

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-6

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

**Naconiche Reservoir**

Prepared by:

Dan Ashe, Assistant District Management Supervisor  
and  
Todd Driscoll, District Management Supervisor

Inland Fisheries Division  
Jasper District  
Brookeland, Texas



Carter Smith  
Executive Director

Craig Bonds  
Director, Inland Fisheries

July 31, 2016

TABLE OF CONTENTS

Survey and Management Summary ..... 1

Introduction ..... 2

Reservoir Description ..... 2

Angler Access ..... 2

Management History ..... 2

Methods ..... 3

Results and Discussion ..... 4

Fisheries Management Plan ..... 6

Literature Cited..... 9

Figures and Tables..... 10-24

    Reservoir Characteristics (Table 1) ..... 10

    Boat Ramp Characteristics (Table 2)..... 10

    Harvest Regulations (Table 3)..... 10

    Stocking History (Table 4) ..... 11

    Objective Based Sampling Plan for 2015-2016 (Table 5) ..... 12

    Structural Habitat Survey (Table 6)..... 13

    Aquatic Vegetation Survey (Table 7) ..... 13

    Percent Directed Angler Effort per Species (Table 8)..... 13

    Total Fishing Effort and Fishing Expenditures (Table 9) ..... 13

    Gizzard Shad (Figure 1) ..... 14

    Bluegill (Figures 2-3; Table 10)..... 15

    Channel Catfish (Figures 4-5; Table 11) ..... 17

    Largemouth Bass (Figures 6-8; Tables 12-13)..... 19

    Crappies (Figure 9; Table 14) ..... 23

    Proposed Sampling Schedule (Table 15) ..... 24

Appendix A

    Catch Rates for all Species from all Gear Types..... 25

Appendix B

    Map of 2015-2016 Sampling Locations..... 26

Appendix C

    Angler opinion survey..... 27

## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Naconiche Reservoir were surveyed in 2015-2016 using electrofishing and gill netting. Anglers were surveyed from March through May 2016 with a creel survey. 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:** Naconiche Reservoir is an impoundment of Naconiche and Telesco creeks, tributaries of the Attoyac Bayou in the Neches River Basin. The lake was constructed by the County of Nacogdoches for recreation and flood control. This reservoir has a surface area of 692 acres at conservation pool (348 feet msl), a shoreline length of 22.7 miles, and an average depth of 13 feet. Access is available with a two lane boat ramp and an ADA-approved fishing pier. Bank access is adequate. Primary fish habitat is hydrilla and timber.
- **Management History:** Important sport fish include Largemouth Bass and Black Crappie. The management plan from the 2011 survey report included stocking Largemouth Bass at 100 fish/acre every year. The reservoir was opened to the public in September 2012 with an 18-inch minimum length limit. Florida Largemouth Bass have been stocked annually since 2011. Hydrilla was first observed as the reservoir began to fill in 2008 and annual vegetation surveys have been conducted since 2012. Giant salvinia was introduced in 2015. Herbicide treatments and manual removal have limited coverage to < 5 surface acres.
- **Fish Community**
  - **Prey species:** Threadfin Shad and Bluegill were the most abundant prey species and provided ample forage for sport fish. Gizzard Shad were also present but abundance was low and few fish were available as prey. Electrofishing catch of Bluegills declined in 2015 and few fish were > 6 inches.
  - **Catfishes:** Although Channel Catfish were stocked in 2009 and 2011, only two adult fish were collected from gill net surveys in 2014 and 2016. Channel Catfish recruitment has likely been limited by predation from the abundant Largemouth Bass population.
  - **Largemouth Bass:** Largemouth Bass were abundant; size structure and fish condition were good. Few legal-size fish were available to anglers. Largemouth Bass had adequate growth rates (age at 14 inches was 2.8 years). The Largemouth Bass fishery was most popular (86% of fishing effort), and the angler catch rate was 0.7 /h.
  - **Crappies:** The crappie fishery was the second most popular (11% of fishing effort). Since 2012, angler catch rate and total harvest have declined. During the last three creel surveys, Black Crappie comprised nearly all of the angler harvest (only one White Crappie was observed).

**Management Strategies:** Effective September 1, 2016, manage Largemouth Bass with a 16-inch maximum length limit. Continue stocking Florida Largemouth Bass annually at 100 fish/acre. Conduct additional spring electrofishing surveys in 2018 and 2020, and a standard fall electrofishing survey in 2019. Conduct a spring quarter creel survey in 2020. Survey giant salvinia coverage as needed to monitor effects of control measures.

## INTRODUCTION

This document is a summary of fisheries data collected from Naconiche 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*

Naconiche Reservoir is a 692-acre reservoir impounded in 2009 on Naconiche and Telesco creeks. It is located in Nacogdoches County approximately 14 miles northeast of Nacogdoches and is operated and controlled by the County of Nacogdoches for recreation and flood control. The lake opened for public fishing on September 1, 2012. Aquatic habitat consisted of standing timber, hydrilla, and trace amounts of emergent plants. The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development. Other descriptive characteristics for Naconiche Reservoir are in Table 1.

### *Angler Access*

Naconiche Reservoir has one public boat ramp. Additional boat ramp characteristics are in Table 2. Shoreline access is good and an ADA-approved fishing pier is present.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Ashe and Driscoll 2012) included:

1. Manage the Largemouth Bass fishery with an 18-inch minimum length limit and monitor the population with fall and spring electrofishing surveys. Conduct angler creel surveys to assess catch, harvest, and angler opinion regarding future harvest regulations. Stock Florida Largemouth Bass fingerlings annually (100/acre).
 

**Action:** Largemouth Bass have been managed with an 18-inch minimum length limit since the reservoir was opened to the public. Fall (2013 and 2015) and spring (2013, 2014, and 2016) electrofishing surveys were conducted. A fall quarter angler creel survey was conducted in 2012 and spring quarter surveys were conducted in 2013 and 2016. Florida Largemouth Bass have been stocked annually since 2011. Angler opinion surveys were conducted in 2013 and 2015 to estimate angling satisfaction, trophy Largemouth Bass catch, and preferred Largemouth Bass regulations. These data resulted in the implementation of a 16-inch maximum length limit effective September 1<sup>st</sup> 2016.
2. Conduct annual aquatic vegetation surveys and recommend treatment if necessary.
 

**Action:** Aquatic vegetation surveys were conducted annually from 2012 through 2015 to monitor coverage of hydrilla.

**Harvest regulation history:** Sport fishes in Naconiche Reservoir are currently managed with statewide regulations with the exception of Largemouth Bass (Table 3). The reservoir was opened with an 18-inch minimum length limit for Largemouth Bass to protect the population as it developed.

**Stocking history:** Sharelunker Largemouth Bass (2009, 2011, and 2012) and Florida Largemouth Bass (2011 – 2015) were stocked to establish trophy fish potential (Table 4). Threadfin Shad were successfully introduced in 2010. Bluegill and Channel Catfish were stocked in 2009 and 2011 and White and Black crappie were stocked in 2010.

**Vegetation/habitat management history:** Naconiche Reservoir reached conservation pool in 2009. The controlling authority cleared all of the timber in the lower basin, but left a considerable amount in the two creek arms for fish habitat. Hydrilla was observed as the lake was beginning to fill in 2008. Since 2012, hydrilla has been treated annually with herbicides around the boat ramp, swimming area, and the fishing pier. Giant salvinia was discovered in February 2015. Initial attempts to eradicate giant salvinia via manual removal failed. Herbicide treatments were conducted numerous times in both 2015 and 2016.

**Water transfer:** The purpose of Naconiche Reservoir is to provide recreation and flood control. There are no plans for water transfer.

## METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Naconiche Reservoir (TPWD unpublished). Primary components of the OBS plan are listed in Table 5. All survey sites were biologist selected and limited to the lower basin due to dense, inundated timber throughout the rest of the reservoir. Otherwise, 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 fall electrofishing (0.83 hour at 10, 5-min stations) in 2013 and 2015. In 2013, 2014, and 2016, spring electrofishing surveys were conducted (Largemouth Bass only; 1 hour at 12, 5-min stations in 2013 and 0.83 hour at 10, 5-min stations in 2014 and 2016). 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 12 randomly-selected fish (range 13.5 to 14.5 inches).

*Gill netting* – Channel Catfish were collected by gill netting (5 net nights at 5 stations) in 2014 and 2016. CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

*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.

*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 ( $RSE = 100 \times SE$  of the estimate/estimate) was calculated for all CPUE and creel statistics.

*Creel survey* – A fall quarter access-point creel survey was conducted from September through November 2012. A spring quarter access-point creel survey was conducted from March through May, 2013 and 2016. Angler interviews were conducted on 5 weekend days and 4 weekdays to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Total angler catch of Largemouth Bass  $\geq$  4, 7, and 10 pounds was also estimated. Anglers were asked if released fish were within weight categories. Harvested fish lengths were converted to weights for classification (19 inches = 4 pounds; 23 inches = 7 pounds; 25 inches = 10 pounds). Harvested and released fish were combined to represent total catch for weight categories.

Angler opinion surveys were conducted in 2013 (onsite as part of the creel survey) and 2015 (online survey advertised on the Texas Fishing Forum) to estimate angling satisfaction, trophy Largemouth Bass catch, and preferred Largemouth Bass regulations (Appendix C).

*Habitat* – A structural habitat survey was conducted in 2012. Aquatic vegetation surveys were conducted from 2012 - 2015 to monitor hydrilla and giant salvinia, and coverages were assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

## RESULTS AND DISCUSSION

**Habitat:** Littoral zone structural habitat consisted primarily of standing timber and natural shoreline (Table 6). Hydrilla covered 20.5% of the reservoir's surface area in 2015 compared to 46.0% coverage in 2014 (Table 7). Giant salvinia was first discovered in 2015; coverage in 2016 was 3.0 acres.

**Creel:** Directed fishing effort was highest for Largemouth Bass (64.7% - 85.7%), followed by effort for crappie and anything (Table 8). Total fishing effort (38,492 h) and direct expenditures (\$169,005) were highest when the reservoir was first opened to the public in 2012 (Table 9). Total effort (14,616 and 16,322 h) and direct expenditures (\$54,345 and \$64,702) have remained similar during the spring creel surveys conducted in 2013 and 2016.

A total of 18 (onsite) and 101 (online) angler opinion surveys were completed from 2013 and 2015, respectively. Approximately 65% of the respondents indicated they preferred to target trophy bass, while 35% targeted overall numbers of fish. Survey respondents were moderately to very satisfied with the fishery. Relative to a potential regulation change, 50% of anglers preferred a 16-inch maximum length limit, while 28% and 22% preferred a 16-24 inch and 14-21 inch slot-length limit, respectively.

**Prey species:** Electrofishing surveys indicated an adequate forage base for sport fishes. Forage species consisted of Threadfin Shad, Gizzard Shad, Warmouth, Bluegill, Redear Sunfish, and Redspotted Sunfish (Appendix A). Bluegill was the most abundant sunfish species with 111.6/h collected during the 2015 fall electrofishing survey (Figure 1), which was lower than 2012 and 2013 surveys. Few anglers sought sunfish (0 – 1.7% of total fishing effort) (Table 8), and total estimated harvest ranged from 0 – 1,142 fish (Table 10).

**Channel Catfish:** Although Channel Catfish were stocked in 2009 and 2011, only two total fish were collected from 2014 and 2016 gill net surveys (Figure 4), and few anglers targeted Channel Catfish (0 – 0.6% of directed effort) (Table 8). Channel Catfish recruitment is likely limited by Largemouth Bass predation. No harvest of Channel Catfish has been observed during the past two creel surveys (Table 11).

**Largemouth Bass:** The fall electrofishing catch rate of Largemouth Bass was 96.0/h in 2015, lower than the 183.6/h and 195.6/h observed in 2012 and 2013, respectively (Figure 6). In contrast, spring electrofishing catch rates were high and similar in 2014 and 2016 (168.0/h and 163.2/h, respectively), and considerably greater than 2013 (37.0/h) (Figure 7). Size structure indices from the spring electrofishing surveys have remained excellent (PSD range = 61 – 81). Growth of Largemouth Bass was adequate; average age at 14 inches (13.5 to 14.5 inches) was 2.8 years (N = 12; range = 2 – 3 years). Body condition from the past three surveys was adequate (relative weight above 80) for nearly all size classes of fish (Figure 6).

Directed fishing effort, catch per hour, and total harvest for Largemouth Bass was highest during the fall 2012 creel survey when the reservoir first opened to public fishing (Table 12). Creel statistics from the 2013 and 2016 surveys were relatively similar. Nearly all legal-sized Largemouth Bass that were caught were released (96.3 to 98.7%) (Table 12). Total estimated catch in 2016 was 12,197 fish; 6.2% were 4.0 – 6.9 pounds and 0.2% were 7.0 – 9.9 pounds (Table 12). Florida Largemouth Bass influence has increased between 2011 and 2015, as Florida alleles increased from 31% in 2011 to 60% in 2015, and Florida genotype increased from 0 to 17% (Table 13).

**Crappies:** Trap netting for crappie was discontinued in 2011 due to poor catch rates (1.0/nn) and sampling efficiency. White and Black Crappie adults were stocked in 2010 (Table 4), but the population is primarily comprised of Black Crappie (only one White Crappie has been observed from creel surveys). The crappie fishery was the second most popular (8.1 – 22.5% of directed effort) (Table 8). Angler catch rates of Black Crappie were relatively low, ranging from 0.5 to 1.0 fish/h. Harvest was relatively high in 2012 (1,596 fish), but declined considerably in 2013 (83 fish), even though directed effort remained high (Table 14). The decline in directed effort in 2016 was likely a result of low availability of harvestable fish.

## **Fisheries management plan for Naconiche Reservoir, Texas**

Prepared – July 2016.

**ISSUE 1:** Largemouth Bass abundance and size structure reflect a quality population and the majority of anglers prefer to target trophy bass.

### **MANAGEMENT STRATEGIES**

1. To maximize trophy fish production request FLMB annually at a rate of 100 fish/acre.
2. Monitor the success of the 16-inch maximum length limit regulation (to be implemented September 1<sup>st</sup> 2016) via biennial spring electrofishing surveys, and a fall electrofishing survey and angler creel survey every four years. Examine Largemouth Bass growth every four years.

**ISSUE 2:** Giant salvinia was introduced in 2015. Initial attempts to eradicate giant salvinia via manual removal were not successful. However, ongoing herbicide treatments in 2015 and 2016, coupled with manual removal efforts by a volunteer group (Focused Removal of Giant Salvinia – FROGS), have maintained coverage to < 5 surface acres.

### **MANAGEMENT STRATEGIES**

1. Document giant salvinia coverage and distribution as needed (numerous times per year).
2. Conduct herbicide treatments when appropriate (i.e., when plants are congregated).
3. Continue cooperating and communicating with the FROGS volunteer group relative to manual removal efforts.
4. Continue to maintain giant salvinia signage regarding plant presence and prevention of transport to other waters.

**ISSUE 3:** Hydrilla is present in Naconiche Reservoir. Although it provides beneficial fish habitat, it has the potential to impede use of the swimming area, boat ramp, and fishing piers.

### **MANAGEMENT STRATEGIES**

1. Monitor hydrilla coverage annually.
2. Continue herbicide treatment of hydrilla at the public boat ramp, boat dock, swimming area, and fishing dock as needed.
3. Continue cooperating with lakeside homeowners by permitting herbicide treatments of hydrilla (at homeowner expense) adjacent to their property.



**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

##### Sport fish, forage fish, and other important fishes

Sport fishes in Naconiche Reservoir include Largemouth Bass, Spotted Bass, crappies, and Channel Catfish. Important forage species include Bluegill and Threadfin Shad.

##### Low-density fisheries

Although approximately 70,000 Channel Catfish fingerlings were stocked in 2009 and 2011, only two total fish were collected from 2014 and 2016 gill net surveys. Less than 1% of angling effort was directed at catfishes during the 2012, 2016, and 2016 creel surveys. No future directed sampling is planned.

Spotted Bass abundance is low in the reservoir, as only one fish has been collected from the past six electrofishing surveys. Although no future directed sampling is planned, Spotted Bass catch will be recorded from electrofishing surveys directed at Largemouth Bass (see below).

##### Survey objectives, fisheries metrics, and sampling objectives

**Largemouth Bass:** Largemouth Bass are the most popular sport fish in Naconiche Reservoir, accounting for approximately 80% of the annual angling effort. Impounded in 2009, the reservoir currently supports a high-quality fishery. Relative to trophy fish production, expectations are high but the population is still developing. Largemouth Bass are currently managed with an 18-in MLL regulation, but a 16-in maximum length limit will be in effect September 1, 2016. From 2010 to 2016, trend data on CPUE, size structure, and body condition were collected annually with fall (2010 – 2013 and 2015) and spring electrofishing (2013, 2014, and 2016). As expected, population abundance and size structure expanded during the first three sample years. Catch rates from the 2014 and 2016 spring surveys were above 160/h indicating an abundant population with high recruitment rates. **A spring quarter creel survey will be conducted in 2017, to collect angler trend data, catch rates, and fishing effort.** Angler catch and effort were highest in 2012 when the reservoir was first opened to the public with catch rates and effort remaining similar for the 2013 and 2016 creel surveys. Beginning in 2016/2017, biennial night electrofishing (spring) and fall night electrofishing (every four years) will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. A total of 10 randomly selected 5-min electrofishing sites will be sampled due to lack of suitable sampling water resulting from dense, inundated timber. These 10 sites should ensure that sampling objectives are achieved (> 50 stock-size fish; RSE ≤ 25), as

simulations indicated that only 4 sites were required. In addition, average age of Largemouth Bass between 13.0 and 14.9 in (Category 2; N = 13) will be estimated in 2019, and every four years thereafter. If growth problems are detected from this cursory estimate, mean length-at-age will be estimated from a random population sample of 400 fish > 6 inches, subsampled at 10 fish per 0.4 in strata (Category 4). Largemouth Bass genetics will also be monitored every four years with a mixed age-class sample (N = 30).

**Crappies:** The crappie fishery is the second most popular at Naconiche Reservoir. Although an abundant crappie population has been established, 2011 trap netting resulted in a catch rate of 1.0/nn. No additional trap netting is planned. Beginning in 2016/2017, a spring quarter creel survey every four years (5 weekend and 4 week days) will be conducted to detect any large-scale changes in the crappie population that may warrant additional sampling.

**Prey species:** Bluegill and Threadfin Shad are the primary forage at Lake Naconiche. Fall electrofishing every four years, sampling 10 random sites per year, will result in sufficient numbers of Bluegill for size structure (50 fish minimum) and relative abundance ( $RSE \leq 25$  of CPUE-Total). At this effort, the expected RSE for CPUE-T is 53 for Threadfin Shad. No additional effort will be expended to achieve an RSE25 for Threadfin Shad or Gizzard Shad, but Largemouth Bass body condition (fish  $\geq 8$ " TL) will be used to provide additional information on forage abundance and vulnerability.

## LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Ashe, D., and T. Driscoll. 2012. Statewide freshwater fisheries monitoring and management program survey report for Paradise Reservoir, 2011. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.

Table 1. Characteristics of Naconiche Reservoir, Texas.

| Characteristic                    | Description           |
|-----------------------------------|-----------------------|
| Year constructed                  | 2009                  |
| Controlling authority             | County of Nacogdoches |
| County                            | Nacogdoches           |
| Reservoir type                    | Secondary stream      |
| Shoreline Development Index (SDI) | 3.55                  |
| Conductivity                      | 100 uS/cm             |

Table 2. Boat ramp characteristics for Naconiche Reservoir, Texas, February, 2016. Reservoir elevation at time of survey was 348 feet above mean sea level.

| Boat ramp      | Latitude<br>Longitude<br>(dd) | Public | Parking<br>capacity<br>(N) | Elevation at<br>end of boat<br>ramp (ft) | Condition                    |
|----------------|-------------------------------|--------|----------------------------|--|------------------------------|
| Naconiche Park | 31.76980<br>-94.58539         | Y      | 50                         | 343                                      | Excellent. No access issues. |

Table 3. Harvest regulations for Naconiche Reservoir, Texas.

| Species  | Bag limit                  | Length limit    |
|--|----------------------------|-----------------|
| Catfish: Channel and Blue Catfish, their hybrids and subspecies <sup>a</sup> | 25<br>(in any combination) | 12-inch minimum |
| Catfish, Flathead  | 5                          | 18-inch minimum |
| Bass: Largemouth   | 5 <sup>a</sup>             | 18-inch minimum |
| Bass: Spotted  | 5 <sup>a</sup>             | None            |
| Crappie: White and Black Crappie, their hybrids and subspecies               | 25<br>(in any combination) | 10-inch minimum |

<sup>a</sup>Bag limit for spotted and largemouth bass is 5 in the aggregate.

Table 4. Stocking history of Naconiche Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults.

| Species                     | Year    | Number  | Size |
|-----------------------------|---------|---------|------|
| Black crappie               | 2010    | 266     | ADL  |
|                             | Total   | 266     |      |
| Bluegill                    | 2009    | 79,480  | AFGL |
|                             | 2011    | 67,369  | AFGL |
|                             | Total   | 146,849 |      |
| Channel catfish             | 2009    | 70,444  | FGL  |
|                             | 2011    | 72,393  | FGL  |
|                             | Total   | 142,837 |      |
| Florida largemouth bass     | 2011    | 15      | ADL  |
|                             | 2011    | 6,729   | AFGL |
|                             | 2011    | 73,135  | FGL  |
|                             | 2012    | 233     | ADL  |
|                             | 2012    | 75,214  | FGL  |
|                             | 2013    | 69      | ADL  |
|                             | 2013    | 73,080  | FGL  |
|                             | 2014    | 75,696  | FGL  |
|                             | 2015    | 99      | ADL  |
|                             | 2015    | 74,381  | FGL  |
| Total                       | 378,651 |         |      |
| ShareLunker largemouth bass | 2009    | 173     | ADL  |
|                             | 2009    | 27,927  | AFGL |
|                             | 2009    | 67,462  | FGL  |
|                             | 2011    | 2,020   | AFGL |
|                             | 2012    | 173     | ADL  |
| Total                       | 97,755  |         |      |
| Threadfin shad              | 2010    | 2,500   | AFGL |
|                             | 2011    | 4,000   | FGL  |
|                             | Total   | 6,500   |      |
| White crappie               | 2010    | 89      | ADL  |
|                             | Total   | 89      |      |

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

| Gear/target species             | Survey objective                        | Metrics   | Sampling objective           |
|---------------------------------|---|---|------------------------------|
| <i>Electrofishing</i>           |   |   |                              |
| Largemouth Bass                 | Abundance                               | CPUE – stock  | RSE-Stock $\leq 25$          |
|                                 | Size structure                          | PSD, length frequency                                   | $N \geq 50$ 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 <sup>a</sup>           | Abundance                               | CPUE – Total  | RSE $\leq 25$                |
|                                 | Size structure                          | PSD, length frequency                                   | $N \geq 50$                  |
| Threadfin Shad <sup>a</sup>     | Abundance                               | CPUE – Total  |                              |
| Gizzard Shad <sup>a</sup>       | Abundance                               | CPUE – Total  |                              |
|                                 | Size structure                          | Length frequency  |                              |
|                                 | Prey availability                       | IOV   |                              |
| <i>Creel survey<sup>b</sup></i> |   |   |                              |
| Black basses                    | Trend information on angler utilization | Angler effort, CPUE, total harvest and size composition |                              |
| Crappies                        | Trend information on angler utilization | Angler effort, CPUE, total harvest and size composition |                              |
| Catfishes                       | Trend information on angler utilization | Angler effort, CPUE, total harvest and size composition |                              |

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE of Bluegill, Threadfin Shad, and Gizzard Shad, or an  $N > 50$  for size structure and IOV of Gizzard Shad, 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.

<sup>b</sup> Angler utilization data and associated statistics will be calculated for all sport fish.

Table 6. Survey of structural habitat types, Naconiche Reservoir, Texas, 2012. Shoreline habitat type units are in miles and standing timber is acres.

| Habitat type    | Estimate    | % of total |
|-----------------|-------------|------------|
| Natural         | 22.0 miles  | 97.0       |
| Rocky           | 0.7 miles   | 3.0        |
| Standing timber | 588.0 acres | 85.0       |

Table 7. Survey of aquatic vegetation, Naconiche Reservoir, Texas, 2012 – 2015. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

| Vegetation               | 2012        | 2013         | 2014         | 2015         |
|--------------------------|-------------|--------------|--------------|--------------|
| Hydrilla (Tier III)*     | 92.0 (13.3) | 219.0 (31.6) | 319.0 (46.0) | 142.0 (20.5) |
| White waterlily          | 0.0 (0.0)   | < 1.0 (<0.1) | 0.0 (0.0)    | 0.0 (0.0)    |
| Giant salvinia (Tier I)* | 0.0 (0.0)   | 0.0 (0.0)    | 0.0 (0.0)    | 3.0 (0.4)    |

\*Tier I is immediate Response, Tier III is Watch Status

Table 8. Percent directed angler effort by species for Naconiche Reservoir, Texas, 2012, 2013, and 2016. Survey periods were from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016).

| Species         | 2012 | 2013 | 2016 |
|-----------------|------|------|------|
| Anything        | 11.4 | 11.1 | 3.2  |
| Largemouth Bass | 79.8 | 64.7 | 85.7 |
| Crappies        | 8.1  | 22.5 | 10.7 |
| Catfishes       | 0.6  | 0.0  | 0.4  |
| Sunfishes       | 0.1  | 1.7  | 0.0  |

Table 9. Total fishing effort (h) for all species and total directed expenditures at Naconiche Reservoir, Texas, 2012, 2013, and 2016. Survey periods were from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). Relative standard error is in parentheses.

| Statistic                   | 2012           | 2013          | 2016          |
|-----------------------------|----------------|---------------|---------------|
| Total fishing effort        | 38,492 (15)    | 14,616 (18)   | 16,322 (18)   |
| Total directed expenditures | \$169,005 (35) | \$54,345 (47) | \$64,702 (42) |

## Gizzard Shad

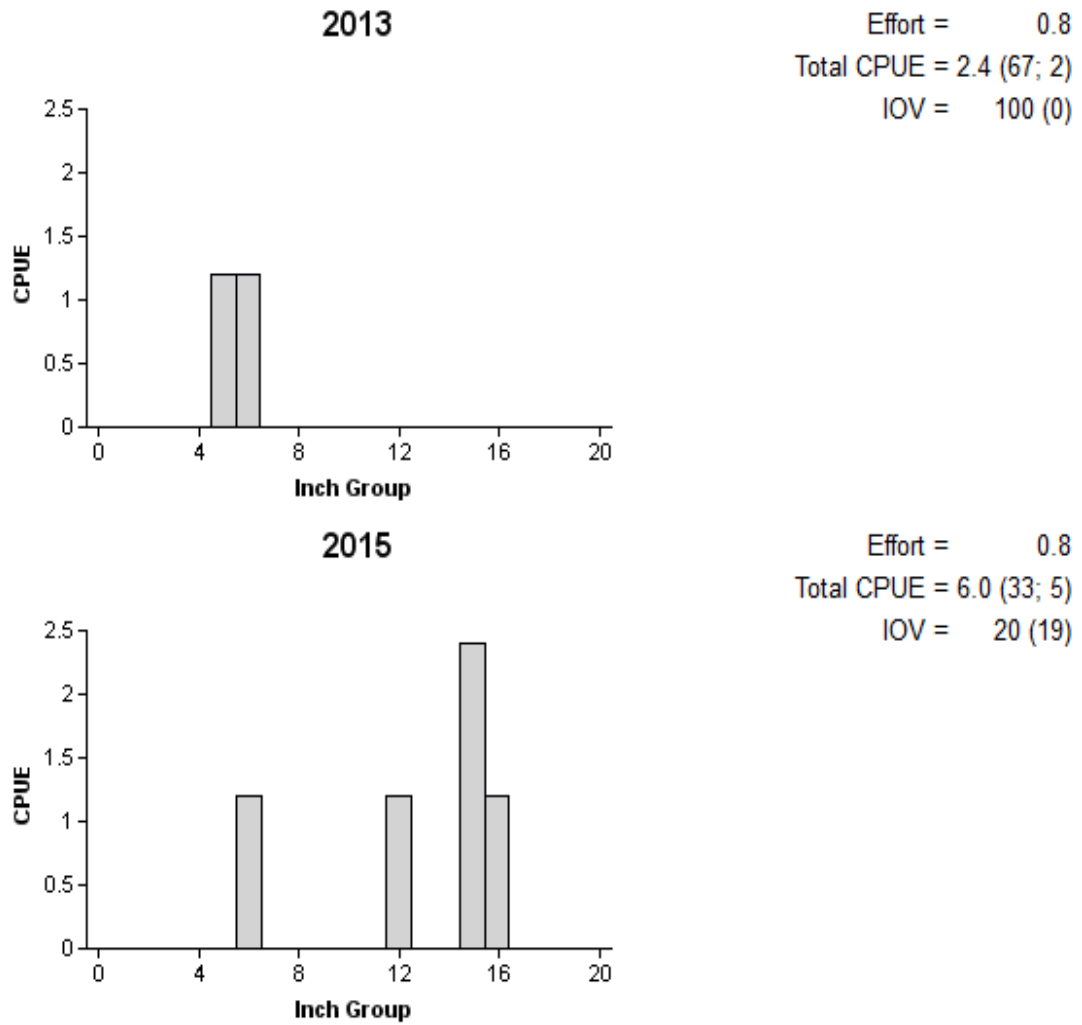


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Naconiche Reservoir, Texas, 2013 and 2015. A fall electrofishing survey was conducted in 2012 and no Gizzard Shad were collected.



# Bluegill

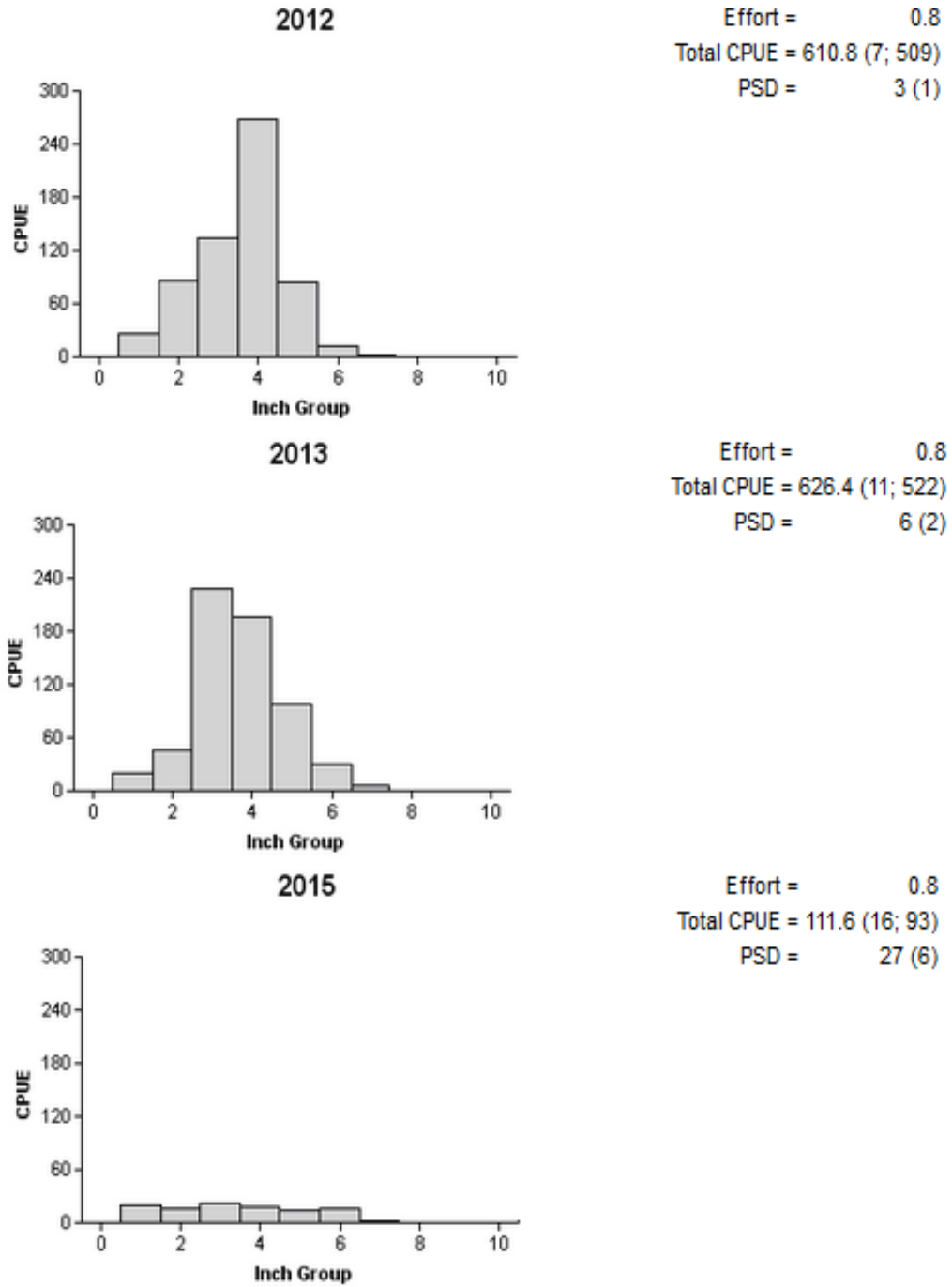


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Naconiche Reservoir, Texas, 2012, 2013, and 2015.

## Sunfishes

Table 10. Creel survey statistics for sunfishes at Naconiche Reservoir (692 acres), Texas, from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). Total catch per hour is for anglers targeting sunfishes and total harvest is the estimated number of sunfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Statistic              | 2012        | 2013       | 2016    |
|------------------------|-------------|------------|---------|
| Directed effort (h)    | 32.9 (135)  | 241.6 (97) | 0.0 (0) |
| Directed effort/acre   | < 0.1 (135) | 0.4 (97)   | 0.0 (0) |
| Total catch per hour   | 2.1 (NA)    | 0.0 (0)    | 0.0 (0) |
| Total harvest          | 1,142 (56)  | 523 (62)   | 0 (0)   |
| Harvest/acre           | 1.7 (56)    | 0.8 (62)   | 0 (0)   |
| Percent legal released | 66.1        | 22.3       |         |

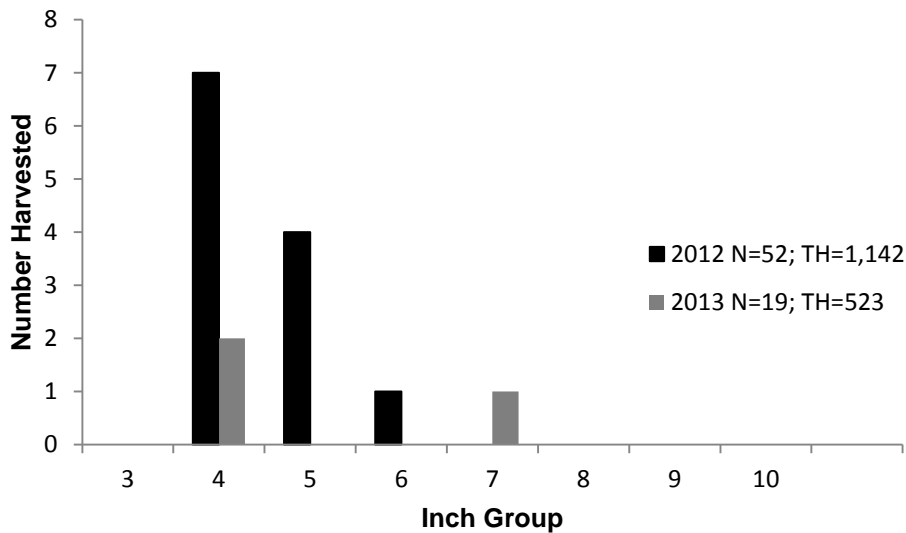


Figure 3. Length frequency of harvested Bluegill observed during creel surveys at Naconiche Reservoir, Texas, all anglers combined. Survey periods were from 1 September through 30 November (2012) and 1 March through 31 May (2013). N is the number of harvested Bluegill observed during the creel survey, and TH is the total estimated harvest for the creel period.

## Channel Catfish

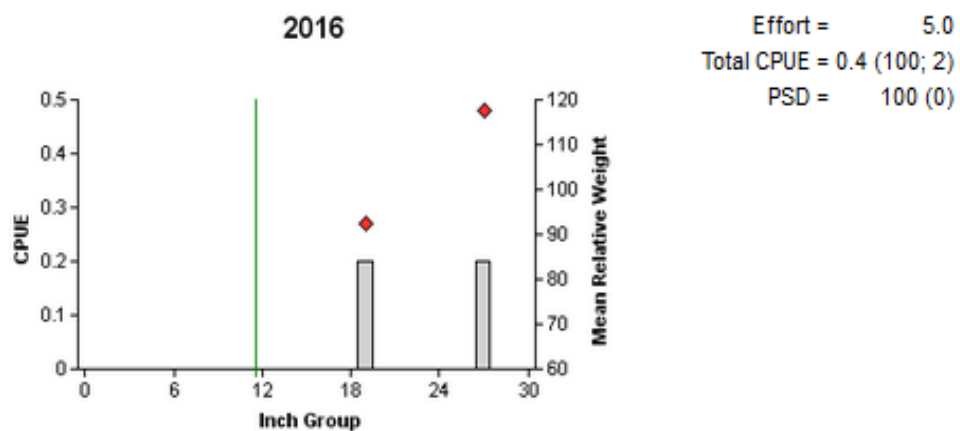


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for the spring gill net survey, Naconiche Reservoir, Texas, 2016. Vertical lines represent the minimum length limit. A gill net survey was conducted in 2014 and no Channel Catfish were collected.

## Channel Catfish

Table 11. Creel survey statistics for Channel Catfish at Naconiche Reservoir (692 acres), Texas, from September through 30 November (2012), and 1 March through 31 May (2013 and 2016). Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Statistic              | 2012       | 2013    | 2016       |
|------------------------|------------|---------|------------|
| Directed effort (h)    | 230.7 (70) | 0.0 (0) | 64.5 (165) |
| Directed effort/acre   | 0.3 (70)   | 0.0 (0) | 0.1 (165)  |
| Total catch per hour   | 0.2 (35)   | 0.0 (0) | 0.0 (0)    |
| Total harvest          | 522 (54)   | 0 (0)   | 0 (0)      |
| Harvest/acre           | 0.8 (54)   | 0.0 (0) | 0.0 (0)    |
| Percent legal released | 57.3       |         |            |

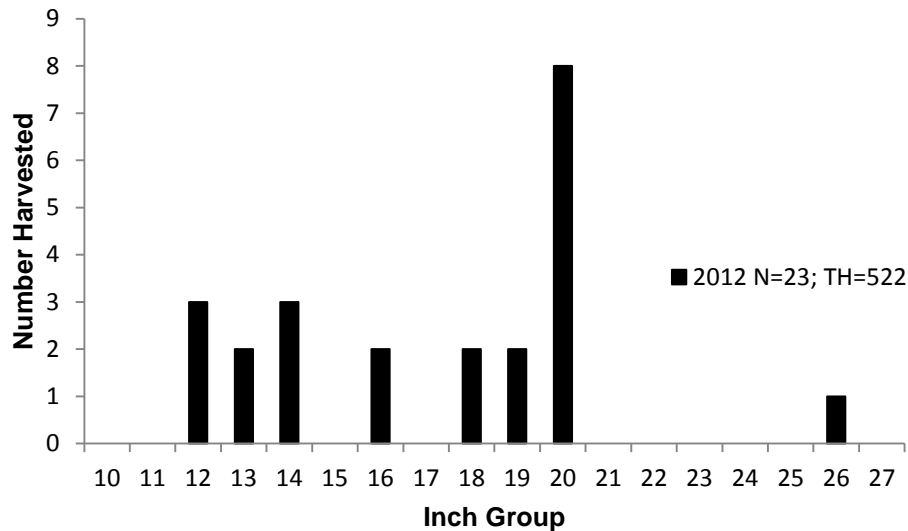


Figure 5. Length frequency of harvested Channel Catfish observed during the creel survey at Naconiche Reservoir, Texas, September through November 2012, all anglers combined. N is the number of harvested Channel Catfish observed during the creel survey, and TH is the total estimated harvest for the creel period.

## Largemouth Bass

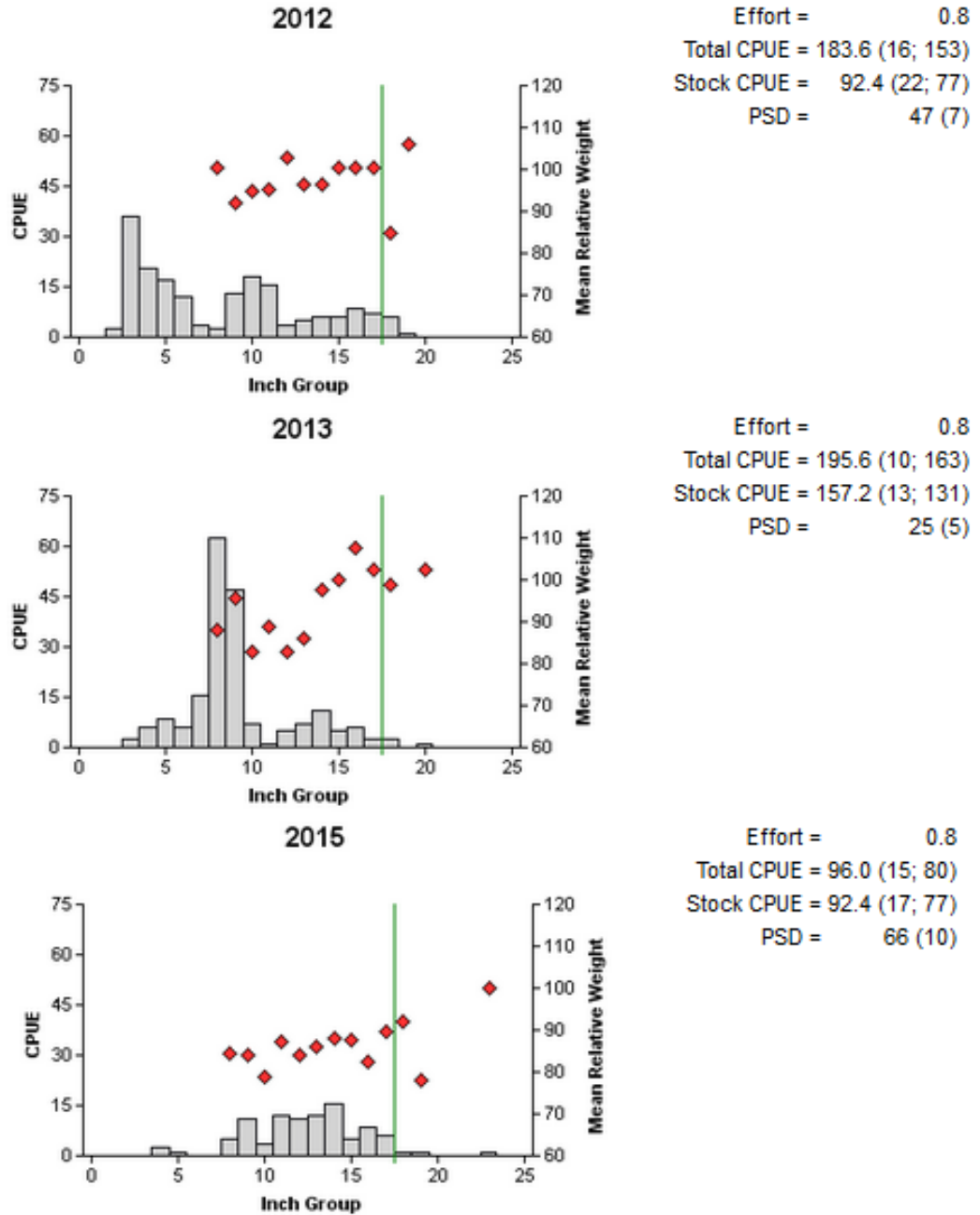


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Naconiche Reservoir, Texas, 2012, 2013, and 2015. Vertical lines represent the minimum length limit.

## Largemouth Bass

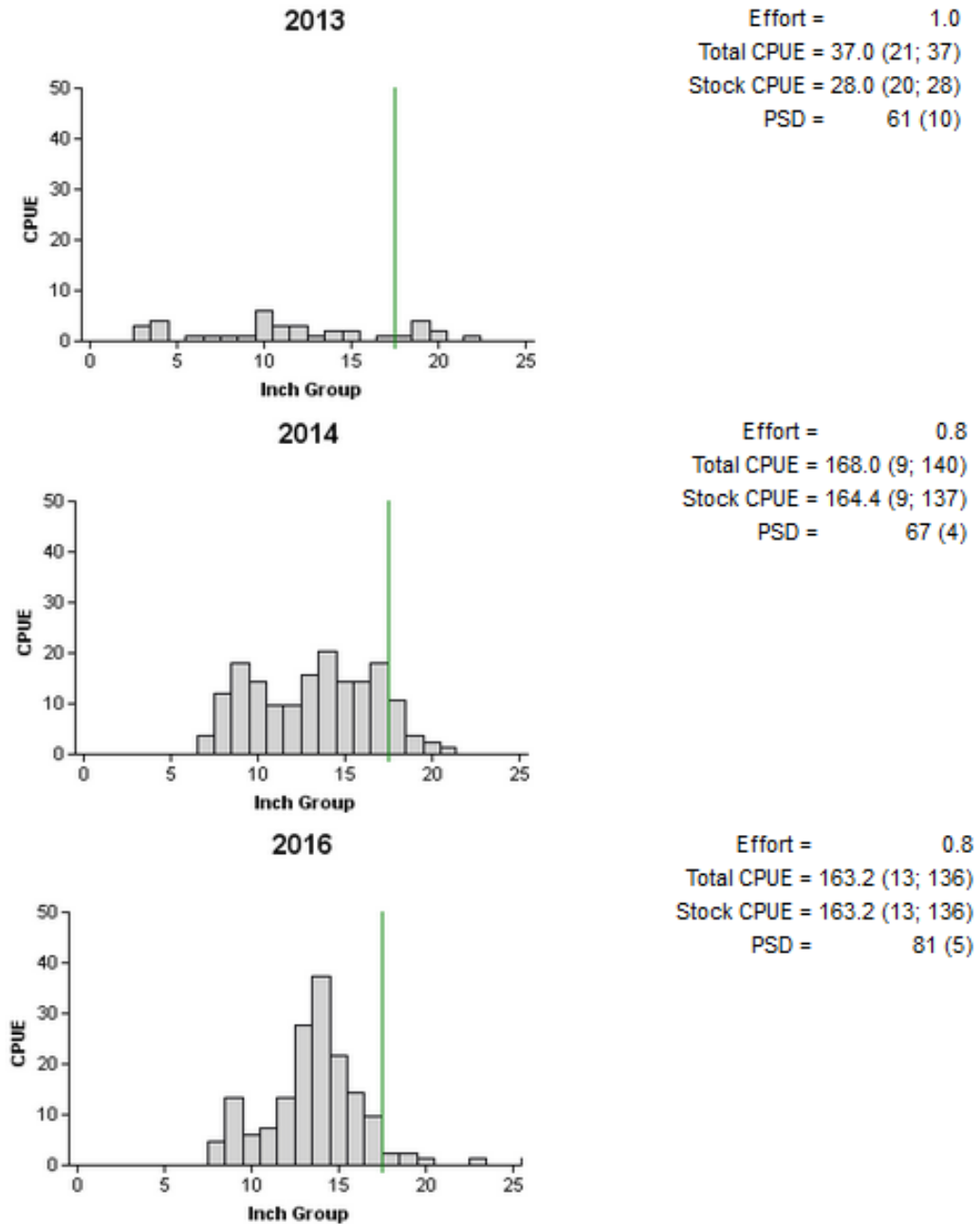


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring electrofishing surveys, Naconiche Reservoir, Texas, 2013, 2014, and 2016. Vertical lines represent the minimum length limit.

## Largemouth Bass

Table 12. Creel survey statistics for Largemouth Bass at Naconiche Reservoir (692 acres), Texas from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). Catch rate is only for anglers targeting Largemouth Bass, and total catch and harvest is the estimated number from all anglers. Relative standard errors (RSE) are in parentheses.

| Statistic              | 2012           | 2013          | 2016           |
|------------------------|----------------|---------------|----------------|
| Directed effort (h)    | 30,725.7 (15)  | 9,456.4 (19)  | 13,990.9 (19)  |
| Directed effort/acre   | 44.4 (15)      | 13.7 (19)     | 20.2 (19)      |
| Total catch per hour   | 1.3 (10)       | 0.7 (21)      | 0.7 (12)       |
| Total catch            | 29,502 (27)    | 7,676 (23)    | 12,197 (27)    |
| < 4.0 lbs              | 26,016 – 88.2% | 6,576 – 85.7% | 11,421 – 93.6% |
| ≥ 4-6.9 lbs            | 3,345 – 11.3%  | 1,068 – 13.9% | 751 – 6.2%     |
| ≥ 7-9.9 lbs            | 141 – 0.5%     | 32 – 0.4%     | 25 – 0.2%      |
| ≥ 10 lbs               | 0 – 0%         | 0 – 0%        | 0 – 0%         |
| Total Harvest          | 304 (50)       | 83 (68)       | 29 (60)        |
| Harvest/acre           | 0.4 (50)       | 0.1 (68)      | < 0.1 (60)     |
| Percent legal released | 96.3           | 97.2          | 98.7           |

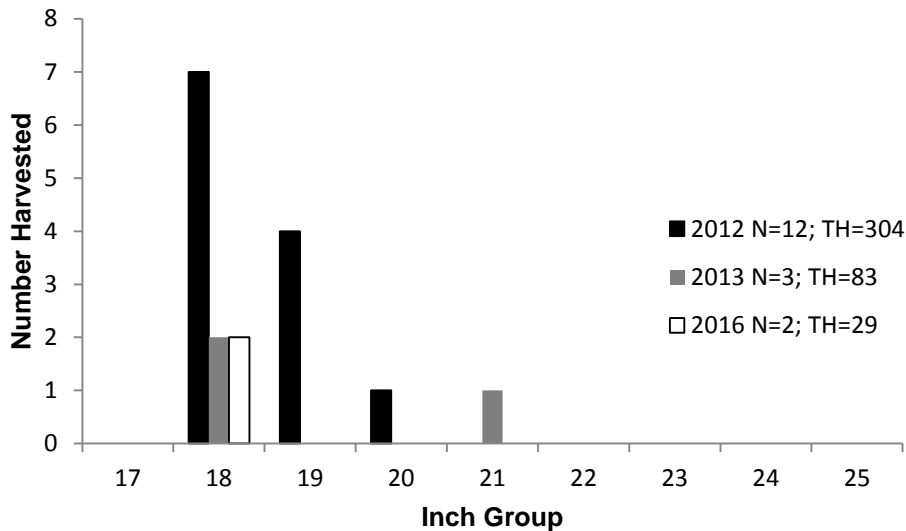


Figure 8. Length frequency of harvested Largemouth Bass observed during creel surveys at Naconiche Reservoir, Texas, all anglers combined. Survey periods were from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Largemouth Bass

Table 13. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Naconiche Reservoir, Texas, 2011, 2012, and 2015. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined with micro-satellite DNA analysis.

| Year | Sample size | Number of fish |            |      | % FLMB alleles | % FLMB |
|------|-------------|----------------|------------|------|----------------|--------|
|      |             | FLMB           | Intergrade | NLMB |                |        |
| 2011 | 30          | 0              | 30         | 0    | 31.0           | 0.0    |
| 2012 | 30          | 7              | 22         | 1    | 53.0           | 23.0   |
| 2015 | 30          | 5              | 25         | 0    | 60.0           | 16.7   |



## Crappies

Table 14. Creel survey statistics for crappies at Naconiche Reservoir (692 acres), Texas, from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). Total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Statistic              | 2012         | 2013         | 2016         |
|------------------------|--------------|--------------|--------------|
| Directed effort (h)    | 3,104.0 (31) | 3,289.9 (28) | 1,752.6 (35) |
| Directed effort/acre   | 4.5 (31)     | 4.8 (28)     | 2.5 (35)     |
| Total catch per hour   | 1.0 (41)     | 0.5 (69)     | 0.7 (39)     |
| Total harvest          | 1,596 (47)   | 83 (107)     | 307 (50)     |
| Harvest/acre           | 2.3 (47)     | 0.1 (107)    | 0.4 (50)     |
| Percent legal released | 20.2         | 71.4         | 24.6         |

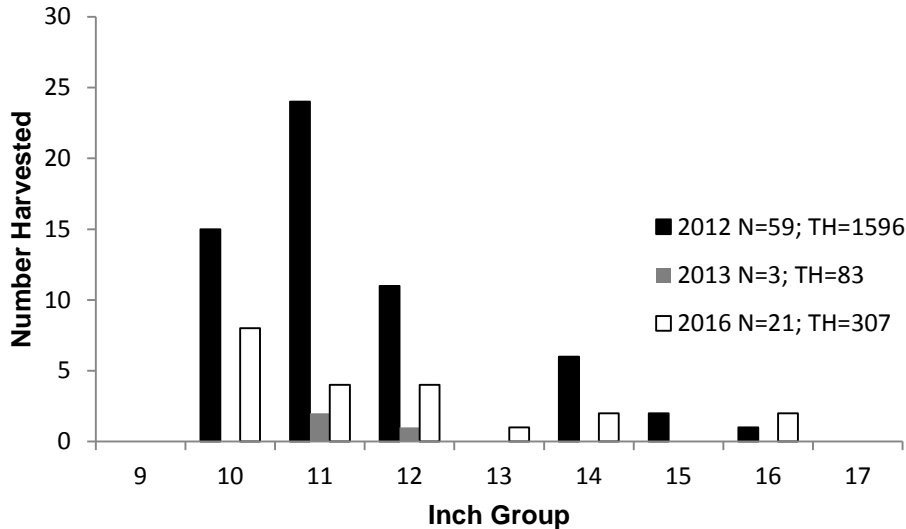


Figure 9. Length frequency of harvested Black Crappie observed during creel surveys at Naconiche Reservoir, Texas, all anglers combined. Survey periods were from 1 September through 30 November (2012) and 1 March through 31 May (2013 and 2016). N is the number of harvested Black Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 15. Proposed sampling schedule for Naconiche Reservoir, Texas. Survey period is June through May. Standard electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

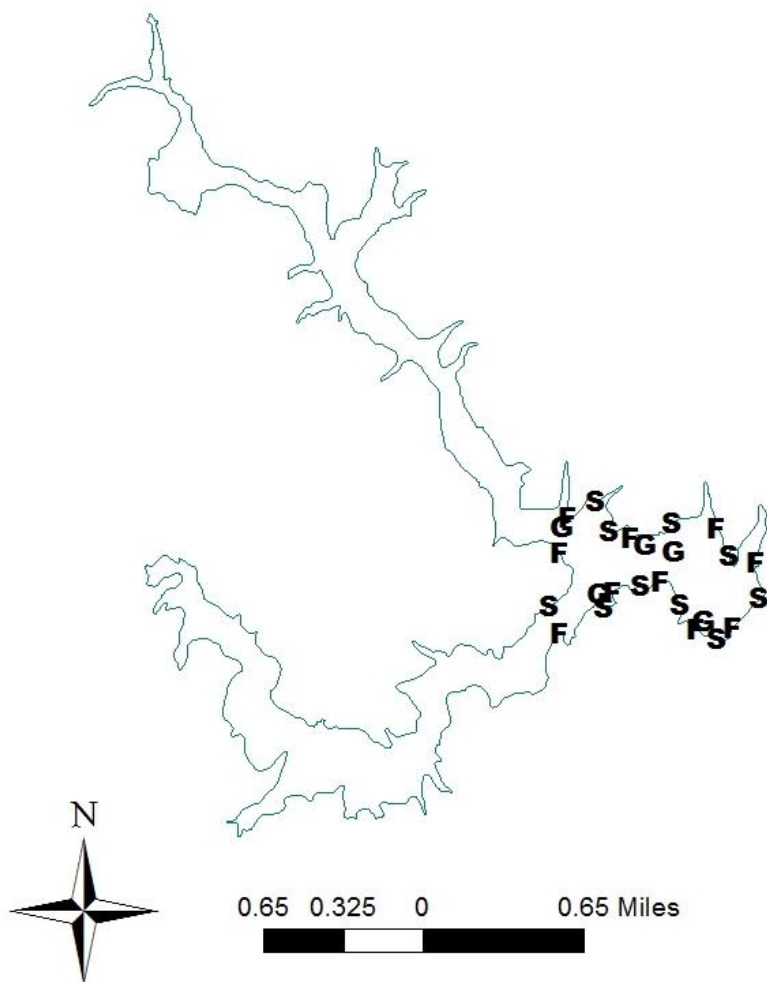
| Survey year | Electrofishing<br>Fall(Spring) | Habitat    |            |        | Creel<br>survey | Report |
|-------------|--------------------------------|------------|------------|--------|-----------------|--------|
|             |                                | Structural | Vegetation | Access |                 |        |
| 2016-2017   |                                |            | S          |        |                 |        |
| 2017-2018   | (A)                            |            | S          |        |                 |        |
| 2018-2019   |                                |            | S          |        |                 |        |
| 2019-2020   | S (A)                          | S          | S          | S      | A               | S      |

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Naconiche Reservoir, Texas, 2015-2016. Sampling effort was 0.83 hours for electrofishing and 5 net nights for gill netting.

| Species            | Fall Electrofishing |       | Gill Netting |      | Spring Electrofishing |       |
|--------------------|---------------------|-------|--------------|------|-----------------------|-------|
|                    | N                   | CPUE  | N            | CPUE | N                     | CPUE  |
| Gizzard Shad       | 33                  | 6.0   | 9            | 1.8  |                       |       |
| Threadfin Shad     | 16                  | 19.2  |              |      |                       |       |
| Yellow Bullhead    |                     |       | 55           | 11.0 |                       |       |
| Channel Catfish    |                     |       | 2            | 0.4  |                       |       |
| Warmouth           | 1                   | 1.2   |              |      |                       |       |
| Redspotted Sunfish | 1                   | 1.2   |              |      |                       |       |
| Bluegill           | 93                  | 111.6 |              |      |                       |       |
| Redear Sunfish     | 6                   | 7.2   |              |      |                       |       |
| Largemouth Bass    | 80                  | 96.0  | 8            | 1.6  | 136                   | 163.2 |
| Black Crappie      |                     |       | 11           | 2.2  |                       |       |

## APPENDIX B



Location of sampling sites, Naconiche Reservoir, Texas, 2015-2016. Gill net, fall electrofishing, and spring electrofishing stations are indicated by G, F, and S, respectively. Water level was near full pool at time of sampling.

**APPENDIX C**

**Texas Parks and Wildlife Department  
Inland Fisheries Division**

This is a questionnaire that is part of official research being conducted by Texas Parks and Wildlife concerning Lake Naconiche. Information gained from this questionnaire will enable TPWD to make most informed decisions regarding future fisheries management strategies. Your cooperation is extremely important to the completion of this research. Your answers will not be connected with your name and all information you provide will remain strictly confidential.

Please take the time to complete this questionnaire and return it to the drop box located at the lake office. If you have any questions, please contact Todd Driscoll, District Fisheries Biologist (409) 698-9114; todd.driscoll@tpwd.texas.gov

1. How many times have you fished at Lake Naconiche during the previous 12 months?  
\_\_\_\_\_ times

2. Overall, how satisfied are you with fishing at Lake Naconiche? **(Circle one)**

|                         |                    |                         |                |                        |
|-------------------------|--------------------|-------------------------|----------------|------------------------|
| Not at all<br>Satisfied | Slightly Satisfied | Moderately<br>Satisfied | Very Satisfied | Extremely<br>Satisfied |
| 1                       | 2                  | 3                       | 4              | 5                      |

3. Which is most important to you when targeting bass at Lake Naconiche? **(CIRCLE ONLY ONE)**

- 1 The chance to catch high numbers of bass regardless of their size
- 2 The chance to catch a trophy bass

4. At Lake Naconiche, how many total largemouth bass have you and other anglers fishing with you caught that were:

\_\_\_\_\_ Greater than 7 pounds                      \_\_\_\_\_ Greater than 10 pounds

5. At Lake Naconiche, what is the weight of the largest bass caught by you or other anglers fishing with you? \_\_\_\_\_ pounds

6. Relative to catch of largemouth bass 5 pounds or greater, which one of the following best describes your harvest practices at Lake Naconiche under the current regulation (18-inch minimum length limit)?

- A. I always practice catch and release of bass 5 pounds or greater..
- B. I sometimes keep bass 5 pounds or greater.
- C. I always keep bass that are 5 pounds or greater.

7. TPWD biologists can manage largemouth bass populations at Lake Naconiche using various regulations to provide fishing opportunities based on what anglers prefer. The current 18-inch minimum length limit is standard practice for new lakes and has created a quality fishery at Lake Naconiche. However, regulations that reduce or eliminate harvest of large bass could be implemented to provide larger average size.

Please **RANK** the following regulations according to your most preferred (1) to your least preferred (3) of the following options.

\_\_\_\_\_ **A 14-21 INCH SLOT LENGTH LIMIT WITH A 5 FISH DAILY BAG.** Bass 14 inches or less or 21 inches or greater may be retained. Only one bass 21 inches or greater may be retained each day.

\_\_\_\_\_ **A 16-24 INCH SLOT LENGTH LIMIT WITH A 5 FISH DAILY BAG.** Bass 16 inches or less or 24 inches or greater may be retained. Only one bass 24 inches or greater may be retained each day.

\_\_\_\_\_ **A 16-INCH MAXIMUM LENGTH LIMIT WITH A 5 FISH DAILY BAG.** Only bass 16 inches or less may be retained. All bass over 16 inches must be immediately released, with the exception that bass 24 inches or longer may be temporarily held in a live well and immediately weighed using personal scales. Fish weighing 13 pounds or more may be donated to the ShareLunker Program. Bass not donated or not accepted by TPWD must be immediately released.

8. In terms of recreational fishing, do you believe the amount of aquatic vegetation in Lake Naconiche is **(Circle one)**

|            |             |          |
|------------|-------------|----------|
| Not Enough | About Right | Too Much |
| 1          | 2           | 3        |

9. Do you believe the daily/annual access fees are at Lake Naconiche are **(Circle one)**

|            |             |          |
|------------|-------------|----------|
| Not Enough | About Right | Too Much |
| 1          | 2           | 3        |

10. Please provide your name and email address:

Name \_\_\_\_\_ Email  
address: \_\_\_\_\_

Please provide any other comments below:

---



---



---



---



---

