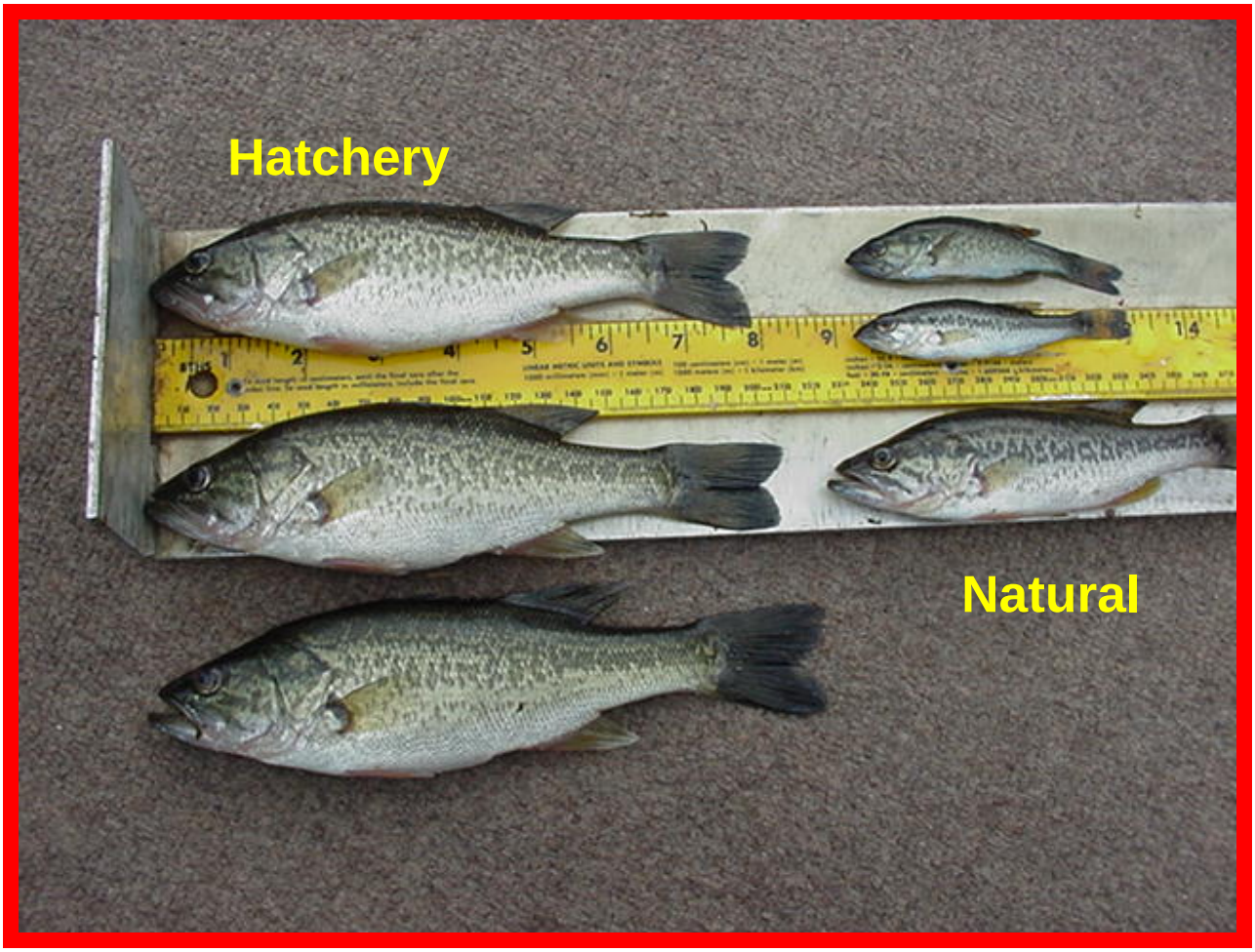
Appendix 7.

Lake Talquin Largemouth Bass

Stocking Evaluation

2002 – 2003



By:

Charles Mesing

Appendix 7.

ANNUAL PERFORMANCE REPORT

STATE: Florida **STATE PROJECT NO.:** 6110

PROJECT TITLE: Apalachicola River Watershed Investigations

PROJECT OBJECTIVE: To evaluate the fisheries and aquatic habitats in the Apalachicola River watershed and to develop enhancement techniques for perpetuating the fisheries.

STUDY TITLE III: Lake Talquin Largemouth Bass Stocking Evaluation

Objective: To determine if supplemental stocking of largemouth bass can increase the number and size of young of year (yoy) bass in natural year-classes during non-drawdown years by measuring the contribution of hatchery raised bass to the natural yoy bass year-class through age-1.

STUDY ABSTRACT

In April-May 2002, approximately 216,000 advanced phase I bass were released into Lake Talquin (3,563 ha). Twenty-six thousand fish (12%) were marked with CWTs. Initial relative survival of stocked fish was greater than 90% for 72 hours. Forty-two (6.3%) of 667 young of year (yoy) bass collected in October 2002 electrofishing samples exhibited CWT, while only nine (3.4%) of 264 age-1 bass in April 2003 revealed CWTs. Age-0 stocked hatchery fish in October 2002 and April 2003 comprised an estimated 40% and 44% respectively, of the 2002 year-class. Hatchery fish in 2002 exhibited smaller modal peaks in October and April samples compared to the 2000 and 2001 year-classes. October (1.1 yoy bass/min) and April (0.44 age-1 bass/min) mean catch per unit effort (CPUE) electrofishing values were higher than 2000 and 2001 year-classes, but significantly ($p < 0.05$) lower than 1984, 1991, and 1998 drawdown year-classes. Age-1 stocked bass made up 37% of all bass collected in April 2003. Three CWT bass (1.7%) were observed during two bass fishing tournaments when 177 bass greater than 12 inches were measured and weighed during May 2003.

A. BACKGROUND

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Lake Talquin is a 3,563 ha (8,800-acre) man-made reservoir with limited littoral zone fisheries habitat in the form of aquatic vegetation. Insufficient aquatic vegetation or nursery areas have resulted in low numbers of young of year (yoy) largemouth bass (bass) surviving to age-1, except after extreme lake drawdowns in 1984, 1991, and 1998 (Cailteux 1999). Years between drawdowns have consistently produced low numbers of age-0 bass even though the lake is productive with an abundance of forage food (shad). Because bass fishing is extremely popular, and Lake Talquin is one of the major aquatic resources in Northwest Florida, there is a need to investigate stocking largemouth bass in order to increase the numbers of harvestable bass between lake drawdowns for recreational bass fishing.

Largemouth bass stockings have been common throughout the country (Smith and Reeves 1986). Unfortunately, many scientific studies have demonstrated that the return of stocked fish to the anglers has been low (Loska, 1982) and Boxrucker (1986). However, Buynak and Mitchell (1999) stocked 24.2 to 68.7 fish/ha (10.7-11.4 cm in length) for five consecutive years, and reported that stocked bass contributed 24.5% of the total electrofishing catch. In their 1235-ha reservoir, stocked bass accounted for 11.6% of the legal harvest from 1990 to 1995.

Fall cove rotenone samples were conducted intermittently in Lake Talquin from 1983 to 1995 to evaluate the success of lake drawdowns and assess sportfish year-class strength for years in between drawdowns. Average densities of yoy bass estimated in two September block-net samples each year ranged from 808 fish/ha after the most successful drawdown in 1984 to a low of 42 fish/ha in 1985 (Cailteux unpublished data). Because density estimates of yoy bass occurred in average water depths less than or equal to three meters, we estimated that approximately 30% (1,012 ha) of the reservoir had water depths similar to block-net samples. In order to stock sufficient numbers of fish to increase the natural population of yoy bass by

October, we estimated the need for stocking a minimum of 250,000 advanced largemouth bass fingerlings (247 fish/ha for 1,012 ha of littoral surface area).

B. ACTIVITY

Hatchery bass (*Micropterus salmoides floridanus*) were stocked into Lake Talquin during the spring of 2000, 2001, 2002 and 2003 (Table 1). A target of at least 10% of the total bass stocked were to be tagged with coded wire tags (CWT) from 2000 to 2002. All 52,000 largemouth bass stocked in 2003 received CWTs to evaluate "distinctive marks" on otoliths of hatchery bass. Largemouth bass were raised in fertilized ponds on zooplankton for 30-40 days. Subsequently, bass were harvested and transferred to newly fertilized ponds at approximately 10,000/acre and harvested in approximately 40-50 days. The target size of bass at stocking was 80 mm in total length (TL) or greater. The target date for stocking was May 15th or earlier. A sub-sample of stocked fish was held for 24 to 72 hours in cages or in aquaria to measure short-term survival.

During October and April, standardized 15-minute daytime electrofishing samples were conducted at 20 previously sampled stations (1984-1999) to determine relative abundance and size of yoy bass (Cailteux 1999). All bass were measured, weighed, and checked for a CWT. Otoliths from a sub-sample of at least five bass per specific 1 cm size-classes were analyzed to determine the overlap between age-0 and age-1 bass. Age data was extrapolated to the entire sample based on length distribution. Year-class contribution, relative abundance, and growth of stocked and natural fish were compared to baseline years before, during and after lake drawdowns. Thirty-one additional supplemental 10-minute daytime electrofishing samples were conducted to collect additional hatchery tagged bass and natural bass in the main lake proper. These areas included off the shoreline in deeper water (1.5 to 2.5 m) or near stocking locations.

Appendix 7.

Stocked bass were identified by presence of a CWT, size, or a large distinct nucleus on their otolith, which appears to differ from natural yoy bass populations since 1984.

A roving creel survey, using non-uniform probability, was conducted on Lake Talquin for 14 weeks from March to June 2003. The lake was sampled from the dam to a line crossing from Coe's Landing, on the southeast shore, to near Double Branch, on the northeast shore, approximately 80% of the surface area. The lake above this line was not surveyed because the area is shallow, with numerous stumps and logs, and the old river channel becomes indiscernible. Surveys were six hours per day, and were conducted five days every two-week period. During each two-week period, surveys were randomly scheduled for three weekdays and two weekend days, either during the morning (0700 – 1300) or afternoon (1300 – 1900). Friday was treated as a weekend day for data analysis. Angling effort (hours) directed towards largemouth bass, angler success (fish per hour) and total catch and harvest were estimated from survey results. Effort, total catch and/or harvest and success estimates for all anglers encountered during the survey are attached as an appendix.

Two largemouth bass tournaments were monitored to determine the contribution of stocked hatchery fish to the angler catch. All fish caught and weighed by tournament anglers were measured, weighed and checked for CWTs. Bass identified as having been marked with CWT tags were also carefully examined for metal fishing hooks in their gut so that fish with metal hooks in their stomachs were not mistaken for tagged fish. All bass were grouped into 1 cm size-classes for comparisons with the April 2003 electrofishing data to determine if the size distribution of angler catch was similar to springtime electrofishing samples. Otoliths were removed from all dead bass collected in the tournaments.

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C. RESULTS & DISCUSSION

In April-May 2002, approximately 216,000 hatchery-raised bass were released into Lake Talquin and 26,000 of these fish (12%) were marked with CWTs (Table 1). In 2002, the average size of hatchery bass at stocking was smaller (61-80 mm TL) than in 2000 and 2001 (70-90 mm TL). Approximately 50% of the hatchery bass stocked in 2002 averaged less than 70 mm in total length at stocking (Unpublished FWC data). The size range of individual hatchery bass varied greatly from 45 mm to 130 mm TL in April 2002. In May 2003, approximately 52,000 bass were tagged with CWT and released at five locations to determine if the unique otolith mark was specific to one or both hatcheries and did not occur in the wild. In May 2003, the average size of various truckloads of hatchery bass ranged from 73 mm to 84 mm in TL with a range from 65 to 120 mm. Overnight CWT retention was greater than 92% for all years. Additional bass were tagged to compensate for the initial tag loss overnight. Relative survival of stocked fish held for 24 hours in aquaria was greater than 90% for all years.

Electrofishing Relative Abundance

The mean electrofishing catch per unit effort (CPUE) for yoy largemouth bass in October 2002 was 1.1 fish/min (SE = 0.05) for all 51 stations. The October (1.1/min) mean yoy bass CPUE value was significantly ($p < 0.05$) less than the 1984 drawdown year-class catch rate (3.8 fish /min), but similar to the October 1998 drawdown year-class catch rate (1.2 fish/min) reported by Cailteux (1999). The October 1998 yoy CPUE value was low due to low dissolved oxygen at the upper lake sites because of decaying vegetation from the drawdown (Cailteux personal comm.). As a result, we compared the April 1999 CPUE value of age-1 bass from the 1998 drawdown (lowest age-1 bass CPUE values for all drawdowns) to the highest bass stocking density (212/littoral ha) conducted in 2002.

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Mean electrofishing CPUE value for age-1 bass (2002 year-class) in April 2003 was 0.40 fish/min (SE = 0.03) and significantly less ($p < 0.05$) than the 1984, 1991 and 1998 drawdown year-classes ranging from 1.0 to 2.3 yoy bass/min. After stocking 216,000 bass in May 2002, yoy bass electrofishing catch rates for the 2002 year-class in October 2002 (1.1 bass/min SE = 0.14) and April 2003 (0.40/min SE = 0.03) were significantly higher ($p < 0.05$) than catch rates for the 2000 year-class in October 2000 (0.57/min SE = 0.05) and April 2001 (0.26 fish/min SE = 0.03) and catch rates for the 2001 year-class in October 2001 (0.46/min SE = 0.05) and April 2002 (0.23/min SE = 0.03) when fewer bass were stocked. The 2000 and 2001 natural year-classes of bass were extremely poor based on electrofishing CPUE values from historic and supplemental sites. It was not surprising that following two relatively strong year-classes in 1998 and 1999, the 2000 and possibly 2001 year-classes were poor due to cannibalism from the drawdown year-classes. This phenomenon was observed after the first significant drawdown in 1984 (Dobbins personal comm.).

CWT Returns

A total of 42 age-0 and 9 age-1 hatchery bass with CWTs were collected in October 2002 and April 2003, respectively (Table 1). As observed in previous years, the number of CWT tagged age-0 bass collected from historic sites increased from 1 to 42 in October 2002 after supplemental electrofishing sites within the main lake were included in data analysis. These results continue to demonstrate that shallow shoreline-oriented historic sites are not adequate to collect the larger sized hatchery bass in October. The 42 CWT age-0 bass made up 6.3% of all yoy bass and 16% of all estimated hatchery bass (12% marked with CWT) collected in October 2002 from all sites. Age-1 CWT bass collected in April 2002 represented 3.4% of all age-1 bass (n = 264) collected and 8% of 116 age-1 hatchery bass in our electrofishing samples. The consistent percentages of age-0 bass with CWTs in our electrofishing samples support our

estimate that at least 40% and 44% of the age-0 and age-1 bass collected in October 2002 and April 2003 were hatchery bass.

Year-class Contribution and Growth

In October, most untagged yoy bass greater than 180 mm in total length were identified as stocked age-0 bass based on size, otolith analysis, and CWTs. Historically, the size distribution of three natural year-classes of age-0 bass in October (1997- 1999) revealed modal peaks at the 9 or 10 cm class compared with an extended size distribution between 10 cm to 31 cm for the 2000, 2001 and 2002 year-classes (Mesing et, al. 2002). Furthermore, 42 age-0 CWT bass collected in October 2002 exhibited total lengths from 170 mm to 270 mm with a majority between the 22 and 26 cm classes (Figure 1). A significant number of untagged hatchery bass were identified between 12-16 cm classes based on otolith analysis. Although there were no CWT bass in these smaller size-classes (the smallest CWT bass was 170 mm TL), many hatchery bass stocked in 2002 averaged less than 70 mm TL. Generally the largest hatchery bass were selected for CWT tagging, while many "culls" too small for tagging, probably lacked size to immediately consume yoy shad resulting in poor growth by October. Culled hatchery bass did not meet our 70 mm TL size criteria, but they were released in order to try to meet our stocking goal of 250,000 fish.

Age analysis of 132 otoliths allowed us to partition age-0 from age-1 bass in October 2002. Otoliths of 25 bass from the 20 to 24 cm classes revealed that yoy bass (hatchery fish) comprised 100% of all bass collected. Larger sized age-0 bass were determined to be hatchery fish because of size, presence of a CWT, or large distinguished nucleus on their otolith. This unique mark has occurred on CWT bass for three consecutive years and it appears to be a characteristic of fast growing bass reared in fertilized hatchery ponds and restocked for advanced

phase grow out. Since 2000, all CWT bass (N > 100) sacrificed have exhibited a unique identifiable nucleus on their otoliths (Figure 2).

During April 2003, 705 largemouth bass were collected by electrofishing and 13 (1.8%) had CWTs. An estimated 264 were age-1 and nine (3.4%) exhibited CWTs. Based on CWTs, historic length frequencies, and unique otolith marks, hatchery bass comprised an estimated 44% (N = 116) of the age-1 bass collected (Figure 3).

Size distribution of age-1 bass in April 2003 revealed hatchery bass (2002 year-class) exhibited higher maximum and lower minimum total lengths compared to 2000 and 2001 year-classes of stocked age-1 bass. Size differences in hatchery bass probably resulted from extreme variation in total lengths at stocking (45-130 mm in TL). Size distribution of age-1 bass in April 2003 exhibited a major peak from 12-14 cm, while hatchery bass ranged from 16 cm to the 32 cm size-class (Figure 3). Age-1 CWT bass in April ranged from the 19 cm to the 29 cm size-classes. Similar to October, size differences between untagged hatchery bass and CWT bass in April probably resulted from selecting larger sized bass for tagging. Most age-1 CWT hatchery bass were represented in the 27-29 cm size-classes, while two smaller CWT bass were in the 19 and 20 cm classes. In April 2003, larger age-1 untagged bass sacrificed exhibited unique otoliths as reported in 2001 and 2002 (Mesing 2002). There was no overlap observed for age-1 and age-2 bass less than 200 mm in total length in our samples, and 72% of all bass collected between the 20 cm and 31 cm classes were designated as age-1 fish based on otolith analysis.

In April 2003, 171 otolith samples were analyzed for age determination. The strong 1998 drawdown and subsequent 1999 year-class (ages 4-5) comprise an estimated 32% of bass collected in April 2003 (Figure 4). Age-1 bass comprised a significant 37% of April 2003 electrofishing samples compared to 23% in April 2001 and 21% in 2002. The percent increase in age-1 bass is probably related to stocking 216,000 bass and/or improved bass natural

reproduction or survival. Age-2 bass made up only 16% of the April 2003 sample compared to an estimated 50% contribution of age-2 hatchery bass for the 2000 year-class in April 2002 (Mesing 2002). Age-2 hatchery bass made up only 20% of the all two-year-old bass based on CWT recaptures (n = 4) and seven larger sized age-2 bass with unique otolith marks. We did not collect any age-3 CWT bass in the April 2003 electrofishing samples, but one age-3 CWT hatchery bass (495 mm TL) was observed in a fishing tournament in May 2003.

Figure 5 illustrates average numbers of bass/acre collected from two September cove rotenone block-net samples (1983-1995) and October electrofishing values for yoy bass. A significant (P = 0.0016) positive relationship (r = 0.8552) was determined for average number of bass collected in rotenone samples and October electrofishing CPUE values from 1983 to 1995.

Numbers of stocked bass in April-May (2000-2003) can be related to densities of bass collected in two September block-nets (Figure 5). The 1984 and 1991 drawdowns resulted in an estimated 327 and 149 yoy bass/acre, while poor year-classes in 1983, 1985, 1992, and 1994 ranged from 17 to 72 bass/littoral acre. From May 2000 to 2003, densities of stocked bass ranged from 20 to 86/littoral acre, well below September estimates from cove rotenone block-nets for drawdown year-classes (327-149 yoy bass/littoral acre). Furthermore, electrofishing samples in June and October (1999-2003) reflect a 35-60 percent decline in CPUE values for age-0 bass during this period (Figure 6). Therefore, our highest stocking density of 86 bass/littoral acre (216,000) in May 2002 may only result in an estimated 34-60 yoy bass/littoral acre by October if CPUE values in Figure 6 reflect natural mortality between May and October. Some differences in CPUE electrofishing for yoy bass may be related to off shore movement of hatchery bass.

When block-net rotenone samples were not taken, electrofishing CPUE values proved to be an excellent estimate of bass year-class strength. Generally, strong drawdown year-classes of

bass exhibited high electrofishing CPUE values and numbers of age-0 bass collected in block-nets (Figure 5). One exception was found from data collected in 1986, when a significant amount of hydrilla was present in the upper lake and yoy bass electrofishing values were high and block-net estimates were low (Figure 5). Because of a significant correlation between cove rotenone samples and electrofishing samples, block-net sampling was discontinued after 1995 and electrofishing samples replaced them as an indicator of bass year-class strength.

Creel Survey and Fishing Tournaments

A total of 3,356 anglers were interviewed during 31 creel surveys conducted on Lake Talquin in spring 2003 (Table 2). These anglers spent an estimated 6,326 (S.E. = 752) hours fishing for largemouth bass. No tournament anglers were encountered during the surveys. An estimated 3,998 (S.E. = 976) largemouth bass were caught during the 14-week period. Approximately 14% of the largemouth bass caught were longer than the 457 mm (18-inch) minimum size limit, including an estimated 106 (S.E. = 76) fish that were harvested and 468 (S.E. = 199) fish that were released. Illegal sized largemouth bass, less than 18 inches, were not observed by the creel clerk during the creel period. Largemouth bass anglers were moderately successful catching bass with an estimated 0.31 (S.E. = 0.08) fish per hour success rate.

A total of 177 bass weighed in during two largemouth bass tournaments in May 2003 were measured and checked for CWT. Only three (1.7%) bass > 304 mm (12 inches) had CWT detected. Bass with CWTs represented all year-classes of stocked fish, age-1 (TL = 305 mm), age-2 (TL = 371 mm) and age-3 (TL = 495 mm). Unfortunately, only 13% of all stocked bass from 2000 to 2002 were marked with CWT during the three-year stocking period (59,000 CWT of 457,000) and only a few age-1 bass (2002 year-class) were eligible (> 12 inches) for 2003 tournaments. Interestingly, the size distribution of angler caught bass (> 304 mm TL) was similar to the length frequency of electrofishing samples in April 2003 (Figure 7). Therefore, the

contribution of age-2 and older hatchery bass available to anglers may be extrapolated or determined from April electrofishing length frequency and age analysis if sufficient numbers of otoliths are collected. The 2002 year-class received the largest number of hatchery fish during the four-year study and these fish will be age-2 in April 2004. Therefore, spring electrofishing and a large otolith sample in spring 2004 should provide sufficient information to measure the contribution of the 216,000 bass stocked in 2002 to the adult population.

It is unclear whether hatchery bass supplement the natural population of age-0 bass or replaced individuals from the natural bass population thus resulting in compensatory mortality. Hatchery stocked bass are collected in the main lake proper, while most natural age-0 bass in October are collected in creeks and shallow coves where small amounts of aquatic vegetation occur. However, average size of age-0 hatchery bass in October 2002 (TL = 227 mm) and April 2003 (TL = 250 mm) were significantly larger ($p < 0.05$) than natural age-0 bass in October (TL = 127 mm) and April (TL = 143 mm) collected during fall and spring electrofishing. These results are consistent with 2000 to 2001 when fewer bass were stocked in Lake Talquin. Also, different food habits of hatchery bass (shad), compared to natural yoy bass (mosquito fish & insects), support our observations that natural yoy bass and stocked yoy bass (CWT) inhabit different areas within Lake Talquin during the first year (Mesing et al. 2002). However, we believe that many of the stocked bass can be sampled along shore at age-2 and older during the April spawning season electrofishing samples and springtime bass fishing tournaments.

Appendix 7.

D. Recommendations

1) Monitor additional largemouth bass tournaments for CWT bass.

2) Monitor the long-term CWT retention for at least 1 year in the hatchery.

3) Continue to monitor and evaluate the distinct marks on CWT hatchery bass otoliths as a potential tag for a long-term evaluation of untagged bass and tag loss.

4) Hatchery bass raised on artificial feed should be stocked into Lake Talquin to determine if survival and growth are comparable to the hatchery bass raised on natural zooplankton and fish from 2000-2003.

E. Geographic Location: Lake Talquin, Florida

F. Personnel: Charles Mesing, Biological Administrator I
Eric Long, Biological Scientist II
Robert Rousseau, Senior Fish and Wildlife Technician
Darcy Schroeder, Staff Assistant

G. Literature Reviewed:

Boxrucker, J. 1986. Evaluation of supplemental stocking of largemouth bass as a management tool in small impoundments. North American Journal of Fisheries Management 6:391-396.

Buynak, G. L., and B. Mitchell. 1999. Contribution of stocked advanced-fingerling largemouth bass to the population and fishery at Taylorsville Lake, Kentucky. North American Journal of Fisheries Management 19:494-503.

Cailteux, R. L, D. A. Dobbins and J. J. Nordhaus.1999 Apalachicola/Ochlockonee Completion Report. Study XV: Evaluation of sportfish harvest restriction on Lakes Jackson and Talquin. Wallop-Breaux Project F-37. Florida Game and Freshwater Fish Commission. Tallahassee, Florida.

Loska, P. M. 1982. Stocking bass to improve your fishing – is it the key to better fishing? Bass Research Foundation, Special Report, Starkville, Mississippi.

Mesing, C. 2002. Lake Talquin Largemouth bass Stocking Evaluation. Annual Report. Florida Fish and Wildlife Conservation Commission, Tallahassee Florida.

Smith, B. W., and W. C. Reeves. 1986. Stocking warm water species to restore or enhance fisheries. Pages 17-29 *in* R. H. Stroud, editor. Fish culture in fisheries management. American Fisheries Society, Fish Culture Section and Fisheries Management Section, Bethesda, Maryland.

Appendix 7.

Table 1. Numbers and percent of CWT bass and hatchery largemouth bass stocked and collected in Lake Talquin, 2000 – 2003.

				October			April		
Year	Total No. Stocked	No. CWT Bass	Percent Tagged	No. Age-0 Bass	CWT Recaptures	CWT Percent of Age-0	No. Age-1 Bass	CWT Recapture	CWT Percent of Age-1
2000	100,000	8,000	8%	405	24	5.9%	146	13	9.0%
2001	141,000	25,000	18%	390	33	9.0%	79	4	5.0%
2002	216,000	26,000	12%	667	42	6.3%	264	9	3.4%
2003	52,000	52,000	100%	429	63	15.0%	---	---	---
Total	509,000	111,000	22%	1891	162	8.5%	489	26	5.3%

Appendix 7.

Table 2. Lake Talquin creel survey estimates, spring 2003.

Category	Effort (hrs) Est.	Effort (hrs) S.E.	Catch Est.	Catch S.E.	Success Est.	Success S.E.
Striped bass caught	243	96	3,301	2,337	0.06	0.35
Striped bass harvest	---	---	25	25	0.33	0.33
Striped bass >30 inches	---	---	25	25	0.33	0.33
Largemouth bass caught	6,326	752	2,998	976	0.31	0.08
Largemouth bass harvest	---	---	106	76	0.02	0.02
Largemouth released >18 in.	---	---	468	199	0.07	0.03
White bass harvest	0	---	0	0	---	---
Black crappie caught	46,411	0	101,665	13,601	2.32	0.15
Black crappie harvest	---	---	52,093	6,915	1.19	0.08
Sunfish spp. harvest	47,978	2,916	135,326	14,687	2.72	0.12
Catfish spp. harvest	10,286	1,287	121,782	66,115	7.08	3.22
Flathead catfish harvest	0	0	0	0	---	---
Other spp. harvest	31	25	20	20	0.50	---
	---	---	---	---	---	---
Total (caught)	111,819	10,083	366,092	97,736	---	---
Total angler count =	3,356					
Striped bass anglers =	34					
Largemouth bass anglers =	168					
Black crappie anglers =	1,110					
Sunfish anglers =	1,615					
Other anglers =	319					
Local residents =	1,946					
Non-local residents =	369					
Non-residents =	1,040					
Sunfish by species:						
Bluegill =	96,081					
Redear sunfish =	36,538					
Redbreast sunfish =	2,707					

Appendix 7.

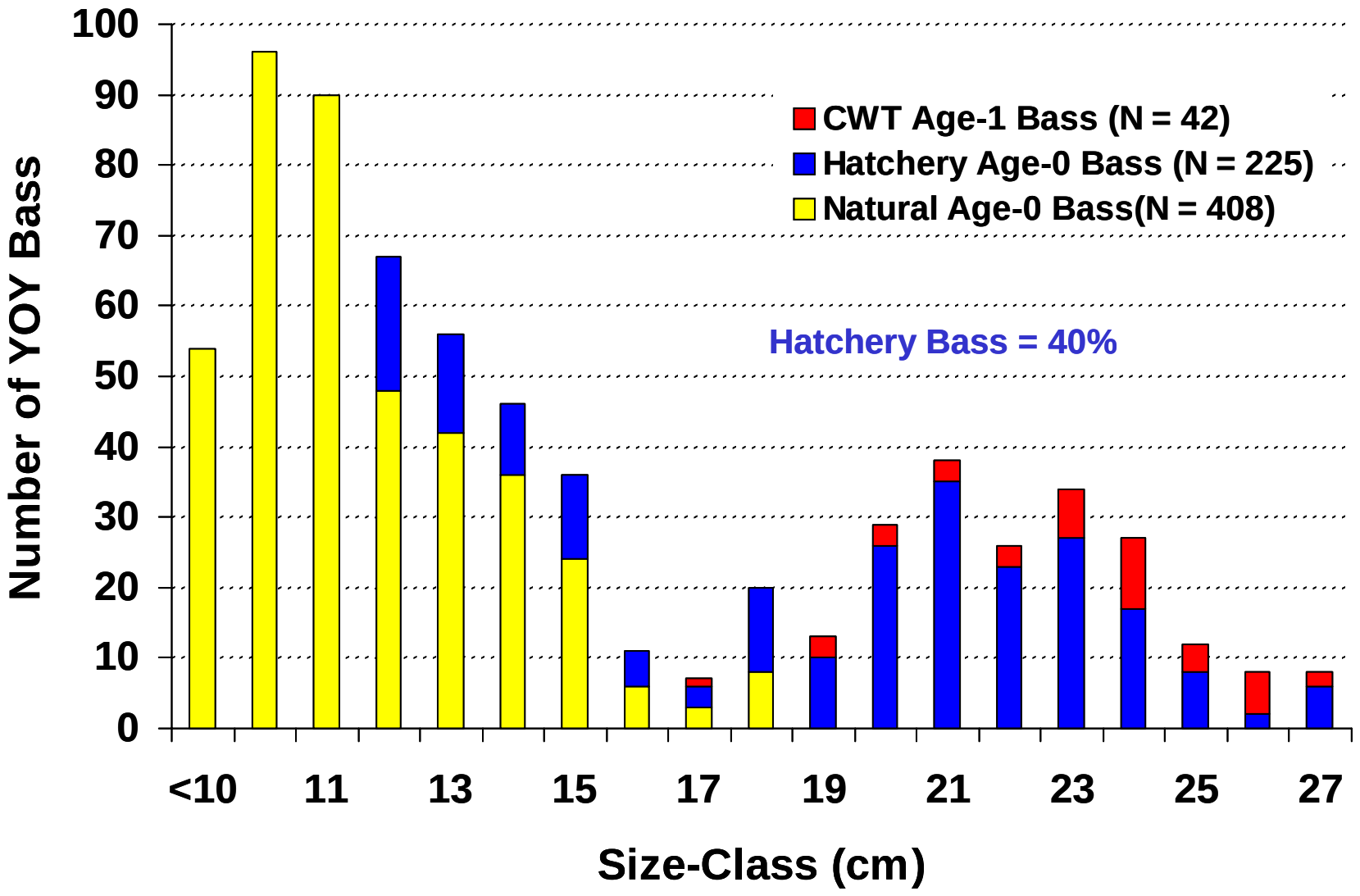

Figure 1. Size distribution of age-0 hatchery and natural largemouth bass collected by electrofishing on Lake Talquin, October 2002.

Appendix 7.

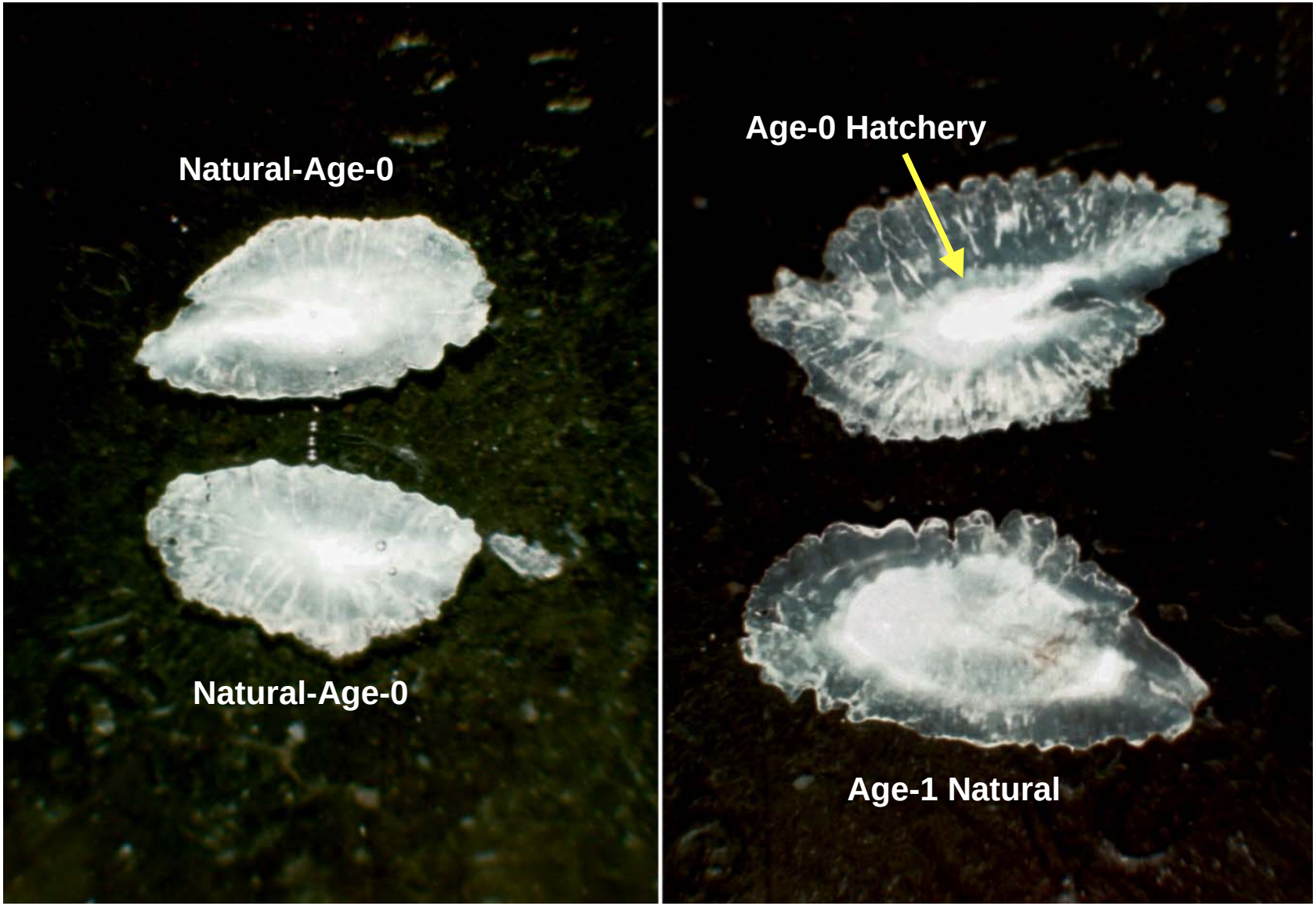

Figure 2. Otoliths from hatchery and natural age-0 and age-1 largemouth bass from Lake Talquin.

Appendix 7.

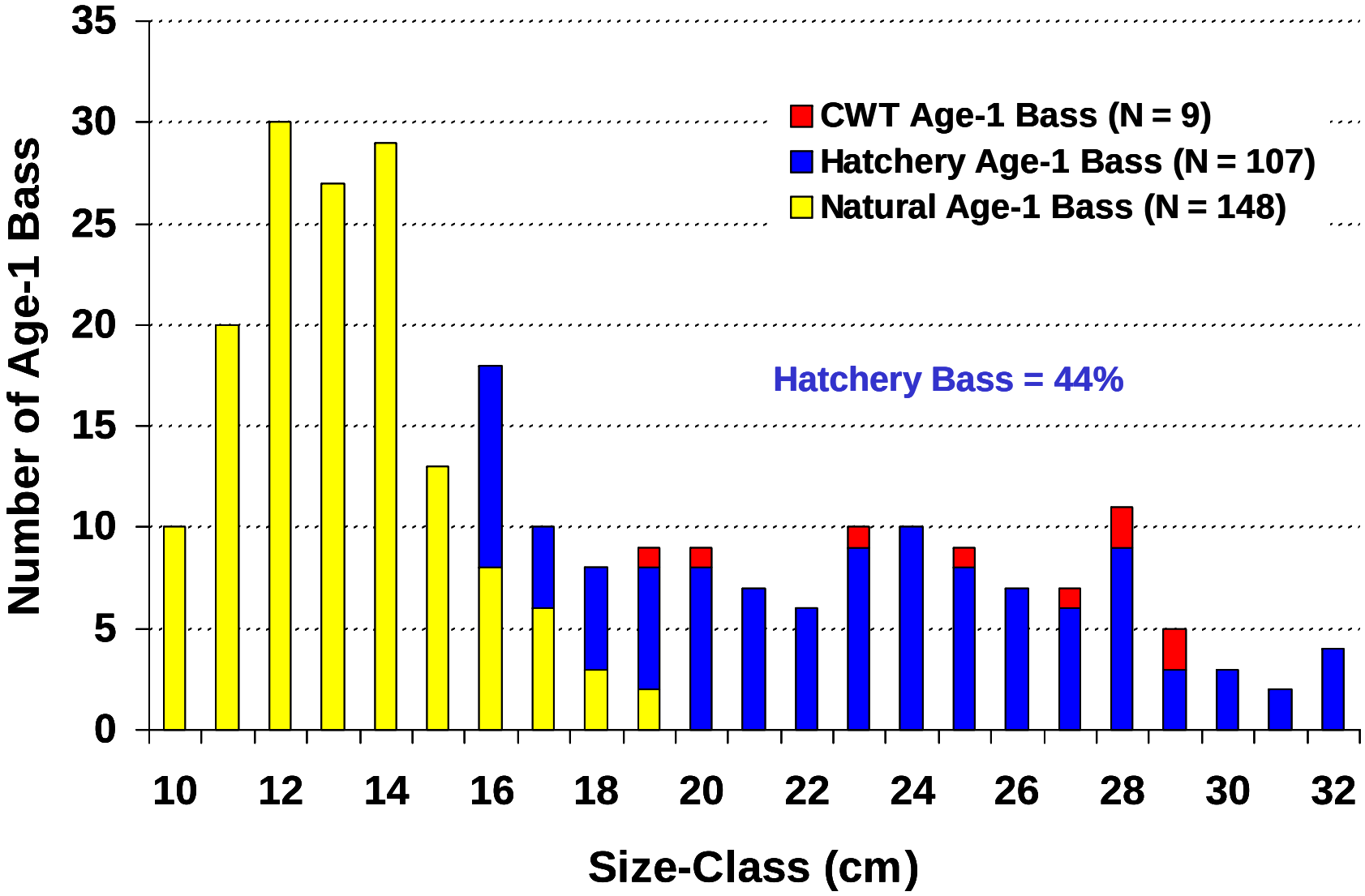

Figure 3. Natural and hatchery stocked age-1 largemouth bass collected by electrofishing on Lake Talquin, April 2003

Appendix 7.

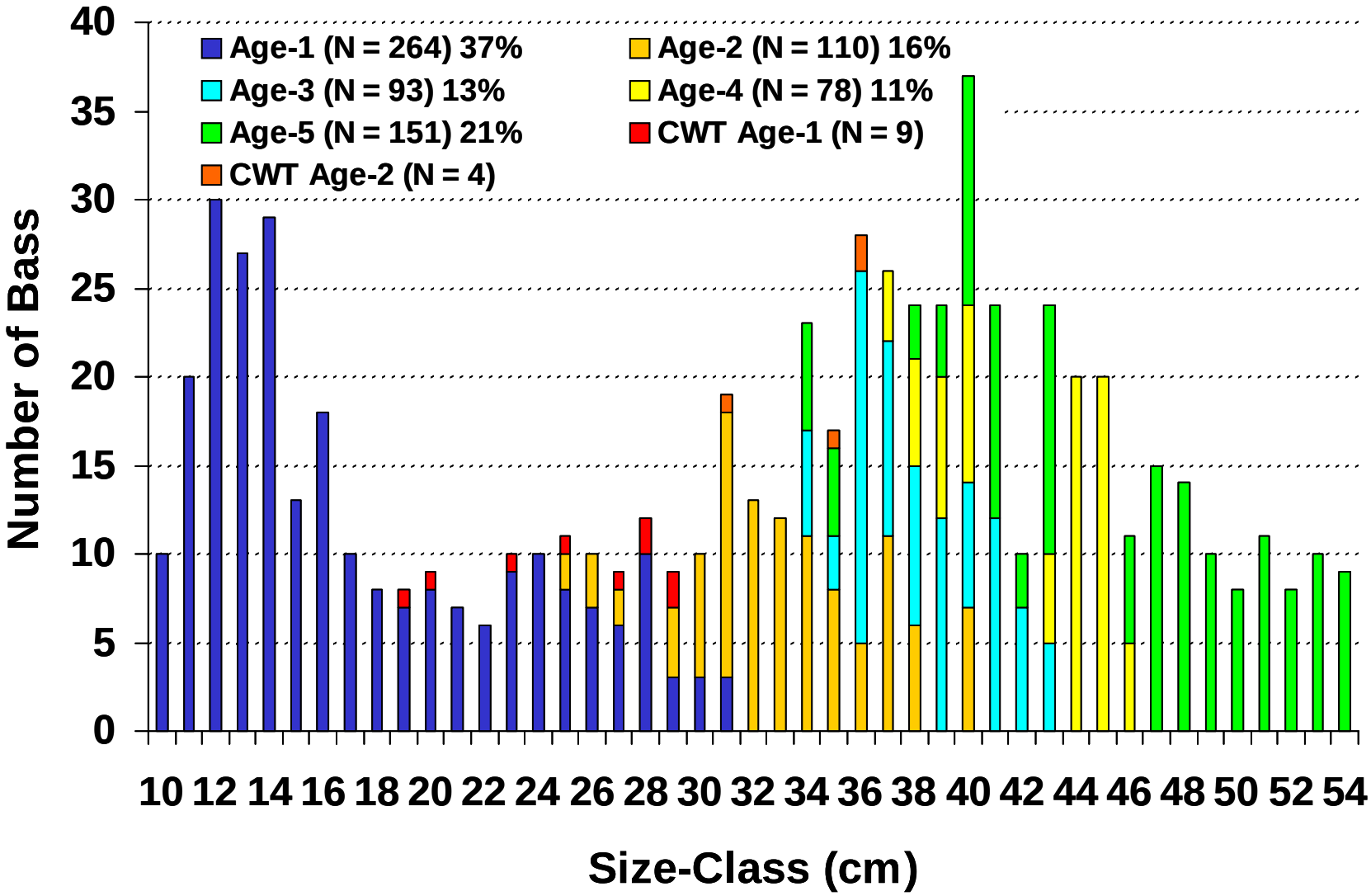

Figure 4. Size distribution, age distribution and percent composition of largemouth bass (N = 705) estimated from otoliths (N = 171) collected by electrofishing in Lake Talquin, April 2003.

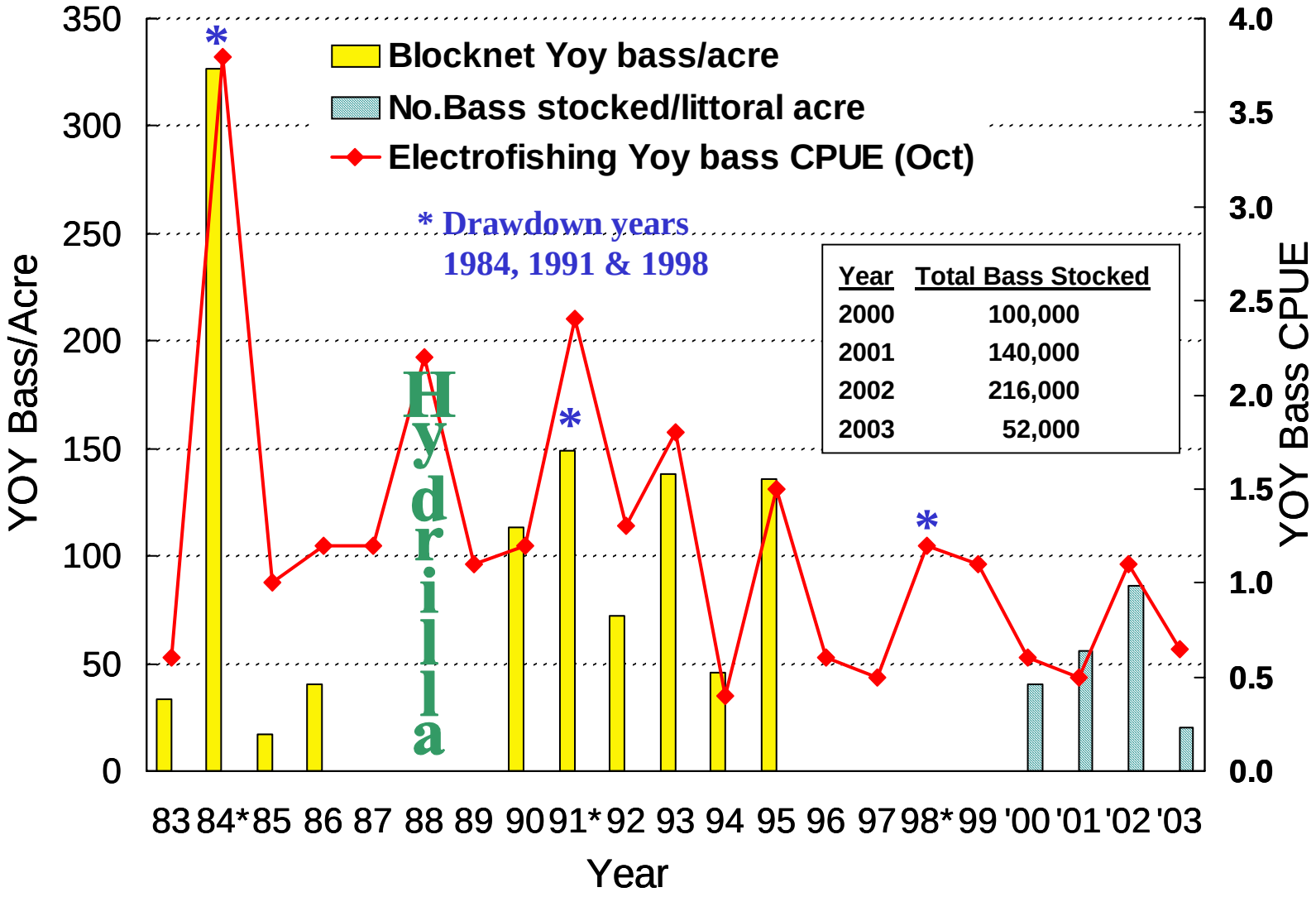

Figure 5. Average YOY largemouth bass per acre from September bolcknets (1983 – 1995) and number of hatchery bass stocked from 2000-2003 for Lake Talquin; based on approximately 2,500 littoral acres (<3 meters).

Appendix 7.

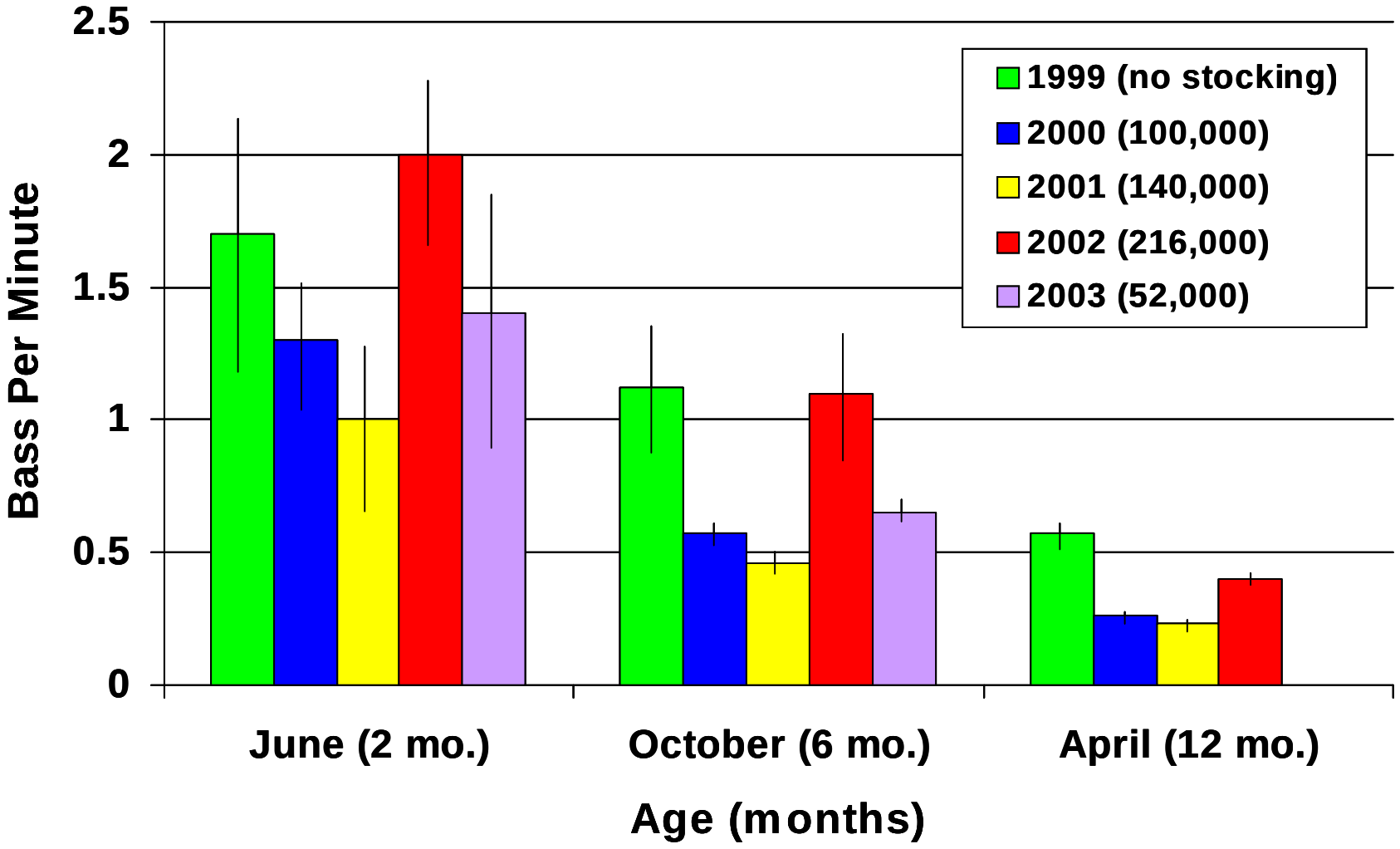

Figure 6. Relative abundance of YOY bass collected in June and October (1999 – 2003) and April (2000 – 2003).

Appendix 7.

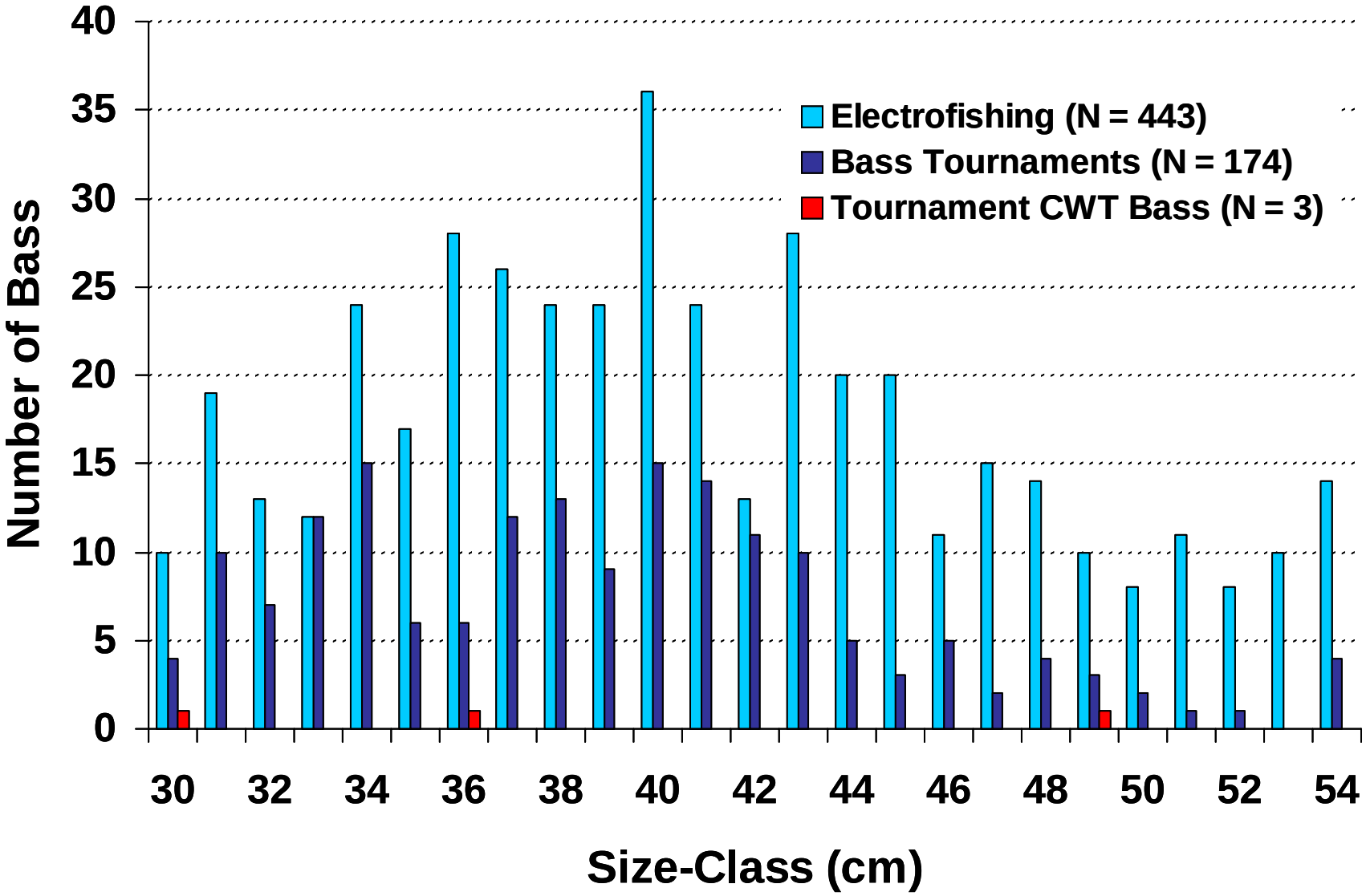

Figure 7. Size distribution of largemouth bass collected by electrofishing and bass tournaments (April and May 2003).