PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

Martin Creek Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Martin Creek Reservoir were surveyed in 2015 using electrofishing and in 2016 using gill netting and baited tandem hoop netting. Historical data are presented with the 2015-2016 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Martin Creek Reservoir is located on Martin Creek, a tributary of the Sabine River in Rusk County. Luminant Energy impounded the reservoir in 1974 to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres with a shoreline length of 62 miles and a mean depth of 16 feet. Water level fluctuations average 3 to 5 feet annually.

- **Management History:** The management plan from the 2009 survey report included working in conjunction with Martin Creek State Park and Luminant Energy to prevent additional introductions of giant salvinia. Additionally, annual aquatic vegetation surveys were recommended to ensure that a rapid response could occur if giant salvinia was reintroduced. State Park personnel have been vigilant in inspecting boat trailers. Several giant salvinia introductions have been identified and quickly eliminated. Triploid grass carp were stocked from 1996 through 1999 at a rate of 0.6/acre each year to reduce hydrilla that covered about a third of the reservoir. Aquatic vegetation was introduced in 2012, and brushpiles were introduced in 2014. Submersed aquatic vegetation coverage has increased in recent years.

- **Fish Community**
  - **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch rates of Gizzard Shad and Bluegill have increased compared to those of previous surveys, and both species served as an excellent prey source for Largemouth Bass in the reservoir.

  - **Catfishes:** Blue Catfish and Channel Catfish were present in the reservoir. The gill netting catch rate of Blue Catfish was lower than it was in the previous survey. The Channel Catfish population continued to have few fish over 12 inches available to anglers. Flathead Catfish were present in the reservoir.

  - **Largemouth Bass:** Largemouth Bass abundance has increased compared to that of previous surveys. This is likely due to the recent increase in submersed aquatic plant coverage in the reservoir. Largemouth Bass had fast growth (age at 14 inches long was 2.0 years), but few fish over 14 inches were available to anglers.

  - **Crappie:** White Crappie and Black Crappie have been present in the reservoir, but they usually exist in low density. Also, few anglers have been documented fishing for crappie in the past. Therefore, no sampling was conducted for crappie during this report period.

Management Strategies: The threat of giant salvinia introduction to this reservoir is high. Continue to work with state park staff, TPWD Aquatic Habitat Enhancement, and Luminant Energy to monitor and manage for invasive aquatic plant introductions. Conduct annual invasive aquatic plant surveys. Continue to investigate alternative sampling gears to monitor catfish populations.

INTRODUCTION

This document is a summary of fisheries data collected from Martin Creek Reservoir in 2015-2016. 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 fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2015-2016 data for comparison.

Reservoir Description

Martin Creek Reservoir was impounded in 1974 on Martin Creek. It is located in Rusk County approximately 10 miles northeast of Henderson and is operated and controlled by Luminant Energy to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres in size and has a shoreline length of 62 miles and a mean depth of 16 feet. Water level fluctuations average three to five feet annually, but the reservoir was over 10 feet below conservation pool during 2011 (Figure 1). The primary habitat type is standing timber. Most of the land around the reservoir is used for agriculture and oil and gas production. Other descriptive characteristics for Martin Creek Reservoir are presented in Table 1.

Angler Access

Martin Creek Reservoir has a public boat ramp and one handicap-accessible fishing pier present at Martin Creek State Park and a private ramp located on Luminant Energy property. Both ramps were unavailable to anglers in 2011 due to low water levels. Additional boat ramp characteristics are listed in Table 2. Shoreline access is limited to Martin Creek State Park and from the causeways that cross the reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ashe and Driscoll 2014) included:

1. Minimize the threat of giant salvinia introduction to the reservoir. Encourage Martin Creek State Park personnel to inspect all boat trailers entering the park for invasive plants. Conduct annual vegetation surveys to monitor for the presence of invasive aquatic vegetation.
   Action: State park superintendent stated they do not have manpower to inspect every boat that enters the park. However, park staff have been very active in monitoring the boat ramp and boat trailers for giant salvinia, especially during large fishing tournaments. Their efforts have resulted in early detection of giant salvinia on several occasions. Inland Fisheries staff were able to respond to infestations rapidly and physically removed individual giant salvinia plants. Herbicide treatments were also conducted. Annual aquatic vegetation surveys have been conducted to monitor for the presence of invasive species.
2. Conduct annual aquatic vegetation surveys to monitor for the reestablishment of hydrilla. Consult with Luminant Energy and state park to develop vegetation management plan. Introduce water willow to improve habitat. Assist state park with brushpile projects.
   Action: Hydrilla has started to reestablish in the reservoir. Herbicide spot-treatments will be conducted adjacent to the state park to maintain access for boating, fishing, and swimming.

Harvest regulation history: Sport fishes in Martin Creek Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Blue Catfish were stocked in 2003 (273,789 fingerlings) and 2007 (249,050 fingerlings). Approximately 3,000 triploid Grass Carp were stocked annually from 1996 through 1999. The complete stocking history is listed in Table 4.

Vegetation/habitat management history: The controlling authority stocked triploid Grass Carp in 1993 and 1996 through 1999 to reduce hydrilla that had become problematic. The reservoir had nearly 35% hydrilla coverage prior to the triploid Grass Carp stockings. Giant salvinia was discovered in June 2009 and was eradicated until recent introductions in 2015 and 2016. Early detection of these introductions allowed rapid response with a combination of physical removal and herbicide treatment. Aquatic vegetation (water willow, water stargrass, and Illinois pondweed) was introduced in 2012 with limited success. Brush piles were installed in 2014.

Water transfer: There is no interbasin transfer associated with the operation of Martin Creek Reservoir. Martin Creek Reservoir does have the ability to pump water from the Sabine River when needed, and water is released through the dam to maintain flow downstream and to manage pool elevation.

METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Martin Creek Reservoir (TPWD unpublished). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 13 randomly-selected fish (range 13.0 to 14.7 inches).

Gill netting – Channel Catfish and Blue Catfish were collected by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

Low-frequency electrofishing – The OBS plan included low-frequency electrofishing to survey the Blue Catfish population. The survey was attempted, but only one Blue Catfish was collected after 9 stations. Therefore, it was determined that this survey method would not be effective.

Tandem hoop nets – Channel Catfish were collected using 10 tandem hoop-net series at 10 stations. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series).

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2015.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV)

was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

Habitat – A structural habitat survey was conducted in 2005 (Ashe and Driscoll 2006). Vegetation surveys were conducted in 2014 – 2015 to monitor expansion of hydrilla and to inspect for giant salvinia. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Water level – Source for water level data was the United States Geological Survey (USGS 2016).

RESULTS AND DISCUSSION

Habitat: A structural habitat survey was last conducted in 2005 (Ashe and Driscoll 2006). During the 2015 aquatic vegetation survey, native vegetation covered 10% of the reservoir's surface area (Table 6). Hydrilla has expanded from 3 acres in 2014 to 21 acres in 2015 (Table 6). While no giant salvinia has been documented in recent surveys, there have been several introductions of the plant at the public boat ramp in the state park. Early detection and rapid response (physical removal and herbicide treatment) have been successful in eliminating giant salvinia from the reservoir.

Prey species: The electrofishing catch rate of Gizzard Shad was higher in 2015 (78/h) than it was in 2013 (31/h) or 2009 (25/h) (Figure 2). Index of vulnerability (IOV) for Gizzard Shad was high, indicating that 78% of Gizzard Shad were available to existing predators; this was higher than IOV estimates in previous years (Figure 2). Total CPUE of Bluegill in 2015 was higher than total CPUE from surveys in 2013 and 2009, and size structure was dominated by small individuals (Figure 3).

Catfishes: The gill net catch rate of Blue Catfish was 6.3/nn in 2016, which was lower than total CPUE in 2014 (20.8/nn) and 2010 (12.0/nn) (Figure 4). No Blue Catfish were collected in 2016 that were < 11 inches, which indicates poor recruitment compared to 2014. Even though the sampling objective to achieve an RSE < 25 for stock length fish was met, only 63 fish were collected instead of the target 100 stock length fish (200 total fish). This was even after sampling effort was increased from 5 nets to 10 nets. Flathead Catfish were present.

The gill net catch rate of stock-length Channel Catfish was 3.3/nn in 2016 (Figure 5). This was an increase over the catch rate of the previous two surveys. Sampling objectives for gill netting were based on Blue Catfish catches, but the RSE for CPUE of stock-length Channel Catfish was 24. However, only 33 stock-length fish were collected.

Baited tandem hoop netting was much more successful at collecting a larger number of Channel Catfish (136 stock-length fish, Figure 6), which exceeded the sampling objective for length frequency and size structure data collection. However, the catch of fish in each hoop net series was more variable. The RSE of CPUE of stock-length Channel Catfish was 65 (Figure 6).

Low-frequency electrofishing for Blue Catfish failed to meet any sampling objectives. After 9 sampling stations, only one Blue Catfish had been collected. Sampling was abandoned. Even though water temperatures were within the range stated for this type of sampling, perhaps results would have been different if sampling was conducted later in the summer.

Largemouth Bass: The electrofishing catch rate of stock-length Largemouth Bass has increased steadily over the last three surveys. However, the number of fish ≥ 14 inches has been more consistent. Survey sampling objectives were met with the collection of 102 stock-sized fish and CPUE RSE = 26 (Figure 7). Growth of Largemouth Bass was fast. The average age of 14-inch fish was 1.8 years (N = 13; range = 1 to 3 years). Body condition was good (Wr > 90) for most size classes (Figure 7). Body

condition was lower for fish >15 inches, but sample size was low. Genetic influence of Florida Largemouth Bass (FLMB) was high with 74% FLMB alleles and 7% pure FLMB in the 2015 sample (Table 7).

Crappie: Black and White Crappie are present in Martin Creek Reservoir, but trap netting surveys have historically caught few fish. Efforts to increase the catch of crappie in 2009 was made using procedures for dual-cod trap nets, but only 1 White Crappie and 6 Black Crappie were caught during the survey. Trap net surveys were discontinued after 2009. There has been very little directed angling effort for crappie estimated during recent winter angler creel surveys (2009-2010 = 5.2%; 2013-2014 = 0.8%). Therefore, sampling this low density fishery was determined to be unnecessary.

Fisheries management plan for Martin Creek Reservoir, Texas

Prepared – July 2016

ISSUE 1: Giant salvinia was first discovered in Martin Creek Reservoir in June 2009. This initial infestation was contained and eliminated using herbicides. There have been several other instances in recent years in which giant salvinia has been found at the Martin Creek State Park boat ramp and on boat trailers. These infestations have also been eliminated by mechanical removal and/or herbicide applications. The threat of future giant salvinia introductions remains high.

MANAGEMENT STRATEGY

1. Continue to encourage state park personnel to inspect boat trailers and monitor the boat ramps for any invasive plant introductions.
2. Conduct annual surveys to monitor the reservoir for giant salvinia occurrence.
3. Be prepared for rapid response to reports of giant salvinia introduction (i.e., deploy floating containment booms, mechanically remove visible plants, and coordinate with TPWD Aquatic Habitat Enhancement to conduct herbicide treatment).

ISSUE 2: Hydrilla and other submersed aquatic vegetation have reestablished in the reservoir following years of little to no submersed plant presence. The Largemouth Bass and sunfish populations have responded favorably to this increase in plant growth. However, hydrilla coverage has reached nuisance levels in the past and should be monitored.

MANAGEMENT STRATEGIES

1. Conduct annual surveys to monitor hydrilla coverage.
2. Coordinate with TPWD Aquatic Habitat Enhancement to conduct herbicide treatment of hydrilla around the state park fishing pier, boat ramps, and swimming area as necessary.
3. Provide information and technical guidance to Luminant Energy related to hydrilla management.

ISSUE 3: Catfish sampling efforts in 2016 had mixed results. Traditional gill netting effort was doubled from 5 net nights to 10 net nights, but the sampling objective to collect 100 stock-length Blue Catfish was not achieved. Baited tandem hoop net sampling was successful in meeting the sampling objective to collect > 100 stock-length Channel Catfish, but variability in CPUE was high. Low-frequency electrofishing for Blue Catfish in May was unsuccessful.

MANAGEMENT STRATEGIES

1. Monitor Channel Catfish with baited tandem hoop netting during June 2019. Set 10 hoop net series on first day of sampling. If CPUE of stock-length fish RSE is > 25, and sampling objectives are attainable, set 5 additional hoop net series.
2. Monitor Blue Catfish with low-frequency electrofishing during summer 2019 at a minimum of 10 randomly-selected stations. If sampling objectives are not met, sample an additional 10 stations.
3. If neither of these alternative catfish sampling gears meet objectives, traditional gill netting will be conducted during spring 2020.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels 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 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. 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.

Objective-Based Sampling Plan and Schedule

FY 2017 – FY 2020

Sport fish, forage fish, and other important fishes

Sport fishes in Martin Creek Reservoir include Blue Catfish, Channel Catfish, Largemouth Bass, White Crappie, and Black Crappie. Known important forage species include Bluegill, Gizzard Shad, and Threadfin Shad.

Low-density fisheries

Crappie: Black and White Crappie are present in Martin Creek Reservoir, but trap netting surveys have historically caught few fish. Efforts to increase the catch of crappie in 2009 were made using procedures for dual-cod trap nets, but only 1 White Crappie and 6 Black Crappie were caught during the survey. Trap net surveys were discontinued after 2009. There has been very little directed angling effort for crappie estimated during recent winter angler creel surveys (2009-2010 = 5.2%; 2013-2014 = 0.8%). Sampling this population is unnecessary in FYs 2017 - 2020.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth bass: Largemouth bass are the most popular sport fish in Martin Creek Reservoir. Directed angling effort exceeded 85% during recent winter creel surveys (2009-2010 and 2013-2014). The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Results from the 2013-2014 winter creel survey showed directed angling effort for Largemouth Bass to be 3.2 hours/acre, and anglers caught 1.8 fish/hour. Largemouth Bass are managed with the statewide 14-in MLL regulation. Trend data on CPUE, size structure, and body condition have been collected every 4 years with fall nighttime electrofishing. Continued collection of trend data in this power plant cooling reservoir with night electrofishing in the fall every 4 years will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2019 (Table 8), but sampling will continue at random sites until 50 stock-sized fish are collected and the RSE of CPUE-S is $\leq$ 25 (the anticipated effort to meet both sampling objectives is 12 stations with 80% confidence). The previous 3 surveys have achieved this objective with 12 electrofishing stations. In addition to the original 12 random stations, 3 additional random stations will be pre-determined in the event some extra sampling is

necessary to achieve objectives. Fin samples will be taken from 30 fish every 4 years beginning in 2015 and submitted for genetic analysis to monitor trends of Florida Largemouth Bass genetic influence in the population. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected in 2019 to determine mean age at 14 inches to monitor large-scale changes in growth that may indicate the need for further investigation. Relative weight of Largemouth Bass $\geq$ 8 inches (total length) will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class). A winter-quarter angler creel survey will be conducted in 2019-2020 to monitor the Largemouth Bass fishery.

Catfish: Blue Catfish and Channel Catfish are present in Martin Creek Reservoir. The use of alternative sampling gears to monitor the catfish populations instead of traditional gill netting will reduce the by-catch and unnecessary mortality of non-target species that is often experienced with gill nets. Also, gill netting has not been successful in collecting a desired number of stock-length fish to calculate reliable size structure indices and length frequencies.

The Channel Catfish population will be surveyed using baited tandem hoop nets during June 2019 (Table 8). The estimated number of baited hoop net sets to achieve an RSE for CPUE-S ≤ 25 is 10 sets using the recommended 2-night soak duration. A target of 100 stock sized fish should provide an adequate PSD estimate per the tandem hoop net procedures (PSD within 10% with 80% confidence, 75-140 fish are recommended). Hoop netting in 2016 collected 136 stock-length fish in 10 hoop net series, but RSE for CPUE-S was 65. If survey sampling objectives are not achieved in the first 10 hoop net series and the sampling objectives are attainable, an additional 5 hoop net series will be sampled.

The Blue Catfish population at Martin Creek Reservoir had been expanding in recent years, but the gill netting survey in 2016 did not collect as many fish as it did in 2014. Low-frequency electrofishing was attempted during May 2016 but only caught one Blue Catfish in nine stations. This survey method may be more successful during summer months. For Blue Catfish, the minimum number of LFE stations recommended by TPWD Inland Fisheries procedures is 10 stations that produce a catch > 0 with a total sample of 200 fish. We will initially collect fish at 10 randomly-selected stations during summer 2019 (Table 8). If we do not meet our target of RSE for CPUE-S ≤ 25 and a minimum 200 fish sample, and the sampling objectives are attainable, we will sample an additional 10 randomly-selected stations. Our maximum sampling effort for LFE will be 20 stations.

If low-frequency electrofishing is not successful in collecting Blue Catfish, gill netting can be conducted during spring 2020 (Table 8). Our target for Blue Catfish will be 100 stock-length fish (with a total sample of >200 fish), with a target RSE ≤ 25 for CPUE-S. We estimated that 10 net nights is needed to achieve 100 stock-length fish. However, because the population had been expanding, we may achieve our targets with a minimum of 5 randomly set gill nets. If targets are not met after the first 5 nets, we will set nets at an additional 5 randomly set locations. The anticipated effort to achieve an RSE ≤ 25 for CPUE-S with 80% confidence is 6 net nights. Our maximum sampling effort will be 10 net nights.

A winter-quarter angler creel survey will be conducted in 2019-2020 to monitor the catfish fishery.

Bluegill and shad: Bluegill is the primary forage at Martin Creek Reservoir. Gizzard Shad and Threadfin Shad are present but not as abundant as Bluegill. Shad species will be surveyed for presence/absence during electrofishing surveys. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in Bluegill and Gizzard Shad relative abundance and size. No additional effort will be expended beyond effort necessary to achieve Largemouth Bass objectives. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density. Relative weight of Largemouth Bass $\geq$ 8” TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

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Water Level

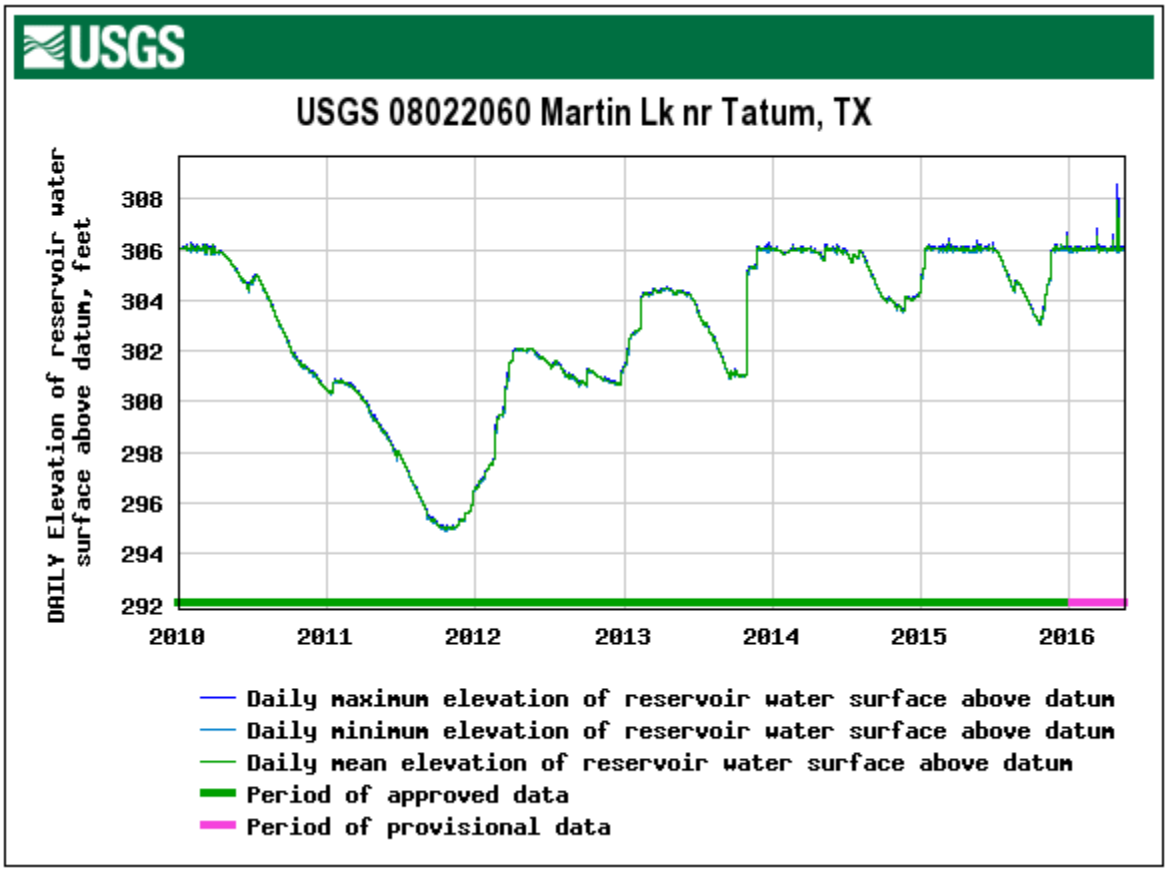


Figure 1. Daily water level elevations in feet above mean sea level (MSL) recorded for Martin Creek Reservoir, Texas. Conservation pool elevation is 306 ft. MSL.

Table 1. Characteristics of Martin Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1974
Controlling authority	Luminant Energy
Counties	Rusk
Reservoir type	Secondary stream
Shoreline Development Index (SDI)	4.7
Conductivity	120 umhos/cm

Table 2. Boat ramp characteristics for Martin Creek Reservoir, Texas, May 2016. Reservoir elevation at time of survey was 306 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
State Park	32.27379 -94.56583	Y	50	302	No access issues
Luminant Energy	32.26949 -94.58557	N	20	301	No access issues

Table 3. Harvest regulations for Martin Creek Reservoir.

Species	Bag limit	Length limit
Catfishes: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappies: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Martin Creek Reservoir, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Blue Catfish	1974	81,520	UNK
	1982	600	UNK
	1984	100,758	FGL
	1985	50,062	FGL
	2003	273,789	FGL
	2004	200	ADL
	2007	249,050	FGL
	Total	755,979	
Channel Catfish	1973	15	UNK
	1974	100,888	AFGL
	Total	100,903	
Florida Largemouth Bass	1974	365,000	FRY
	1984	559,970	FGL
	1990	251,357	FRY
	Total	1,176,327	
Palmetto Bass	1974	49,880	UNK
	1975	15,000	UNK
	1983	49,800	UNK
	1984	99,875	FGL
	Total	214,555	
Redbreast Sunfish	1983	346,853	
	1984	404,236	
	Total	751,089	
Triploid grass carp	1993	800	AFGL
	1996	2,899	AFGL
	1997	2,857	AFGL
	1998	3,000	AFGL
	1999	3,000	AFGL
	Total	12,556	
Walleye	1974	1,250,676	FRY
	Total	1,250,676	
White Crappie	1983	30,913	UNK
	1984	134,227	FGL
	1986	91,696	FRY
	Total	256,836	

Table 5. Objective-based sampling plan components for Martin Creek Reservoir, Texas 2015 – 2016.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Abundance	CPUE – stock	RSE-stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	N = 30, any age
Bluegill [a]	Abundance	CPUE – total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad			Presence/absence
Threadfin Shad			Presence/absence
Low-frequency electrofishing			
Blue Catfish	Abundance	CPUE – stock	RSE-stock ≤ 25
	Size structure	Length frequency	N ≥ 200
Gill netting			
Blue Catfish	Size structure	PSD, length frequency	N = 100 stock (200 total)
	Abundance	CPUE – stock	RSE-stock ≤ 25
Channel Catfish			Survey targets based on Blue Catfish catch
Tandem hoop netting			
Channel Catfish	Abundance	CPUE– stock	RSE-stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 100 stock

[a] No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of aquatic vegetation, Martin Creek Reservoir, Texas, 2014 – 2015. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014	2015
Native submersed		14 (0.3)
Native floating-leaved		377 (7.6)
Native emergent		72 (1.4)
Non-native		
Giant salvinia (Tier I)[a]	[b]	[b]
Hydrilla (Tier II)[a]	3 (0.1)	21 (0.4)
Alligatorweed (Tier III)[a]	4 (0.1)	Present

[a] Tier I is immediate response, Tier II is management status, Tier III is watch status.
[b] Giant salvinia has been detected and removed from boat ramp area on several occasions.

Gizzard Shad

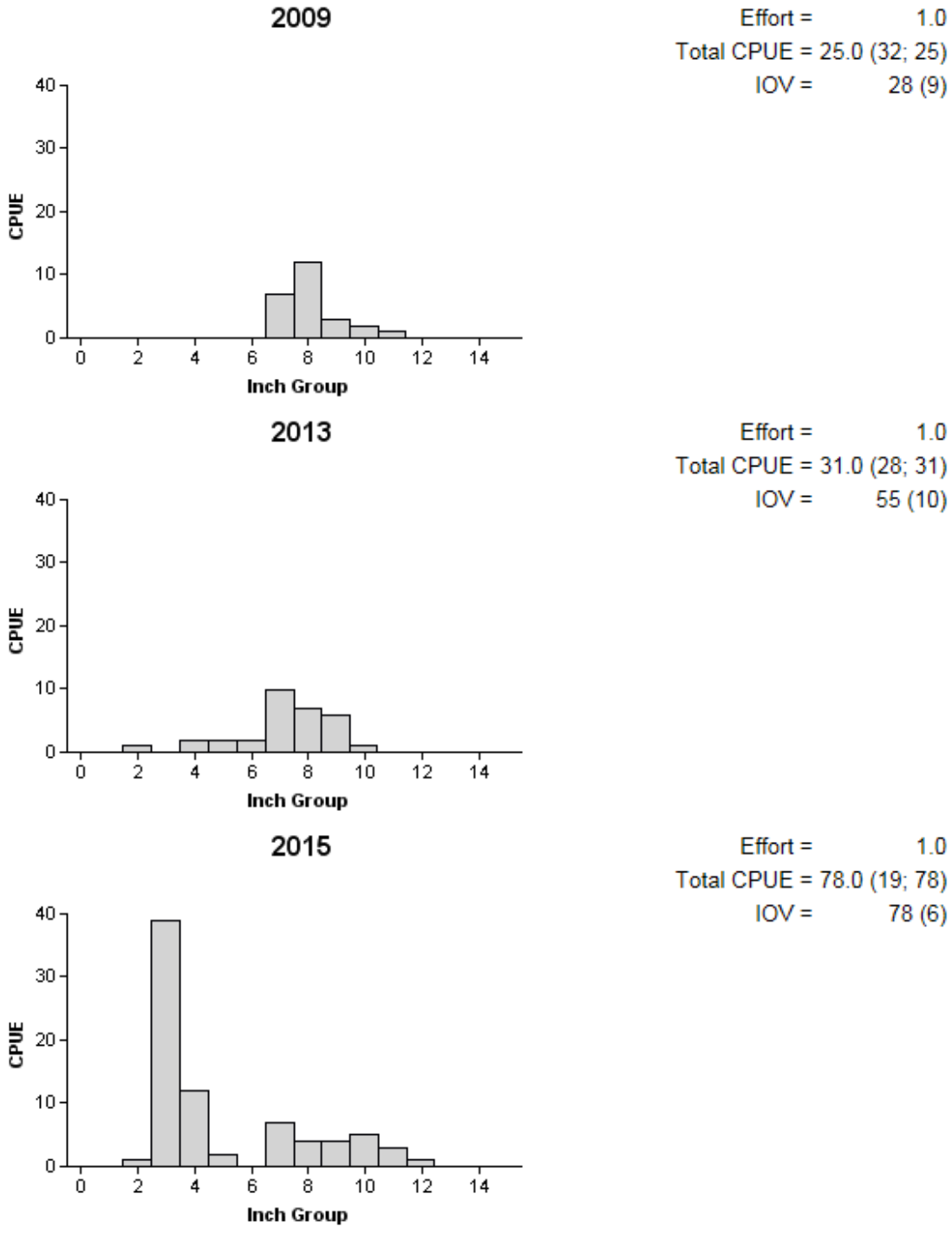


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2009, 2013, and 2015.

Bluegill

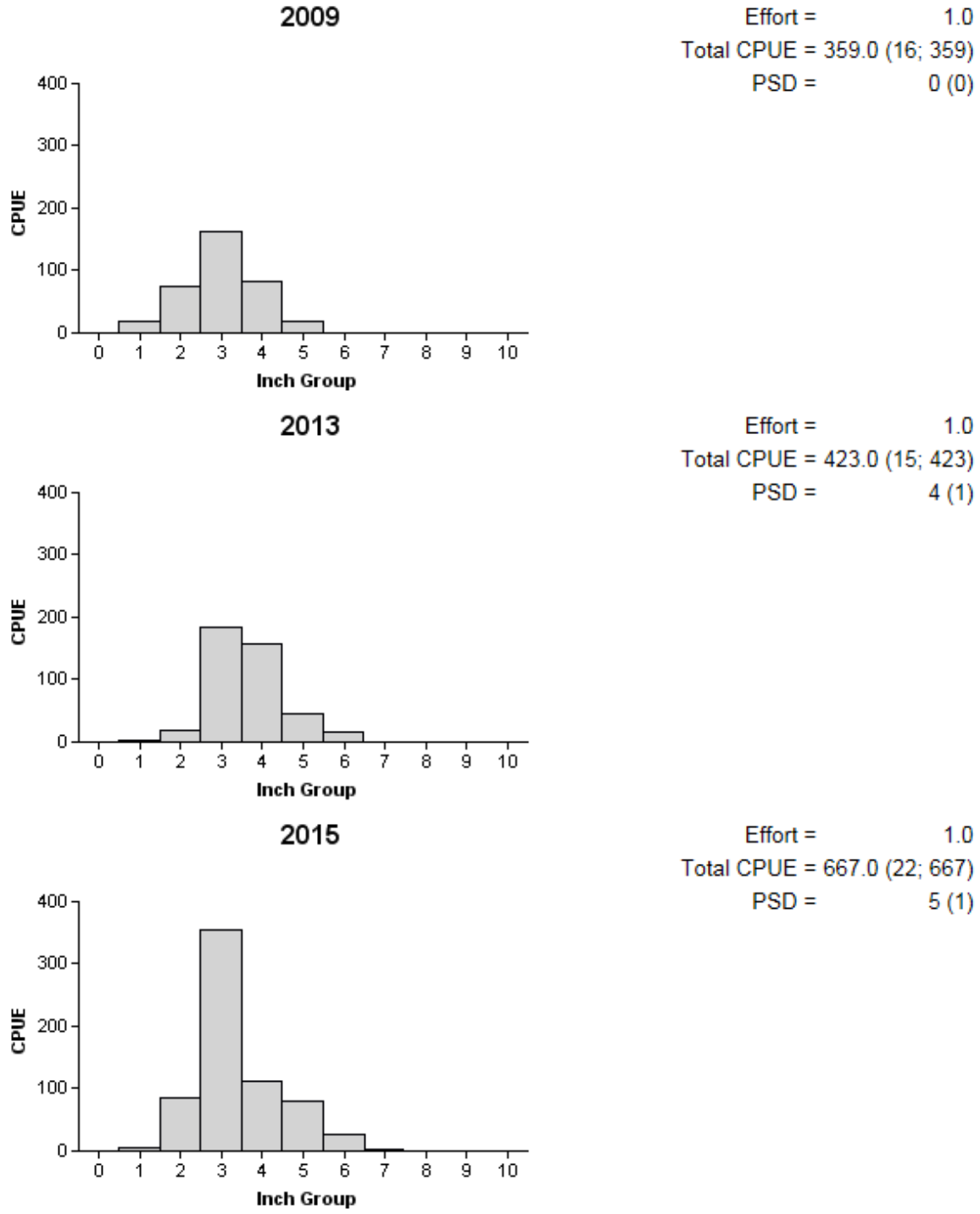


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2009, 2013, and 2015.

Blue Catfish

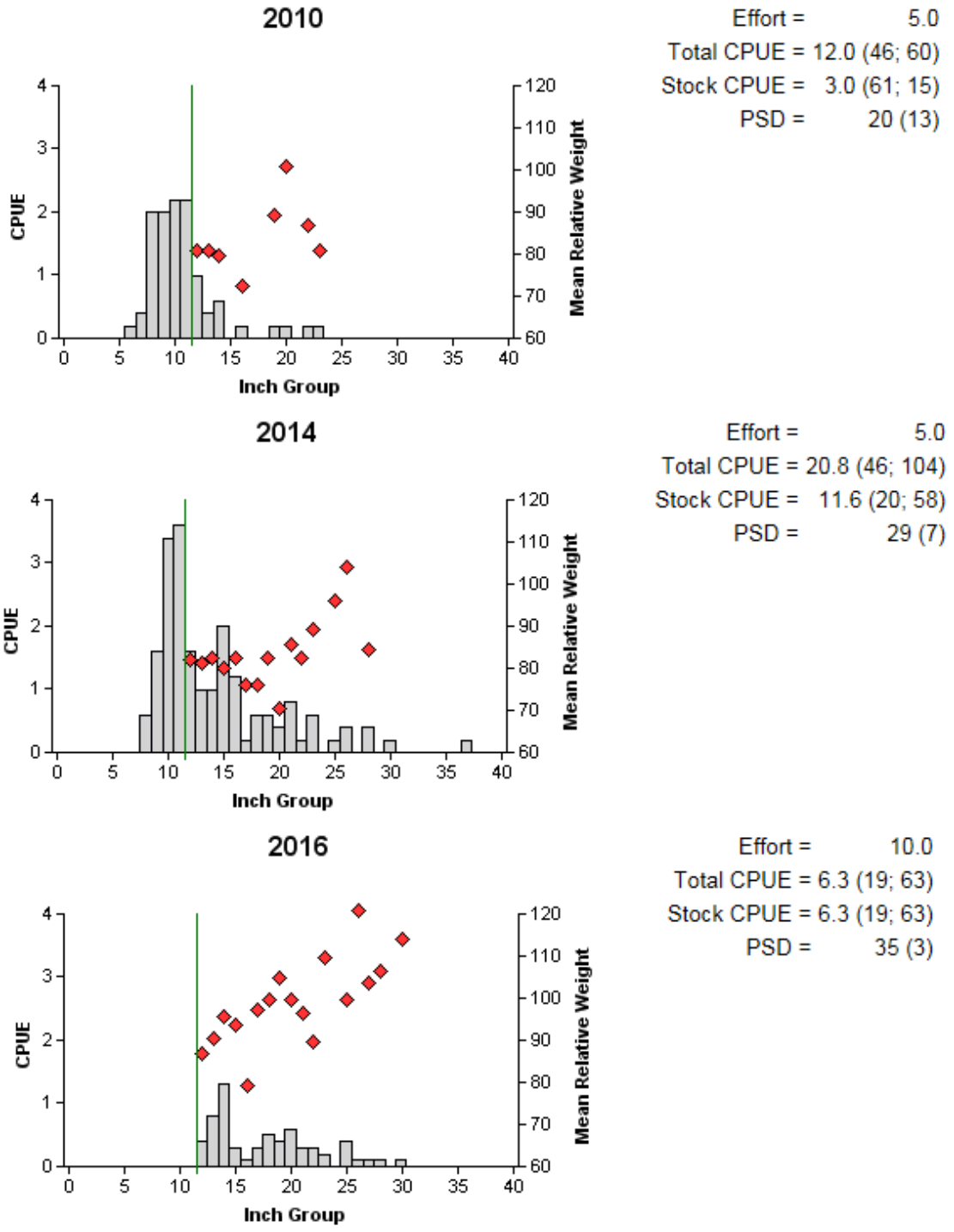


Figure 4. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Martin Creek Reservoir, Texas, 2010, 2014, and 2016. Vertical line indicates minimum length limit.

Channel Catfish

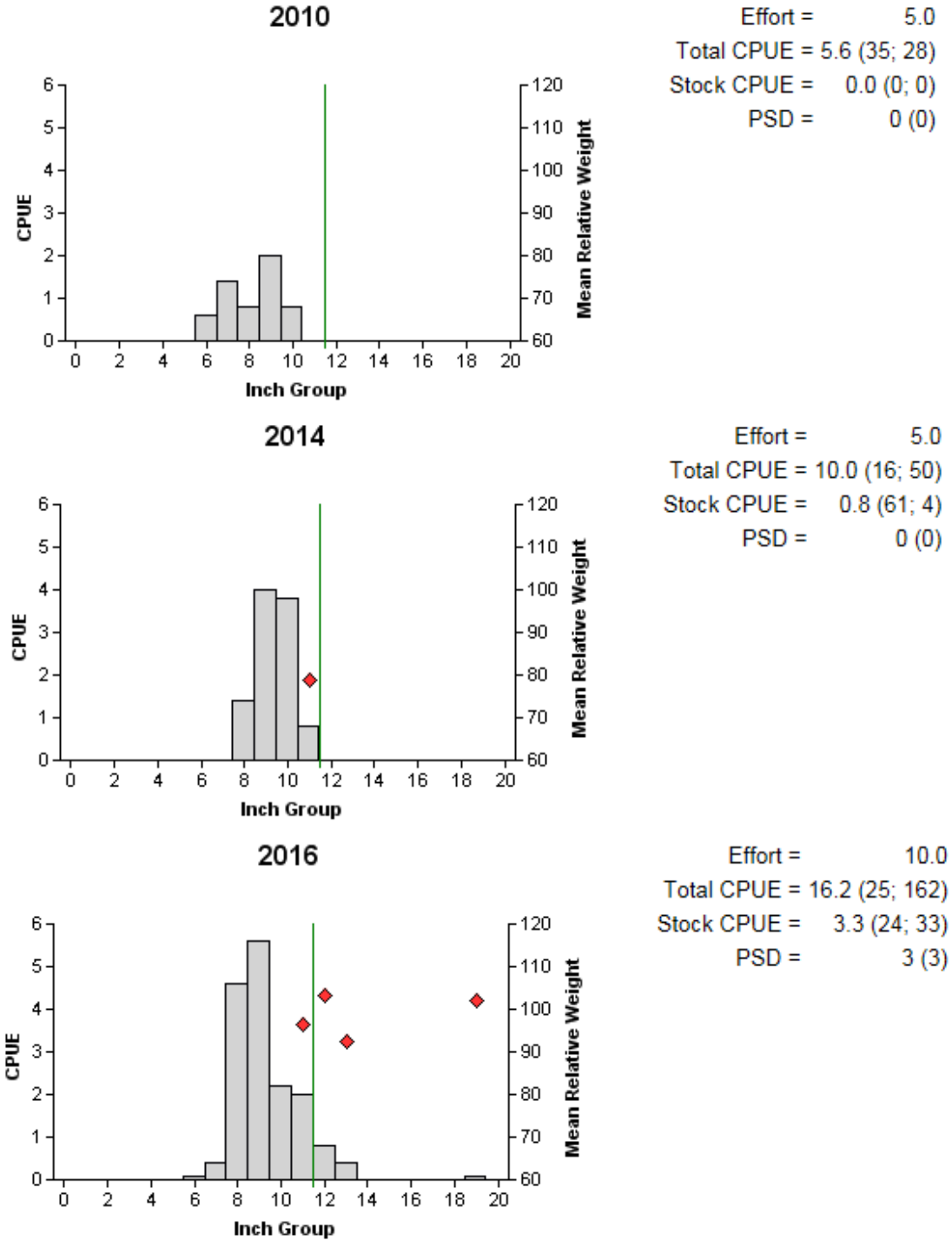


Figure 5. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Martin Creek Reservoir, Texas, 2010, 2014, and 2016. Vertical line indicates minimum length limit.

Channel Catfish

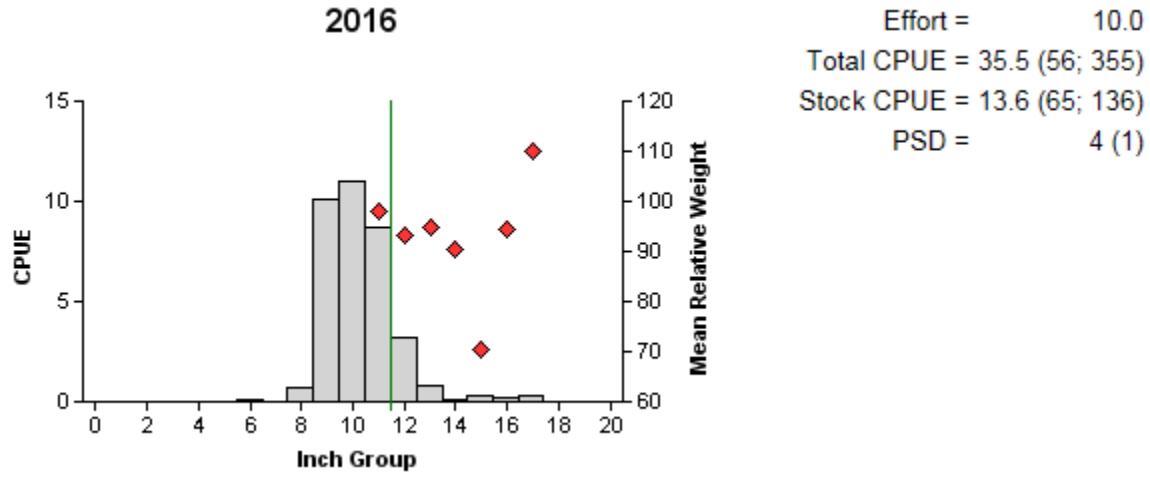


Figure 6. Number of Channel Catfish caught per net series (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring tandem hoop net surveys, Martin Creek Reservoir, Texas, 2016. Vertical line indicates minimum length limit.

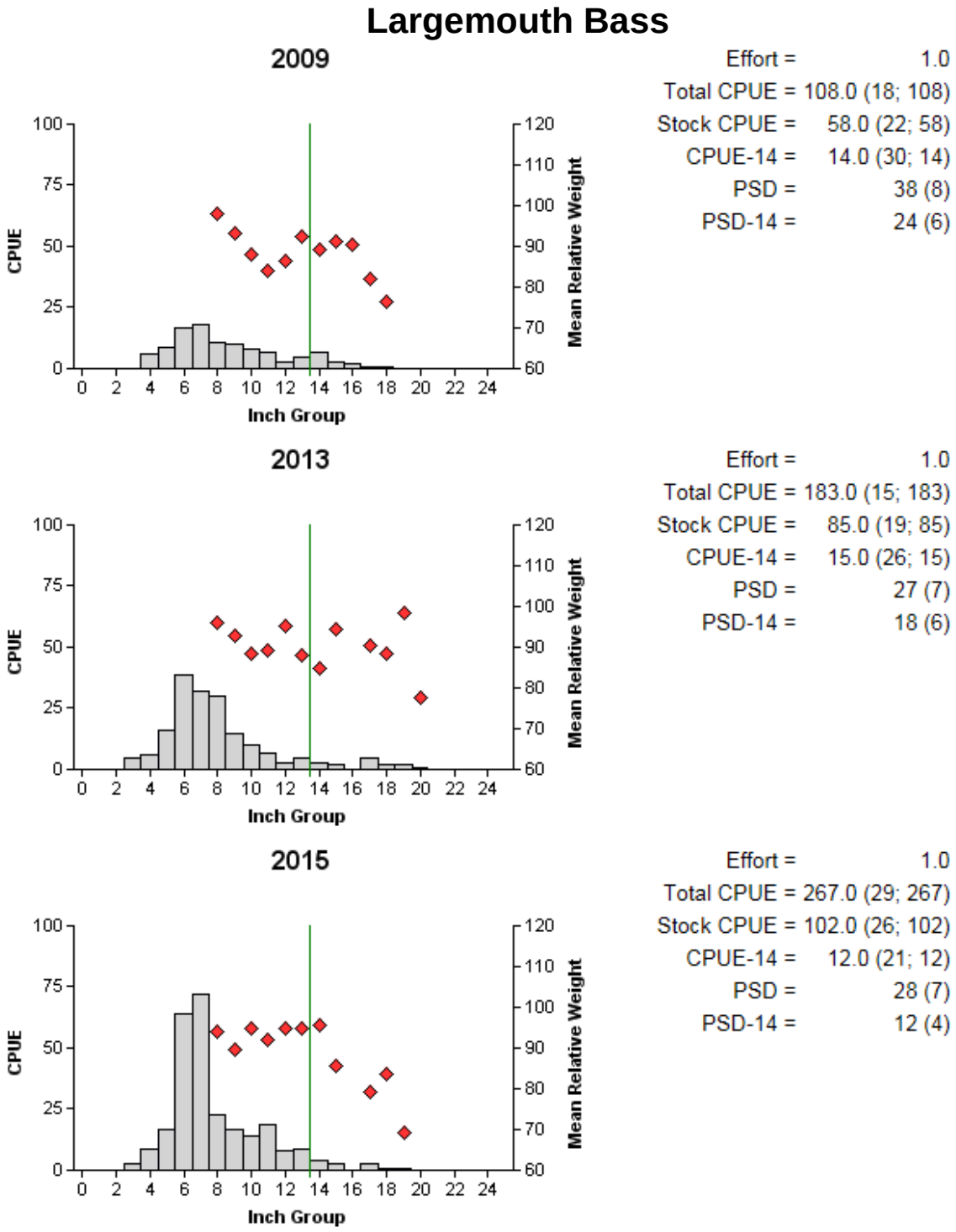


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2009, 2013, and 2015. Vertical line indicates minimum length limit.

Largemouth Bass

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Martin Creek Reservoir, Texas, 2005, 2009, 2013, and 2015. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by micro-satellite DNA analysis.

		Number of fish				
Year	Sample size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB
2005	55	1	54	0	65.4	2.0
2009	30	0	30	0	62.0	0.0
2013	30	2	28	0	59.0	7.0
2015	30	2	28	0	74.0	7.0

Table 8. Proposed sampling schedule for Martin Creek Reservoir, Texas. Survey period is June through May. Hoop netting survey will be conducted in June, low-frequency electrofishing survey will be conducted during summer, standard electrofishing will be conducted in fall, and gill netting surveys will be conducted in the spring. Standard survey denoted by S and additional survey denoted by A.

					Habitat				
Survey year	Electrofish	Hoop net	LFE	Gill net	Structural	Vegetation	Access	Creel survey	Report
2016-2017						A			
2017-2018						A			
2018-2019						A			
2019-2020	S	A	A	S	S	S	S	A*	S

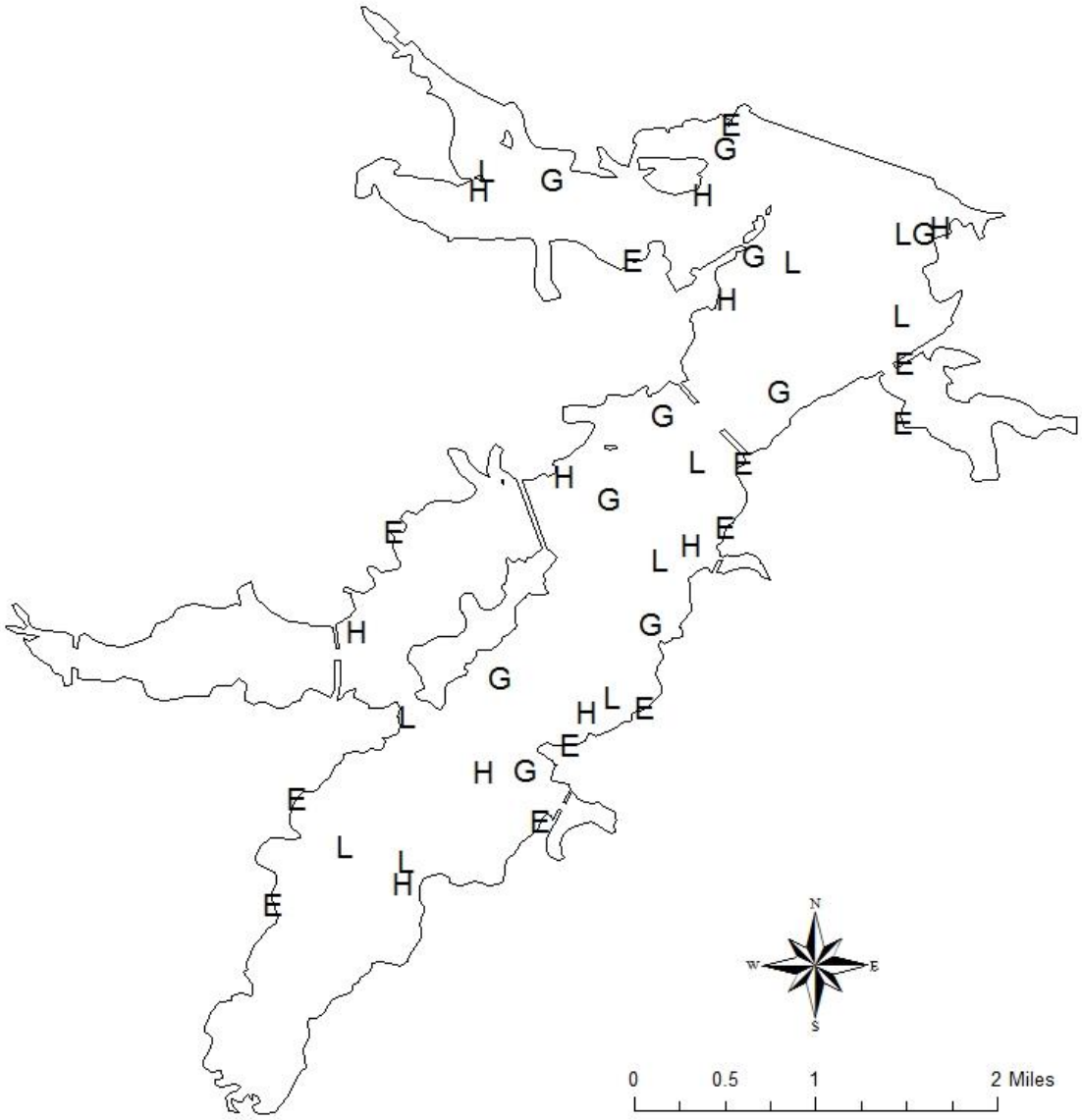
* Winter-quarter creel survey.

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Martin Creek Reservoir, Texas, 2015-2016. Sampling effort was 10 net nights for gill netting, 10 net series for tandem hoop netting, and 1 hour for electrofishing.

Species	Gill Netting		Hoop Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					78	78.0
Threadfin Shad					162	162.0
Blue Catfish	63	6.3				
Channel Catfish	162	16.2	355	35.5		
Flathead Catfish	4	0.4				
Redbreast Sunfish					13	13.0
Bluegill					667	667.0
Longear Sunfish					93	93.0
Redear Sunfish					10	10.0
Largemouth Bass					267	267.0

APPENDIX B



Location of sampling sites, Martin Creek Reservoir, Texas, 2015-2016. Hoop netting, gill netting, low-frequency electrofishing, and electrofishing stations are indicated by H, G, L, and E, respectively. Water level was near full pool at time of sampling.