

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2020 ANNUAL REPORT

PROJECT: 110

Project Title

Smallmouth bass control in the lower Yampa River

Bureau of Reclamation Agreement Number:

R20PG00024

Project/Grant Period:

Start date: 10/1/2019

End date: 9/30/2024

Reporting period end date: 9/30/2020

Is this the final report? Yes _____ No X

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Abstract:

Green River Basin Fish and Wildlife Conservation Office completed three smallmouth bass removal passes in the lower Yampa River in 2020, removing 1,230 smallmouth bass. Although the majority of bass (52.7%) captured this year were <200mm in length, the proportion of adults (≥ 200 mm total length) captured was much higher than in 2019. The overall catch rate for smallmouth bass was much higher than 2019 and more than doubled from 2018. The number and distribution of adult and larger juvenile bass point to a successful year classes being produced in 2017 and 2018. Fish community composition monitoring reaches were also sampled. Flannelmouth and bluehead suckers were the most abundant species, as has been the case since these monitoring reaches were initiated.

Study Schedule:

2004-Ongoing

Relationship to RIPRAP:

Green River Action Plan: Yampa River

III.B.2. Control nonnative fishes via mechanical removal

III.B.2.e. Remove smallmouth bass

III.B.2.d. Remove northern pike from Yampa River designated critical habitat

III.B.2.f. Control channel catfish in Yampa Canyon

Accomplishment of FY 2020 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Nonnative Fish Removal

Green River Basin Fish and Wildlife Conservation Office (GRB FWCO) completed three electrofishing passes in the lower Yampa River from 15 June to 10 July 2020. During this period, daily average flow ranged from 4,686 cfs to 577 cfs, and mean water temperatures increased from 17.6°C to 21.5°C (USGS gauge # 9260050 located at Deerlodge Park, CO). Mean water temperature exceeded 16°C on 12 June, indicating we conducted all removal passes after the river reached the temperature threshold when smallmouth bass spawning is more likely to commence. We began noting ripe bass on the first pass; however, most of the adults captured were not ripe. Of those expressing gametes, 61 were males and 47 were females.

We removed 1,230 smallmouth bass, including 66 fish <100mm, 582 juveniles (100-199mm), and 582 adults (≥200mm) (Table 1). The overall mean total length of these fish was 195mm (Standard Error =147mm). Of the adults, 16 were large enough (≥325mm) to be classified as piscivores posing a competitive threat to adult Colorado pikeminnow.

Catch rates for 2020 were the highest on record since 2014. The catch rate for bass ≥100mm was 13.57 fish/hour for all passes combined (Figure 1). This catch rate is comprised of 7.15 juveniles/hr and 6.42 adults/hr. The juvenile catch rate mirrors that of 2019 (Smith 2019). Therefore, the noticeably higher 2020 combined (juvenile and adult) catch rate was driven entirely by adult smallmouth bass.

Length frequency data for 2020 showed a relatively even distribution with high captures of fish ranging from 151-175 mm TL and 200-225 mm TL (Fig. 3). This distribution suggests large year classes of bass likely spawned in 2017 and 2018, which was evident as age-1 bass in 2018 but less so in 2019 (Figs. 4a-b). River conditions were extremely dry in 2018, and although we did not catch as many age-1 bass as we expected last year, the 2018 cohort was very evident in 2020. Given that budget reductions necessitated the elimination of two removal passes in 2021, it will be necessary to optimize effort in this reach during suitable river conditions in order to reduce these relatively strong year classes.

The spatial distribution of smallmouth bass varied by size class and exhibited different patterns (Fig. 5). Adult bass catch rates were highest in reach six. Juvenile catch rates peaked in the most upstream reach, but were also high in most of the lower half of the canyon, below Big Joe rapid. This is consistent with electrofishing efforts in 2017 through 2019, where we observed spawning activity in reach 6, as well as high captures of age-0 bass in the Green River below the confluence (Jones 2017, Jones and Smith 2018, Smith 2019). This pattern could also represent a shift in distribution compared to previous years when bass spawning occurred primarily upstream of Deerlodge Park and small bass moved into the reach the following year.

A component of this project is to remove channel catfish >400mm. This is the length at which catfish are believed to transition to a higher level of piscivory, making them a competitive threat to Colorado

¹ This is a reduction of passes compared to previous years. This project was reduced from 5 passes to 3 passes because of the Recovery Program's budget constraints.

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pikeminnow and a predatory threat to native fishes. We removed 25 channel catfish meeting this size threshold in 2020.

Sampling for fish community composition

We sampled five, one-mile sub reaches during pass two (29 June - 2 July) in order to monitor fish community species composition (Fig. 6). These reaches were established in 2002 to monitor the overall fish community response to nonnative fish removal, and were chosen specifically based on previous capture locations of humpback chub (Fuller and Modde 2002). As in previous years, native suckers (flannelmouth and bluehead) were the two most abundant species captured (Figs. 7-8). Other species captured, in decreasing abundance, were smallmouth bass, channel catfish, roundtail chub, northern pike, white sucker, and flannelmouth x bluehead sucker (Fig. 6). This represents an apparent increase in the presence of smallmouth bass, which were less common than roundtail chub in all previous years since 2014 (Fig. 6).

We captured a total of 26 northern pike, with all except one large enough to be classified as piscivores. Unlike 2019, when northern pike were only caught in the two most-downstream reaches, pike were caught in every reach in Yampa Canyon in 2020. During spring of 2020, upstream northern pike removal was not conducted because the COVID-19 pandemic limited field work. Lack of upstream removal may have allowed more northern pike to emigrate downstream in 2020.

Perhaps the result of intense spring removal efforts in the Green River, no walleye were captured in Yampa Canyon in 2020. Several other nonnative fish species were collected over the course of the three passes, including green sunfish, white sucker, and white sucker hybrids (Table 2).

We encountered 16 unique Colorado pikeminnow this year. Twelve of the pikeminnow were recaptures that already had tags, but none with an old frequency tag (400 kHz). A male Colorado pikeminnow captured on 18 June at RM 11.2 and caught again at RM 11.1 on 1 July was noted as ripe on the second encounter but not the first. Excluding this individual, 10 of the 16 pikeminnow were noted as being tuberculate upon capture.

Colorado Parks and Wildlife stocked bonytail in this reach at Deerlodge Park in October 2020 after Project 110 sampling had ceased. Although we did not catch any bonytail in our 2020 sampling, monitoring chubs may assist in estimating survival and movement of these fish.

Roundtail chub monitoring

Roundtail chub monitoring was conducted during the initial pass when flows ranged between 4,680 cfs to 3,690 cfs. We also processed all chub encountered in the monitoring reaches on pass two. In total, 177 roundtail chub were captured, consisting of 143 adults (≥ 200 mm TL) and 35 juveniles, and we inserted PIT tags into 138 of these fish. We also recaptured six roundtail chub that were previously tagged. Except for two individuals which lack tag deployment records, all of these fish had previously been captured within this study reach. In addition, a PIT tag that was inserted into a roundtail chub in July 2019 was detected in the stomach of a northern pike, further confirming the predatory threat of this invasive species. Fewer small (<150 mm TL) chub were captured this year, which is hopefully related to

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the chub monitoring pass occurring during lower flows this year rather than an indication of lower juvenile survival than has been observed in the past.

Additional noteworthy observations:

Water clarity was very high during the base flow period in the Green, White, and Yampa Rivers this summer because of an almost complete absence of rainstorms and resulting sediment contributions. The lower than normal turbidity likely contributed to higher than normal angling success for smallmouth bass. Green River Basin FWCO personnel removed 68 smallmouth bass from the Yampa River in or near Echo Park (RM 0.0 – RM 1.0) on 28 August during approximately 18 hours of angling effort. Compared to raft electrofishing efforts this year, these bass were larger in size (mean TL \pm SE = 241.6 \pm 5.7 mm TL). Furthermore, daily average flow at Deerlodge was 54 cfs on 28 August, which was far from being boatable. During years when the Yampa River drops quickly and becomes too low to complete four raft electrofishing passes, Yampa Canyon could be accessed with lighter craft and smallmouth bass removal could continue via angling.

Recommendations:

Optimize nonnative fish removal in response to the large classes of fish produced in 2017 and 2018. Effort should again focus on the time period when water temperatures are likely to initiate bass spawning ($>16^{\circ}\text{C}$).

During years with extended periods of high water clarity and low flows in the Yampa River, angling should be viewed as a viable option for smallmouth bass removal.

Continue to monitor roundtail chub and bonytail. Data collected over the last five years indicate that long term data is needed to assess movement and to allow for recaptures of marked fish.

Adjust chub sampling to produce more robust data for future estimation.

Continue fish community monitoring to characterize any changes in the overall species composition through time. This work has recently been used to make comparisons between fish communities in the regulated Lodore Canyon reach of the Green River and this reach, which is virtually unregulated. Our fish monitoring in the Yampa has also been useful in tracking native fish response to invasion by smallmouth bass and corresponding effects based on bass abundance.

If resources and funding are available in the future, consider expanding the scope of fish community monitoring throughout Yampa Canyon and include small-bodied fish monitoring (seining) as well. This type of monitoring has been conducted on the Green River in the regulated Lodore Canyon and semi-regulated Whirlpool Canyon for years, yet our knowledge of the unregulated Yampa Canyon's fish community is much more limited.

Project Status:

On track and ongoing.

FY 2020 Budget Status

Funds Provided: \$112,065

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Funds Expended: \$112,065

Difference: -X-

Percent of the FY 2020 work completed, and projected costs to complete: 75%

Recovery Program funds spent for publication charges: -X-

Status of Data Submission

Data was uploaded into STReAMS on 27 October.

Signed:

Christian Smith
Principal Investigator
14 December, 2020

References

Fuller, M. and T. Modde. 2002. Development of a channel catfish control program in the lower Yampa River. Project #110. Annual report to the Recovery Implementation Program, U.S. Fish and Wildlife Service, Denver, CO.

Jones, M.T. 2017. Smallmouth bass control in the lower Yampa River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Jones, M.T. and C. Smith. 2018. Smallmouth bass control in the lower Yampa River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Smith, C. 2019. Smallmouth bass control in the lower Yampa River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

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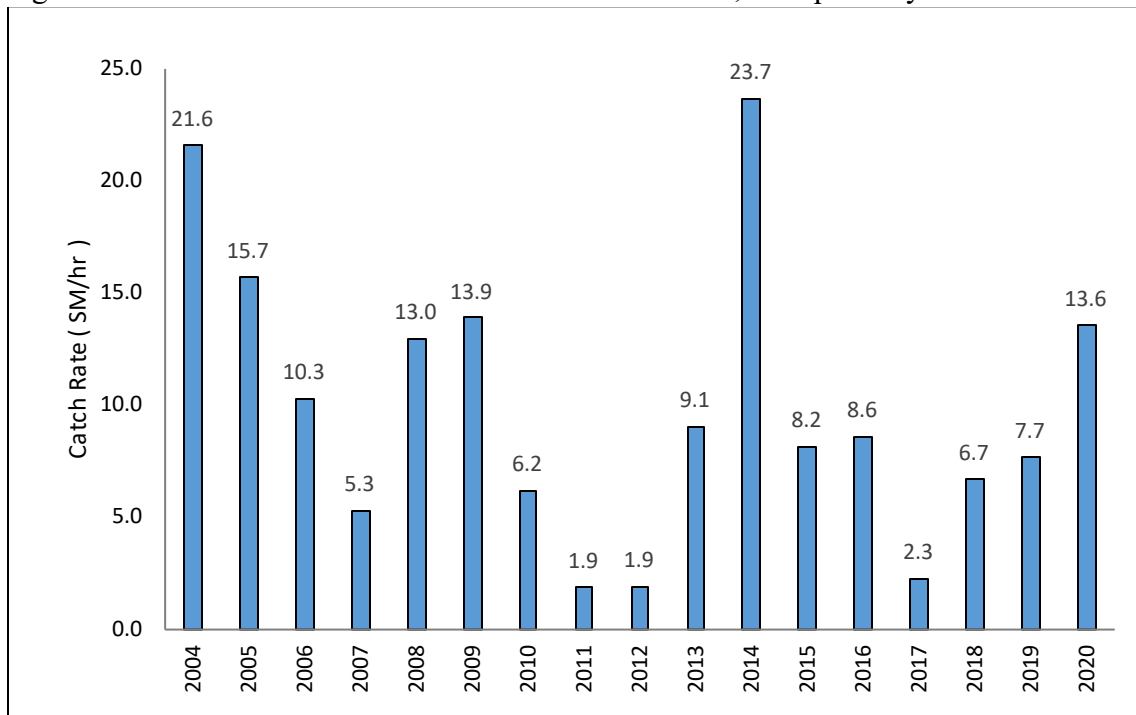
Table 1. Sampling passes and smallmouth bass captured by size class, 2020.

Pass	Date	<100 mm	Juvenile	Adult	Piscivore
1	15-19 June	10	129	88	3
2	29 June-2 July	39	310	306	8
3	7-10 July	17	143	172	5
Total		66	582	566	16

Table 2. Other species captured during removal passes in Yampa Canyon, 2020.

Species	Number Captured	Size Range (mm TL)
Colorado pikeminnow	17	508-795
Roundtail chub	178	96-363
Flannemouth sucker	234	92-534
Flannemouth x bluehead sucker	1	146
Bluehead sucker	206	126-405
Channel catfish	57	261-720
Green sunfish	2	95-97
Northern pike	26	176-836
White sucker	96	86-389
White sucker hybrids	12	201-435

Figure 1. Overall catch rate of smallmouth bass ≥ 100 mm, Yampa Canyon 2004-2020.



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Figure 2. Catch rates by pass for smallmouth bass ≥ 100 mm, Yampa Canyon 2020.

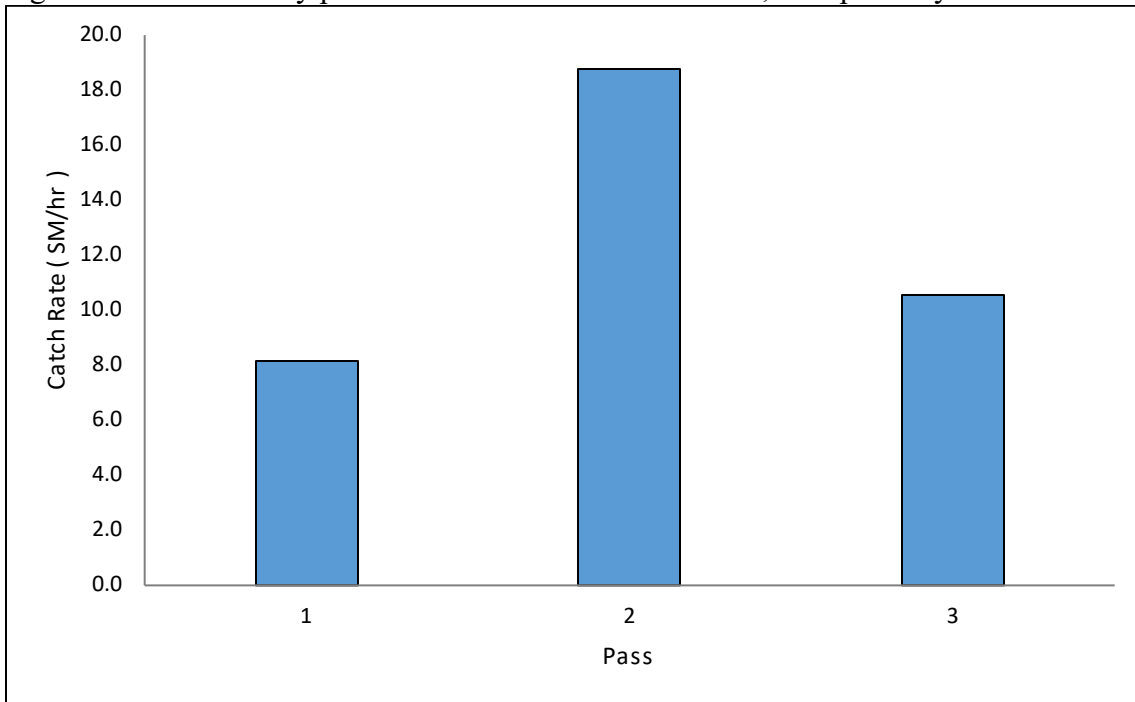
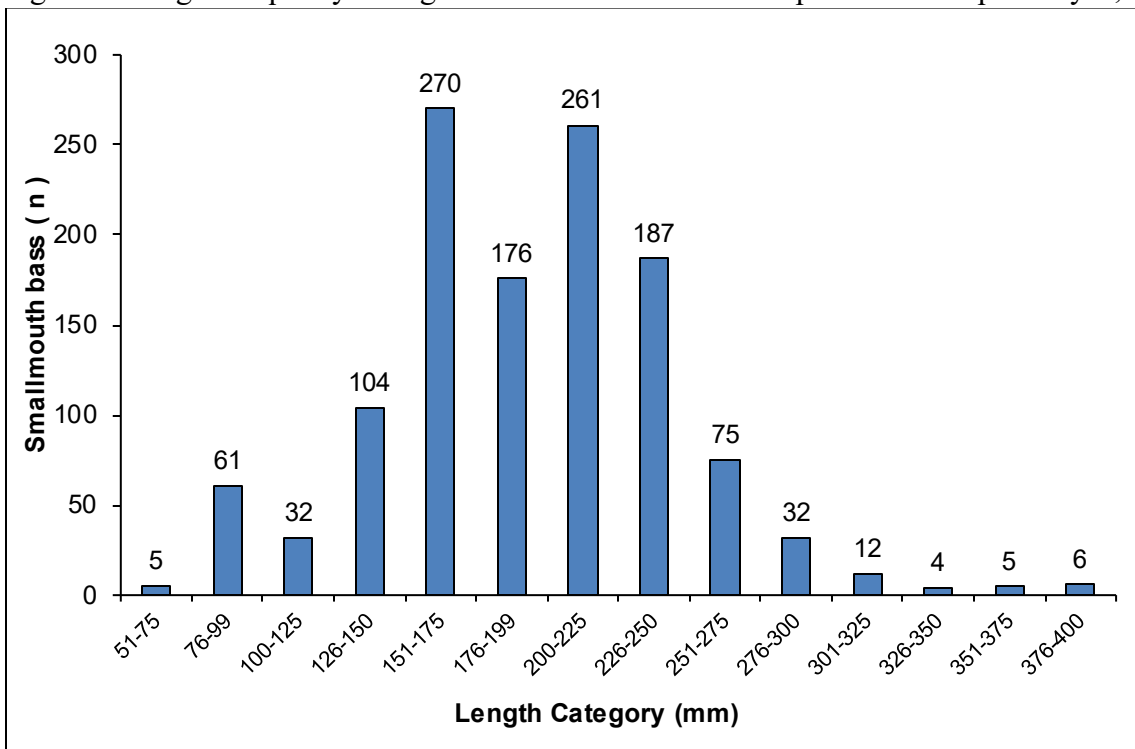
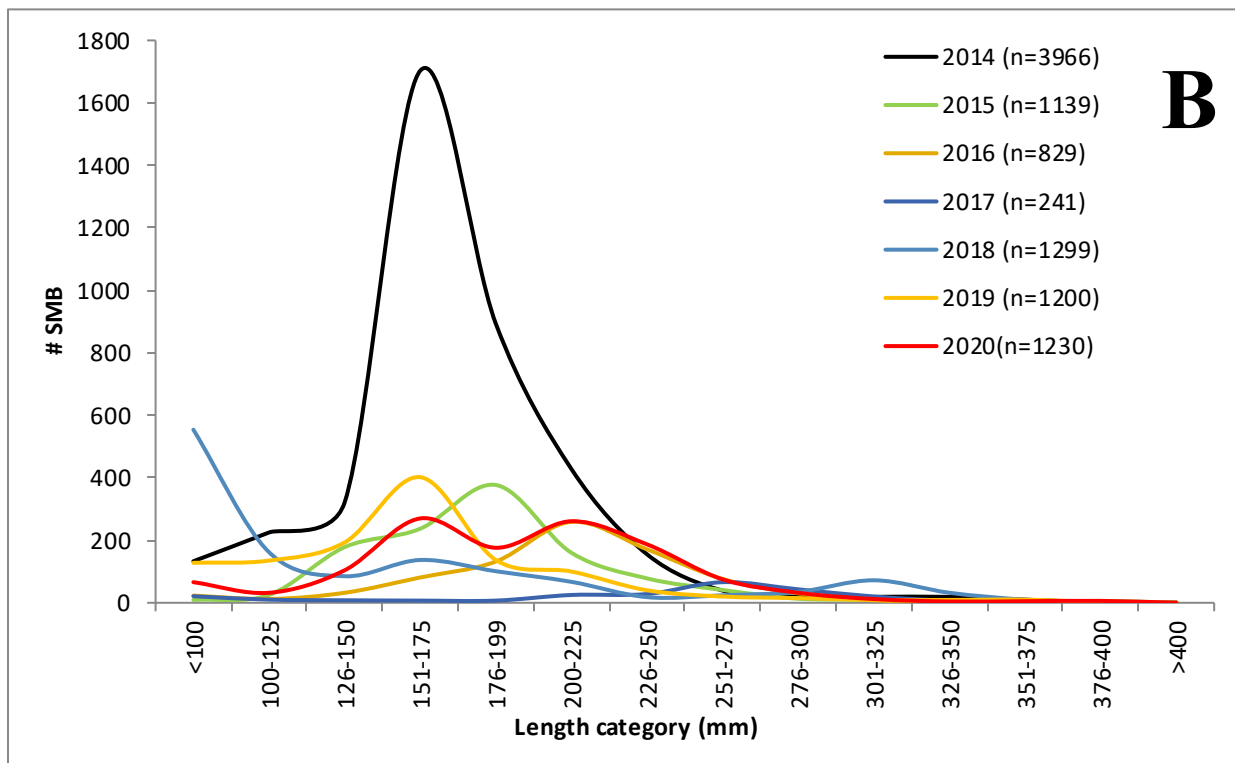
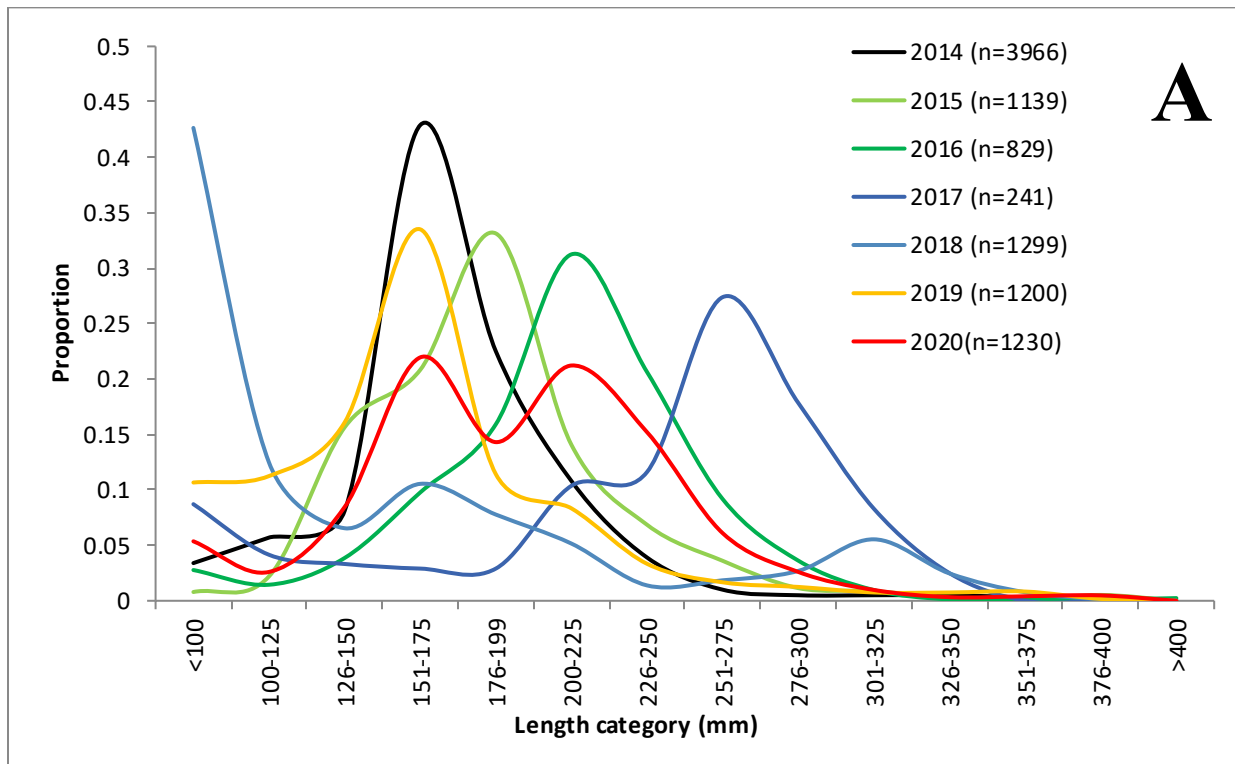


Figure 3. Length frequency histogram for smallmouth bass captured in Yampa Canyon, 2020.



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Figure 4a-b. Length-frequencies for smallmouth bass captured in Yampa Canyon in 2014-2020. Figure 4a shows percent fish caught in each size range, as a proportion of total catch each year, and Fig. 4b shows total numbers of fish caught in each size range.



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Figure 5. Catch rates of smallmouth bass in Yampa Canyon by reach, 2020.

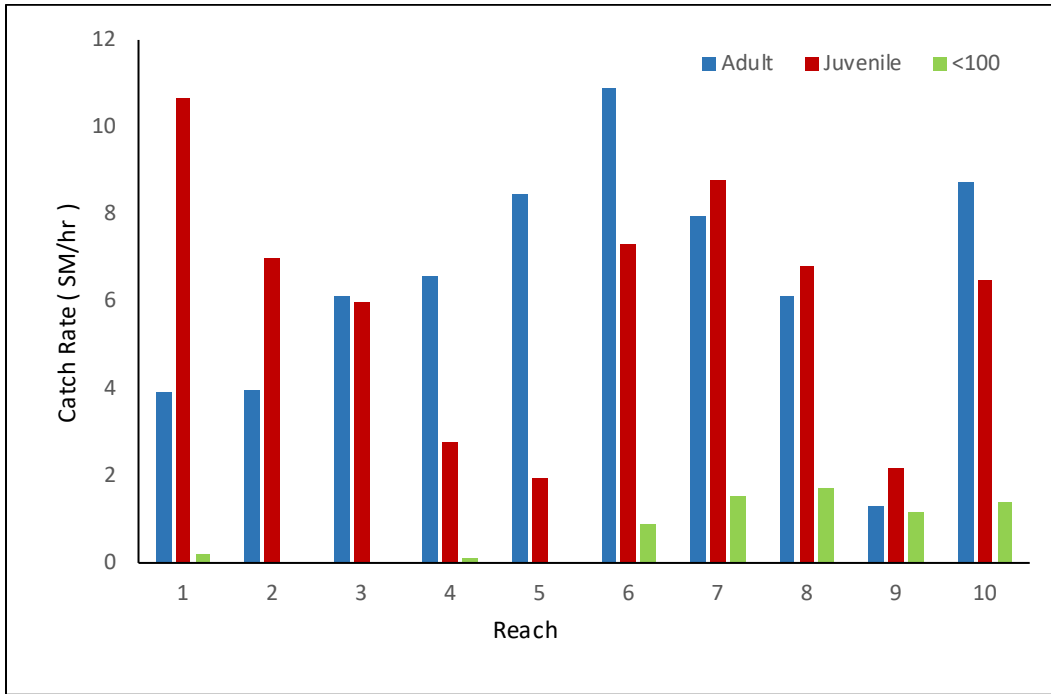
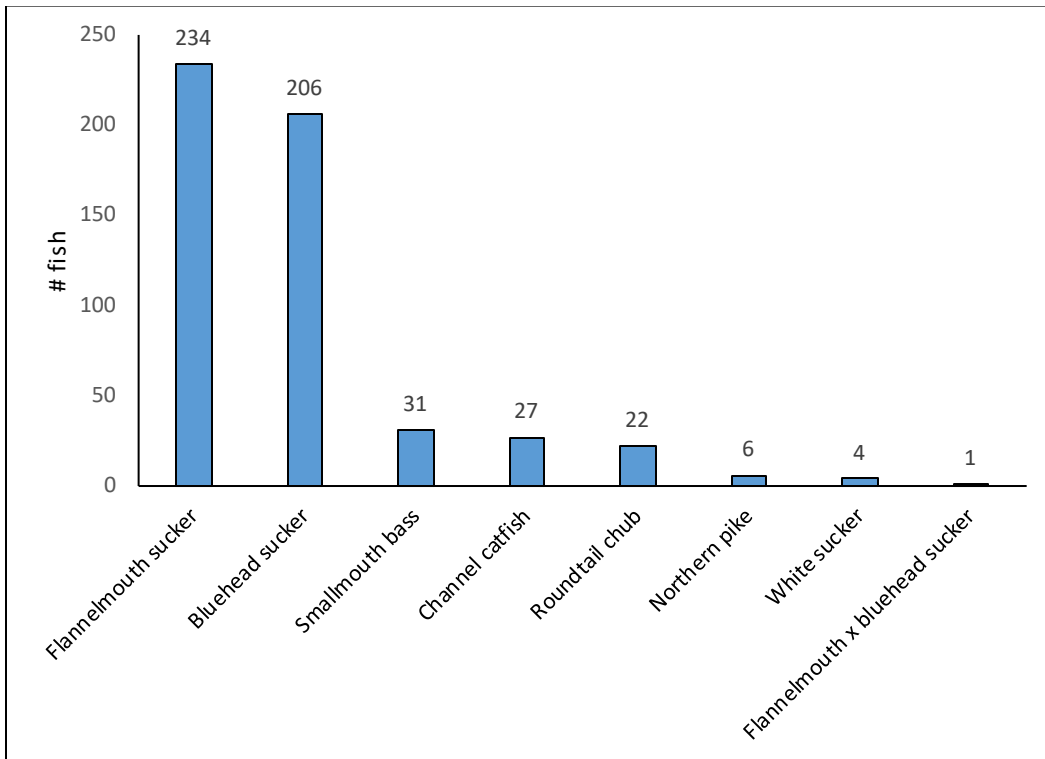


Figure 6. Total species composition for five, 1-mile monitoring reaches in Yampa Canyon, 2020.



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Figure 7. Annual catch rates of five most common species found in 1-mile monitoring reaches in Yampa Canyon, 2009-2020. Species codes are BH (bluehead sucker), FM (flannelmouth sucker), CC (channel catfish), RT (roundtail chub), and SM (smallmouth bass).

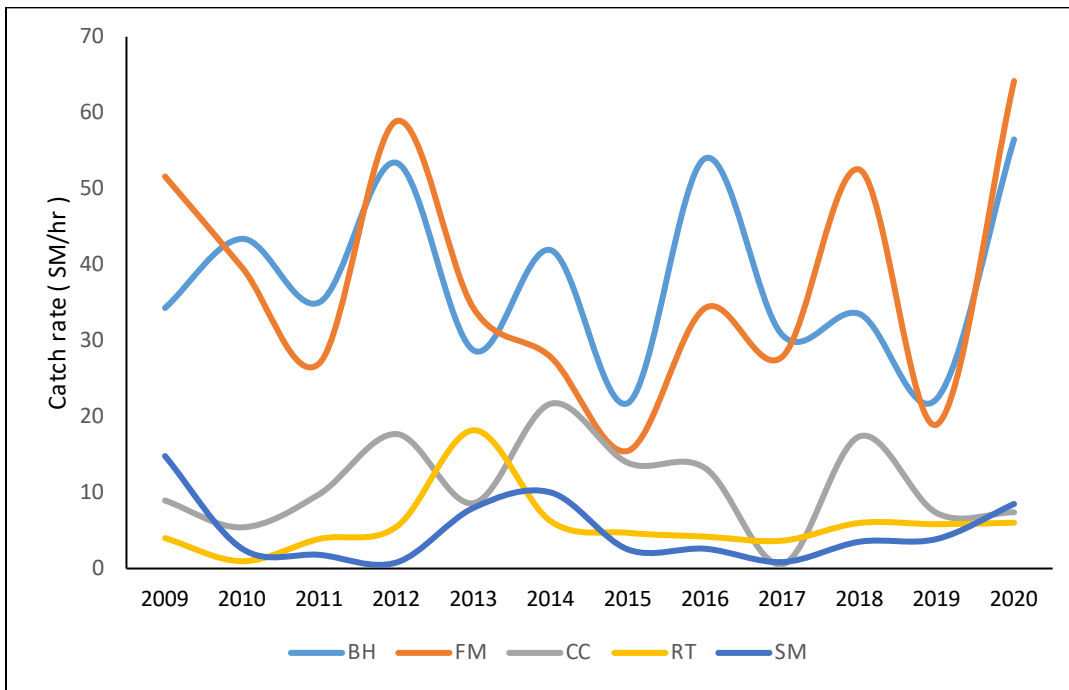


Figure 8. Percent catch of five most common species encountered in annual fish community monitoring reaches in Yampa Canyon, 2009-2020.

