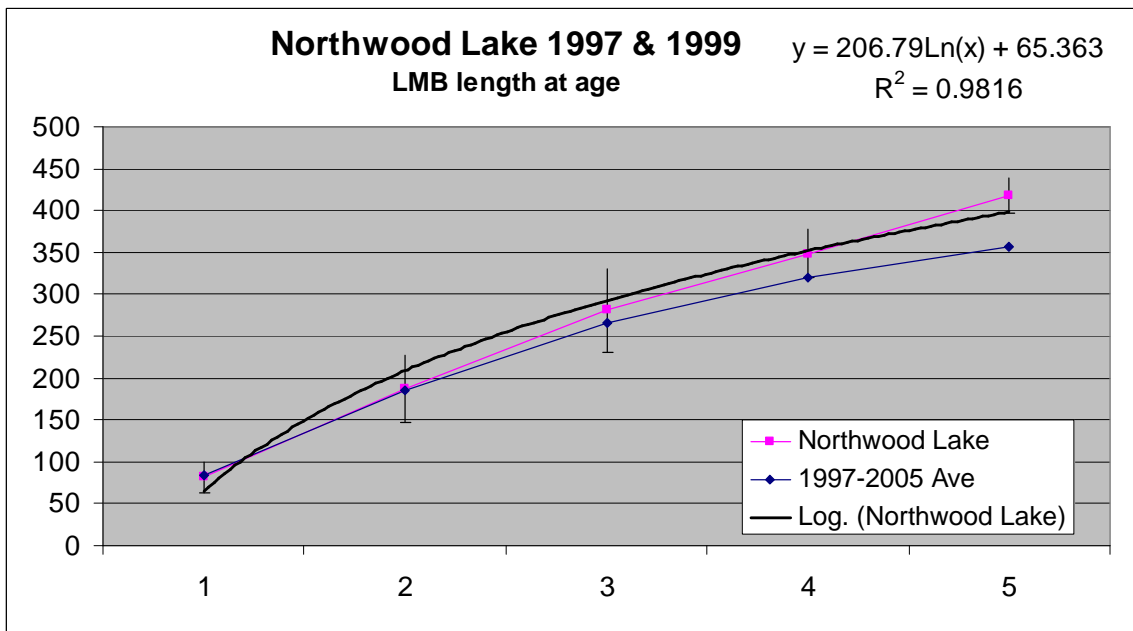


Figure 46. Average back-calculated length at age for largemouth bass from Northwood Lake (Northwood) sampled in 1997 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

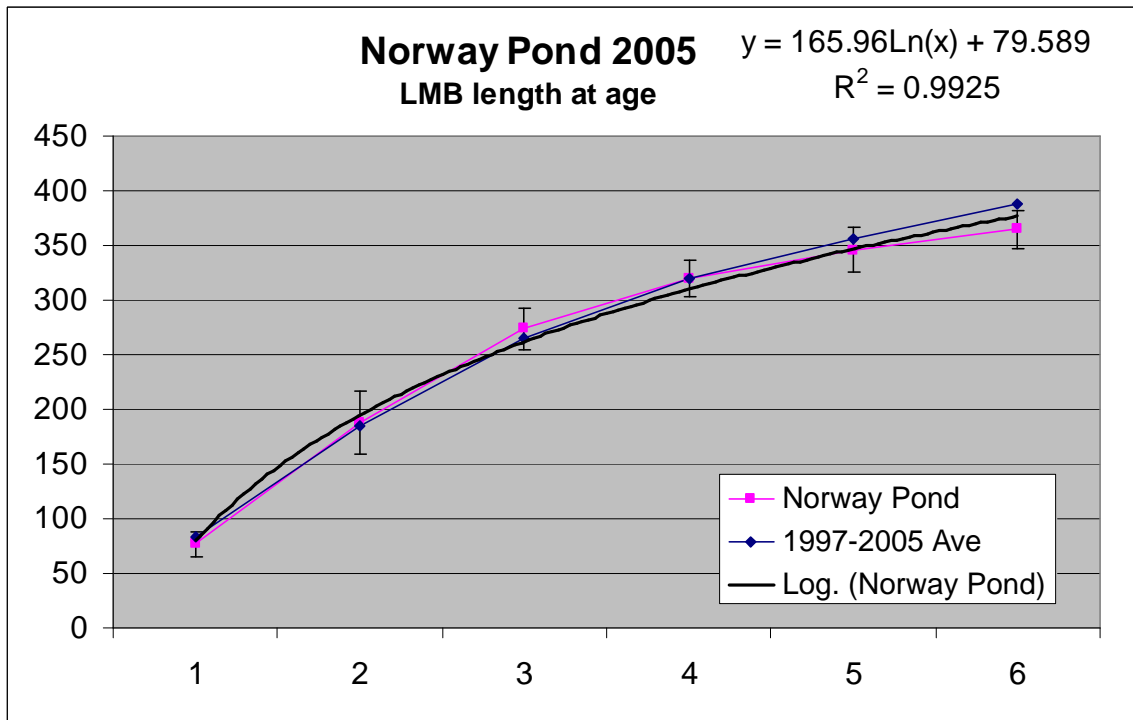


Figure 47. Average back-calculated length at age for largemouth bass from Norway Pond (Hancock) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

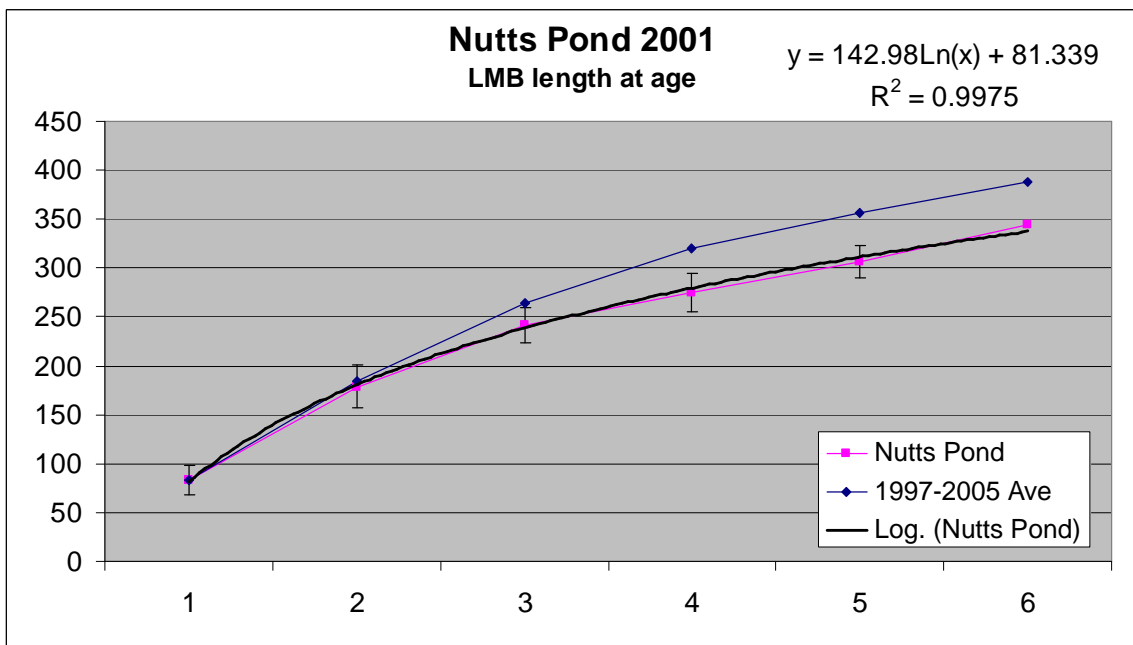


Figure 48. Average back-calculated length at age for largemouth bass from Nutts Pond (Manchester) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

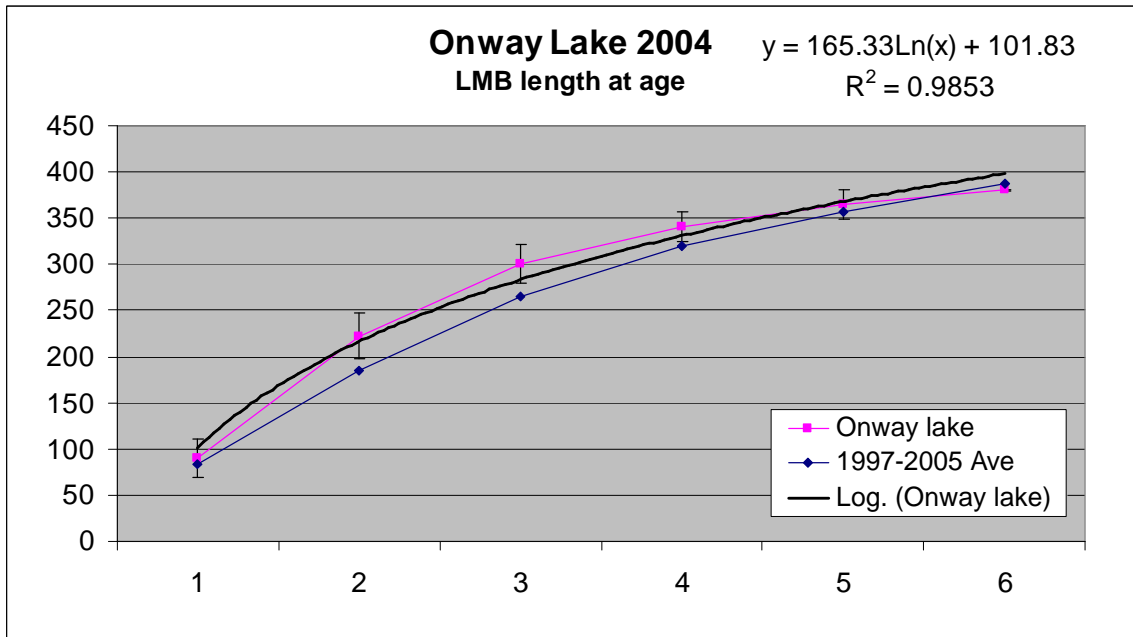


Figure 49. Average back-calculated length at age for largemouth bass from Onway Lake (Raymond) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

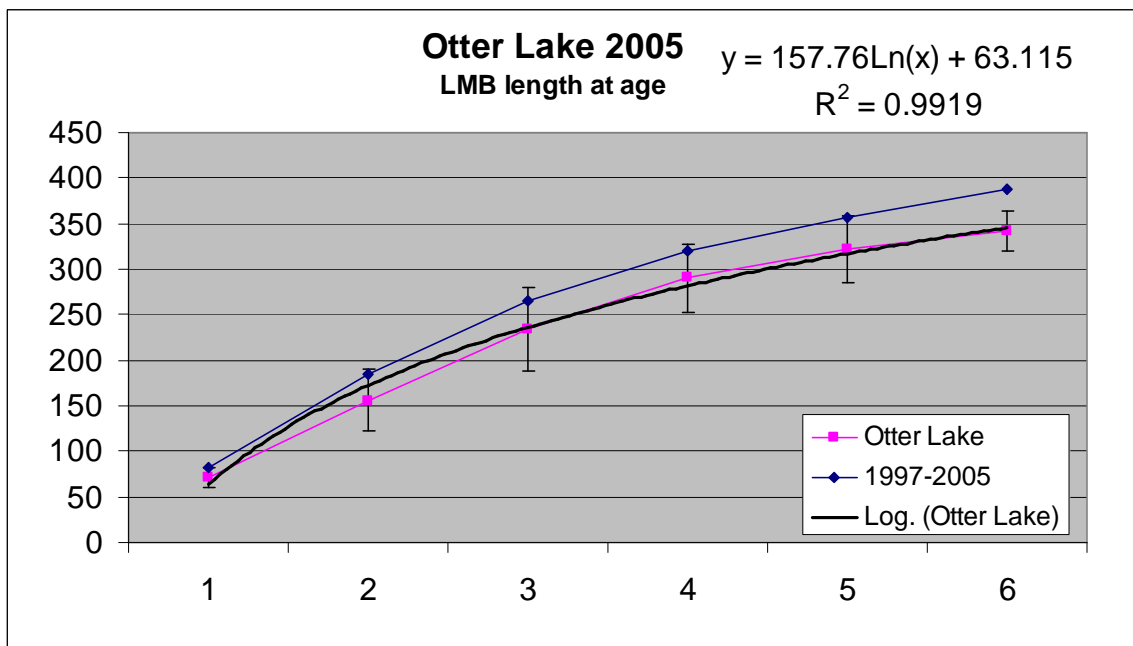


Figure 50. Average back-calculated length at age for largemouth bass from Otter Lake (Greenfield) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

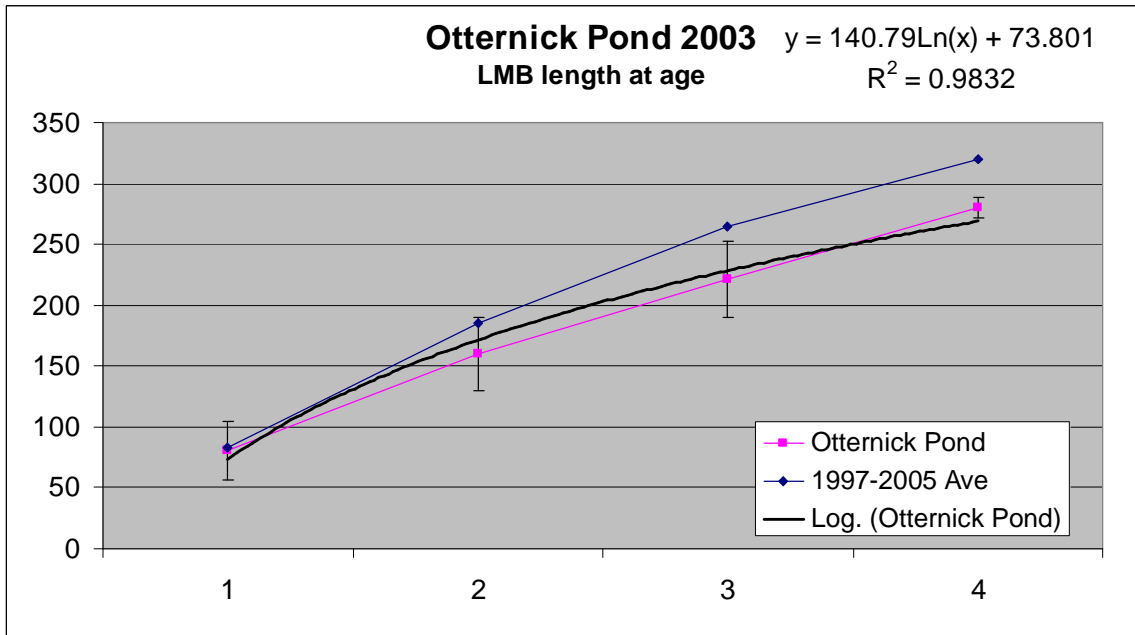


Figure 51. Average back-calculated length at age for largemouth bass from Otternick Pond (Hudson) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

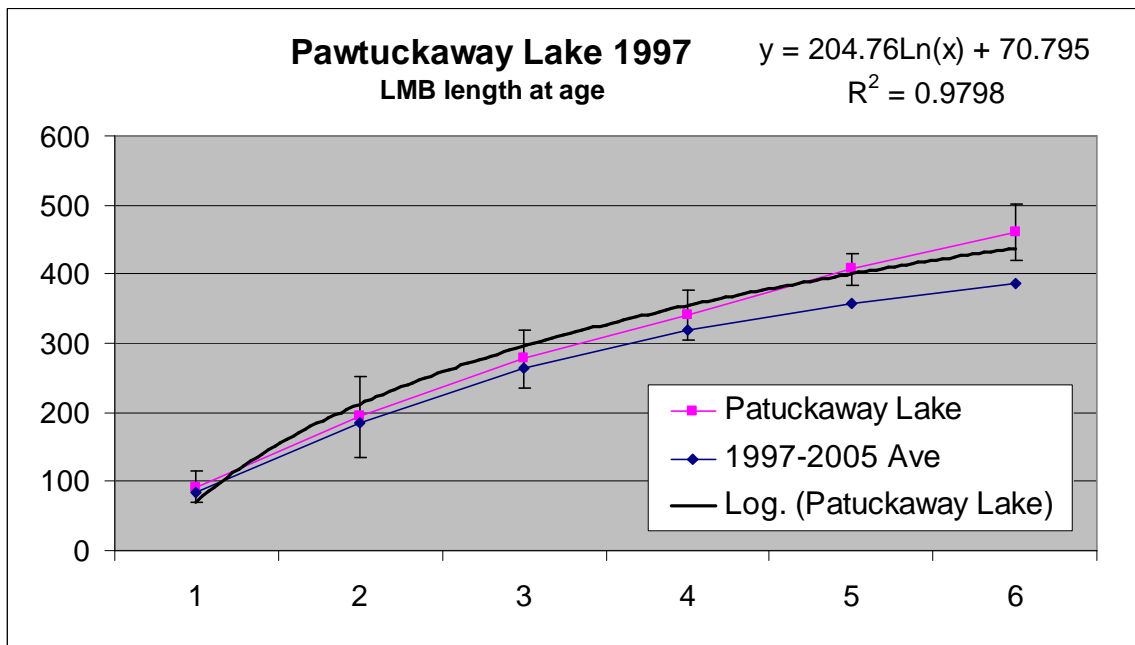


Figure 52. Average back-calculated length at age for largemouth bass from Pawtuckaway Lake (Nottingham) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

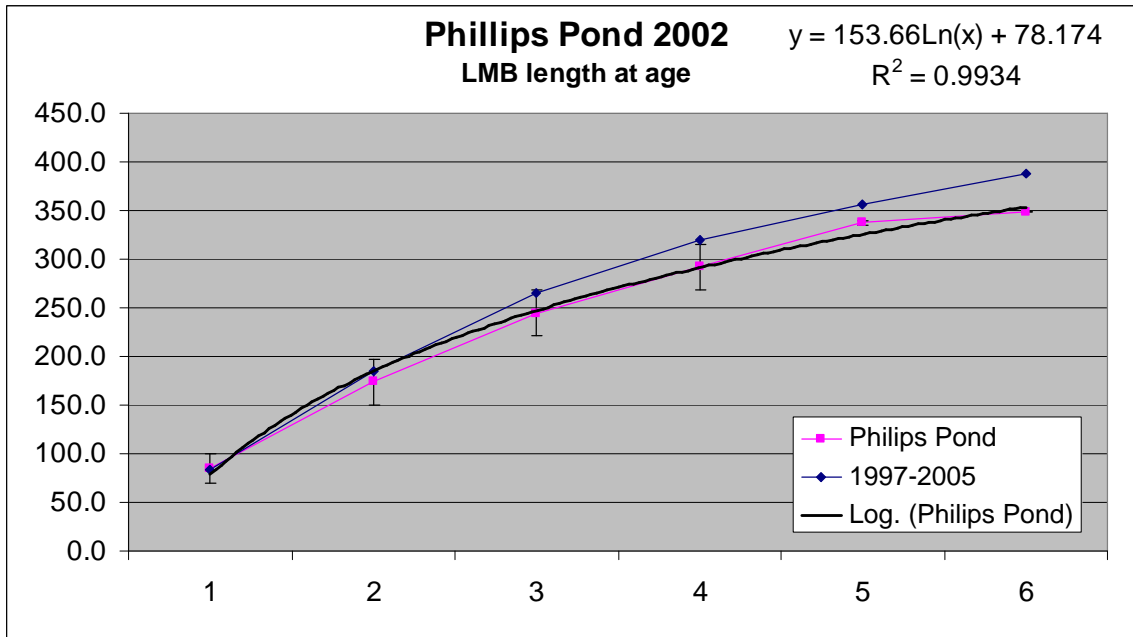


Figure 53. Average back-calculated length at age for largemouth bass from Phillips Pond (Sandown) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

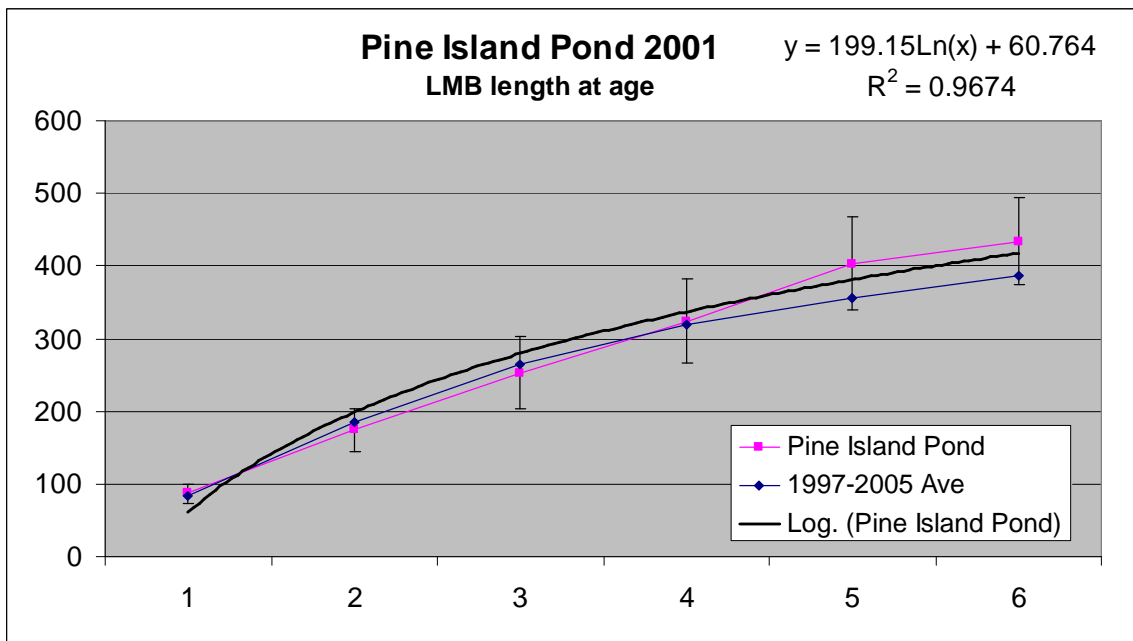


Figure 54. Average back-calculated length at age for largemouth bass from Pine Island Pond (Manchester) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

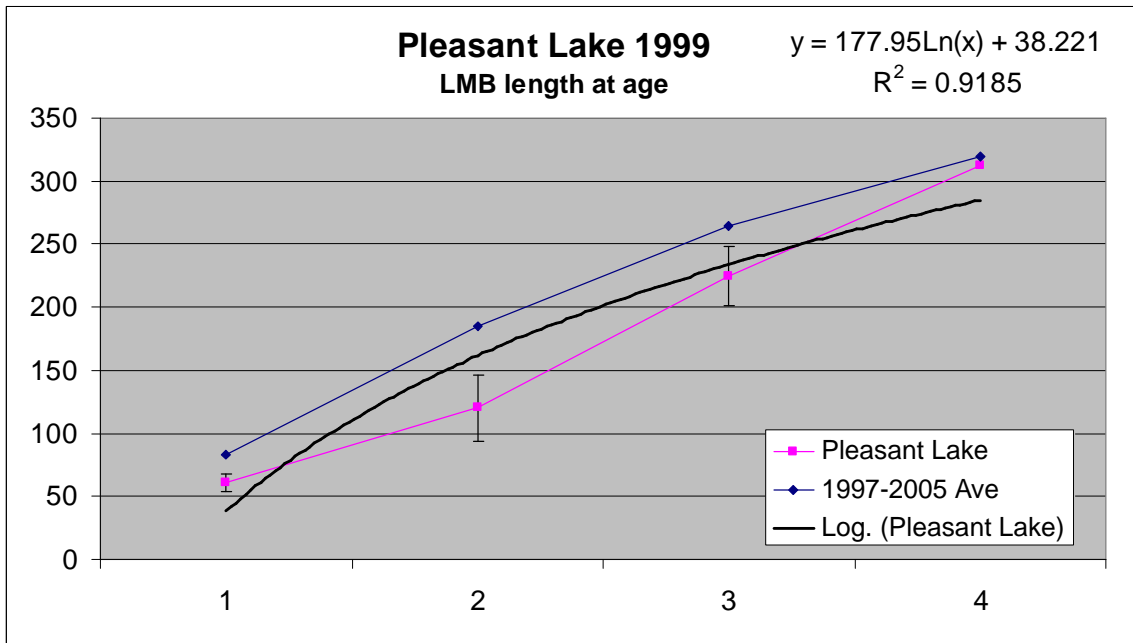


Figure 55. Average back-calculated length at age for largemouth bass from Pleasant Lake (Deerfield) sampled in 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

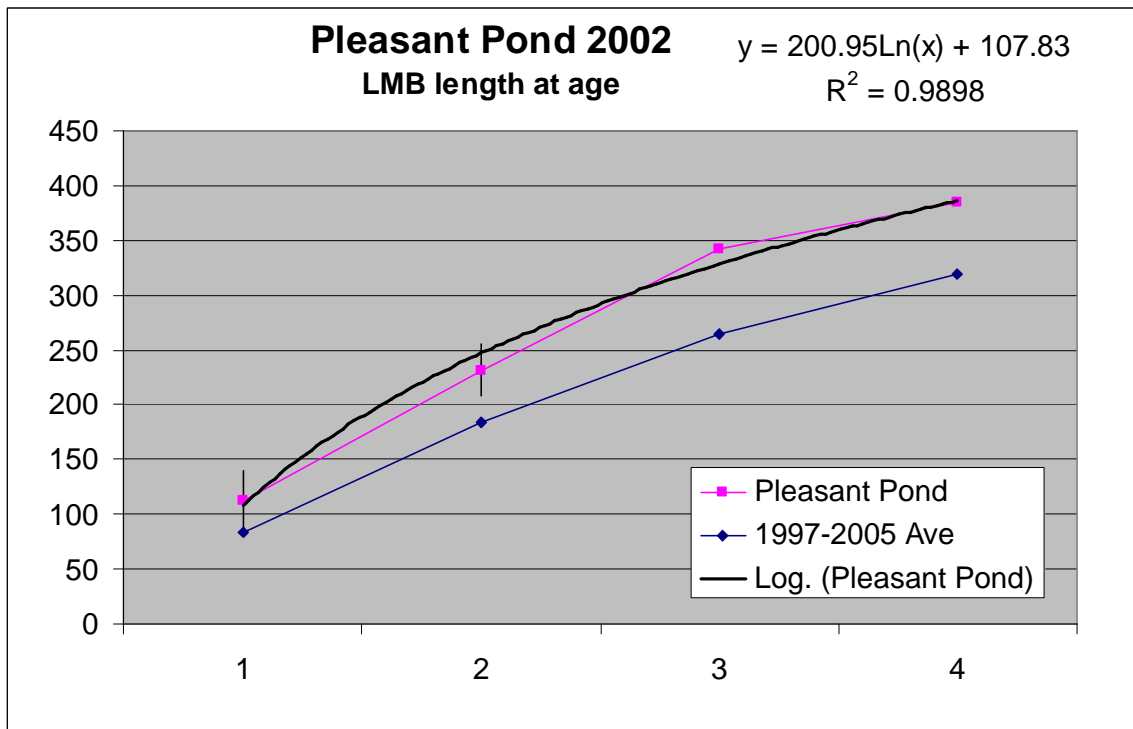


Figure 56. Average back-calculated length at age for largemouth bass from Pleasant Pond (Francestown) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

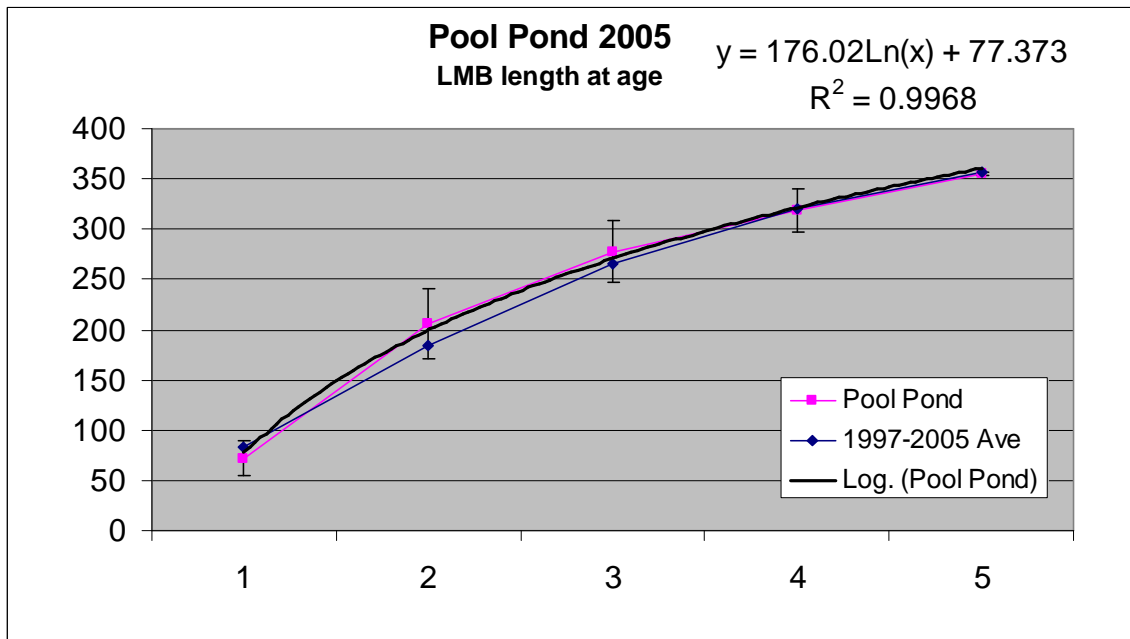


Figure 57. Average back-calculated length at age for largemouth bass from Pool Pond (Rindge) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

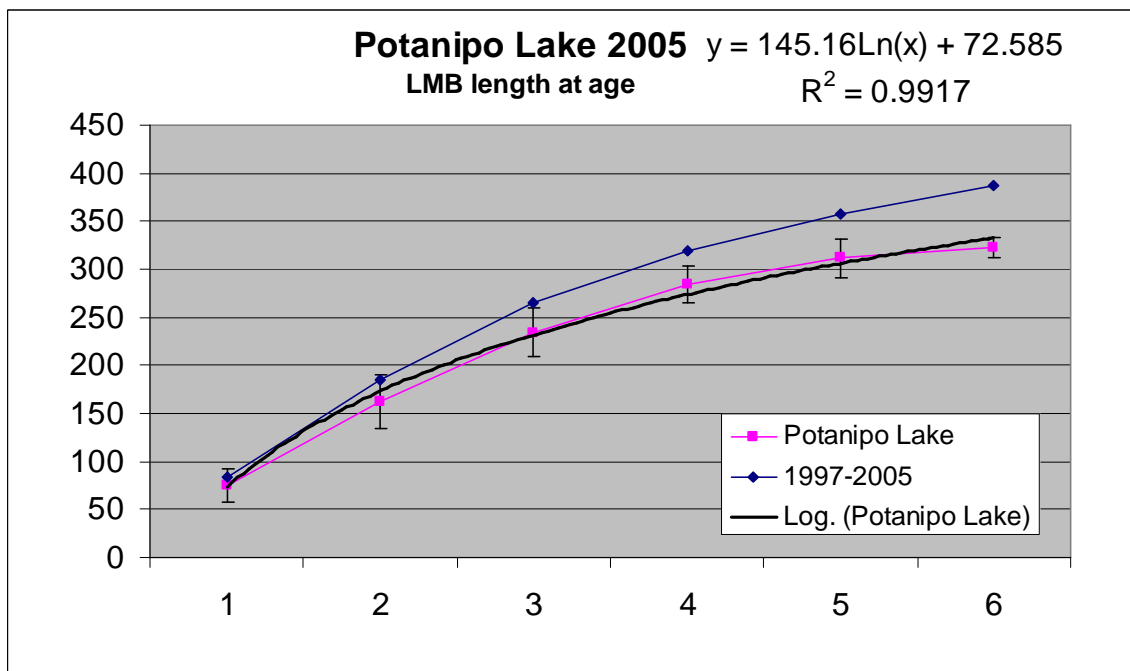


Figure 58. Average back-calculated length at age for largemouth bass from Potanipo Lake (Brookline) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

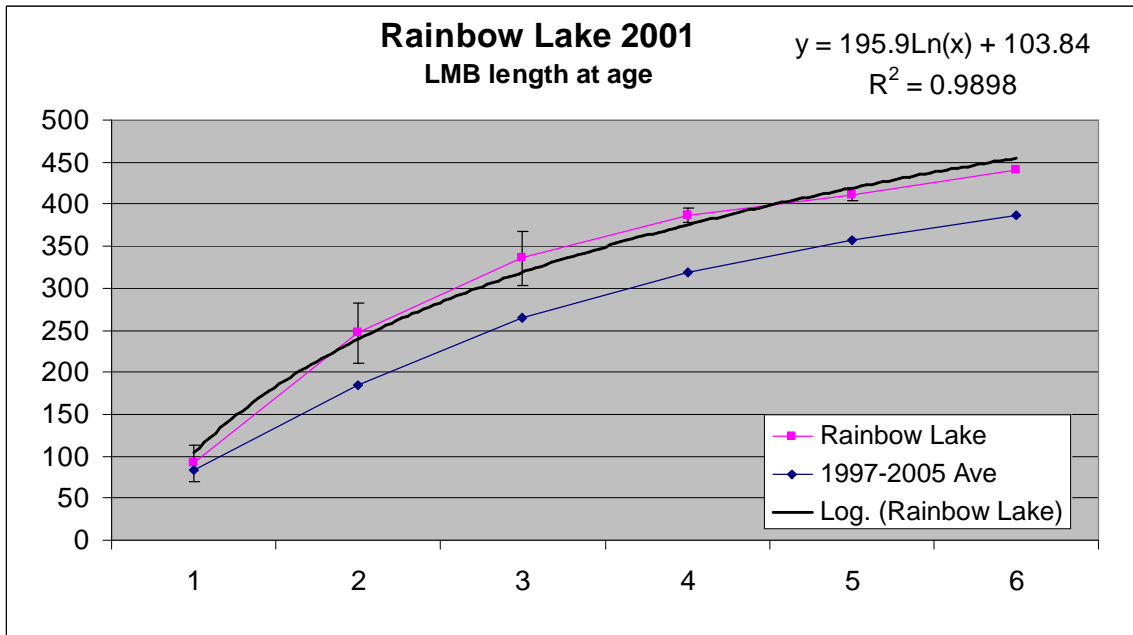


Figure 59. Average back-calculated length at age for largemouth bass from Rainbow Lake (Derry) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

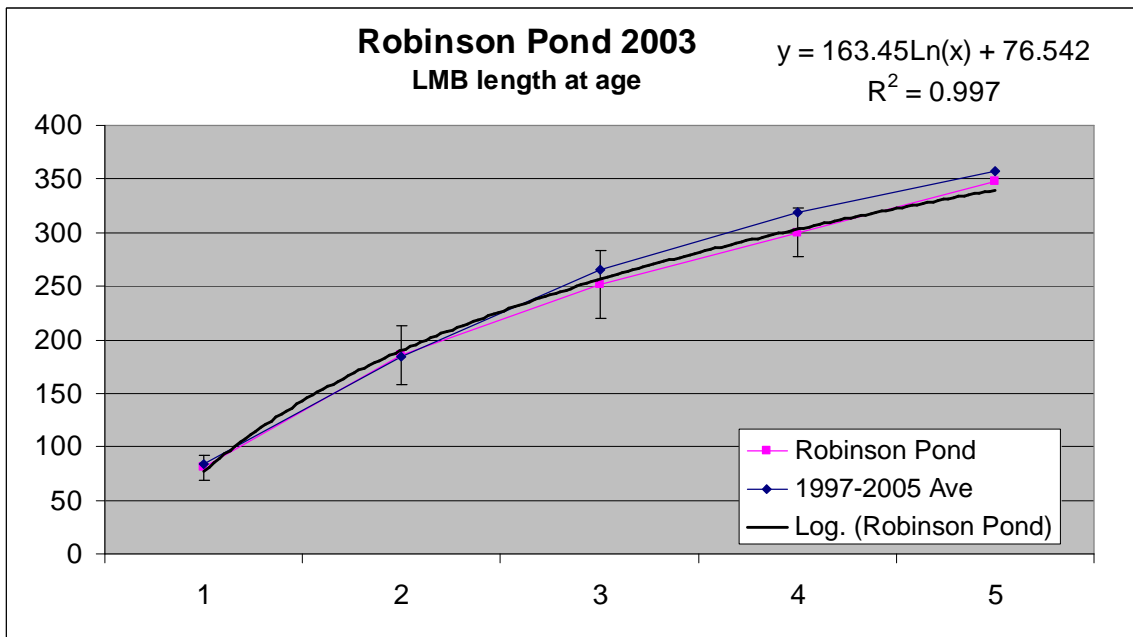


Figure 60. Average back-calculated length at age for largemouth bass from Robinson Pond (Hudson) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

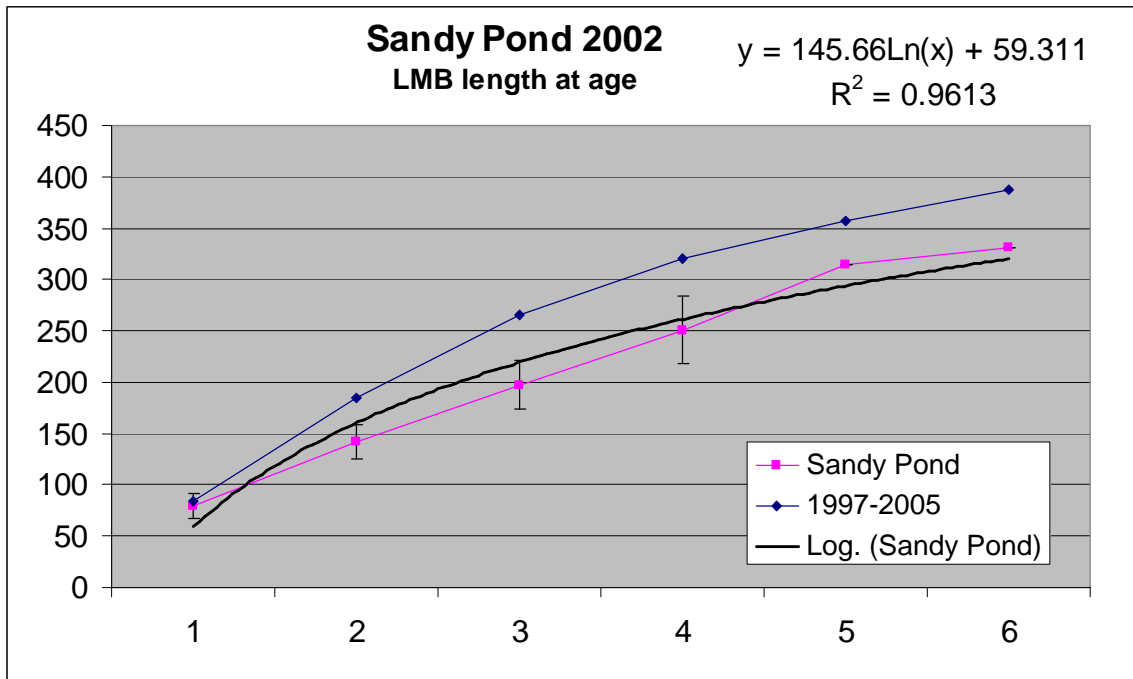


Figure 61. Average back-calculated length at age for largemouth bass from Sandy Pond (Richmond) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

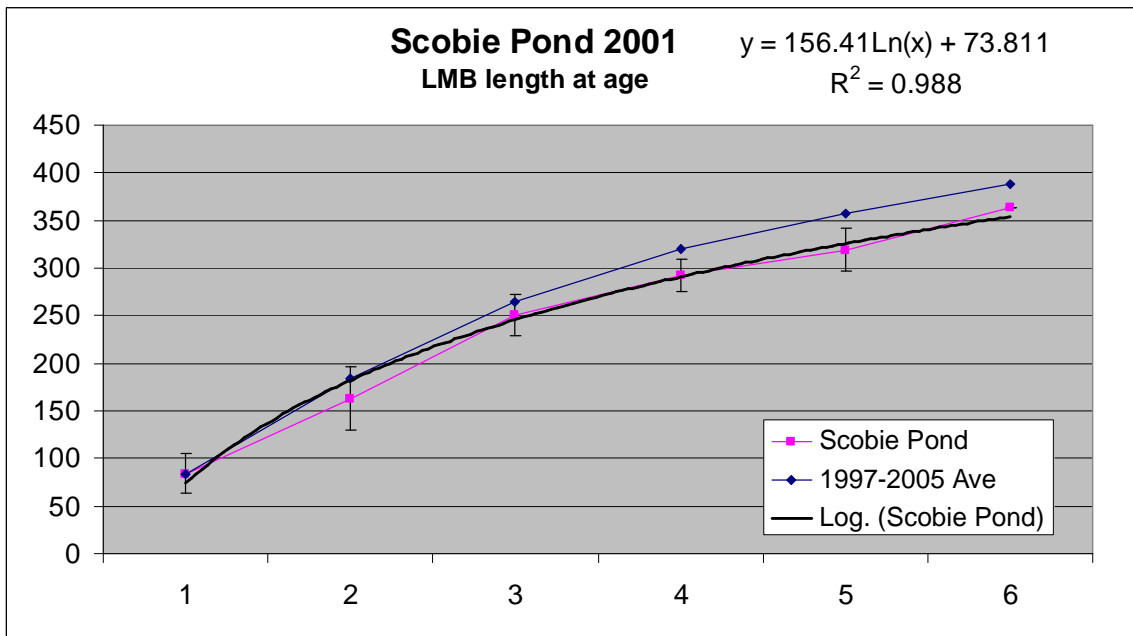


Figure 62. Average back-calculated length at age for largemouth bass from Scobie Pond (Londonderry) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

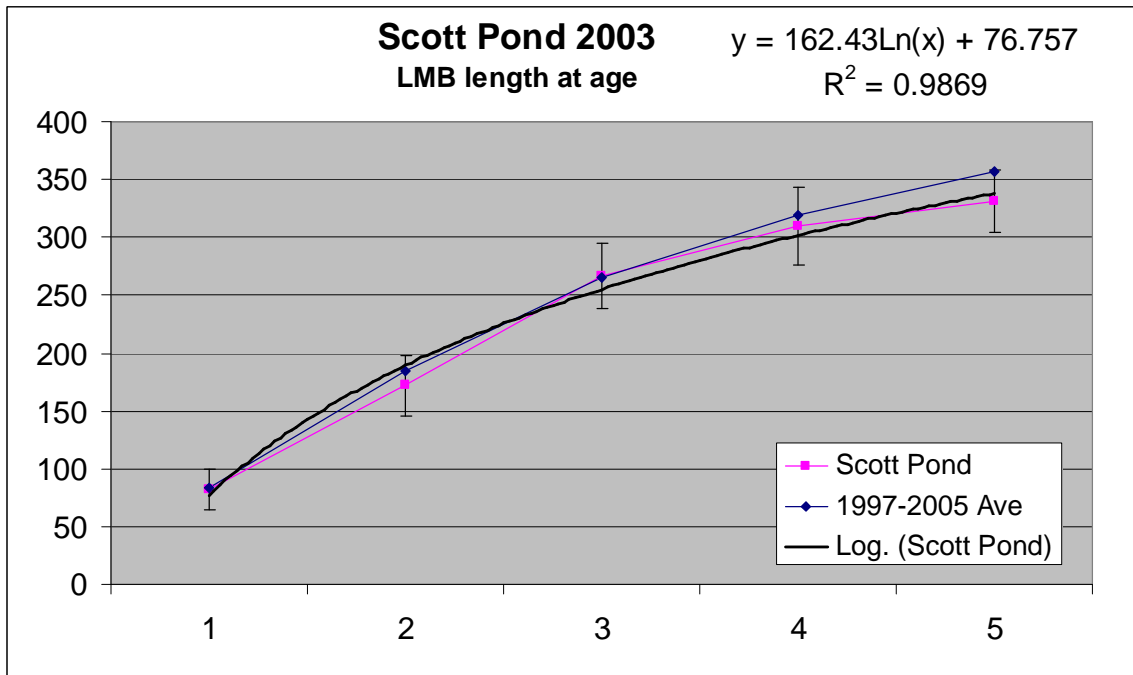


Figure 63. Average back-calculated length at age for largemouth bass from Scott Pond (Fitzwilliam) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

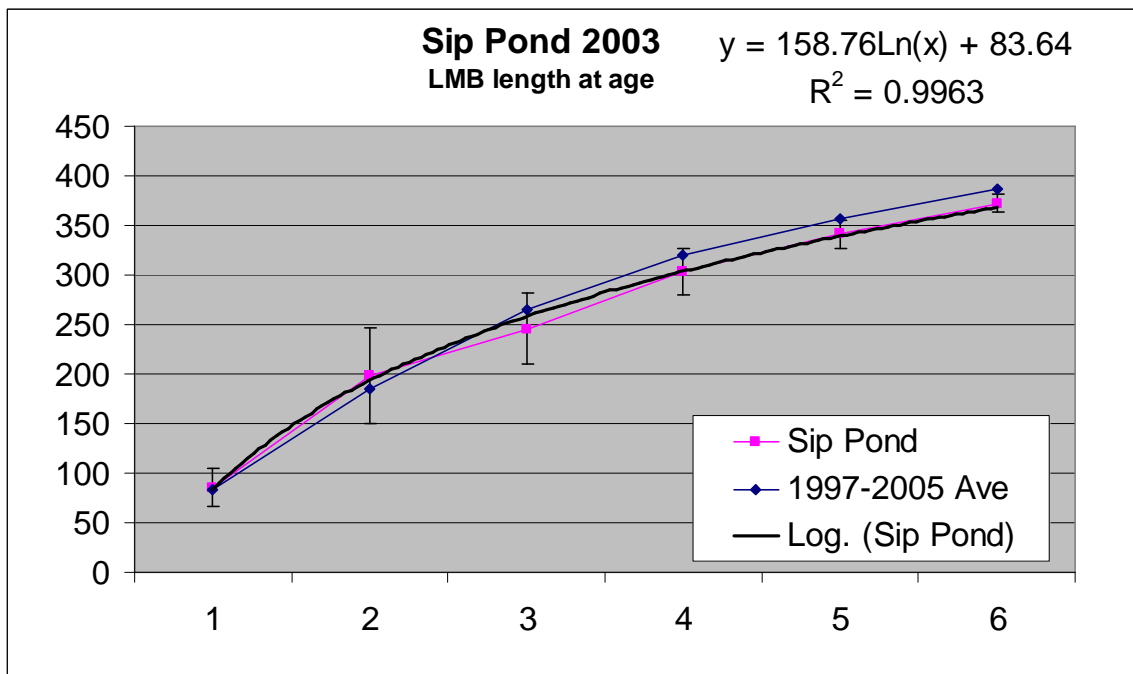


Figure 64. Average back-calculated length at age for largemouth bass from Sip Pond (Fitzwilliam) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

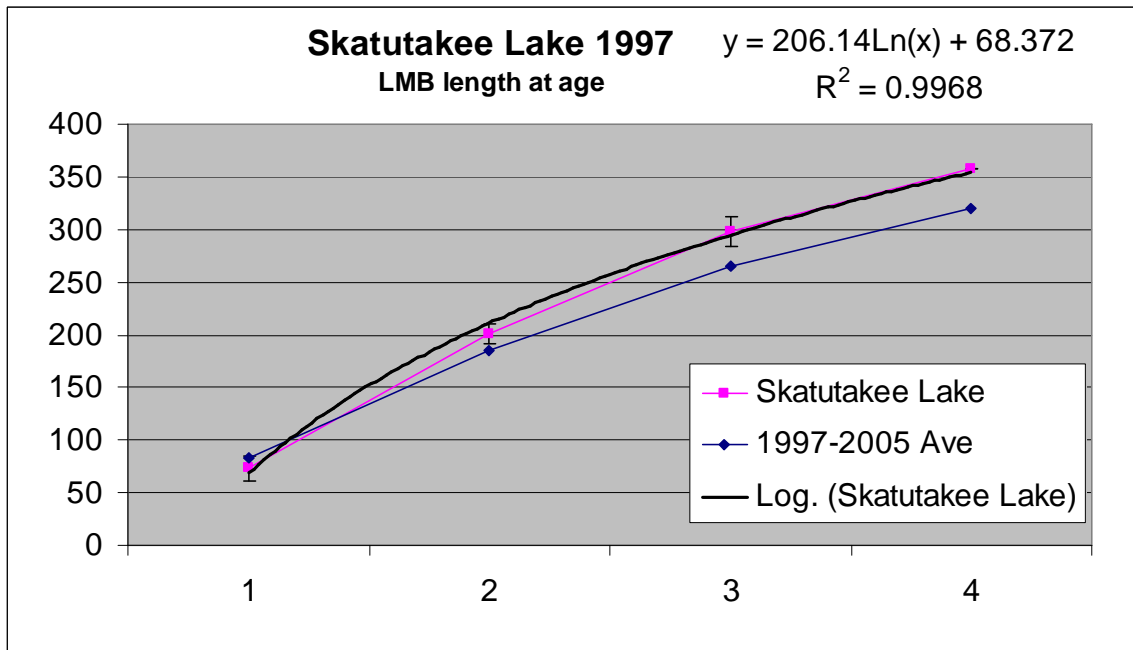


Figure 65. Average back-calculated length at age for largemouth bass from Skatutakee Lake (Harrisville) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

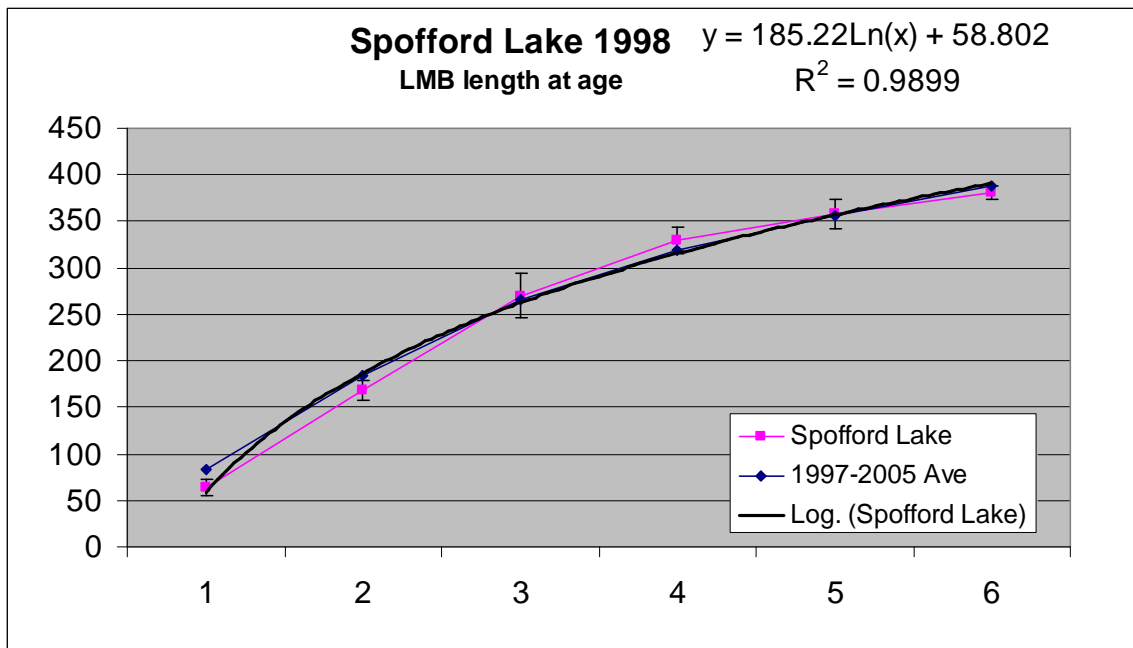


Figure 66. Average back-calculated length at age for largemouth bass from Spofford Lake (Spofford) sampled in 1998 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

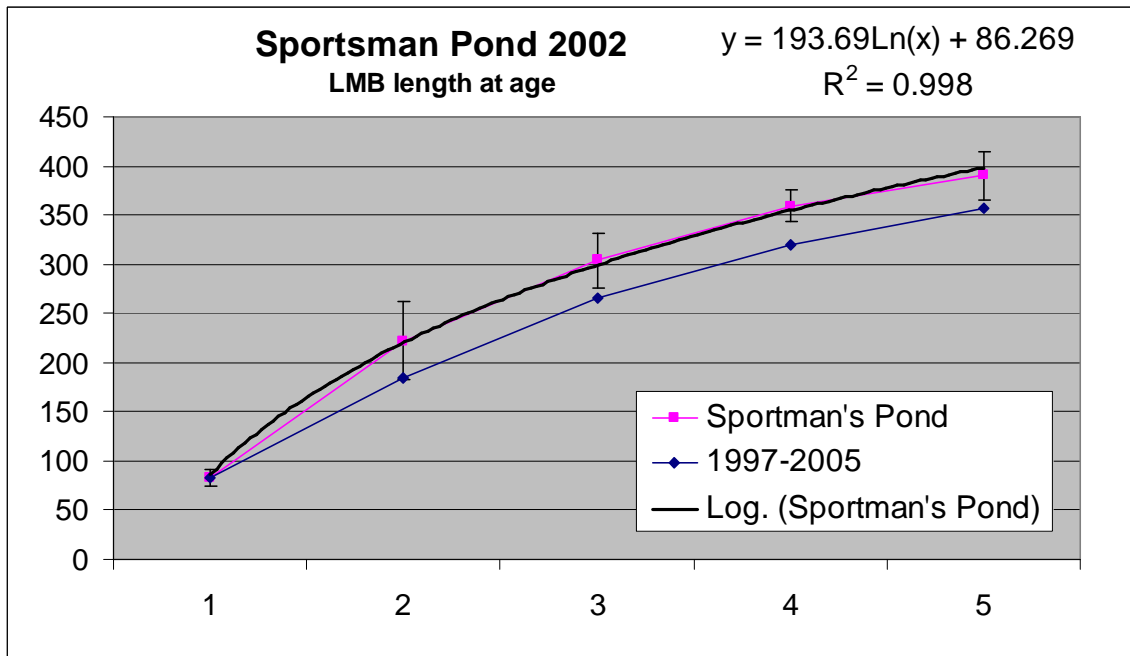


Figure 67. Average back-calculated length at age for largemouth bass from Sportsman Pond (Fitzwilliam) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

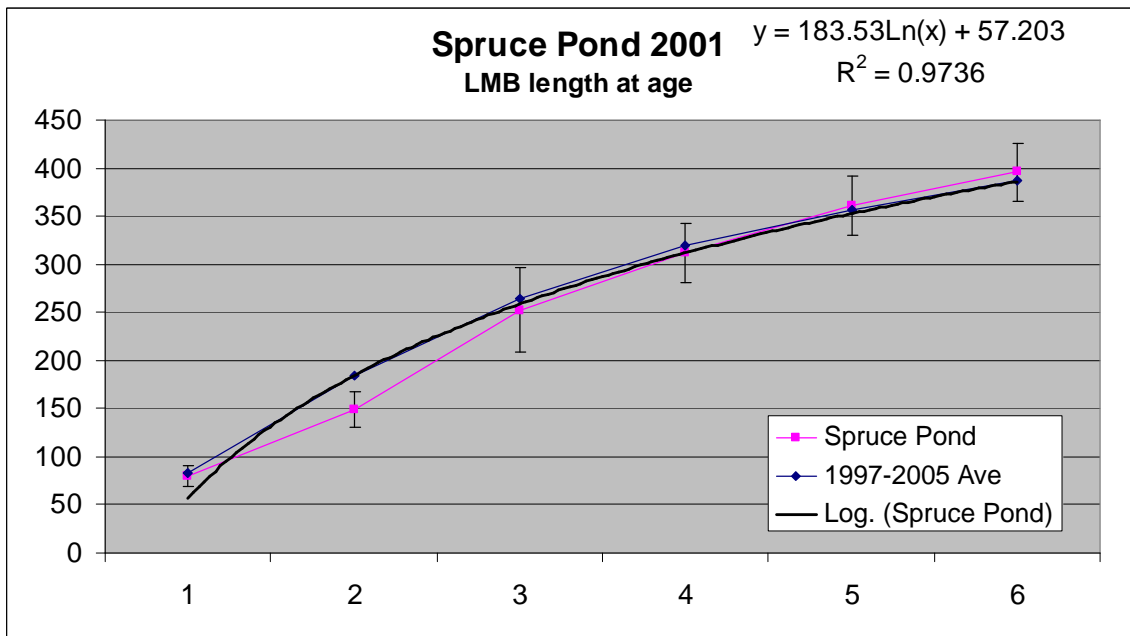


Figure 68. Average back-calculated length at age for largemouth bass from Spruce Pond (Deerfield) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

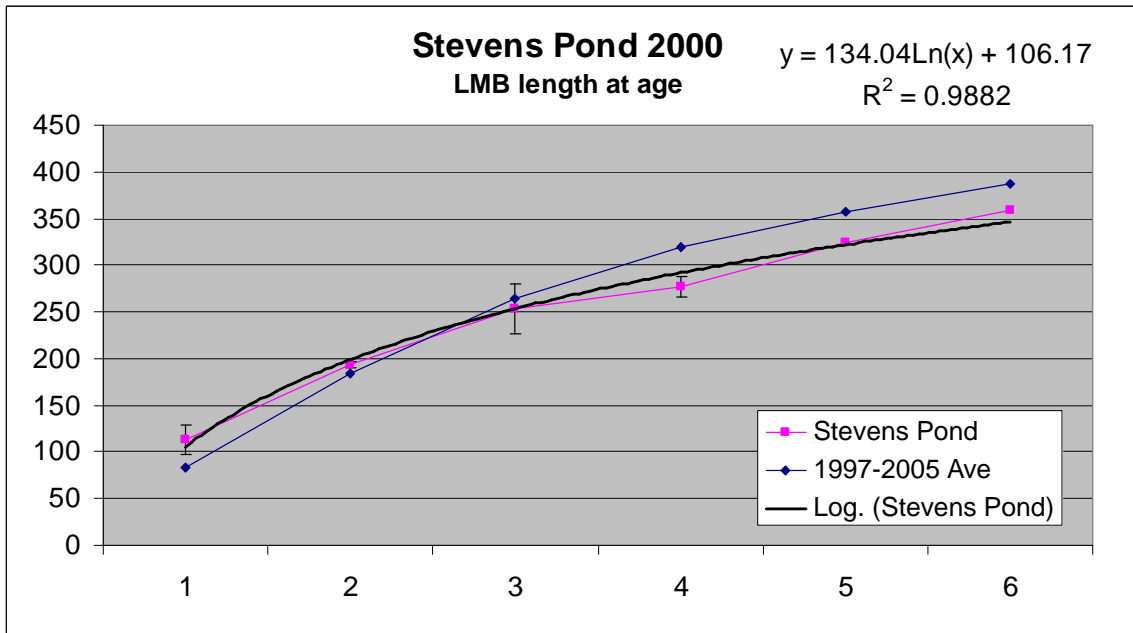


Figure 69. Average back-calculated length at age for largemouth bass from Stevens Pond (Manchester) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

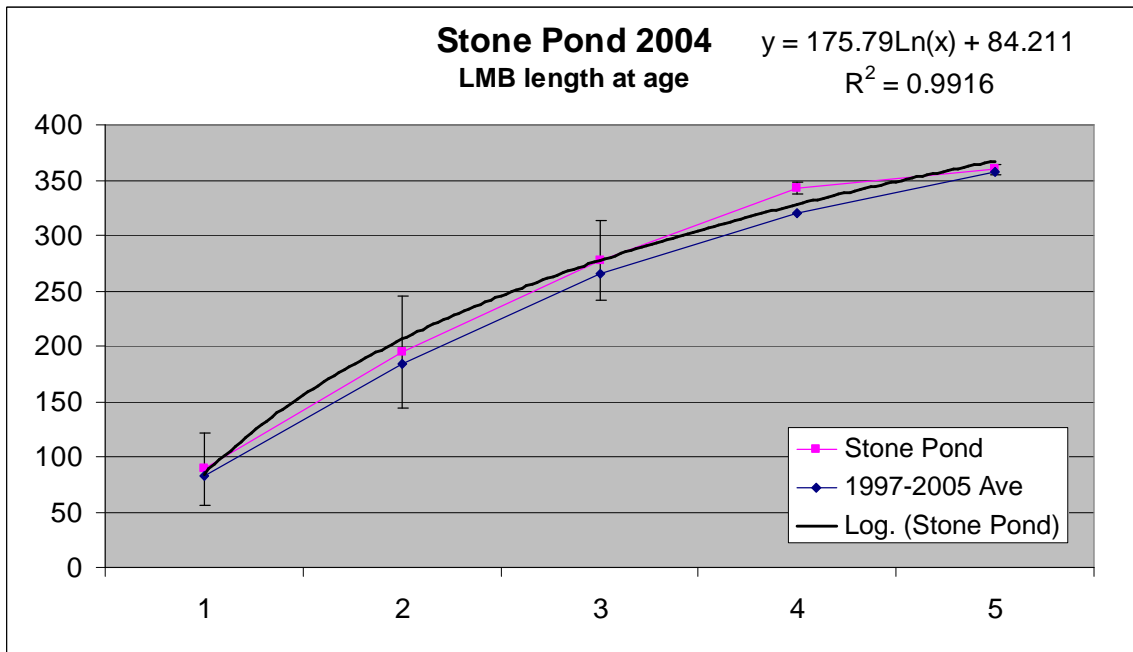


Figure 70. Average back-calculated length at age for largemouth bass from Stone Pond (Marlow) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

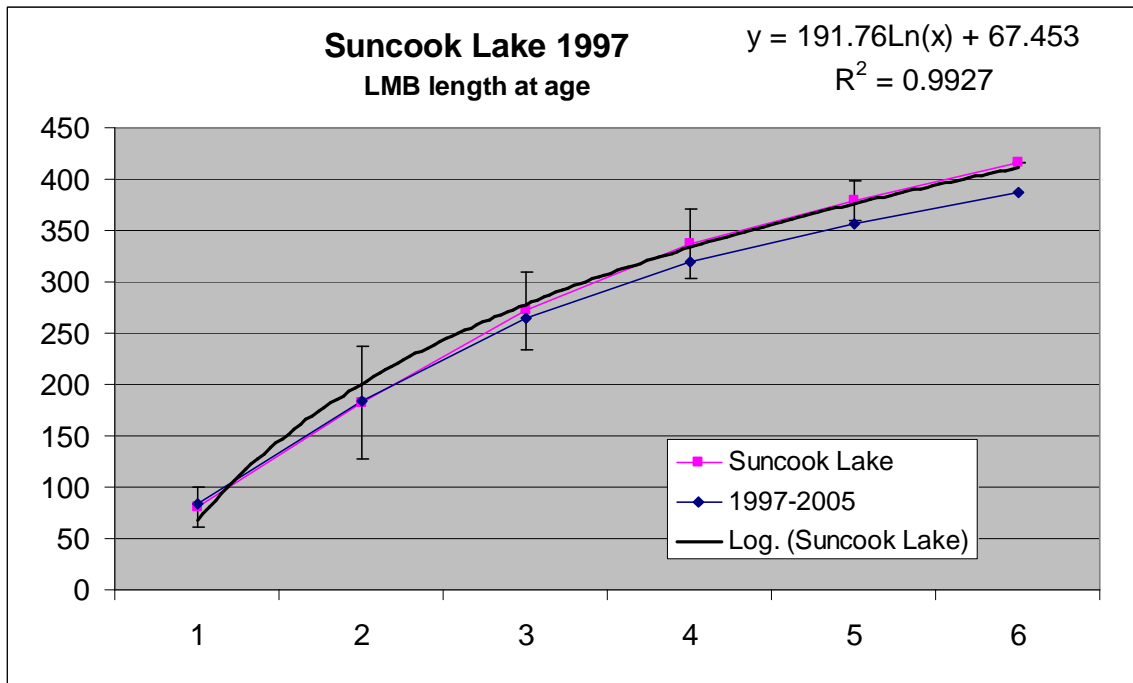


Figure 71. Average back-calculated length at age for largemouth bass from Suncook Lake (Barnstead) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

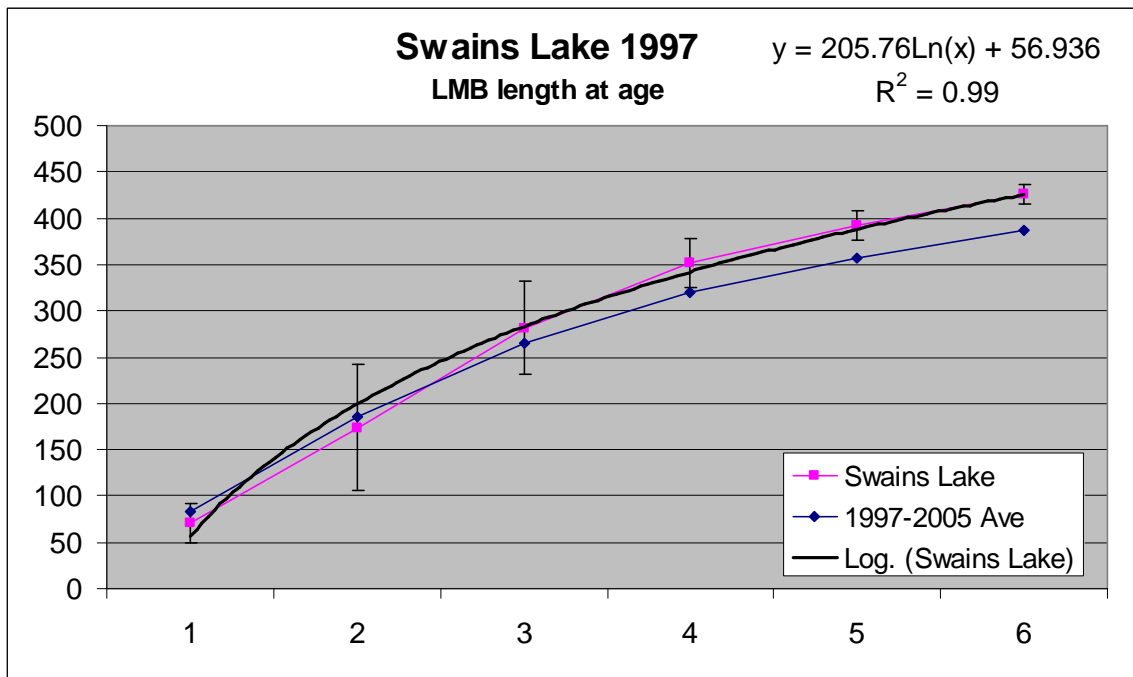


Figure 72. Average back-calculated length at age for largemouth bass from Swains Lake (Barrington) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

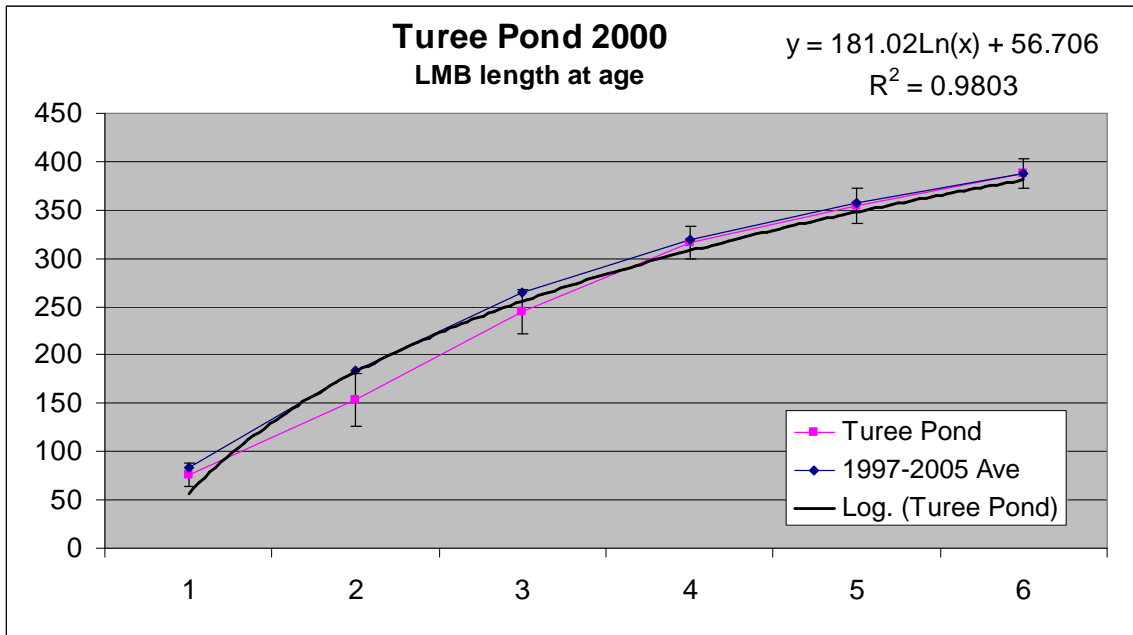


Figure 73. Average back-calculated length at age for largemouth bass from Turee Pond (Bow) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

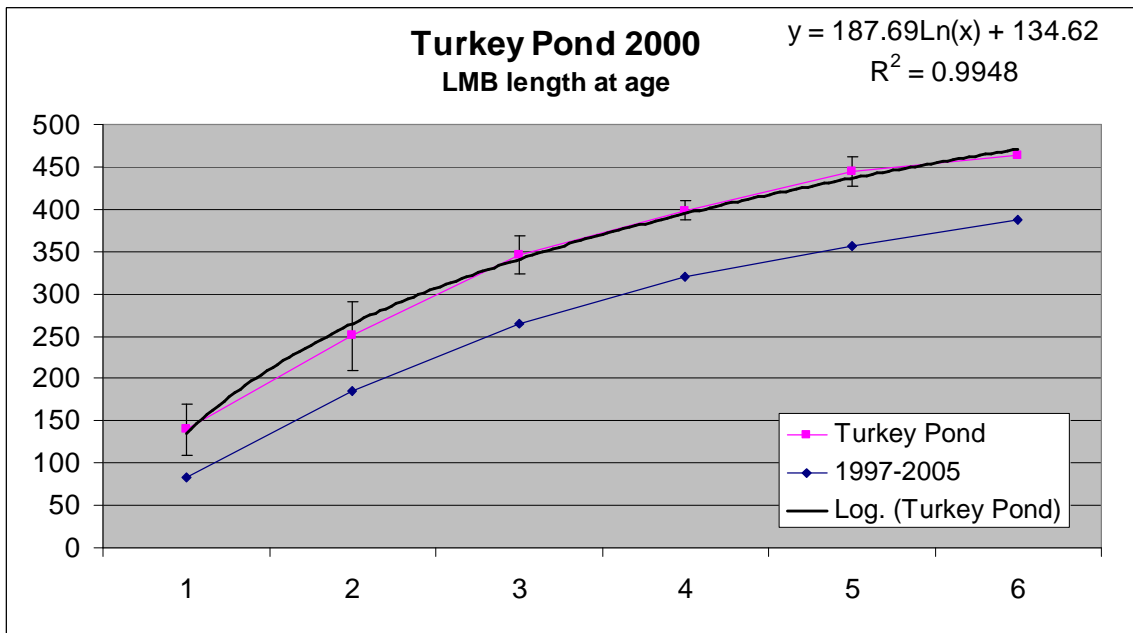


Figure 74. Average back-calculated length at age for largemouth bass from Turkey Pond (Concord) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

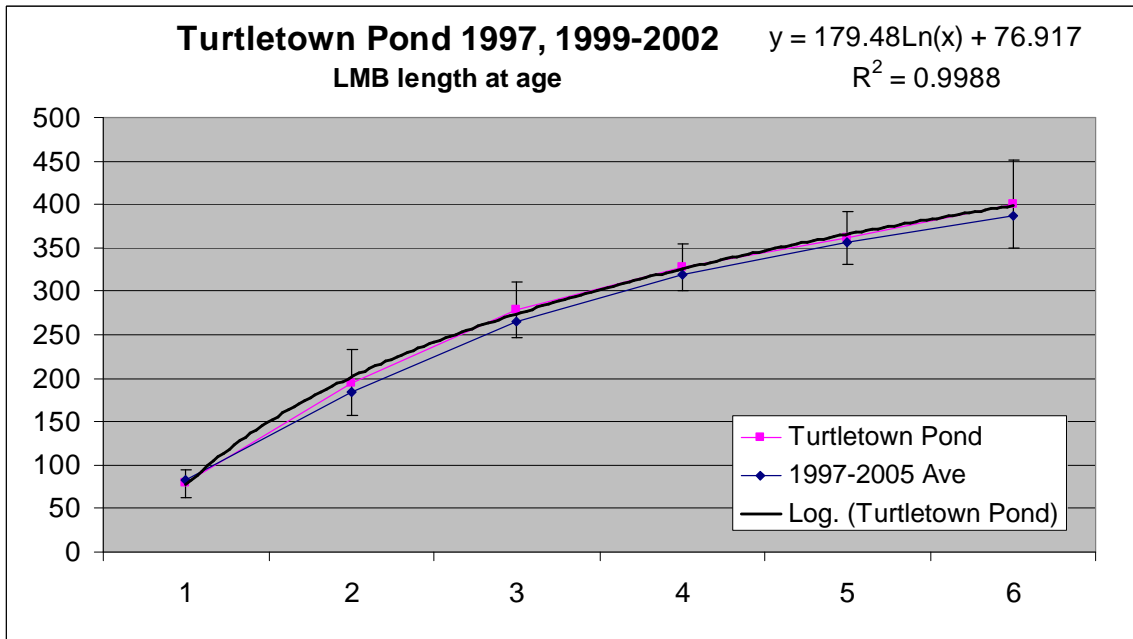


Figure 75. Average back-calculated length at age for largemouth bass from Turtletown Pond (Concord) sampled in 1997 and 1999-2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

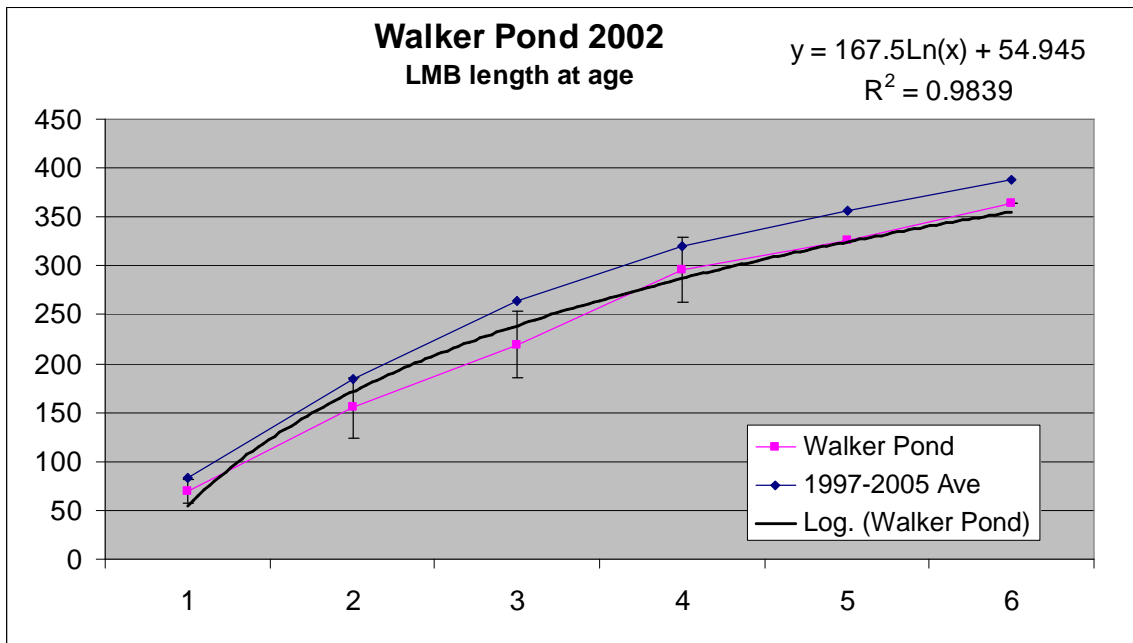


Figure 76. Average back-calculated length at age for largemouth bass from Walker Pond (Webster) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

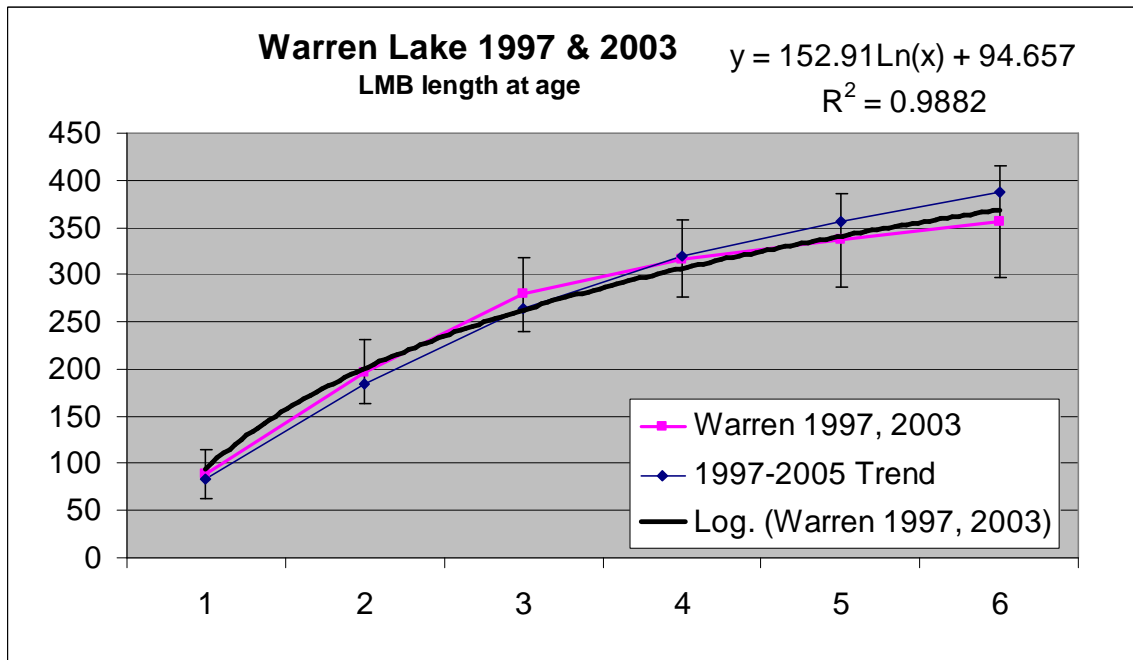


Figure 77. Average back-calculated length at age for largemouth bass from Warren Lake (Alstead) sampled in 1997 and 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

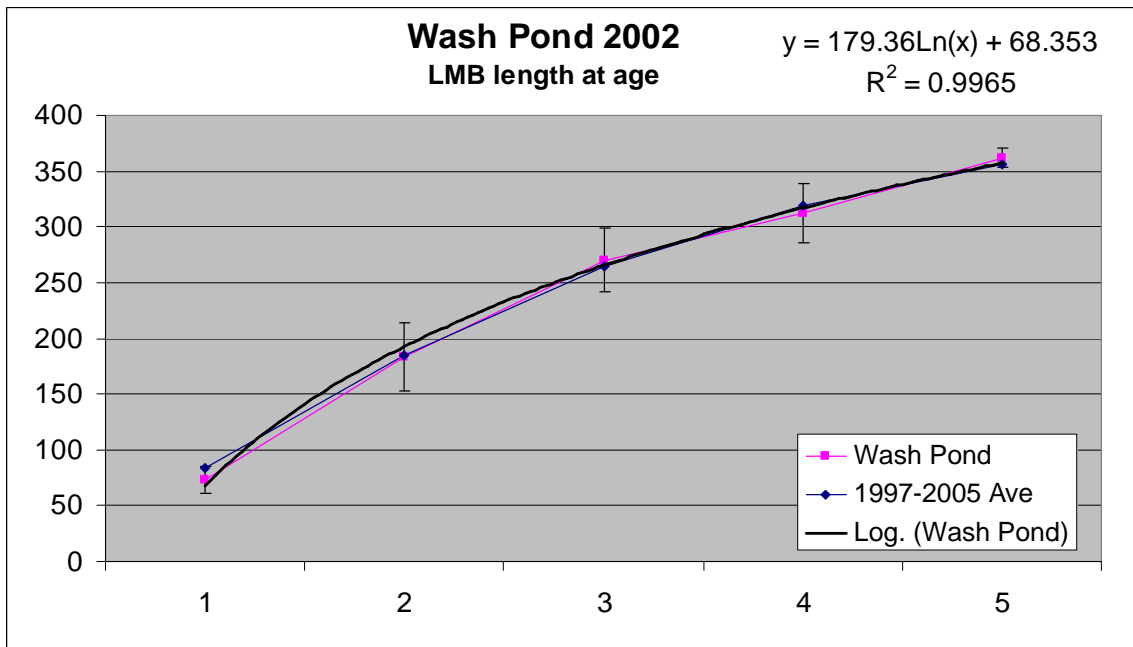


Figure 78. Average back-calculated length at age for largemouth bass from Wash Pond (Hampstead) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

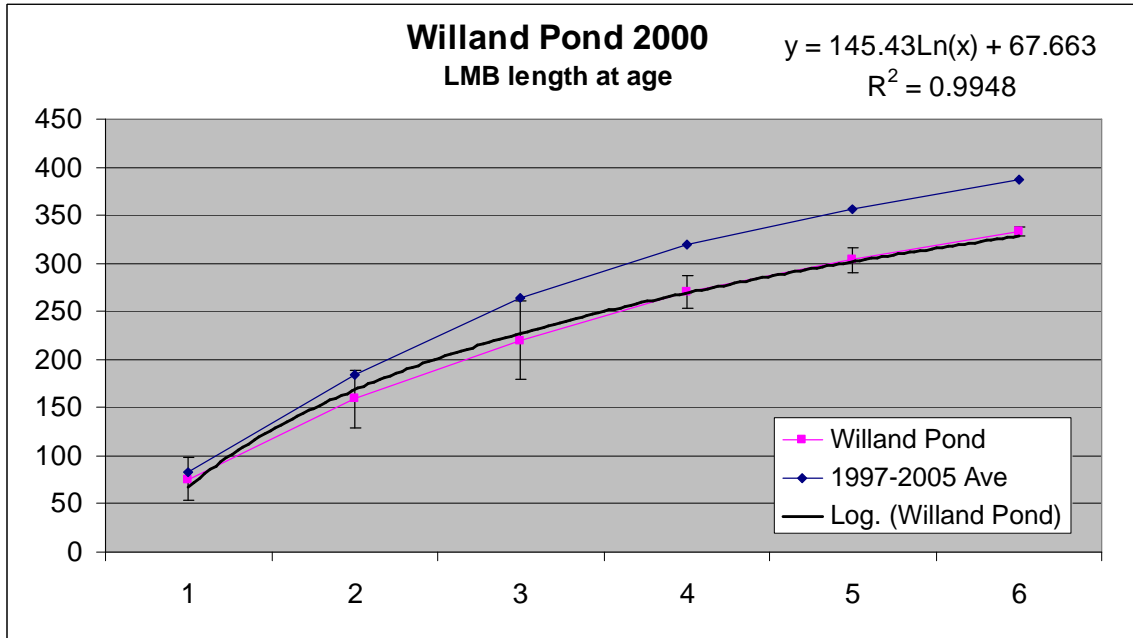


Figure 79. Average back-calculated length at age for largemouth bass from Willand Pond (Somersworth) sampled in 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

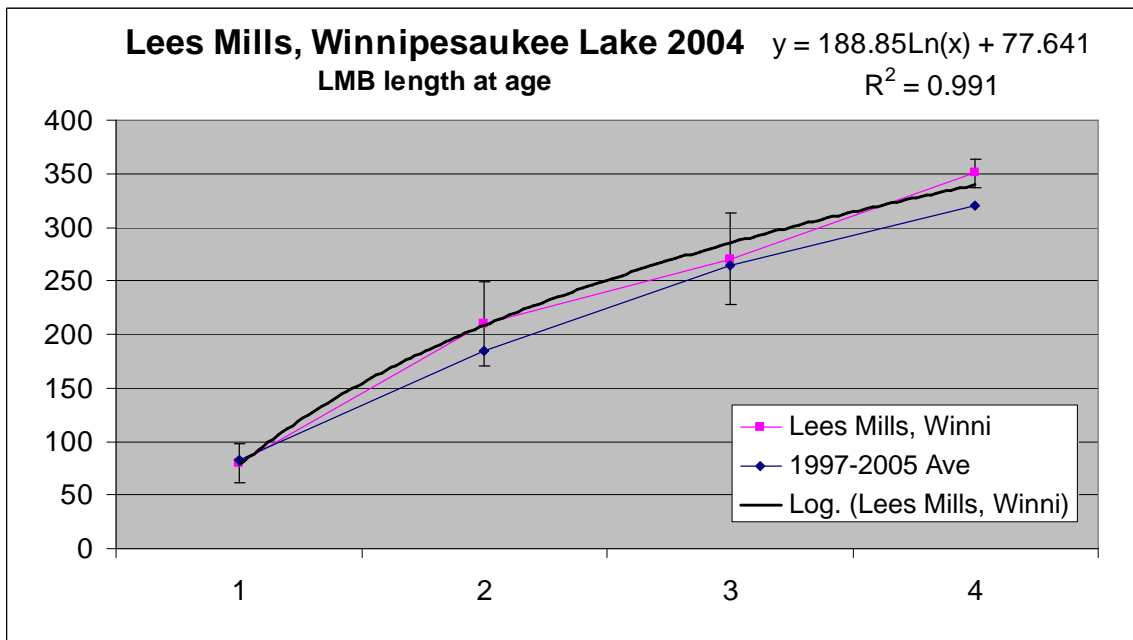


Figure 80. Average back-calculated length at age for largemouth bass from Lees Mills, Winnepesaukee Lake (Moultonborough) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for largemouth bass from 1997-2005 (from Figure 111).

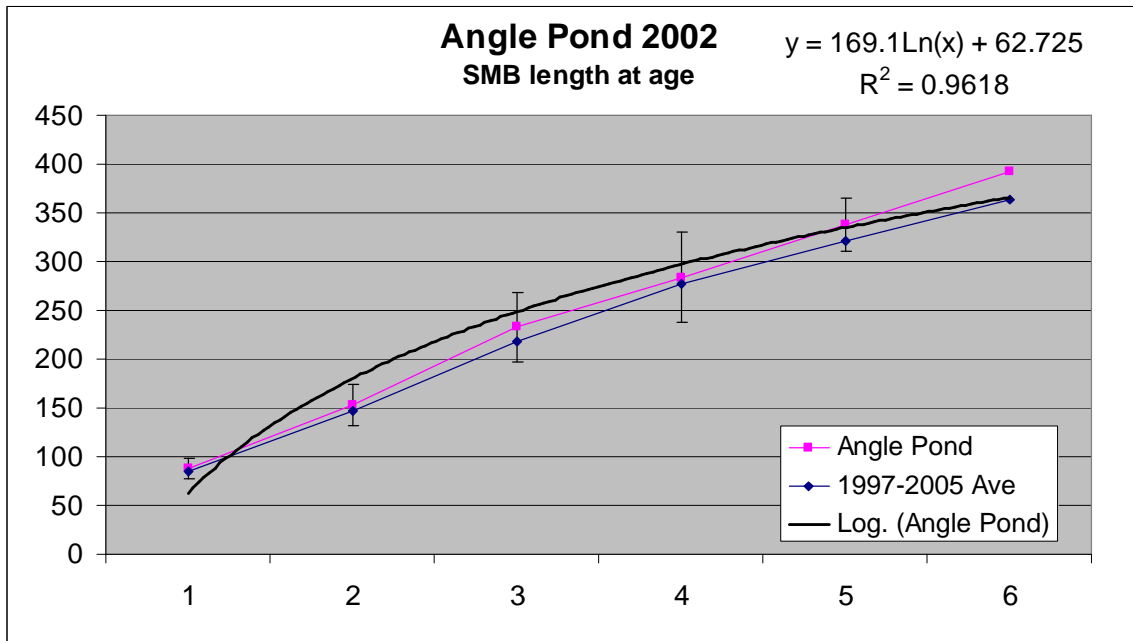


Figure 81. Average back-calculated length at age for smallmouth bass from Angle Pond (Sandown) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

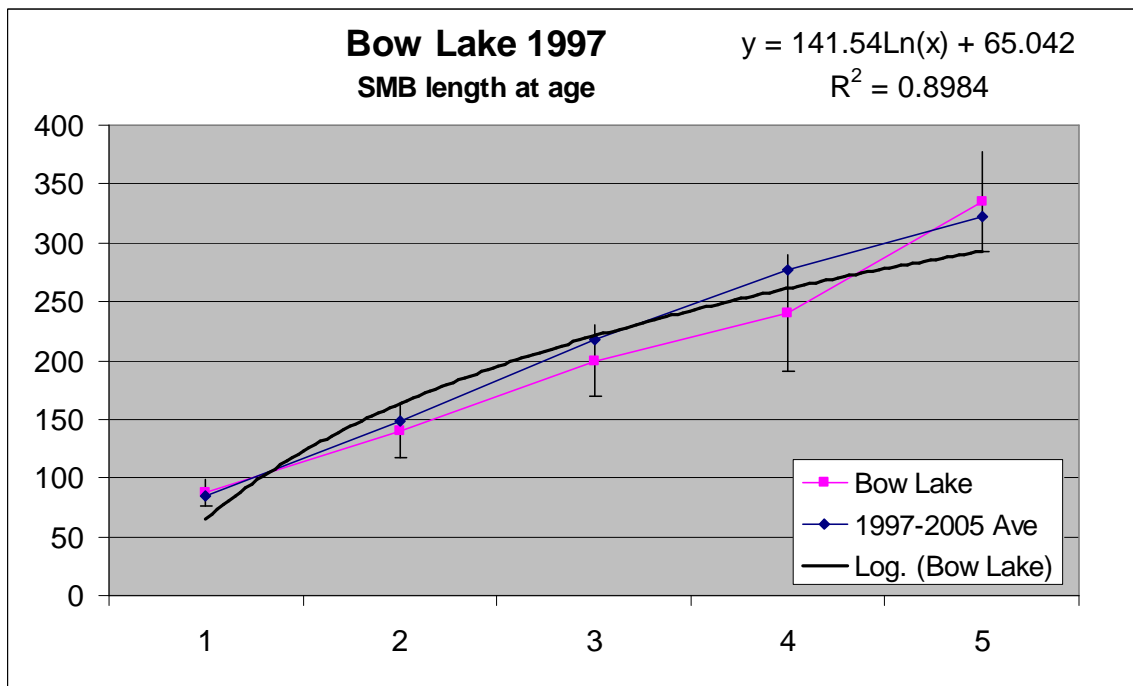


Figure 82. Average back-calculated length at age for smallmouth bass from Bow Lake (Strafford) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

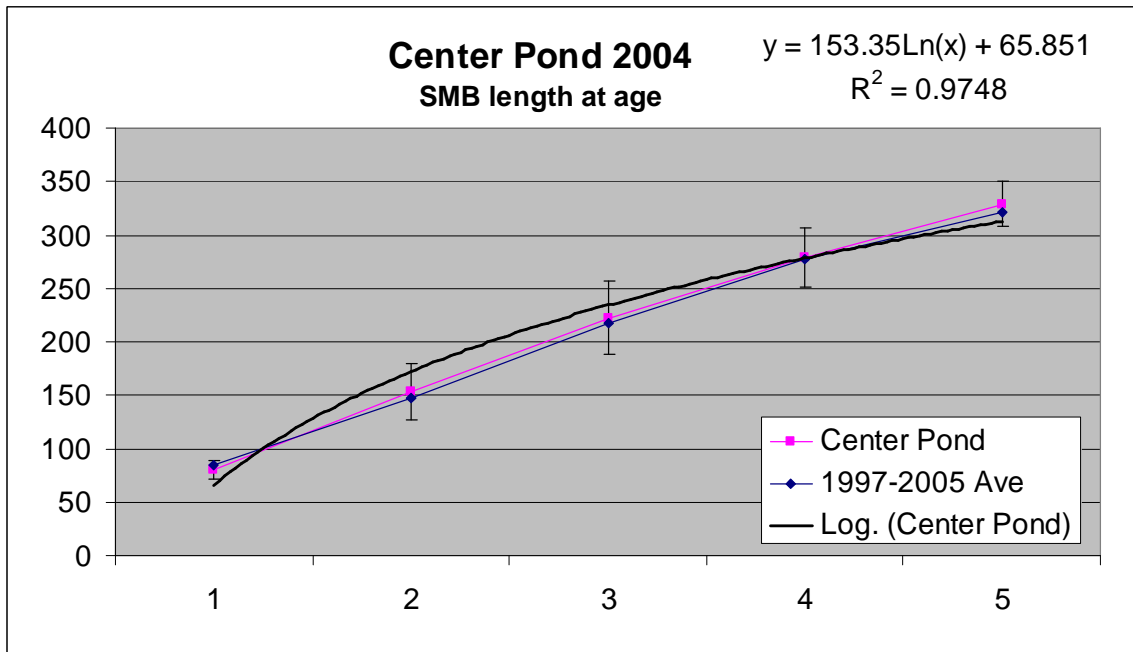


Figure 83. Average back-calculated length at age for smallmouth bass from Center Pond (Stoddard) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

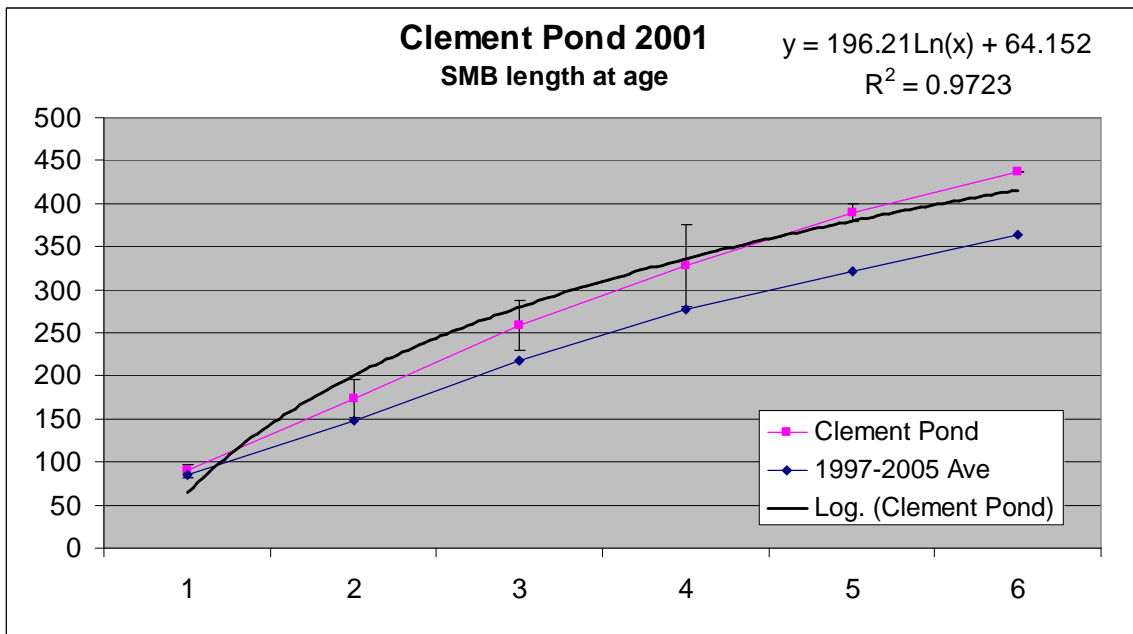


Figure 84. Average back-calculated length at age for smallmouth bass from Clement Pond (Hopkinton) sampled in 2001 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

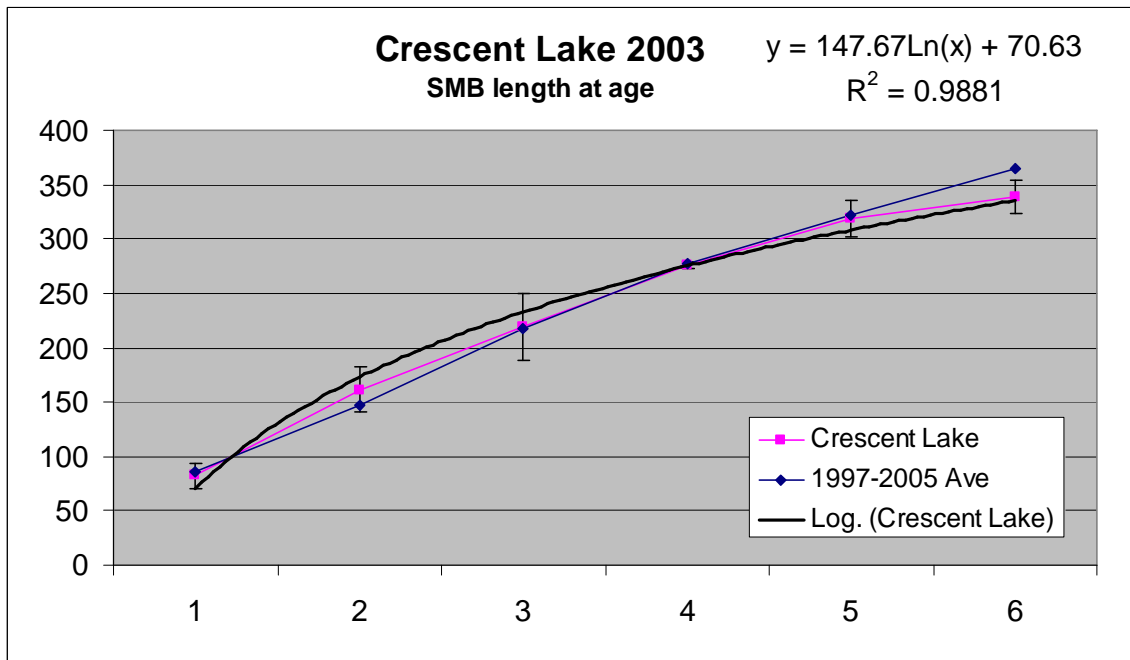


Figure 85. Average back-calculated length at age for smallmouth bass from Crescent Lake (Acworth) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

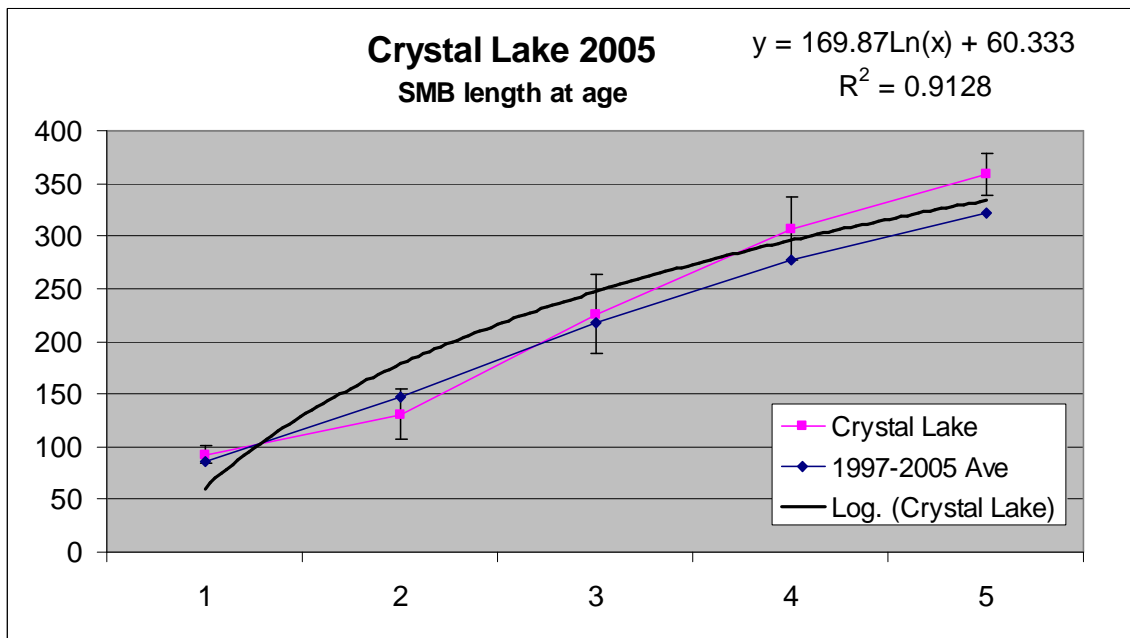


Figure 86. Average back-calculated length at age for smallmouth bass from Crystal Lake (Gilmanton) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

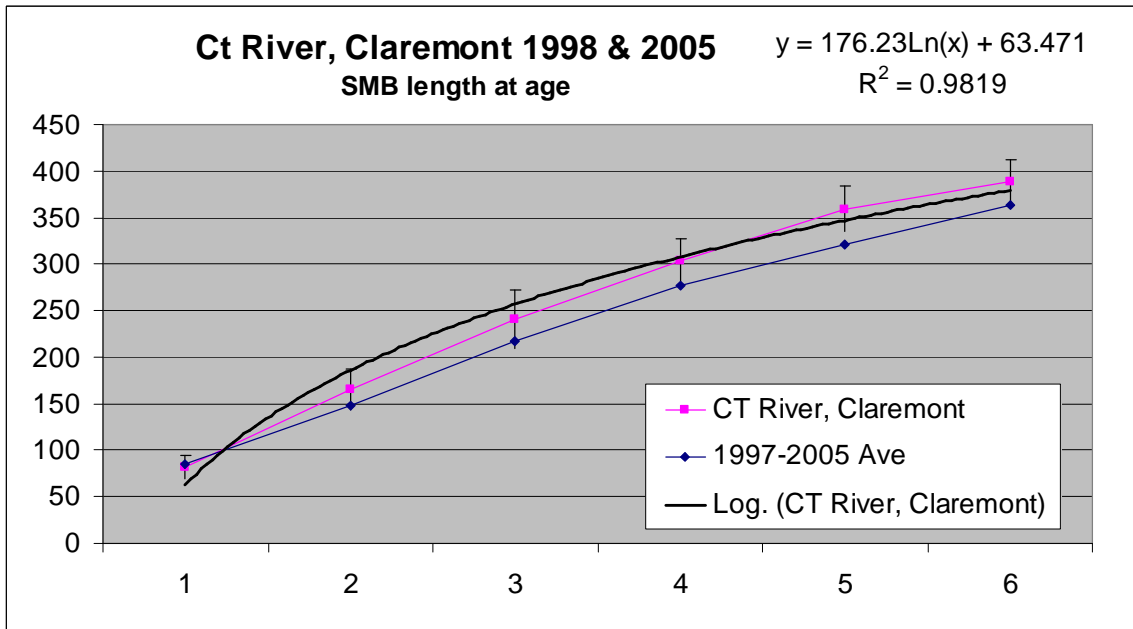


Figure 87. Average back-calculated length at age for smallmouth bass from Connecticut River (Claremont) sampled in 1998 and 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

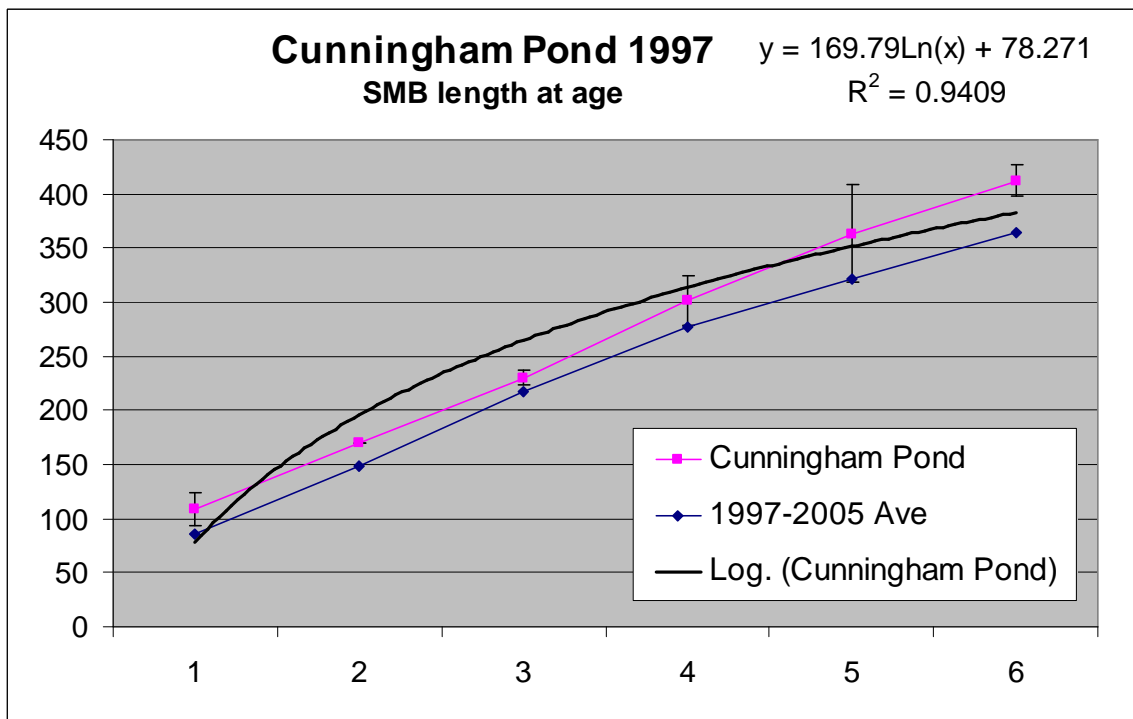


Figure 88. Average back-calculated length at age for smallmouth bass from Cunningham Pond (Peterborough) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

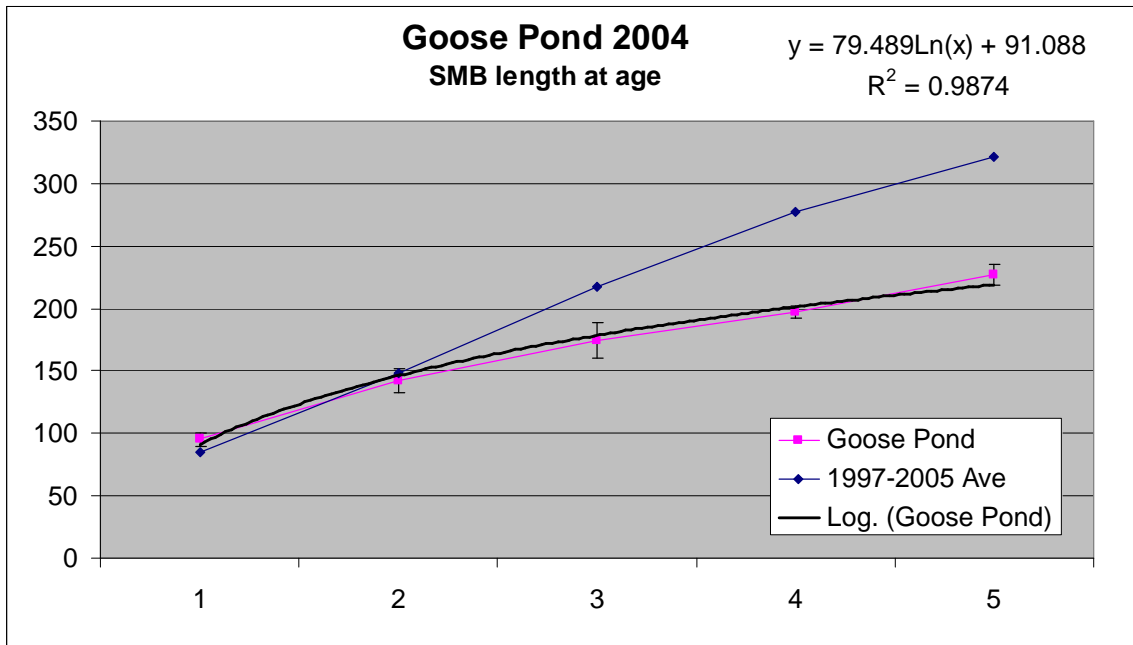


Figure 89. Average back-calculated length at age for smallmouth bass from Goose Pond (Canaan) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

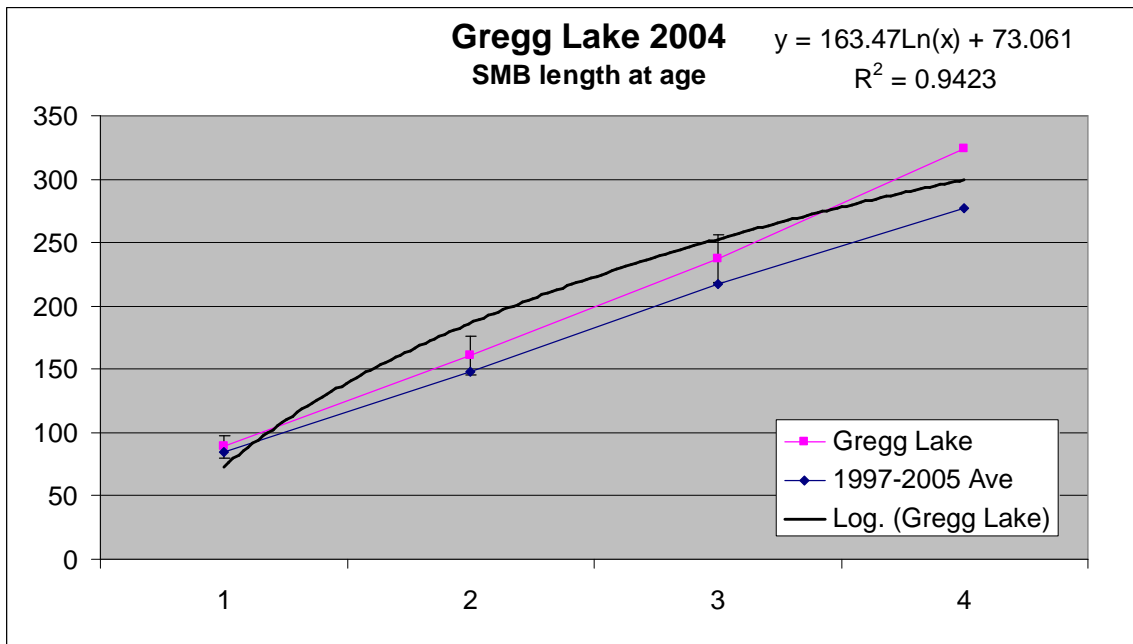


Figure 90. Average back-calculated length at age for smallmouth bass from Gregg Lake (Antrim) sampled in 2004 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

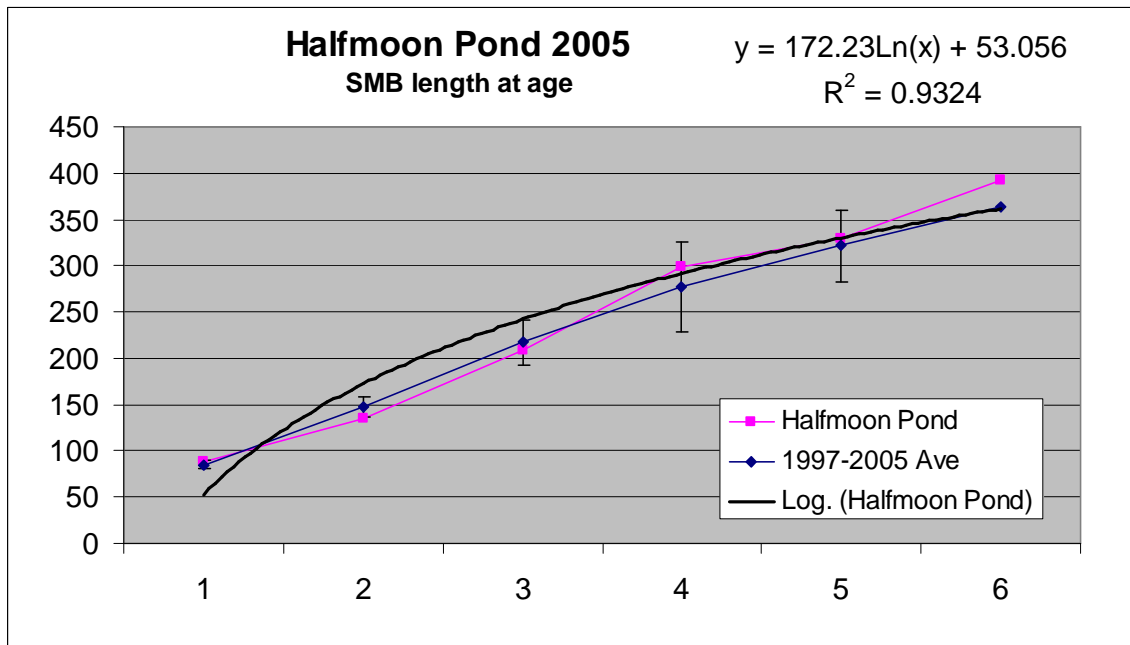


Figure 91. Average back-calculated length at age for smallmouth bass from Halfmoon Pond (Barnstead) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

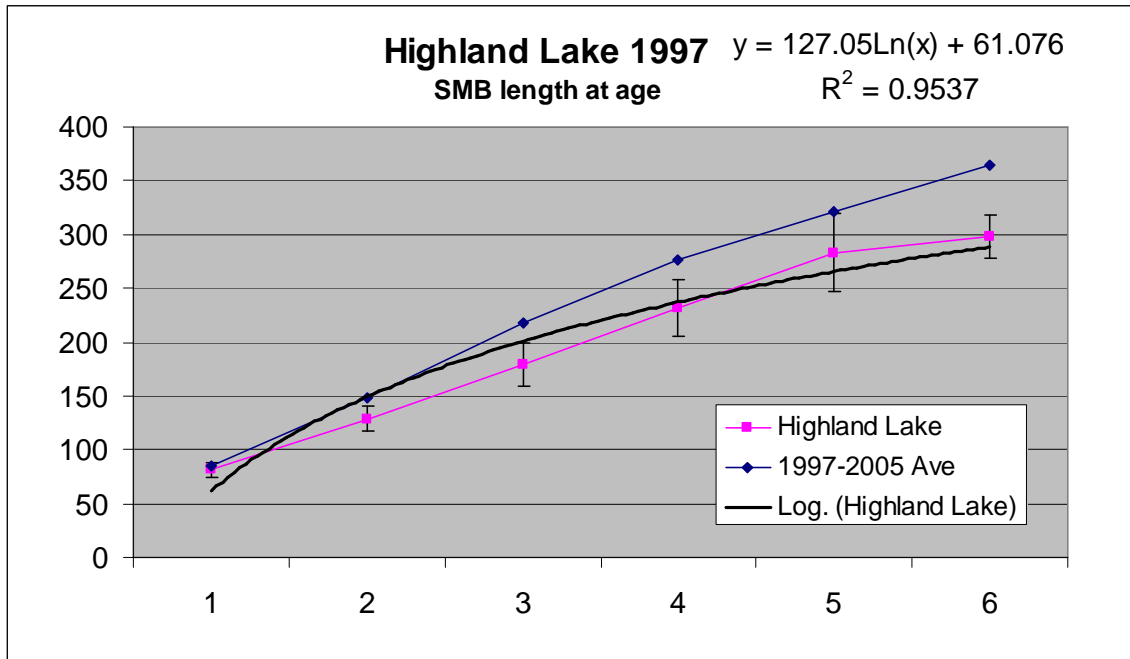


Figure 92. Average back-calculated length at age for smallmouth bass from Highland Lake (Stoddard) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

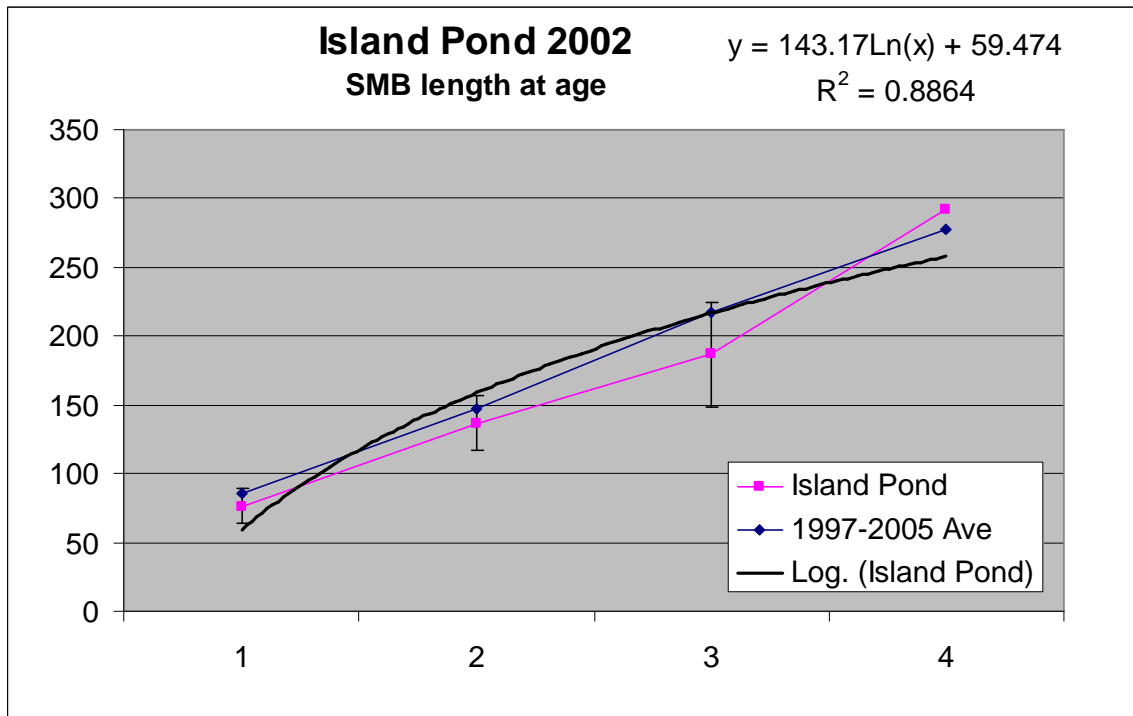


Figure 93. Average back-calculated length at age for smallmouth bass from Island Pond (Washington) sampled in 2002 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

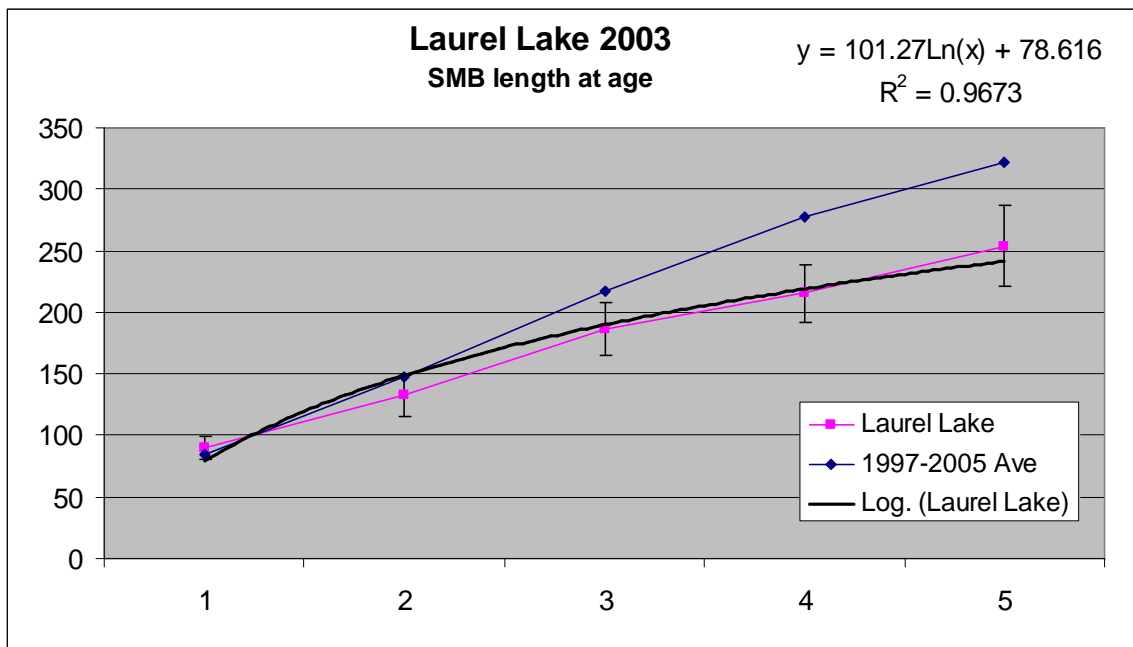


Figure 94. Average back-calculated length at age for smallmouth bass from Laurel Lake (Fitzwilliam) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

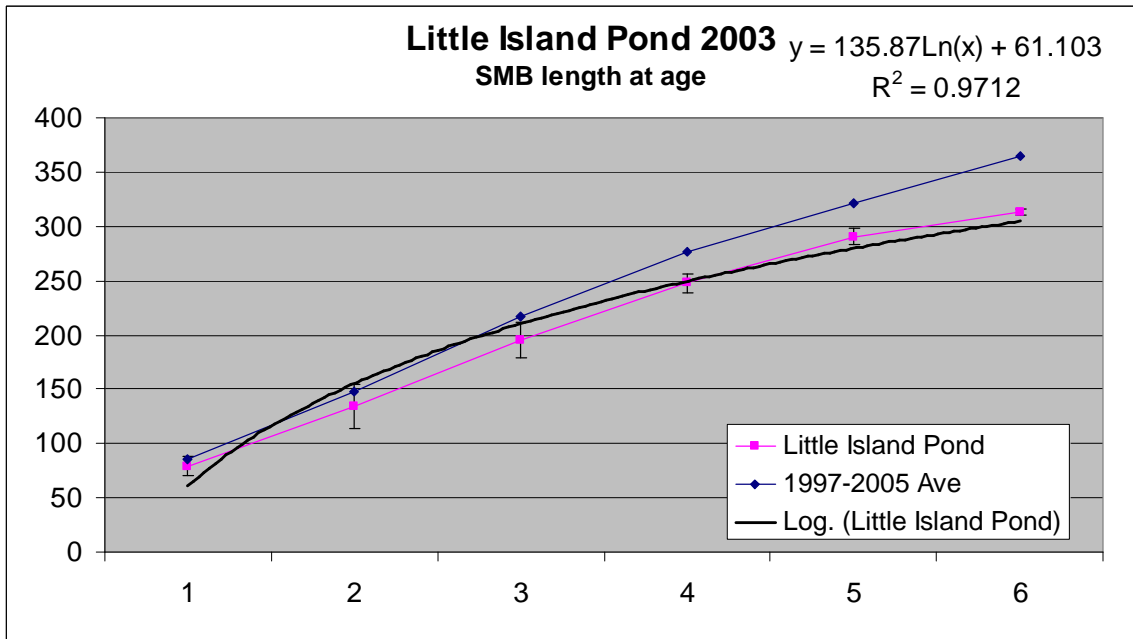


Figure 95. Average back-calculated length at age for smallmouth bass from Little Island Pond (Pelham) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

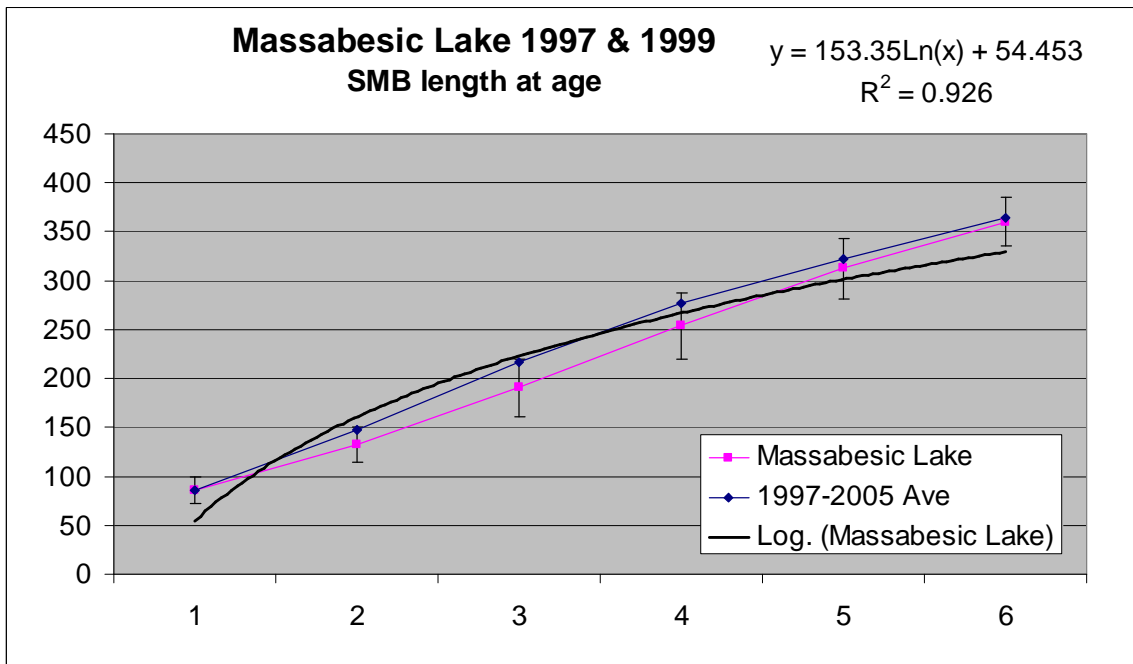


Figure 96. Average back-calculated length at age for smallmouth bass from Massabesic Lake (Auburn) sampled in 1997 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

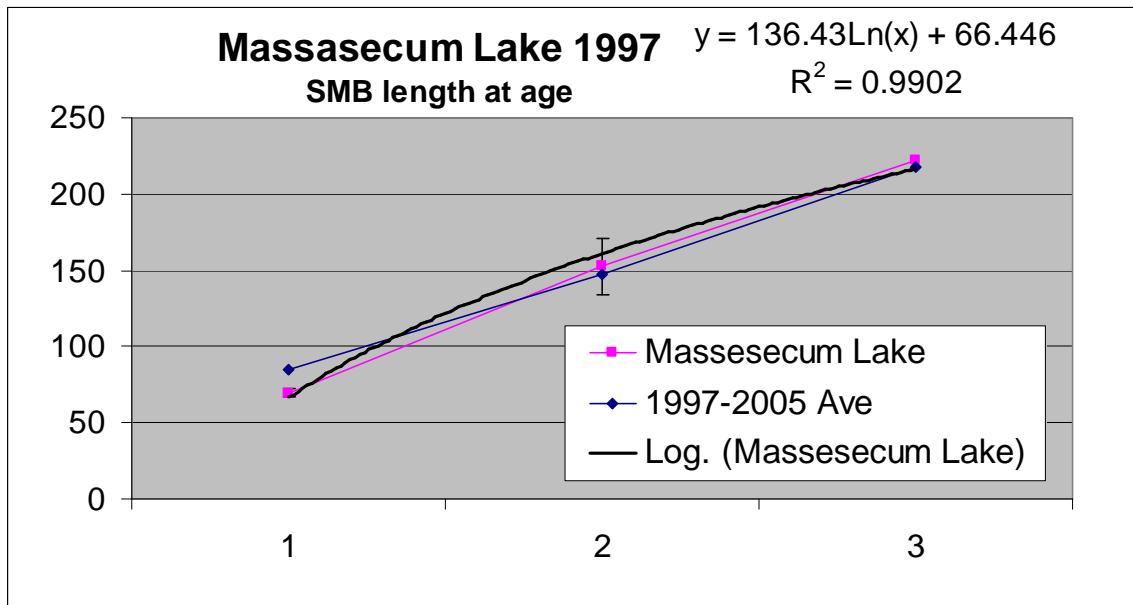


Figure 97. Average back-calculated length at age for smallmouth bass from Massesecum Lake (Bradford) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

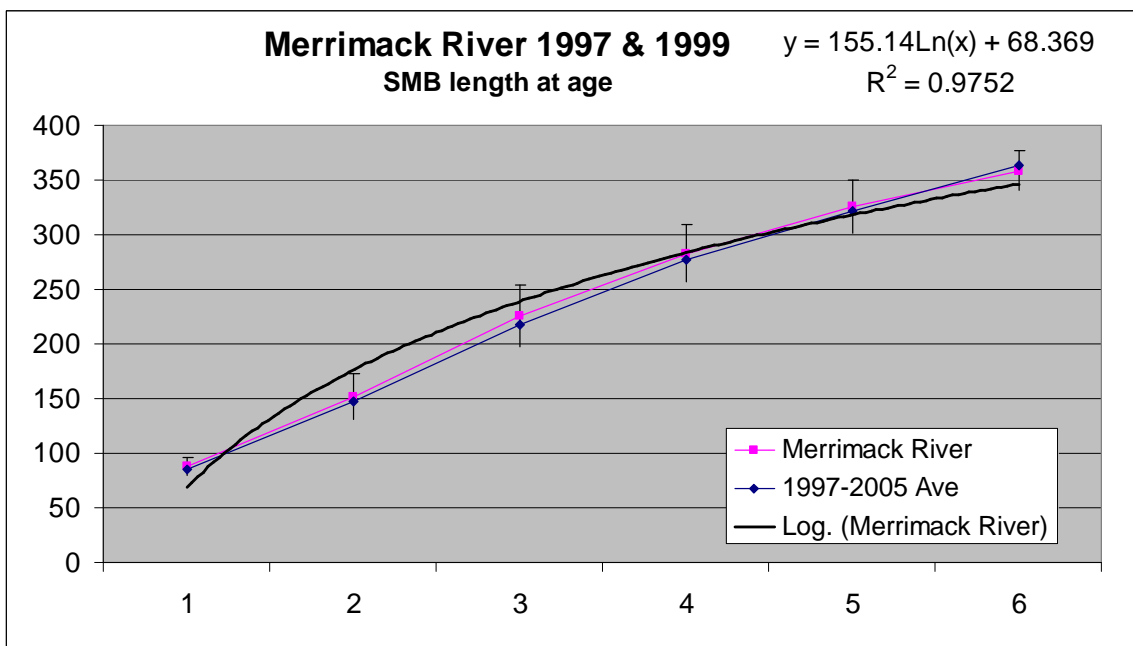


Figure 98. Average back-calculated length at age for smallmouth bass from Merrimack River sampled in 1997 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

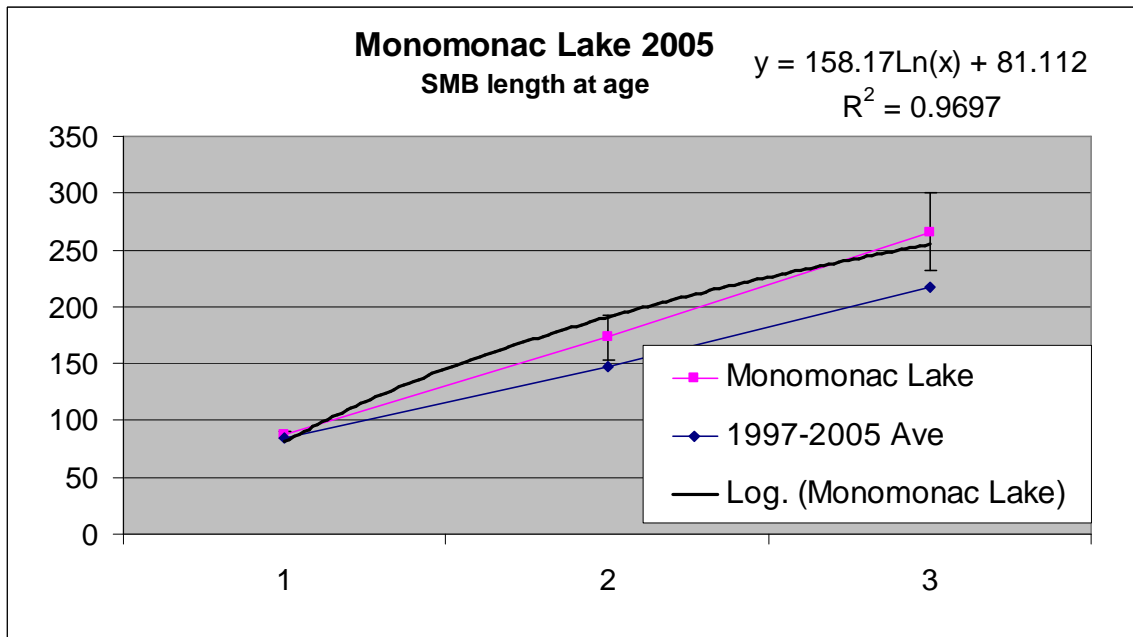


Figure 99. Average back-calculated length at age for smallmouth bass from Monomonac Lake (Rindge) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

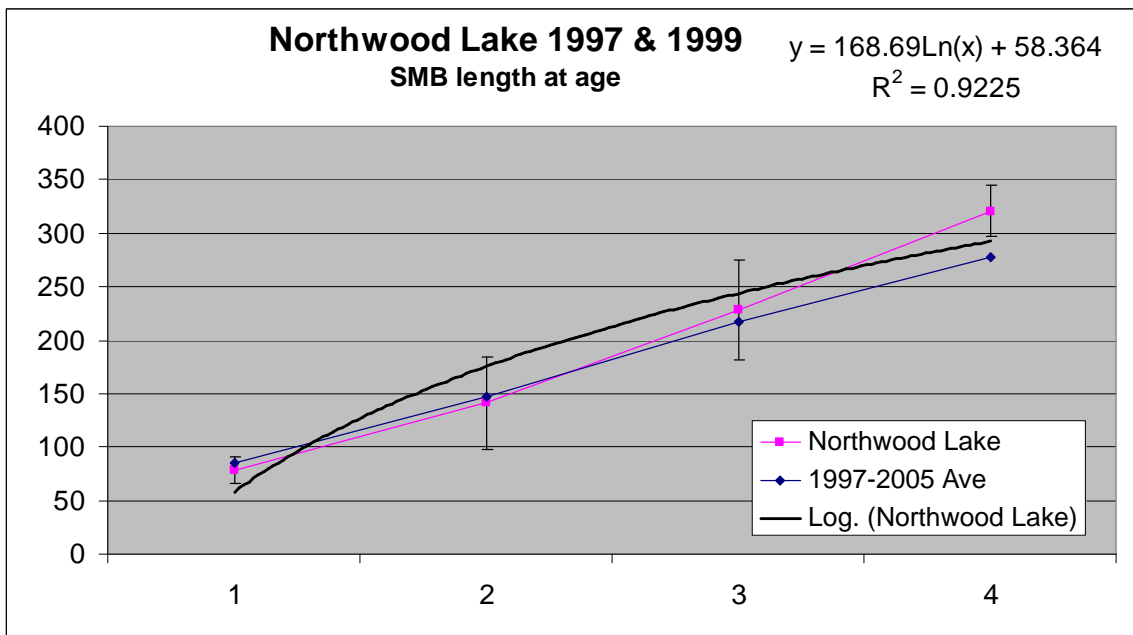


Figure 100. Average back-calculated length at age for smallmouth bass from Northwood Lake (Northwood) sampled in 1997 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

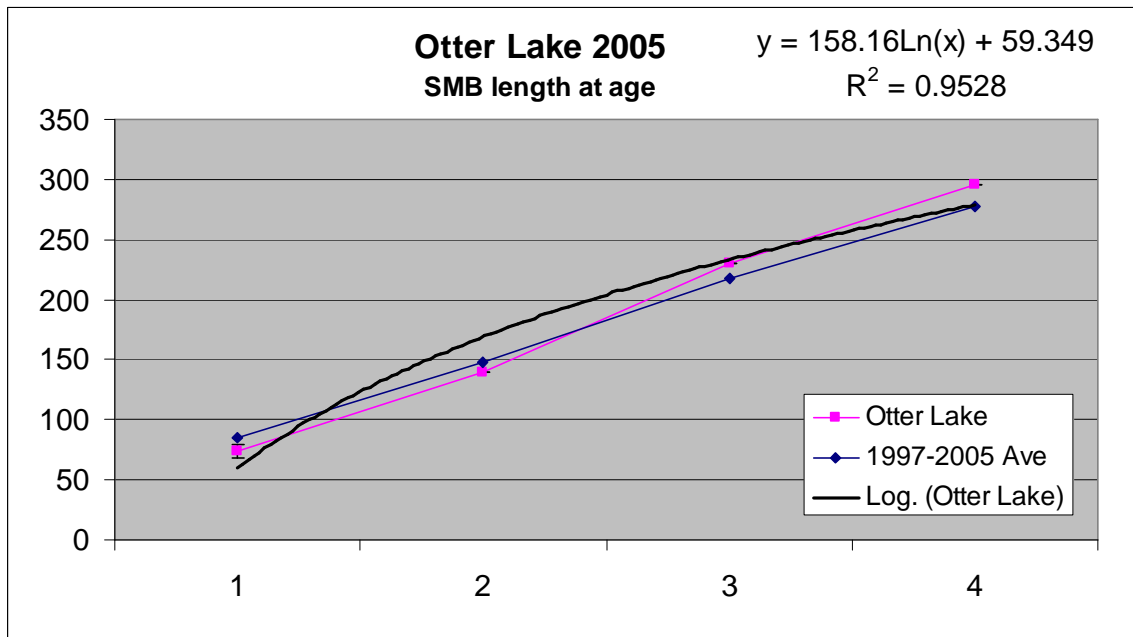


Figure 101. Average back-calculated length at age for smallmouth bass from Otter Lake (Greenfield) sampled in 2005 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

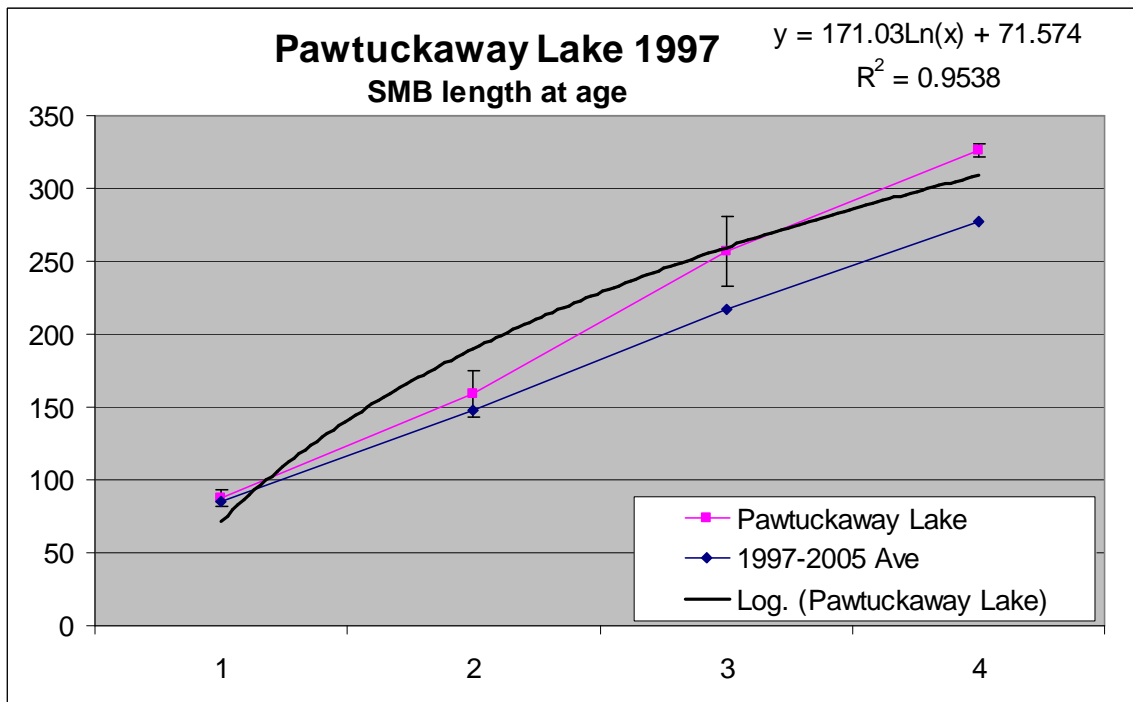


Figure 102. Average back-calculated length at age for smallmouth bass from Pawtuckaway Lake (Nottingham) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

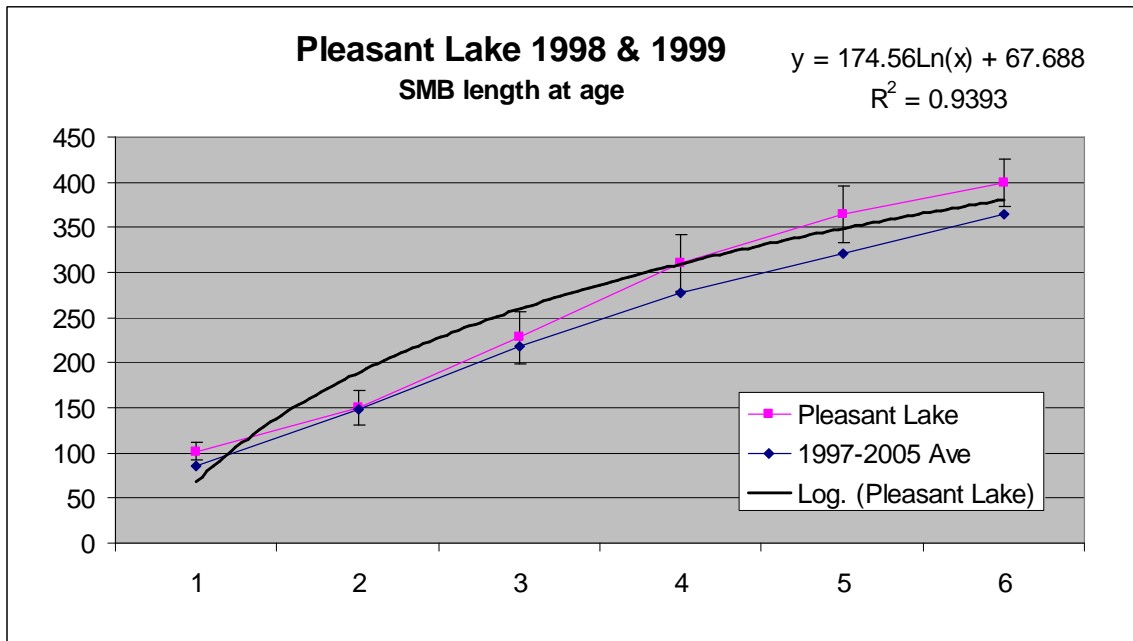


Figure 103. Average back-calculated length at age for smallmouth bass from Pleasant Lake (Deerfield) sampled in 1998 and 1999 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

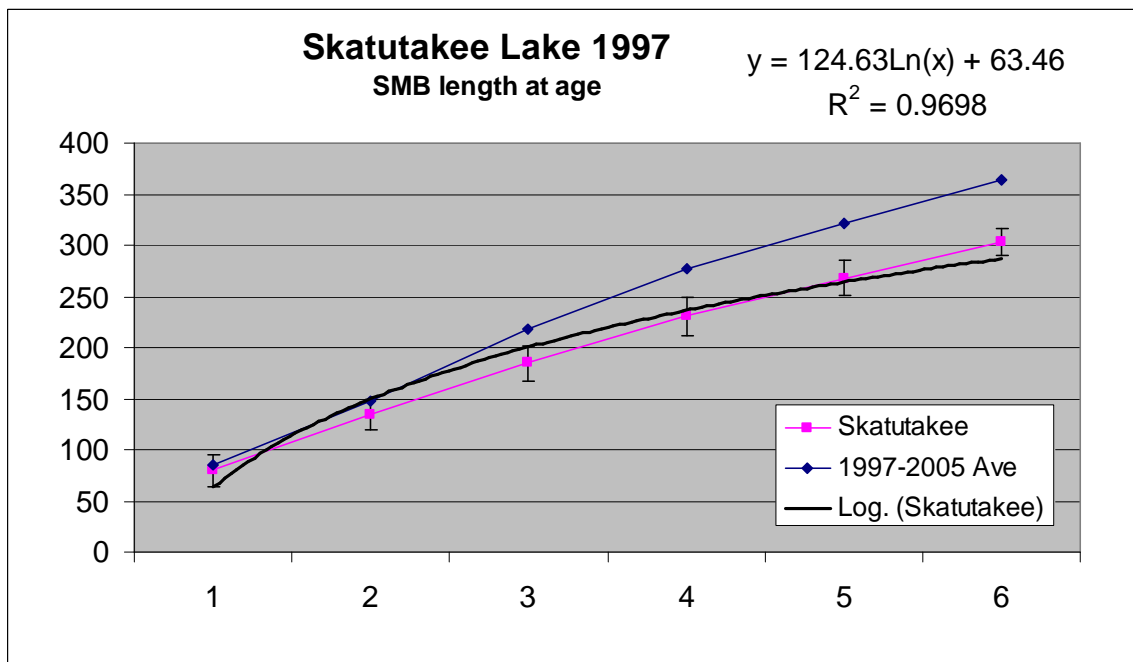


Figure 104. Average back-calculated length at age for smallmouth bass from Skatutakee Lake (Harrisville) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

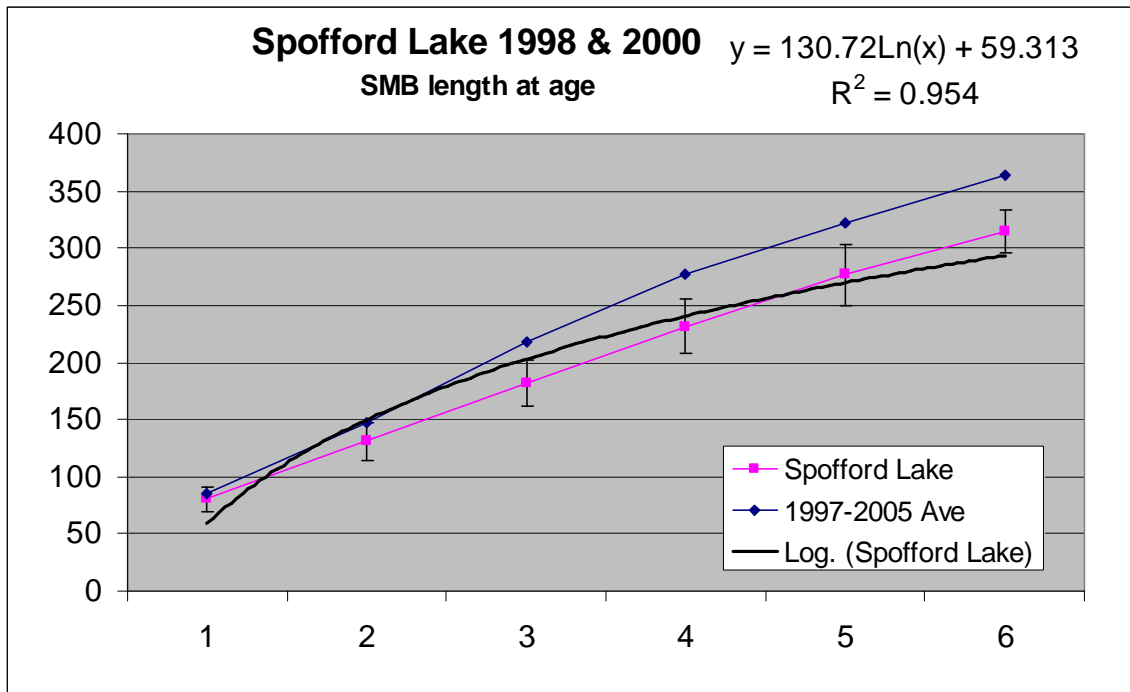


Figure 105. Average back-calculated length at age for smallmouth bass from Spofford Lake (Spofford) sampled in 1998 & 2000 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

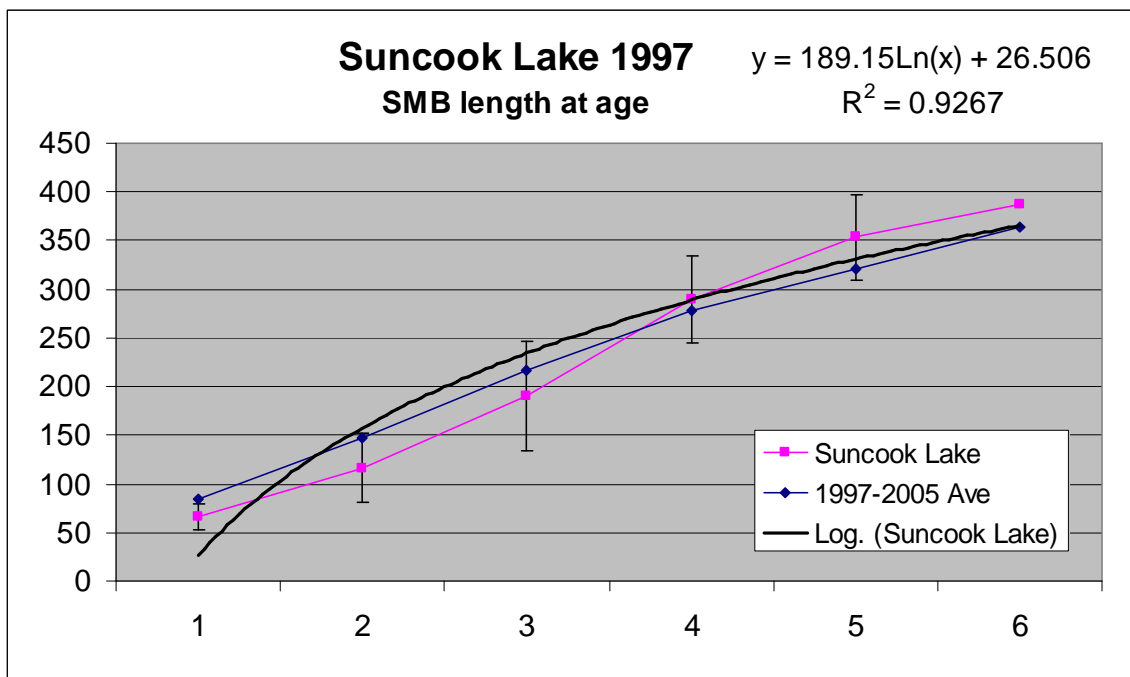


Figure 106. Average back-calculated length at age for smallmouth bass from Suncook Lake (Barnstead) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

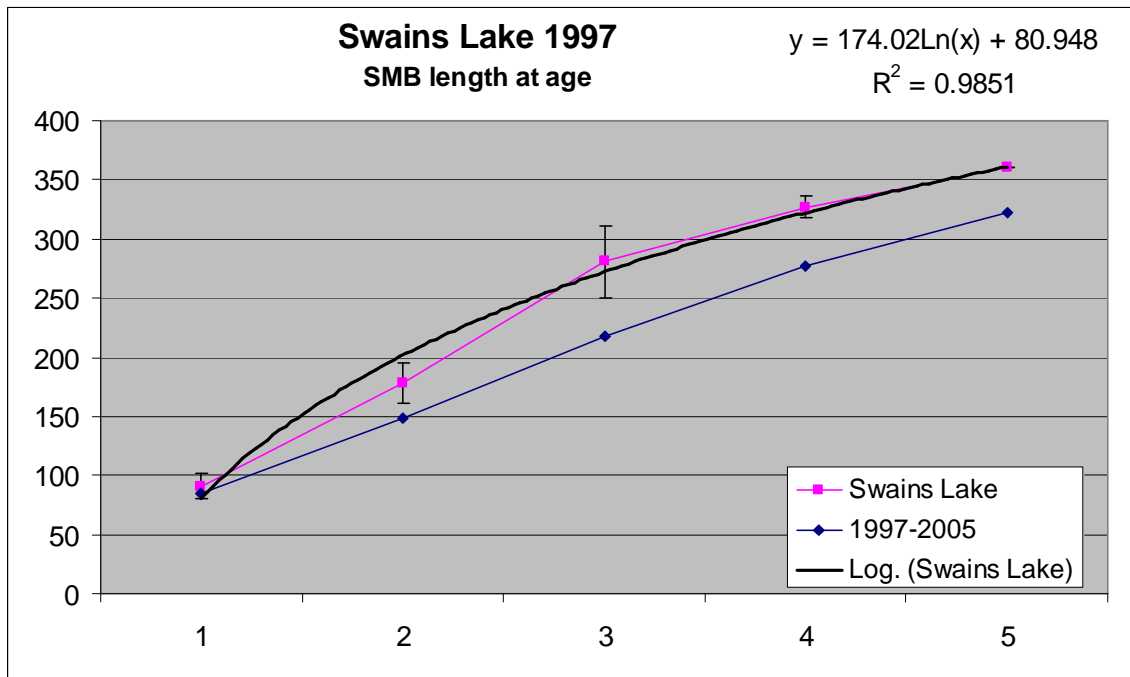


Figure 107. Average back-calculated length at age for smallmouth bass from Swains Lake (Barrington) sampled in 1997 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

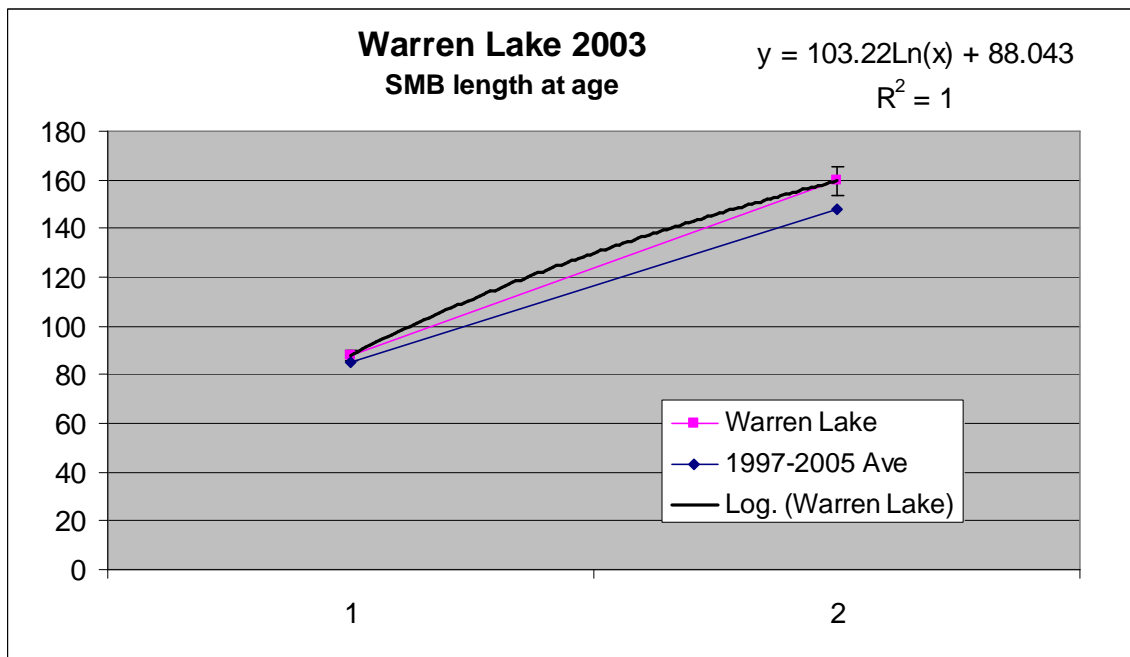


Figure 108. Average back-calculated length at age for smallmouth bass from Warren Lake (Alstead) sampled in 2003 (± 1 SD), corresponding logarithmic trendline and equation, and statewide average back-calculated length at age for smallmouth bass from 1997-2005 (from Figure 112).

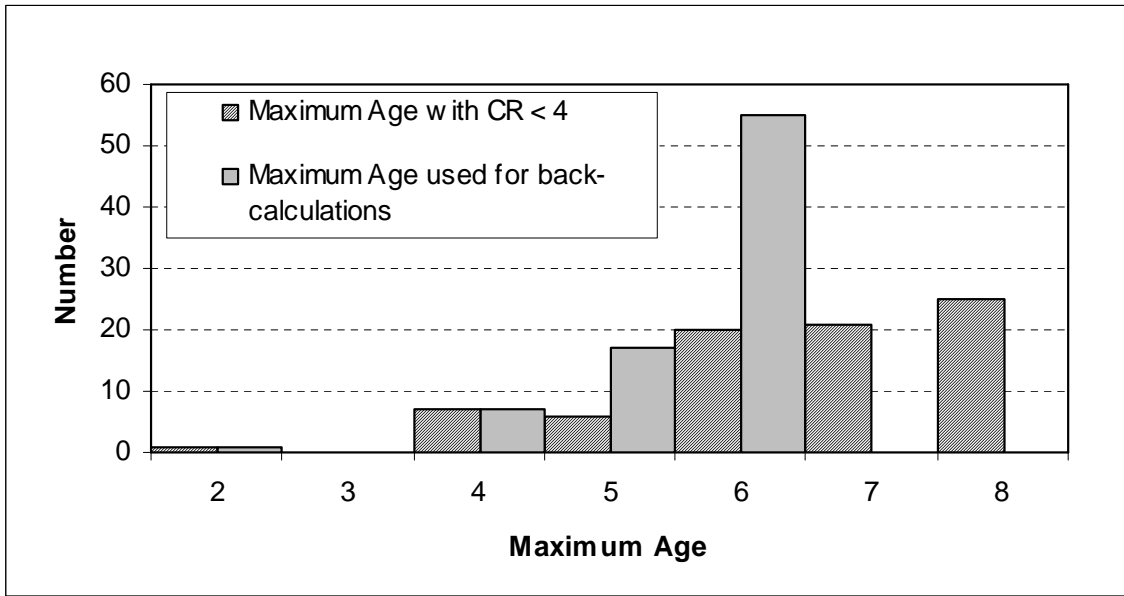


Figure 109. Length frequency histogram of water bodies having maximum aged largemouth bass with a confidence rating less than 4 and maximum age used for back-calculations ($n = 80$).

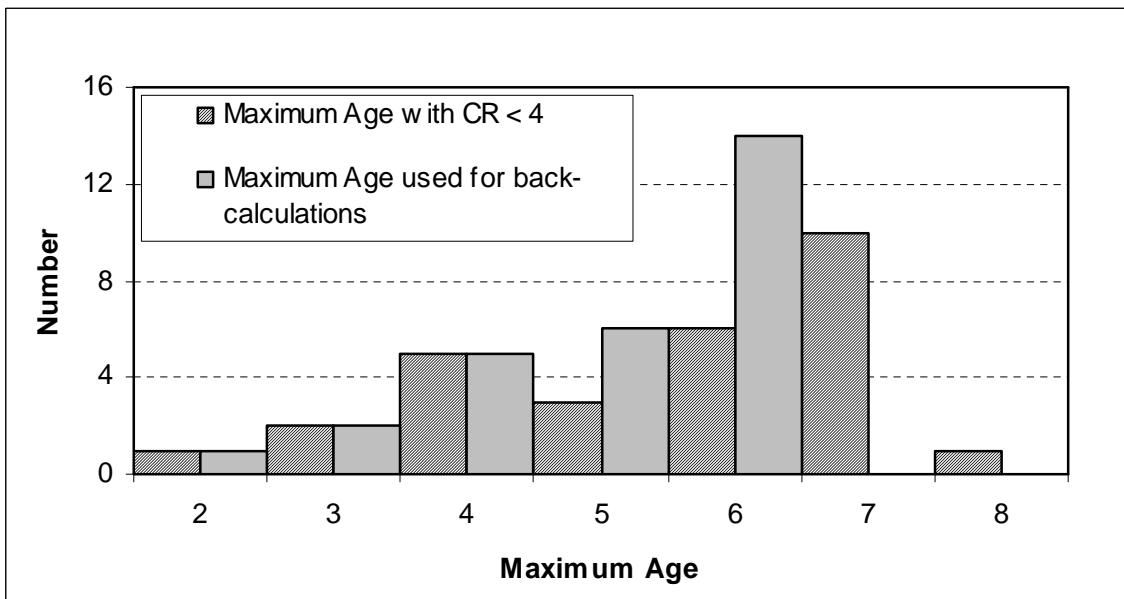


Figure 110. Length frequency histogram of water bodies having maximum aged smallmouth bass with a confidence rating < 4 and maximum age used for back-calculations ($n = 28$).

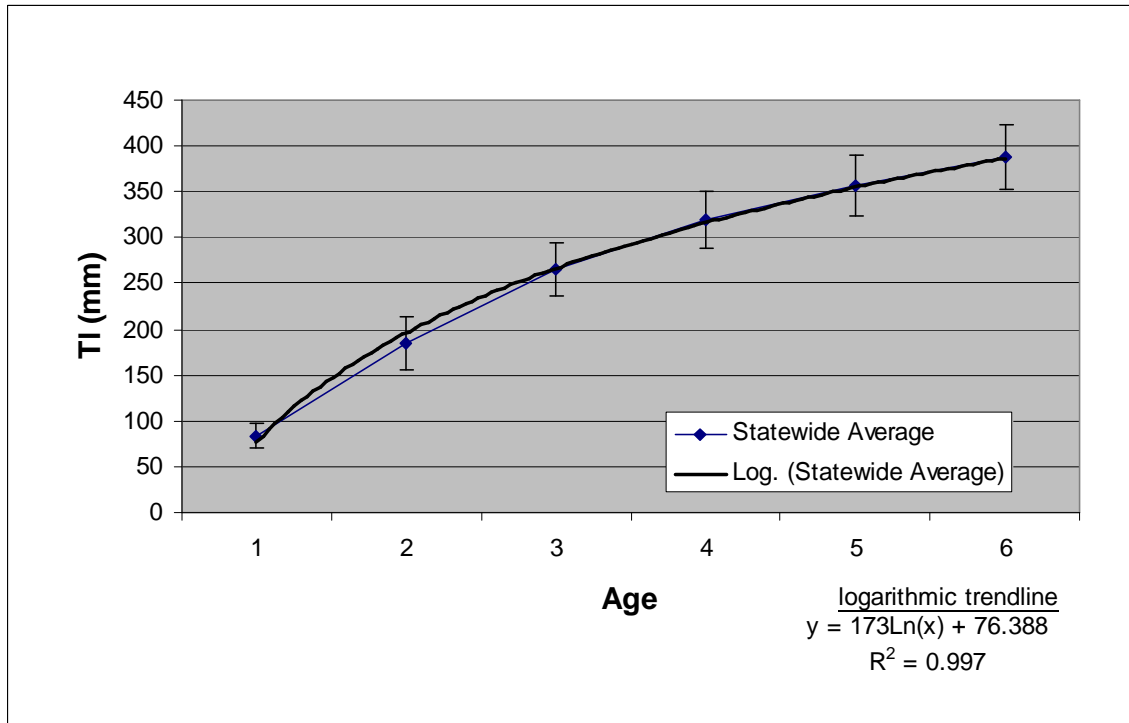


Figure 111. Statewide average back-calculated length at age for largemouth bass for water bodies sampled from 1997 through 2005 (± 1 SD). Number of water bodies used in analysis was 81.

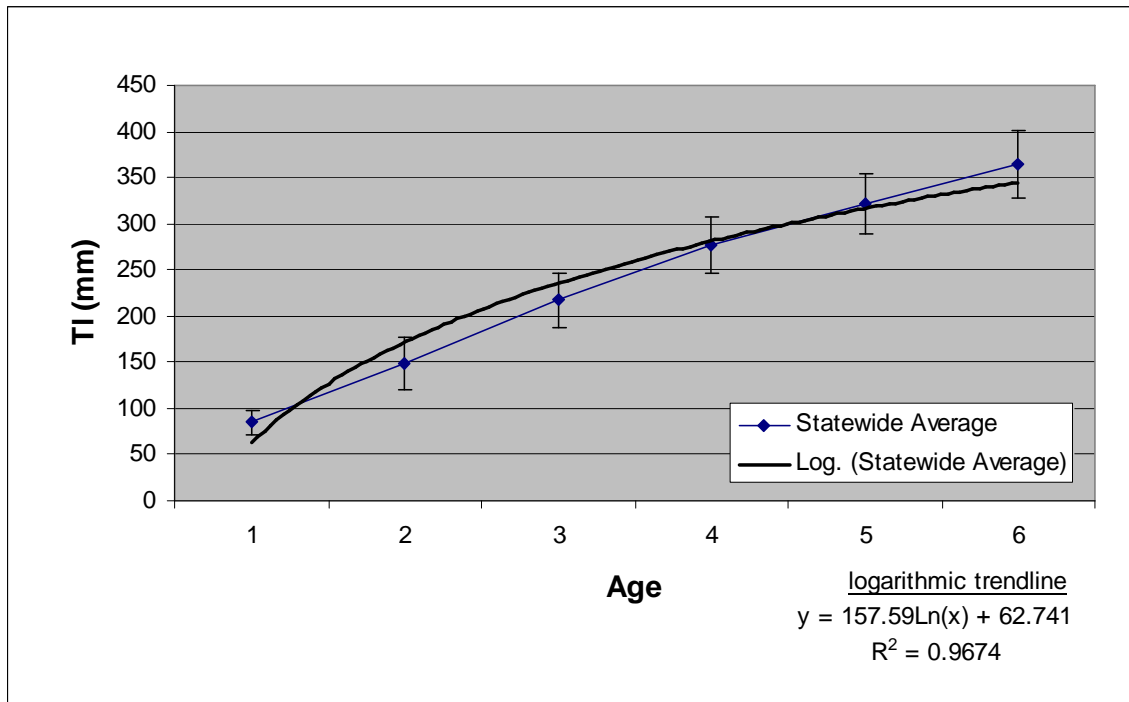


Figure 112. Statewide average back-calculated length at age for smallmouth bass for water bodies sampled from 1997 through 2005 (± 1 SD). Number of water bodies used in analysis was 27.

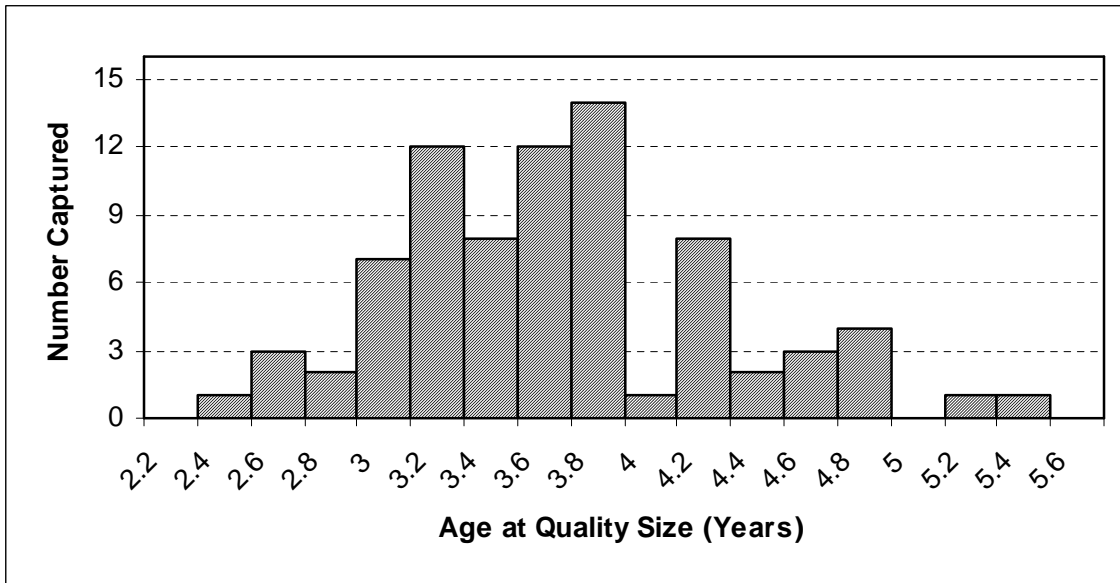


Figure 113. The length-frequency distribution of age at quality size largemouth bass populations sampled during 1997 – 2005. $n = 79$.

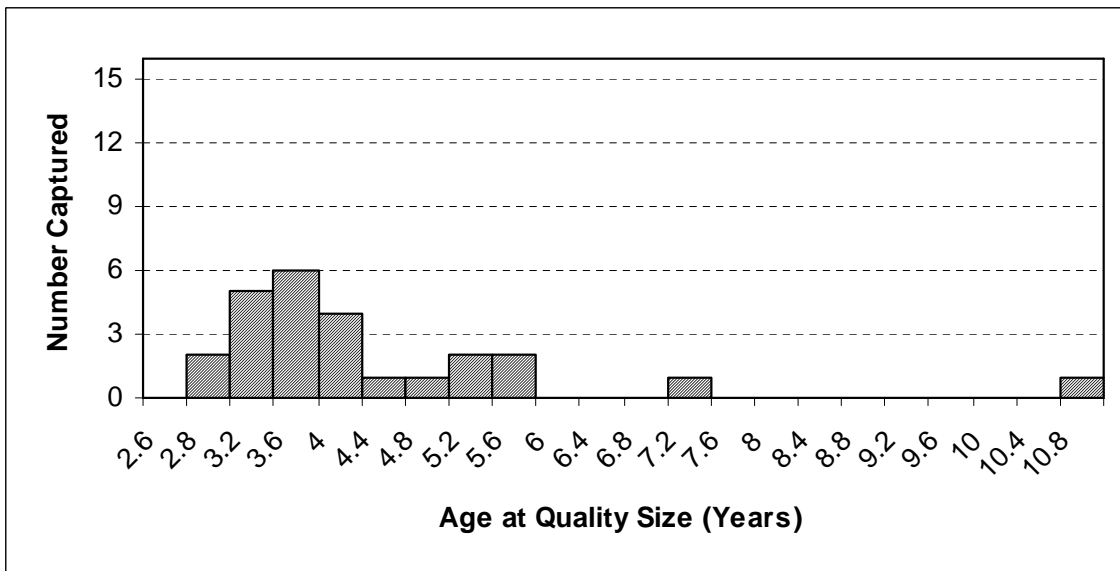


Figure 114. The length-frequency distribution of age at quality size smallmouth bass populations sampled during 1997 – 2005. $n = 25$.

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