Meredith Reservoir

2018 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Meredith Reservoir were surveyed in 2018 using electrofishing and in 2019 using gill netting. Historical data are presented with the 2018-2019 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: Meredith Reservoir is a 16,411 acre impoundment on the Canadian River 35 miles northeast of Amarillo, Texas. It was built in 1965 to provide municipal and industrial water. It experiences substantial water level fluctuations and covered approximately 6,990 acres during 2018-2019, up from 1,718 acres in 2014-2015. Golden alga kills have ceased with increased water levels and the fishery is recovering. Habitat was primarily silt and rock, with some non-native macrophytes and flooded timber. At the current elevation there are three usable boat ramps and two ADA compliant fishing piers.

Management History: Important sport fish include White Bass, Largemouth Bass, Walleye, and Channel Catfish. The management plan from the 2015 survey report included golden alga monitoring. Meredith Reservoir was managed using statewide regulations. Gizzard Shad, Flathead Catfish, Smallmouth Bass, Bluegill, Black Crappie, and Walleye were stocked to rebuild the fishery following low water conditions and golden alga related fish kills.

Fish Community

- **Prey species:** Electrofishing catch of Gizzard Shad was moderate and is still recovering. The availability of Gizzard Shad is fair with approximately half of the population available as prey to the existing sport fish. Electrofishing catch of Bluegill is improving, but few Bluegill were over 6-inches long.
- **Catfishes:** The Channel Catfish population is low, and the size structure is weighted toward smaller fish. Flathead Catfish were not sampled in 2019 but were stocked in 2016.
- **White Bass:** White Bass were present in 2019. Limited survival following golden alga kills is likely. The population will be monitored in the future.
- **Largemouth Bass:** Largemouth Bass catch rates were fair. The survey was dominated by fish less than 10 inches. Angling opportunities should improve as the population matures.
- **Walleye:** Walleye catch rates were good and size structure appears to be balanced. Angling opportunities should be excellent for Walleye.

Management Strategies: Develop water temperature profiles and assess the feasibility of a biennial Walleye stocking strategy. Collect angler survey data in Spring and Summer 2022. Inform the public about the negative impacts of aquatic invasive species. Conduct additional electrofishing and gill net surveys in 2020-2021, and general monitoring surveys with gill nets and electrofishing surveys in 2022-2023. Access and vegetation surveys will be conducted in 2022.

Introduction

This document is a summary of fisheries data collected from Meredith Reservoir in 2018-2019. 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 2018-2019 data for comparison.

Reservoir Description

Meredith Reservoir is a 16,411 acre impoundment on the Canadian River 35 miles northeast of Amarillo, Texas. It was built in 1965 to provide municipal and industrial water. Reservoir elevation is managed by the Canadian River Municipal Water Authority and lake access is controlled by the National Park Service. Meredith Reservoir experiences substantial water level fluctuations and covered approximately 6,990 acres during 2018-2019, up from 1,718 acres in 2014-2015. A record low of 26.14 feet ft maximum water depth (2,839.14 MSL) was documented on 8 July 2013 (Figure 1). The first documented golden alga kill occurred 20 December, 2010 into March, 2011 (Munger and Clayton 2015). An additional golden alga kill occurred in spring 2012 (Munger and Clayton 2015). Golden alga kills have ceased with increased water levels, and the fishery is recovering. Habitat was primarily silt and rock, with some non-native macrophytes and flooded timber. Other descriptive characteristics for Meredith Reservoir are in Table 1.

Angler Access

Meredith Reservoir has seven public boat ramps and no private boat ramps. Two of the public ramps have been unusable due to low water levels for over 20 years. Recovering water levels have increased the number of available ramps. Sanford-Yake Marina and Fritch Fortress ramps were available to angers in 2018-2019 along with a low water ramp located at Harbor Bay. Four public ramps were unavailable in 2018-19 due to low lake levels. The extension of these ramps was not feasible due to slope or distance from the water. A complete list of boat ramps and additional characteristics is provided in Table 2. There were handicap accessible fishing docks at Sanford-Yake Marina and Fritch Fortress. Shoreline access is good in areas adjacent to boat ramps or in areas with public access roads. Shoreline access in other areas is poor due to the steep terrain and rocky shoreline.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Munger and Clayton 2015) included:

1. Continue monitoring of golden alga through fall 2015. If golden alga cell counts remain low consider stocking requests for 2016.

   Action: Regular water samples were collected to monitor for golden algae. Numerous fish stockings were performed beginning in 2016. Species stocked included Largemouth Bass, Smallmouth Bass, Walleye, and Black Crappie.

2. Conduct golden alga cell counts in fall, winter and spring to monitor for blooms.

   Action: Water samples were monitored as indicated by previous management plan (Munger and Clayton 2015).

3. Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically

   Action: Cooperated with the controlling authority and educated the public during contacts about the risks of invasive species. Personnel attended meetings hosted by the National Park Service and Canadian River Municipal Water Authority.

Harvest regulation history: Sport fishes in Meredith Reservoir are currently managed with statewide regulations (Table 3). From 1988 to 1992, Smallmouth Bass were managed with a 14-inch minimum

length limit; a 12- to 15-inch slot length limit was implemented in 1992 to improve population size structure. Current regulations are found in Table 3.

Stocking history: Previous to 2000, Meredith Reservoir was stocked regularly with multiple species including but not limited to Walleye, Largemouth Bass, Smallmouth Bass, Channel Catfish, and Flathead Catfish (Table 4). No fish were stocked from 2000-2016. In order to rebuild the fishery following multiple golden alga kills and major drought conditions, regular stockings were scheduled beginning in 2016. Historically, Lake Meredith was able to maintain a reproducing Walleye population without regular stocking. The complete stocking history is in Table 4.

Vegetation/habitat management history: Meredith Reservoir had a history of non-problematic Eurasian Watermilfoil which was the primary aquatic vegetation, but it has yet to cause access issues (Munger and Clayton 2015). Eurasian Watermilfoil typically is only present July-October and exhibits significant die-back during the winter. The Canadian River Municipal Water Authority and the National Park Service both have active salt cedar treatment programs.

Water transfer: Meredith Reservoir is primarily used for municipal water supply and recreation. The reservoir supplies water to 11-member cities via a 358-mile pipeline system. When functioning, the water system transfers water from the Canadian River Basin to the Brazos River Basin.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Meredith Reservoir (Munger and Clayton 2015). 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, Smallmouth Bass, sunfishes, and Gizzard Shad, were collected by electrofishing (12, 5-min stations in 2015, 2016, and 2018). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Gill netting – Channel Catfish, White Bass, and Walleye were collected by gill netting (5 net nights at 5 stations in 2016, 10 net nights at 10 stations in 2017, and 6 net nights at 6 stations in 2019). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

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.

Habitat – A structural habitat survey and vegetation survey was conducted in August 2018. The vegetation surveys were conducted to monitor the expansion of Eurasian Watermilfoil. 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 2019).

Results and Discussion

Habitat: Littoral zone structural habitat consisted primarily of natural and rocky shoreline (Table 6). Non-native Eurasian Watermilfoil covered 0.1% of the reservoir's surface area and was the only vegetation present in the waterbody (Table 7), and there was an estimated 609 acres of flooded timber.

Prey species: Electrofishing catch rates of Gizzard Shad and Bluegill were 165.0/h and 52.0/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was fair indicating that 57% of Gizzard Shad were available to existing predators. This is comparable to data collected in 2016 that had an IOV of 58 (Figure 2). Total CPUE of Gizzard Shad was lower than 2016 but much higher than data collected in 2015. It important to note that Meredith Reservoir was recovering from a golden algae kill during this report cycle, and it is likely that shad populations may be variable until sportfish populations mature. Total CPUE of Bluegill in 2018 (52.0/h) was considerably greater than total CPUE from surveys in 2016 (4.0/h) and 2010 (2.0/h). There was no record of Bluegill captured during the 2015 electrofishing survey. The Bluegill size structure was largely made up of fish in the 3-6 inch size class (Figure 3).

Channel Catfish: The gill net catch rate for Channel Catfish was 4.8/nn in 2019. Channel Catfish displayed a relatively low abundance and lower catch rates than seen in the 2016 (10.2/nn) and 2017 (8.2/nn) gill net surveys (Figure 4). There was an increase in the catch rate of sub-stock fish in 2019 compared to historic data which could indicate improved reproduction and recruitment. The objective based sampling plan (OBS) from Munger and Clayton 2015, called for a minimum of 10 random gill net stations. The 2019 survey was limited to 6 random sites due to a lack of sampling days with safe weather conditions and catch rates and calculated RSE values satisfied previous OBS objectives.

White Bass: The gill net catch rate for White Bass was 0.2/nn in 2019 (Figure 5). White Bass were not introduced to Meredith Reservoir after the golden algae kill. A limited number of fish survived the golden

alga kills and drought, or fish have been introduced by area anglers. Historically Meredith supported a fair White Bass fishery (Figure 5).

Largemouth Bass: The electrofishing total and stock-length catch rates for Largemouth Bass were 30.0/h and 8.0/h, respectively in 2019. Catch rates were higher than data collected in the 2016 and 2010 fall electrofishing surveys (Figure 6). The size structure was poor in 2019 with most Largemouth Bass from 5 to 8 inches and few fish greater than 14 inches observed. Poor size structure values were expected due to golden alga kills and extreme low water levels that resulted in a lack of adult fish. Body condition was very good with all calculated relative weight values greater than 120 (Figure 6). Historically, Meredith has not been a Largemouth Bass fishing destination despite historical stockings of both Florida and Northern Largemouth Bass (Table 4).

Walleye: The total and stock-length catch rates for Walleye were 26.0/nn and 25.5/nn, respectively in 2019. Values were higher than catch rates from 2017 and 2011 (Figure 7). Size structure metrics (PSD=45 in 2019) indicate a balanced population. Body condition was acceptable with calculated relative weight values greater than 90 for most length categories. The Walleye population has responded well to the recent lake level increases and anecdotal evidence indicates high angler success.

Fisheries Management Plan for Meredith Reservoir, Texas

Prepared – July 2019

ISSUE 1: Walleye contribute a large portion of the available sport fishing opportunities at Meredith Reservoir. Historically, regular Walleye stocking was unnecessary to maintain a population of harvestable fish but fry stockings have been necessary to rebuild the Walleye population. Due to the likelihood of low water elevations and golden algae blooms in the future it may be necessary to develop a long-term stocking plan to maintain acceptable Walleye populations.

MANAGEMENT STRATEGIES

1. Install temperature loggers to document winter temperature profiles which are critical to egg viability and development.
2. Evaluate the feasibility of a biennial Walleye fry stocking schedule. Gill net data will be used to quantify year class strength of stocking and non-stocking years.

ISSUE 2: Creel data have not been collected at Meredith since 2011. It is likely that angler use and preferences have changed following the golden alga kills in 2010-2011.

MANAGEMENT STRATEGY

1. Evaluate angler use and preferences using a spring and summer quarter creel survey from 1 April to 30 September 2022.

ISSUE 3: 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 Canadian River Municipal Water Authority and National Park Service 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 (2019–2023)

Sport fish, forage fish, and other important fishes

Sport fishes in Meredith Reservoir include Channel Catfish, Flathead Catfish, Largemouth Bass, Smallmouth Bass, White Crappie, Black Crappie, White Bass, and Walleye. The primary forage species are Bluegill and Gizzard Shad

Low-density fisheries

Flathead Catfish: Flathead Catfish have not been sampled using gill nets since 2009. According to the 2009 creel survey, there was no directed effort and Flathead Catfish only comprised 0.7% of the total catch for the entire survey period. Fry were stocked in 2016, but at this point the future of the fishery is uncertain. Gill net data collected while sampling for other species will provide enough trend data to track the Flathead Catfish population at this time.

White Bass: White Bass have not been reintroduced by Texas Parks and Wildlife personnel since the major golden alga kills in 2010-2011. There was one fish sampled in the 2019 spring gill net survey. There are no plans to reintroduce White Bass at this time. Gill net data collected while sampling for other species will provide enough trend data to track any emerging White Bass population.

Black Crappie: Black Crappie were introduced to Meredith reservoir in 1966 and recently stocked by the National Park Service in 2016. Historical catch rates are very low and there has been a lack of natural recruitment. Unless there is evidence to indicate an increase in the current population, species specific sampling is not necessary.

Survey objectives, fisheries metrics, and sampling objectives

Channel Catfish: Creel data collected in 2009 indicates that Channel Catfish received 8.1% of the direct angler effort. Due to low angler demand and low catch rates, general monitoring and trend data will be collected to document any large-scale changes in the fish population. Analysis of past sampling effort indicates that a minimum of 15 randomly selected gill net stations will be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence). Due to excessive effort, lack of angler demand and the potential for high sport fish bycatch, Channel Catfish data will be collected using the same strategy as Walleye (minimum of 6 random gill net stations).

Black Basses: Combined directed effort for all black basses was 3.0% in 2009. Smallmouth Bass and Largemouth Bass are the only black bass species in Meredith Reservoir. Trend data on relative abundance and size structure has been collected annually from 1996-2010 and in 2015, 2016, and 2018 using fall electrofishing. Moving forward, data will be collected biennially if lake levels and conductivity are suitable. Electrofishing surveys are scheduled for the fall of 2020 and 2022. Analysis of historical data indicates that more than 100 random stations would be necessary to achieve minimum population abundance trend data (CPUE-S RSE≤25) and size structure (PSD; 50 fish stock length fish minimum with 80% confidence). Due to the excessive effort anticipated to meet these standards, a practical effort of 12 randomly selected 5-min electrofishing stations will be sampled in 2020 and 2022. Length and weight data will be collected on all black bass. Data collected during the scheduled angler creel will also be used to document anecdotal reports of angler success.

Crappie: White Crappie received approximately 6.5% of the directed angler effort in 2009. Additionally Black Crappie were stocked in 2016. Trap net data has been highly variable and catch rates have been low (0.2/nn in 2016 and 0.0/nn in 2014). Gill net and electrofishing data will be used to determine presence/absence of crappie. Personnel will document any crappie that are sampled during planned gill net and electrofishing surveys. Data collected during the scheduled angler creel survey will also be used to determine presence/absence of crappie.

Walleye: Walleye received approximately 28.9% of the directed angler effort in 2009 and was the most targeted species. Catch rates have been variable since the golden alga kill in 2010, but suggest that the

population is expanding (Figure 7). Sampling objectives for future surveys will be to monitor general population trends (CPUE-S; RSE≤25 with 80% confidence) and size structure (PSD; 50 stock length fish minimum with 80% confidence). Analysis of past survey data indicates that 10 random gill net stations will be required to satisfy the objectives for general population trend data and 6 random gill net stations will be required to meet size structure objectives. Minimum sampling effort in 2021 and 2023 will be 6 randomly selected stations. If objectives for both abundance and size structure are not met, additional sites will be sampled, but the total sampling effort will not exceed 12 randomly selected gill net stations.

Forage Fish: Bluegill and Gizzard Shad are the primary forage species at Meredith Reservoir. Trend data has been collected annually from 1996-2010 and in 2015, 2016, and 2018 using fall electrofishing. Sampling, as per black basses above, will allow for general monitoring of large-scale changes of relative abundance, size structure, and IOV data for forage species. No additional effort will be extended beyond what is used for black bass sampling.

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Tables and Figures

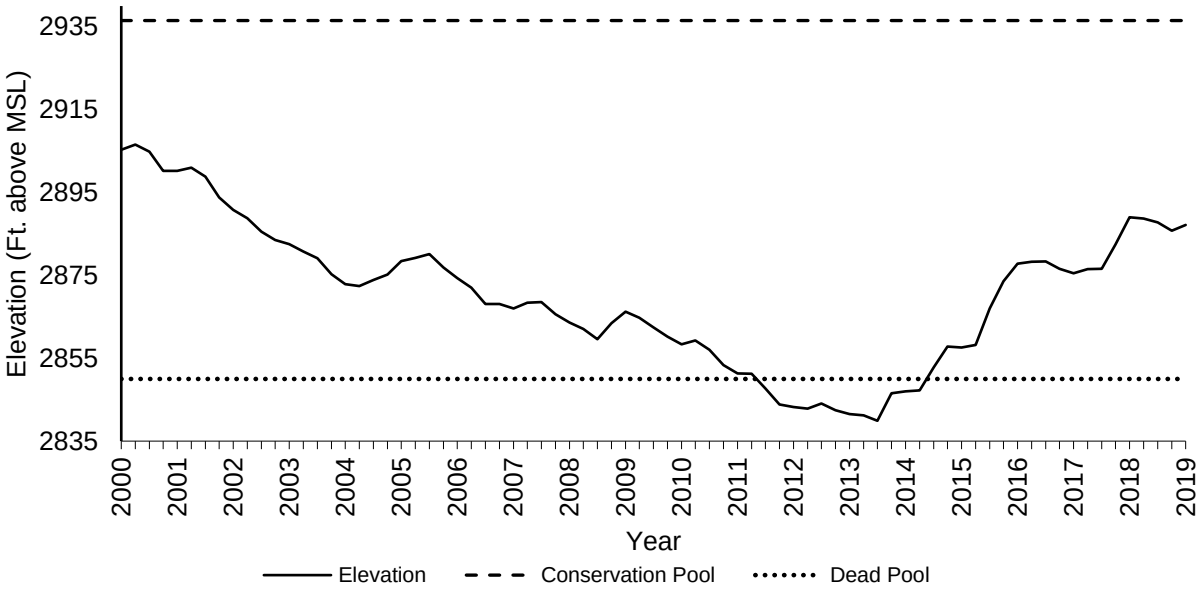


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Meredith Reservoir, Texas.

Table 1. Characteristics of Meredith Reservoir, Texas.

Characteristic	Description
Year constructed	1965
Controlling authority	Canadian River Municipal Water Authority and National Park Service
County	Hutchinson, Moore, Potter
Reservoir type	Main Stem
Shoreline Development Index	2.68
Conductivity	2640 µS/cm

Table 2. Boat ramp characteristics for Meredith Reservoir, Texas, August, 2018. Reservoir elevation at time of survey was 2886.7 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Sanford-Yake	35.707534 -101.555136	Y	120	2,844	Usable at elevation
Cedar Canyon	35.694990 -101.573509	Y	60	2,903	End of ramp (EOR) elevation is 16 ft above water. Extension is not feasible.
Fritch Fortress	35.688489 -101.592646	Y	80	2,863	Usable at current elevation.
Harbor Bay	35.652362 -101.628718	Y	40	2,912	EOR elevation is 26 ft above water. Extension is not feasible. There is a low water ramp at Harbor Bay that is currently usable
Blue West	35.68815 -101.63032	Y	50	2,895	EOR elevation is 9 ft above water. Extension is not feasible
Alibates	35.587616 -101.708155	Y	20	2,912	EOR elevation is 26 ft above water. Extension is not feasible
Plum Creek	35.597238 -101.713031	Y	20	2,915	EOR elevation is 29 ft above water. Extension is not feasible

Table 3. Harvest regulations for Meredith Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth and Smallmouth	5[a]	14-inch minimum
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum
Walleye	5	No more than 2 under 16 inch

[a] Daily bag for Largemouth Bass and Smallmouth Bass = 5 fish in any combination.

Table 4. Stocking history of Meredith Reservoir, Texas. FGL = fingerling; FRY = fry; ADL = adults.

Species	Year	Number	Size
Gizzard Shad	2018	150	ADL
Rainbow Trout	1973	50,000	ADL
	1989	3,000	ADL
	Total	53,000	
Brown Trout	1973	30,000	ADL
Blue Catfish	1965	2,500	FGL
	1966	9,000	FGL
	1971	12,000	FGL
	1972	30,000	FGL
	1988	160,500	FRY
	Total	214,000	
Channel Catfish	1965	421,500	FGL
	1966	360,000	FGL
	1970	9,680	FGL
	1971	12,000	FGL
	1973	107,690	FGL
	Total	910,870	
Flathead Catfish	1966	15,000	FGL
	1966	18	ADL
	2016	30,670	FRY
	Total	45,688	
White Bass	1965	15	ADL
Smallmouth Bass	1974	11,100	FGL
	1975	28,000	FGL
	1976	66,000	FGL
	1977	322,700	FGL
	2017	39,463	FGL
	2018	50,405	FGL
	2019	50,410	
	Total	568,078	
Largemouth Bass	1965	480,000	FGL
	1966	432,000	FGL
	1973	88,000	Mix
	1983	553	ADL
	1993	10,200	FGL
	1994	160,400	FGL
	1995	586,663	FGL
	2000	20,370	FGL
	2019	277,723	FGL
	Total	2,055,909	

Table 4. Stocking history continued.

Species	Year	Number	Size
Florida Largemouth Bass	1986	631	ADL
	1990	401,749	FGL
	1993	100,000	FGL
	1997	177,000	FGL
	Total	679,380	
Kemp's Largemouth Bass	1988	412,727	FGL
	1990	189	ADL
	2001	32,000	FGL
	Total	444,916	
Mixed Largemouth Bass	1989	197	ADL
	1990	40	ADL
	Total	237	
Bluegill	2016	82,611	FGL
	2018	25	ADL
	Total	82,636	
Crappie	1994	308	ADL
White Crappie	1966	50,000	FGL
	1993	161	ADL
	Total	50,161	
Black Crappie	1966	150,000	FGL
	2016	5,992	ADL
	Total	155,992	
Yellow Perch	1980	2,500	ADL
	1981	2,500	ADL
	1983	2,212	ADL
	1984	400	ADL
	1992	165,116	FGL
	1995	30,381	FGL
	Total	203,109	
Walleye	1965	500,000	FRY
	1966	2,000,000	FRY
	1969	750,000	FRY
	1998	5,096,000	FRY
	2000	290,196	FGL
	2016	2,709,402	FRY
	2017	3,066,592	FRY
	2018	1,720,560	FRY
	2019	334,136	FRY
	Total	16,466,886	

Table 5. Objective-based sampling plan components for Meredith Reservoir, Texas 2015-2019.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Smallmouth Bass	Exploratory	CPUE Total	Practical Effort
Largemouth Bass	Exploratory	CPUE Total	Practical Effort
Bluegill [a]	Exploratory	CPUE Total	Practical Effort
Gill Netting			
Channel Catfish	Exploratory	CPUE Total	Practical Effort
White Bass	Exploratory	CPUE Total	Practical Effort
Walleye	Exploratory	CPUE Total	Practical Effort

[a] No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and 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.

Table 6. Survey of structural habitat types, Meredith Reservoir, Texas, 2018. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural	24.0 miles	76.2
Rocky	7.5 miles	23.8
Flooded Terrestrial (Timber)	609.0 acres	8.7

Table 7. Survey of aquatic vegetation, Meredith Reservoir, Texas, 2018. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2018
Non-native	
Eurasian Milfoil (Tier III)*	93.0 (0.1)

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

Gizzard Shad

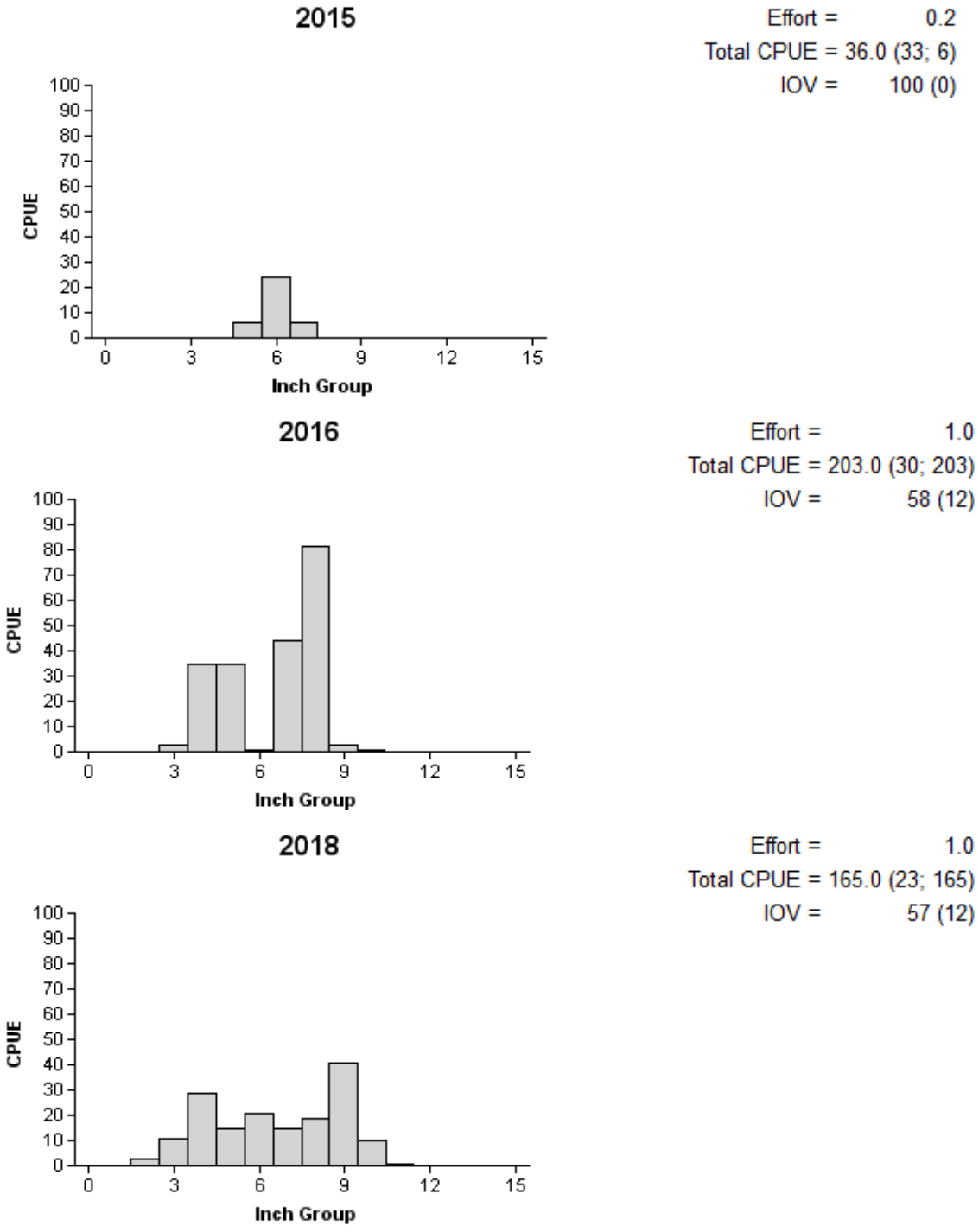


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2015, 2016, and 2018.

Bluegill

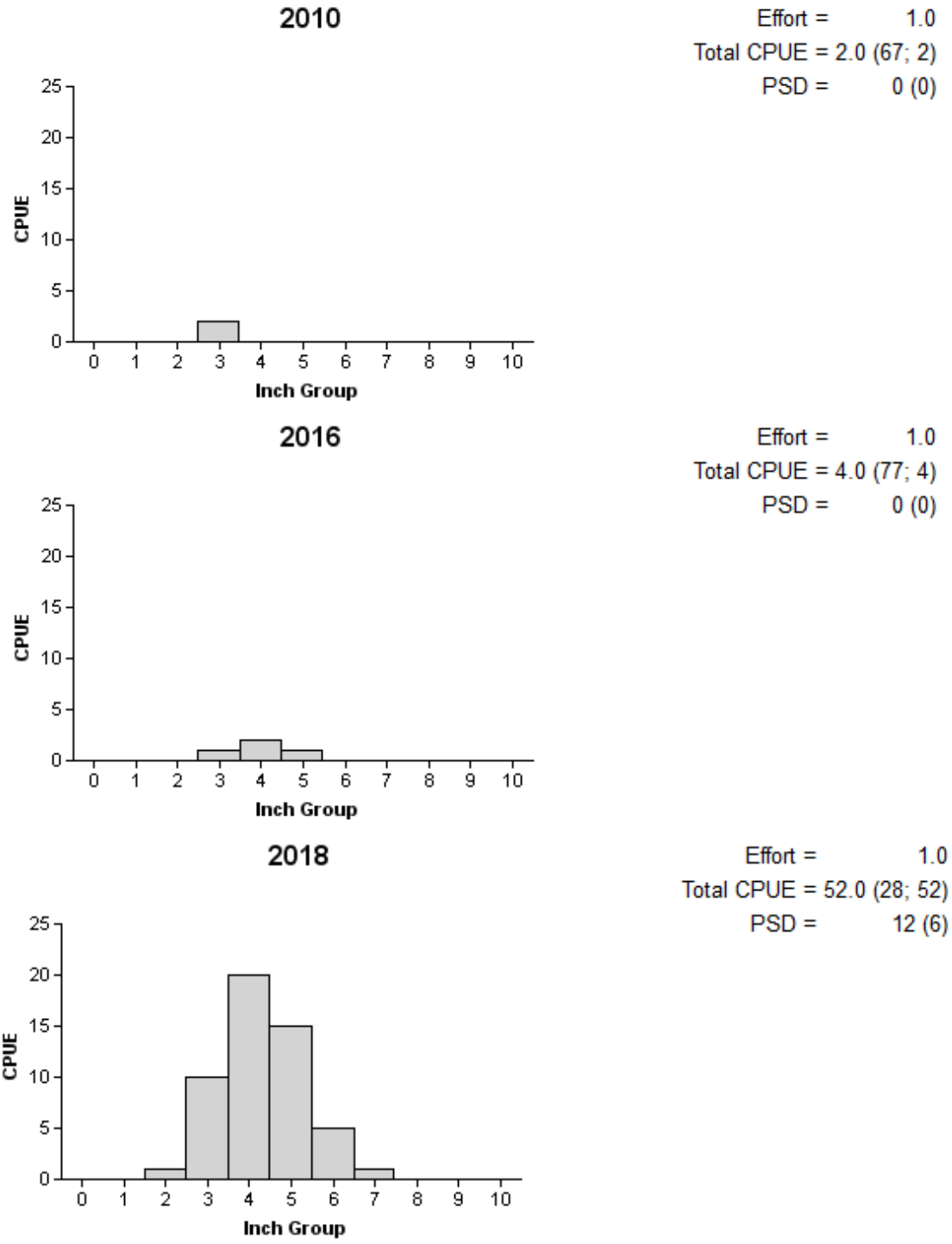


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2010, 2016, and 2018.

Channel Catfish

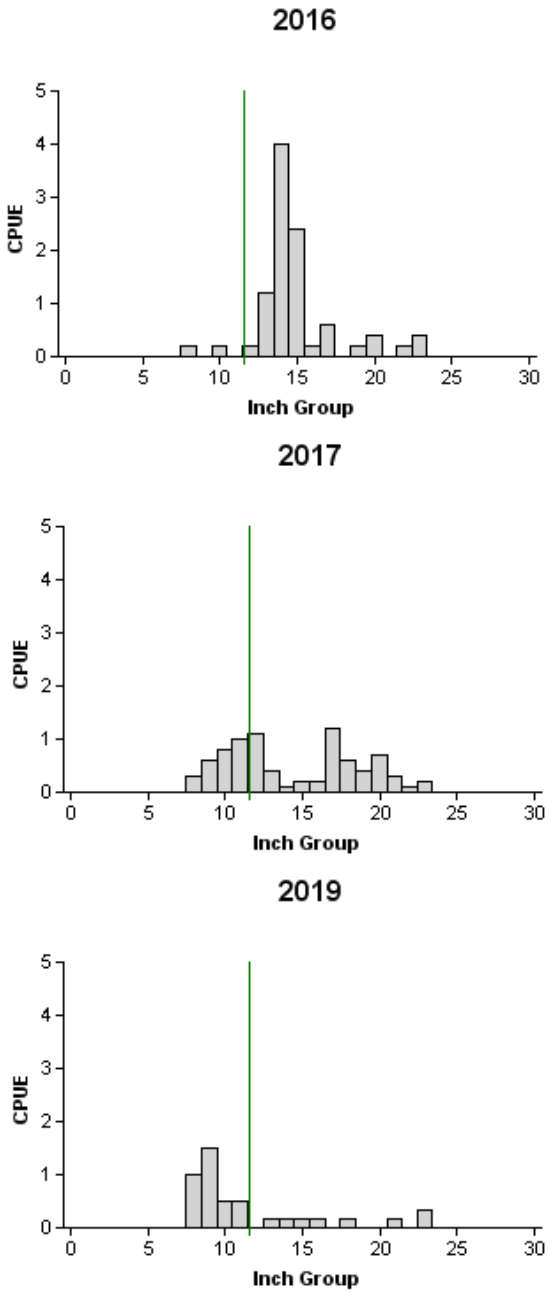


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2016, 2017, and 2019. Vertical line indicates minimum length limit.

White Bass

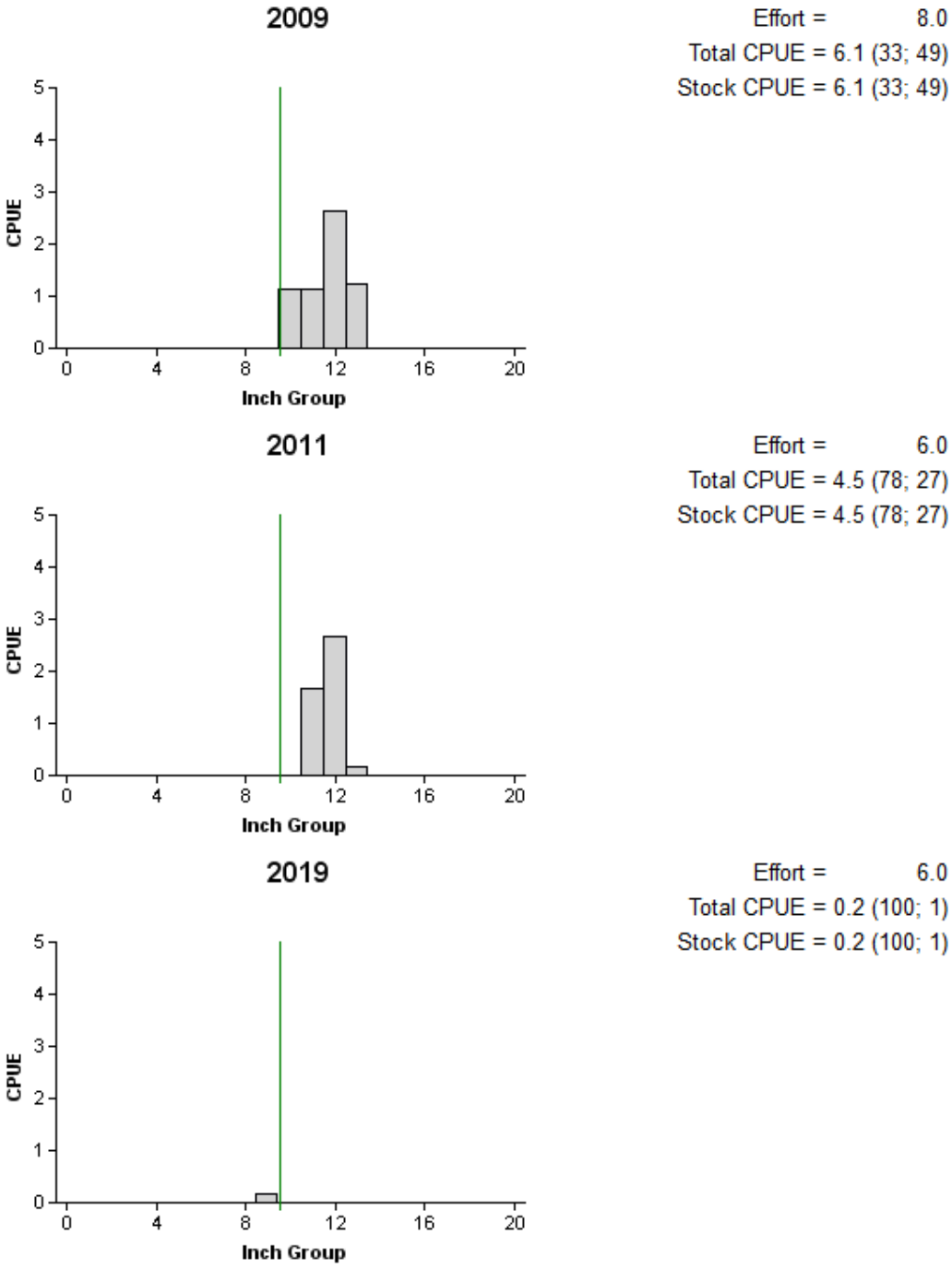


Figure 5. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2009, 2011, and 2019. Vertical line indicates minimum length limit.

Largemouth Bass

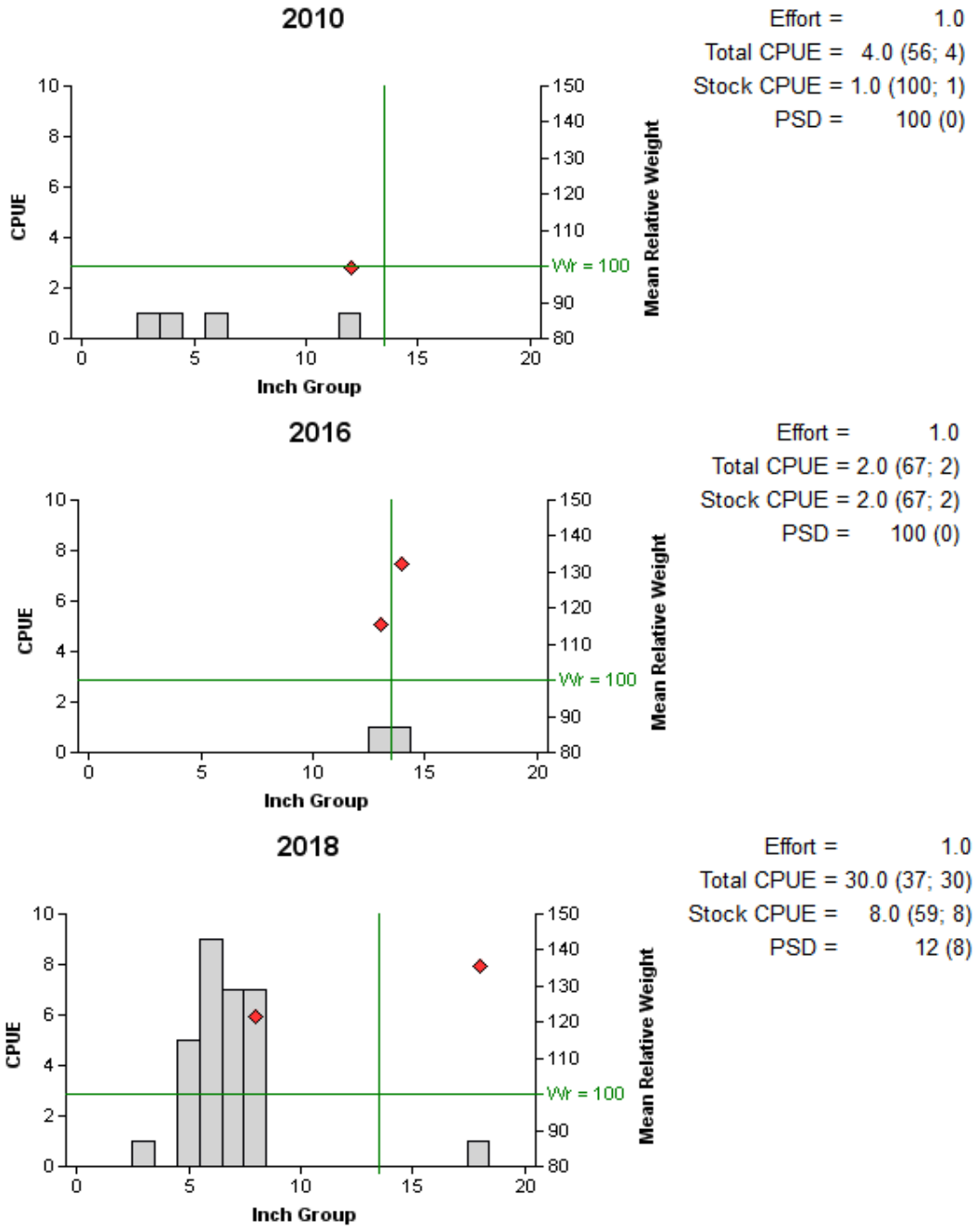


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2010, 2016, and 2018. Horizontal line indicates relative weight equal to 100. Vertical line indicates minimum length limit.

Walleye

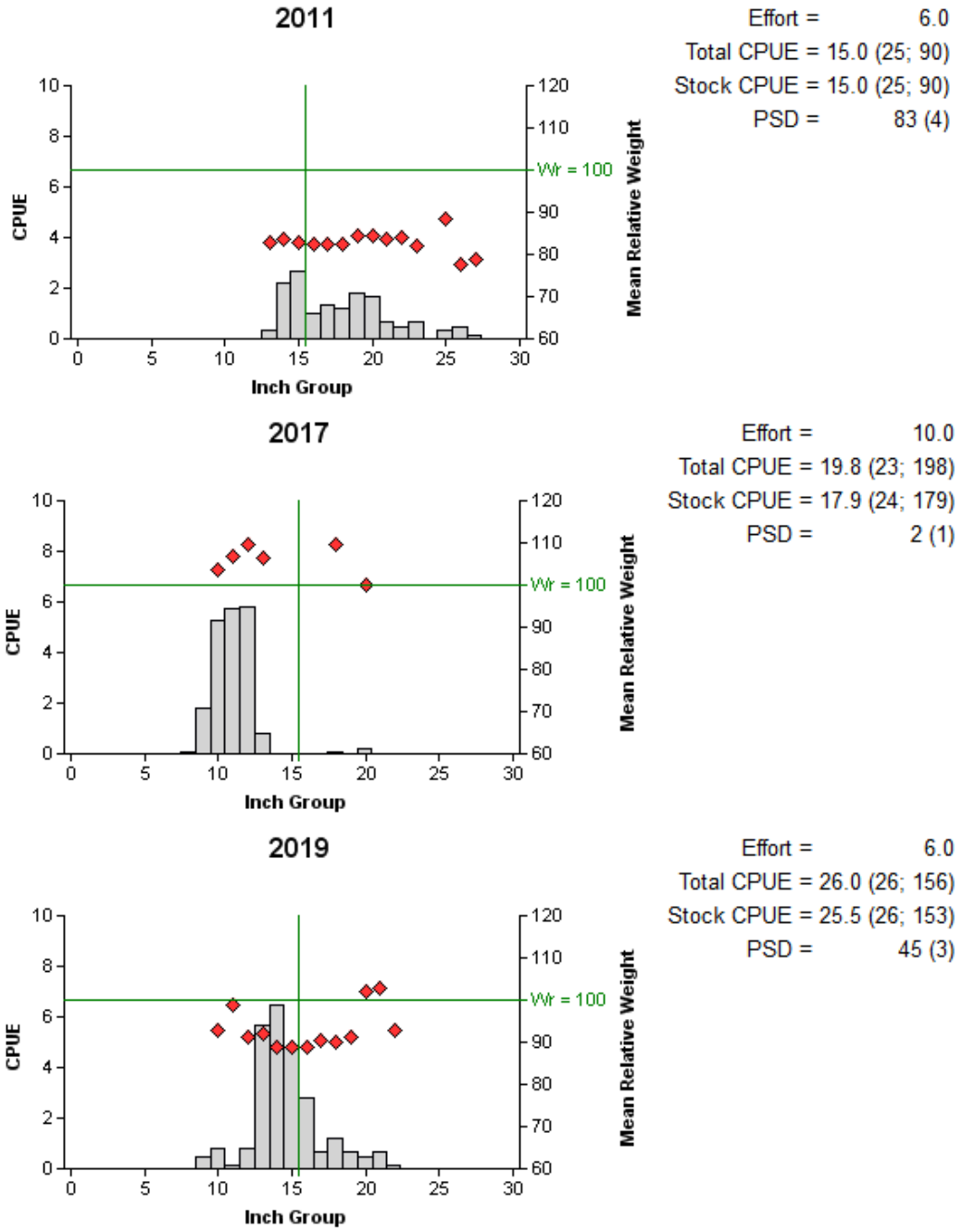


Figure 7. Number of Walleye caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2011, 2017, and 2019. Horizontal line indicates relative weight equal to 100. Vertical line indicates minimum length limit.

Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Meredith Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

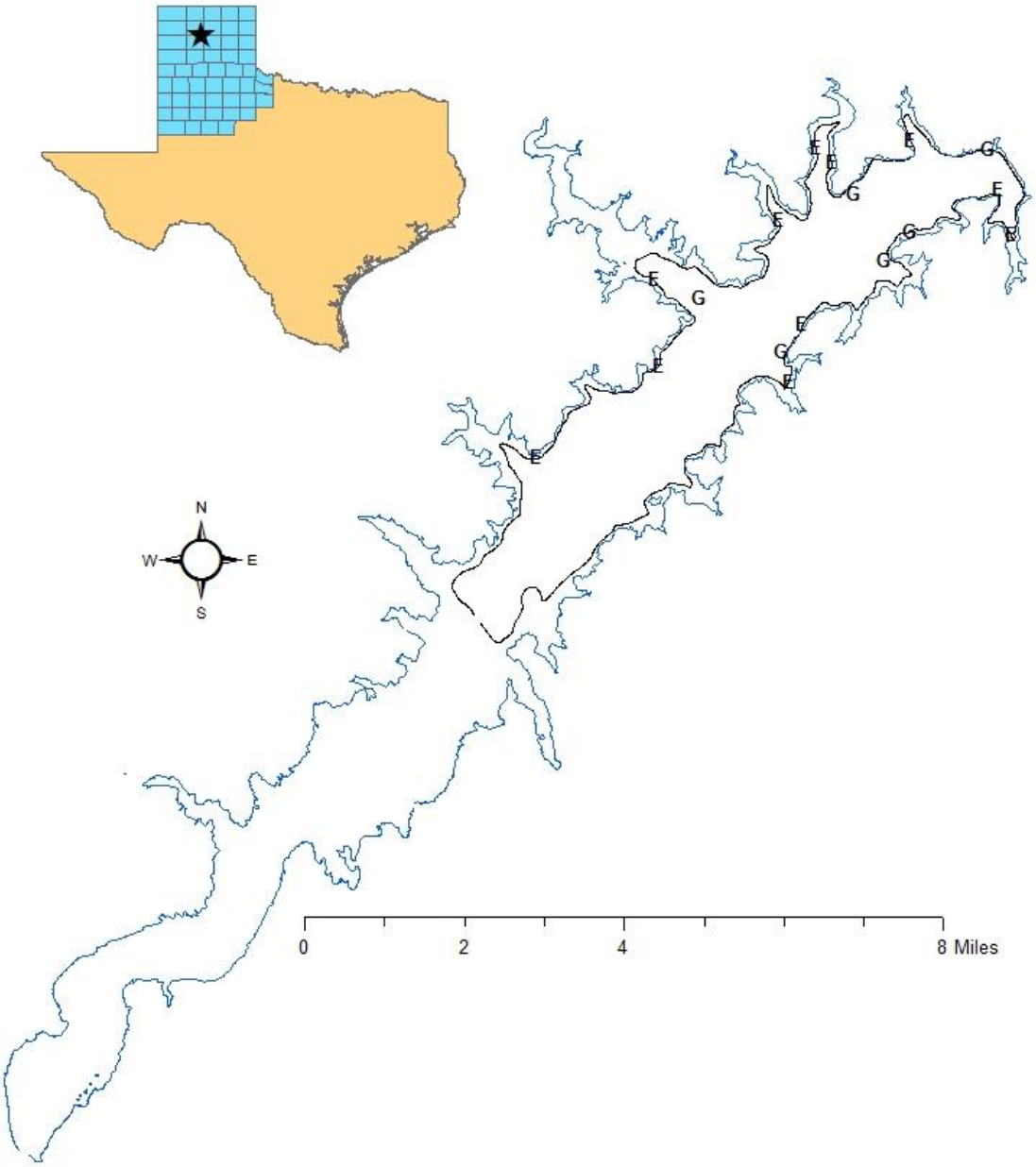
	Survey Year			
	2019-2020	2020-2021	2021-2022	2022-2023
Angler Access				S
Structural Habitat				S
Vegetation				S
Electrofishing – Fall		A		S
Gill netting		A		S
Creel survey			S	
Report				S

APPENDIX A – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE;RSE in parentheses) of all species collected from all gear types from Meredith Reservoir, Texas, 2018-2019. Sampling effort was 6 net nights for gill netting and 1 hour for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			165 (23)	165
Common Carp	29 (21)	4.8	8 (65)	8
Golden Shiner			1 (100)	1
River Carpsucker	9 (64)	1.5	4 (67)	4
Black Bullhead	18 (58)	3.0	4 (77)	4
Channel Catfish	29 (26)	4.8	3 (52)	3
White Bass	1 (100)	0.1	1 (100)	1
Green Sunfish			30 (30)	30
Bluegill	3 (68)	0.5	52 (28)	52
Longear Sunfish			1 (100)	1
Largemouth Bass	5 (48)	0.8	30 (37)	30
White Crappie	12 (32)	2.0		
Black Crappie	1 (100)	0.1		
Walleye	156 (26)	26.0	27 (21)	27

APPENDIX B – Map of sampling locations



Location of sampling sites, Meredith Reservoir, Texas, 2018-2019. Gill net and electrofishing stations are indicated by G and E, respectively. Water level was 2886.7 ft MSL (approximately 48 ft below full pool) at time of sampling.

Appendix C – Historic Golden Alga Cell Counts

Date, Location, and cell count (total cells/ mL) of golden alga samples taken from Meredith Reservoir, Texas, 2013-2018.

Date	Location	Cell Count (Total Cells/mL)
10/9/2013	Sanford-Yake Boat Ramp	24000
1/29/2014	Sanford-Yake Boat Ramp	17000
4/30/2014	Sanford-Yake Boat Ramp	14000
7/15/2014	Sanford-Yake Boat Ramp	0
10/7/2014	Sanford-Yake Boat Ramp	0
12/10/2014 [a]	Sanford-Yake Boat Ramp	27000
1/20/2015	Sanford-Yake Boat Ramp	6000
4/14/2015	Sanford-Yake Boat Ramp	0
11/18/2015	Sanford-Yake Boat Ramp	5000
12/8/2015	Sanford-Yake Boat Ramp	6000
1/12/2016	Sanford-Yake Boat Ramp	1000
3/8/2016	Sanford-Yake Boat Ramp	0
1/24/2017	Sanford-Yake Boat Ramp	0
1/24/2017	Fritch Fortress Boat Ramp	1000
11/16/2017	Sanford-Yake Boat Ramp	2000
12/13/2017	Sanford-Yake Boat Ramp	0
12/17/2018	Sanford-Yake Boat Ramp	0
2/13/2018	Sanford-Yake Boat Ramp	0

[a] Water levels improved beginning in 2015 which decreased conductivity and accounts for the decrease in total cell count.

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