

I. Project Title: **Smallmouth bass control in the White River**

II. Bureau of Reclamation Agreement Number(s): R14AP00007 (UDWR)
R15PG00083 (USFWS)
R17AP00301 (CPW)

III. Principal Investigator(s):

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IV. Abstract:

U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, and Colorado Parks & Wildlife worked collaboratively to control an established and growing population of smallmouth bass in the White River. In 2018, a total of 4,886 smallmouth bass were removed between Taylor Draw Dam and the Green River confluence (river mile 104.3-0.0). Overall catch rates in 2018 were the highest to date due to a dramatic increase in juveniles. Adult (> 200 mm total length [TL]) catch rates peaked in the reach immediately downstream of Taylor Draw Dam, and were the highest recorded to date. Adult, juvenile (100-199 mm TL), and smallmouth bass less than 100 mm TL were caught in 2018, demonstrating that successful reproduction and survival have occurred in this system for at least the past three years.

V. Study Schedule: 2012 – ongoing

VI. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

III. Reduce negative impacts of nonnative fishes and sportfish management activities.

III.A. Reduce negative interactions between nonnative and endangered fishes.

III.A.2. Identify and implement viable active control measures.

GREEN RIVER ACTION PLAN: WHITE RIVER

III. Reduce negative impacts of nonnative fishes and sportfish management activities.

III.A. Reduce negative interactions between nonnative and endangered fishes.

III.B.2. Preclude new nonnative species introductions, translocations or invasions to preserve native species dominance within critical habitat.

VII. Accomplishment of FY 2018 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Smallmouth bass removal from Taylor Draw Dam to the Colorado/Utah border

U.S. Fish and Wildlife Service (Green River Basin FWCO) and Colorado Parks and Wildlife (CPW) removed smallmouth bass from the Taylor Draw Dam to the Colorado/Utah border between 24 April and 11 June 2018 (Table 1). The majority of effort occurred in the 11 miles immediately below Taylor Draw Dam, as previous data suggested this was the area containing the highest bass densities and an abundance of spawning adult bass (Breen et al. 2012; Webber et al. 2013, 2014; Smith et al. 2015, 2016, 2017). Additionally, one day of removal was conducted on 8 June from the BLM Big Trujillo boat launch to the Utah border (river mile [RM] 87.5-71.6) because early season effort in 2017 and 2018 in this reach indicated higher bass densities than previous years. Finally, data from Project 128 (Table 1) are described here and would otherwise not be reported within the Recovery Program, but is not factored into catch rates presented in this report to ensure comparability to previous analysis and reporting. Project 128 passes occurred from the Taylor Draw Dam to the White-Green River confluence.

Representing the highest catch rate since the initiation of this project (Figure 1), 2,898 smallmouth bass were removed during 18 days of electrofishing (mean \pm SE = 158.5 \pm 1.2 mm total length [TL]; range = 53-420 mm TL; Figure 2), consisting of 694 adults (\geq 200 mm TL), 1,629 juveniles (100-199 mm TL), and 575 fish $<$ 100 mm TL (likely age-1). Of the 694 adults caught, 48 were large enough to be considered piscivores (\geq 325 mm TL) posing a competitive threat to Colorado pikeminnow and a predatory threat to smaller native fishes. The majority (n = 375) of adult bass were expressing gametes, and more ripe males were caught than females (n = 205 and 170, respectively). The size structure of bass caught in 2018 revealed two strong size classes that appear to correspond to fish spawned in 2016 and 2017 (Figure 2). Although the magnitude of bass

captured varies by year, age-1 (range = 100 – 199 mm) fish comprise a noticeable proportion of each year's sample, indicating consistent reproduction and juvenile survival in the White River since 2012 (Figure 3).

The catch rate for smallmouth bass from Taylor Draw Dam to the Colorado-Utah border (RM 104.3-71.6) in 2018 was 30.0 fish/hr, more than double the 2017 catch rate (Figure 1). The catch rate downstream of the Big Trujillo boat launch was lower (effort = 16.1 hrs, catch-per-unit effort [CPUE] = 20.5 bass/hr) than upstream reaches (effort = 67.1 hrs, CPUE = 32.3 bass/hr), yet was still alarmingly high.

Adult catch rates were higher in 2018 than 2017 in the reach immediately below the Taylor Draw Dam (RM 104.3-102.6) and, similar to years past, declined abruptly downstream of Douglas Creek (RM 97.1; Figure 4; Webber et al. 2013, 2014, Smith et al. 2015, 2016, 2017). Catch rates for juveniles between 100 to 199 mm TL were fairly high (CPUE > 10 bass/hr) in all reaches, and were highest from RM 97.1 to 93.4 (Reach 3; Figure 4). This is unlike past years' data where catch rates for all size classes had been relatively low in reach three (Smith et al. 2017). Similar to the 100 – 199 mm TL size class, catch rates for smallmouth bass less than 100 mm TL peaked in reach three, and were higher in 2018 for all reaches except the final 3.5 miles upstream of the Utah border. It should be noted that only one day of removal occurred in reach three this year. Consequently, less effort compared to other reaches (except the reaches downstream of the Big Trujillo boat launch) likely biased catch rates high in reach three. However, we expect that the high catch rates observed in all Colorado reaches will continue into 2019 barring environmental factors such as an unusually cold winter that produces high overwinter mortality.

Targeted smallmouth bass removal from the Big Trujillo boat launch (RM 87.5) to the Utah state line (RM 71.6) had not been conducted as part of Project 167 between 2012 and 2016 due to lower bass densities compared to reaches upstream observed during Project 128 passes. Additionally, logistical issues resulting from limited access (private property) to the take out for this stretch would require a multi-day field trip and/or vehicle shuttle. The previously mentioned increase in bass captures in this stretch in May 2017 prompted communication with the Program Director's Office, UDWR Vernal, and a cooperative landowner. This allowed the addition of one day of electrofishing in this stretch in June 2017, and access to this reach was granted again in 2018. During one day of targeted bass removal in this reach in 2018, 330 smallmouth bass were removed, including 37 individuals in the adult size class, and the daily catch rate was 20.5 bass/hr (Table 1 and Figure 4). Given this high catch rate, the number of bass caught in this reach when combined with Project 128 totals (n = 453), and the noticeable increase in Utah catch rates on the White River in 2017 and 2018 (see below), targeted smallmouth bass removal should continue in this reach in the future.

Task 2: Three smallmouth bass removal passes from the Colorado/Utah border to Enron boat launch

Nine days of cataraft electrofishing removal (RM 71.6-24.0; 87.04 hrs of total effort) were completed from 1–15 June 2018 (Table 1). Although we intended to focus our efforts on repetitive nest disturbance in upstream areas that have consistently proven to hold higher densities of smallmouth bass (Breen et al. 2012; Webber et al. 2013, 2014; Smith et al. 2015, 2016, 2017), dry hydrological conditions prompted us to change strategies in order to complete as much removal effort as possible before flows dropped to an unmanageable level. More specifically, after completing one day of effort in upstream reaches on 1 June 2018, we quickly realized that flow velocity was too limited to repeat the daily section, which includes travel to and from the site on the same day (i.e., this single event took >13 hours for only 10 miles of removal effort). Therefore, we determined that the best method would be to complete full passes with remaining flows to limit travel time. Upon completion of the second full pass on 15 June 2018, discharge dropped to 330 cfs and it was clear that we would no longer be able to float the White River with electrofishing equipment.

During this effort, 1,486 smallmouth bass were removed (mean \pm SE = 126.4 \pm 0.9 mm TL; range = 74–356 mm TL; Figure 5), representing a similar abundance and size distribution to 2017 despite limited effort in higher density upstream reaches (Smith et al. 2017; Table 1). Catch consisted of 1,445 juveniles (\leq 199 mm TL) and 41 adults ($>$ 200 mm TL), two of which were in the piscivore size class (\geq 325 mm TL; Figure 5). It is worth mentioning that the total number of bass removed likely would have been much higher if we were afforded the opportunity to electrofish more than three days in the upper 10 miles of the Utah reach (i.e., 50.7% of bass were removed from RM 71.6–61.5). Overall CPUE was 17.07 fish/hr, a 3.13 fish/hr increase over the 2017 catch rate (Smith et al. 2017). Increased total catch and catch rates were driven largely by what appears to be a single year class of fish likely produced in 2017. Adult bass were dissected for sex determination and gamete expression. Excluding three fish because sex was not recorded, we removed 19 female and 19 male adult bass; 15.8% of females and 10.5% of males were ripe at the time of collection. Percentages of ripe bass removed in 2018 were lower than 2017 (Smith et al. 2017), but sampling conditions dictated our efforts this year as mentioned above. Considering our entire 47.6 mile sampling reach, 31.2 bass/mile were removed. Our total catch consisted of 2.8% adults, which is a similar percentage as 2017 (3.3%; Smith et al. 2017) and a substantial decrease over 2016 (14.5%; Smith et al. 2016), which followed an increasing trend observed in 2014 (19.1%; Webber et al. 2014) and 2015 (27.5%; Smith et al. 2015). However, this percentage is misleading with the abundance of juveniles, specifically bass ranging in size from 75–124 and 150–199 mm TL (Figure 5) that likely represent strong cohorts from successful reproduction in 2017 and 2016, respectively. With the exception of bass $<$ 50 mm TL (i.e., 2018 cohort not yet susceptible to collection gear) and $>$ 325 mm TL, population structure is represented by all size classes (Figure 5).

Catch-per-unit-effort of smallmouth bass in this sampling reach has varied considerably during the first six years of this project, a result of flow variability, fluctuating spawning

success, and changing removal strategies. More importantly, dramatic changes in bass distribution along an upstream to downstream gradient are evident. Specifically, 2012 represents CPUE influenced by distance to an upstream source population (Breen et al. 2012; Figure 6a), 2013 CPUE reflects population expansion from excellent recruitment in 2012 (Webber et al. 2013; Figure 6b), and the 2014 CPUE gradient is most likely influenced by environmental factors (Webber et al. 2014; Figure 6c). To explain, RM 61.5 is the end of a 5-mile sample reach as well as the location of the Evacuation Creek confluence. The Evacuation Creek watershed was devastated by the 20,000 acre Wolfden wildfire in July of 2012, leaving a barren landscape that has since been subject to increased erosion and high sediment loads during severe rainstorms. For example, young-of-year (YOY) surveys revealed significant changes in marginal, low-velocity habitats that were nearly or completely filled in with sediment, ash, and debris (Fiorelli and Breen 2014). Given a clear break in CPUE at RM 61.5 (Figure 6c), we suspect that 2013 juvenile bass downstream of Evacuation Creek experienced poor survival rates or moved out of the reach to seek more suitable habitat and have not recolonized the area. Furthermore, Fiorelli and Breen (2015) describe a positive relationship between downstream distance from Evacuation Creek and water depth (i.e., sediment depth in low-velocity habitats). Our 2015 and 2016 results clearly demonstrated that sediment deposition has had a profound effect on bass distribution in the lower White River. Moreover, comparing average CPUE above and below Evacuation Creek (Figure 6c), there was more than a four-fold difference in catch rates in 2015 (4.80 fish/hr vs. 1.05 fish/hr) and more than a three-fold difference in 2016 (5.88 fish/hr vs. 1.80 fish/hr); this result may or may not be associated with the Wolfden fire after several years of sediment sluicing, but regardless, there was a marked difference upstream and downstream of a known sediment contributor in both years. Similar results occurred in 2017, with the exception that CPUE was highest (26.8 fish/hr) in the 5-mile reach below Evacuation Creek (Figure 6c). This result possibly suggests that the successful 2016 cohort has made a density-based shift downstream (i.e., abundance of adults upstream) and/or spring runoff flushed smaller individuals well downstream of their origin. Regardless of the mechanism, substantially higher catch rates compared to previous years were observed as far downstream as RM 26.5 (Figure 6c). Further bass population establishment has continued in 2018, where CPUE has increased in nearly every sample reach (Figure 6c).

Overall observations of smallmouth bass on the White River from Taylor Draw Dam to the Enron Boat Ramp:

In summary, more smallmouth bass were captured in the White River in 2018 (Colorado and Utah) than in any year since this project's inception and catch rates were the highest recorded to date. The majority of bass ($n = 4,042$) were juveniles less than 200 mm TL (mean \pm SE = 147.6 \pm 0.9 mm TL) that were likely spawned in 2016 and 2017. Similar to years past, adult catch rates were highest near Taylor Draw Dam and in general decreased moving downstream (Figure 4). Adult smallmouth bass catch rates decreased in the Utah portion of the White River, however juvenile catch rates increased dramatically. In Colorado, catch rates for all size classes of smallmouth bass were higher in 2018 than in 2017 except for the final 3.5 mile reach upstream of the Utah border. This year's results remain consistent with previous observations that successful spawning

occurred in the White River and young smallmouth bass dispersed throughout the White River.

Task 3: Data entry, analysis, and reporting

Recovery Program annual progress report submitted November 2018. Data will be submitted to the STReAMS database in December 2018.

VIII. Additional noteworthy observations:

U.S. Fish and Wildlife Service (FWS) conducted additional bass removal on the White River as part of Project 128 (Colorado pikeminnow population estimate). Project 128 consisted of three electrofishing passes from the Taylor Draw Dam to the Green River confluence (RM 104.3-0.0) that were completed before Project 167 fieldwork began. Combined, an additional 170 adult, 193 juveniles 100 – 199 mm TL, and 27 smallmouth bass < 100 mm TL were removed in Colorado during this monitoring project, and 49 adult, 281 juveniles 100 – 199 mm TL, and 25 juvenile bass < 100 mm TL were removed in Utah (Table 1). A higher proportion of adult smallmouth bass were caught in both the Colorado and Utah sections of the White River during Project 128 passes than during Project 167. Project 128 adult bass captures in Colorado comprised 45% of the catch compared to 21% in Project 167. In Utah, 12.7% of smallmouth bass captured as part of Project 128 were adults versus 2.8% during Project 167 passes. While possibly the result of fishing in deeper water to target Colorado pikeminnow, these higher adult proportions support the validity of sampling prior to prime smallmouth bass spawning conditions.

Given that there has been some level of successful smallmouth bass reproduction in the White River every year since the initiation of this project (see above), UDWR took a closer look at how this may be affecting the native fish community in the White River in Utah, tying in other projects for the same time period. In addition to concerns related to the effects of increased electrofishing effort on the native fish community (Smith et al. 2017), UDWR has documented decreased catch rates of young-of-year (YOY) native fish species during annual sampling (Fiorelli and Breen, In Prep). Beginning in 2009 UDWR has completed annual YOY sampling in the White River in Utah to determine fall recruitment of native fishes. When bass catch rates are graphically represented in tandem with this information, an alarming pattern is clear (Figure 7). Specifically, each year that bass CPUE is elevated, limited recruitment of native fishes (Tier I species of concern: bluehead sucker, flannelmouth sucker, and roundtail chub) into the fall is observed. Predation due to habitat overlap between juvenile smallmouth bass and YOY native fishes may be a driving factor, especially given the drastic increase in smallmouth bass over the last two years (Smith et al. 2017). Transformation of the fish assemblage of the White River in Utah in a relatively short timeframe warrants immediate discussion to determine potential options for conserving this native fish community. CPW fish community surveys from 2014-2017 in the White River within Colorado show a relatively stable and consistent adult (>150 mm total length) native species composition.

However, investigation into YOY fall recruitment in the upstream reaches may provide more insight into the overall health of the White River native fish community.

Additional electrofishing effort was conducted by UDWR in the White River from 22–25 October 2018 as a part of an aging project for bluehead sucker, flannelmouth sucker, and roundtail chub (Fiorelli and Breen, In Prep). Although focal habitats for electrofishing efforts differed (i.e., we did not target near-shore, complex habitat such as large woody debris) because we were focused on catching the three species in deeper water, smallmouth bass were effectively removed during this time (Table 1). Removing bass in the fall essentially accomplishes the same goal as our current protocol (i.e., remove adults before they spawn), but with the added benefit of more stable base flow conditions (i.e., poor hydrology greatly affected our ability to effectively conduct this project in 2012, 2013, and 2018) and we would be able to limit disturbance of spawning native fishes, an important consideration with dwindling populations as mentioned above.

Roundtail chub ancillary captures (Table 2) does not adequately reflect the number of fish we could have captured during this project. More specifically, UDWR stopped working up roundtail chub on the first full pass (state line to Enron) at RM 41.5 because it added too much time to an already slow process given low flows during spring removal efforts due to drier hydrology. More importantly, roundtail were actively spawning at the time (several ripe individuals collected) and we chose to limit disturbance. CPW and USFWS did not capture or handle Roundtail Chub in Colorado in 2018.

Green sunfish captures increased from 73 fish in 2017 to 187 in 2018, perhaps the result of increased susceptibility to electrofishing gear resulting from the lower flows, warmer water temperatures, and increased clarity observed in 2018. Regardless of whether a gear bias existed or not, crews should continue to remove this species in the future considering their well-documented impacts to native fish communities in the Colorado River basin (Olden and Poff 2005).

Noting that white sucker x native sucker hybrids have been removed opportunistically in the Colorado portion of this study, substantial increases in the number of white sucker hybrid captures occurred, particularly in the Utah portion of the White River in 2015 followed by a smaller increase again in 2016 (Smith et al. 2015, 2016). While the number of white sucker captures decreased from 2017, more bluehead x white sucker were caught. White sucker hybridization in the White River presents a direct threat to the genetic integrity of this robust native catostomid community (e.g., Fiorelli and Breen 2014, 2015).

Gizzard shad were first recorded in the White River in 2012 (Webber and Jones 2013) when one individual was caught, but had not been reported again until April and May 2018, when four were captured in Colorado. All gizzard shad were caught during Project 128 passes, two of which were caught downstream of the Big Trujillo boat launch (RM 87.6), one between RM 93.5 and 87.6, and one near the Taylor Draw Dam (RM 104.3). Additionally, two northern pike were captured in the White River in Colorado in 2018. One of these pike, which was caught in Utah (RM 18.2) on 31 May during the final

Project 128 pass, carried two PIT tags that were inserted into bonytail as determined by searching the tags in the STReAMS database. These bonytail were stocked by Ouray National Fish Hatchery at the Enron boat ramp (RM 24) on 6 and 19 April 2018. The other northern pike was caught on 30 May near the Taylor Draw Dam boat launch (RM 104.2). Although captures of these invasive species have not been numerous in this system, northern pike and gizzard shad present predatory and competitive threats to native fish in the White River.

Temperature loggers were deployed at seven sites on the White River between the Taylor Draw Dam and the Carrot Patch bridge (RM 6) in May 2018. Combined with the existing temperature logger near the Bonanza Bridge, these temperature loggers should increase knowledge of the annual thermal regime within the White River. This knowledge will likely improve fieldwork coordination as well as nonnative fish control and native fish recovery efforts. However, the utility of these instruments requires more than one year of data collection to fully realize.

On July 19th, 2018 the Rio Blanco Water Conservancy District released a pulse of water through the hydro-electric tunnel at the Taylor Draw Dam in an effort to clear Cladophora algae from the river channel and the Town of Rangely water utility structures. Discharge reached about 1,100 CFS for approximately 90 minutes. Pre and post pulse sampling by CSU crews showed little success removing age-0 smallmouth bass with these flows but the short duration and volume of the event may have been insufficient (Bestgen et al. 2018). Further investigation into flow manipulation as a management tool is recommended.

IX. Recommendations:

- Removal passes in the upper 11 miles of the White River below Taylor Draw Dam should continue to target adult smallmouth bass before and during the spawn period since spawning adults make up a larger proportion of the total catch in Colorado.
- We recommend increasing levels of smallmouth bass removal effort in both the Colorado and Utah portions of the White River. Substantial increases in bass densities in 2018 warrant continued pressure on this population.
- Smallmouth bass removal should continue in the reach between Big Trujillo Wash (RM 87.6) and the Colorado – Utah border (RM 71.6). The higher catch rates observed in this reach and in Utah reaches in 2017 and 2018 justify the additional effort required to conduct bass control in this stretch. Additional effort in Colorado could be accommodated by adding six days to cover removal downstream of Big Trujillo Wash. Fall removal efforts in Colorado could be investigated if resources are available and flows in the White River are sufficient, but would not replace spring and summer efforts.

- Additional efforts in the fall may contribute to control of smallmouth bass while limiting disturbance to the native fish community during the spawning period. Fall removal efforts in Utah in October 2018 were effective at removing smallmouth bass and as such four additional days of sampling are recommended in Utah reaches of the White River.
- Despite relatively low white sucker densities, an increase in white sucker hybrid captures has occurred since 2014, warranting continued focus toward nonnative catostomid removal in the White River in the future.
- Coordinate with Rio Blanco Water Conservancy District and Town of Rangely for future opportunities to manipulate discharge below the Taylor Draw Dam hydro-electric tunnel to provide short duration high flow events in the White River. Evaluate YOY smallmouth bass response to flow manipulations.

X. Project Status: On track and ongoing

XI. FY 2018 Budget Status

- A. Funds Provided: \$84,027
- B. Funds Expended: \$84,027
- C. Difference: \$0
- D. Percent of the FY 2018 work completed: 100%
- E. Recovery Program funds spent for publication charges: \$0

XII. Status of Data Submission:

We will submit all data to the database manager by December 2018.

XIII. Signed: Chris Smith, Matthew J. Breen, & Jenn Logan November 27, 2018

Principal Investigators

Date

References:

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Webber, A., M.T. Jones, M.J. Breen, and R.C. Schelly. 2014. Smallmouth bass control in the White River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Table 1. Juvenile (includes all bass < 200 mm) and adult smallmouth bass removed from the White River for each pass in 2018. River miles (RM) and dates sampled are also indicated for each pass.

Agency/Date	RM	Juveniles	Adults	Total
FWS 128, 24 April - 29 May*	104.3 - 71.6	220	180	400
FWS 128, 25 April - 1 June*	71.6 - 24.0	296	43	339
FWS 128, 8 - 30 May*	24.0 - 0.0	10	6	16
CPW, 22 May	104.3 - 97.1	162	118	280
CPW, 23 May	93.5 - 87.6	84	21	105
CPW, 30 May	104.3 - 97.1	213	105	318
FWS, 31 May	97.1 - 93.5	97	12	109
CPW, 5 June	93.5 - 87.6	154	28	182
CPW, 6 June	104.3 - 97.1	363	95	458
CPW, 7 June	97.1 - 93.5	204	12	216
FWS, 8 June	87.6 - 71.6	294	37	331
FWS, 11 June	104.3 - 97.1	230	63	293
CPW, 11 June	93.5 - 87.6	183	23	206
UDWR, 1 June	71.6 - 61.5	335	3	338
UDWR, 4 - 7 June	71.6 - 24.0	686	17	703
UDWR, 12 - 15 June	71.6 - 24.0	424	21	445
UDWR, 22 - 25 October**	71.6 - 24.0	87	60	147
Totals		4042	844	4886

* Ancillary captures from Colorado pikeminnow population estimate (Project 128a).

**Three species sampling conducted by UDWR, not sanctioned by the Recovery Program.

Table 2. Ancillary captures from the White River, 2018.

Species	Total Captured	Length Range (mm)
Black bullhead	41	95 - 250
Black crappie	43	70 - 205
Bluehead x white sucker hybrid	26	100 - 449
Bonytail	5	270 – 315
Colorado pikeminnow*	3	593 - 634
Flannelmouth x white sucker hybrid	55	130 - 486
Gizzard shad	4	322 - 422
Green sunfish	187	38 - 202
Northern pike	1	691
Rainbow trout	1	301
Razorback sucker*	1	485
Roundtail chub**	35	124–367
White sucker	34	90 - 423
Yellow perch	1	229

* Colorado pikeminnow and razorback sucker captured during Project 128 passes are not reported here.

** Roundtail chub were collected only in Utah and only during the first 3.5 days of Project 167 due to time constraints with diminishing water levels.

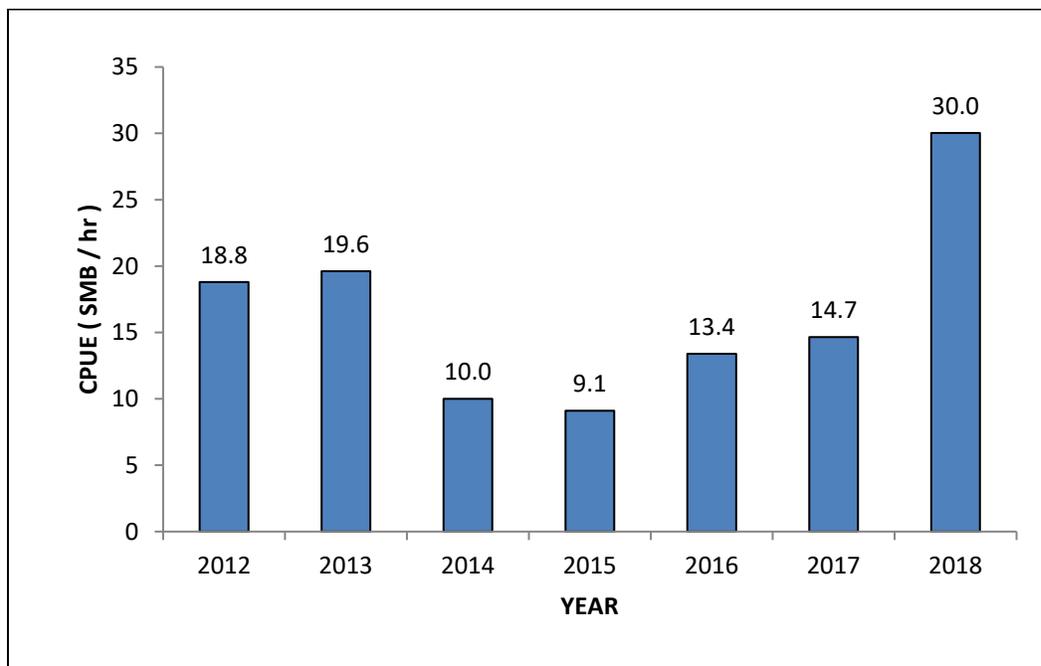


Figure 1. Catch rate for all smallmouth bass captured during Project 167 passes in the White-River in Colorado (RM 104.3-71.6), 2012-2018.

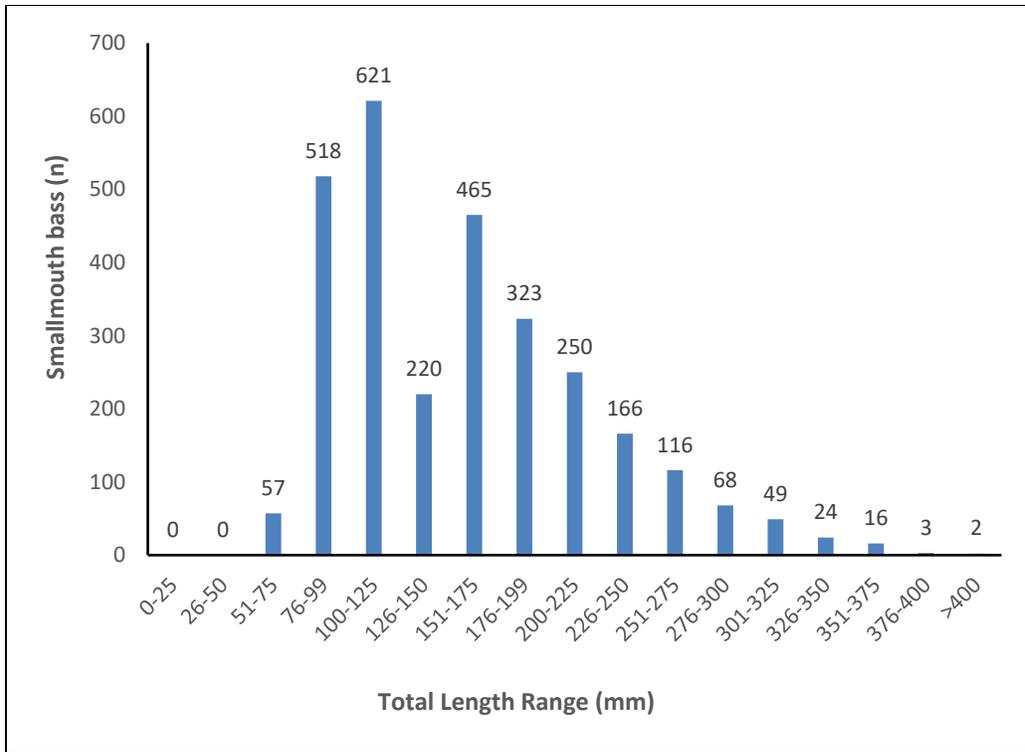


Figure 2. Length frequency of smallmouth bass removed from the White River in Colorado, 2018.

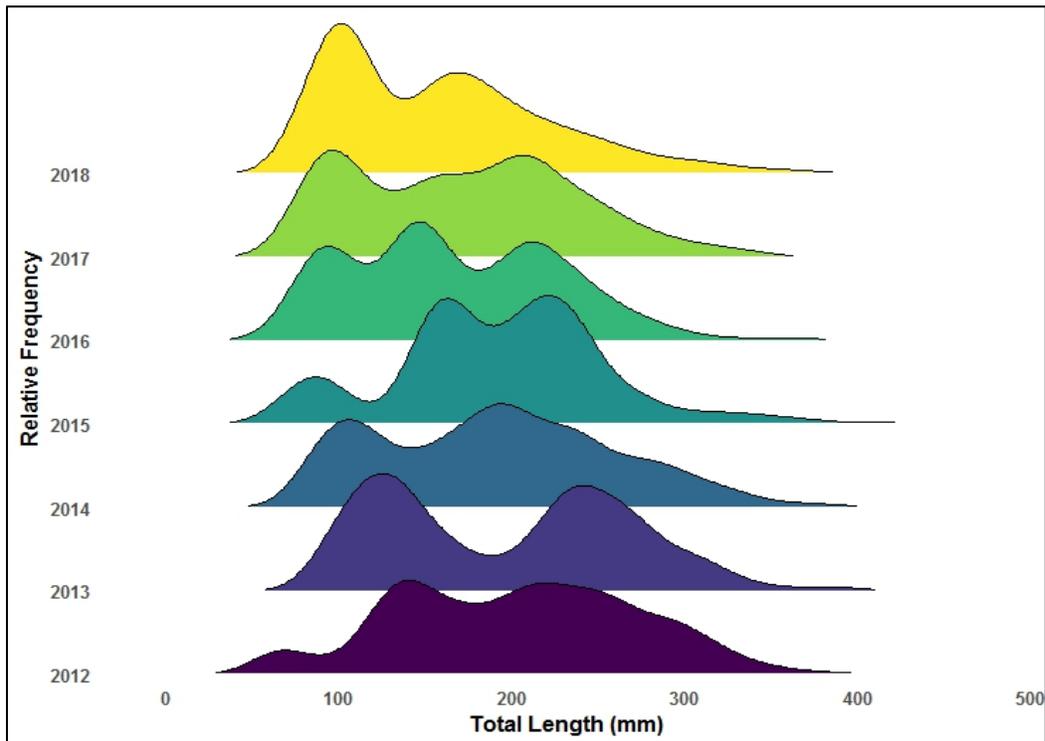


Figure 3. Relative frequency of smallmouth bass removed from the White River in Colorado, 2012-2018.

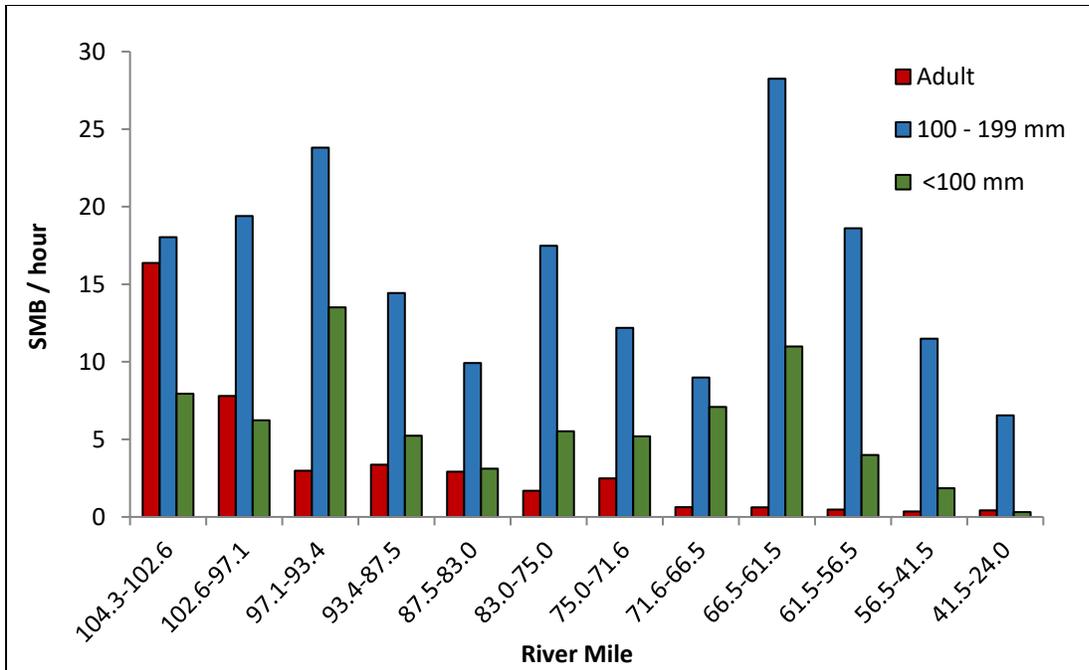


Figure 4. Catch rates for different size classes of smallmouth bass in the White River, Colorado and Utah during Project 167 passes by river reach, 2018.

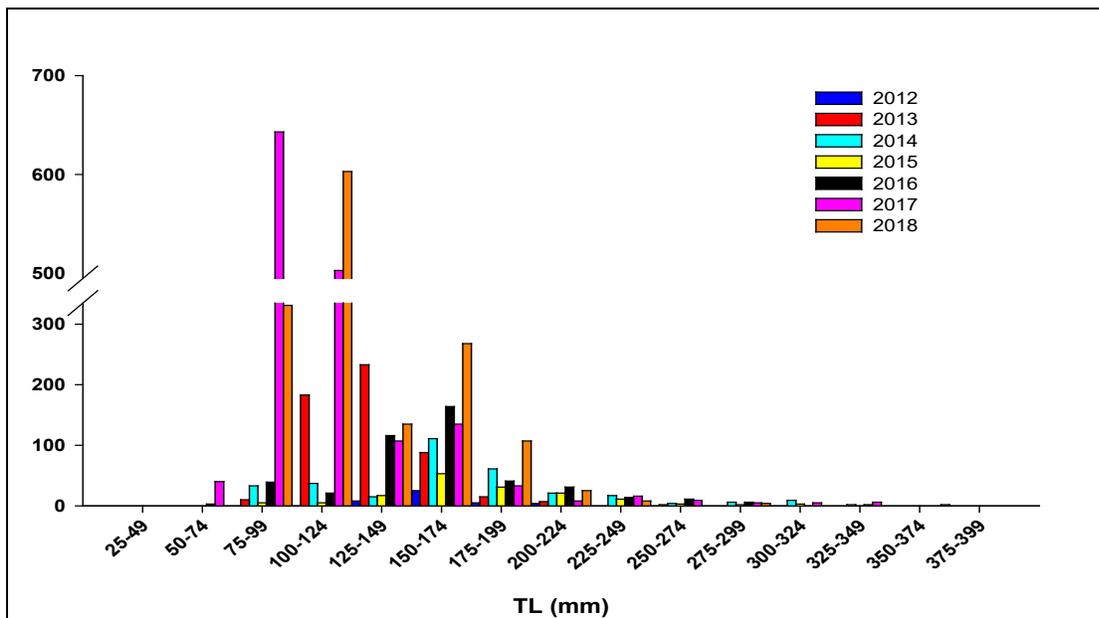


Figure 5. Length-frequency distribution of smallmouth bass collected in the Utah portion of the White River. Three 4-day passes of cataraft electrofishing were conducted from RM 66.5–24.0 in 2012, one 4-day pass from RM 75.8–24.0 in 2013, and two 4-day passes from RM 71.6–24.0 in 2014. Beyond 2014, sampling was conducted from RM 71.6–24.0 with one full pass each year and remaining effort distributed as needed in higher concentration areas; eight, 11, 12, and 9 days of total effort in 2015, 2016, 2017, and 2018 respectively.

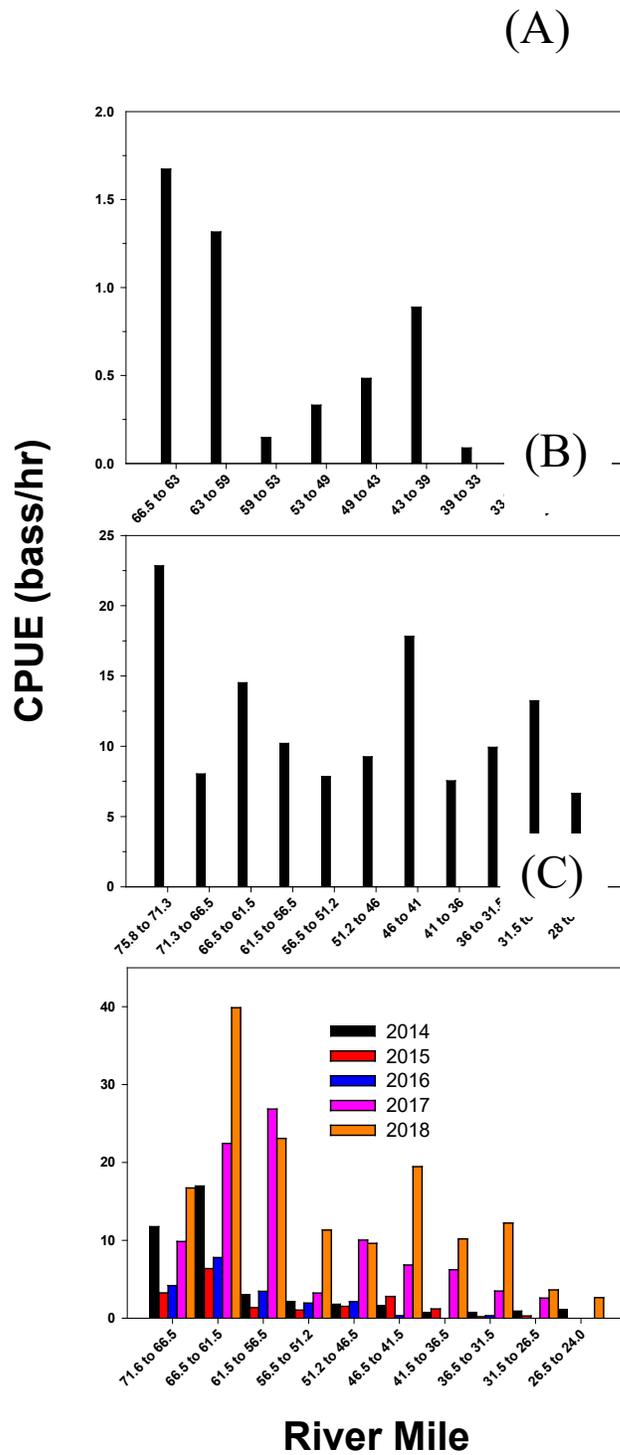


Figure 6. Catch-per-unit-effort (CPUE) of smallmouth bass collected during cataraft electrofishing in the White River in Utah from (A) three passes conducted in 2012 from RM 66.5–24, (B) one pass conducted in 2013 from RM 75.8–24, and (C) two passes conducted in 2014 from RM 71.6–24 (black bars). Beyond 2014,

one full pass was conducted from RM 71.6-24 with the remaining effort distributed as needed in higher concentration areas.

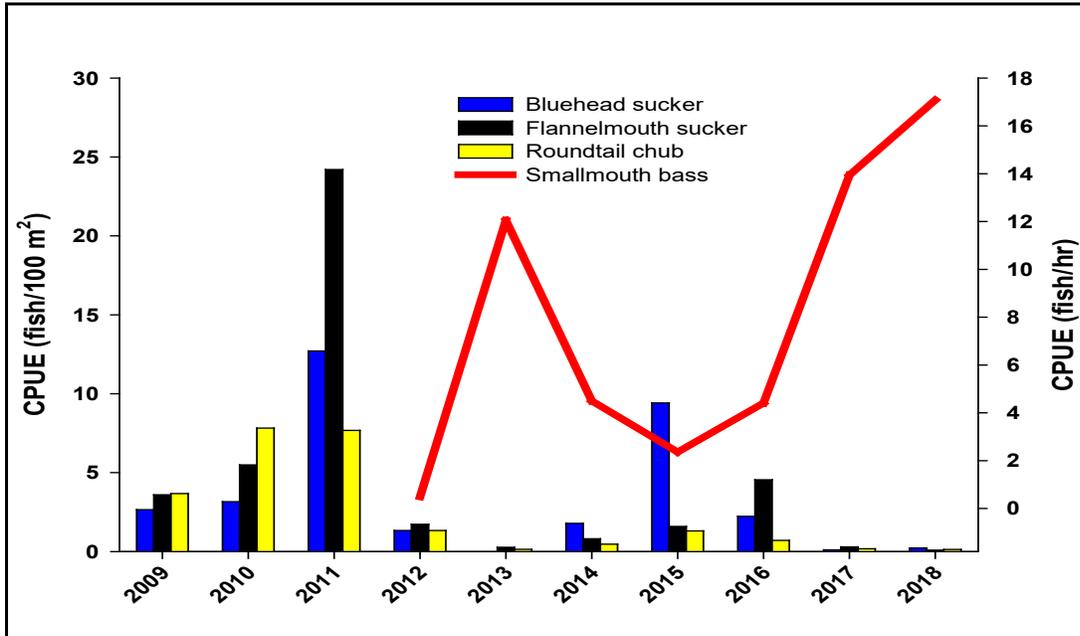


Figure 7. Catch-per-unit-effort (CPUE) of young-of-year bluehead sucker, flannelmouth sucker, and roundtail chub collected from Utah portions of the White River during annual fall seining of low-velocity habitats (left Y-axis; data from Fiorelli and Breen, In Prep) and annual CPUE of smallmouth bass (red line; right Y-axis) collected during cataraft electrofishing for Project #167 from 2012-2018 (river mile 71.6–24.0).

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: #R14AP00007

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 167

Project Title: Smallmouth bass control in the White River

Principal Investigator:

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Project/Grant Period: Start date (Mo/Day/Yr): 5/1/2014
 End date: (Mo/Day/Yr): 9/30/2018
 Reporting period end date (Mo/Day/Yr): 9/30/2018
 Is this the final report? Yes _____ No X

Performance:

Tasks 2–3 were accomplished as outlined in the scope of work for this project. From 1–15 June 2018 we completed three passes of cataraft electrofishing from river mile 71.6–24.0. Bass densities in the lower White River have increased drastically from 2016 levels, mainly due to marked differences in juveniles (smallmouth bass < 200 mm TL). We removed a total of 1,486 smallmouth bass with nine days of effort, only 41 of which were in the adult category. Annual reporting is complete under task 3 and nonnative data will be submitted to Recovery Program personnel by January 2019.

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: #R17AP00301

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 167b

Project Title: Smallmouth bass control in the White River

Principal Investigator:

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Project/Grant Period: Start date (Mo/Day/Yr): 9/22/2017
 End date: (Mo/Day/Yr): 9/30/2022
 Reporting period end date (Mo/Day/Yr): 12/31/2018
 Is this the final report? Yes _____ No X

Performance:

Task 5-Complete

- Eight removal days were conducted on the White River by CPW crews from May 22-June 11, 2018. CPW was unable to complete the final day due to low water conditions. Two 16' rafts equipped with ETS units electrofished both shorelines and all accessible backwater and slackwater habitats. Fish captured were measured in length to the nearest millimeter and weighed to the nearest gram. Reproductive condition was also assessed on all Smallmouth Bass over 200 mm in total length. All non-native, non-salmonid fish captured were lethally removed. No Colorado Pikeminnow, Razorback Sucker, or Bonytail were encountered during this project in 2018. Other native fish species, salmonid species, channel catfish and most Common Carp were not netted or handled.
- Three passes were completed from Taylor Draw Dam (river mile 104.3) to RM 97.1. One pass completed from RM 97.1- 93.4 and three passes from RM 93.4- 87.5. Additional passes were conducted by USFWS personnel and are not included in this summary.
- Ten species of non-native fish were captured and removed. Smallmouth Bass comprised 88% of the total fish removed by CPW crews. Black Bullhead, Black Crappie, Common Carp, Fathead Minnow, Northern Pike, Red Shiner, Sand Shiner, Green Sunfish, White Sucker and White Sucker hybrids were also removed.

- Total Number of Fish Captured and removed = 2,006

Species	Total Captured	% of Total Catch	Size Range
Black Bullhead	38	1.9%	95-250 mm
Black Crappie	22	1.1%	70-188 mm
Common Carp	1	<1%	89 mm
Green Sunfish	115	5.7%	38-202 mm
Northern Pike	1	<1%	691 mm
Smallmouth Bass	1,765	88%	22- 420 mm
White Sucker and Hybrids	53	2.7%	100-486 mm
Nonnative cyprinid species	11	<1%	54-84 mm
<i>Total</i>		<i>2,006</i>	

- Total effort expended= 53.67 hours

Catch per unit effort (CPUE)

Species	CPUE (fish/hour)
Black Bullhead	0.71
Black Crappie	0.41
Common Carp	0.02
Northern Pike	0.02
Smallmouth Bass	32.89
White Sucker and Hybrids	0.99
Nonnative cyprinid species	0.20

Task 6- Complete

- All data submitted to USFWS (Green River- FWCO) for data analysis August 2018.
- All data submitted to STreaMs database November 2018.