Colorado River-Yuma Division
Fisheries Management Plan
2019-2029

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Approved [X] by Chris Cantrell for Date: 9/30/19

Aquatic Wildlife Branch Chief

Location

The Yuma Division of the Colorado River consists of a 35.6 kilometer (22.1 miles) section from Laguna Dam down to Morelos Dam. The Colorado River above Morelos Dam (approximately 1.8 kilometers) forms the international boundary between the United States and Mexico and the remainder of the Yuma Division forms the boundary between Arizona and California (Figure 1).

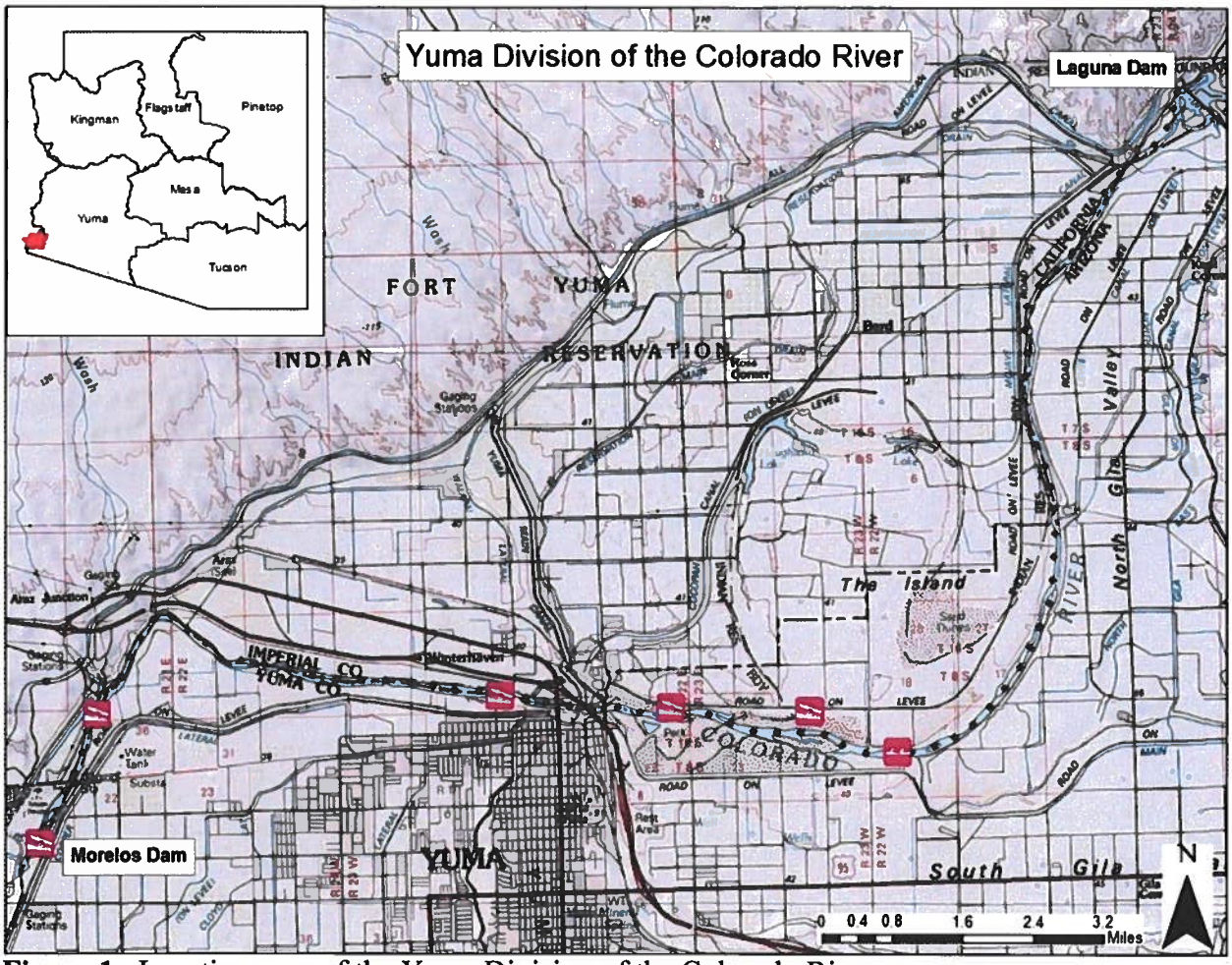

Figure 1. Location map of the Yuma Division of the Colorado River.

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 on the Yuma Division of the Colorado River will focus on general opportunity for all fisheries.

Objective 1: Maintain angler catch rates ≥ 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. Yuma Division Objectives and Adaptive Management Strategies.

Objective 1 : **Maintain angler catch rates ≥1 fish/hr.**			
Parameters	**Objective Guideline**	**Trigger point to address unmet objectives**	**Strategies if Objectives are not met**
Angler Catch Rates	Angler CPUE ≥ 1 fish /hour.	Angler CPUE < 1 fish/hour for two consecutive creel surveys.	• Stocking • Regulation Changes • Outreach/Education

Objective 2: Maintain an overall angler satisfaction at 80%.			
Angler Satisfaction	Angler satisfaction > 80%	Angler satisfaction < 80% for two consecutive creel surveys.	• Stocking • Regulation Changes • Outreach/Education

Background

The Yuma Division of the Colorado River consists of a 35.6 kilometer (22.1 miles) section from Laguna Dam down to Morelos Dam (Figure 1). The Colorado River above Morelos Dam (approximately 1.8 kilometers) forms the international boundary between the United States and Mexico and the remainder of the Yuma Division forms the boundary between Arizona and California. On the lower end Morelos Dam was completed in 1950 for the purpose of diverting the entire river into the Mexican irrigation system. Laguna Dam on the upper end of the Yuma

Division was the first dam on the Colorado River. Construction was completed in 1909 for the purpose of diverting water to both Arizona and California.

The river in this division is contained between a high levee on the California side from Laguna Dam to Morelos Dam and another levee on the Arizona side from Morelos Dam up to the Gila River confluence. The Gila River is the only natural inflow into the Colorado River in this division. It enters approximately 13.3 km. below Laguna Dam. All other inflows are irrigation, municipal, and power generation return flows.

In the period of 1902 through 1933 flows in this section of the Colorado River fluctuated dramatically throughout the year. These annual flows typically ranged from highs of over 50,000 cfs (cubic feet per second) to lows of 4,000 cfs. The highest flow was in 1920 at 120,000 cfs. This flow pattern has completely changed with stabilized flow around 300 cfs to 700 cfs year round (Figure 2). The only variations were the result of flood flows down the Gila River and once on the Colorado River in the mid 1980's. Even with those flows, the highest resulting flow in the division was less than 30,000 cfs. In 1998, the Bureau of Reclamation (BOR) released flushing flows from Laguna Dam, which removed a sand plug in the vicinity of the Gila River confluence. The removal of the plug lowered the water level in the upper portions of the river making it impossible to launch a boat. With low water levels in the upper portion BOR, was also changing the habitat in the middle by dredging two large backwaters. Deepening several miles of the river above Morelos Dam also changed the lower portion.

Historically there were nine native species of fish in this portion of the Colorado River (Minckley 1979). The last native species found in this division was the Striped Mullet *Mugil cephalus*. The last Striped Mullet sampled in this division of the Colorado was surveyed in 1998. In 1979 and 1997 Pacific Tenpounders *Elops affinis* entered this section of the Colorado River, but disappeared by the next surveys, which were in 1980 and 1998 respectively. For the most part, the aquatic habitat changed to favor introduced sportfish instead of native species. Fisheries management on this portion of the Colorado River has historically focused on Largemouth Bass and Flathead Catfish. Due to the difficulty of access and navigation due to lack of water on the Yuma Division, a comprehensive fish survey effort of the division has not been done by the Department since 2012.

Productivity/Water Quality

The Department has not taken basic water quality measurement for many years. However, there is no 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 the Yuma Division of the Colorado River. A better understanding of nutrient inputs, specifically phosphorus and nitrogen, into the river under different conditions and the corresponding changes in primary productivity of the Yuma Division 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 the Yuma Division of the Colorado River is currently focused on maintaining a diverse prey base to support healthy predatory fish populations. Bluegill Sunfish *Lepomis macrochirus,* Redear Sunfish *Lepomis microlophus*, Threadfin Shad *Dorosoma petenense*, and Gizzard Shad *Dorosoma cepedianum* contribute the most to the prey base in the Yuma Division and associated backwaters.

Surveys conducted prior to 2014 were species-specific surveys primarily targeting Flathead Catfish *Pylodictis olivaris* and Largemouth Bass *Micropterus salmoides*. 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. However, a 1999 fall electrofishing survey by the region did attempt to determine relative species composition, that survey found that forage fishes comprised 67% of the total catch (Table 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 river conditions, both biotic and abiotic. If after several years of community-wide surveys, biologists are still unable to understand the connections between river 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.) on the Yuma Division of the Colorado River. An increased understanding of the links between the aforementioned forage sources could help better inform fisheries management on the Yuma Division of the Colorado River.

Habitat

Fish habitat is abundant in the Yuma Division of the Colorado River. 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 the Yuma Division include Largemouth Bass, Smallmouth Bass *Micropterus dolomieu*, Striped Bass *Morone saxatillis*, 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.

Trend surveys of this section of the river were performed annually by the Region IV Aquatic Wildlife Program before large changes in the hydrology of the Yuma Division occurred (i.e. river

flow became highly regulated). As per regional protocol, Flathead Catfish were surveyed in the spring and Largemouth Bass were surveyed in the fall of each year. Since the change in hydrology, access and navigation to most parts of the division has become difficult. Due to these factors, a comprehensive fish survey effort of the division has not taken place since 2012. The Yuma Division of the Colorado River 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 and a lack of water in the division making surveying it difficult. At this time, management of the fish population 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

Flathead catfish population surveys were conducted on the Yuma Division of the Colorado River each year during the spring. The VVP-15 was 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 are 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 the occasional Channel Catfish captured during sampling. Fish collected were measured to the nearest millimeter in length and weighed in grams. Flathead Catfish surveys were conducted in the main channel of the river.

From 1996 to 2012 spring electrofishing surveys yielded a high CPUE of Flathead Catfish of 59.6 fish per hour and a low of 14.4 fish per hour (Figure 3). Only two of the twelve surveys from 1996 to 2012 met metrics for a general opportunity Flathead Catfish fisheries under AGFD's Warmwater Vision metrics. As an index of age class distribution, the Yuma Division electrofishing surveys from 2006 to 2012 showed multiple size classes of Flathead Catfish, indicating multiple age classes during all years sampled (Figure 4 - 7).

Fall Survey Summary

Largemouth Bass surveys were conducted in the Yuma Division of the Colorado River in fall each year. The VVP-15 was generally set to put out 8 to 10 amps of pulsed DC current at 100 to 200 volts with a frequency of 120 pulses per second and a pulse width of 50 percent. The boat was maneuvered along the shoreline and current was applied periodically and to areas where cover is present. Fish are collected using dip nets, identified to species, their total length measured to the nearest millimeter and weighed to the nearest gram. Largemouth Bass surveys were conducted in the main channel of the river, two selected backwaters along the river and a canal drain near Yuma that flows into the river ("California Waste way").

From 1992 to 2007 fall electrofishing surveys yielded a high CPUE of Largemouth Bass of 112.4 fish per hour and a low of 20.4 fish per hour (Figure 8). From 1992 to 2007 nine of twelve surveys met metrics for a general opportunity Largemouth Bass fisheries under AGFD's Warmwater Vision metrics. Additionally, the Yuma Division exceeded CPUE metrics for a high-quality

Largemouth Bass fishery for three of the twelve years. As an index of age class distribution, the Yuma Division electrofishing surveys showed multiple size classes of Largemouth Bass, indicating multiple age classes during all years sampled. Length frequency distribution of surveys from 1999 to 2007 are shown in Figures 9 to 13.

Invasive or undesirable species

Quagga Mussels *Dreissena bugensis*, Bullfrogs *Lithobates catesbeiana*, Northern Crayfish *Orconectes virilis*, Gizzard Shad, Apple Snails *Pomocea spp.* and Giant Salvinia *Salvinia molesta* have all been documented in the Yuma Division. Currently, Giant Salvinia is the greatest concern and as such has required significant resources to control. Gizzard Shad are one of the most recent fish species to invade the Yuma Division of the Colorado River 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

Due to its proximity to Yuma, Arizona, vehicular access to the Yuma Division of the Colorado River is relatively abundant when compared to most reaches of the river. Vehicular access to the Yuma Division is mainly from Levee Roads on both the Arizona and California shorelines. Anglers can fish and small craft can access the river at the following locations: the confluence of the Gila River and Yuma Division from the shore, a small dirt launch ramp inside of Backwater 33, a dirt launch ramp in Backwater 31 (tribal fishing license is required), concrete launch ramp at Yuma West Wetlands Park, Mode II dirt launch ramp, and Morelos Dredge dirt launch ramp. Even though access is relatively abundant, shoreline access for angling and camping is limited by dense vegetation on the banks. The Department will continue to work with management partners to evaluate boat ramps and other access areas and correct problems, as well as work to increase/provide funding and/or manpower as needed ensure anglers continue to have access.

Catch and Satisfaction

Catch, harvest, and angler satisfaction rates on the Yuma Division 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 the Yuma Division. However, limited resources, access and personnel may restrict the Department's ability to conduct a creel survey on the Yuma Division. In lieu, other practices (i.e. tagging) may be implemented to more accurately assess angler pressure and harvest of fishes at the Yuma Division.

Literature Cited

Arizona Game and Fish Department. 2019. Warmwater Sportfisheries Strategic Vision Document. Arizona Game and Fish Department, Statewide Fisheries Program, Phoenix, Arizona.

Jacobson, W. B. 2003. Colorado River Yuma Division fish management report 1997-2002. Fisheries Technical Report 02-04. Statewide Fisheries Investigations, Federal Aid Project F-7-M-45. Arizona Game and Fish Department, Phoenix Arizona.

Minckley, W.L. 1979. Aquatic Habitats and Fishes of the Lower Colorado River, Southwestern United States. Final Report, Contract No. 14-06-300-2529. U.S. Department of Interior, Bureau of Reclamation, Lower Colorado River Region, Boulder City, Nevada.

Tables and Figures

Table 2. Summary stats of fish caught in Yuma Division during the 1999 fall electrofishing survey.

Species	#	% of Total	Average Length (mm)	Std Dev.	Average Weight (g)	Std Dev.
Bluegill Sunfish	233	60.2	91	34	20	29
Largemouth Bass	47	12.1	227	150	427	775
Common Carp	42	10.9	462	70	1364	655
Striped Mullet	30	7.8	280	63	246	166
Tilapia Spp.	9	2.3	197	108	329	434
Goldfish	8	2.1	328	54	555	142
Threadfin Shad	8	2.1	108	26	12	8
Redear Sunfish	4	1.0	109	3	20	4
Black Crappie	2	0.5	163	64	73	74
Flathead Catfish	2	0.5	743	170	5808	4373
Channel Catfish	1	0.3	591	-	1870	-
Smallmouth Bass	1	0.3	305	-	395	-
Total	387	100.0				

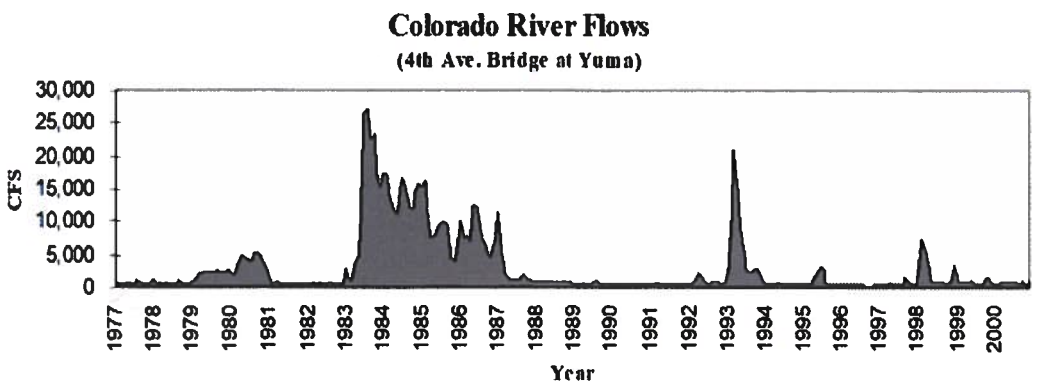

Figure 2. Mean monthly flow of the Colorado River at the 4th Avenue Bridge in Yuma for the years 1977 to 2000.

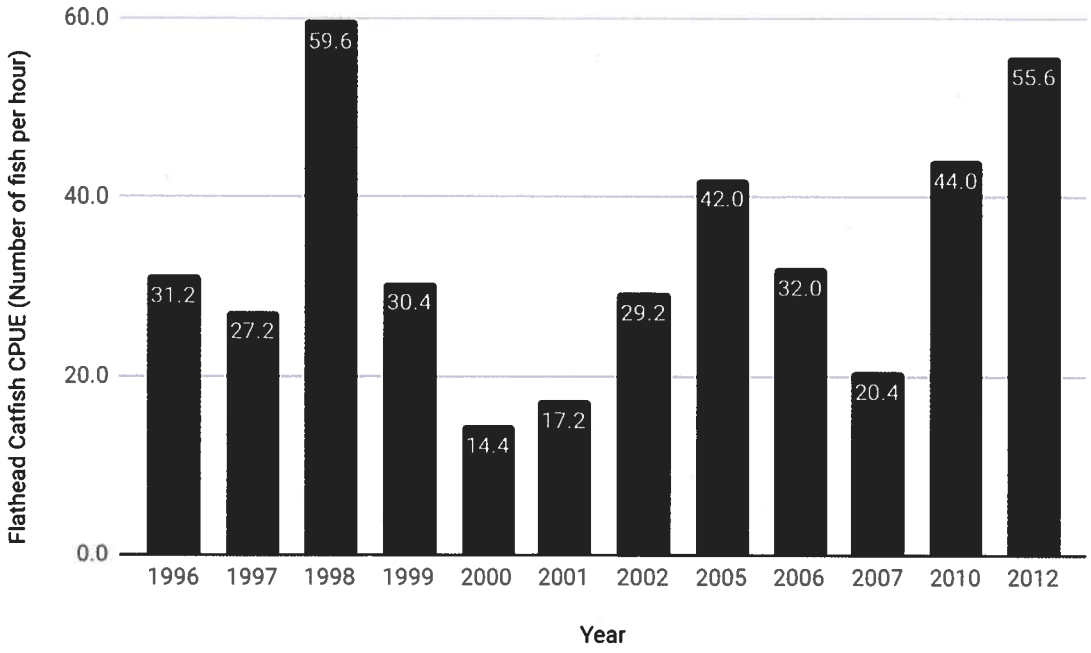

Figure 3. Catch per unit effort of Flathead Catfish sampled by electrofishing in the Yuma Division of the Colorado River from 1996 to 2012.

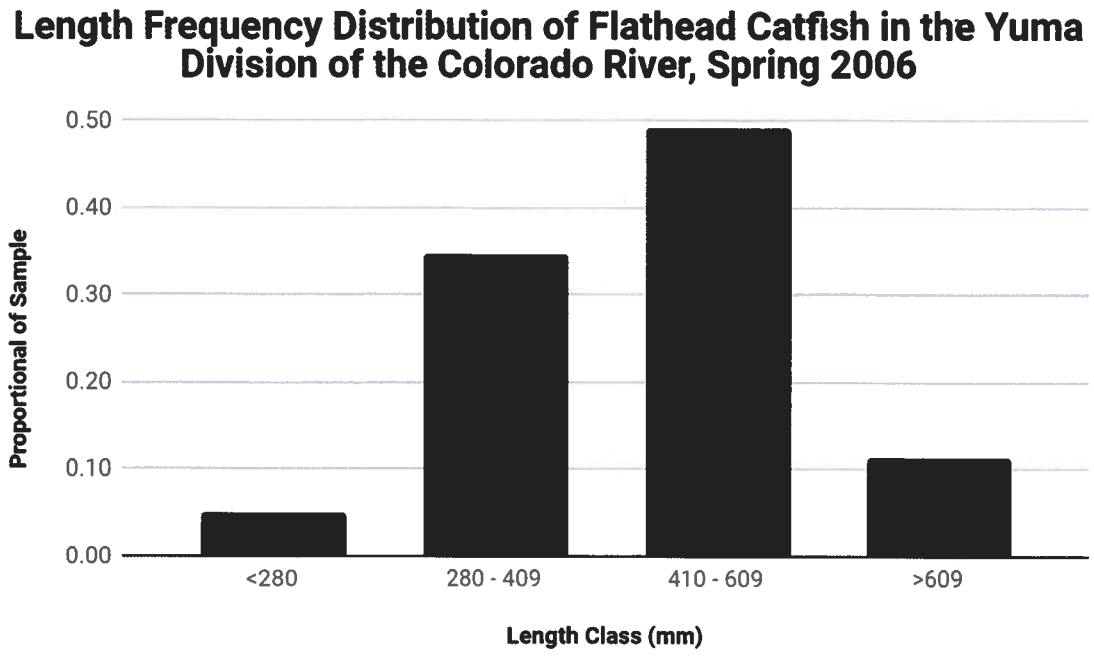

Figure 4. Length frequency of Flathead Catfish caught in Yuma Division during the 2006 spring electrofishing survey.

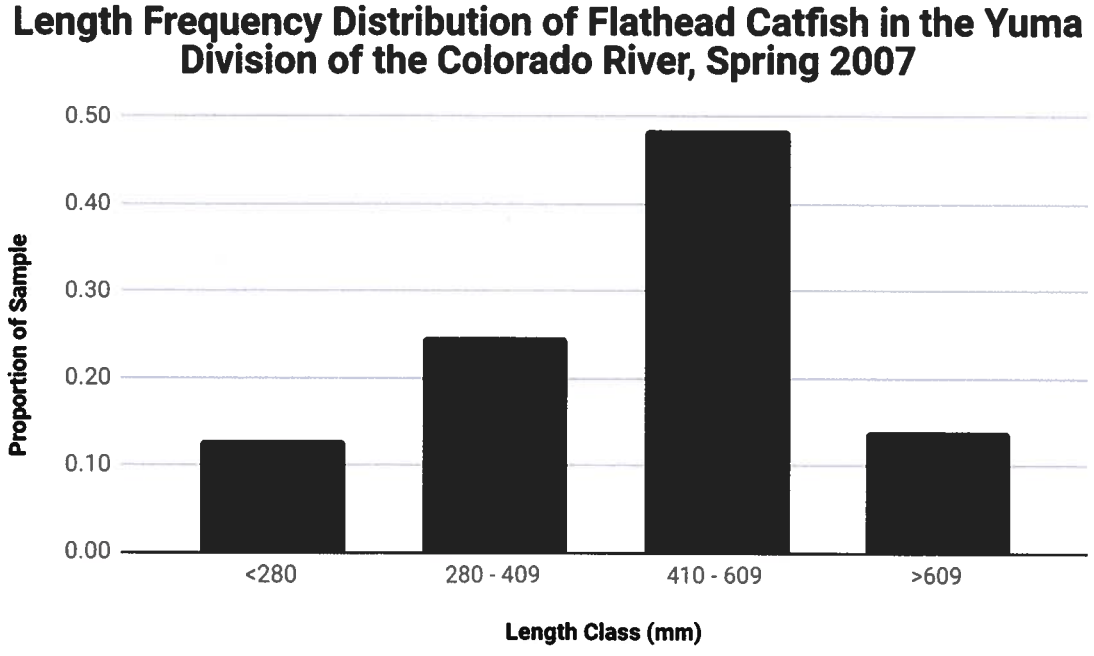

Figure 5. Length frequency of Flathead Catfish caught in Yuma Division during the 2007 spring electrofishing survey.

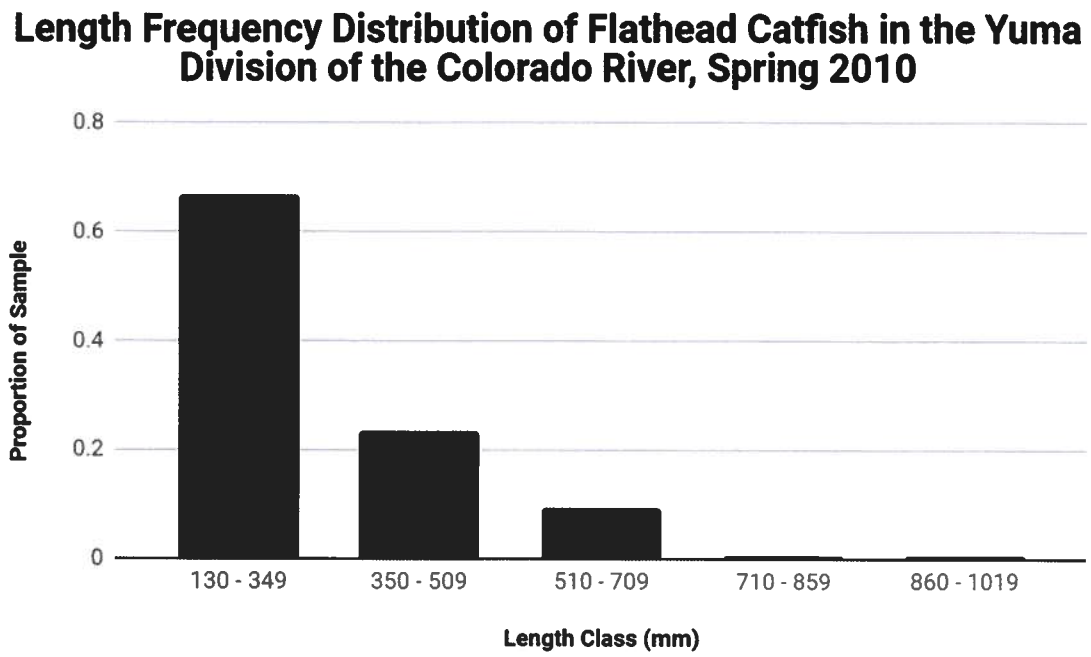

Figure 6. Length frequency of Flathead Catfish caught in Yuma Division during the 2010 spring electrofishing survey.

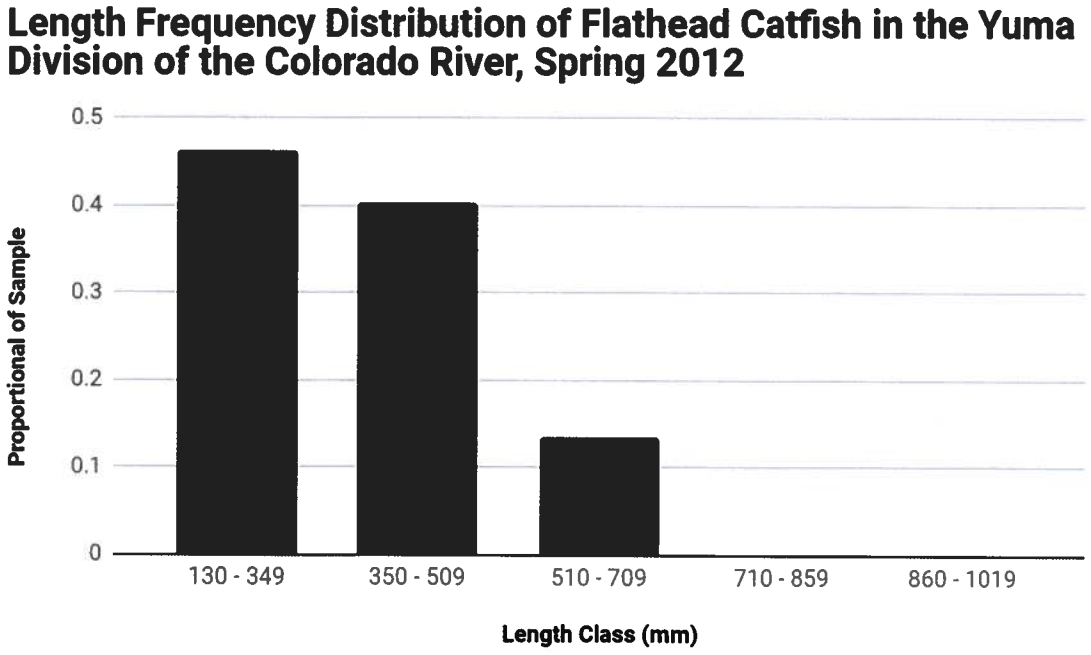

Figure 7. Length frequency of Flathead Catfish caught in Yuma Division during the 2012 spring electrofishing survey.

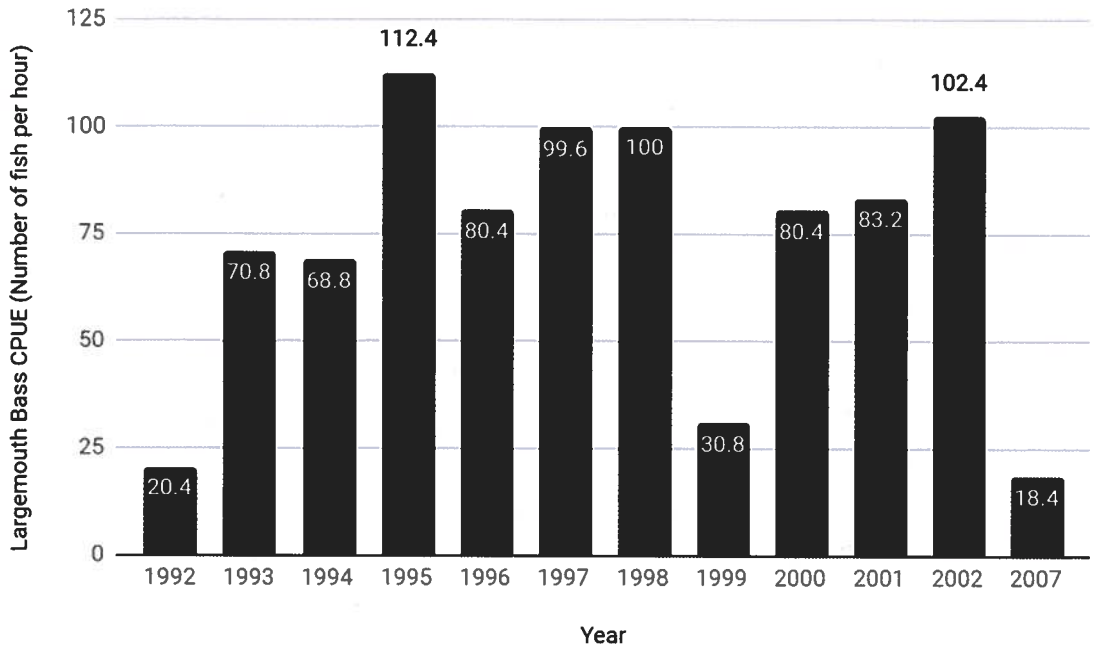

Figure 8. Catch per unit effort of Largemouth Bass sampled by electrofishing in the Yuma Division of the Colorado River from 1992 to 2007.

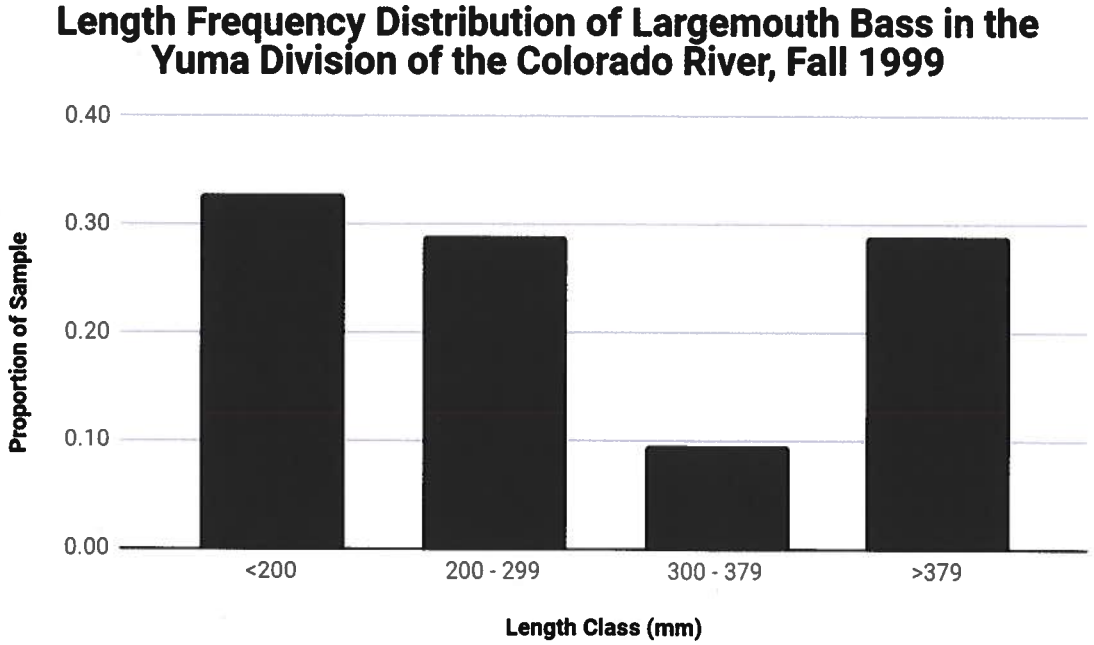

Figure 9. Length frequency of Largemouth Bass caught in Yuma Division during the 1999 fall electrofishing survey.

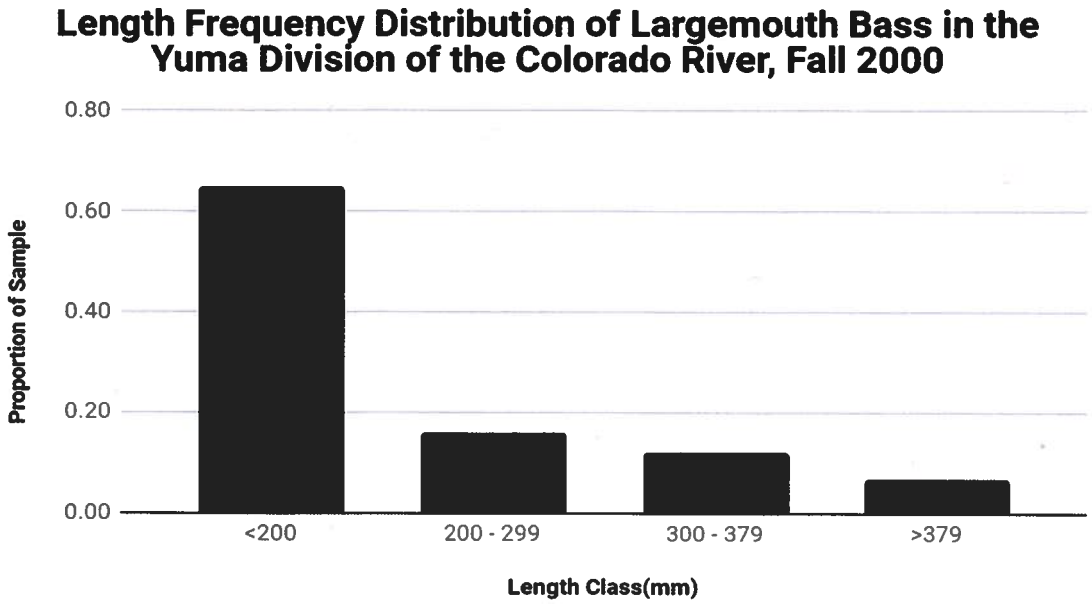

Figure 10. Length frequency of Largemouth Bass caught in Yuma Division during the 2000 fall electrofishing survey.

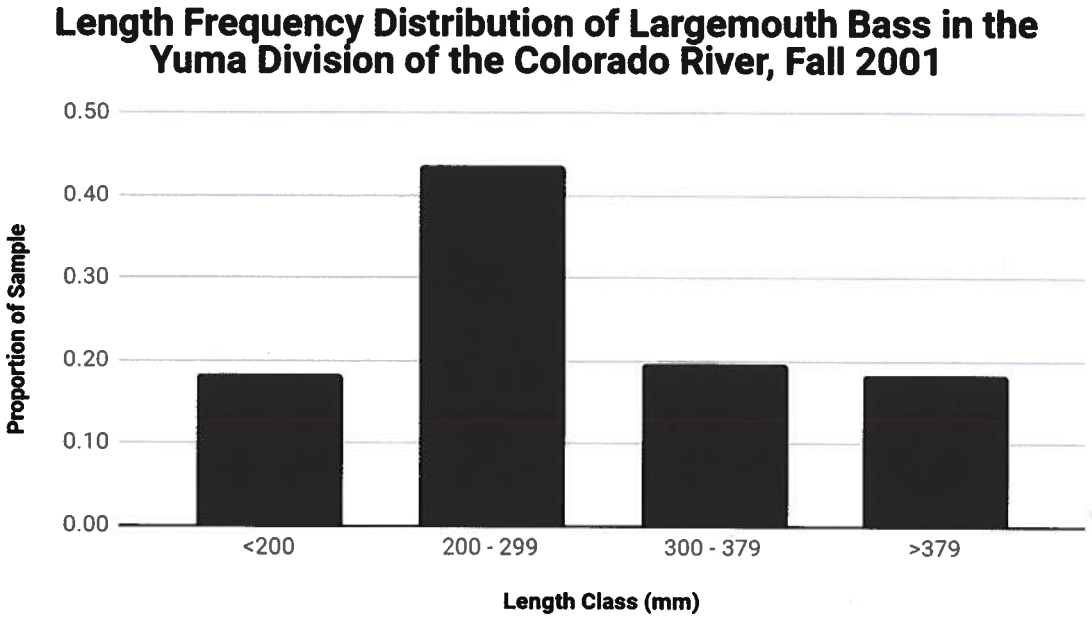

Figure 11. Length frequency of Largemouth Bass caught in Yuma Division during the 2001 fall electrofishing survey.

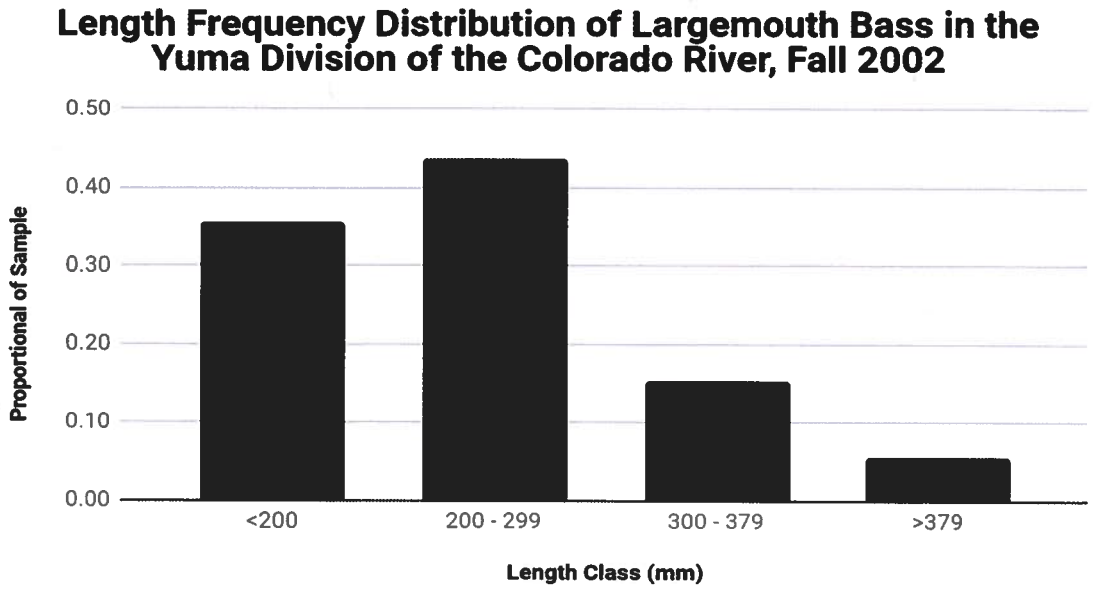

Figure 12. Length frequency of Largemouth Bass caught in Yuma Division during the 2002 fall electrofishing survey.

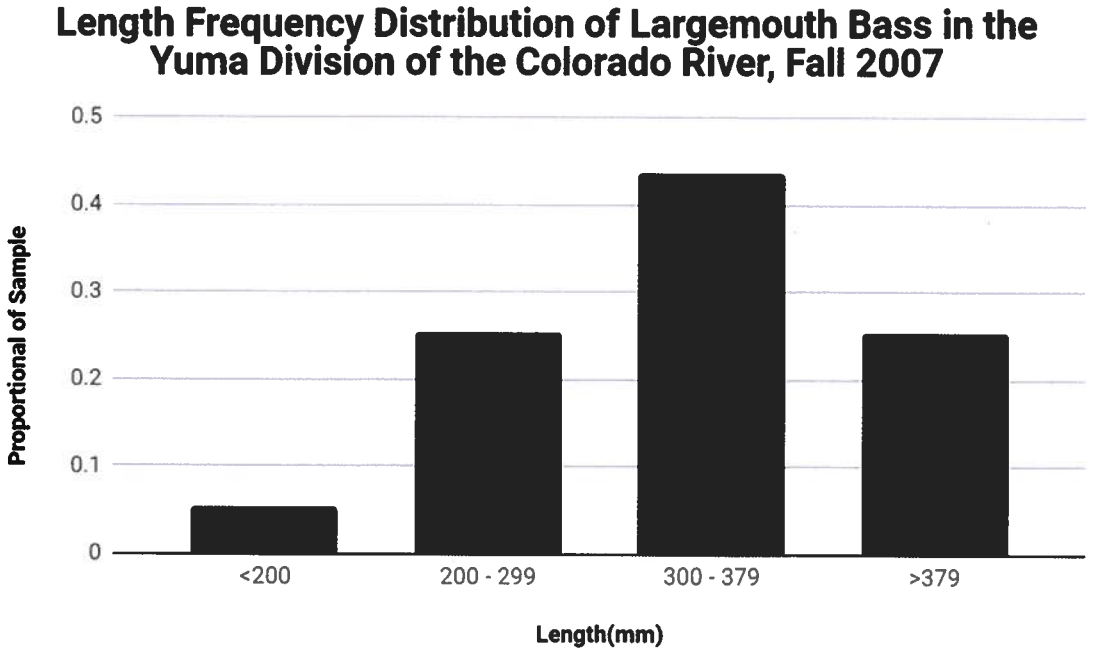

Figure 13. Length frequency of Largemouth Bass caught in Yuma Division during the 2007 fall electrofishing survey.