

- I. Project Title: Smallmouth bass control in the lower Yampa River
- II. Principal Investigator(s):  
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- III. Project Summary:  
This project is a continuation of work that began in 2001 to reduce the impacts of increasing smallmouth bass densities and channel catfish on native and endangered fish in the lower Yampa River. Study objectives included estimating the smallmouth bass population of the lower Yampa River in Yampa Canyon, reducing the abundance of smallmouth bass, analyzing catch rates to assess efficacy, determining native and nonnative fish composition, and locating possible “hotspots” of spawning activity. This year a marking pass for smallmouth bass population estimation was conducted, in addition to five removal passes for smallmouth bass and channel catfish >400mm total length (TL). The size composition and relative abundance of both nonnative and native species were also determined for five, one-mile sub-reaches in order to monitor the fish community response to removal. In 2009 an extensive *Gila spp.* tagging component was introduced to the study in order to monitor populations of humpback and roundtail chubs. *Gila spp.* were captured and tagged this year during two passes.
- IV. Study Schedule: To be continued as needed
- V. Relationship to RIPRAP:  
General Recovery Program Support Action Plan  
III.A.2.c Evaluate the effectiveness and develop and implement an integrated, viable active control program.
- Green River Action Plan: Yampa and Little Snake Rivers  
III.B.2. Control nonnative fishes via mechanical removal
- VI. Accomplishment of FY 2011 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:  
  
Six passes were completed in July and August following peak runoff. Smallmouth bass were marked during pass 2 in order to conduct a population estimate, but low recaptures did not allow for a Lincoln-Petersen estimate. Adult fish community sampling was completed during pass 5, and all *Gila spp.* were tagged on passes 1 and 2.

*Smallmouth Bass Results*

All bass  $\geq 100$ mm total length (TL) were tagged and released on pass 2, and recaptured fish with tags were released as part of the marking effort. Thirty-five adults and eighteen subadults were tagged. In pass 3, no adults were recaptured, and only one subadult was recaptured. During the entire study, only three adults and four subadults tagged this year were recaptured, making it unlikely that a reliable population estimate can be generated. We are still assessing methods to attempt a population estimate, but results are not available at this time. In five passes, 165 adults, 127 subadults, and 76 age-1 bass were removed (Table 1).

For all passes and sizes combined, the catch rate was 2.3 bass/hour (h), with 1.1 adults/h and 0.8 subadults/h. In comparison with previous years, the catch rate for all bass  $\geq 100$ mm was 1.9 fish/h (Fig. 1), which was much less than any other year of this study. Catch rates for adults appeared similar across all passes, whereas subadults showed increasing catch rates up to pass 5. Catch rates for all bass  $\geq 100$ mm are shown in Figure 2.

The length frequency histogram for fish captured in 2011 is shown in Figure 3. Fish between 150-300mm made up the majority of fish sampled. This study has been able to track a large cohort of fish spawned in 2007 (Fig. 4). These fish now appear to average  $\sim 225$ mm, although total numbers of fish caught in this cohort are much lower than previous years. This suggests these fish are either not available for capture due to movement or behavior, or survival of this cohort has been low over the last two years. Fish  $\leq 100$ mm were also captured this year, but in total numbers similar to 2009 and 2010, when the previous years' reproduction appeared to be limited.

Sixteen adults tagged within the study area in previous years were recaptured. Three adults with gray tags from the study reach upstream were recaptured. Of the fish tagged in this study area in 2010, three had moved upstream one reach, seven were found in the same reach, one had moved downstream one reach, and two had moved downstream two reaches. For adults that had been at large for two years, two had moved downstream two reaches and one had moved upstream one reach. Adult bass tagged in 2010 had mean growth rates of 36.8mm/year. Eight of the thirteen (62%) recaptures tagged in 2010 were subadults that had recruited to adult size in 2011. One subadult tagged in 2009 was recaptured this year. This fish had moved downstream one reach and had grown on average 22mm/year. Four subadults tagged this year were recaptured, and all were recaptured in the reach where they were tagged. There were also four gray tagged subadults captured that had moved downstream into reaches 1 or 2. Adult fish tagged this year grew an average of 1.8mm/week, and subadults grew an average of 3.7mm/week.

Bass distribution again appeared to be skewed toward the upper reaches, especially for subadult and age-1 fish (Fig. 5). Data from past years have shown this pattern continues into the study reaches upstream of Yampa Canyon (Hawkins et al. 2009, 2010). Adult distribution was relatively similar through the first six reaches. Also, recaptured fish with gray tags from upstream are often found in the upper reaches, while few tagged bass from the downstream Green River reaches have been captured. These trends suggest many of

the younger fish may be coming from upstream reaches where high adult densities and reproduction have been documented (Hawkins et al. 2009, 2010).

#### *Fish Community Sampling*

Five one-mile subreaches were sampled during pass 5, when flows were measured at 1,940-1,760cfs at Deerlodge Park. This year bluehead and flannelmouth suckers again were the most abundant two species caught, making up 76.9% of fish sampled (Fig. 6). These species were followed, in order of composition, by channel catfish, roundtail chub, smallmouth bass, common carp, hybrid suckers (white x flannelmouth), and white sucker. Natives suckers have comprised 70-80% of the large-bodied fish community since 2007, with the proportion of bluehead to flannelmouth changing (fig. 7). Smallmouth bass made up a smaller proportion of the fish community compared to 2009 and 2010, and roundtail chub increased as a proportion of the fish community.

#### *Channel Catfish Removal*

Forty-three channel catfish >400mm were removed during this project, with a catch rate of 0.24 fish/h. Total captures and catch rates were similar to 2010.

#### *Gila Sampling Results*

All chub encountered were netted and processed on passes 1 and 2, and if appropriate, these fish were PIT tagged. In these 2 passes, 191 roundtail and small unidentified chub were captured. No fish identified as a humpback chub was caught. Of these fish, 89 were adults and 102 were subadults (Fig. 8). Adults were caught in every reach except for reach 10, and subadults were common throughout the canyon (Fig. 9). Ninety-eight roundtail chub received PIT tags during these passes. There were 11 recaptured fish, including one bonytail stocked at Echo Park in 2010. Seven recaptured fish were originally tagged in 2009, one was tagged in 2011, one was tagged in 2010 in the Green River, and another one was tagged in the Green River in 2003. Researchers from Colorado State University also reported recapturing two fish upstream that were originally tagged in this study reach in 2010.

#### VII. Recommendations:

- Continue monitoring and tagging chub. Recaptured fish are becoming more common from previous tagging, and fish from the Green River have been captured. The chub monitoring this year documented a bonytail in the Yampa River that had survived from the 2010 Echo Park stocking in September.
- Forego Floy tagging bass in 2012. Reductions in funding for this project have reduced the proposed number of passes for 2012. With reduced effort expended next year, all passes should be devoted to removal.
- Continue with bass removal. Average to high flows and short growing seasons have limited bass recruitment. This year's data suggest a decline in the bass population, despite being unable to generate an estimate. Total catch and catch rates were lower than any year since bass removal began in this reach. In the

absence of hydrology conducive to bass spawning and recruitment, continued removal in this reach may keep this population low, although replacement from upstream may confound these efforts. Actions that will limit or eliminate the production and downstream movement of bass in the Yampa River will assist in reducing bass abundance in this reach.

VIII. Project Status: On track and ongoing

IX. FY 2011 Budget Status

- A. Funds Provided: \$130,296.88
- B. Funds Expended: \$130,296.88
- C. Difference: -0-
- D. Percent of the FY 2011 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: -0-

X. Status of Data Submission: Data are still being compiled and will be submitted by 12/31/2011.

XI. Signed: *Sildon Jones* 10/14/2011  
Principal Investigator Date

Fuller, M. 2009. Lower Yampa River channel catfish and smallmouth bass control program, Colorado, 2001-2006. Final Report, Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Hawkins, J., C. Walford, B. Wright, J. Logan, and A. Hill. 2009. Evaluation of smallmouth bass and northern pike management in the middle Yampa River. 2009 Annual Report. Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Hawkins, J., C. Walford, and B. Wright. 2010. Evaluation of smallmouth bass and northern pike management in the middle Yampa River. 2010 Annual Report. Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

**Table 1. Sampling dates and number of smallmouth bass captured in each pass, 2011. Fish were tagged and released on pass 2. Numbers in parentheses indicate 2011 tags recaptured.**

Pass	Date	<100mm	Subadults	Adults
1	July 5-8	1	9	25
2	July 12-15	3	<b>18*</b>	<b>35*</b>
3	July 19-22	8	16 (1)	24
4	July 26-29	15	34 (1)	55 (2)
5	August 2-5	46	55 (1)	41 (0)

6	August 9-12	6	13	(1)	20	(1)
Total		79	145		200	

Table 2. Ancillary fish captures.

Species	Number captured
Northern pike	5
Bluegill	1
Black crappie	5
Creek chub	2
White sucker	35
Colorado pikeminnow	29
Bonytail	1
Roundtail chub	154
Small <i>Gila spp.</i> (<150mm)	55

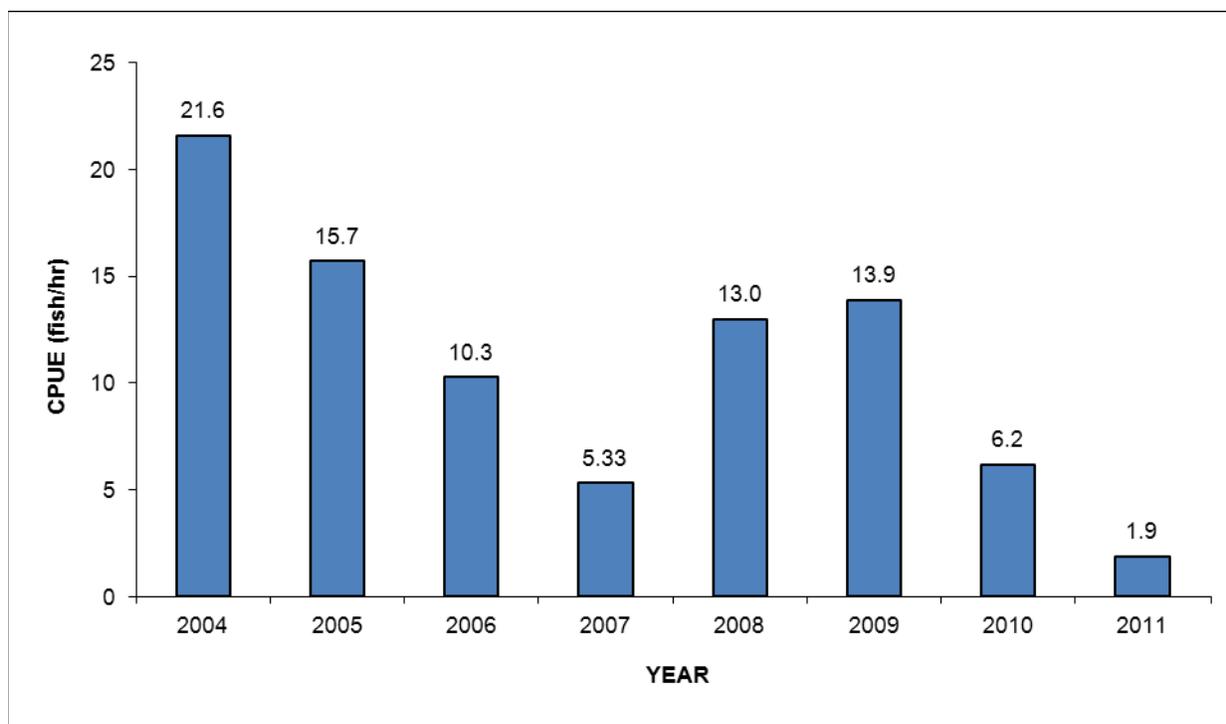


Figure 1. Catch rates for smallmouth bass  $\geq 100$ mm TL, 2004-2011.

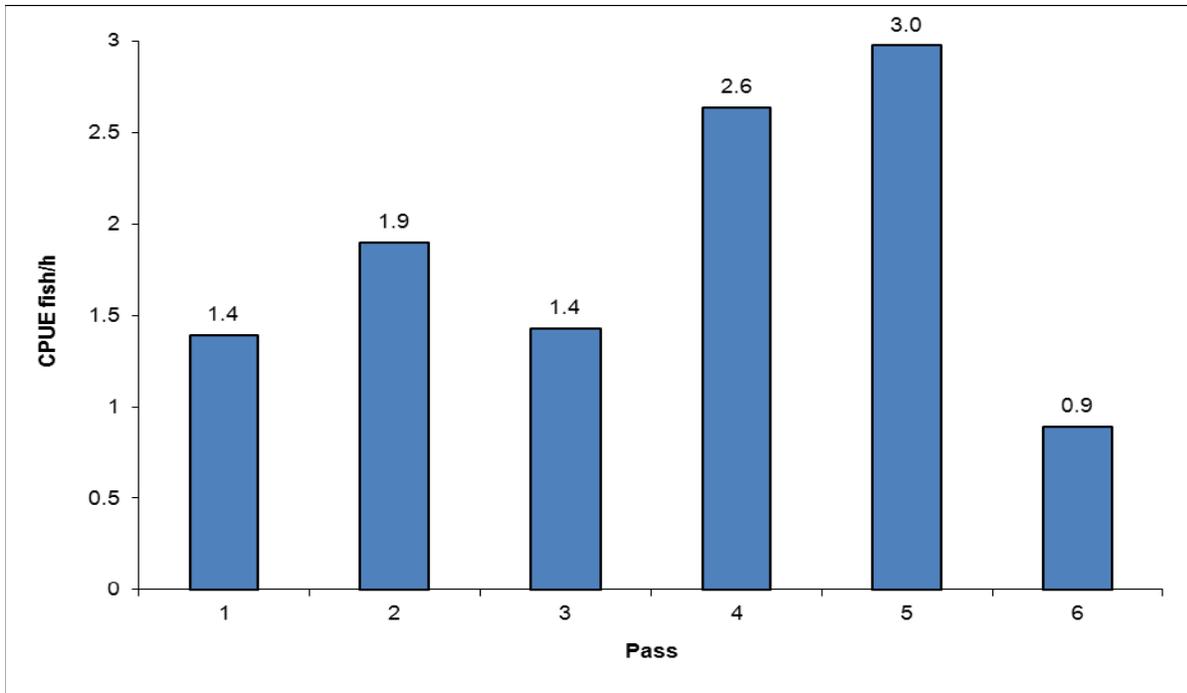


Figure 2. Catch rates for smallmouth bass  $\geq 100$ mm TL by pass, 2011.

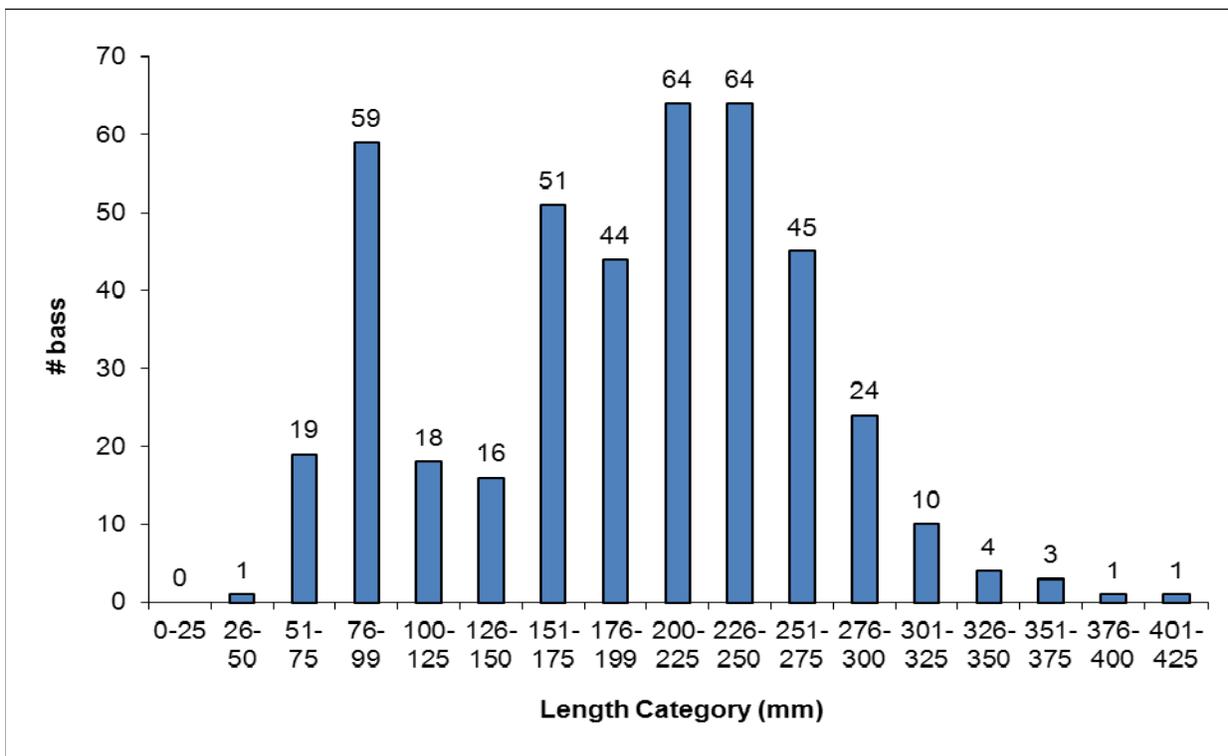


Figure 3. Length frequency histogram for smallmouth bass captured, 2011.

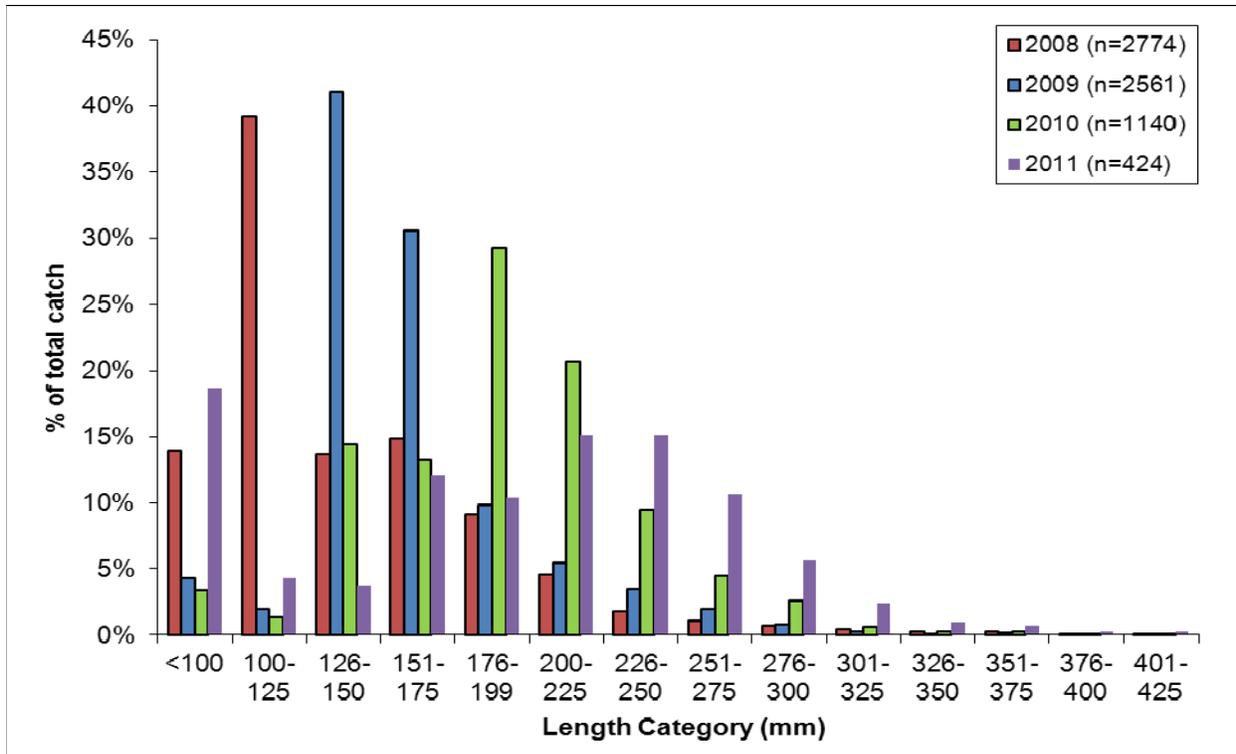


Figure 4. Length frequency histogram for smallmouth bass, 2008-2011. NOTE: columns indicate % of total catch, and total numbers caught for each year are indicated in the legend.

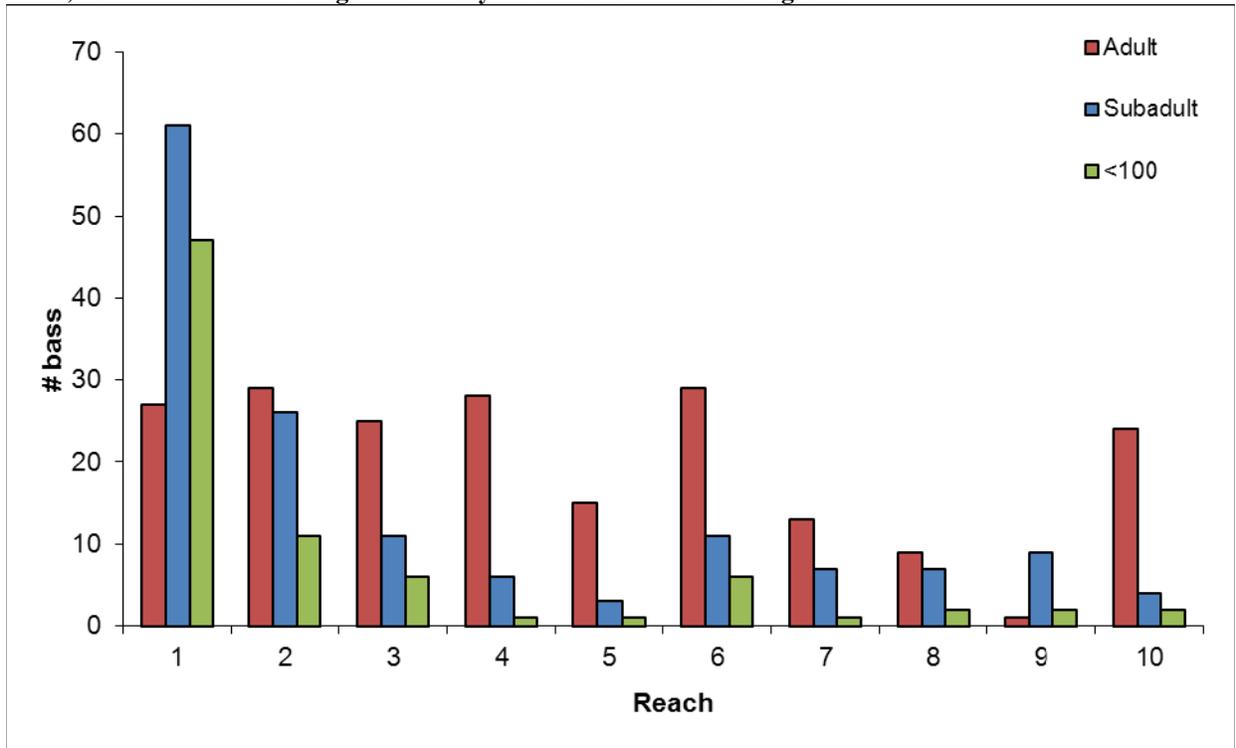


Figure 5. Distribution of smallmouth bass captured by reach and size class.

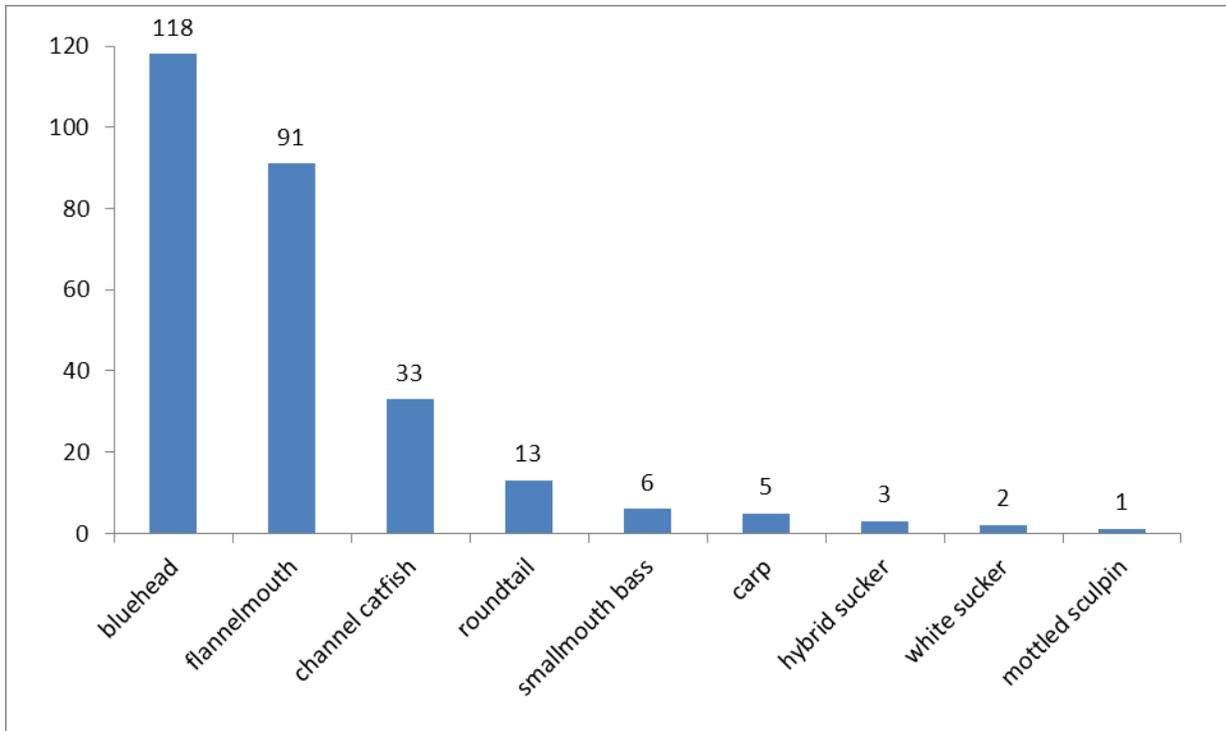


Figure 6. Total fish captured by species during monitoring pass in five, one-mile reaches.

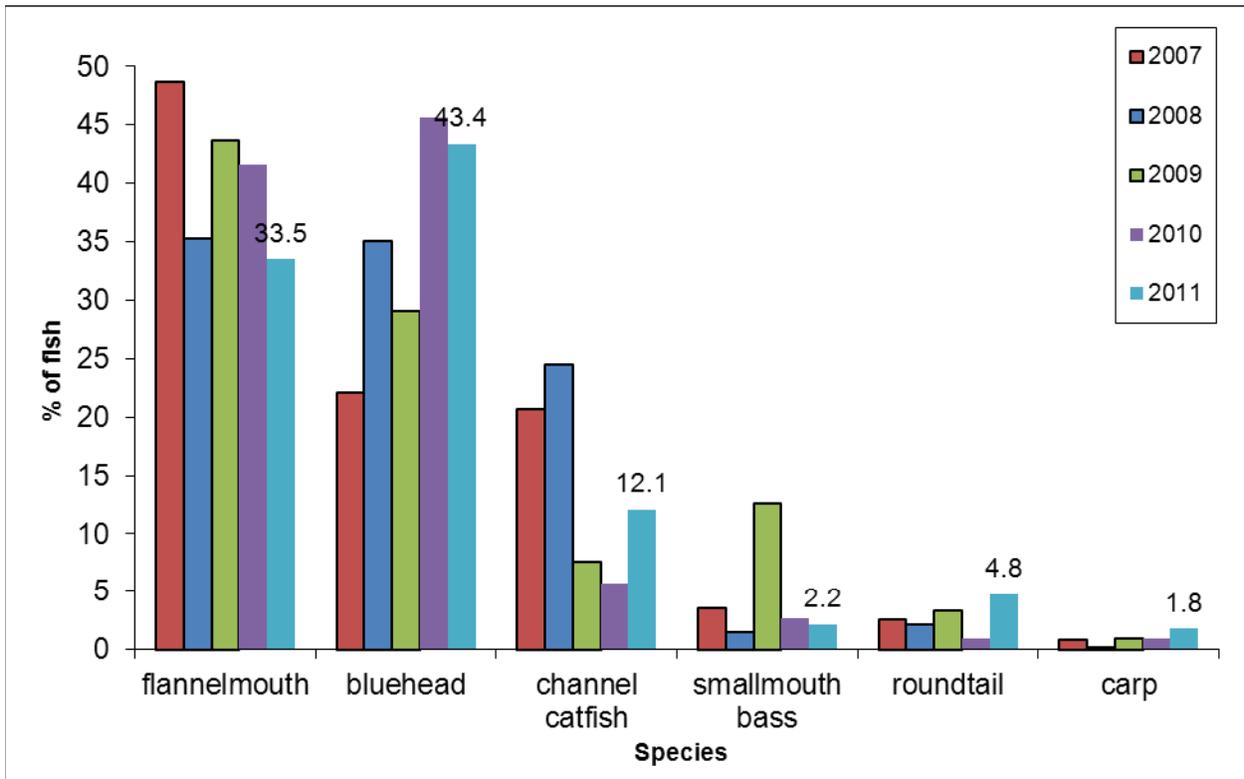


Figure 7. Proportion of fish community represented by each species, 2007-2011.

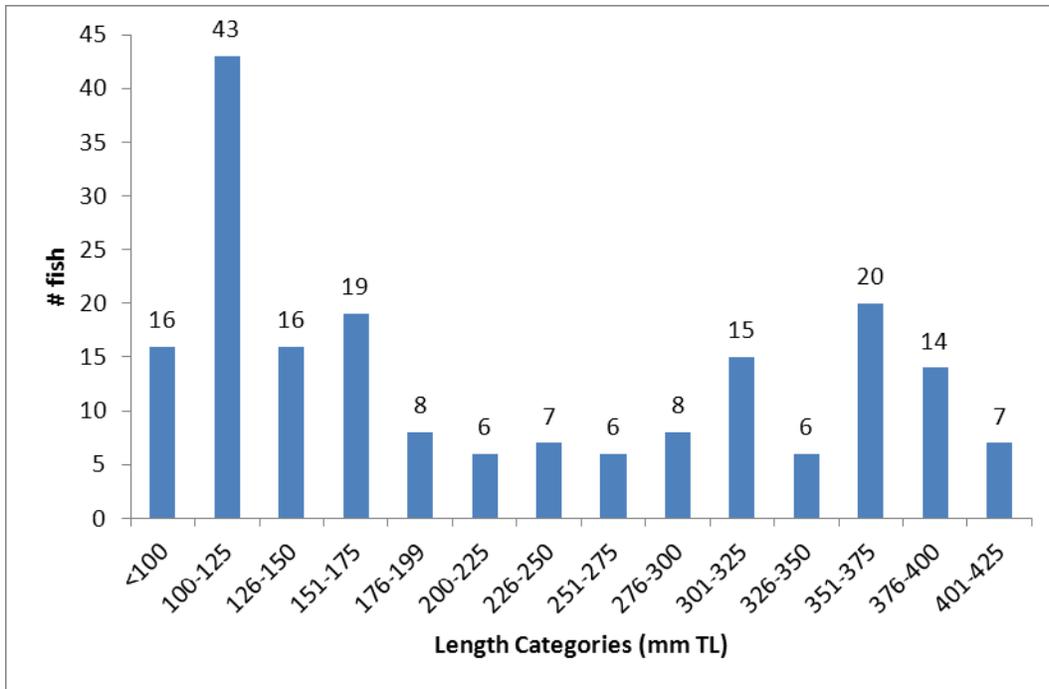


Figure 8. Length frequency histogram for *Gila spp.* caught in passes 1-2, 2011.

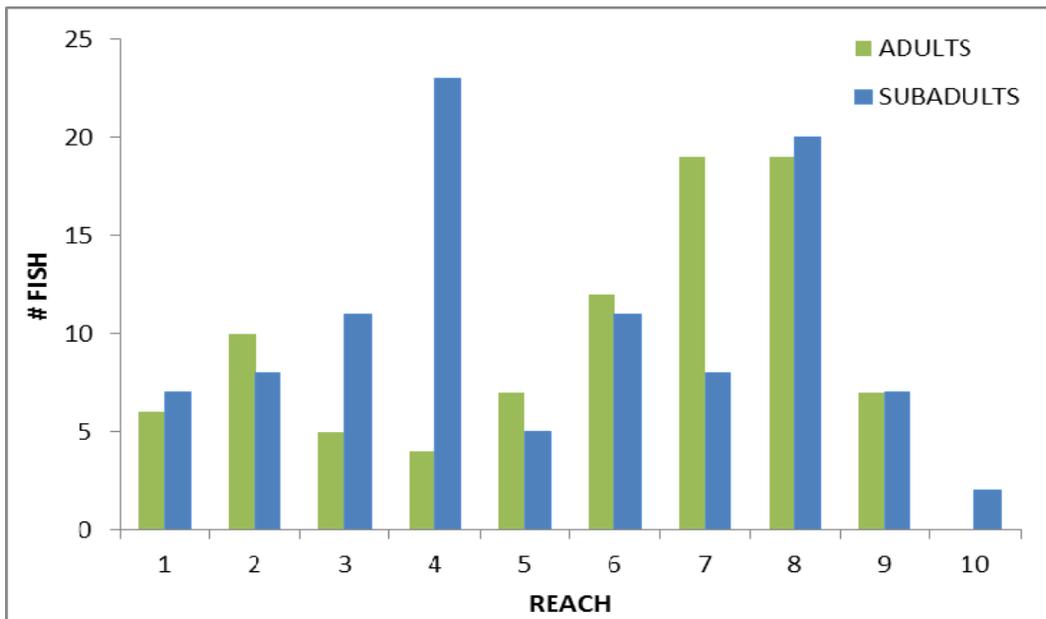


Figure 9. Distribution of roundtail chub caught during passes 1-2 by size class, 2011.