

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2023 ANNUAL REPORT

PROJECTS: FR-115, 123a, 123b, 123d, 126a, 126b, 128

Project Title

Walleye Management in the Upper Colorado River Basin

Bureau of Reclamation Agreement Numbers and Grant Periods:

Utah Division of Wildlife Resources, R14AP0059 (10/01/2019-09/30/2024)

U.S. Fish and Wildlife Service R20PG00024 (10/01/2019-9/30/2024)

Colorado Parks and Wildlife, R23AP00309 (6/05/2023-9/30/2027)

Colorado State University, R19AP0058 (10/1/2018-9/30/2023)

Is this the final report? Yes No

Principal Investigators:

Sam Brockdorff, Utah Division of Wildlife Resources-Moab Field Station
spbrockdorff@utah.gov

Travis Francis, U.S. Fish and Wildlife Service Grand Junction FWCO
travis_francis@fws.gov

Anna Amidon, Utah Division of Wildlife Resources- Moab Field Station
aamidon@utah.gov

Katherine Lawry, U.S. Fish and Wildlife Service Green River Basin FWCO
katherine_lawry@fws.gov

Christian Smith, U.S. Fish and Wildlife Service Green River Basin FWCO
christian_t_smith@fws.gov

Saidee J. Hyder, Utah Division of Wildlife Resources - Vernal
shyder@utah.gov

Michael S. Partlow, Utah Division of Wildlife Resources - Vernal
mpartlow@utah.gov

Edward Kluender, Colorado State University Larval Fish Laboratory
edward.kluender@colostate.edu

Kevin R. Bestgen, Colorado State University Larval Fish Laboratory
kbestgen@colostate.edu

Abstract:

During the 2023 field season, researchers removed 116 walleye from the Upper Colorado River Basin as targeted and ancillary captures associated with Projects FR-115, 123a, 123b, 123d, 126a, 126b, and 128. This represents a collaborative effort of researchers from multiple Utah Division of Wildlife Resources offices, United States Fish and Wildlife Service offices, Colorado Parks and Wildlife, and the Colorado

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

State University Larval Fish Lab. Seventy-six of the walleye removed came from the Green River sub-basin through a combination of electrofishing (.04 fish/hr.) and fyke netting (.02 fish/hr.) effort. The remaining 40 walleye (.06 fish/hr.) were removed from the Colorado River sub-basin, all from the targeted nonnative removal efforts of Projects 123d and 126a. This season's catch represents approximately one-third of that removed last year and is notably the lowest basin wide catch since 2010 (Figure 1). While overlap with non-targeted projects continues to account for a large portion of the total catch in the Upper Colorado River Basin, 79% of the total catch came from targeted electrofishing efforts. For the purpose of this report, "targeted" efforts will refer to projects which utilize adaptive spatial and temporal techniques to optimize walleye catch rates. While this primarily pertains to the efforts of Projects 123d and 126a, components of Project 128 which occurred in sections of river that have historically received "targeted" walleye removal pressure will also be considered as such. Projects FR-115, 123a, 123b, and 126b that do not specifically target walleye will be considered "non-targeted".

Study Schedule:

2014-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.I. Reduce walleye numbers through all means practicable (including targeted removal) in riverine habitats throughout the UCR Basin.

GREEN RIVER ACTION PLAN: MAINSTEM

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.d. Walleye in the middle and lower Green River

COLORADO RIVER ACTION PLAN: MAINSTEM

III.A. Develop and implement control programs in reaches of the Colorado River occupied by endangered fishes.

III.A.8. Walleye in the Colorado River.

Accomplishment of FY 2023 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Removal Efforts

Colorado River Sub-basin

Colorado River Mainstem

Researchers from the Utah Division of Wildlife Resources (UDWR), United States Fish and Wildlife Service (FWS), and Colorado Parks and Wildlife (CPW) completed 622.69 hours of electrofishing through the Colorado River sub-basin during the 2023 field season, resulting in the removal of 40 walleye (.064 fish/hr.)(Table 1). Walleye are targeted in the upper Colorado River from lower Westwater Canyon to Potash. This effort has been broken down into four sections where walleye are

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

currently encountered. The four sections are: 1. lower Westwater Canyon (RM 116.6) to Fish Ford (RM 104), 2. Coats Creek (RM 103.9) to Dewey Bridge (RM 94.6), 3. Dewey Bridge (RM 94.5) to Takeout Beach (RM 74.2), and 4. Takeout Beach (RM 74.1) to Potash (RM 47.2). All walleye removed from the Colorado River this field season came from 243.46 hours of targeted electrofishing within these sections, yielding a CPUE of .16 fish/hour. Work was completed between March 13th and October 23rd representing a total of 33 unique samples. UDWR Moab Field Station completed three days of removal effort combined with new seasonal training between April 19th and May 9th as river discharge rose from 3480 cfs to 27,500 cfs (Figure 2). Work was completed between RM 72 and RM 70. During this window, two walleye were captured and removed from the allocation of 2.33 hours of electrofishing (.86 fish/hr.). The 38 remaining walleye were removed from the mainstem of the Colorado River in association with the targeted electrofishing efforts of Project 126a (.16 fish/hr.). This work was completed by FWS-GJ, between the dates of April 13th and October 20th. Mean total lengths were similar to recent years at 525 mm and ranging between 387 and 633 mm (Figure 3). An additional 81 hours of electrofishing was completed on the mainstem of the Colorado River in association with Projects 131 and UT-3SP. No walleye were removed in association with these two projects. All electrofishing effort completed on the mainstem of the Colorado River is depicted in Figure 4. An apparent shift in walleye densities between early and late season sampling is also apparent. Field crews encountered catch rates of approximately 0.3 walleye per hour between Takeout Beach and Potash early in the season, however, as the field season progressed these higher catch rates shifted upstream towards Westwater Canyon (Figure 5). While much of the riverine walleye behavior in this basin have been thought to be the result of spawning behaviors, the trend of fish concentrations moving upstream through the season may indicate other drivers. This could be related to feeding behavior and fluctuations in population densities of prey species including gizzard shad. No walleye were encountered upstream of Westwater Canyon. Three walleye in spawning condition (7.5% of the total catch) were encountered in the Colorado River during the 2023 field season with 67% of the ripe fish being male.

Dolores River

FWS-GJ allocated .62 hours of electrofishing to investigate the bottom ½ mile of the Dolores River on June 28th in association with Project 126a, targeted nonnative removal. This effort did not yield any walleye captures (Table 2).

Gunnison River

During the 2023 field season, researchers from FWS-GJ completed 15.9 hours of non-targeted walleye removal on the lower Gunnison River (RM 3-0.7). Work was completed between June 16th and October 19th and entailed 14 unique samples. Through this effort zero walleye were encountered.

Green River Sub-basin

During 2023, researchers encountered 76 walleye throughout the Green River sub-basin. However, similar to previous years, no walleye were encountered within the White River or the Yampa River upstream of the lower Yampa Canyon reach. Field crews removed 74 walleye as targeted and ancillary catch through 2,102.8 hours of electrofishing within the sub-basin (Table 3). Basin wide catch rates were 0.04 fish/hour, down from 2022 (0.1 fish/hour). Sampling within the sub-basin began on March 15th and continued through September 21st, in association with Projects 98a, 98b, 110, 125, FR-115, 123a, 123b, 123d, and 128. River discharge fluctuated between 3,430 and 40,400 cfs (Figure 7). Walleye ranged in size from 315 mm to 705 mm with an average size of 481mm (Figure 8). In addition, two walleye were removed through a fyke netting component of Project 123b.

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Green River Mainstem

A total of 1,063.13 hours of electrofishing was completed on the mainstem of the Green River during the 2023 field season resulting in the removal of 71 walleye (Figure 9). This yielded an overall catch rate of .07 fish per hour, however significant variation in catch rate occurs across the system (Figure 10) with 71% of the total catch coming from downstream of the Tusher Diversion. Additionally, a total of 96 hours were spent fyke netting on the middle Green River in association with Project 123b. Netting effort focused around the mouth of Brush Creek (RM 304.6) resulted in the removal of two walleye (.02 fish/hr.).

Walleye encounters on the Green River began increasing in 2007 and, although they have leveled off in recent years, encounters remain at noteworthy levels. Historically, both the middle and lower Green River yielded higher catch rates and a greater number of encounters than other reaches within the sub-basin. However, in recent years CPUE has remained relatively constant on the lower Green and declined on the middle Green. Managers consider both reaches critically important for Colorado pikeminnow recovery because they serve as nursery habitat for younger age classes. Survival of young age classes is important to preserve recruitment into the adult population.

Consistent with past years, catch rates were higher in the spring than summer within the Green River sub-basin. Overall, the size structure and distribution supports the assumption that the lotic walleye population is not able to consistently recruit at this time and is therefore supported by escapement from, primarily, the Lake Powell population.

Yampa River

A total of 662 hours of electrofishing was completed on the Yampa River during the 2023 field season in association with Projects 98a, 98b, 110, 125, and 128. All electrofishing effort was completed between April 19th and July 28th with temperatures rising from 1.6 C to 22 C. Through these various projects, a total of two walleye were encountered (.003 fish/hr.). Similar to previous years, all walleye encountered this year were in the lower Yampa River (RM 46.8-0). A total of 191 hours of electrofishing occurred in this stretch, reflecting a CPUE of .01 (Table 4). A similar amount of effort completed on the lower Yampa last year resulted in the removal of two walleye as well.

White River

A total of 377 hours of electrofishing effort was completed on the White River during the 2023 field season. Work was completed between April 25th and August 11th in association with Projects 167 and 128. No walleye were removed from the White River during the 2023 field season.

Duchesne River

One day of targeted nonnative removal occurred in the lower Duchesne River (RM 4-0) in association with Project 123b. Work was completed on June 5th with a main channel temperature of 13.9° C. A total of 3.1 hours of electrofishing effort occurred, resulting in the removal of 1 walleye (.32 fish/hr.).

Task 2: Data Management, analysis, and reporting

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Data were submitted to the database manager on November 1, 2023. This report will serve as a compilation of data collected in association with multiple projects.

Additional noteworthy observations:

The removal of 116 Walleye from the Upper Colorado River Basin this year not only represents a marked decline from 2022's catch of 423, but is in fact the lowest catch dating back to 2010 (Figure 1). Not only was there a drastic decline in total catch when compared to last year, but the catch rate declined as well from .14 fish per hour to .04. This decline is similarly reflected when breaking the basin down into sub-basins. This season on the Green River, researchers experienced peak flows approximately 10,000 cfs higher (USGS gage 09315000) than in 2022, with a difference of nearly 20,000 cfs at peak flow on the Colorado River (USGS gage 09185600). This high water season could have played a role in suppressing walleye movement and use of the riverine system. Additionally, high water can have a negative impact on researchers' electrofishing efficacy. One section that saw a rise in catch rate is Tower Park on the lower Green. This section has not historically been recognized as a walleye hotspot, however, this year's catch rates were the third highest across the basin. The outflow of Millard Canyon within this section is one of the only areas of the lower Green other than the Tusher Diversion that has shallow, gravelly habitat that may be conducive for walleye spawning, and consideration should be made for further sampling of this section.

Researchers encountered no juvenile (<300mm) walleye during the 2023 field season (Figure 6, 11). Historically, the notable lack of age-0 walleye supports the assumption that this species has not consistently reproduced or recruited successfully in the riverine system, however the capture of 15 juvenile walleye during the 2022 field season may indicate a change in this presumed pattern. In the lower Green River alone, this represented three times as many juvenile captures as the previous eight years combined. While this trend did not continue into 2023 it warrants future monitoring.

No walleye encountered this season contained PIT tags associated with Colorado Basin native fish.

Recommendations:

- Continue targeted walleye removal in reaches that have historically produced the highest catch rates of walleye:
 - Lower Green River immediately below Tusher Diversion.
 - Lower Colorado River between lower Westwater Canyon and Fish Ford.
 - Lower Duchesne River, during spring peak flows when passage is possible.
- Consider investigating and/or increasing effort in reaches with recently elevated catch rates of walleye:
 - Lower Green River in Labyrinth Canyon and Tower Park.
 - Lower Colorado River between Takeout Beach and Potash.
 - Lower Colorado River between Fish Ford and Potash.
- Consider investigating and/or increasing effort in reaches that received no targeted or ancillary walleye removal effort in 2023
 - Lower Colorado River from Potash to the confluence with the Green River.
- Targeted walleye removal efforts on the White River and Upper Yampa River are not warranted but ancillary captures through ongoing projects should continue.

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

- Removal should be conducted in the spring through early summer to correspond with spawning movements, or when justified by noteworthy catch rates.
- Continue walleye removal as a component of existing projects, especially those which utilize similar fishing techniques to those targeted towards walleye.
- Maintain spatial and temporal flexibility in the application of effort across all nonnative removal projects. This will allow investigators to reallocate effort to areas containing high densities of problematic nonnative fish species.

Status of Data Submission

Compiled data was submitted to the database manager by November 2023.

Signed:

Sam Brockdorff
Principal Investigator
11/29/2023

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Table 1: Colorado River sub-basin effort summary by gear type

Gear Type	Start Date	End Date	Effort (hrs.)	Number of Walleye	CPUE
Electrofishing	3/13/2023	10/23/2023	622.69	40	.06
Fyke Net	3/20/2023	7/18/2023	1447.1	0	0
Gill Net	3/20/2023	9/25/2023	3434.5	0	0
Trammel Net	4/18/2023	10/26/2023	160.3	0	0
Hoop Net	8/29/2023	9/8/2023	925.2	0	0

Table 2: Colorado River electrofishing effort by reach

Reach	River Mile	Effort (hrs.)	Number of Walleye	CPUE
Silt to Rifle	248-240.1	6.01	0	0
Rifle to Rulison	240-230.1	3.53	0	0
Rulison to Parachute	230-222.2	8.33	0	0
Debeque to Beavertail Tunnel	209.6-195.7	2.12	0	0
GVWU Dam to Cameo	193.7-189.8	5.47	0	0
Price Stubb to Riverbend Park	187.9-184.2	14.58	0	0
Riverbend Park to Corn Lake	184.1-177.4	44.64	0	0
Corn Lake to Redlands Parkway	177.3-166.7	83.54	0	0
Redlands Parkway to Fruita State Park	166.6-157.1	67.61	0	0
Fruita State Park to Loma Boat Launch	157-152.6	26.49	0	0
Loma Boat Launch to Fault Line 2	152.5-139	24.00	0	0
Fault Line 2 to Westwater Ranger Station	138.9-127.6	12.54	0	0
Westwater Ranger Station to Westwater Wash	127.5-124.8	3.84	0	0
Lower Westwater Canyon to Fish Ford	116.6-104	70.23	18	.26
Dolores River	.5-0	.62	0	0
Coats Creek to Dewey Bridge	103.9-94.6	40.31	3	.07
Dewey Bridge to Takeout Beach	94.5-74.2	86.94	7	.08
Takeout Beach to Potash	74.1-47.2	78.15	12	.15

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Table 3: Green River sub-basin effort summary by gear type

Gear Type	Start Date	End Date	Effort (hrs.)	Number of walleye	CPUE
Electrofishing	3/15/2023	9/21/2023	2102.83	74	.04
Fyke Net	5/30/2023	6/1/2023	96	2	.02
Gill Net	4/19/2023	4/24/2023	385.8	0	0
Trammel Net	6/6/2023	9/27/2023	227.7	0	0

Table 4: Green River electrofishing effort by reach

Reach	River Mile	Effort (hrs.)	Number of walleye	CPUE
Upper Green River	412.7-364.8	0	0	0
Lodore Canyon	364.7-346.3	25.55	1	.04
Upper Yampa River	213.6-189.2	0	0	0
Middle Yampa River	189.1-46.9	471.15	0	0
Lower Yampa River	46.8-0	190.93	2	.01
Whirlpool Canyon	346.2-335.9	127.78	2	.02
Island and Rainbow Parks	335.8-328.6	119.39	1	.01
Split Mountain Canyon	328.5-321.3	70.64	2	.03
Jensen	321.2-300.1	68.47	1	.01
Upper middle Green River	300-260	87.23	5	.06
Ouray	259.9-240	44.69	0	0
White River	104.3-0	377.62	0	0
Duchesne River	4-0	3.08	1	.32
Lower middle Green	239.9-190.7	115.79	2	.02
Desolation Canyon	190.6-157.9	42.72	0	0
Gray Canyon	157.8-129.5	59	5	.08
Tusher Diversion	129.4-96.6	68.05	20	.29
Labyrinth Canyon	96.5-34.2	147.49	21	.14
Tower Park	34.1-19.8	34.86	7	.20
Stillwater Canyon	19.7-0	51.47	4	.08

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

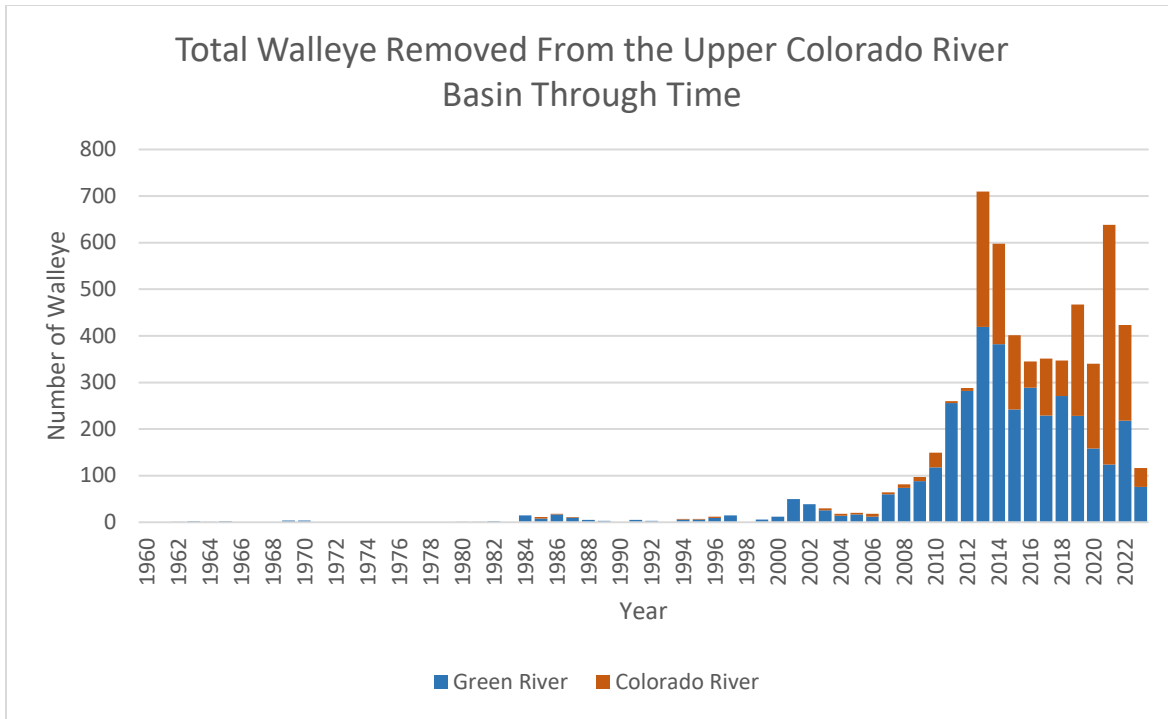


Figure 1: Total walleye removed from the Upper Colorado River basin through time

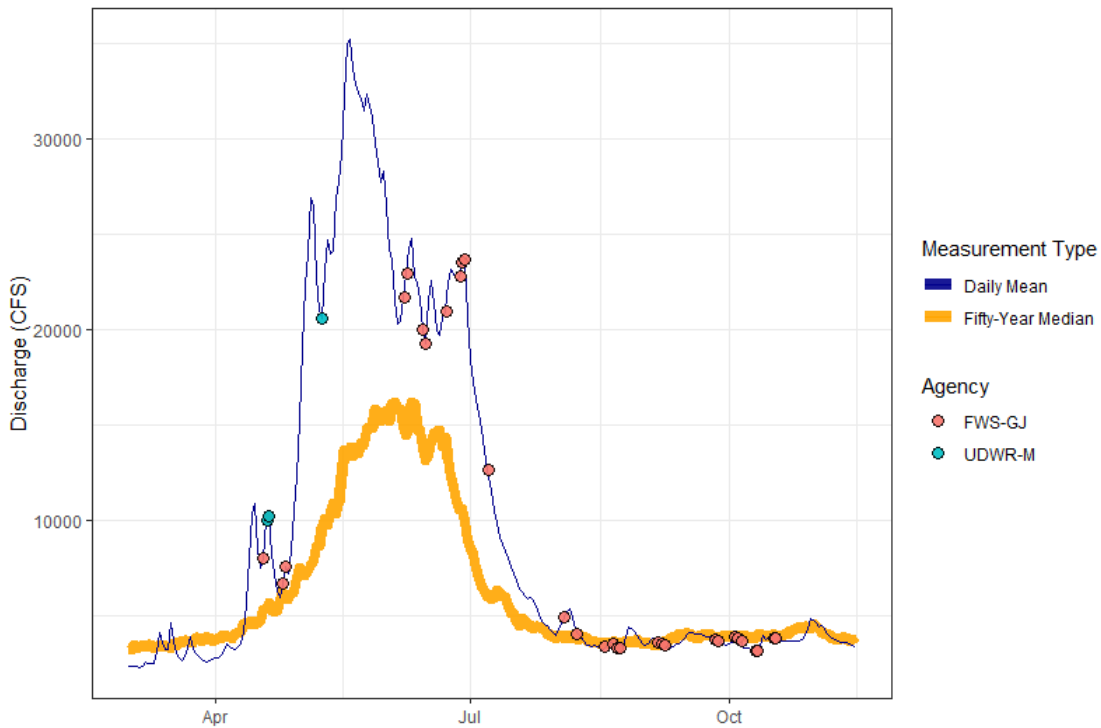


Figure 2: Colorado River targeted removal days and hydrologic conditions

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

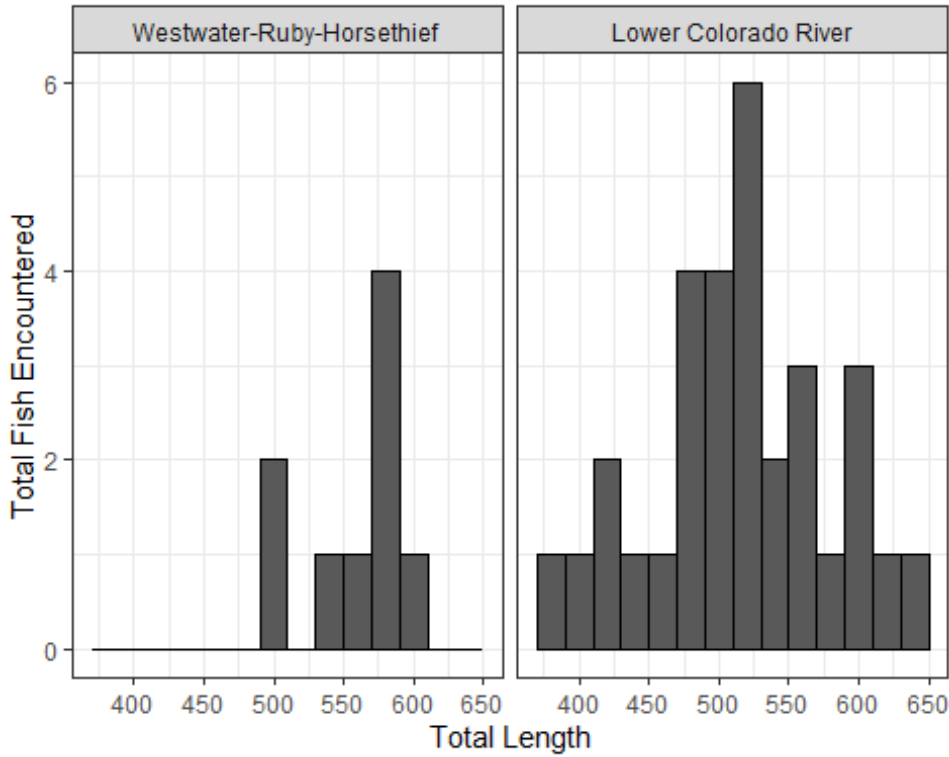


Figure 3: Length frequency of all walleye encounters in the Colorado River sub-basin

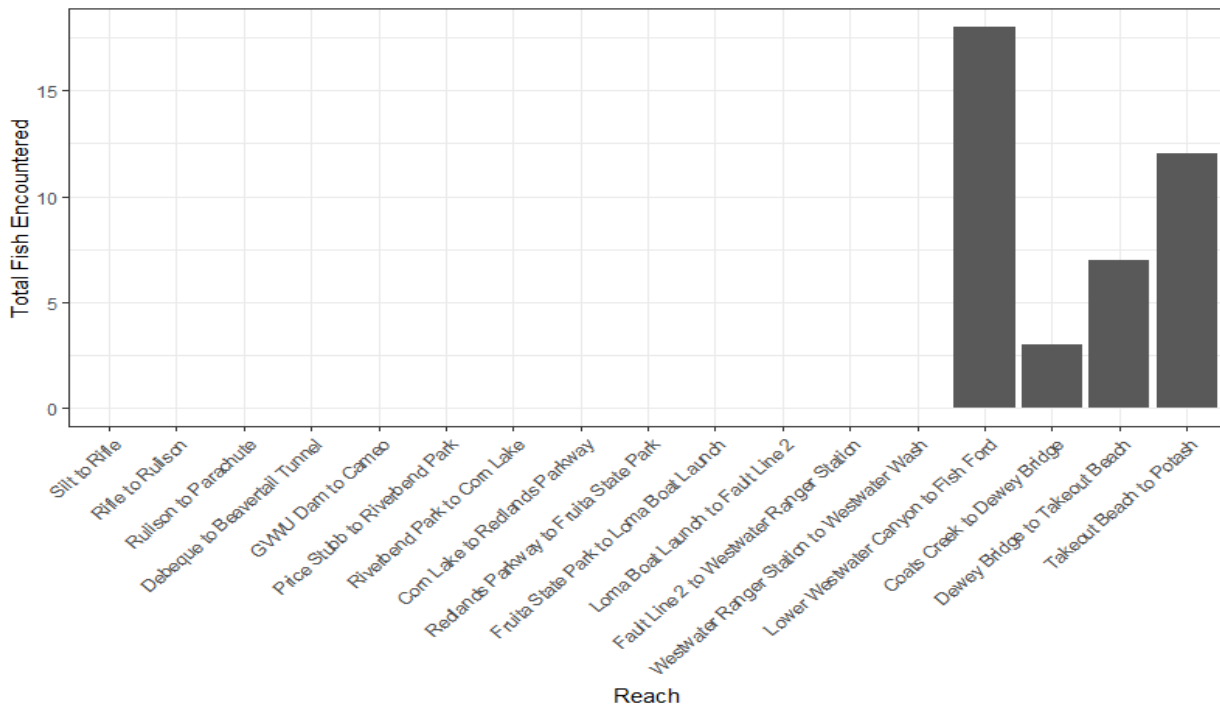


Figure 4: Total captures by removal reach on the Colorado River, includes all efforts

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

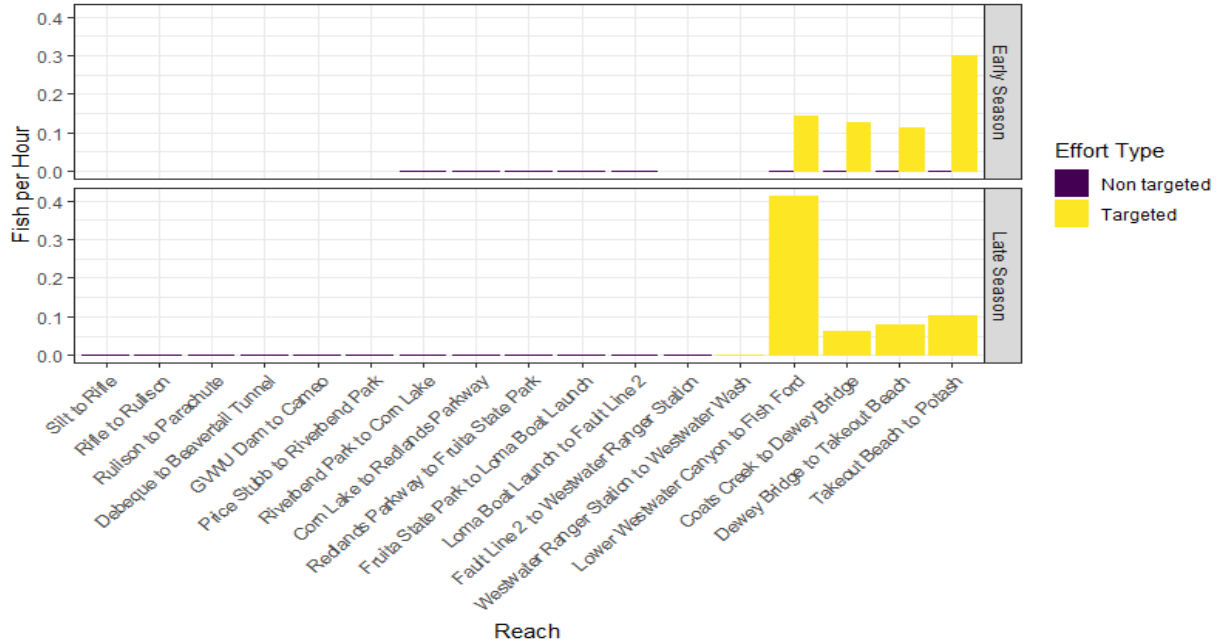


Figure 5: Electrofishing CPUE by reach, season, and effort type on the Colorado River

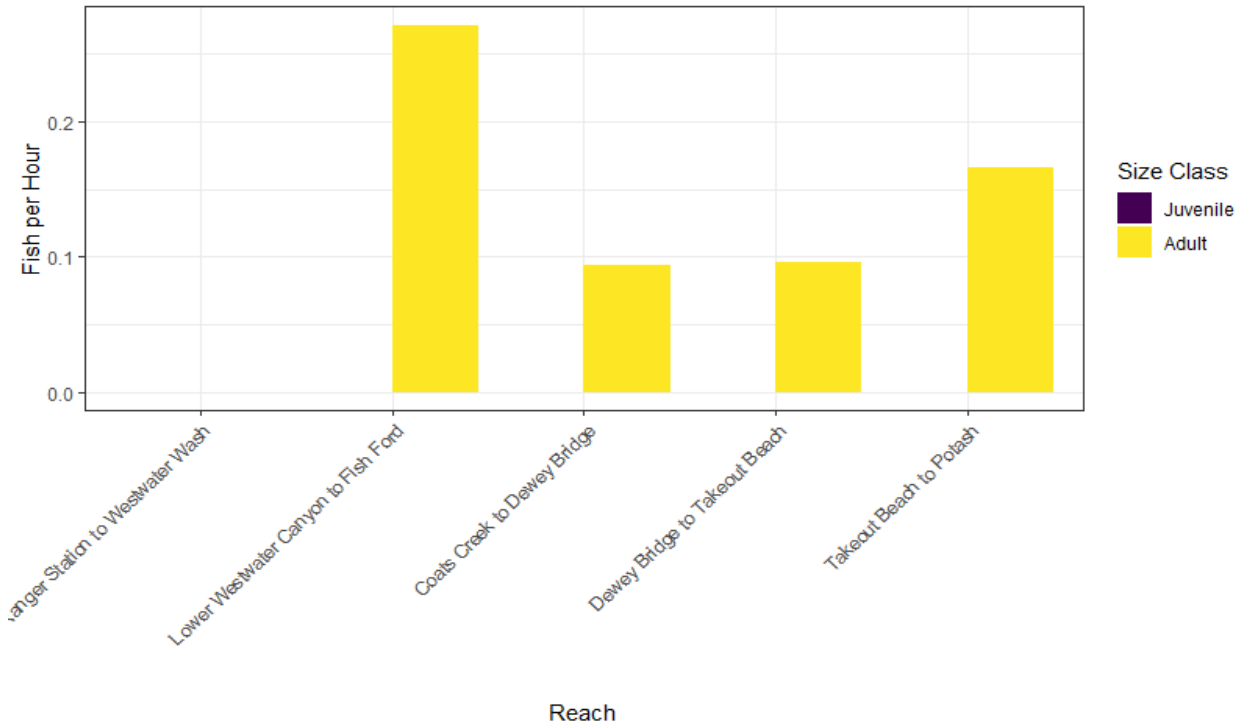


Figure 6: Targeted electrofishing CPUE by reach and size class on the Colorado River

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

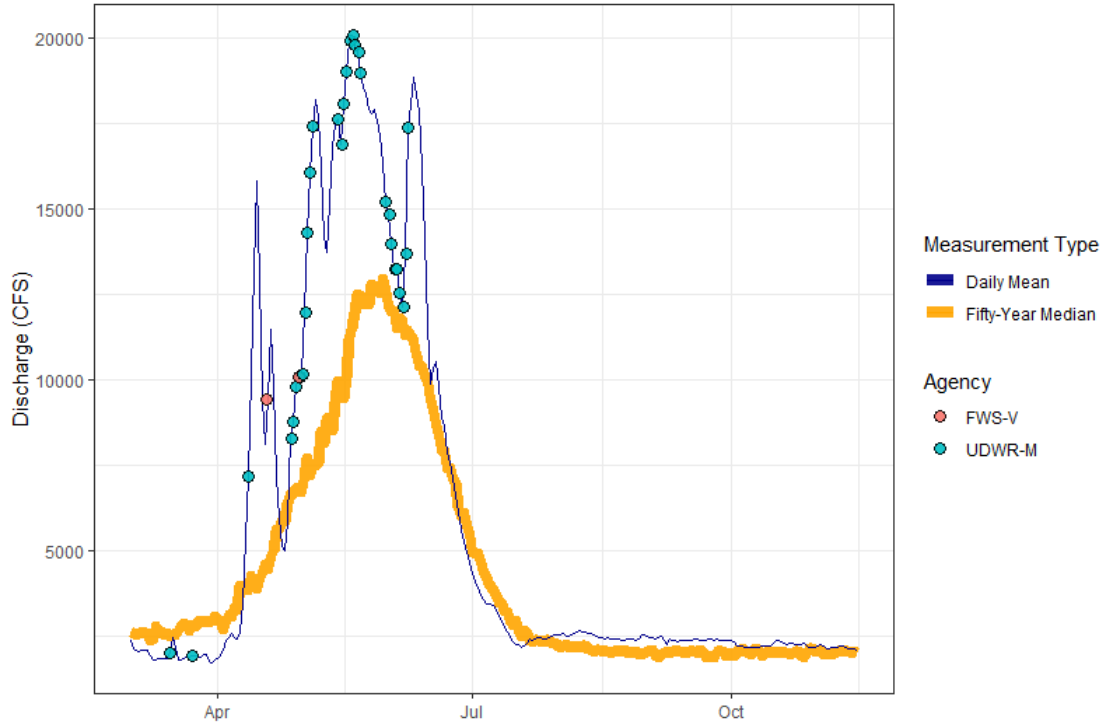


Figure 7: Green River targeted removal days and hydrologic conditions

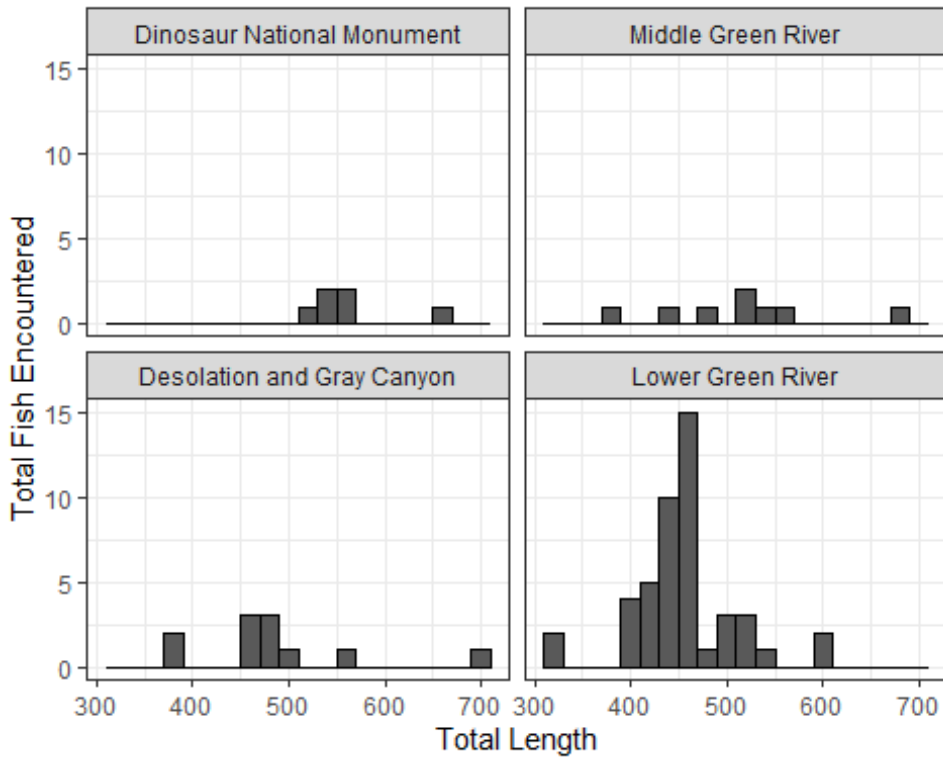


Figure 8: Length frequency of all walleye encounters in the Green River sub-basin

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

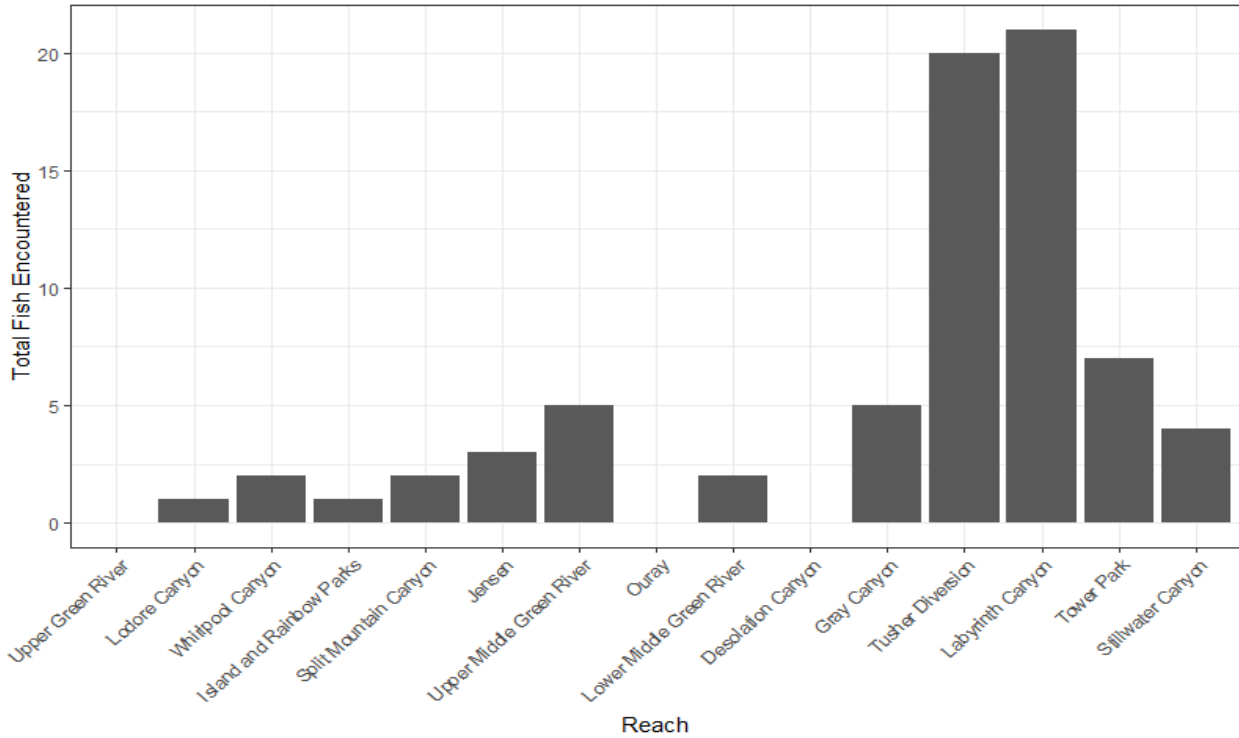


Figure 9: Total captures by removal reach on the Green River, includes all efforts

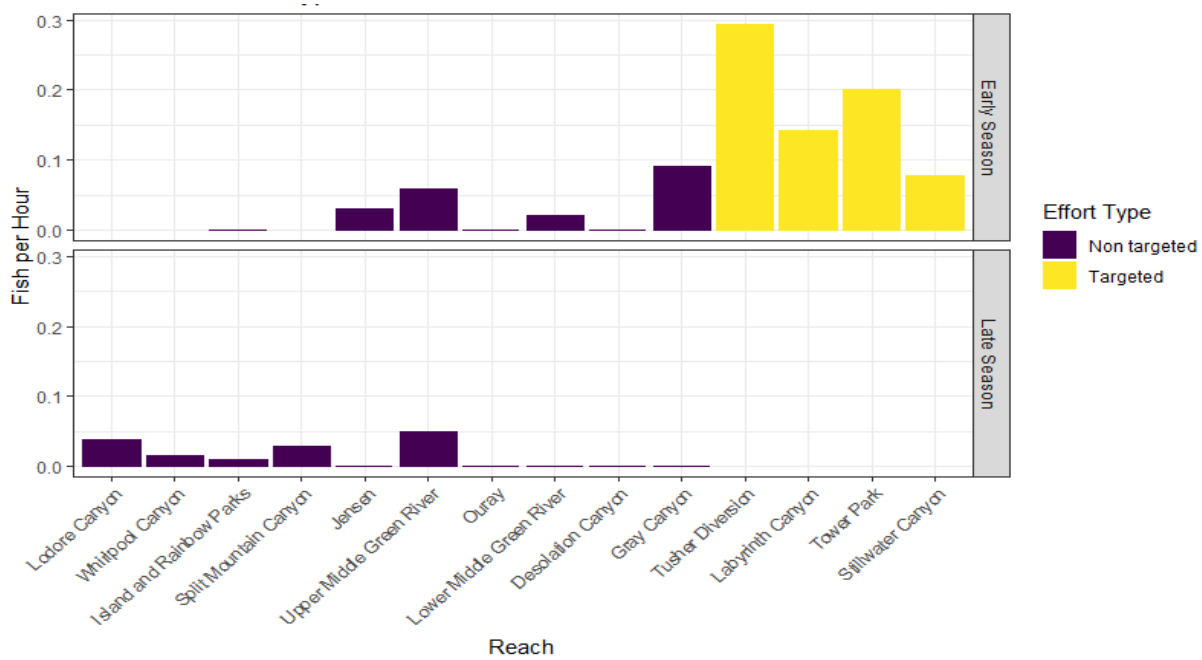


Figure 10: Electrofishing CPUE by reach, season, and effort type on the Green River

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

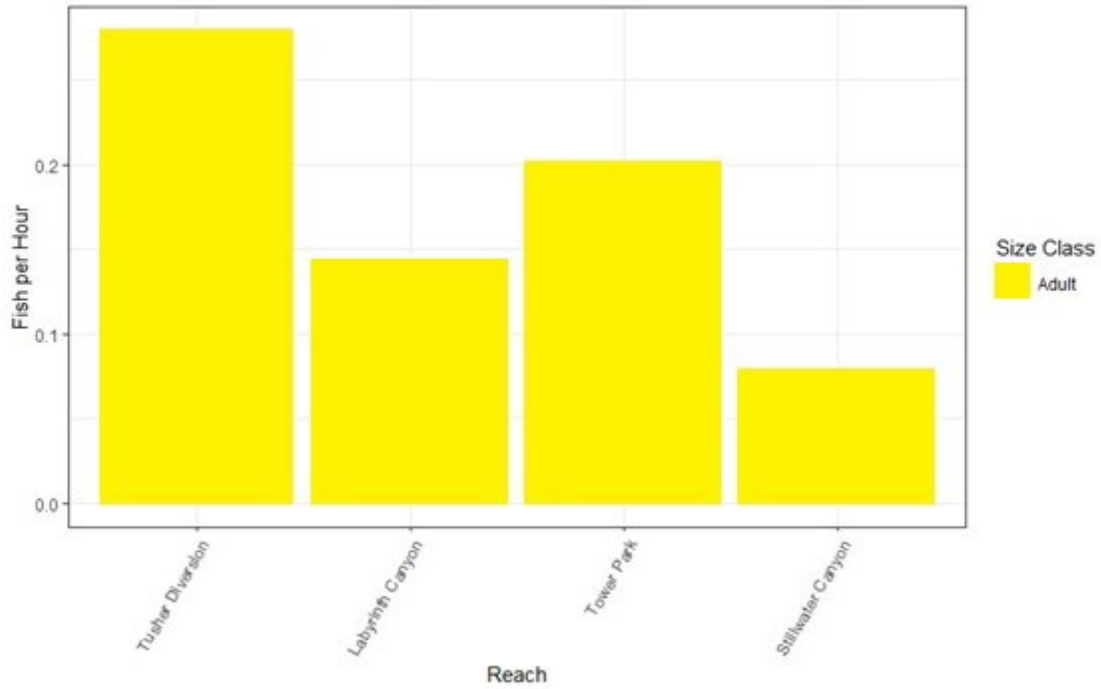


Figure 11: Targeted electrofishing CPUE by reach and size class on the Green River