



**Cibola Lake  
Fisheries Management Plan  
2019-2029**

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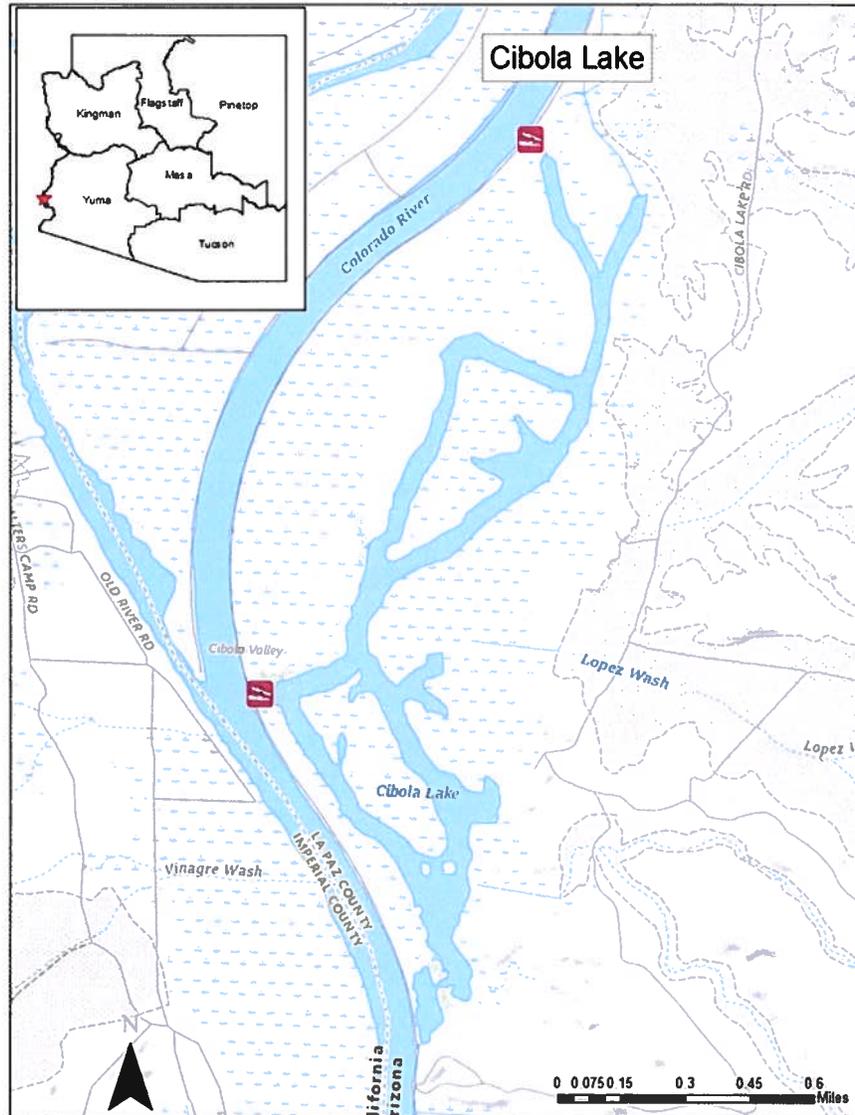
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Approved [  ] by Chris Cantrell *D. Andrew Ch...* *chief for* Date: 9/30/19  
Aquatic Wildlife Branch Chief

## Location

Cibola Lake is located within the Cibola Division on the Arizona side of the Colorado River. Cibola Lake is a backwater area located on the Cibola National Wildlife Refuge south of Blythe, California (Figure 1).



**Figure 1.** Location map of the Cibola Lake.

## Management Prescription

The Arizona Game and Fish Department (AGFD, Department) has developed concepts under a Strategic Vision Document (AGFD 2019) to help guide warmwater fisheries management in Arizona. Using these concepts, fisheries management of Cibola Lake will focus on general opportunity for all fisheries.

Objective 1: Maintain angler catch rates  $\geq 1$  fish /hour.

Objective 2: Maintain angler satisfaction at 80%.

Monitoring activities to determine if management objectives are being met should include: spring community-wide and/or species-specific electrofishing surveys every two to three years; creel surveys every five years, water quality, and vegetation surveys. Management strategies to meet objectives are identified in Table 1.

**Table 1.** Cibola Lake Objectives and Adaptive Management Strategies.

<b>Objective 1: Maintain angler catch rates <math>\geq 1</math> fish/hour.</b>			
<b>Parameters</b>	<b>Objective Guideline</b>	<b>Trigger point to address unmet objectives</b>	<b>Strategies if Objectives are not met</b>
Angler Catch Rates	Angler CPUE $\geq 1$ fish/hour for anglers	Angler CPUE $< 1$ fish/hour for two consecutive creel surveys.	<ul style="list-style-type: none"> <li>● Stocking</li> <li>● Regulation Changes</li> <li>● Outreach/Education to better inform anglers how to catch fish in Cibola Lake.</li> </ul>
<b>Objective 2: Maintain an overall angler satisfaction at 80%.</b>			
Angler Satisfaction	Angler satisfaction $> 80\%$	Angler satisfaction $< 80\%$ for two consecutive creel surveys.	<ul style="list-style-type: none"> <li>● Stocking</li> <li>● Regulation Changes</li> <li>● Outreach/Education</li> <li>● Coordinate with the Refuge staff to ensure facilities are meeting anglers needs.</li> </ul>

## Background

Cibola Lake is located within the Cibola Division on the Arizona side of the Colorado River. Cibola Lake is a backwater area located on the Cibola National Wildlife Refuge south of Blythe, California and was developed by the Bureau of Reclamation (BOR) for the purpose of mitigating fish and wildlife losses resulting from channelization of the main river channel. Prior to that, the area was located in the floodplain, and likely formed an ephemeral marsh habitat following flood events (B. Zaun, U.S. Fish and Wildlife Service, personal communication with M. Brown). Cibola Lake is about 3 kilometers long and less than 1.6 kilometers wide. The lake has a water-surface area of about 243 hectares and contains 2,250 hectare-meters of water, with a maximum depth of 4.5 meters at river elevation 212 feet MSL. Water can be supplied to Cibola Lake via Arnett Ditch, which returns agricultural runoff (or river water pumped into the ditch), from Hart Mine Marsh, or passively from the river via a culvert that likely only inputs water when the river is unusually high (B. Zaun, U.S. Fish and Wildlife Service, personal communication with M. Brown).

Cibola Lake and adjoining lands are closed to all activities between Labor Day to March 15 in order to provide a safe and undisturbed area for wintering waterfowl. Additionally, Cibola Lake is a no wake zone and only electric trolling motor or manually powered vessels may be used.

## Productivity and Water Quality

The Department has not taken basic water quality measurement for many years. However, there has not been any indication of severe or chronic water quality issues in this stretch of the river at this time.

Very little is known about nutrient levels in Cibola Lake. A better understanding of nutrient inputs, specifically phosphorus and nitrogen, into the lake under different conditions and the corresponding changes in primary productivity of the Cibola Lake could help managers understand trophic connections and the associated effect on sportfish populations. The Department will coordinate with other agencies to acquire water quality measurements and determine if additional sampling is necessary.

## Forage/Prey

Management of forage fishes in Cibola Lake is currently focused on maintaining a diverse prey base to support healthy predatory fish populations. Threadfin Shad *Dorosoma petenense*, Redear Sunfish *Lepomis microlophus*, Bluegill Sunfish *Lepomis macrochirus*, and Gizzard Shad contribute the most to the prey base in Cibola Lake.

Surveys conducted prior to 2014 were species-specific surveys primarily targeting Largemouth Bass *Micropterus salmoides* or Flathead Catfish *Pylodictis olivaris*. Community-wide surveys have been conducted since 2014 to collect data on species-specific abundance and species composition, which will help to better quantify abundance of forage fishes. During a 2014 fall electrofishing survey they comprised 80 % of the total catch (Figure 2).

In 2018, the Region 4 Aquatic Wildlife Program began to measure total length (mm) and wet weight (g) of Threadfin and Gizzard Shad sampled to gain a better understanding of the population.

With additional community-wide surveys, managers hope to better understand the connection between the abundance of shad and other forage fish, as well as lake conditions, both biotic and abiotic. If after several years of community-wide surveys, biologists are still unable to understand the connections between lake conditions and forage abundance, alternative survey methods may be required.

The Department is unaware of any data collected on non-fish forage sources (i.e. plankton, macrophytes, crayfish, invertebrates, etc.) of Cibola Lake. An increased understanding of the links between the aforementioned forage sources could help better inform fisheries management of Cibola Lake.

## **Habitat**

Fish habitat is abundant in the Cibola Lake. The substrate of the main channel is primarily sand and the banks are lined with dense stands of *Phragmites*, cattails and bulrush providing overhanging cover. The backwaters of the Yuma Division (e.g. Backwater 31 and Backwater 33) have diverse substrates ranging from silt, sand, rock and also have organic habitat inputs, including inundated tree stumps, submerged and emergent vegetation.

## **Species**

Fishes known to occur in Cibola Lake include Largemouth Bass, Smallmouth Bass *Micropterus dolomieu*, Striped Bass *Morone saxatilis*, Bluegill Sunfish, Redear Sunfish, Green Sunfish *Lepomis cyanellus*, Warmouth Sunfish *Lepomis gulosus*, Channel Catfish *Ictalurus punctatus*, Flathead Catfish, Black Crappie *Pomoxis nigromaculatus*, tilapia *Oreochromis spp.*, Common Carp *Cyprinus carpio*, Yellow Bullhead *Ameiurus natalis*, Threadfin Shad, and Gizzard Shad.

Electrofishing surveys have been periodically conducted by AGFD in the past. Surveys have largely been conducted as spot check surveys to answer specific management questions rather than to determine trends in the fish population. Cibola Lake is managed as a general opportunity water for all warm water fish, but metrics will be largely focused on angler catch rates due to a lack of recent survey data. At this time, management of fish populations in this lake does not merit any species specific metrics. In lieu of recent survey data, this document will describe the past condition of the fishery. The national standard for assessing Largemouth Bass populations call for spring nighttime sampling however, so future population sampling will switch over to the spring months. Fall sampling is still valuable and spot check type surveys to assess relative reproductive success of centrarchids may still be done in the fall.

### Spring Survey Summary

Spring electrofishing surveys of Cibola Lake were typically conducted during daylight hours in May. The VVP-15 was generally set to put out 2 to 4 amps of pulsed DC current with a frequency of 20 pulses per second and a pulse width of 70 to 80 percent. The boat was maneuvered along the shoreline and current was applied continually. Fish were collected using dip nets by netters on the electrofishing boat and on a second non-electrofishing "chase" boat. These settings primarily affect only Flathead Catfish with an occasional Channel Catfish. Fish collected are measured to the nearest millimeter in length and weighed in grams.

General opportunity objectives include multiple age classes, as well as electrofishing CPUE goals of greater than 50 fish per hour and angler CPUE no less than one fish per hour. The 2011 survey yielded an estimated mean CPUE of Flathead Catfish of 13.6 fish per hour, which was below management objectives (Table 2). As an index of age class distribution, the Cibola Lake electrofishing surveys show multiple size classes of Flathead Catfish, indicating multiple age classes (Figure 3).

### Fall Survey Summary

Fall electrofishing surveys of Cibola Lake were typically conducted during the night time hours in November. During the survey, the electrofishing boat slowly moved along the shoreline emitting electricity in 30 second blocks with an off period that lasted fifteen seconds or the time required for the boat to travel the length of the boat along the shoreline. This pattern was repeated until fifteen minutes of total electrofishing time was reached. A Coffelt VVP-15 was used for this survey with the following settings: ~ 10 amps, 30 % pulse width, and 60 Hz frequency. During the survey, personnel attempted to net all fish stunned except for Common Carp. Common Carp were counted if they were stunned in a manner that they could have been netted. Total lengths and wet weights of all Largemouth Bass, Flathead Catfish, Channel Catfish, and Black Crappie were recorded. All other species were sub-sampled for total length and wet weight measurements to reduce the amount of time required to process fish.

General opportunity objectives include multiple age classes, as well as electrofishing CPUE goals of greater than 50 fish per hour and angler CPUE no less than one fish per hour. The 2014 survey yielded an estimated mean CPUE of Largemouth Bass of 17.2 fish per hour, which was below management objectives (Table 3). The 2014 survey yielded an estimated mean CPUE of sunfish species of 42.5 fish per hour, which was below management objectives (Table 3). As an index of age class distribution, Cibola Lake electrofishing surveys show multiple size classes of both Largemouth Bass and sunfish species, indicating multiple age classes (Figure 4 and 5). Since surveys are completed in the fall, fall electrofishing CPUE cannot be compared with spring electrofishing CPUE due to seasonal biases in fisheries data (Pope and Willis 1996). Additionally, centrarchids (e.g. Largemouth Bass) spawn in the spring by building and guarding nests in shallow water (Page and Burr 2011) where they are more susceptible to shoreline electrofishing, thus further seasonally biasing their estimated CPUE. Furthermore, aquatic vegetation varies seasonally, with increased growth throughout the summer, and stem density is well known to decrease capture probability (Chick et al. 1999). Finally, water conductivity in Cibola Lake is at the upper limits of the current sampling gear (Coffelt VVP-15) available to AGFD Region IV staff, which likely further limits capture probability.

### Invasive/undesirable species

Quagga Mussels *Dreissena bugensis*, Bullfrogs *Lithobates catesbeiana*, Northern Crayfish *Orconectes virilis*, Gizzard Shad *Dorosoma cepedianum* have all been documented in Cibola Lake. Giant Salvinia *Salvinia molesta* is present in the mainstem of the Colorado River and has the potential to negatively impact the fishery of Cibola Lake. Apple Snails *Pomacea spp.* are present in downstream sections of the Colorado River. Gizzard Shad are one of the most recent fish species

to invade Cibola Lake and the full impacts to the fishery are not yet known. The Department will continue to work with partner agencies to maintain and enhance monitoring and participate in control efforts when needed.

## **Access**

Vehicular access to Cibola Lake is mainly from California Highway 78 and Cibola Lake Road on the California shore and via Highway 95 and Cibola Lake Road on the Arizona shore. Two gravel boat ramps are available to access Cibola Lake with a boat: one on the north side and one on the south end of the lake, both available via a levee road on the west side of the lake. Shoreline access for angling is limited by dense vegetation on the banks. Camping is not allowed in the Cibola National Wildlife Refuge. The Department will continue to work closely with the Cibola National Wildlife Refuge to ensure anglers continue to have access to the lake by maintaining boat ramps and other access areas.

## **Catch and Satisfaction**

Catch, harvest, and angler satisfaction rates on Cibola Lake are not known because creel surveys have not been conducted recently due to a lack of funding and resources. It is recommended that creel surveys be conducted approximately every five years on Cibola Lake. However, limited resources, access and personnel may restrict the Department's ability to conduct a creel survey. Other practices (i.e. tagging) may be implemented to assess angler pressure and harvest of fishes at Cibola Lake.

## **Literature Cited**

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- Brown, M., and W.B. Jacobson. 2006. Cibola Division Fish Management Report 2003 - 2005. Fisheries Technical Report 05-01. Statewide Fisheries Investigations, Federal Aid Project F-7-M-48. Arizona Game and Fish Department, Phoenix, Arizona.
- Chick, J. H., S. Coyne, and J. C. Trexler. 1999. Effectiveness of airboat electrofishing for sampling fishes in shallow, vegetated habitats. *North American Journal of Fisheries Management* 19(4): 957-967.
- Page, L.M. and B.M. Burr, 2011. *A field guide to freshwater fishes of North America north of Mexico*. Boston: Houghton Mifflin Harcourt, 663p.
- Pope, K. L., and D. W. Willis. 1996. Seasonal influences on freshwater fisheries sampling data. *Reviews in Fisheries Science* 4(1): 57-73.

## Tables and Figures

**Table 2.** Number, relative abundance, catch per unit effort and size of Flathead Catfish sampled by electrofishing on Cibola Lake during the spring of 2011.

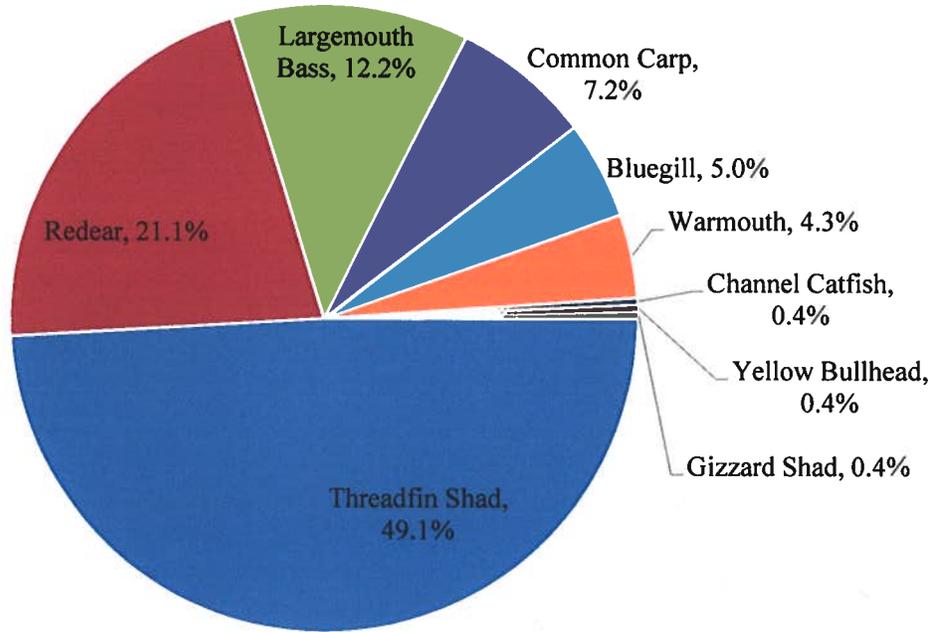
Species	Number Sampled	Catch per Effort (PYOL/hour)	Min Length (mm)	Max Length (mm)	Avg. Length (mm)	Avg. Weight (g)
Flathead catfish	46	13.6	168	841	587	2550

**Table 3.** Number, relative abundance, catch per unit effort and size of Largemouth Bass and sunfish sampled by electrofishing on Cibola Lake during the fall of 2014.

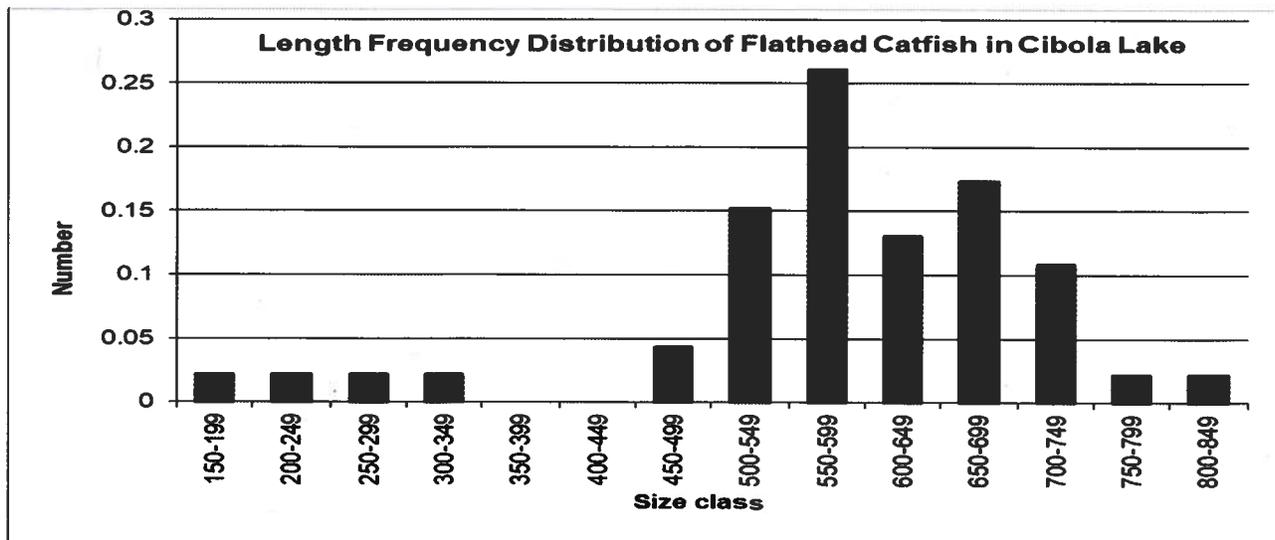
Species	Number Sampled	Catch per Effort (MISA/hour)	Min Length (mm)	Max Length (mm)	Avg. Length (mm)	Avg. Weight (g)
Largemouth Bass	34	17.2	97	438	239	280
Sunfish Species*	85	42.5	45	228	135	58

\*All Sunfish species (i.e. Redear, Bluegill, and Warmouth) were combined for analysis.

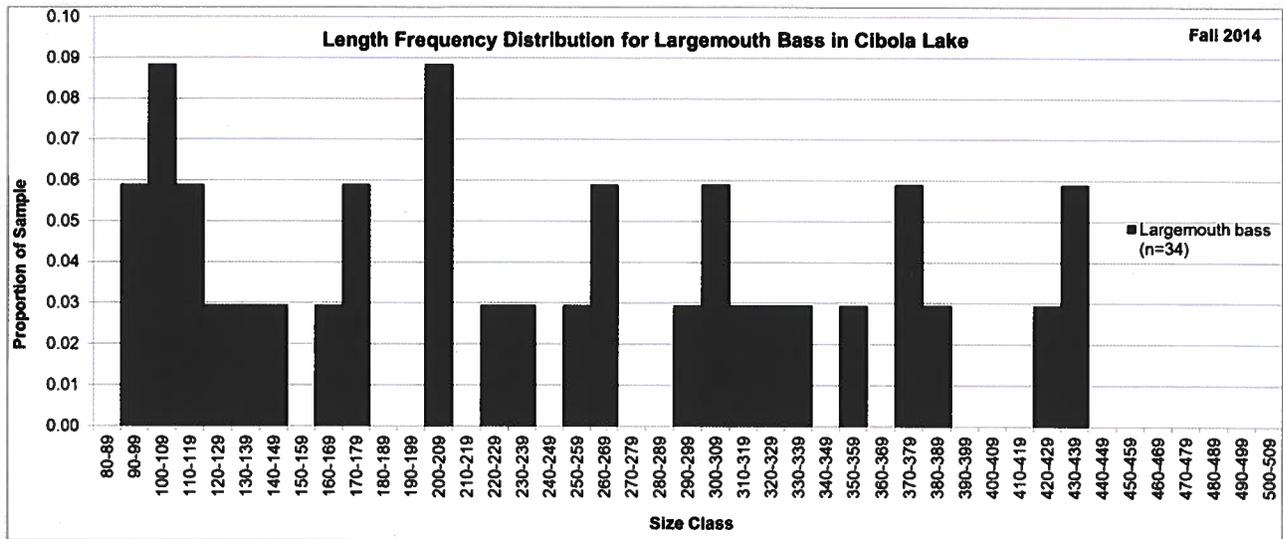
Relative Species Composition of Cibola Lake,  
Fall 2014



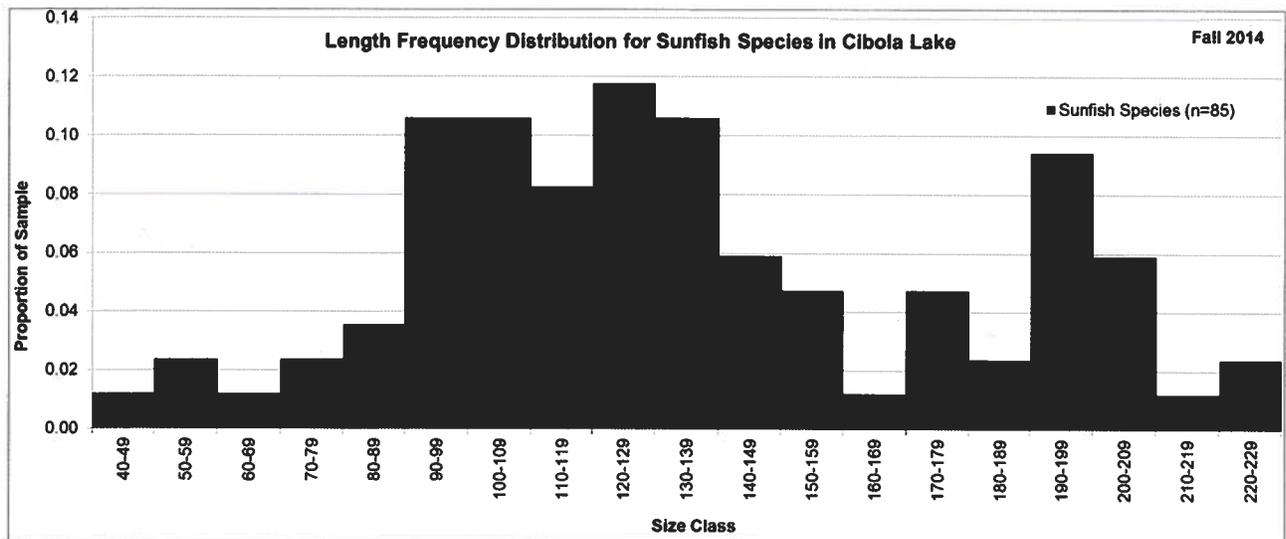
**Figure 2.** Relative species composition of fish captured during an electrofishing survey on Cibola Lake in the fall of 2014.



**Figure 3.** Length frequency distribution of Flathead Catfish sampled during the 2011 electrofishing survey of Cibola Lake.



**Figure 4.** Length frequency distribution of Largemouth Bass sampled during the 2014 electrofishing survey of Cibola Lake.



**Figure 5.** Length frequency distribution of sunfish species sampled during the 2014 electrofishing survey of Cibola Lake.