

# FLATHEAD CATFISH SAMPLING IN THE LOWER COLORADO RIVER WITH CONSIDERATIONS FOR RAZORBACK SUCKER



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## BACKGROUND

Following introduction to the lower Colorado River, Flathead Catfish *Pylodictis olivaris* have had deleterious effects on native fishes of the lower Colorado River, most notably, the Razorback Sucker *Xyrauchen texanus* (Marsh and Brooks 1989; USFWS 2018, 2019; Ehlo 2022). Flathead Catfish have reduced abundances of and presently pose a threat to the persistence of Razorback Sucker within its historical range due to their gape width and piscivorous behavior (Marsh and Brooks 1989; Slaughter and Jacobson 2008; USFWS 2018, 2019; Ehlo 2022). Razorback Sucker stocked by the Multi-Species Conservation Program (MSCP) have a minimum stocking size of 305 mm in total length. Stocking at this size has been shown to improve survival largely because of gape width limitations of common predators (Ehlo 2022). However, gape width studies indicated that a Flathead Catfish of 300 mm in total length could consume the accepted stocking size of Razorback Sucker (Portz and Tyus 2004; Slaughter and Jacobson 2008; Ehlo 2022; D. L. Ward, U.S. Fish and Wildlife Service, unpublished data). Additionally, Flathead Catfish eclipsing 700 mm in total length can consume even the largest Razorback Suckers (Portz and Tyus 2004; Slaughter and Jacobson 2008; Ehlo 2022; Ward, unpublished).

Information about Flathead Catfish in the lower Colorado River is limited, with the most recent study in 1990 assessing age and growth of these fish in a reach of river near Yuma, Arizona (Young and Marsh 1990). This study utilized pectoral fin rays to determine age and revealed fast growth with a maximum age of nine years (i.e., 1,010 mm specimen). Young and Marsh (1990) documented that Flathead Catfish in the lower Colorado River near Yuma reach 300 mm in total length consistently at two years of age, and 700 mm between six and seven years of age. These results

suggest Flathead Catfish may persist for only a few years after surpassing 700 mm in total length. This longevity and growth may translate to other populations or regions within the lower Colorado River but remains unknown.

With these considerations in mind, there is a need to improve the knowledge on Flathead Catfish in the lower Colorado River. Specifically, the assessment of longevity (i.e., age) and rate of growth for Flathead Catfish in this system is paramount when attempting to ascertain present and future impacts to Razorback Sucker. The lower Colorado River upstream of Parker Dam has not been studied in this regard. These population dynamics are crucial to informing fisheries managers and need to be determined (Isely and Grabowski 2007). As such, we set forth with the following study objectives:

- A) Collect Flathead Catfish specimens from the lower Colorado River upstream of Parker Dam through various sampling methods for age estimation via lapillus otoliths.
- B) Examine Flathead Catfish encountered in relation to feasibility of Razorback Sucker consumption.
- C) Take steps to answer the following questions:
  - i. How quickly do Flathead Catfish reach 300 mm and 700 mm (respectively) in total length in the lower Colorado River upstream of Parker Dam?
  - ii. After eclipsing 700 mm in total length, what is the longevity of Flathead Catfish within the system?

## **METHODOLOGY**

Flathead Catfish were targeted in November 2023 via low frequency pulsed-DC boat electrofishing (i.e., 1.7 hours), trammel netting (i.e., N = 23, 45.7 m long, mesh size = 3.8 cm), and hook and line sampling (Montague and Shoup 2022). Targeted fish sampling occurred on the lower Colorado River (i.e., Lake Havasu). Our utilization of traditional sampling gears corresponded to protocols established by Ratliff et al. (2014) and Rasset et al. (2024). Hook and line sampling constituted the usage of a 3.5 g jig head and a 6.4 cm soft plastic bait. Captured Flathead Catfish were measured for total length (mm), weight (g), dispatched via cranial pithing, and subsequently sexed by visually observing gonadal tissue(s) (Kwak et al. 2006; Diggles 2016). Lapillus otoliths were removed identically to the methods described by Kwak et al. (2006). All species captured while trammel netting except

Common Carp *Cyprinus carpio*, Goldfish *Carassius auratus*, and Gizzard Shad *Dorosoma cepedianum* were measured for total length (mm). Every species encountered besides Flathead Catfish were released following extraction from trammel nets, enumeration, and measurement. Only Flathead Catfish were netted during boat electrofishing.

## RESULTS

We obtained a total of 60 Flathead Catfish for ageing purposes via boat electrofishing [N = 2, catch per unit of effort (CPUE) = 1.1 fish per hour], trammel netting [N = 45, CPUE (standard error in parentheses) = 2.2 fish per net (fish/net)], and hook and line sampling (N = 5). Additional specimens (N = 8) were acquired via trammel netting and boat electrofishing while monitoring for Razorback Sucker in the lower Colorado River near Park Moabi, Needles, California, in October 2023.

We encountered a total of 13 fish species (including hybrids) among 459 individual specimens while targeting Flathead Catfish via trammel netting. Striped Bass *Morone saxatilis* (N = 164), Gizzard Shad (N = 90), and Common Carp (N = 51) constituted the most observed fishes (Table 1).

Table 1. All species (i.e., common name) encountered while trammel netting the lower Colorado River in terms of number captured, CPUE (fish per net, standard error in parentheses), minimum, maximum, and mean total length (mm).

Species	N =	CPUE	Total Length (mm)		
			Minimum	Maximum	Mean
Black Crappie	26	1.1 (0.4)	204	386	284
Bluegill	3	0.1 (0.1)	184	197	189
Blue Tilapia	14	0.6 (0.2)	175	463	264
Channel Catfish	4	0.2 (0.1)	400	656	494
Common Carp	51	2.2 (0.5)	–	–	–
Flathead Catfish	45	2.0 (0.3)	318	1086	715
Gizzard Shad	90	3.9 (0.8)	–	–	–
Goldfish	2	0.1 (0.1)	–	–	–
Largemouth Bass	21	0.9 (0.2)	290	439	334
Redbelly Tilapia	4	0.2 (0.1)	180	206	191
Redear Sunfish	16	0.7 (0.2)	190	320	223
Redear Sunfish x Bluegill	19	0.8 (0.3)	190	300	230
Striped Bass	164	7.1 (1.9)	192	690	471
Total	459	20.0 (2.5)	–	–	–

Collected Flathead Catfish ranged in size from 318 mm to 1,086 mm (mean = 714 mm). All fish captured were larger than 300 mm in total length. Over 53% (N = 32) of Flathead Catfish were greater than 700 mm in total length (Figure 1).

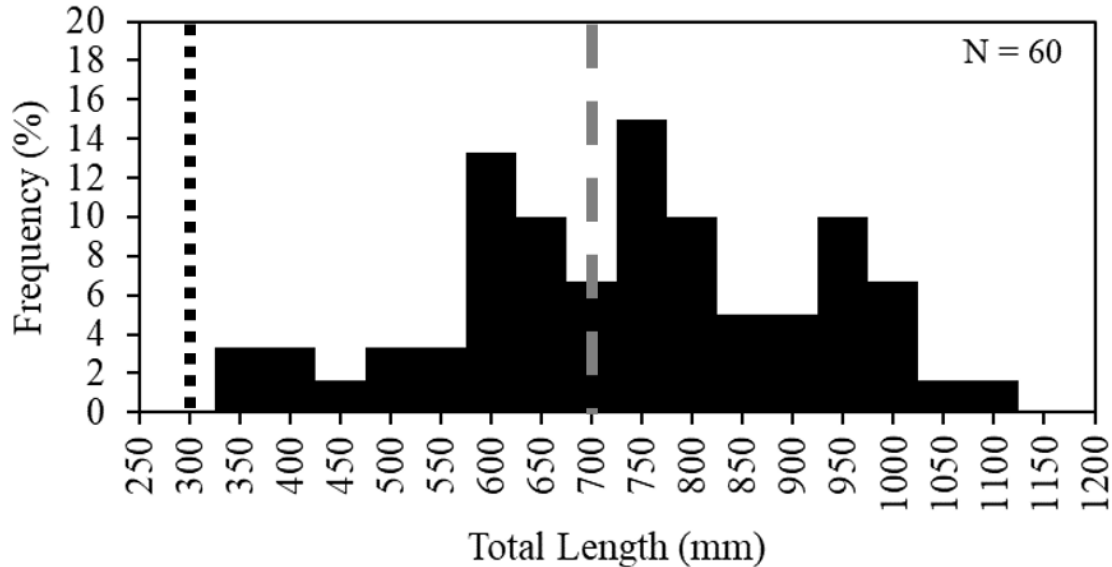


Figure 1. Length-frequency distribution of Flathead Catfish acquired from the lower Colorado River. The dotted line on the left of the distribution indicates the total length at which Flathead Catfish could feasibly consume Razorback Sucker that are 305 mm (Ehlo 2022; Ward, unpublished). The dashed line in the middle of the distribution indicates the total length at which Flathead Catfish could feasibly consume any Razorback Sucker (Ehlo 2022; Ward, unpublished).

## DISCUSSION

While gear type may have selected for larger individuals, finding that all Flathead Catfish encountered could feasibly consume a stocked size Razorback Sucker, and 53% could consume any sized Razorback Sucker, is of great concern. This data further supports the need to document how long these fish are present in the system following the eclipse of 700 mm in total length. Ageing otoliths of the collected Flathead Catfish should inform about longevity and time required to reach 300 mm and 700 mm (respectively) in total length (see *Future Work* section). If longevity is greater than what was previously documented (i.e., nine years), deleterious impacts exponentially increase, and conversations should be had about suppressing Flathead Catfish range overlap with Razorback Sucker.

## FUTURE WORK

Lapillus otoliths from Flathead Catfish will be embedded in epoxy and thin-sectioned across a frontal plane using a low-speed saw (Phelps et al. 2017; Sakaris and Bonvechio 2020; Waters et al. 2020; Rasset 2023). Annuli will be enumerated

by independent readers (Rasset 2023). Back calculation at total length at each age (i.e., each annuli formation) will be performed via the Dahl Lea direct proportion equation (Young and Marsh 1990; Quist et al. 2012). Results will be presented orally and/or published in a scientific journal to inform fisheries managers and generate discussion on the future of Flathead Catfish management in the lower Colorado River with relation to Razorback Sucker.

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