

I. Project Title: Smallmouth bass control in the lower Yampa River

II. Bureau of Reclamation Agreement Number: R15PG00083
Project/Grant Period: Start date: 10/01/2014
End date: 09/30/2019
Reporting period end date: 09/30/2017
Is this the final report? Yes No

III. Principal Investigator:
M. Tildon Jones, U.S. Fish & Wildlife Service
1380 S 2350 W, Vernal, UT 84078
tildon_jones@fws.gov, (435) 789.0351

IV. Abstract:

USFWS completed four smallmouth bass removal passes in the lower Yampa River in 2017, removing 241 smallmouth bass. The majority of bass (78%) captured this year were adults over 200mm in length, representing fish spawned in 2012 and 2013. The overall catch rate for smallmouth bass this year was low and similar to that of 2011 and 2012. Fish community composition monitoring reaches were also sampled, and native suckers again were the most abundant species, as has been the case since these monitoring reaches were initiated.

V. Study Schedule: 2004-ongoing

VI. 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...

VII. Accomplishment of FY 2017 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Nonnative Fish Removal

We completed four electrofishing passes in the lower Yampa River during 6-29 June 2017. During this time, mean daily flows ranged from 9,960 cfs to 2,110 cfs, and mean water temperatures increased from 15.5°C to 19.5°C. Mean water temperatures exceeded 16°C around May 31, and we were able to conduct all removal passes after the river reached this temperature threshold when spawning is more likely to commence. We began noting a few ripe bass on the first pass, but bass expressing gametes represented roughly 40% of the adults captured on passes three and four (June 20-29). We also extended the last sampling trip (June 30) through Island Park on the Green River in order

to target spawning adult bass¹. We experienced equipment issues on the first pass (malfunctioning generator), which combined with other work priorities (middle Yampa spawning disruption) and a staff injury, limited the total effort expended on this project despite adequate flows.

We were able to remove 241 smallmouth bass (SMB), including twenty-one fish <100mm, thirty-two sub-adults (100-199mm), and 188 adults (≥ 200 mm) (Table 1). Of these adults, seven were large enough (≥ 325 mm) to be classified as piscivores posing a competitive threat to adult Colorado pikeminnow. Piscivore sized bass exhibited a slight increase in both total number and catch rate, but these metrics were comparable to past years.

Catch rates for 2017 were relatively low (Fig. 1), and similar to those in 2011 and 2012. For all passes combined, the catch rate for bass ≥ 100 mm was 2.28 fish/hour. The total catch rate from this year consisted of 0.33 sub-adults/h and 1.95 adults/h. The catch rate for bass ≥ 100 mm did not vary much between passes (Figure 2), and catch rates for all bass were largely driven by adult numbers.

Length frequency data for 2017 showed a unimodal distribution centered around the 251-300 mm groups (Fig. 3). This distribution most likely reflects two large year classes of bass spawned in 2012 and 2013, years when water temperatures were warm and low flows allowed for early bass spawning and a longer growing season. Using length-frequencies to track these two year classes, these fish have grown into adult size (Fig. 4a), but since their high abundance in 2014, these year classes have decreased in numbers (Fig. 4b). This is consistent with observations of a year class produced in the similarly warm, low flow year of 2007, where a large cohort of fish were observed in the reach, but subsequently decreased—or left the reach—as they grew into adult sizes (Jones 2015). Based on this year's data, the large number of fish from the 2012 and 2013 year classes have largely declined to the baseline level observed in this reach. Both the 2007 and 2012-13 year classes have provided information on the longer term persistence of strong reproduction years for bass, suggesting that annual mortality rates limit their recruitment to adult sizes. Our data is not able to differentiate mortality and emigration, so looking at recruitment and changes in adult abundance in adjacent reaches would be helpful in determining whether these fish may be contributing to spawning stocks in other river reaches known to be more conducive to spawning (i.e. Little Yampa Canyon, Lily Park, and Island Park).

Bass distribution again deviated from what has been observed in past years (Fig. 5). First, adult bass had the highest catch rates in all reaches, as opposed to higher sub-adult catch rates seen in most years. Second, the adult catch rate was highest in reach six (above Big Joe rapid to Harding Hole). Unusually high water clarity allowed us to observe nesting, ripe male bass in this reach during pass four. Of the 23 ripe fish observed on this pass, eight of them (35%) came from this reach. Another eight ripe adults were captured between reaches eight and nine (Grand Overhang through Castle, Laddie, and Outlaw Parks).

¹ Data from the Island Park passes are presented in the Project 123a report.

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 pikeminnow and a predatory threat to native fishes. We removed nine channel catfish meeting this size threshold. The low number of catfish captured likely resulted from the fact that our sampling occurred when flows were relatively high (>2,000 cfs). Since catfish occur along the river bottom and are slower to react to electrofishing, they are more easily captured when the water column is shallow at lower flows.

Sampling for fish community composition

We sampled five, one-mile subreaches during pass four (June 27-29) 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 (Fig. 7). Other species captured, in decreasing abundance, were roundtail chub, smallmouth bass, channel catfish, common carp, white x flannelmouth hybrid, white sucker, and brown trout (Fig. 8).

We also collected several other nonnative fish species over the course of the four passes, including northern pike, walleye, and white sucker and white sucker hybrids (Table 2). All six northern pike and the walleye were large enough to be classified as piscivores. All of the pike were captured in reaches five, seven, and eight. Finally, we encountered twelve Colorado pikeminnow this year. Ten of the pikeminnow were recaptures that already had tags, including one with an old frequency tag. Nine of the pikeminnow were tuberculated at capture, and most of these tuberculated fish were encountered on passes three and four (late June).

Roundtail chub monitoring

In order to accommodate the chub sampling this year, along with other components of the project, we split chub sampling between the first two passes. We also processed all chub encountered in the monitoring reaches on pass 4. We were able to capture 90 roundtail chub, consisting of 82 adults and seven sub-adults (one fish escaped before measuring), and tagged 81 of these. We recaptured five roundtail chub that were previously tagged. One fish was tagged in the Green River in 2013, and has since been detected on submersible PIT tag antennas in 2015 at Yampa River mile 15.9. The same fish was recaptured at RMI 14.9 this year. Another fish was tagged in the Yampa River in 2013. A third chub was tagged in 2015 and recaptured near that original encounter. The other two recaptured were fish tagged this year. Of the 90 roundtail chub encountered, 41 were tuberculated, and 16 had slight tubercles. Twenty-one fish were listed as ripe. Most of the ripe fish were observed in reaches six and seven. We also collected fifteen small chub that were not identified to species (TL 69-148 mm).

VIII. Additional noteworthy observations:

We captured one adult Colorado pikeminnow with a 400kHz tag. This fish was originally tagged as a 225 mm sub-adult in the Green River at RMI 38.6 in 2002. According to the STReaMS database, this fish has not been encountered since that time. This individual was 623 mm at the time of capture (Yampa RMI 2.7) and exhibited tubercles.

IX. Recommendations:

- Continue nonnative fish removal at current levels, focusing on time period when water temperatures are likely to initiate bass spawning (>16°C).
- Continue to monitor chub. 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. Colorado Parks and Wildlife has stocked bonytail in this reach at Deerlodge Park and Hell's Canyon Ranch (formerly Mantle Ranch) after our sampling season, and monitoring chubs may assist in estimating survival and movement of these fish.
- 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.

X. Project Status: On track and ongoing

XI. FY 2017 Budget Status

- A. Funds Provided: \$ 100,360
- B. Funds Expended: \$ 100,360
- C. Difference: -0-
- D. Percent of the FY 2017 work completed: 100%
- E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission: Data are compiled and will be submitted to the database manager by December 2017.

XIII. Signed: M. Tildon Jones 11/17/2016
Principal Investigator Date

Literature Cited

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. 2015. Smallmouth bass control in the lower Yampa River. Project #110. Annual report to the Recovery Implementation Program, U.S. Fish and Wildlife Service, Denver, CO.

Table 1. Sampling passes and smallmouth bass captured by size class, 2017.

Pass	Date	<100mm	Sub-adults	Adults	Piscivores
1	6-7 June	2	2	29	1
2	13-16 June	0	3	40	1
3	20-23 June	8	13	64	3
4	27-29 June	12	14	54	2
Total		22	32	187	7

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

Species	Number captured	Piscivores
Northern pike	6	6
White sucker and hybrids	107	
Walleye	1	1
Channel catfish	9	9
Colorado pikeminnow	12	
Roundtail chub	90	
Small, unidentified <i>Gila</i>	15	

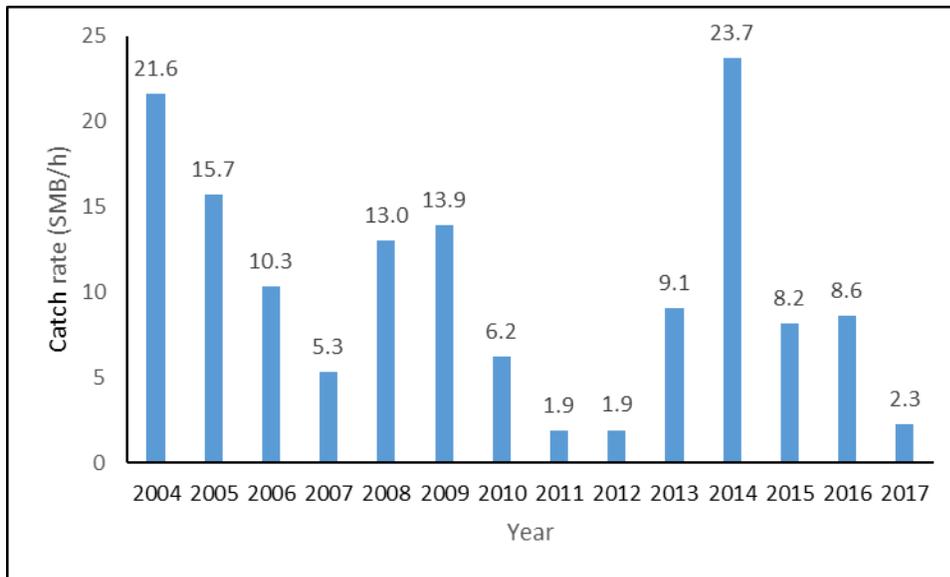


Figure 1. Overall catch rate of smallmouth bass ≥ 100 mm, Yampa Canyon 2004-2017.

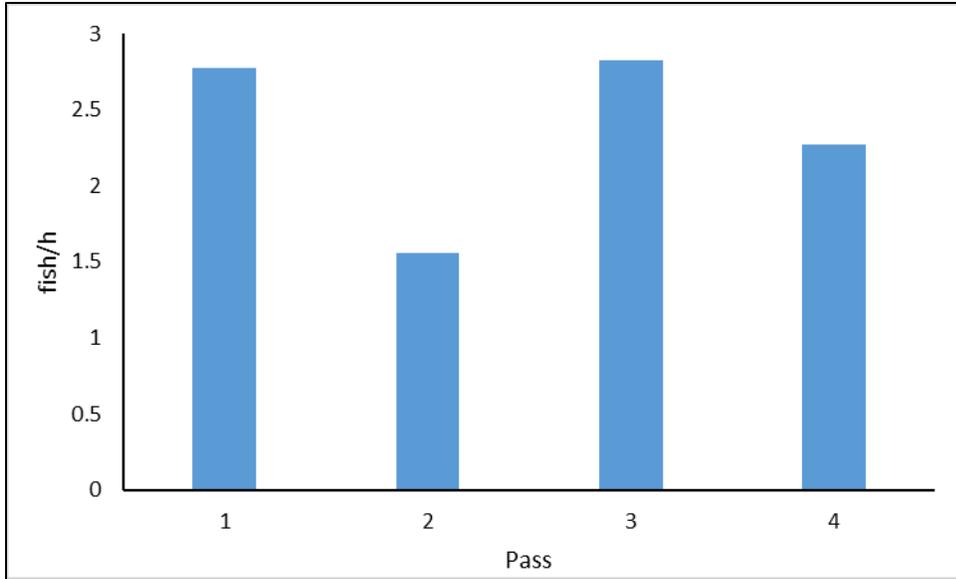


Figure 2. Catch rates by pass for fish >100mm, Yampa Canyon 2017.

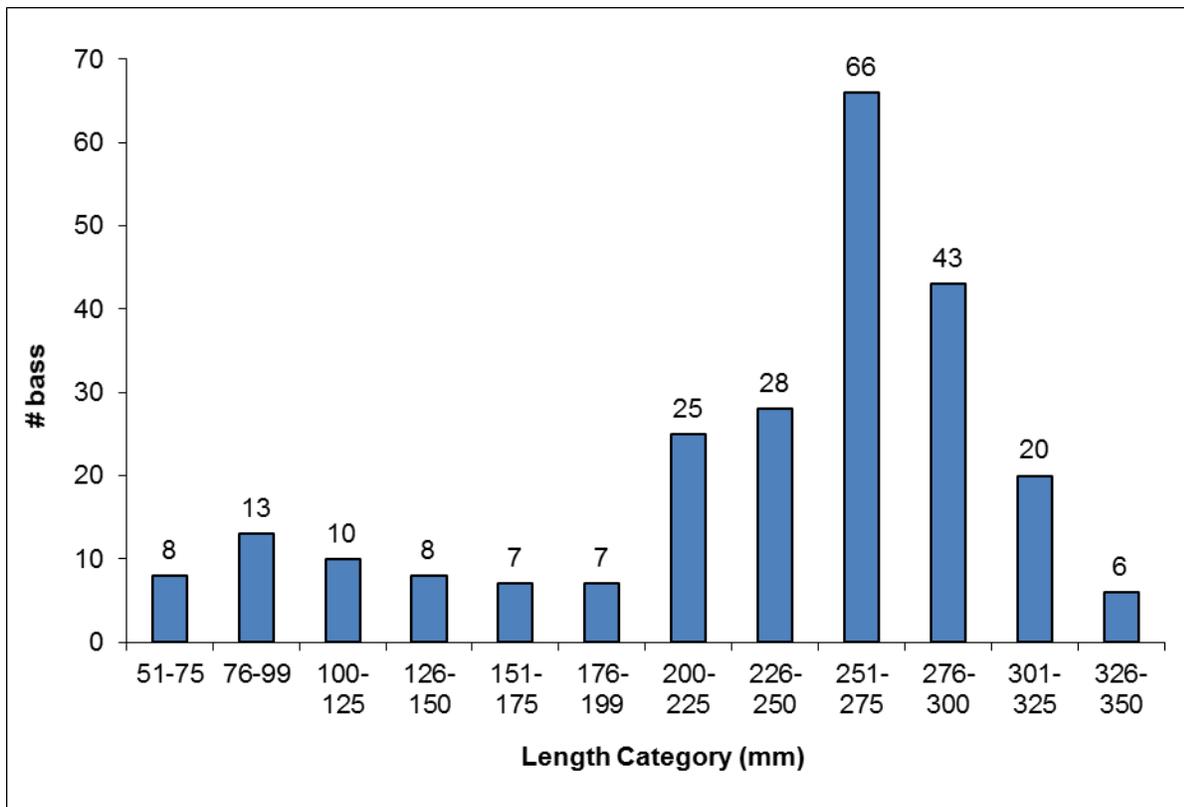


Figure 3. Length frequency histogram for smallmouth bass captured in Yampa Canyon, 2016.

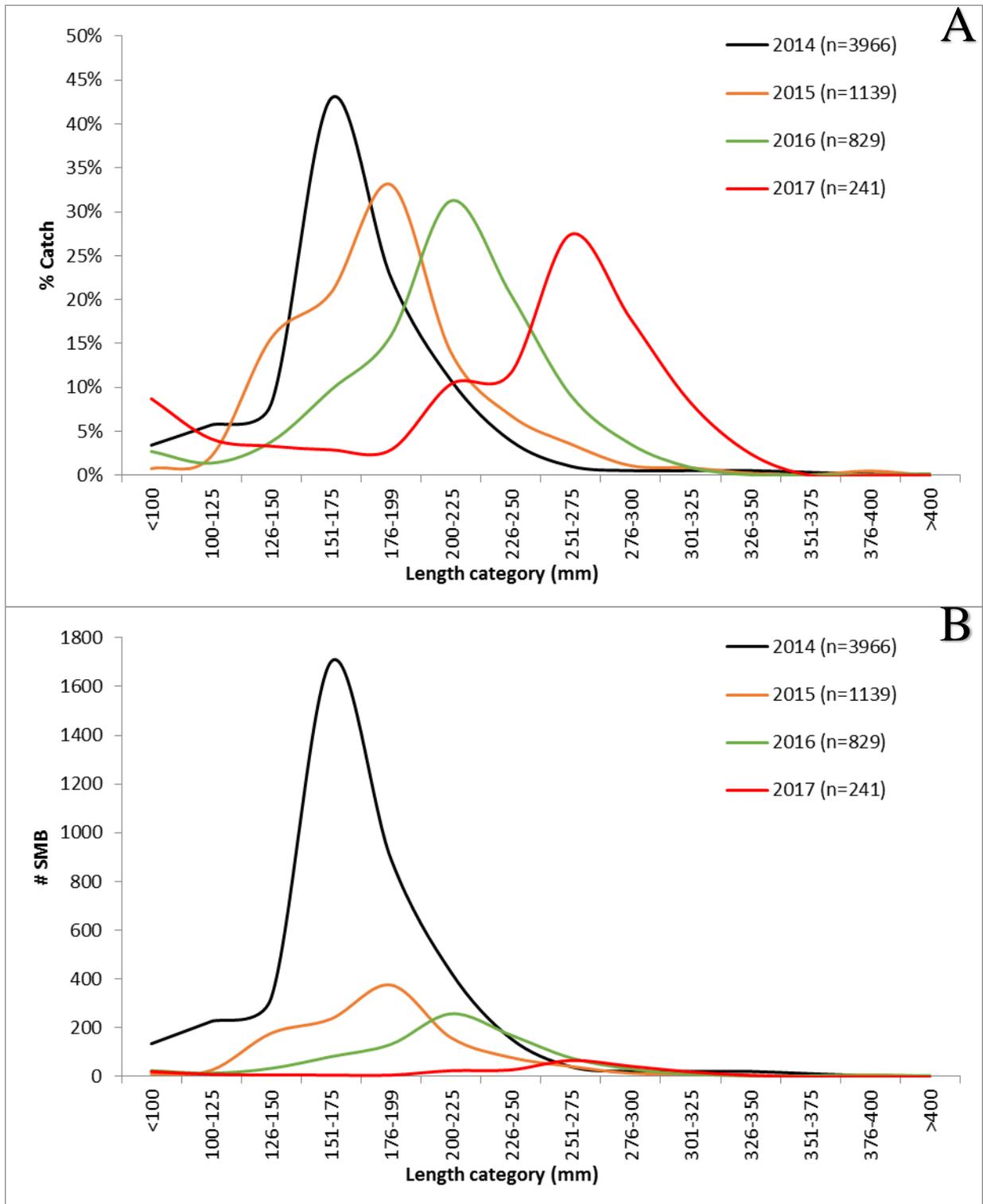


Figure 4a-b. Length-frequencies for smallmouth bass captured in Yampa Canyon in 2014-2017. Figure 4a shows percent fish caught in each size range, as a proportion of total catch each year, and Fig. 4b shows total numbers of fish caught in each size range.

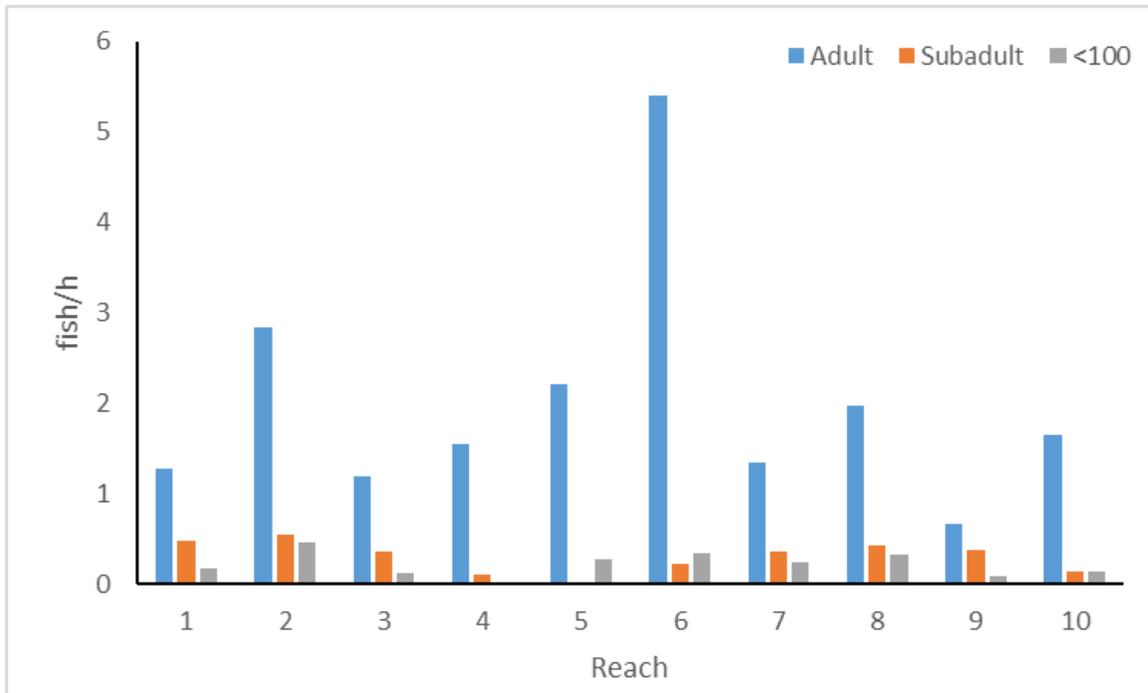


Figure 5. Catch rates of smallmouth bass in Yampa Canyon by reach, 2017.

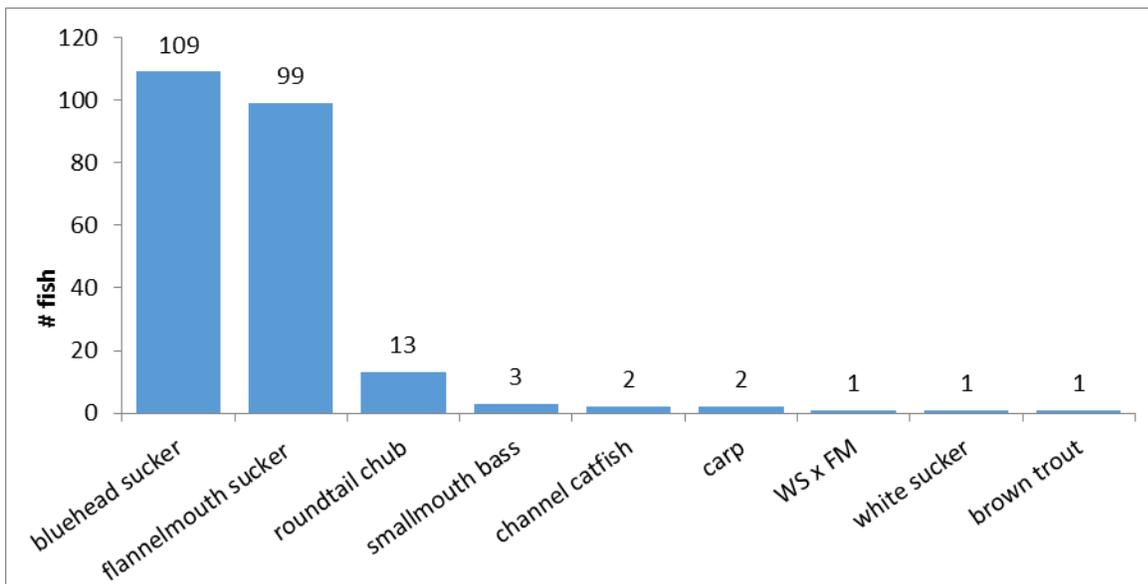


Figure 6. Total species composition for five, 1-mile monitoring reaches in Yampa Canyon, 2017.

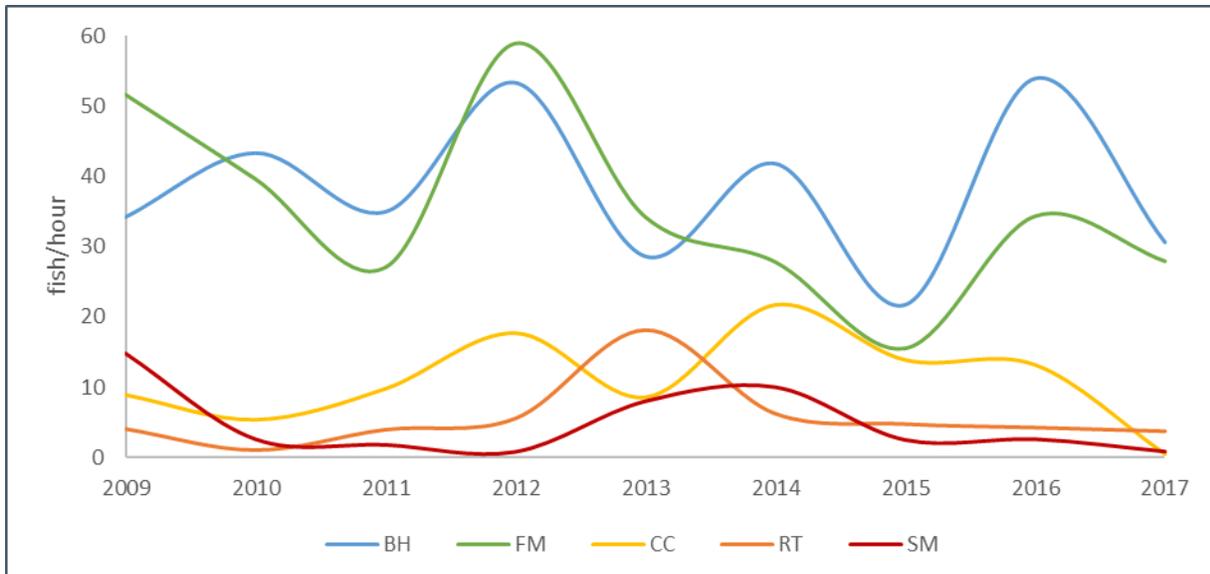


Figure 7. Annual catch rates of five most common species found in 1-mile monitoring reaches in Yampa Canyon, 2009-2017. Species codes are BH (bluehead sucker), FM (flannemouth sucker), CC (channel catfish), RT (roundtail chub), and SM (smallmouth bass).

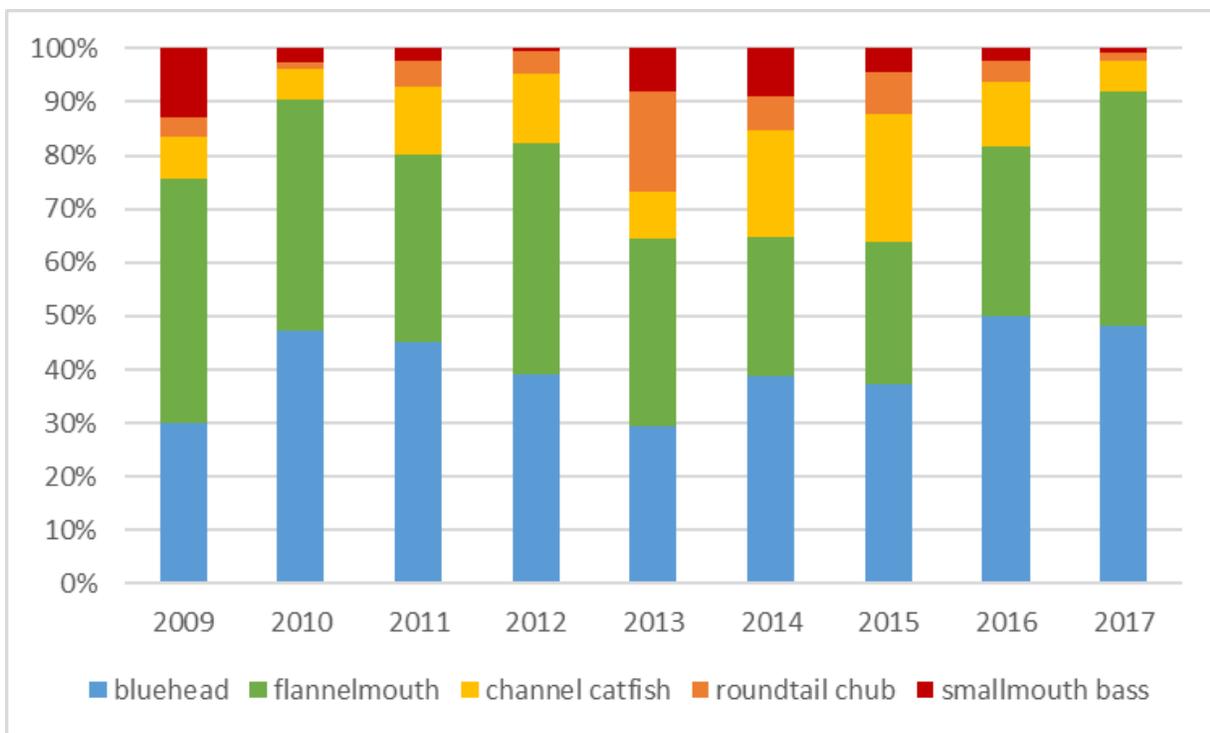


Figure 8. Percent catch of five most common species encountered in annual fish community monitoring reaches.