

- I. Project Title: Smallmouth bass control in the lower Yampa River
- II. Bureau of Reclamation Agreement Number: R13PG40020
Project/Grant Period: Start date: 10/01/2012
End date: 09/30/2015
Reporting period end date: 09/30/2014
Is this the final report? Yes _____ No X
- III. Principal Investigator:
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- IV. Abstract: USFWS completed five passes in 2014, removing 3,966 smallmouth bass. The majority of bass captured this year were sub-adult fish less than 200mm, the product of successful spawning in 2012. Due to this increase in smaller fish, overall catch rates increased compared to the last few years. Monitoring passes for overall fish community composition were also completed, and native suckers were the most abundant species, as has been the case since these monitoring reaches were initiated. White sucker captures were similar to 2013, indicating an increase in this species compared to previous years.
- 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.a. Estimate nonnative abundance, status, trends, and distribution
III.B.2.e. Remove smallmouth bass
III.B.2.f(2) Remove channel catfish >400mm in Yampa Canyon
III.B.2.h. Monitor native and endangered fish response
- VII. Accomplishment of FY 2014 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Nonnative Fish Removal

We completed five electrofishing passes between June 17 and July 25. During this time, flows decreased from 8,000cfs to just below 800cfs, and water temperatures increased from 13°C-26°C. The passes occurred just before the river warmed to suitable spawning temperatures and continued until raft access was no longer possible (<800cfs). We were able to remove 3,966 smallmouth bass (SMB), including 133 fish <100mm, 3,142 sub-adults (100-199mm), and 691 adults (>200mm) (Table 1). Of these adults, 32 were large enough (>325mm) to be classified as piscivores posing a competitive threat to adult Colorado pikeminnow. The total catch of SMB this year was more than twice that of 2013 (n=1,659), and nearly 80% of fish caught were sub-adults. We continued to observe a large group of small fish, likely spawned in 2012, grow to near adult size.

Over the course of this year's sampling, catch rates were high and relatively consistent across passes (Figure 1). The overall catch rate in 2014, for SMB larger than 100mm, was 23.7 SMB/h, in contrast to 9 fish/h in 2013 (Fig. 2). By comparison, the reach downstream from Echo Park to Split Mountain had an overall catch rate of 12.1 fish/h this year. This year's catch rate is the highest observed in this reach since SMB removal began in Yampa Canyon in 2004, and these rates were influenced by the large numbers of sub-adults being captured. Catch rates for adults increased slightly across passes (Fig. 3). We noted several bass expressing gametes during pass 2, around June 25, and minimum water temperatures were consistently greater than 15°C by June 21.

Length frequency data for 2014 again showed a large size class of bass 100-200mm in length (Fig. 4). These fish comprised 79% of bass captured during the season. When comparing the total number of fish captured in this year class to the catch from 2013, there was a marked increase in sub-adult fish. This suggests that sub-adult bass in this size class may have moved into Yampa Canyon, likely from upstream. One of the two tagged bass captured this year was a sub-adult that was tagged in Little Yampa Canyon (RMI 112) in May 2013. We recaptured this fish near Warm Springs rapid (RMI 4.3) in July 2014. Past recaptures of tagged fish have also suggested a general downstream movement or displacement of sub-adult bass from upstream reaches into Yampa Canyon. Higher flows in 2014 and/or intraspecific competition could account for this general trend, particularly in years with a large year class. The other tagged bass had been tagged in 2010 as a small adult in reach 7, and it was recaptured this year in reach 1.

We also compared length frequency for 2014 to data from 2009 (Fig. 5). Both years represent the second year after spawning for large year classes produced in drought years (2012 and 2007, respectively). The 2014 data showed that the 2012 year class was larger and more numerous than the 2007 year class was in 2009. The 2014 data also indicate a much smaller group of bass were spawned in 2013, and these are shown as fish <100mm. Our passes were too early to detect young of year bass that may have been spawned in the reach this year.

Bass were distributed throughout the study reach in relatively equal numbers (Fig. 6). In past years, sub-adults were typically more numerous in the two most upstream reaches, and this pattern reflected a gradient of high catch rates extending from upstream reaches. This presumably reflected downstream movement of smaller fish into Yampa Canyon. In both 2013 and 2014, sub-adult bass were distributed throughout the canyon. We captured high numbers of sub-adults through reaches 1-8. Bass <100mm were more common in reaches with less gradient, and therefore, more low velocity habitat, especially reaches 6-10.

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 chubs. We removed 52 channel catfish meeting this size threshold.

Sampling for fish community composition

We sampled five, one-mile subreaches during pass 4 (July 8-11) in order to monitor fish community species composition (Fig. 7). As in previous years, native suckers

(flannelmouth and bluehead) were the two most abundant species captured. Other species captured, in decreasing abundance, were channel catfish, smallmouth bass, roundtail chub, white sucker, brown trout, and common carp. Smallmouth bass comprised a larger portion of the fish community in 2014 than recent years, reflecting the large increase in sub-adult numbers.

We also collected several other nonnative fish species over the course of the five passes, including black bullhead, green sunfish, northern pike, walleye, and white sucker and white sucker hybrids (Table 2). Thirteen of the 14 northern pike were classified as piscivores, as were both of the walleye captured. One of the walleye captured was located in reach 2, and we collected otoliths from this fish for microchemical analysis. Most walleye encountered to date have been in the lower reaches, suggesting upstream movement from higher concentrations in the Green River. As was the case in 2013, white sucker numbers were higher than previous years. Finally, we encountered 30 Colorado pikeminnow this year, but no razorback sucker or bonytail.

Roundtail chub monitoring

We captured all roundtail chub encountered during pass 1 (reaches 1-6) and pass 3 (reaches 7-10). Sampling occurred during separate passes due to time constraints and weather conditions. We were able to capture 203 roundtail chub, consisting of 130 adults and 73 sub-adults, and tagged 97 of these. We recaptured six roundtails that were tagged in 2009 (n=2) or 2012 (n=4). One of these fish had originally been tagged in the Green River near Echo Park and was recaptured as a tuberculated adult at Yampa RMI 12. Of nine roundtail captured that have moved between the Green and Yampa Rivers in this study, seven have been tuberculated when captured in the Yampa River. We rarely observe tuberculated chub in the Green River, and these movements indicate some roundtail are using the Yampa River for spawning.

VIII. Additional noteworthy observations:

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 also stocked bonytail in this reach at Deerlodge Park after our sampling season, and monitoring chubs may assist in estimating survival and movement of these fish.

X. Project Status: On track and ongoing

XI. FY 2014 Budget Status

- A. Funds Provided: \$100,681
- B. Funds Expended: \$100,681
- C. Difference: -0-
- D. Percent of the FY 2014 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 2014.

XIII. Signed: M. Tiddon Jones 14 November 2014
Principal Investigator Date

Table 1. Sampling passes and smallmouth bass captured by size class, 2014.

Pass	Date	<100mm	Sub-adults	Adults	Piscivores
1	17-20 June	34	519	109	2
2	24-27 June	22	661	128	10
3	30 June-3 July	26	723	128	6
4	8-11 July	36	564	142	8
5	22-25 July	15	675	184	6
Total		133	3142	691	32

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

Species	Number captured	Piscivores
Northern pike	14	13
White sucker and hybrids	145	
Green sunfish	8	
Walleye	2	2
Channel catfish	52	52
Colorado pikeminnow	30	
Roundtail chub	192	
Small <i>Gila spp.</i> (<150mm)	11	

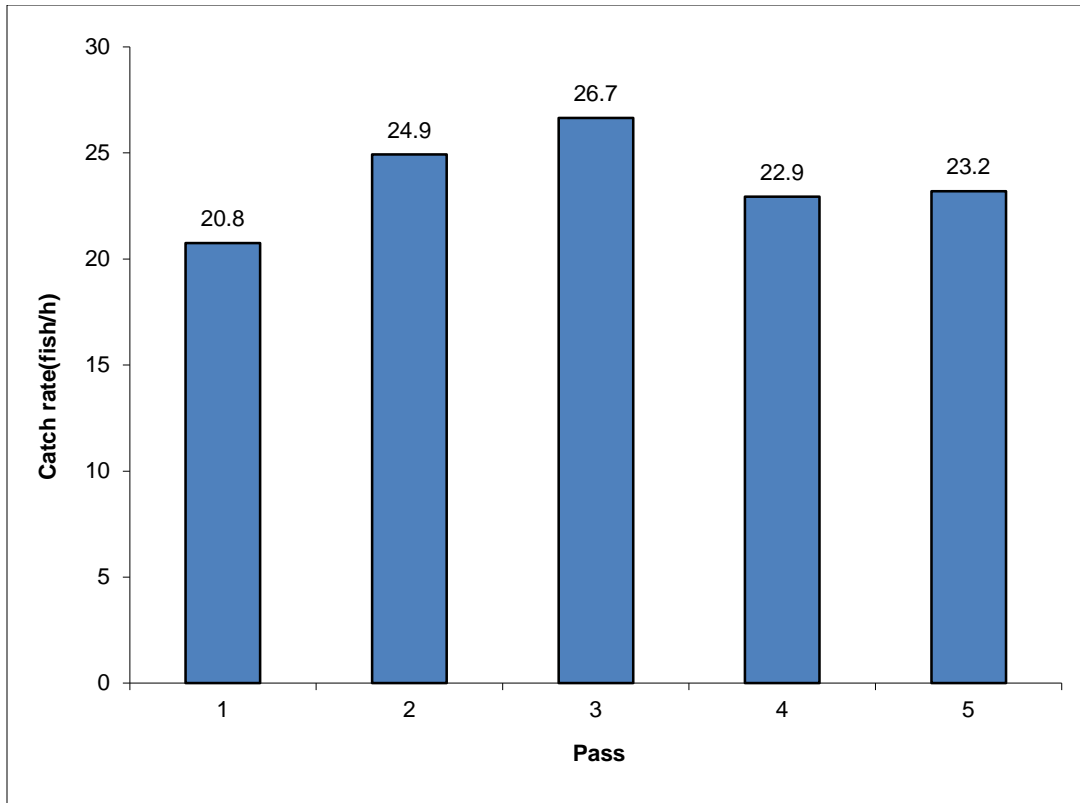


Figure 1. Catch rates for smallmouth bass ≥ 100 mm captured in Yampa Canyon, 2014.

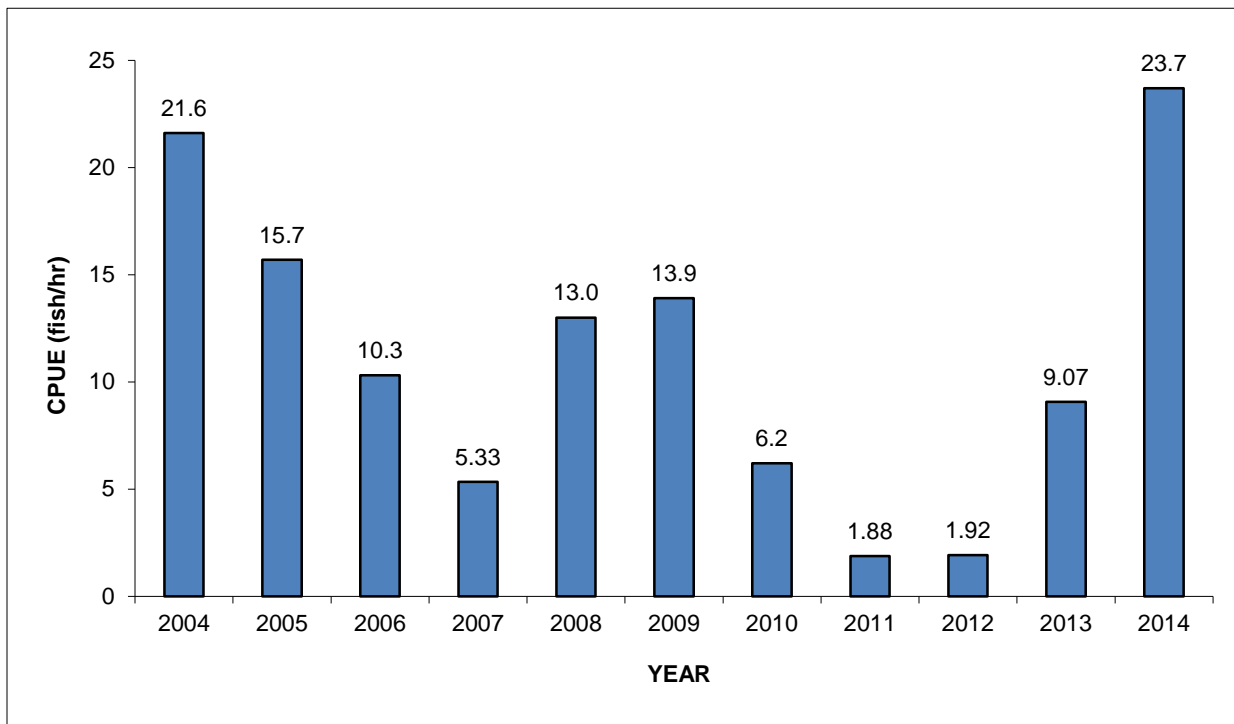


Figure 2. Catch rates for smallmouth bass ≥ 100 mm in Yampa Canyon, 2004-2014.

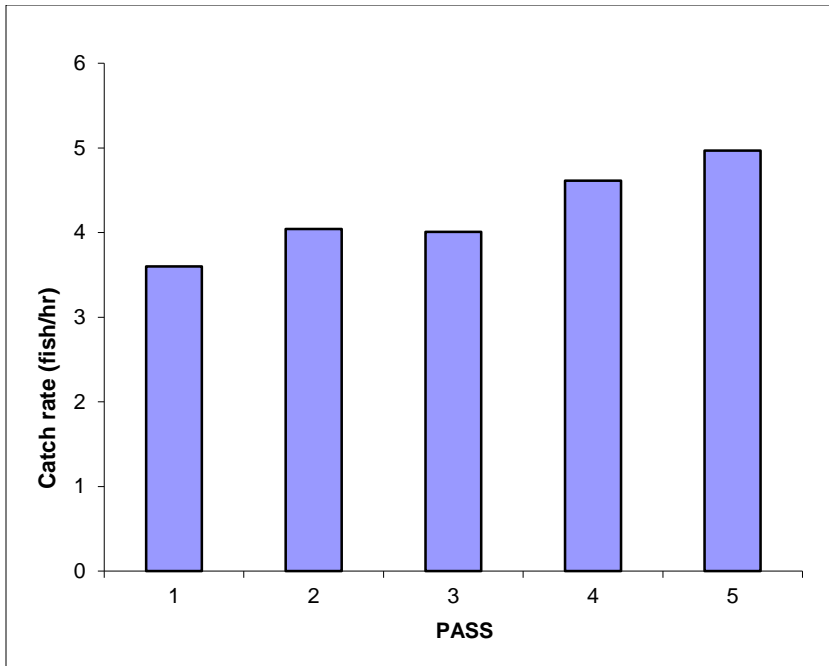


Figure 3. Catch rates by pass for adult smallmouth bass in Yampa Canyon, 2014.

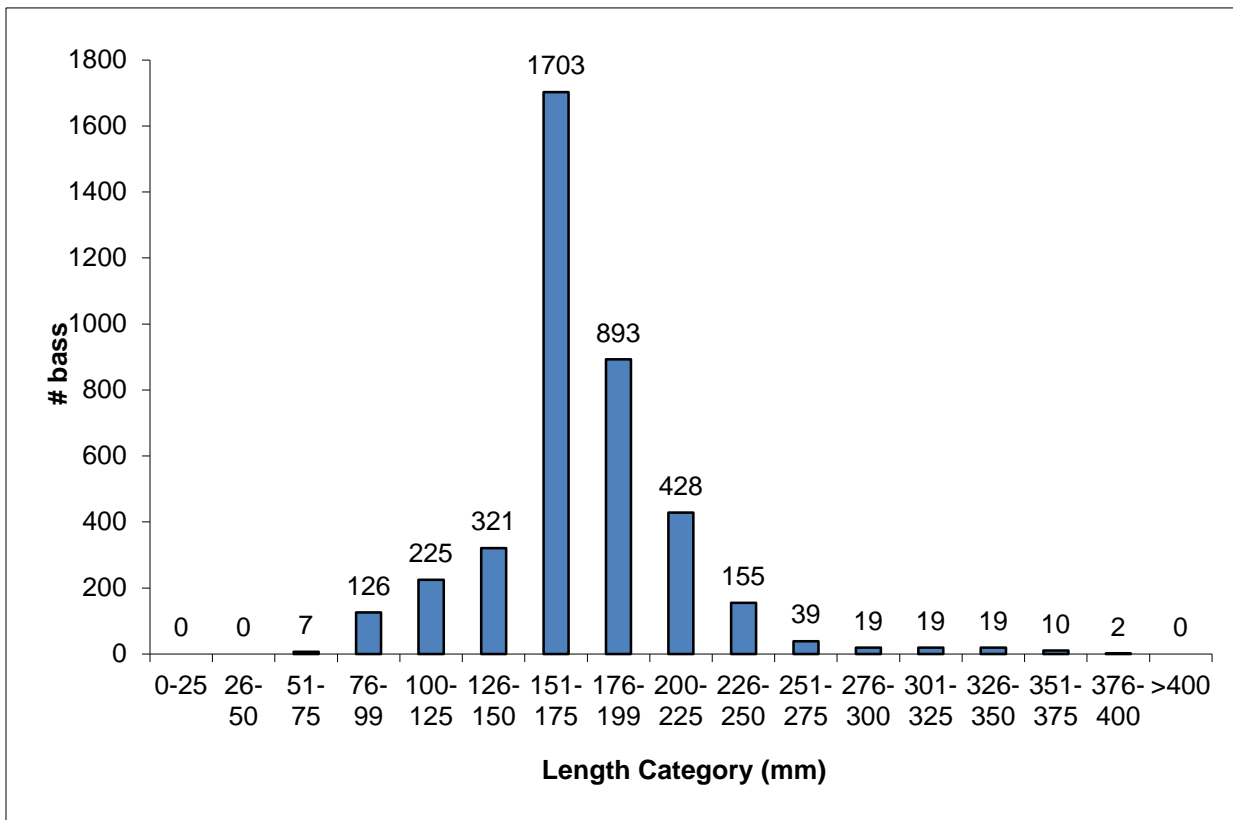


Figure 4. Length frequency of smallmouth bass caught in Yampa Canyon, 2014.

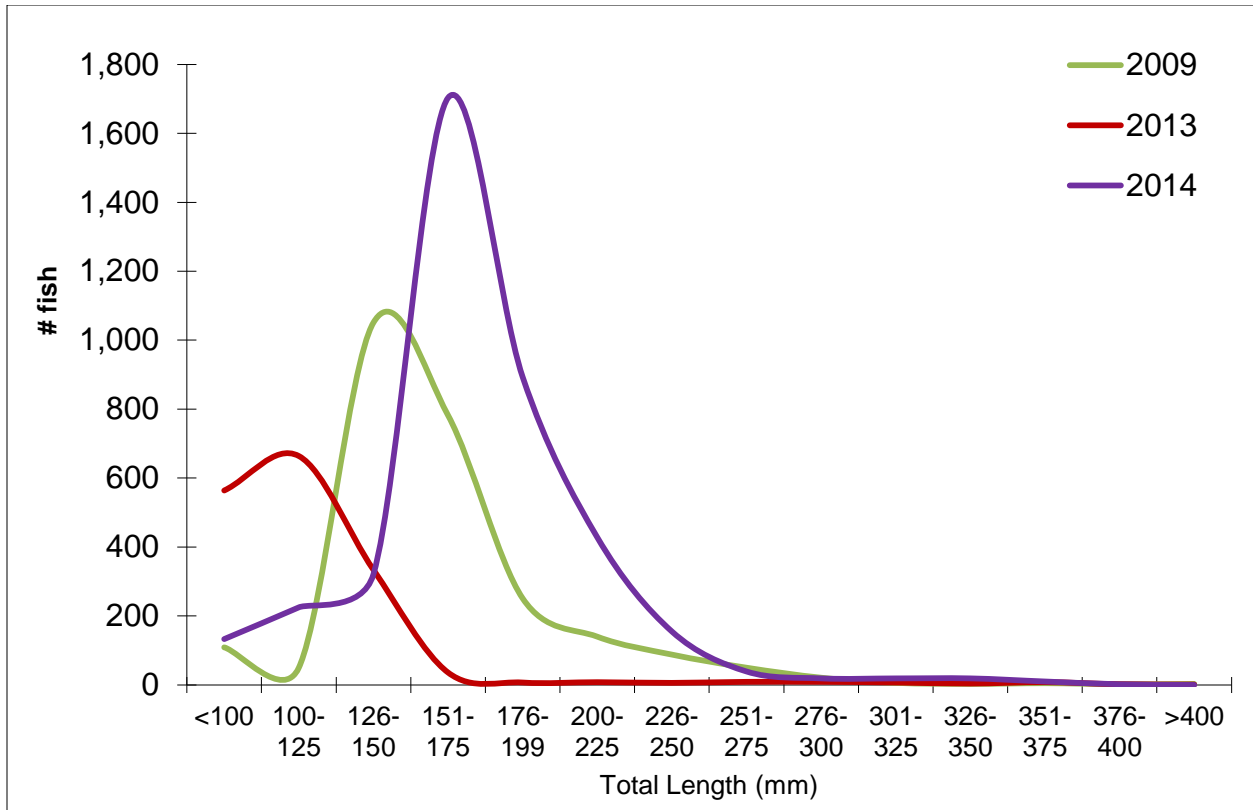


Figure 5. Length frequency of smallmouth bass for all passes, 2009, 2013 & 2014.

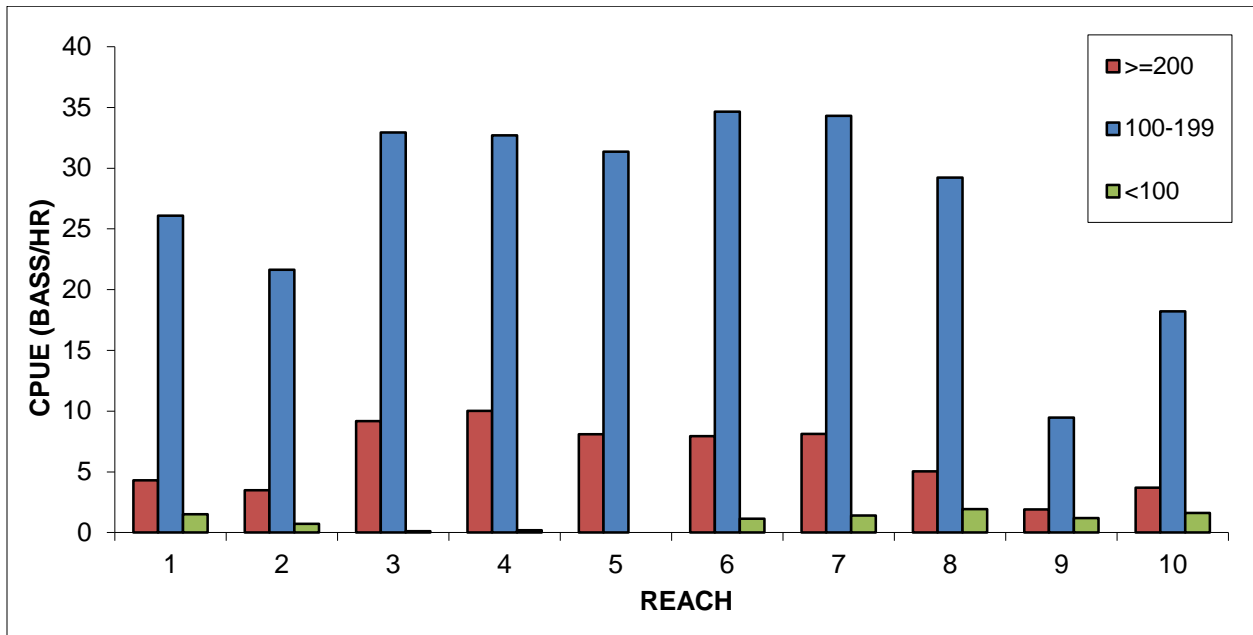


Figure 6. Catch rates for different size classes of smallmouth bass by reach.

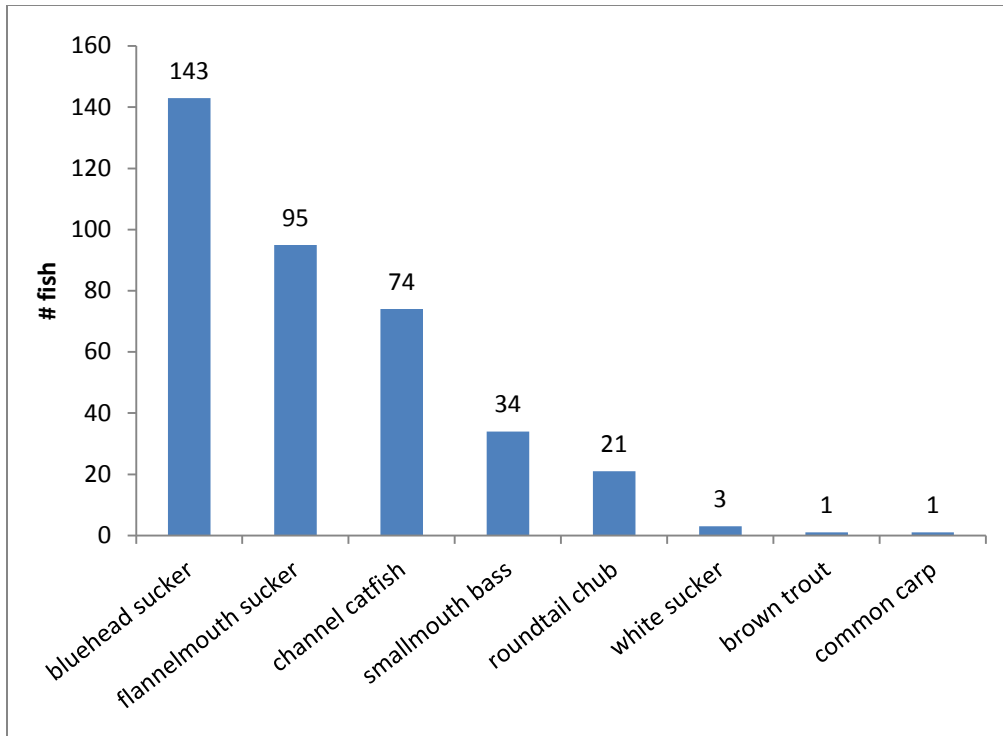


Figure 7. Fish caught in five subreaches for fish community sampling.