

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2020 ANNUAL REPORT

PROJECT: 123b

Project Title

Nonnative fish control in the middle Green River

Bureau of Reclamation Agreement Number:

R19AP00059

Project/Grant Period:

Start date: 10/01/2018

End date: 09/30/2023

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Is this the final report? No

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Abstract:

The purpose of this project is to remove nonnative species that pose the greatest threat to recovery of the four endangered fish in the upper Colorado River basin through predation, competition, and hybridization. Spring components of this project included electrofishing and fyke netting of tributaries and backwaters to target northern pike and white sucker, and main channel electrofishing to target walleye. Targeted smallmouth bass electrofishing took place during summer months. In 2020, we removed 52 northern pike, 17 walleye, 1,037 white sucker, and 5,492 smallmouth bass from the middle Green River. Total smallmouth bass catch rates for all size classes increased from 2019, with the 100-199 mm length class making up the largest component of the catch. Northern pike and walleye catch rates were slightly higher than 2019, but Walleye catch rates remain low compared to historical norms.

Study Schedule:

Ongoing

Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
- III.A. Reduce negative interactions between nonnative and endangered fishes.
- III.A.2. Identify and implement viable active control measures.
- III.A.2.c. Evaluate the effectiveness (e.g., nonnative and native fish response) and develop and implement and integrated, viable active control program.

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GREEN RIVER ACTION PLAN: MAINSTEM

- III. Reduce impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
- III.A. Reduce negative impacts to endangered fishes from sportfish management activities.
- III.A.4. Develop and implement control programs for nonnative fishes in river reaches occupied by the endangered fishes to identify required levels of control. Each control activity will be evaluated for effectiveness, and then continued as needed.
- III.A.4.a. Northern pike in the middle Green River.
- III.A.4.b. (3) Smallmouth bass in the middle and lower Green River.
- III.A.4.d. Walleye in the middle and lower Green River.

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

Task 1. Northern pike, white sucker, and walleye removal

We employed several strategies to reduce impacts of nonnative fish during the spring of 2020. From 15 April-12 May 2020, 18.1 hrs of electrofishing were expended to target walleye (*Sander vitreus*) in the middle Green River, and 11.8 hrs of electrofishing were reallocated to Recovery Program Project #123d on the Green River below Tusher Diversion. Tributary electrofishing to target northern pike (*Esox lucius*) and white sucker (*Catostomus commersonii*) took place from 31 March-10 June 2020 targeting Ashley Creek (river mile [RM] 299.0), Stewart Lake drain (RM 299.2), Brush Creek (RM 304.6), and backwaters at RM 299.8 and RM 301.8, comprising 15.5 hrs of effort. Fyke-netting in backwaters and tributaries to target northern pike and white sucker took place from 06 April-14 May 2020 with a total of 32 overnight sets. Fyke-netting targeted the same sites as tributary electrofishing (listed above).

Northern pike

A total of 52 northern pike were captured in 2020 in the middle Green River (RM 319.3-206.8): 24 during fyke-netting, six during smallmouth bass (*Micropterus dolomieu*) removal (see below), 19 during tributary electrofishing, and three during targeted walleye removal (Table 1). Size distribution was skewed towards larger individuals with 50 adults (≥ 300 mm total length [TL]; 96% of the total catch), 46 piscivores (≥ 375 mm TL; 88% of the total catch), and two juveniles (< 300 mm TL; 4% of the total catch). Similar to previous years, fyke-netting and electrofishing in tributaries and backwaters provided the highest catch rates for northern pike in 2020 (Table 1).

Walleye

In the middle Green River, 17 walleye were captured in 2020. Targeted walleye removal in 2020 produced 11 walleye, while smallmouth bass removal accounted for five walleye and tributary electrofishing captured a single walleye (Table 2). Although no clear walleye spawning aggregations were observed in 2020, we removed two ripe males. In 2015, spawning walleye were discovered on a cobble bar in Dinosaur National Monument between RM 319-315.8 (Schelly et al. 2015) and relatively high numbers of ripe walleye have been noted in this area in subsequent years (Staffeldt et al. 2017). All targeted walleye removal in the middle Green River in 2020 took place between RM 319-315.8.

For the second consecutive year, Utah Division of Wildlife Resources (UDWR) Moab personnel working under project #123d reported high walleye catch rates below Tusher Diversion while catch rates in the middle Green River remained relatively low (Table 2). From 26 May-28 May, UDWR Vernal reallocated effort to the lower Green River from RM 128.5-120.0, where 23 walleye were captured in

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11.8 hrs of electrofishing. To maintain consistency, effort and catch during this reallocation of effort will be included in the Recovery Program Project #123d annual report.

The size distribution of walleye removed in 2020 was skewed towards larger individuals with all 17 fish in the piscivore size class (≥ 375 mm TL; Table 2). No juvenile walleye (< 300 mm TL) were removed from the middle Green River in 2020. Captures of juvenile walleye have been rare; however, collection of juvenile and/or age-0 fish did occur in 2009 (Monroe and Hedrick 2009), 2012 (Skorupski and Breen 2012), 2013 (Harding et al. 2013), and 2017 (Staffeldt et al. 2017).

White sucker

In 2020, total white sucker captures were similar to 2019 (1,037 vs 1,027 respectively) but were lower than in 2018 and 2017, 2,169 and 1,738, respectively (Partlow et al. 2018 and 2019; Staffeldt et al. 2017). Historically, targeting tributaries and backwaters for white sucker has produced high catch rates (Skorupski et al. 2013). Electrofishing in tributaries and backwaters in 2020 produced a catch-per-unit-effort (CPUE) of 7.1 fish/hr, compared to 9.3 and 3.0 fish/hr for walleye and smallmouth bass removal, respectively (Table 3). Combining all sampling methods, an additional 13 white x flannelmouth sucker hybrids were captured along with one white x bluehead sucker hybrid (Table 4). White sucker size distribution was skewed towards smaller individuals in 2020 (mean TL = 164 mm; range = 48-447 mm). In southwestern Missouri, white suckers become mature around 275 mm (Wakefield and Beckman 2005). Because of this, our goal for removing white suckers is to reduce the proportion of the white sucker population ≥ 275 mm TL. In 2020, just 3.0% of the white suckers removed (n=31) were ≥ 275 mm TL.

Task 2. Smallmouth bass removal

Targeted smallmouth bass removal occurred from 15 June-7 October 2020. The onset of smallmouth bass removal in 2020 was determined by timing of flows, which receded below 10,000 cfs on 12 June 2020. Two full electrofishing passes were implemented in the middle Green River from Split Mountain boat ramp (RM 319.3) to Tabyago Riffle (RM 206.8). The first full pass was performed on 15 June-9 July 2020, and the second on 10-25 August 2020. Data from these passes were used to identify areas with the highest catch rates, and guide subsequent electrofishing efforts. Additionally, multi-agency crews (UDWR Vernal, UDWR Moab, and the Green River Basin Fish and Wildlife Conservation Office [GRBFWCO]) implemented the spring “surge” effort to disturb smallmouth bass spawning during the period of optimal water temperatures in Island Park (RM 333.9 to 327.6). However, rapidly declining flows prohibited the use of propeller driven jon boats in Island Park this year. Therefore, on 30 June 2020, UDWR Vernal personnel provided focused removal efforts by utilizing a three-electrode barge electrofishing unit in several pools associated with a large side channel at the upstream end of Island Park (RM 339.8). A summary of collaborative efforts in Island Park is described in the Recovery Program Project #123a annual report.

Population size structure

Between Split Mountain boat ramp and Tabyago Riffle, 5,312 smallmouth bass were removed during targeted removal. Figure 1 displays the size distribution of smallmouth bass captured in the middle Green River in 2020. Sub-adult smallmouth bass (100-199 mm TL) constituted the most abundant size class, comprising 58% of the catch (n=3,102). Adult bass (≥ 200 mm TL) made up 29% (n=1,517) of smallmouth bass removed, while juvenile smallmouth bass (< 100 mm TL) accounted for 13% (n=693) of all bass removed. Of the total 2020 smallmouth bass catch, 1.4% (n=75) were in the piscivore size class (≥ 325 mm TL). The average TL of smallmouth bass in 2020 was 171.6 mm; a bimodal

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distribution of bass lengths can be observed in Figure 1 with cohorts identified by modes around 175 mm and 250 mm, indicating that the abundant sub-adult size class encountered in previous years are recruiting to adults. Including smallmouth bass removed during walleye removal (n=117) and tributary electrofishing (n=63), a total of 5,492 bass were removed in 2020.

Catch rate

A combined CPUE of 20.88 fish/hr during targeted smallmouth bass removal represents an increase from 2019 and 2018 (10.47 and 17.19 fish/hr, respectively). In 2020, CPUE for juvenile smallmouth bass (< 100 mm TL) was 2.72 fish/hr, while CPUE for sub-adult (100-199 mm TL) and adult (\geq 200 mm TL) smallmouth bass was 12.19 fish/hr and 5.96 fish/hr, respectively (Figure 2). Furthermore, CPUE for smallmouth bass in the piscivore size class (\geq 325 mm TL) was 0.29 fish/hr (Figure 3). Catch rates for all size classes of smallmouth bass have increased from levels encountered in 2019 (Figures 2 and 3). The spatial distribution of catch rates in 2020 (Figure 4) was characterized by a general increase in the downstream direction. The highest concentration of juveniles occurred near the Ouray National Wildlife Refuge in section K-N (RM 270.8-250.8). Particularly high sub-adult catch rates were encountered near Pariette Wash in section R (RM 235.8-230.8).

Catch rates by month generally increased for all size classes throughout the season (Figure 5). Sub-adult and adult catch rates began increasing in July while adult rates began increasing in August. Juvenile and sub-adult rates decreased in the month of October while adult rates remained relatively unchanged from September. The increase in CPUE later in the season could be an artifact of targeting concentration areas determined by previous full-pass sampling and an increased susceptibility as juveniles recruited to our gear later in the year.

Movement

Currently there are no mark-recapture studies conducted by UDWR Vernal. One floy-tagged smallmouth bass was captured in 2020. A 197 mm TL bass was captured at RM 315.8 on 12 May 2020 with a green USFWS floy tag #21127. This fish was likely tagged between Echo Park and Split Mountain, under Recovery Program Project #123a. Data has been provided to Project #123a investigators and will be submitted to the STReAMS database.

Additional noteworthy observations:

- Ancillary captures—Table 4 lists additional nonnative fishes removed and native fishes released alive during all sampling efforts in the middle Green River in 2019. All native fish data will be submitted to the STReAMS database.
- A concentration of adult smallmouth bass was encountered in Ashley Creek during spring tributary electrofishing where 32 large adult bass (mean TL=348 mm; range=263-449 mm) were captured. Water temperatures in lower Ashley Creek are generally warmer than main channel temperatures in the spring and may provide a thermal refuge for breeding smallmouth bass or gonadal development.

Recommendations:

- With promising results suggesting local smallmouth bass population suppression after multiple years of using two full passes to direct intensive fishing efforts at hotspots, we recommend a continuation of this approach in 2021.

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- Continue targeting riffles where walleye have been observed spawning (e.g., Dinosaur National Monument) whenever personnel and equipment are available. In 2016, a concentration of walleye was discovered between the White River confluence and Sand Wash, thus we still recommend monitoring this area during spring sampling in 2021.
- In 2020, UDWR Vernal reallocated three days of effort to assist with project 123d below Tusher Diversion where UDWR Moab reported high walleye catch rates (C. Michaud, UDWR, personal communication). In just 11.8 hrs of electrofishing, UDWR Vernal removed more walleye than in the entirety of the middle Green River in 2020 (23 vs. 17 respectively). We recommend that some flexibility be maintained to allow us to repeat such reallocations in the future if similar situations arise.
- UDWR Vernal had success using a barge electrofisher to assist with the Island Park surge efforts. In 1.25 hrs of electrofishing, we removed 32 smallmouth bass. Considering that Island Park is safely accessible by propeller driven jon boats only at flows above approximately 8,000 CFS, it may be unlikely that our boats will ever be effective at disturbing nesting bass as the majority of side channels are actively flowing at those levels. We recommend continuing to explore other gear options such as a barge electrofisher once flows have receded to the point that low-velocity habitat suitable for spawning is present or accessing the area via rafts launched at Echo Park.

Project Status:

On track, ongoing.

FY 2020 Budget Status

Funds Provided: \$266,717

Funds Expended: \$266,717

Difference: -0-

Percent of the FY 2020 work completed, and projected costs to complete: 100%

Recovery Program funds spent for publication charges: -0-

Status of Data Submission

Data will be uploaded into STReAMS by the end of December, 2020

Signed:

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Principal Investigators

11/12/2020

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Table 1.

Total captures, catch-per-unit-effort (CPUE; electrofishing [fish/hr] and fyke-netting [fish/overnight set]), and total length (TL; mm) means and ranges of northern pike for four sampling phases in the middle Green River during 2020.

Project	Captures	Electrofishing CPUE	Fyke CPUE	Mean TL	Range TL
Tributary electrofishing	19	1.22	-	628.9	437-783
Tributary fyke-netting	24	-	0.77	595.8	407-810
Walleye removal	3	0.17	-	553.3	515-625
Smallmouth bass removal	6	0.02	-	484.0	170-820

Table 2.

Total captures, catch-per-unit-effort (CPUE; electrofishing [fish/hr] and fyke-netting [fish/overnight set]), and total length (TL; mm) means and ranges of walleye for four sampling phases in the middle Green River during 2020.

Project	Captures	Electrofishing CPUE	Fyke CPUE	Mean TL	Range TL
Tributary electrofishing	1	0.06	-	351	-
Tributary fyke-netting	0	-	0.000	-	-
Walleye removal	11	0.61	-	524.5	441-674
Smallmouth bass removal	5	0.02	-	531.8	469-564

Table 3.

Total captures, catch-per-unit-effort (CPUE; electrofishing [fish/hr] and fyke-netting [fish/overnight set]), and total length (TL; mm) means and ranges of white sucker for four projects conducted in the middle Green River during 2020.

Project	Captures	Electrofishing CPUE	Fyke CPUE	Mean TL	Range TL
Tributary electrofishing	110	7.08	-	149.2	71-401
Tributary fyke-netting	2	-	0.06	286.5	242-331
Walleye removal	168	9.30	-	149.7	80-337
Smallmouth bass removal	757	2.98	-	168.5	48-359

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Table 4.

Additional nonnative species removed and native species released alive during all sampling efforts in the middle Green River in 2020.

Species	Captures
Black crappie	3
Brown trout	14
Creek chub	3
Green sunfish	347
Rainbow trout	27
White X bluehead sucker hybrid	1
White X flannelmouth sucker hybrid	13
Yellow perch	1
Bonytail	6
Colorado pikeminnow	26
Humpback chub	1
Roundtail chub	4
Razorback sucker	84

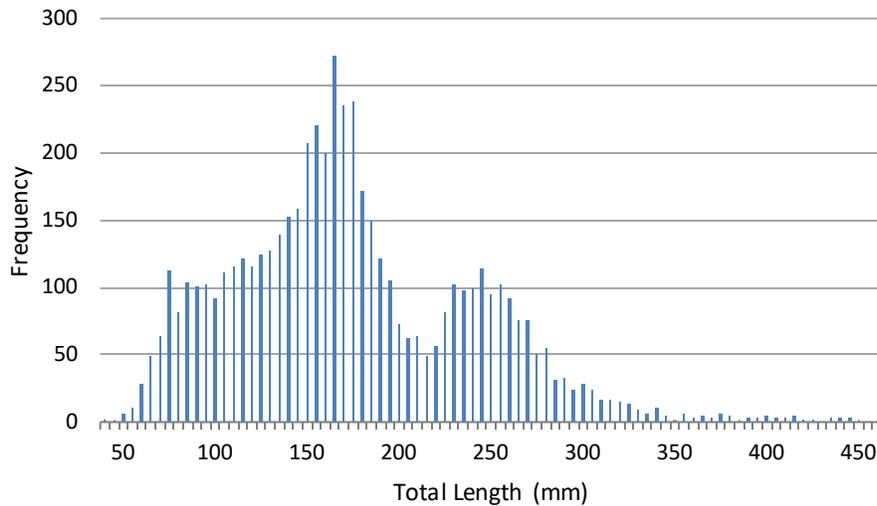


Figure 1.

Size distribution of smallmouth bass electrofishing captures in the middle Green River during 2020; includes captures during tributary electrofishing, targeted walleye, and smallmouth bass removal efforts.

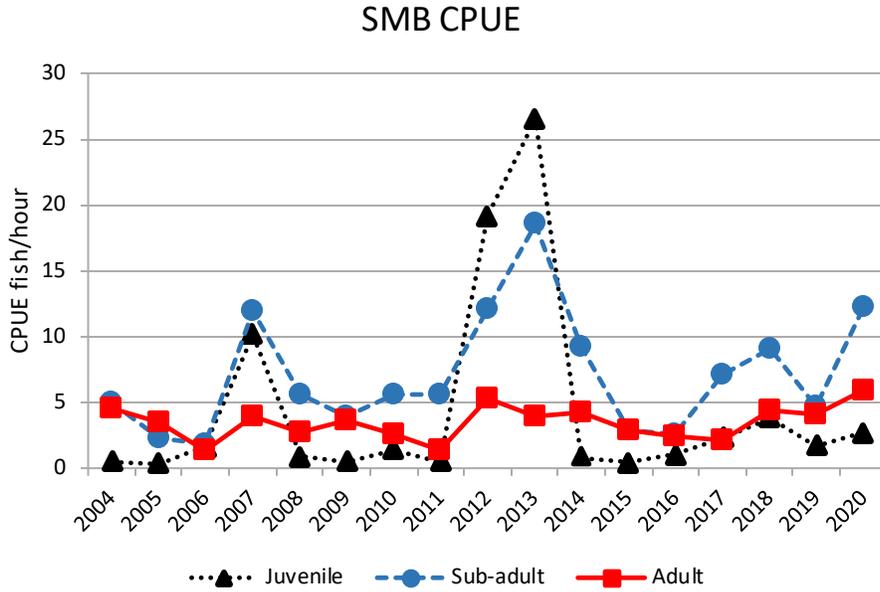


Figure 2. Catch-per-unit-effort (CPUE; fish/hr) of juvenile (< 100 mm total length [TL]), sub-adult (100-199 mm TL), and adult (\geq 200 mm TL) smallmouth bass (SMB) in the middle Green River during targeted smallmouth bass removal, 2004-2020.

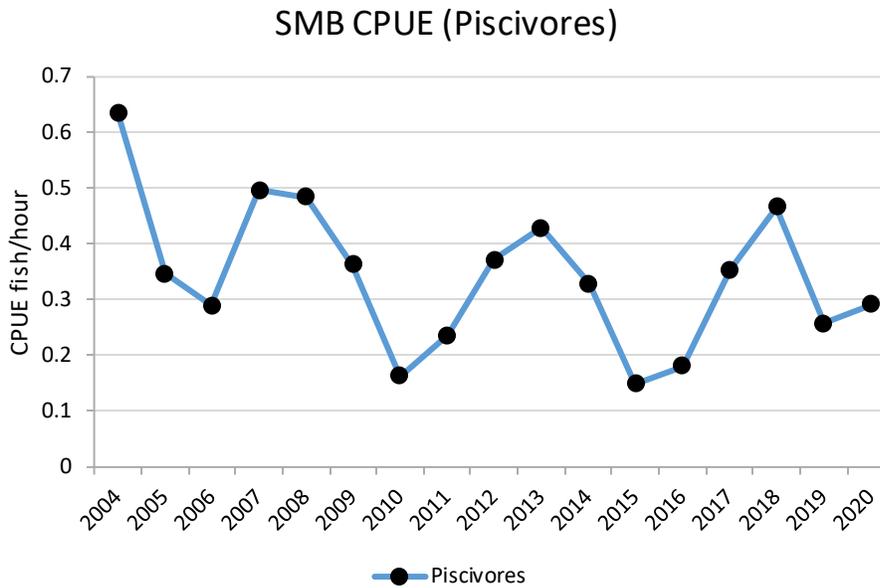


Figure 3. Catch-per-unit-effort (CPUE; fish/hr) of piscivore (\geq 375 mm total length) smallmouth bass (SMB) removed from the middle Green River during targeted smallmouth bass removal, 2004-2020.

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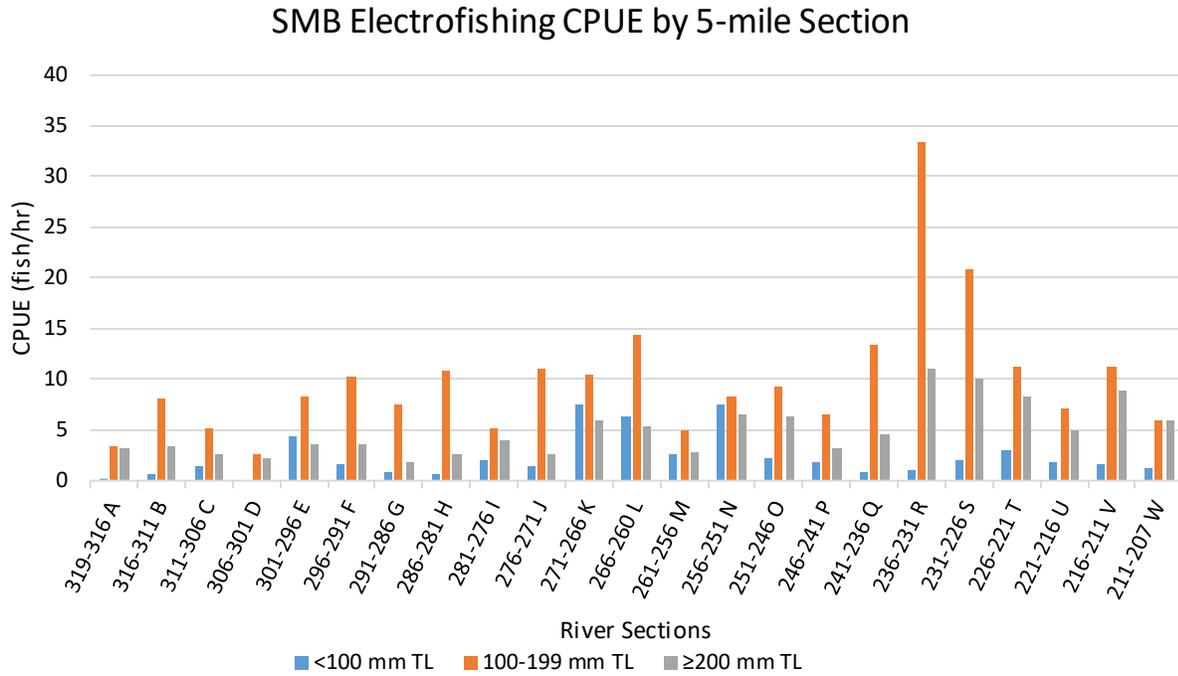


Figure 4. Smallmouth bass (SMB) juvenile (< 100 mm total length [TL]), sub-adult (100-200 mm TL), and adult (> 200 mm TL) catch rates from Split Mountain boat ramp (A) to Tabayago Riffle (V) in the middle Green River, 15 June – 7 October 2020.

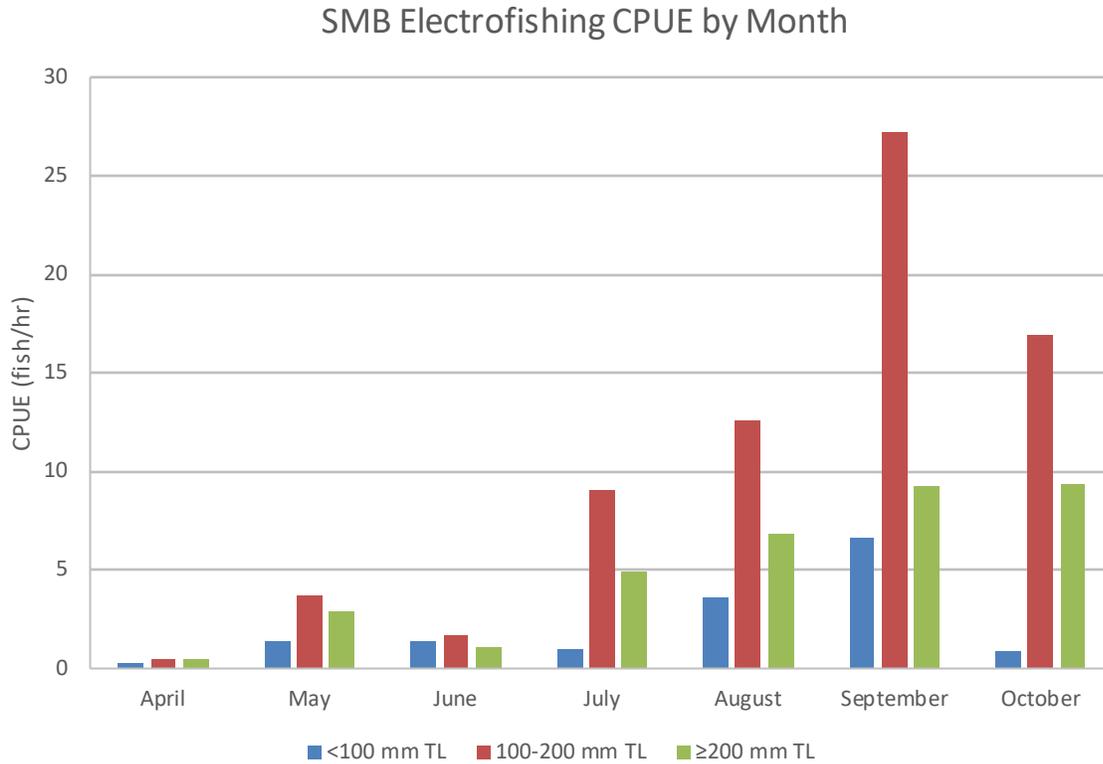


Figure 5. Smallmouth bass juvenile (< 100 mm total length [TL]), sub-adult (100-200 mm TL), and adult (> 200 mm TL) catch rates by month in the middle Green River in 2020. Catch-per-unit-effort (CPUE) in April and May correspond to walleye removal (spring fyke netting and tributary electrofishing excluded for data consistency); CPUE from 15 June–7 October correspond to sampling that targeted smallmouth bass.