PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Austin Reservoir

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July 31, 2009

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Austin Reservoir were surveyed using electrofishing in 2008 and gill nets in 2009. This report summarizes the results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

- **Reservoir Description:** Austin Reservoir is a stable level 1,599 acre riverine type impoundment of the Colorado River located in the heart of the City of Austin (COA). It was constructed in 1893 for purposes of hydro-electric power, municipal water supply, water conservation and recreation. The reservoir is used to pass water from Travis Reservoir downstream. The reservoir is operated by the Lower Colorado River Authority (LCRA) and COA. The reservoir lies within the Edwards Plateau vegetational area and has a drainage area of approximately 38,240 square miles. Land surrounding the reservoir is highly developed with commercial and residential property bordering most of the shoreline.

- **Management History:** Important sport fishes include largemouth bass and catfishes. Fingerling Florida sub-species of largemouth bass were last stocked in Austin Reservoir in 2007. ShareLunker offspring (advanced size fingerlings) were stocked in 2008. These are offspring of largemouth bass donated to the TPWD ShareLunker program. In order to qualify for the ShareLunker Program largemouth bass must weigh at least 13 pounds. Triploid grass carp (12,800) were stocked by the City of Austin from 2003 to 2007 in an attempt to control the aquatic plant hydrilla.

- **Fish Community**
  - **Prey species:** Bluegill, redbreast sunfish, gizzard shad and threadfin shad were the dominant prey species available.

  - **Catfishes:** Channel, blue and flathead catfish were present in low density.

  - **Largemouth Bass:** Largemouth bass were abundant. Almost all angling effort (91%) on the reservoir was directed towards largemouth bass (Smith et al. 2002). Lake Austin is considered one of Texas' best trophy largemouth bass fisheries. Since 1994 seven largemouth bass weighing 13 pounds or greater caught by anglers were documented by TPWD. The most recent documented catch of a largemouth bass exceeding 13 pounds was in 2007.

- **Management Strategies**
  Based on current information, the reservoir should continue to be managed with existing harvest regulations. Aquatic vegetation coverage, including hydrilla, typically varies each year and should be monitored annually. Aquatic plant coverage may help explain trends in largemouth bass abundance. Electrofishing surveys should be conducted annually to measure largemouth bass abundance.

INTRODUCTION

This document is a summary of fisheries data collected from Austin Reservoir in 2008 and 2009. The purpose of the document is to provide fisheries information and make fisheries management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport species and important prey species. Fisheries management strategies are included to address existing problems or opportunities. Historical data is presented with the 2008 and 2009 data for comparison.

Reservoir Description

Austin Reservoir is a stable level 1,599 acre riverine type impoundment of the Colorado River located in the City of Austin (COA). It was constructed in 1893 for purposes of hydro-electric power, municipal water supply, water conservation and recreation. The reservoir is used to pass water from Travis Reservoir downstream. The reservoir is operated by the Lower Colorado River Authority (LCRA) and COA. The reservoir lies within the Edwards Plateau vegetational area and has a drainage area of approximately 38,240 square miles. Land surrounding the reservoir is highly developed with commercial and residential property bordering most of the shoreline. Based on the most recent habitat survey much (41.3%) of the reservoirs shoreline has been bulkheaded (Bonds and Magnelia 2005). Boat access consisted of four public boat ramps. Public bank access was available in seven public parks. Other descriptive characteristics for Austin Reservoir are listed in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Magnelia and Bonds 2005) included:

1. Evaluate the effects of aquatic vegetation control measures (i.e. triploid grass carp, winter drawdowns and bottom barriers) on largemouth abundance through annual aquatic vegetation and fall electrofishing surveys.

   Actions: Since 2004 annual fall electrofishing surveys have been conducted. These surveys included increased sampling effort (0.5 hours). Fourteen aquatic vegetation surveys were conducted from 2005 through 2008.

2. Stock the Florida sub-species of largemouth bass if the Florida genotype drops below 20%.

   Action: The Florida sub-species of largemouth bass were stocked in 2005, 2007 and 2009.

Harvest Regulation History: Sport fish in Austin Reservoir have been managed with statewide regulations (Table 2).

Stocking History: Since 1997 Austin Reservoir has been stocked with the Florida sub-species of largemouth bass to increase the potential for trophy size catches. The last fingerling stocking was in 2007. Triploid grass carp were first stocked by the City of Austin in February 2003 in an attempt to control the aquatic plant hydrilla. A complete stocking history is in Table 3.

Aquatic Vegetation Management: Aquatic vegetation management has been a part of the Austin Reservoir ecosystem for over fifty years. A history of aquatic vegetation management efforts through 2000 are found in Tennant and Magnelia (2001). Since 2003 12,800 triploid grass carp have been stocked by the City of Austin to control the aquatic plant hydrilla. A history of those efforts and effects on the largemouth bass population through 2006 is found in Chilton and Magnelia (2009). In addition to

triploid grass carp stockings the reservoir has been periodically drawn down 12 feet during the winter months in an attempt to manage aquatic vegetation. Waterfront homeowners have also used bottom barriers to control aquatic vegetation along their shoreline. Angler attitudes and opinions concerning aquatic vegetation management practices on the reservoir are found in Smith et. al. (2002). Vegetation survey results from September 2008 are found in Table 4.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations) and gill netting (5 net nights at 5 stations). Catch-per-unit-effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing, and for gill netting as the number of fish caught in one net set overnight (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual, revised 2008). Trap netting for white crappie was not performed due to historically low catch rates and high costs associated with collecting these data.

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)] and condition indices [relative weights (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). The Index of Vulnerability (IOV) was used to determine the percentage of gizzard shad vulnerable to predation (DiCenzo et al. 1996). Relative standard error (RSE = 100 x SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined for largemouth bass in fall 2008 using otoliths from 13 individuals between 330 and 381mm (category 2 age analysis; TPWD Procedures Manual, revised 2005). Largemouth bass electrophoresis samples were collected according to the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division manual, revised 2008). Genotype identification of F1 hybrid largemouth bass was omitted due to high probability of misidentification resulting from low numbers of loci available for analysis. The last habitat survey of the reservoir was conducted in 1995. No major changes in structural shoreline habitat have occurred in the interim.

RESULTS AND DISCUSSION

Shoreline Habitat: Shoreline habitat consisted primarily of bulkheaded bank and overhanging brush (Table 5).

Aquatic Vegetation Management: Hydrilla (*Hydrilla verticillata*) was first documented in the reservoir in July 1999. In 2000, 2001 and 2002 winter (January and February) reservoir drawdowns were used by the controlling authorities in an attempt to control this potentially invasive aquatic plant. In February 2003 the first of eight triploid grass carp (*Ctenopharyngodon idella*) stockings was initiated by the City of Austin. Stocking rates were based on the results of TPWD aquatic vegetation surveys and grass carp were incrementally stocked over a four year period. The premise of incrementally stocking was to rely upon the fact that hydrilla would be a preferred food item (Fowler and Robson 1978). The strategy was to increase the number of grass carp slowly until there were just enough in the reservoir to control hydrilla, but not so many as to eliminate less preferred aquatic plant species (Chilton and Magnelia 2009). The decision to incrementally stock, rather than using high initial stocking rates, was made with the understanding that aquatic vegetation was good for erosion control, fish habitat and water clarity (Carpenter and Lodge 1986). The number of triploid grass carp in the reservoir per acre of hydrilla, taking into account monthly mortality, ranged from 11.8 to 3,482.4 (Chilton and Magnelia 2009). Since the introduction of triploid grass carp in 2003 hydrilla coverage has decreased (Appendix A), but Eurasian watermilfoil (*Myriophyllum spicatum*) coverage has generally increased. In 2008 hydrilla mixed with other aquatic plants was present only in the very upper end of the reservoir (Appendix B). Conversely, hydrilla was distributed throughout much of the reservoir in November 2003, nine months after the first triploid grass carp stockings (Appendix C). Total vegetation coverage remained similar from 2003 through 2007, but decreased in

2008 (Appendix A). A 12 foot winter drawdown in 2007 appeared to be effective at decreasing Eurasian water milfoil coverage as this species decreased by 70% in 2008 when compared to August, 2007. This species typically grows in a depth of 15 feet or less. In 2008 aquatic plant coverage in the upper third of the reservoir still provided good cover for largemouth bass (Appendix B), but the remainder of the reservoir lacked significant stands of aquatic vegetation. Cooler water temperatures, due to the hypolimnetic discharge from Lake Travis, may have decreased grass carp feeding rates in the upper part of the reservoir (Chilton and Magnelia 2009). This may explain why aquatic vegetation still remains in this area, while aquatic vegetation in the middle and lower reaches of the reservoir has disappeared. Eurasian watermilfoil is also one of the least preferred submerged plant species for grass carp (Fowler and Robson 1978).

Prey species: Gizzard shad, threadfin shad, redbreast sunfish and bluegill electrofishing catch rates were 77.3/h, 38.7/h, 126.0/h, and 44.7/h, respectively. These catch rates were generally lower than catch rates from 2004. Index of Vulnerability (IOV) for gizzard shad was 33; indicating 33% of the gizzard shad were vulnerable to existing predators. This was similar to the IOV estimate in 2004 (IOV = 27).

Catfishes: Channel, flathead and blue catfish were present in the reservoir, but total catch rates were generally low. The 2009 gill net catch rate for channel catfish was 1.0/nn, which was similar to the 1.3/nn average for the previous three surveys. Blue and flathead catfish gill net catch rates were 0.6 and 0.4/nn, respectively. These low catch rates are similar to previous years. Because of the low catch rates length frequency histograms were not warranted.

Largemouth bass: Austin Reservoir contained a high quality, moderate density largemouth bass population. Many large bass have been caught in this reservoir since the early 1990's, including seven bass over 13 pounds, which were entered into the Texas Parks and Wildlife ShareLunker program. Based on these catches, it is regarded as one of the states best trophy largemouth bass fisheries. In 2008 electrofishing catch rate and structural indices for most length categories were much lower than previous samples (Figure 5). The decrease in total vegetation coverage in 2008 or sampling variability may have decreased catch (Appendix D). The paucity of aquatic vegetation to concentrate largemouth bass in much of the reservoir in 2008 (Appendix B) may have resulted in lower electrofishing catch. Many of the electrofishing stations sampled in 2008 were along shorelines where no aquatic vegetation was present (Appendix F). Continued annual fall electrofishing surveys will determine if the downward trend in the population continues. Through 2006 mean fall electrofishing CPUE(TOT) and CPUE(14) were not significantly different ($P>0.05$) after triploid grass carp introduction (Appendix D). Mean electrofishing CPUE(21) increased ($P<0.05$) in post-introduction surveys. Mean CPUE(<8) declined ($P<0.05$), although remaining aquatic vegetation (predominately Eurasian watermilfoil) appeared to provide adequate cover for juvenile largemouth bass survival (Chilton and Magnelia 2009, Appendix D). Largemouth bass generally reach harvestable length by age-2 (Figure 6). Despite multiple stocking of the Florida sub-species of largemouth bass (Table 3) genetic influence (percent Florida alleles) has remained similar since 2002 (Table 6).

Fisheries management plan for Austin Reservoir, Texas

Prepared - June 2009

ISSUE 1 Aquatic vegetation management continues to be an issue of concern in Austin Reservoir. If hydrilla coverage increases further stocking of triploid grass carp may be requested by the City of Austin. Aquatic vegetation provides the only significant habitat for largemouth bass in this reservoir. Reductions in aquatic vegetation over the long-term (years) could decrease abundance of this species and the quality of the fishery.

MANAGEMENT STRATEGIES

1. Continue annual aquatic vegetation and fall electrofishing surveys to document vegetation coverage and largemouth bass abundance.
2. Continue to use hydrilla coverage, as documented by TPWD aquatic vegetation surveys, to determine the need for additional triploid grass carp stockings.

ISSUE 2 Seven largemouth bass over 13 pounds (i.e. trophy bass) have been documented caught from this reservoir since the early 1990's. Based on these catches the reservoir has the potential for producing trophy largemouth bass. Maintaining genetic influence from the Florida sub-species of largemouth bass will increase the potential for future trophy bass catches.

MANAGEMENT STRATEGY

1. Continue Florida largemouth bass sub-species stockings.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule will consist of mandatory sampling in 2012-2013, with additional bass-only electrofishing surveys each fall (Table 7). Due to poor historic sampling returns for crappie, and cost efficiency, trap netting will be removed from the sampling schedule at Austin Reservoir.

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Table 1. Characteristics of Austin Reservoir, Texas

Characteristic	Description
Year constructed	1893
Controlling authority	LCRA and COA
County	Travis
Reservoir type	Mainstem water supply
Shoreline development index (SDI)	8.5
Conductivity	400-700 umhos/cm

Table 2. Harvest regulations for Austin Reservoir.

Species	Bag limit	Length limit (inches)
Bass: largemouth	5	14 minimum
Catfish: channel and blue catfish	25	12 minimum
Flathead catfish	5	18 minimum

Table 3. Stocking history of Lake Austin, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Channel catfish	2007	204	ADL	14.6
	Total	204		
Florida largemouth bass	1996	1,103,215	FRY	0.6
	1997	196,074	FRY	0.7
	1998	184,554	FGL	1.4
	1998	685,311	FRY	0.7
	1999	4,980	AFGL	5.4
	1999	184,016	FGL	1.7
	2003	262,750	FGL	1.7
	2003	881,925	FRY	0.6
	2004	318	ADL	10.2
	2004	162,149	FGL	1.6
	2004	431,007	FRY	0.4
	2005	12,000	FGL	1.9
	2007	171,291	FGL	2.1
	2007	89,897	FRY	0.3
	2009	174,246	FRY	0.3
	Total	4,543,733		
Triploid grass carp	2003	3,825		UNK
	2004	4,300		UNK
	2006	1,600		UNK
	2007	3,075		UNK
	Total	12,800		
Northern pike	1980	88,500		UNK
	1981	34,514		UNK
	Total	123,014		
Palmetto bass (striped X white bass hybrid)	1975	20,000	UNK	UNK
	1977	20,035	UNK	UNK
	1981	5,000	UNK	UNK
	1983	10,089	UNK	UNK
	Total	55,124		
Rainbow trout	2001	3,008	ADL	9.3
	Total	3,008		
ShareLunker largemouth bass	2008	12,612	AFGL	6.2

Species	Year	Number	Life Stage	Mean TL (in)
	Total	12,612		
Walleye	1976	20,200	FRY	0.2
	Total	20,200		

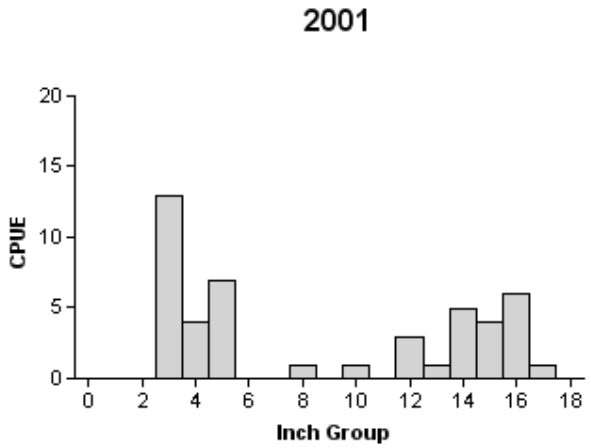
Table 4. Aquatic plants observed during aquatic vegetation surveys, Austin Reservoir, Texas, September 2008. Surface area (acres) and percent reservoir coverage were determined for each plant species.

Common Name	Scientific name	Acres	% coverage
Bulrush	*Scirpus sp.*	3	<1
Milfoil	*Myriophyllum spicatum.*	66	4
Mix 1	*Chara sp., Myriophyllum spicatum, Hydrilla veticillata*	90	6
Pondweed	*Potamogeton sp.*	<1	<1
	Total	159	10

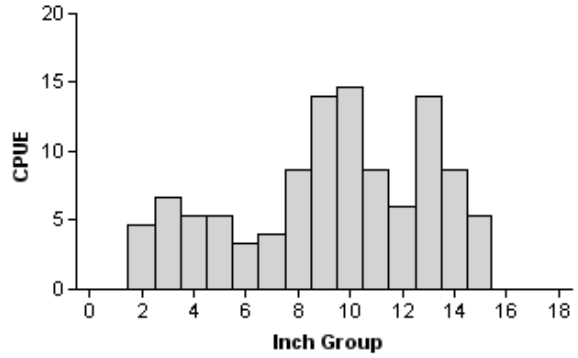
Table 5. Survey of structural habitat types, Austin Reservoir, Texas, 1995. A linear shoreline distance (miles) was recorded for each habitat type found. Structural habitat has not changed significantly since 1995.

	Shoreline distance	
Structural habitat type	Miles	Percent of total
Boulder	0.12	0.26
Broken rock	2.69	6.03
Bulkhead	18.43	41.33
Concrete	0.68	1.53
Cut bank	0.08	0.17
Dead trees	0.16	0.37
Eroded bank	0.01	0.03
Featureless	0.85	1.90
Overhanging brush	13.94	31.25
Riprap	0.26	0.58
Rock bluff	2.55	5.72
Rock shore	0.68	1.53
Vegetated bank	4.16	9.32
Total	13.9	100

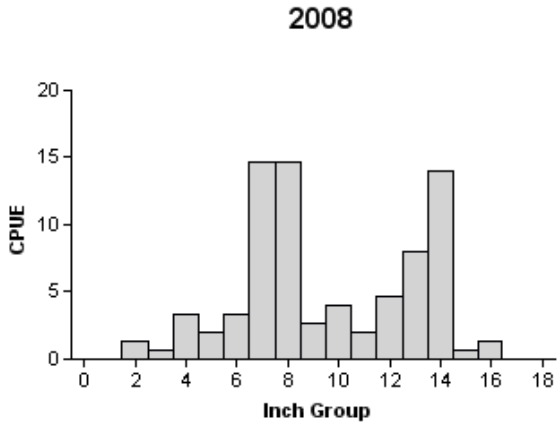
Gizzard Shad



Effort = 1.0
Total CPUE = 46.0 (34; 46)
IOV = 52.17 (10.5)



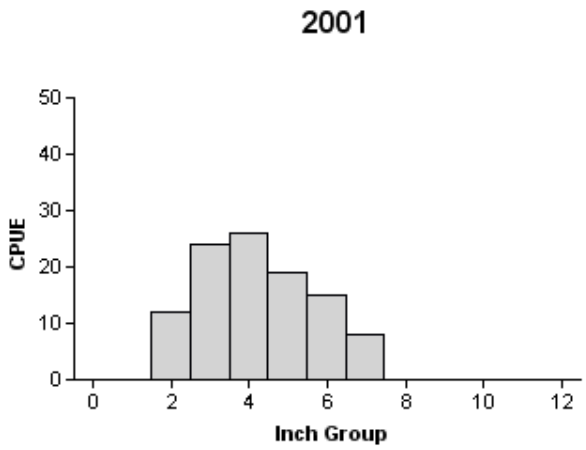
Effort = 1.5
Total CPUE = 109.3 (21; 164)
IOV = 26.83 (7.4)

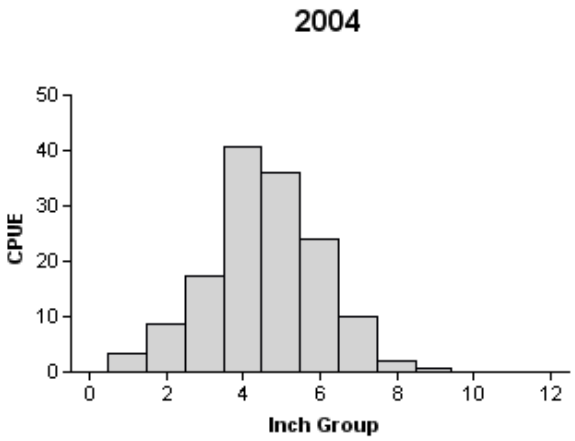


Effort = 1.5
Total CPUE = 77.3 (25; 116)
IOV = 32.76 (7.5)

Figure 1. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Austin Reservoir, Texas, 2001, 2004 and 2008.

Redbreast Sunfish





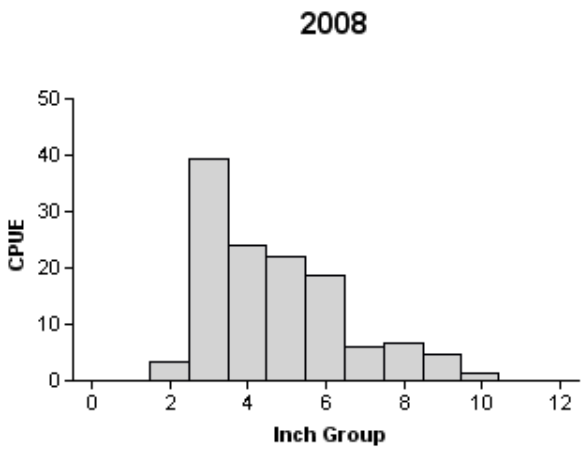
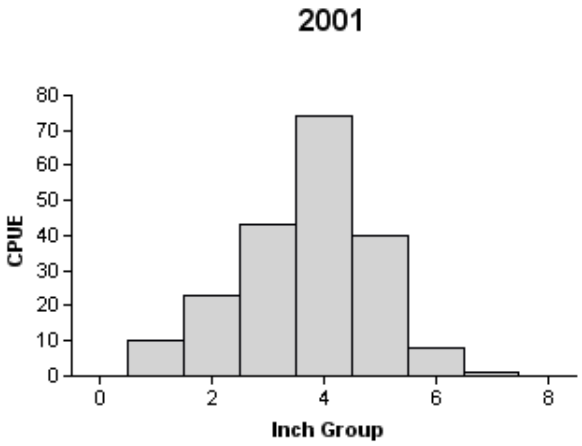
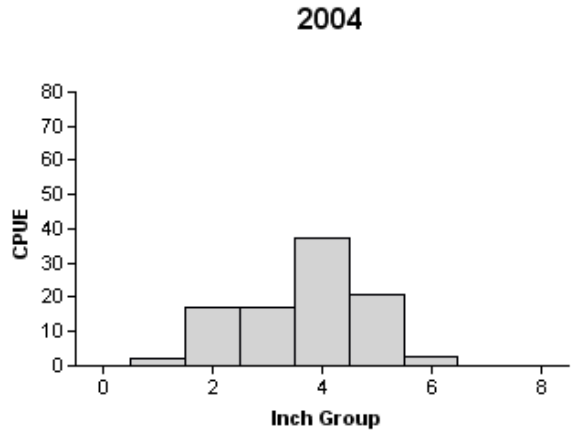


Figure 2. Number of redbreast sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Austin Reservoir, Texas, 2001, 2004 and 2008.

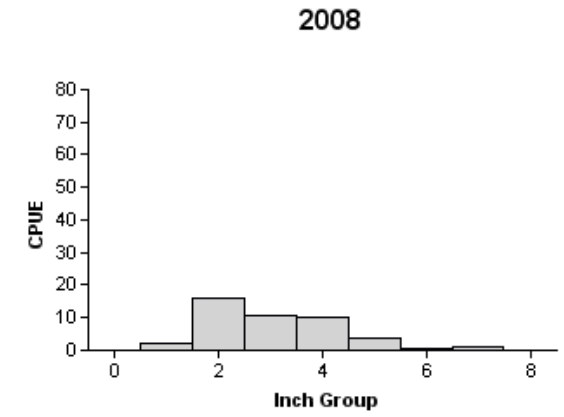
Bluegill



Effort = 1.0
Total CPUE = 199.0 (35; 199)



Effort = 1.5
Total CPUE = 97.3 (23; 146)

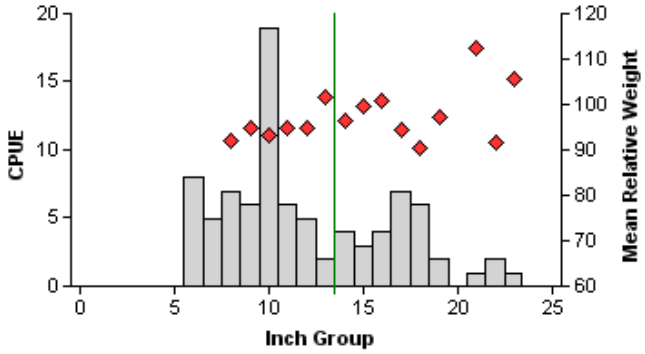


Effort = 1.5
Total CPUE = 44.7 (36; 67)

Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Austin Reservoir, Texas, 2001, 2004 and 2008.

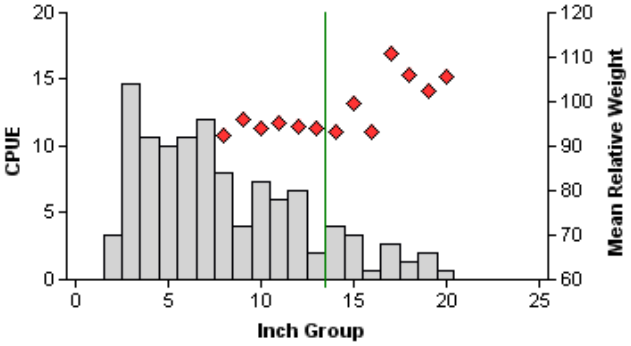
Largemouth bass

2003



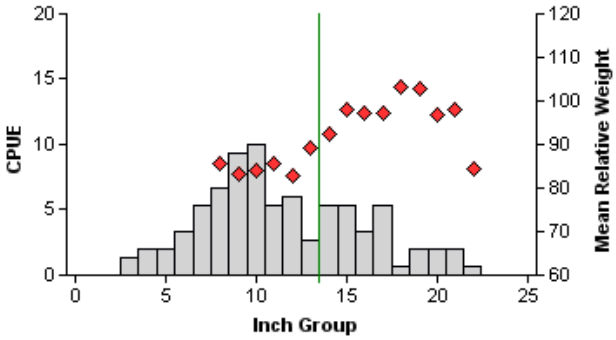
Effort =	1.0
Total CPUE =	88.0 (14; 88)
Stock CPUE =	75.0 (13; 75)
CPUE-14 =	30.0 (23; 30)
CPUE-18 =	12.0 (28; 12)
CPUE-21 =	4.0 (43; 4)
PSD =	49 (6.4)
RSD-14 =	40 (8.2)
RSD-21 =	5 (2.2)

2004



Effort =	1.5
Total CPUE =	110.0 (14; 165)
Stock CPUE =	48.7 (14; 73)
CPUE-14 =	14.7 (19; 22)
CPUE-18 =	4.0 (34; 6)
CPUE-21 =	0.0 (0; 0)
PSD =	48 (5.6)
RSD-14 =	30 (4.9)
RSD-21 =	0 (0)

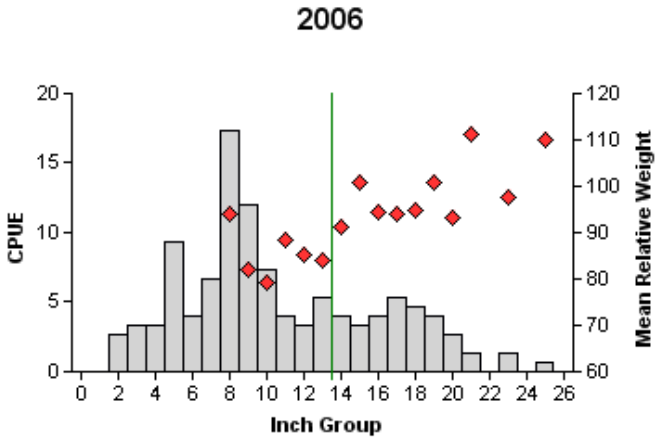
2005



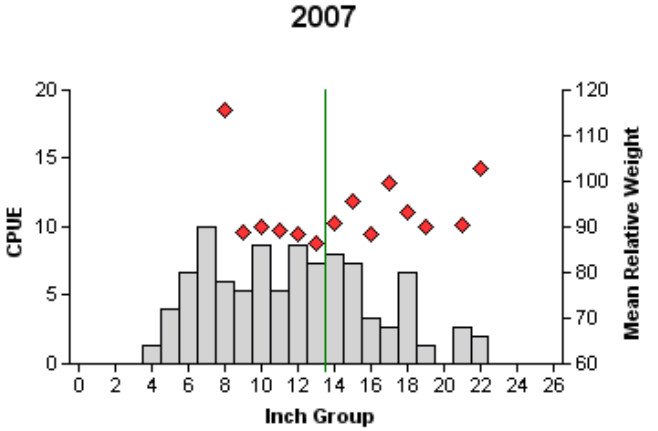
Effort =	1.5
Total CPUE =	80.7 (15; 121)
Stock CPUE =	66.7 (16; 100)
CPUE-14 =	26.7 (19; 40)
CPUE-18 =	7.3 (33; 11)
CPUE-21 =	2.7 (45; 4)
PSD =	53 (8.5)
RSD-14 =	40 (9.5)
RSD-21 =	4 (1.9)

Figure 4. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Austin Reservoir, Texas, 2003, 2004 and 2005. Minimum length limit indicated by vertical line.

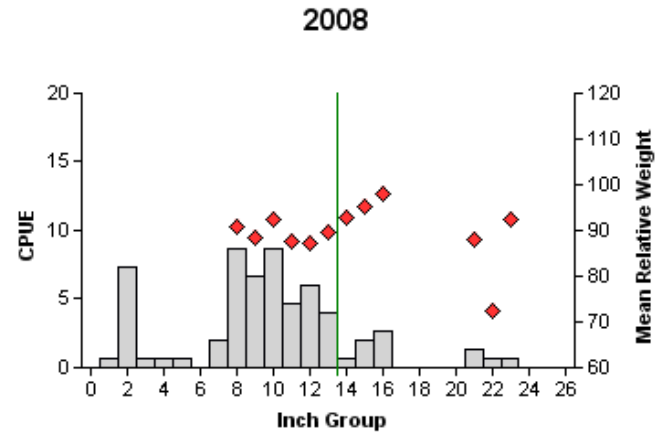
Largemouth bass



Effort =	1.5
Total CPUE =	110.0 (11; 165)
Stock CPUE =	80.7 (14; 121)
CPUE-14 =	31.3 (17; 47)
CPUE-18 =	14.7 (20; 22)
CPUE-21 =	4.0 (42; 6)
PSD =	50 (5.5)
RSD-14 =	39 (5.6)
RSD-21 =	5 (2)



Effort =	1.5
Total CPUE =	97.3 (11; 146)
Stock CPUE =	75.3 (12; 113)
CPUE-14 =	34.0 (18; 51)
CPUE-18 =	12.7 (22; 19)
CPUE-21 =	4.7 (42; 7)
PSD =	66 (4.3)
RSD-14 =	45 (3.9)
RSD-21 =	6 (2.2)



Effort =	1.5
Total CPUE =	58.7 (18; 88)
Stock CPUE =	46.7 (19; 70)
CPUE-14 =	8.0 (24; 12)
CPUE-18 =	2.7 (45; 4)
CPUE-21 =	2.7 (45; 4)
PSD =	39 (7.2)
RSD-14 =	17 (4.8)
RSD-21 =	6 (2.6)

Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Austin Reservoir, Texas, 2006, 2007 and 2008. Minimum length limit indicated by vertical line.

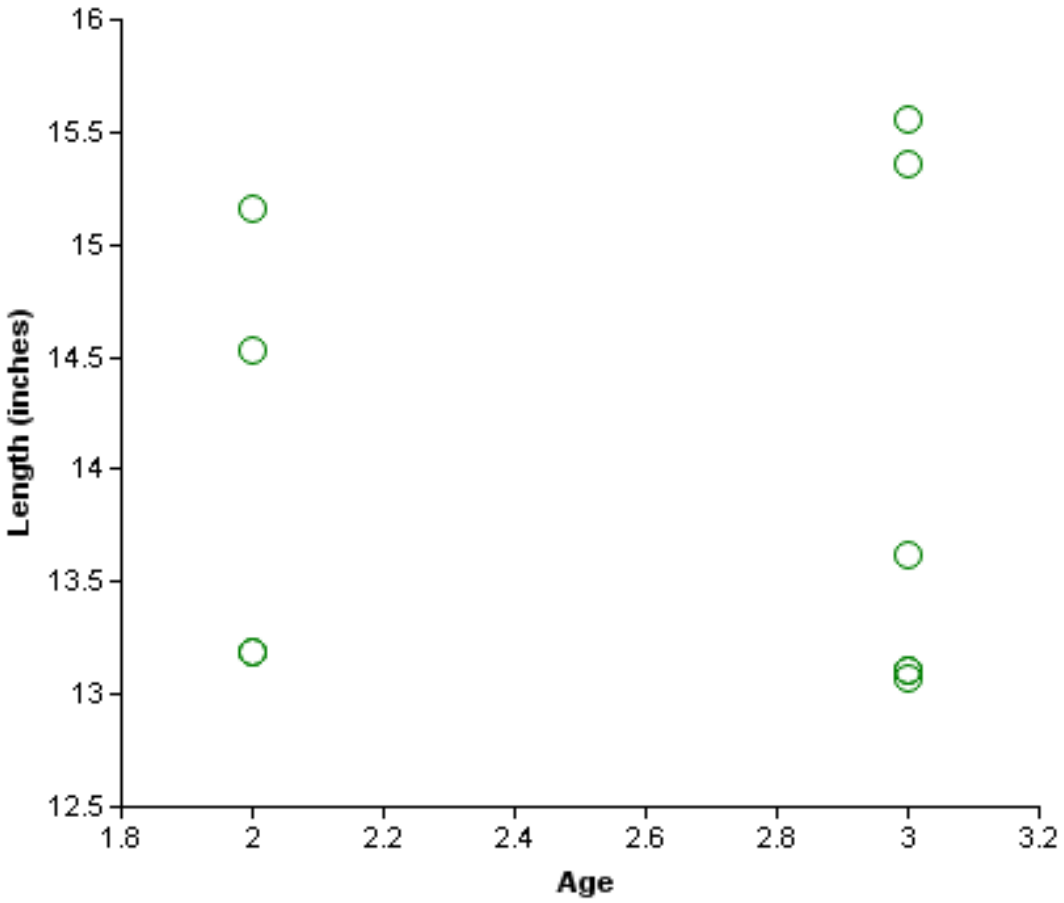


Figure 6. Length at age for largemouth bass collected by electrofishing at Austin Reservoir, Texas, November 2008 (N = 10).

Table 6. Results of genetic analysis of largemouth bass collected by electrofishing, Austin Reservoir, Texas, 2002, 2006 and 2008. FLMB = Florida largemouth bass, NLMB = northern largemouth bass, Fx = second or higher generation hybrid between FLMB and NLMB.

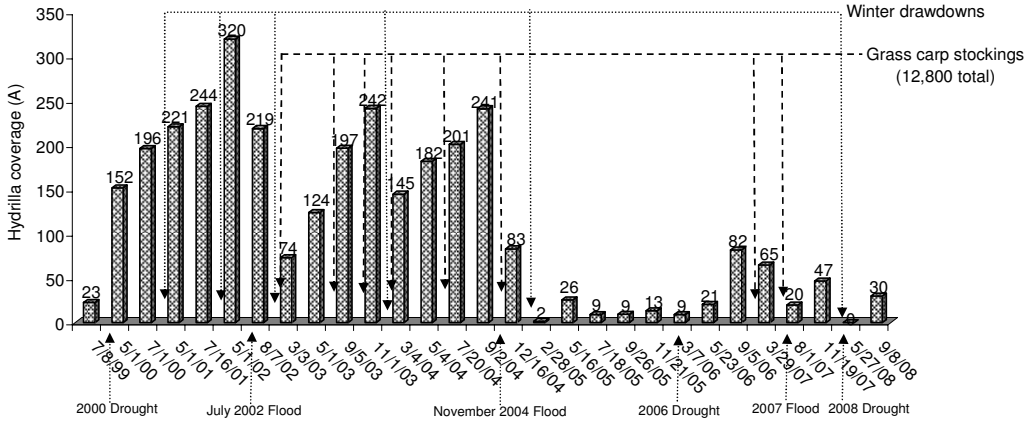
Year	Sample size	Genotype			% FLMB alleles	% pure FLMB
		FLMB	Fx	NLMB		
2002	26	5	21	0	71	19
2006	30	2	28	0	71	7
2008	30	4	26	0	76	13

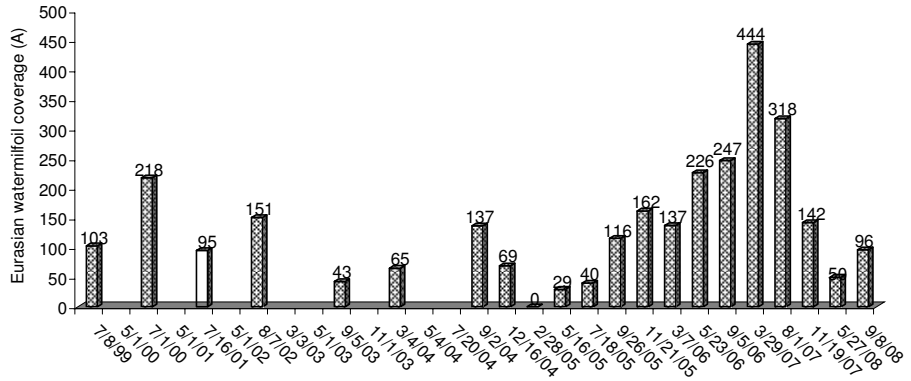
Table 7. Proposed sampling schedule for Austin Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S, and additional survey denoted by A.

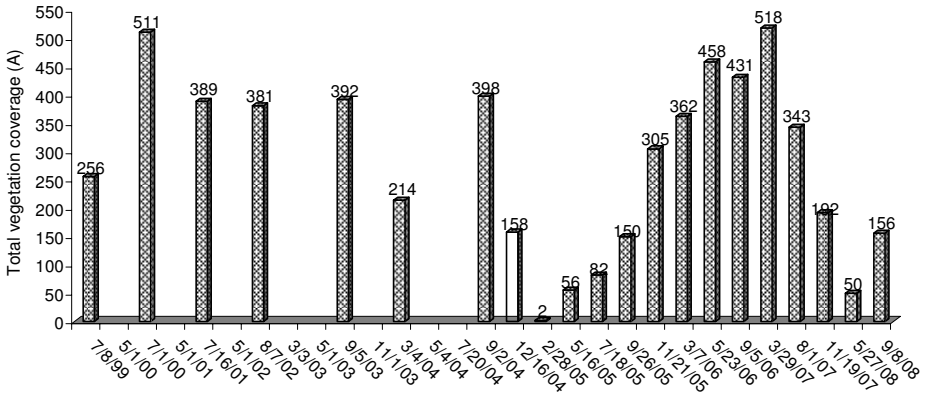
Survey Year	Electrofisher	Gill Net	Creel Survey	Report
Fall 2009-Spring 2010	A			
Fall 2010-Spring 2011	A			
Fall 2011-Spring 2012	A			
Fall 2012-Spring 2013	S	S		S

Appendix A

Hydrilla, Eurasian watermilfoil and total aquatic vegetation coverage (acres) (values rounded) from TPWD aquatic vegetation surveys, Lake Austin, TX 1999-2008. Total vegetation coverage includes all submerged and floating leaved species encountered. Emergent species (total coverage in all surveys was <1%) were excluded. Triploid grass carp stockings, winter (January and February) drawdowns, and flood and drought events are indicated with lines and arrows.





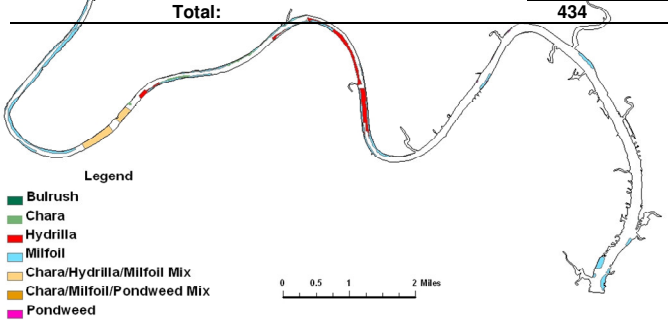


Appendix B

Location, species, acres and percent (%) coverage of aquatic vegetation coverage, Austin Reservoir, Texas, 2006, 2007 and 2008. July through September is considered the peak of the growing season for aquatic vegetation.

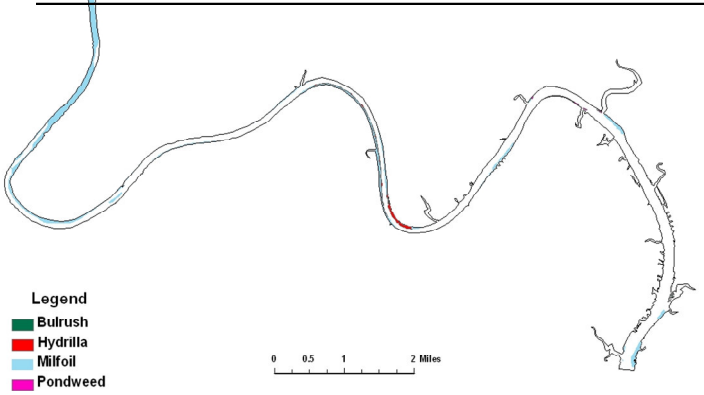
September 2006

Common Name	Scientific Name	Acres	% Coverage
Bulrush	*Scirpus sp.*	3	<1
Chara	*Chara sp.*	14	<1
Hydrilla	*Hydrilla verticillata*	66	4
Milfoil	*Myriophyllum spicatum*	198	12
Pondweed	*Potomogeton sp.*	5	<1
Mixed 1 Species	*Chara/hydrilla/myriophyllum*	48	3
Mixed 2 Species	*Chara/myriophyllum/potomogeton*	99	6
	Total:	**434**	**27**



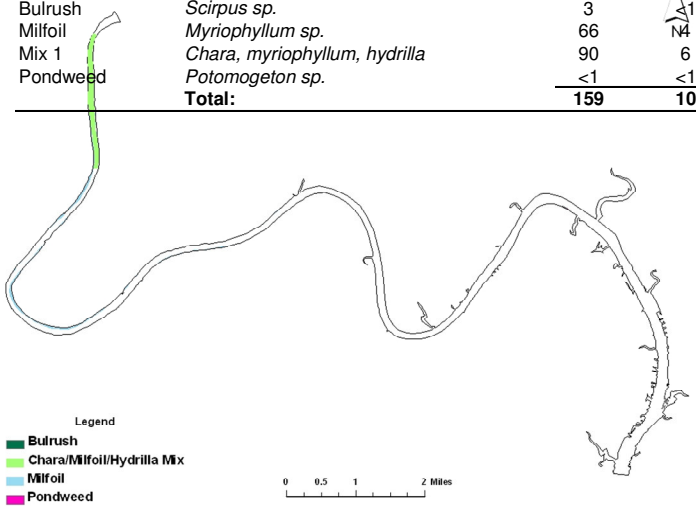
August 2007

Common Name	Scientific Name	Acres	% Coverage
Bulrush	*Scirpus sp.*	3	<1
Hydrilla	*Hydrilla verticillata*	20	1
Milfoil	*Myriophyllum sp.*	318	20
Pondweed	*Potomogeton sp.*	5	<1
	Total:	**346**	**21**



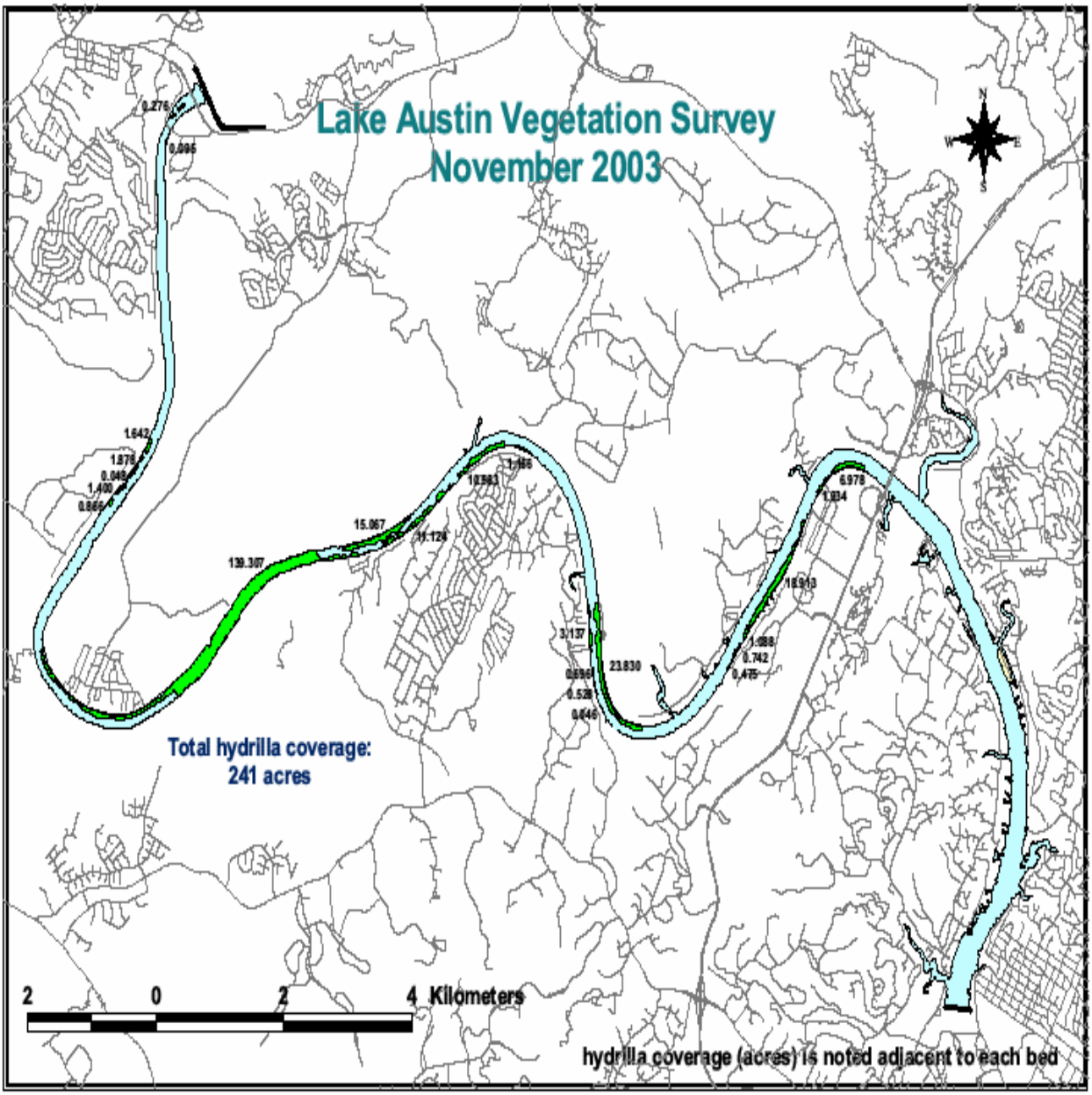
September 2008

Common Name	Scientific Name	Acres	% Coverage
Bulrush	*Scirpus sp.*	3	<1
Milfoil	*Myriophyllum sp.*	66	4
Mix 1	*Chara, myriophyllum, hydrilla*	90	6
Pondweed	*Potomogeton sp.*	<1	<1
	Total:	**159**	**10**



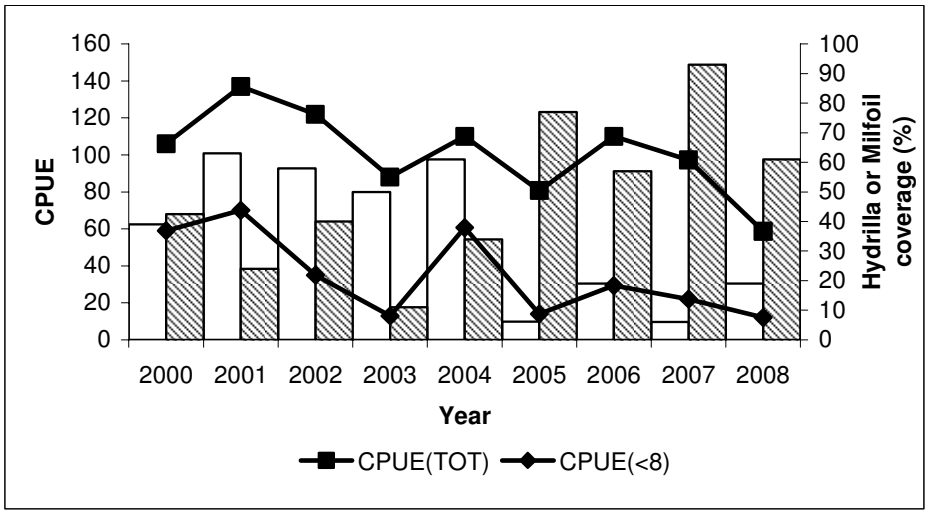
Appendix C

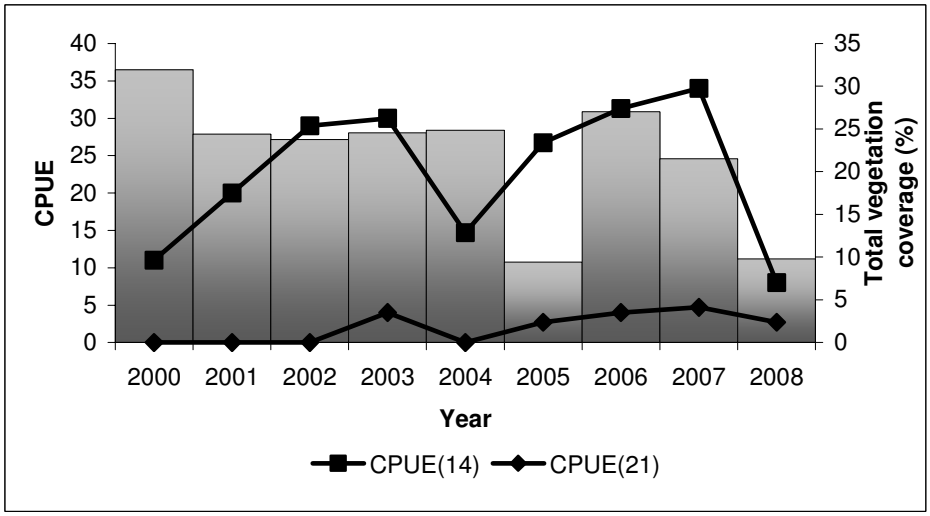
Location of hydrilla in Austin Reservoir, TX, November 2003. Triploid grass carp were first stocked into the reservoir in February, 2003. By November 2003, 3,825 triploid grass carp had been stocked. The peak of hydrilla coverage was in May, 2002 (320 acres).



Appendix D

Comparison of the number of largemouth bass caught-per-hour (CPUE, lines) from fall (November-December) electrofishing surveys, Lake Austin, Texas, 2000-2008. Open columns represent the percent of the total reservoir coverage comprised of hydrilla; cross hatched columns represent the percent of the total reservoir coverage comprised of Eurasian watermilfoil; shaded columns represent the total percent coverage for all submerged and floating leaved aquatic plants documented. All vegetation data are from aquatic vegetation surveys conducted during the peak (July-September) of the growing season, Lake Austin, Texas, 2000-2008. Triploid grass carp were first stocked in February 2003.





Appendix E

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Austin Reservoir, Texas, 2008 and 2009.

	Gill Netting		Electrofishing	
Species	N	CPUE	N	CPUE
Gizzard shad			116	77.3
Threadfin shad			58	38.7
Inland silverside			35	23.3
Blacktail shiner			27	18.0
Blue catfish	3	0.6		
Channel catfish	5	1.0		
Flathead catfish	2	0.4		
Bluegill			67	44.7
Redbreast sunfish			189	126.0
Longear sunfish			4	2.7
Redear sunfish			16	10.7
Largemouth bass			16	10.7
Logperch			9	6.0

Appendix F

Location of sampling sites, Austin Reservoir, Texas, 2008-2009. Gill netting and electrofishing stations indicated by circles and triangles, respectively. Public boat ramps are indicated by a boat ramp symbol .