

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

**Lady Bird Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations Lady Bird Reservoir were surveyed in 2011 using electrofishing and in 2012 using gill nets. This report summarizes results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

- **Reservoir Description:** Lady Bird Reservoir is a stable-level, 469-acre impoundment of the Colorado River located in the city of Austin, Travis County, Texas. Prior to 2007 the reservoir was named Town Lake. The reservoir runs through the mid-section of the city and was constructed in 1960 for purposes of flood control, municipal and industrial water supply and recreation. The reservoir is owned and operated by the City of Austin. The reservoir lies within the Edwards Plateau ecological area and has shoreline length of 18.3 miles and a drainage area of approximately 38,240 square miles. Some of the adjacent land has been developed into city parks. Other shoreline areas have been developed by private businesses.
- **Management History:** Important sportfish included largemouth bass, channel catfish, and common carp. Largemouth bass were managed under a 14-inch minimum length limit until September 1, 2000 when a 14- to 21-inch slot length limit was initiated. Prior to this more restrictive length limit, harvest may have been limited due to an imposed fish consumption advisory. The Florida sub-species of largemouth bass was stocked in 1998 to improve largemouth bass growth potential. In 2009, a harvest restriction was implemented to protect trophy-sized common carp; only one carp 33 inches or greater may be retained per day.
- **Fish Community**
  - **Prey species:** Sunfishes (primarily redbreast sunfish and bluegill) were the predominant prey species available.
  - **Common carp:** The data indicates that Lady Bird Reservoir has a low density carp population dominated by larger individuals.
  - **Catfishes:** Channel catfish and flathead catfish were present in low density.
  - **Largemouth bass:** Largemouth bass were abundant, in good condition, and population size structure was good.
- **Management Strategies:** The reservoir's fish population should continue to be managed with existing harvest regulations. Aquatic vegetation surveys should continue to be conducted annually to monitor for the potential establishment of hydrilla, and for changes to the aquatic vegetation community that could be attributed to the emigration of grass carp from upstream Austin Reservoir. Continue collection of information on grass carp and common carp populations in collaboration with the Carp Anglers Group.

## INTRODUCTION

This document is a summary of fisheries data collected from Lady Bird Reservoir from 2011-2012. The purpose of the document is to provide fisheries information and make 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 fishes and important prey species. Historical data are presented for comparison.

### *Reservoir Description*

Lady Bird Reservoir is a stable-level, 469-acre impoundment of the Colorado River located in the city of Austin, Travis County, Texas. The reservoir runs through the mid-section of the city and was constructed in 1960 for purposes of flood control, municipal and industrial water supply and recreation. The reservoir is owned and operated by the City of Austin (COA). The reservoir lies within the Edwards Plateau ecological area and has shoreline length of 18.3 miles and a drainage area of approximately 38,240 square miles. Some of the land bordering the reservoir has been developed into city parks. Other shoreline areas have been developed by private businesses. Boat access was adequate and consisted of three public boat ramps (Appendix B) and a designated canoe/kayak access ramp in the COA Red Bud Park. The use of gasoline-powered motors was prohibited by city ordinance; however, the use of electric trolling motors was permitted. Bank fishing access was excellent. Other descriptive characteristics for Lady Bird Reservoir are in Table 1.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Magnelia and De Jesus 2008) included:

1. Continue annual aquatic vegetation surveys  
**Action:** Annual aquatic vegetation surveys were conducted from 2008 to 2011 to monitor for any changes attributable to the presence of grass carp that escaped from Austin Reservoir.
2. Continue collecting information on grass carp during electrofishing surveys.  
**Action:** Grass carp were not captured during electrofishing surveys in 2009 and 2011, but were observed escaping the field of shock. The Carp Anglers Group (CAG) agreed to submit any grass carp caught during the 11<sup>th</sup> annual Austin Team Championship common carp tournament in 2012. Only one grass carp was caught during the tournament.
3. Continue annual aquatic vegetation surveys to document the presence of hydrilla.  
**Action:** Annual aquatic vegetation surveys were conducted from 2008 to 2011 and there was no evidence to show establishment of hydrilla.
4. Recommend immediate treatment to COA should stands of hydrilla be documented.  
**Action:** Establishment of hydrilla was not documented in Lady Bird Reservoir.
5. Continue to encourage COA to build additional, and improve existing boat ramps; and, build at least one fishing pier.  
**Action:** Discussions were held with COA Parks and Recreation Department and the private sector. The COA was not ready for new access infrastructure, but would have it under future consideration.
6. Start collecting length-frequency information on common carp collected during electrofishing surveys.  
**Action:** Information was collected from common carp caught during a spring carp-only electrofishing survey in 2009 and standard survey in 2011. In addition, historical tournament data was obtained from CAG to supplement standard data.

**Harvest regulation history:** Sportfish in Lady Bird Reservoir are currently managed with statewide regulations with the exception of largemouth bass, and there is a special regulation for common carp (Table 2). From 1985 to 1999, largemouth bass were managed with a 14-inch minimum length limit. A 14- to 21-inch slot length limit was implemented in 2000 to: increase abundance of bass greater than 14 inches in length; increase angler catches of bass greater than 14 inches in length; and, re-direct harvest at individuals less than 14 inches in length. Lady Bird Reservoir is a popular destination for trophy common carp anglers from around the country and from overseas because of the opportunity to catch 30- to 40-plus-pound carp. The reservoir holds the rod and reel state record for common carp at 43.75 pounds. In 2009, a harvest restriction was implemented to protect trophy common carp; only one carp 33 inches or greater may be retained per day. There is no daily bag limit for carp less than 33 inches in length. Gablehouse (1984) designated a minimum length limit of 33 inches for trophy carp.

**Stocking history:** Lady Bird Reservoir has not been stocked since 2001 (channel catfish). Florida largemouth bass were stocked in 1998 to improve the growth potential for largemouth bass. A complete stocking history is included in Table 3.

**Aquatic vegetation/habitat history:** Low historic vegetation coverage has been descriptive of Lady Bird Reservoir (Magnelia and Bonds 2004, Magnelia and De Jesus 2008). Vegetation is restricted to shallow sediment flats adjacent to creek mouths, shoreline, or directly in creeks like Barton Springs Creek. Austin Reservoir (directly upstream) had dense stands of the exotic plant hydrilla (*Hydrilla verticillata*) (Magnelia and Bonds 2004) and the possible establishment of this aquatic plant in Lady Bird Reservoir was of concern, necessitating the need for annual aquatic vegetation monitoring. Floating hydrilla has often been observed in Lady Bird Reservoir, but has never become established (Magnelia and De Jesus 2008). Eurasian watermilfoil (*Myriophyllum spicatum*) has been the dominant species. Giant cane (*Arundinaria gigantea*) was noted during the 2011 survey and is being managed by COA. Efforts have been taken by COA to establish native aquatic vegetation species via plantings throughout the reservoir.

**Water Transfer:** There are no inter-basin water transfers at Lady Bird Reservoir.

## METHODS

Fishes were collected by electrofishing (1.0 hours at 12 5-min stations) and gill netting (5 net nights at 5 stations). Carp-only electrofishing (0.5 hours) was conducted in spring 2009 (primarily to collect spines for a research project originating in South Dakota). No trap netting was conducted because the reservoir has historically not had a viable crappie population. 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 nets as the number of fish per net night (fish/nn). All survey sites (Appendix B) were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures Manual (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Aquatic vegetation surveys were conducted during peak growing season around the entire reservoir. Aquatic vegetation coverage was estimated by the use of Trimble® GPS unit in conjunction with sonar depth finder. Species identification was confirmed on samples collected with a modified aquatic rake. Length and certified weights of common carp captured at the 2012 Austin Team Championship tournament held at Lady Bird Reservoir were provided by CAG.

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Size Distribution (PSD); as defined by Guy et al. (2007)], and condition indices [relative weight ( $W_r$ )] 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 using otoliths from 13 fish (category 2 age analysis, TPWD, Inland Fisheries Division, unpublished manual revised 2011). The reservoir maintains a stable water level, with little change in elevation, so a water level figure was omitted from this report.

## RESULTS AND DISCUSSION

**Habitat:** The last structural habitat survey (Table 4) was conducted in 2004 (Magnelia and Bonds 2004). No major structural habitat changes have occurred in the interim period.

Total coverage estimate of all plant species in 2011 was 6.9% (32.3 acres) compared to 3.3% (15.3 acres) or less in the previous four years (Tables 4 and 5a–5d). This increase in vegetative cover was largely due to the expansion of Eurasian watermilfoil (*Myriophyllum spicatum*) from 12.6 acres in 2010 to 24.8 acres in 2011, and the presence of fanwort (6.8 acres). Nevertheless, total aquatic vegetation coverage in this reservoir has remained relatively low, but still provide important habitat for game fish.

**Prey species:** Electrofishing catch rates of gizzard shad, redbreast sunfish and bluegill were 84.0/h, 110.0/h and 142.0/h, respectively in 2011. Red spotted sunfish and redear sunfish were also available as forage. Index of vulnerability for gizzard shad was 11; indicating 11% of gizzard shad available to existing predators were of vulnerable size ( $\leq 8$  inches). Total CPUE of gizzard shad (84.0/h) was similar to previous surveys in 2007 (69.0/h) and 2003 (70.0/h), but the IOV (11) was much lower than in 2007 (46, Figure 1). Total CPUE of bluegill (142.0/h) and redbreast sunfish (110.0/h) in 2011 was lower than total CPUE from surveys in 2007 (bluegill 338.0/h, redbreast sunfish 190.0/h) and 2003 (bluegill 255.0/h, redbreast sunfish 131.0/h). Size structure of bluegill continued to be dominated by small individuals whereas there was an improvement in proportion of larger redbreast sunfish (PSD = 39) which offered the opportunity for quality sunfish fishing (Figures 2 and 3).

**Common carp:** Lady Bird Reservoir is renowned among carp anglers (in the United States and abroad) as one of the best trophy carp waters in the U.S. as a consequence of the presence of carp weighing greater than 40 pounds. Two carp tournaments held back-to-back at Lady Bird Reservoir in 2006 (Austin Team Championship and Texas Carp Challenge) resulted in a direct expenditure of \$101,000 (TPWD, unpublished data). Tournament prize money can be high. The Texas Carp Challenge tournament winner received \$25,000 and the angler that broke the state record received \$250,000.

Common carp electrofishing catch rate in fall 2011 was 13.0/h and the bulk of the fish were between 18 to 22 inches in length with the largest fish being 33 inches long (PSD-P = 31, PSD-M = 15, PSD-T = 8, CPUE-33 = 1.0/h). By comparison, in fall 2007, the catch rate was 7.0/h and the bulk of the fish were between 25 to 31 inches in length (PSD-P = 86, PSD-M = 71, PSD-T = 0, CPUE-33 = 0.0/h, Figure 4). Carp-only electrofishing in spring 2009 (specifically to collect spines for a research project originating in South Dakota) yielded a catch rate of 20.0/h and the size structure was dominated by larger fish up to 36 inches in length (PSD-P = 80, PSD-M = 70, PSD-T = 20, CPUE-33 = 4.0/h, Figure 4). The heaviest carp weighed 32.6 pounds. Smaller carp < 15 inches in length were not present in any of the electrofishing and gill net surveys between 2007 and 2012. These data suggest that Lady Bird Reservoir has a low density carp population dominated by larger individuals. This is further supported by data obtained from CAG's 11<sup>th</sup> annual Austin Team Championship which is a total-weight competition, i.e., all sizes of captured carp are included in the data. The majority of the fish caught by anglers during the 2012 tournament were between 29 and 35 inches in length, and 43% were  $\geq 33$  inches in length (Appendix D). Mean relative weights were between 120 and 154, suggesting superb condition. The largest fish weighed 35.5 pounds. Tournament catch rate was 0.08/h in 2012 compared to previous catch rates of 0.16/h (2011), 0.12/h (2010), and 0.18/h (2008, Appendix E). In contrast, a catch rate of 0.43/h was reported for Joe Pool Reservoir by CAG. Tournament data from 2008 to 2012 showed that average weight of carp ranged from 16.3 pounds to 21.3 pounds.

**Catfishes:** The gill net catch rate of channel catfish was 0.4/nn in 2012. The channel catfish population continued to have low relative abundance (Figure 5). Fish were above harvestable-size ( $\geq 12$  inches) and up to 25 inches in length. Flathead catfish were present in low density (0.6/nn) and were greater than 18 inches in length. Fish up to 30 inches in length were available (Figure 6).

**Largemouth bass:** The total electrofishing catch rate for largemouth bass in 2011 was 128.0/h, which was similar to the catch rates obtained in the 2009 (131.0/h) and 2007 (127.0/h) surveys (Figure 7). Electrofishing catch rate for largemouth bass 14 inches and longer (CPUE-14) was 46.0/h. This was

lower than the 2009 survey (68.0/h), approximately the same as in 2007 (45.0/h), and close to the mean CPUE-14 from 2001-2011 (post-slot length limit) of 49.6/h. Electrofishing catch rate for largemouth bass 14 inches and longer (46.0/h) was much higher than the mean pre-slot length limit CPUE-14 (25.7/h) reported by Magnelia and De Jesus 2008. The electrofishing CPUE of largemouth bass exceeding the upper end of the slot length limit (21 inches) was 0.0/h compared to previous catch rates of 2.0/h (2009) and 3.0/h (2007, Figure 7) and was less than the mean from the post-slot length limit surveys of 2001-2011 (2.9/h). Population size structure was good; PSD was 64, which was within the range expected for a balanced population (Gabelhouse 1984). Overall, condition was good, as mean relative weights ( $W_t$ ) exceeded 95 for most inch groups (Figure 7). Age and growth analysis from 2011 indicated individuals on average reached 14 inches by 3.4 years ( $N = 5$ , Figure 8), which is normal for central Texas reservoirs.

**White crappie:** No trap netting was done for crappie because of historically low catch rates and angler effort (Magnelia and De Jesus 2008).

## Fisheries management plan for Lady Bird Reservoir, Texas

Prepared – July 2012.

**ISSUE 1:** Potential for large scale emigration of triploid grass carp from Austin Reservoir into Lady Bird Reservoir and its impact on aquatic vegetation and fish assemblages is still a concern.

### MANAGEMENT STRATEGY

1. Continue annual aquatic vegetation surveys.
2. Continue collecting catch rate information on grass carp during electrofishing surveys and from bycatch at the Austin Team Championship common carp tournament.

**ISSUE 2:** Hydrilla was present in Austin Reservoir, which is directly upstream of Lady Bird Reservoir. This aquatic plant has the potential to cause access problems in Lady Bird Reservoir.

### MANAGEMENT STRATEGY

1. Continue annual aquatic vegetation surveys to document the presence of hydrilla.
2. Recommend immediate treatment to COA should stands of hydrilla be documented.

**ISSUE 3:** Boat access for trailered boats in the upper and middle portions of the reservoir was not available. There were no fishing piers available. This limited fishing opportunities.

### MANAGEMENT STRATEGIES

1. Continue to encourage COA to build additional, and improve existing boat ramps; and, build at least one fishing pier.

**ISSUE 4:** Catch-and-release common carp fishing is a popular activity on this reservoir. More data is needed on which to base management recommendations.

### MANAGEMENT STRATEGIES

1. Continue collecting length-frequency information on common carp during standard electrofishing surveys and continue working with CAG to access catch data at carp tournaments.

**ISSUE 5:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

### MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. If applicable, contact and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential

invasive species responses.

**SAMPLING SCHEDULE JUSTIFICATION:**

The proposed sampling schedule includes additional electrofishing in 2013 and mandatory monitoring in 2015/2016 (Table 5). Additional electrofishing in 2013 is necessary to monitor the largemouth bass, and common carp populations. Trap net sampling for white crappie was eliminated on this reservoir because of low historical trap net catches and low directed angler effort for this species.

## LITERATURE CITED

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Table 1. Characteristics of Lady Bird Reservoir, Texas.

Characteristic	Description
Year constructed	1960
Controlling authority	City of Austin
County	Travis
Reservoir type	Retired power cooling/recreational
Shoreline Development Index (SDI)	4.1
Conductivity	700 $\mu$ mhos/cm

Table 2. Harvest regulations for Lady Bird Reservoir, Texas.

Species	Bag Limit	Length Limit (inches)
Catfish: channel catfish, hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, flathead	5	18 minimum
Common carp	No limit	33 maximum*
Bass: largemouth	5	14 – 21 slot**
Bass: spotted, Guadalupe	5 (in any combination)	No limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

\* Only one fish 33 inches or greater may be retained.

\*\* Only one fish over 21 inches may be retained.

Table 3. Stocking history of Lady Bird Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), 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.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
Atlantic croaker	1975	250		2.0
	Total	250		
Channel catfish	1966	400	UNK	UNK
	1967	2,400	AFGL	7.9
	1969	27,100	AFGL	7.9
	2000	29,988	AFGL	4.9
	2001	24,974	AFGL	10.1
	Total	84,862		
Coppernose bluegill	1981	5,000	UNK	UNK
	Total	5,000		
Florida largemouth bass	1998	52,800	FGL	1.4
	1998	108,660	FRY	0.3
	Total	161,460		
Green sunfish x redear sunfish	1966	300		UNK
	1969	300		UNK
	Total	600		
Kemp's largemouth bass	1984	15,980		3.0
	1987	6,300		1.0
	1988	21,209		1.0
	Total	43,489		
Largemouth bass	1966	94,350	UNK	UNK
	1967	5,050	UNK	UNK
	1973	8,000	UNK	UNK
	Total	107,400		
Northern pike	1974	2,984		UNK
	1975	3,389		UNK
	1976	10,400		UNK
	1981	23,003		UNK
	Total	39,776		
Palmetto bass (striped X white bass hybrid)	1974	500	UNK	UNK
	1975	20,000	UNK	UNK
	1976	13,000	UNK	UNK
	1977	9,994	UNK	UNK
	1980	6,140	UNK	UNK
	1983	10,450	UNK	UNK

Species	Year	Number	Life Stage	Mean TL (in)
	1984	11,900	FGL	2.0
	1986	21,194	FGL	2.0
	Total	93,178		
Red drum	1975	100	UNK	UNK
	Total	100		
Redear sunfish	1981	2,000		UNK
	Total	2,000		
Smallmouth bass	1975	301	UNK	UNK
	1978	15,000	UNK	UNK
	Total	15,301		
Spotted bass	1974	14,400		UNK
	Total	14,400		
Striped bass	1977	108,475	UNK	UNK
	1978	340	UNK	UNK
	1983	5,317	UNK	UNK
	Total	114,132		
Walleye	1974	2,500	FRY	0.2
	1975	1,011,500	FRY	0.2
	Total	1,014,000		

Table 4. Survey of littoral and physical habitat types, Lady Bird Reservoir, Texas, 2004. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found in August, 2011.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Overhanging brush	12.3	68		
Vegetated bank	3.5	20		
Concrete	1.0	5		
Rock bluff	0.5	3		
Eroded bank	0.5	3		
Boat dock	0.3	1		
Eelgrass			0.3	<0.1
Eurasian watermilfoil			24.8	5.3
Fanwort			6.8	1.5
Water willow			0.4	<0.1

Table 5a. Aquatic plants observed during aquatic vegetation surveys in Lady Bird Reservoir, Texas, August 2010. Surface area (acres) and percent reservoir coverage were determined for each plant species.

Common Name	Scientific name	Acres	% coverage
Bulrush	<i>Scripus</i> sp.	1.8	0.4
Cattail	<i>Typha</i> sp.	0.2	<0.1
Eelgrass	<i>Vallisneria americana</i>	0.2	<0.1
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	12.6	2.7
Water willow	<i>Justicia americana</i>	0.5	0.1
Total		15.3	3.3

Table 5b. Aquatic plants observed during aquatic vegetation surveys in Lady Bird Reservoir, Texas, August 2009. Surface area (acres) and percent reservoir coverage were determined for each plant species.

Common Name	Scientific name	Acres	% coverage
Bulrush	<i>Scripus</i> sp.	1.8	0.3
Cattail	<i>Typha</i> sp.	0.2	<0.1
Eelgrass	<i>Vallisneria americana</i>	<0.1	<0.1
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	12.1	2.6
Water willow	<i>Justicia americana</i>	0.6	0.1
Total		14.7	3.1

Table 5c. Aquatic plants observed during aquatic vegetation surveys in Lady Bird Reservoir, Texas, August 2008. Surface area (acres) and percent reservoir coverage were determined for each plant species.

Common Name	Scientific name	Acres	% coverage
Bulrush	<i>Scripus</i> sp.	2.2	0.4
Cattail	<i>Typha</i> sp.	0.4	<0.1
Eelgrass	<i>Vallisneria americana</i>	<0.1	<0.1
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	4.5	0.9
Pondweed	<i>Potamogeton</i> sp.	<0.1	<0.1
Water willow	<i>Justicia americana</i>	0.5	0.1
Total		7.8	1.7

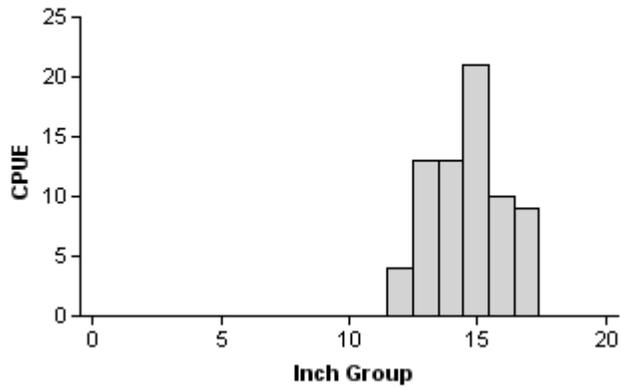
Table 5d. Aquatic plants observed during aquatic vegetation surveys in Lady Bird Reservoir, Texas, August 2007. Surface area (acres) and percent reservoir coverage were determined for each plant species.

Common Name	Scientific name	Acres	% coverage
Arrowhead	<i>Sagittaria latifolia</i>	0.4	<0.1
Bulrush	<i>Scripus</i> spp.	2.2	<0.1
Cattail	<i>Typha</i> spp.	0.4	<0.1
Eelgrass	<i>Vallisneria americana</i>	0.2	<0.1
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	4	<0.1
Pickerelweed	<i>Pontederia cordata</i>	<0.1	<0.1
Water willow	<i>Justicia americana</i>	0.3	<0.1
Total		7.6	0.02

## Gizzard Shad

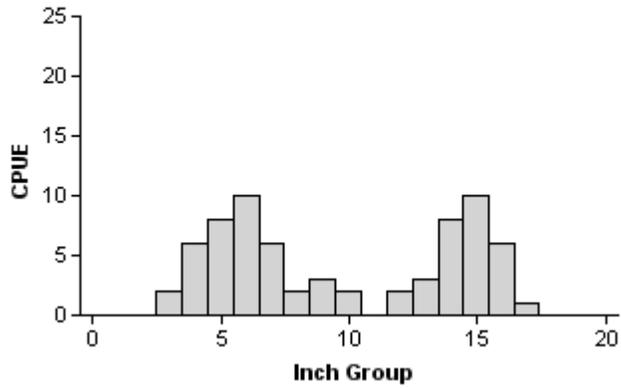
2003

Effort = 1.0  
 Total CPUE = 70.0 (16; 70)  
 IOV = 0 (0)



2007

Effort = 1.0  
 Total CPUE = 69.0 (29; 69)  
 IOV = 46 (13)



2011

Effort = 1.0  
 Total CPUE = 84.0 (20; 84)  
 IOV = 11 (9)

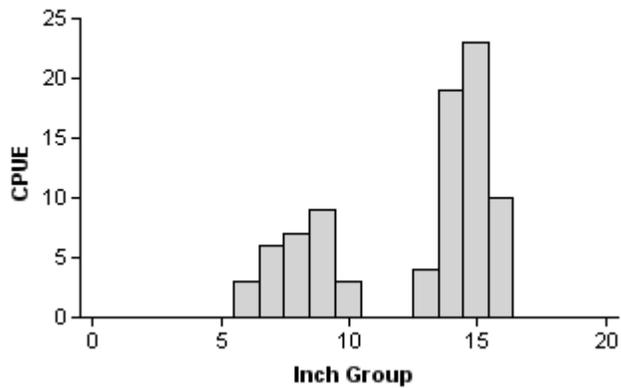
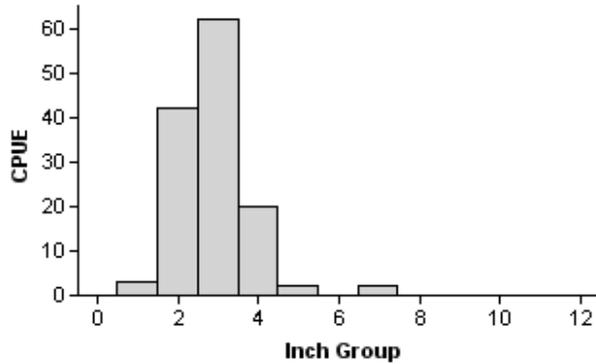


Figure 1. Number of gizzard shad caught per hour (CPUE) population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lady Bird Reservoir, Texas, 2003, 2007 and 2011.

## Redbreast Sunfish

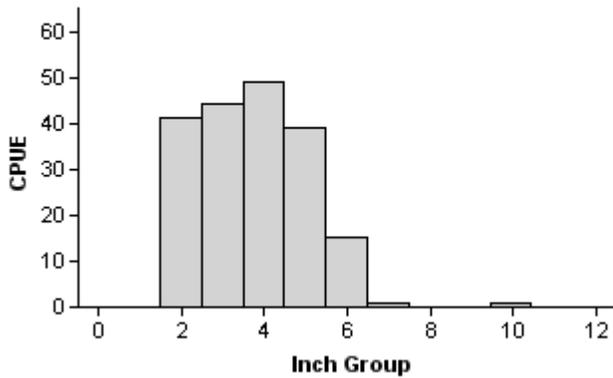
2003

Effort = 1.0  
 Total CPUE = 131.0 (38; 131)  
 PSD = 2 (2.6)



2007

Effort = 1.0  
 Total CPUE = 190.0 (26; 190)  
 PSD = 11 (2.5)



2011

Effort = 1.0  
 Total CPUE = 110.0 (37; 110)  
 PSD = 39 (5.7)

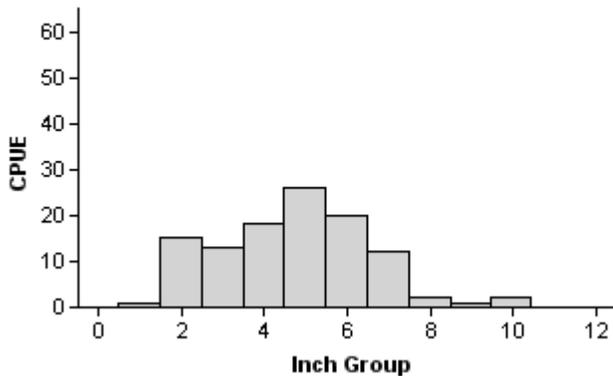
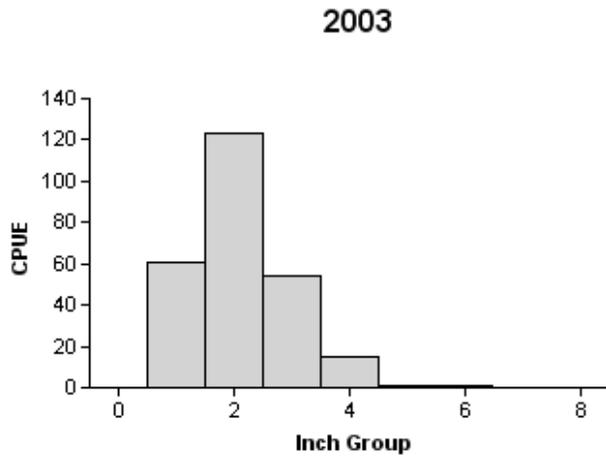
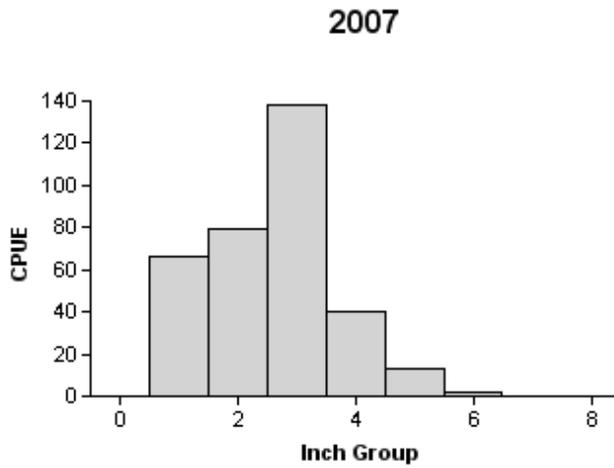


Figure 2. Number of redbreast sunfish caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lady Bird Reservoir, Texas, 2003, 2007 and 2011.

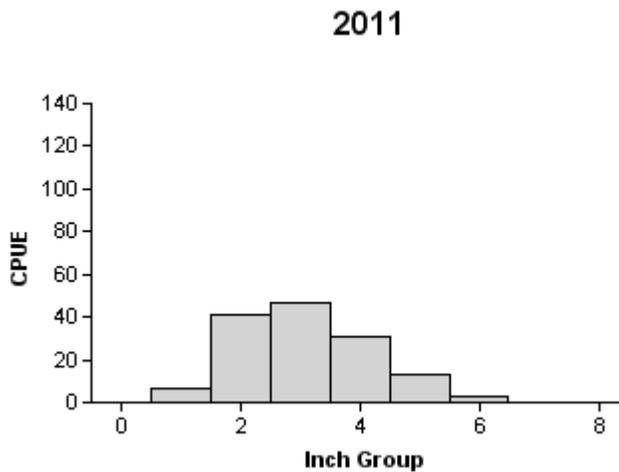
# Bluegill



Effort = 1.0  
 Total CPUE = 255.0 (35; 255)  
 PSD = 1 (1.5)



Effort = 1.0  
 Total CPUE = 338.0 (28; 338)  
 PSD = 1 (0.8)



Effort = 1.0  
 Total CPUE = 142.0 (37; 142)  
 PSD = 3 (2.3)

Figure 3. Number of bluegill caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lady Bird Reservoir, Texas, 2003, 2007 and 2011.

## Common Carp

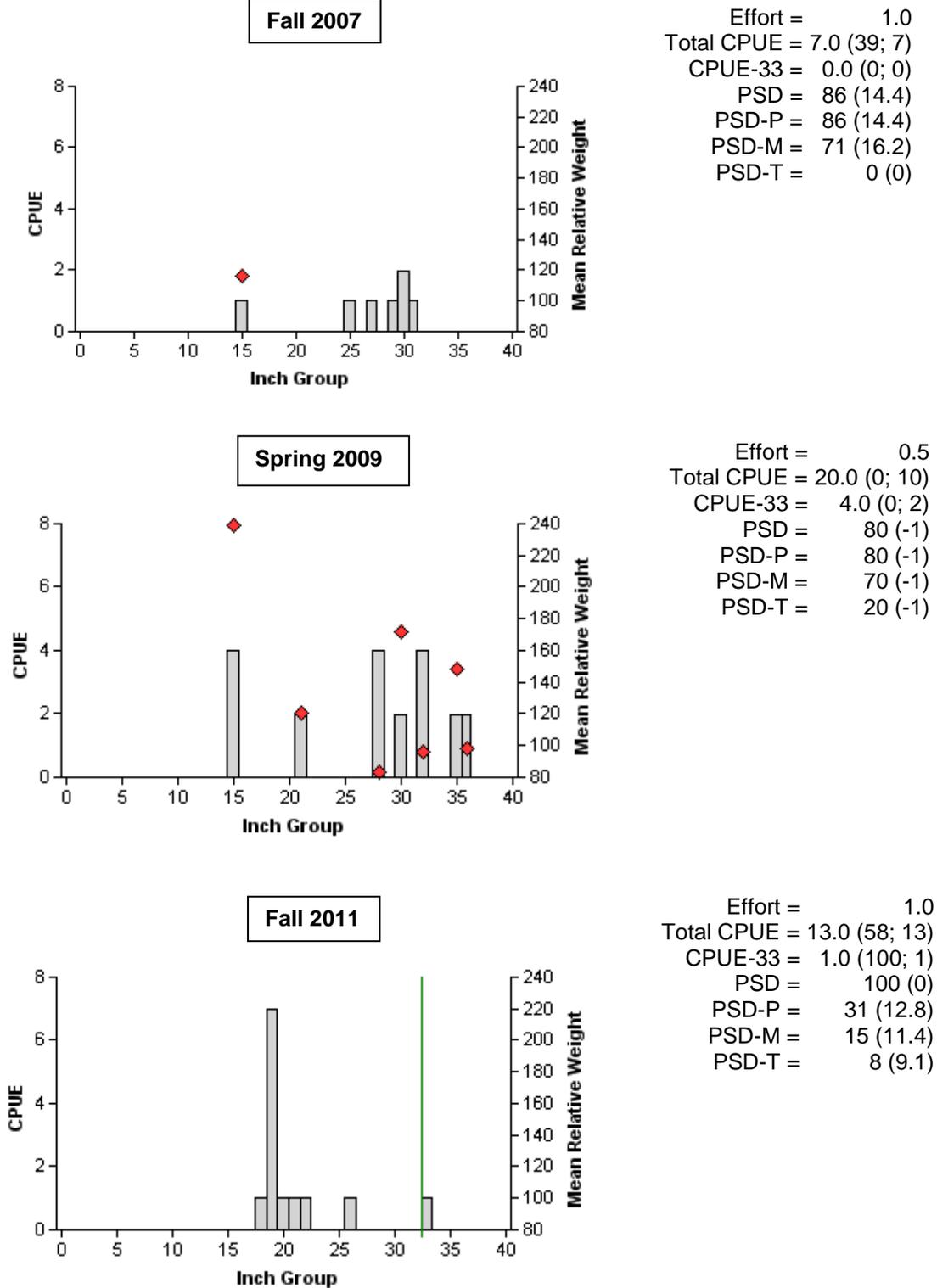


Figure 4. Number of common carp caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for electrofishing surveys, 2007, 2009, and 2011, Lady Bird Reservoir, Texas. Vertical line represents the 33-inch maximum length limit introduced in 2009 (only one fish  $\geq 33$  inches can be retained).

## Channel Catfish

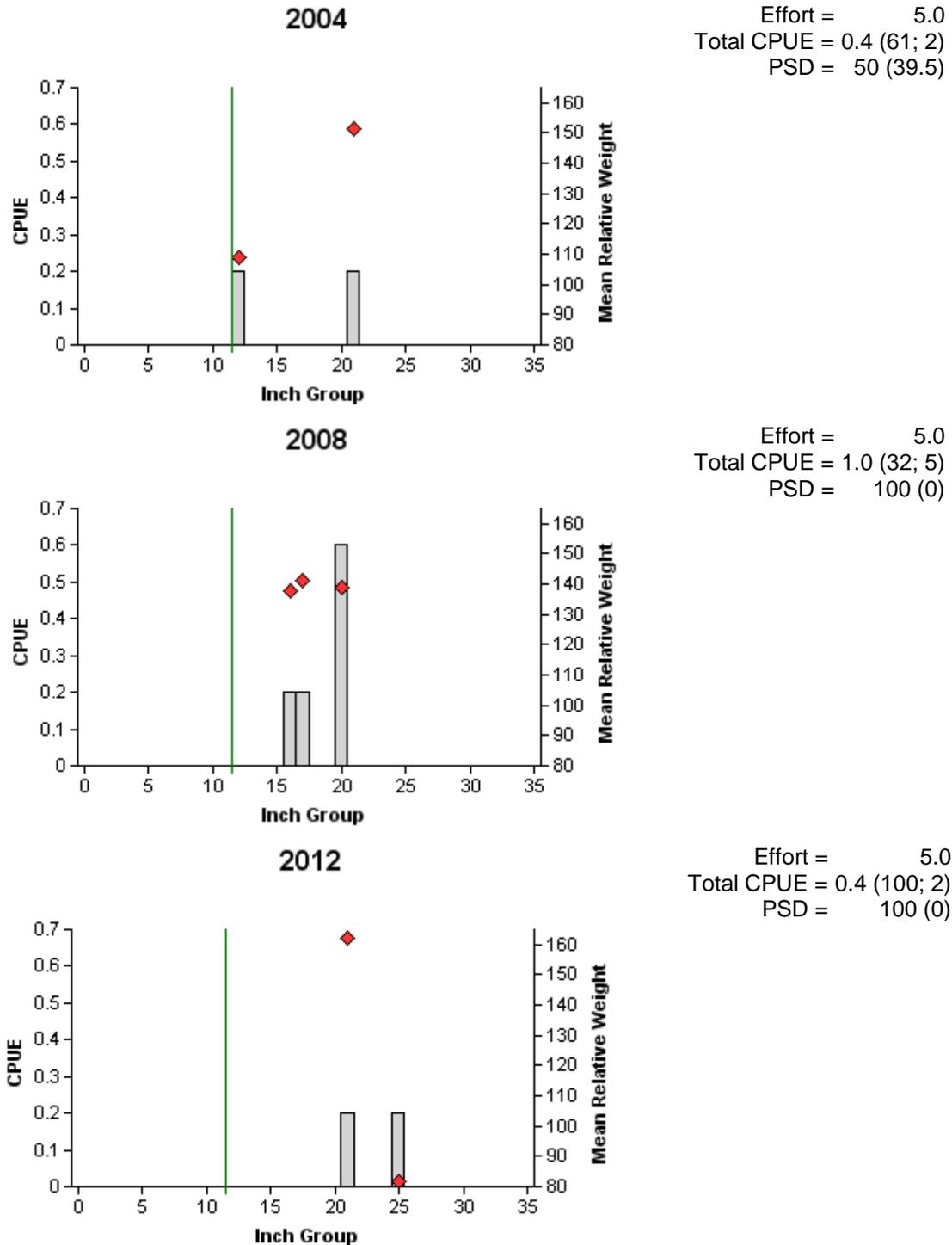


Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lady Bird Reservoir, Texas, 2004, 2008 and 2012. Vertical line represents minimum length limit at the time of sampling.

## Flathead Catfish

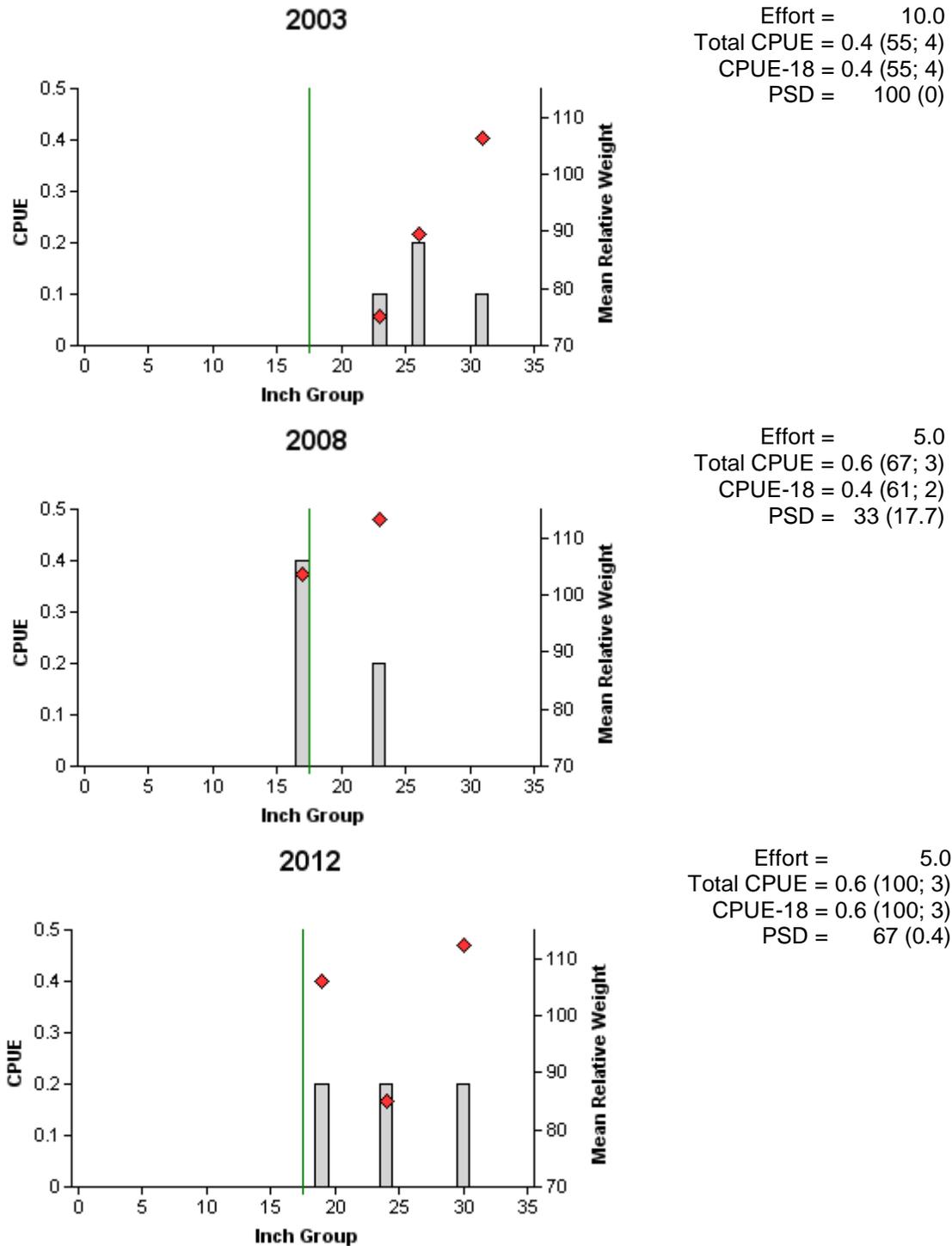


Figure 6. Number of flathead catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lady Bird Reservoir, Texas, 2003, 2008 and 2012. No flathead catfish were caught in 2004. Vertical line represents minimum length limit at the time of sampling.

## Largemouth Bass

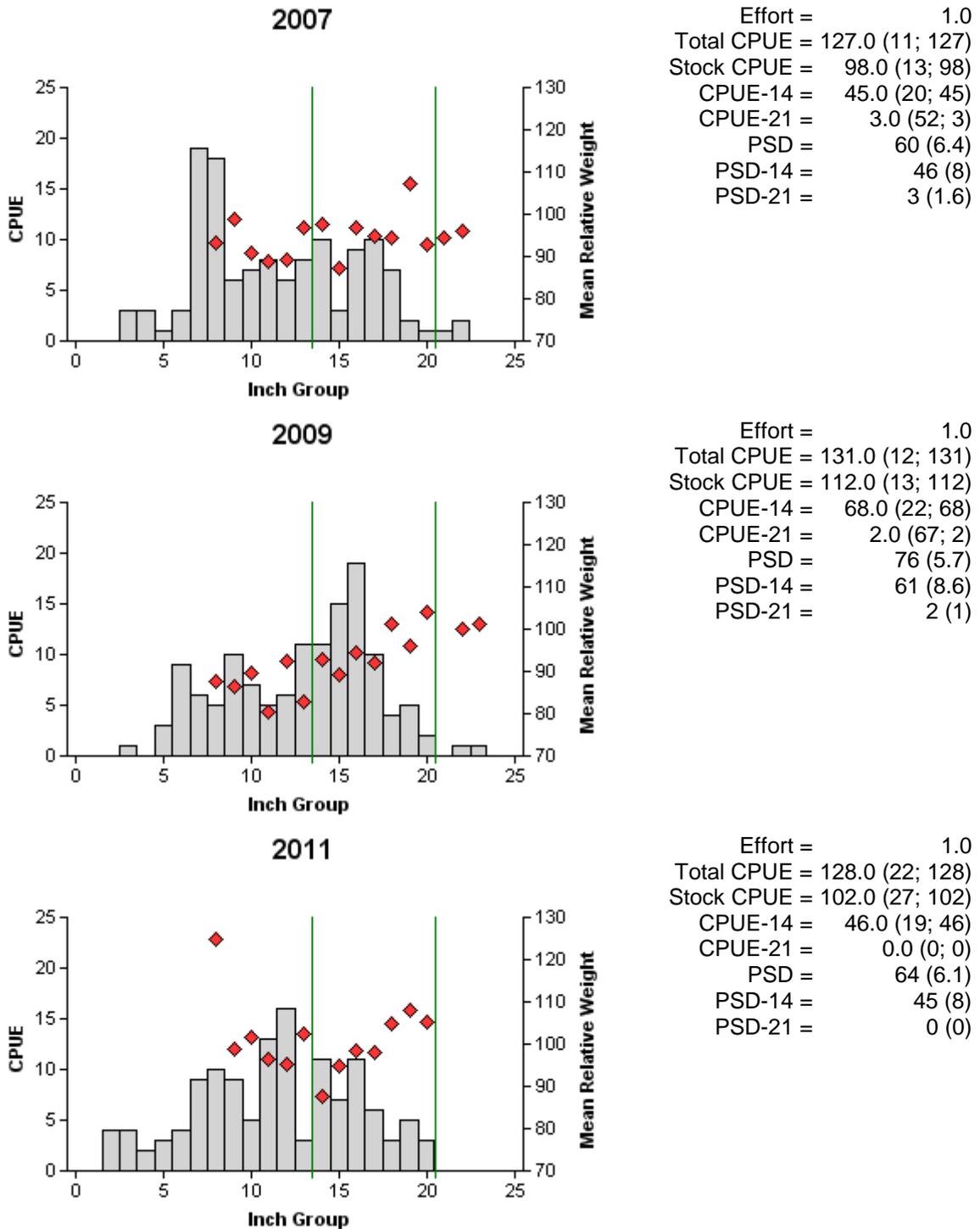


Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lady Bird Reservoir, Texas, 2007, 2009 and 2011. Vertical lines represent slot length limit at the time of sampling.

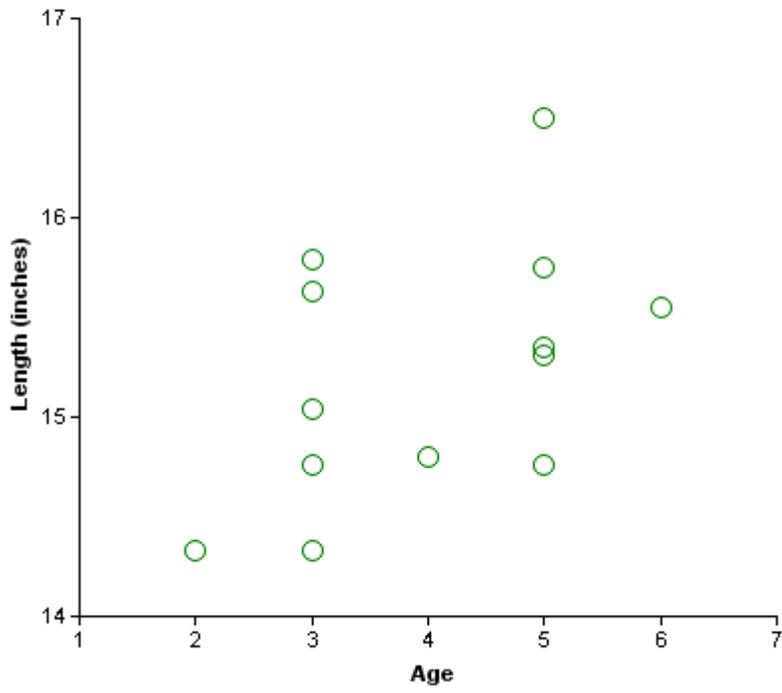


Figure 8. Length at age for largemouth bass collected by electrofishing at Lady Bird Reservoir, Texas, November 2011 (N = 13).

Table 6. Proposed sampling schedule for Lady Bird Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Habitat Survey	Vegetation Survey	Access Survey	Report
Fall 2012-Spring 2013						A		
Fall 2013-Spring 2014	A					A		
Fall 2014-Spring 2015						A		
Fall 2015-Spring 2016	S		S		S	S	S	S

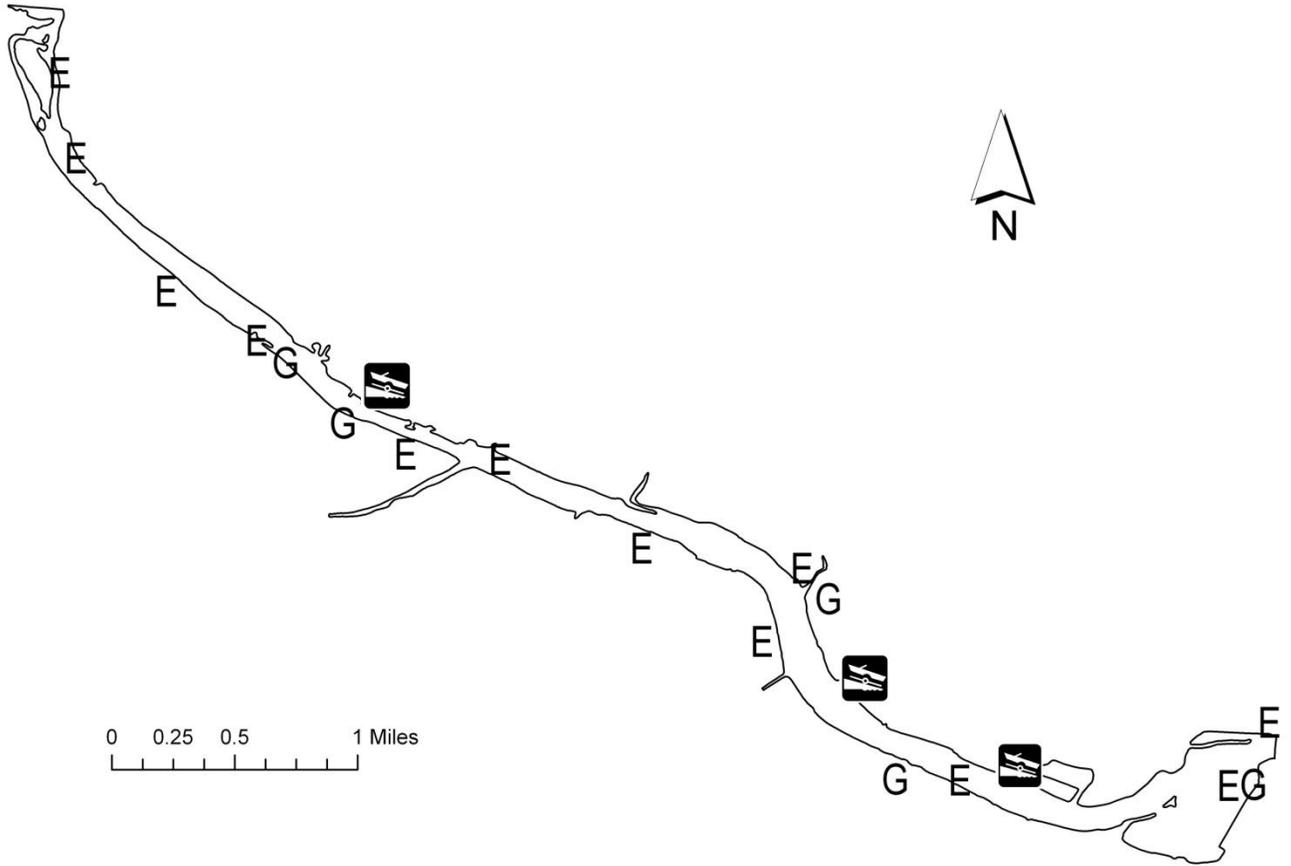
**APPENDIX A**

Number (N) and catch rate (CPUE) of all species collected from all gear types from Lady Bird Reservoir, Texas, 2011-2012.

Species	Electrofishing		Gill Netting	
	CPUE	N	CPUE	N
Gizzard shad	84.0	84		
Common carp	13.0	13		
Inland silverside	2.0	2		
Mexican tetra	6.0	6		
Channel catfish			0.4	2
Flathead catfish			0.6	3
Redbreast sunfish	110.0	110		
Green sunfish	3.0	3		
Warmouth	11.0	11		
Bluegill	142.0	142		
Longear sunfish	3.0	3		
Redear sunfish	16.0	16		
Redspotted sunfish	37.0	37		
Largemouth bass	128.0	128		
Logperch	1.0	1		
Rio Grande cichlid	2.0	2		

**APPENDIX B**

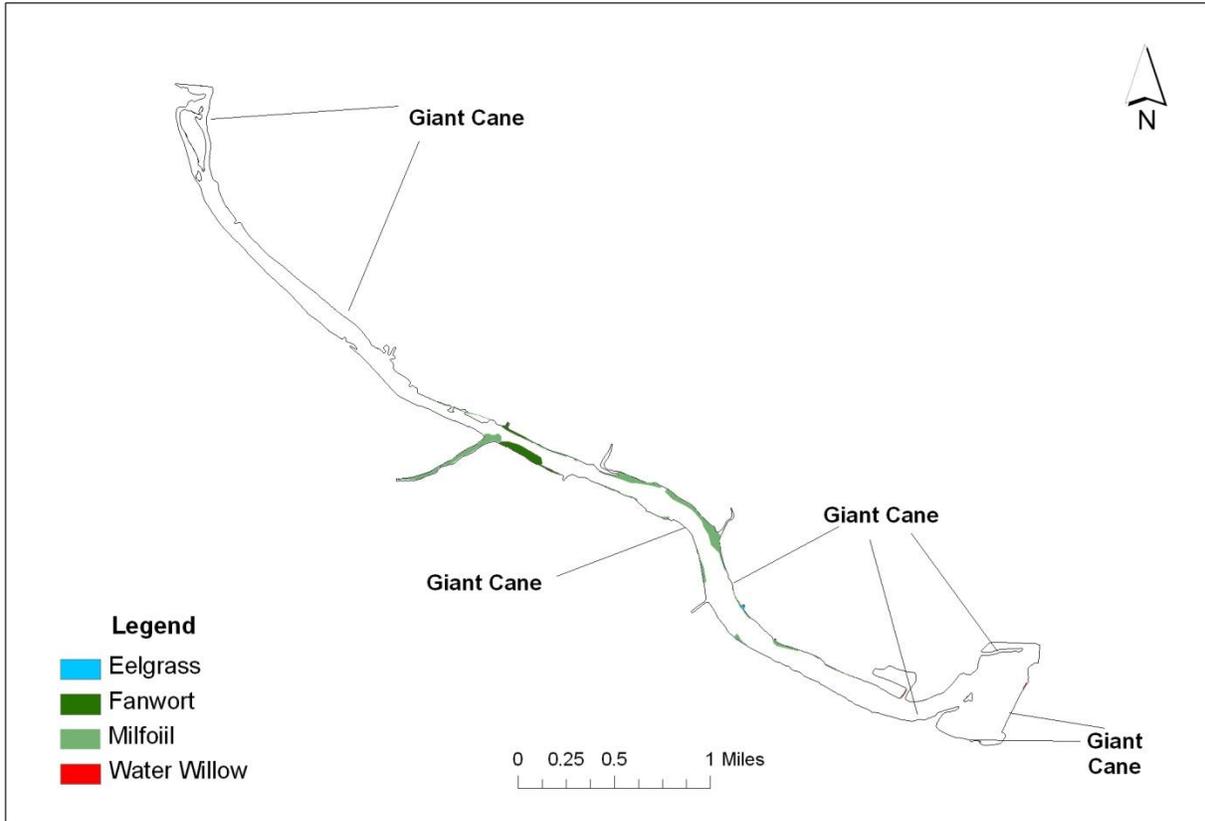
Location of sampling sites, Lady Bird Reservoir, Texas, 2011-2012. Gill net and electrofishing stations are indicated by G and E, respectively.



**APPENDIX C**

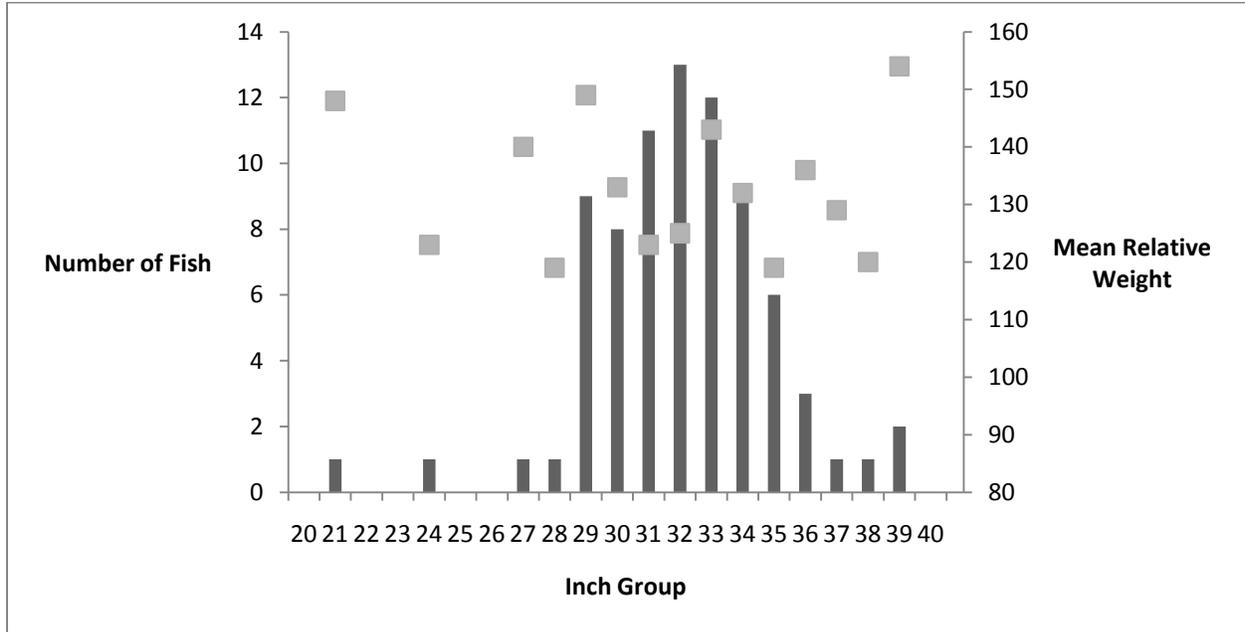
Aquatic vegetation survey coverage map for Lady Bird Reservoir, Texas, August 2011.

**Ladybird Vegetation Survey August 2011**



### APPENDIX D

Number of common carp (bars, N=79) and mean relative weight (squares) of fish captured during the 11<sup>th</sup> annual Austin Team Championship tournament, Lady Bird Reservoir, Texas, February 24-25, 2012. Length data was obtained from CAG by special request since the tournament rankings are determined solely by weight of carp.



### APPENDIX E

Total catch rate (number per hour of angling) of common carp captured during the annual Austin Team Championship tournament, Lady Bird Reservoir, Texas, 2008, 2010 – 2012. The 2012 tournament was fished late February while the others were fished late March. This is a two-day tournament where anglers draw pegs (designated bank fishing locations) on each day and are required to fish those locations for the whole day.

Year	Number of Anglers	Tournament Duration (h)	Total Effort (h)	Number of Carp	Catch Rate (Carp/h)
2012	44	24	1056	79	0.08
2011	34	24	816	139	0.17
2010	36	24	864	103	0.12
2008	30	24	720	128	0.18