

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022 ANNUAL REPORT

PROJECT: 98b

Project Title

Upper Yampa River Northern Pike Management and Monitoring (project 98b with additions from project 125).

Bureau of Reclamation Agreement Number:

R20PG00024

Project/Grant Period:

Start date: 10/01/2019

End date: 09/30/2024

Reporting period end date: 9/30/2022

Is this the final report? Yes ___ No X

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Abstract:

U.S. Fish and Wildlife Service and Colorado State University work collaboratively to control an established population of Northern Pike (*Esox lucius*) in the Yampa River between Hayden and Craig, Colorado. Two electrofishing projects are conducted in this reach: Project 98b targeted pike removal and Project 125 targeted bass removal during The Surge. The Surge is a component of Project 125 wherein multiple agencies simultaneously conduct Smallmouth Bass (*Micropterus dolomieu*) removal throughout the Yampa River, with Northern Pike being removed opportunistically as bycatch. Project 98b utilized boat electrofishing to remove Northern Pike from flooded backwater spawning habitat in the early spring to reduce pike spawning success, and other nonnative fishes were removed opportunistically. We euthanized 74 Northern Pike following 38 hours of electrofishing, compared with 121 pike in 2021. This report presents combined Northern Pike removal totals from both projects while focusing on 98b results for historical comparisons. Smallmouth Bass and ancillary captures from The Surge passes are reported in the Project 125 Annual Report.

Study Schedule: 2004-Ongoing

Relationship to RIPRAP:

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

III.B.2 Control nonnative fishes via mechanical removal

III.B.2.a. Estimate nonnative status, trends, and distribution

III.B.2.d. Remove Northern Pike from Yampa River

III.B.2.e. Remove smallmouth bass

Accomplishment of FY 2021 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

We completed three targeted pike removal electrofishing passes between April 27, 2022 and June 10, 2022. These electrofishing passes occurred between the Hayden Pump Station boat ramp (RM 171.6) and the South Beach boat ramp (RM 134.5). We completed four additional electrofishing passes in conjunction with “The Surge” between July 6, 2022 and July 14, 2022. The Surge is a component of Project 125 (Colorado State University Larval Fish Lab [LFL]), wherein multiple agencies simultaneously conduct Smallmouth Bass (*Micropterus dolomieu*) removal throughout the Yampa River downstream of Hayden, Colorado. The Surge removal efforts occurred from the Dorsey boat ramp (RM 151.5) to South Beach (RM 134.5). Collectively, this amounted to 15 days of electrofishing (Tables 1 and 2). Smallmouth Bass captured during The Surge passes are reported in the Project 125 Annual Report (Tuttle 2022, in prep.). Northern Pike captured during The Surge Passes are reported herein.

We removed 74 Northern Pike in 38 total hours of combined electrofishing during the two projects in the focal reach (Table 1). Fewer Northern Pike were removed in 2022 than 2021 ($n = 121$; Smith & Lawry 2021). When compared with previous years, the total number of pike removed in 2022 is the lowest on record (Figure 1). Our targeted electrofishing efforts in backwater areas do not provide a formal quantitative means to monitor or assess the population status of Northern Pike in this reach. However, the number of Northern Pike removed annually in this project has declined markedly since Colorado Parks and Wildlife (CPW) began using gill nets to remove Northern Pike from the Yampa River in 2014. Targeted electrofishing focused on removal of Northern Pike from backwater spawning habitat in the early spring remains an effective means of control, especially in backwaters with limited suitability for gillnetting.

Although projects 98b and 125 overlap spatially, they do not overlap temporally, and they utilize different electrofishing techniques, so their efficacy for pike removal varies accordingly. We removed 53 pike during 98b, and we removed 21 pike during The Surge, while expending 20 hours of electrofishing effort during 98b and 18 hours of electrofishing effort during The Surge (Table 2).

More Northern Pike were caught in the two-mile reach between RM 153 – RM 151 than any other location ($n = 17$; Figure 2). This was followed closely by RM 143-141 where 14 pike were captured and RM 141-139 where 13 pike were captured (Figure 2).

The combined catch-per-unit-effort for both projects was 2.0 fish per hour (Table 1). Catch rates were higher during Project 98b than they were for The Surge (2.7 fish per hour during 98b vs 1.2 pike/hr during the surge; Table 2). Catch-per-unit-effort for 98b decreased from last year’s 3.6 fish per hour, and this year is the lowest on record since 2017 (Figure 3).

It should be noted that 98b catch rates reported in 2016 and later are likely biased high when compared to those reported between 2005 and 2015. Historically, the entire main channel river reach was electrofished (not just backwaters). Beginning in 2016, crews started electrofishing almost exclusively in backwaters and recording effort and capture locations therein. This change reduced total electrofishing effort. While this biased overall catch rates high in comparison to those prior to 2016, removal efficiency was increased. Catch-per-unit-effort was higher for the spring than for subsequent passes that occurred in the early summer (Table 3). However, when broken down by pass instead of

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time period, CPUE was highest for the third pass (8.2 pike/ hr; Figure 4). Spring was more productive for catching adult pike, whereas summer was a more productive period for catching juvenile pike (Table 4; Figure 5). These results are typical for this reach, as spring is typically the most productive time to electrofish for adult Northern Pike, as they are staging to spawn in the warming backwaters.

Of the 53 pike removed during spring 98b passes, all were adults. Of the 21 fish removed during The Surge, 13 were juveniles. This could be due to The Surge passes taking place later in the season, but it could also be due to differences between the 98b electrofishing protocol and The Surge electrofishing protocol. When electrofishing for bass during The Surge, we are targeting shallow shoreline habitat, and we tend to capture more juvenile pike. This difference in juvenile and adult captures during 98b versus The Surge is not effectively captured by simply breaking down electrofishing events into spring vs early summer periods (Table 4).

Electrofishing passes spanned various discharge conditions as measured in Maybell, CO (Table 5; Figure 6). Temperature increased throughout the season (Figure 7). Variability in catch rates between passes and 98b vs The Surge may also be due to variable hydrologic conditions and differences in temperature between the early and late part of the season. Pike removal is most effective when the water is high enough to inundate the backwaters and warm enough to trigger spawning activity.

Length-frequency of pike captured during passes in 2022 was bimodal in spring and early summer (Figure 8). No juvenile fish were captured during the spring period (Table 4). Thirteen juvenile fish were captured later in the summer (Table 4; Figure 8). The proportional frequency of juvenile fish captured in 2022 was larger than what was observed in 2021 (Figure 9). This is likely the result of more electrofishing effort being expended later in the summer in 2022 and more effort being expended in the early spring last year.

Shortcomings

Discharge was too low for effective Jon boat electrofishing for the majority of the month of April (Figure 6). When flows finally did reach navigable levels in late April, we were busy prioritizing Project 128 on the White River as well as Desolation Canyon. Pre-spawn 98b work was somewhat limited until Project 128 sampling was completed, but was accomplished opportunistically when possible. This is why several of our passes occurred later than usual.

Additional Noteworthy Observations

We removed 486 White Sucker, 1 Green Sunfish, and 1 Creek Chub during 98b electrofishing (Table 6). Smallmouth Bass and ancillary fish from The Surge sampling are documented in the Project 125 report. No native fishes were captured during 98b electrofishing efforts.

Recommendations:

We recommend conducting four passes as early as possible in the spring to remove as many Northern Pike as possible in backwaters where spawning individuals are concentrated.

Project Status:

On track and ongoing.

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FY 2022 Budget Status

Funds Provided: \$103,590

Funds Expended: \$103,590

Difference: \$0

Percent of the FY 2021 work completed, and projected costs to complete: 100%

Recovery Program funds spent for publication charges: \$0

Status of Data Submission

All data have been submitted to the database manager.

Science/Technical Reviewer:

Andrew A. Schultz Ph.D., USFWS, Utah FAC Complex Manager / Project Leader

andrew_schultz@fws.gov

Signed:

Katherine Lawry

Principal Investigator

10/5/2022

Chris Smith

Principal Investigator

12/7/2022

References

Tuttle, D. 2022 (in prep). Evaluation of Smallmouth Bass and Northern Pike management in the middle Yampa River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO

Smith, C. and K. Lawry 2021. Upper Yampa River Northern Pike management and monitoring. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO

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Table 1. Overall effort summary for Middle Yampa River – Reach B – Northern Pike. This table includes combined data from projects 98b and 125. Standardized figure by Chris Michaud.

Sampling Date Range	Sampling River Mile Range	Total Sampling Days	Total Effort (hr)	Number of Target Species Encountered	CPUE of Target Species
Apr 26 - Jul 14	171 - 131	15	38	74	1.95

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Table 2. Effort summary by project for Middle Yampa River - Reach-B - Northern Pike in 2022.
Standardized table by Chris Michaud.

Study Code	Gear Code	Sampling Date Range	Sampling River Mile Range	Total Sampling Days	Total Effort (hr)	Number of Target Species Encountered	CPUE of Target Species
98b	EL	Apr 26 - Jun 10	171 - 131	8	19.9	53	2.66
125	EL	Jul 06 - Jul 14	151.5 - 134	7	18.1	21	1.16

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Table 3. Northern Pike removal summary by time period. Standardized table by Chris Michaud.

Season	Sampling Date Range	Sampling River Mile Range	Total Sampling Days	Total Effort (hr)	Number of Target Species Encountered	CPUE of Target Species
Spring	Apr 26 - Apr 28	171 - 135	3	5.4	27	5.00
Early Summer	Jun 06 - Jul 14	171 - 131	12	32.6	47	1.44

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Table 4. NP encounters and CPUE by size class and period. Standardized table by Chris Michaud.

Season	Juveniles	Adults	Juveniles/hour	Adults/hour
Spring	0	27	0.0	5.02
Early Summer	13	34	0.4	1.04

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Table 5. Hydrologic Summary. Standardized Figure by Chris Michaud.

Station Name	Maximum Discharge	Minimum Discharge	Mean Discharge	Date at Maximum Discharge	Date at Minimum Discharge	Maximum Temperature	Mean Temperature	Date at Maximum Temperature
Yampa River At Deerlodge Park, Co	12,000	66.8	2,000	May 21, 2022	September 07, 2022	30.1	11	August 12, 2022
Yampa River Near Maybell, Co	9,250	57.8	1,570	May 20, 2022	September 03, 2022	29.6	10	August 12, 2022

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Table 6. Targeted and ancillary captures of nonnative fish species on the Middle Yampa River - Reach-B. Unlike previous years, this table does not include data from surge passes. This is 98b data only. Standardized figure by Chris Michaud.

Common Name	Number of Fish	Median Length	Length Range
white sucker	486	387	76 - 520
northern pike	74	568	91 - 994
creek chub	1	106	106 - 106
green sunfish	1	90	90 - 90

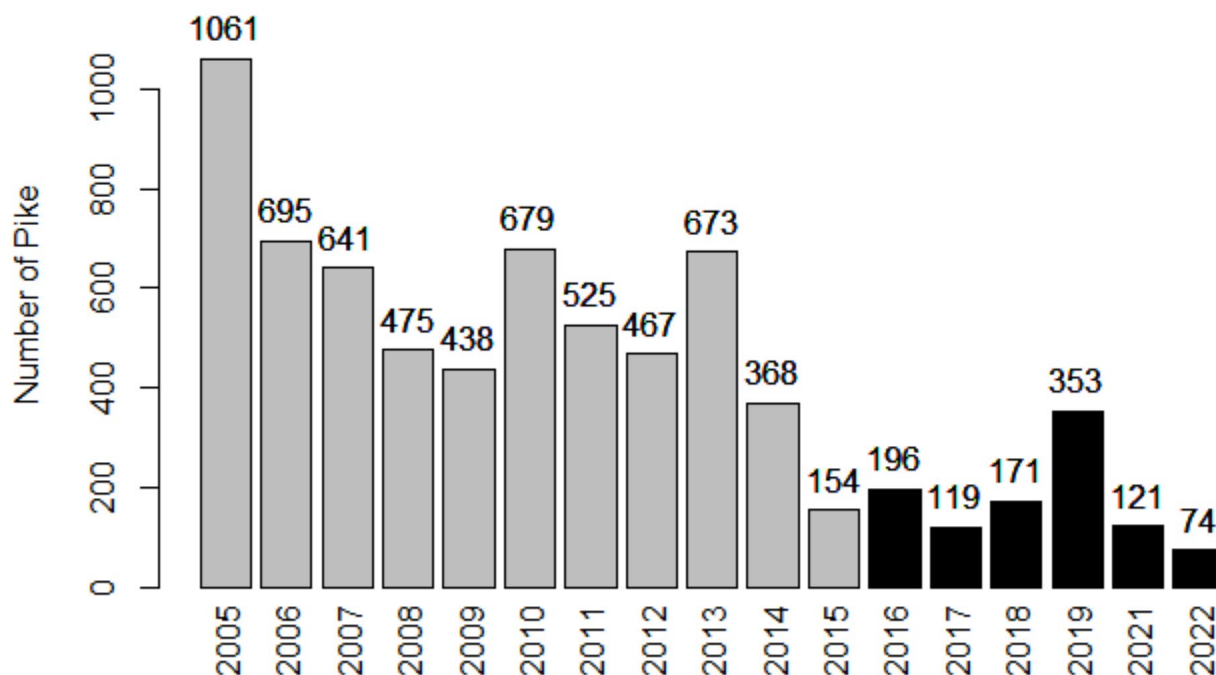


Figure 1. Total number of Northern Pike removed annually from 2005 – 2022 in the Yampa River between Hayden and Craig, Colorado. This figure includes combined data from project 98b and project 125. Caution should be exercised when comparing total catch from 2005 – 2015 (gray) to total catch from 2016 – 2022 (black), as methods were changed in 2016. In years 2005 – 2015, the entire main channel was electrofished, along with all backwaters. Beginning in 2016, effort was focused primarily on backwaters and the entire main channel was no longer electrofished. Note that spring 98b passes were cancelled in 2020 due to Covid-19, but surge passes were completed. Non-standardized figure by Katherine Lawry.

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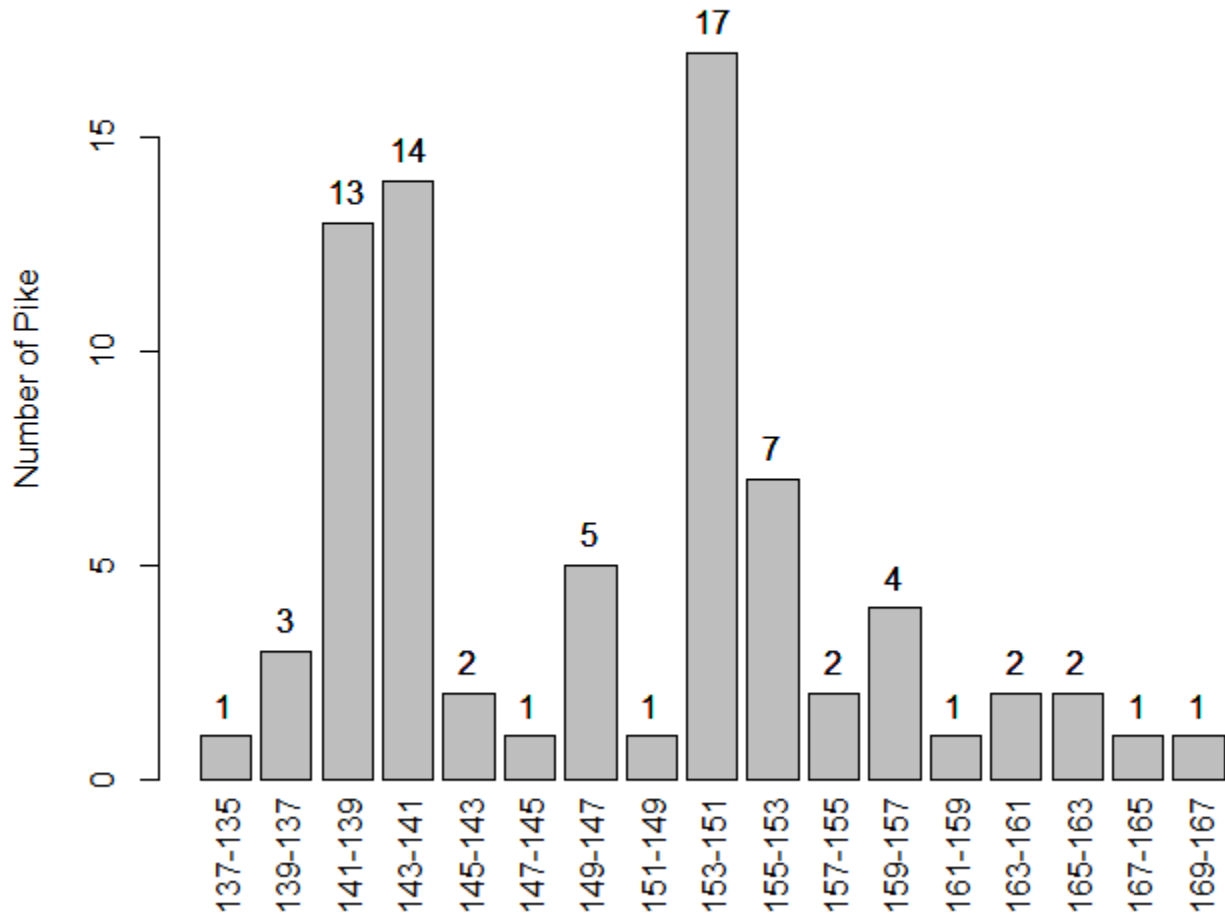


Figure 2. Total number of Northern Pike captured in two-river mile reaches, Yampa River 2022.
Non-standardized figure by Katherine Lawry.

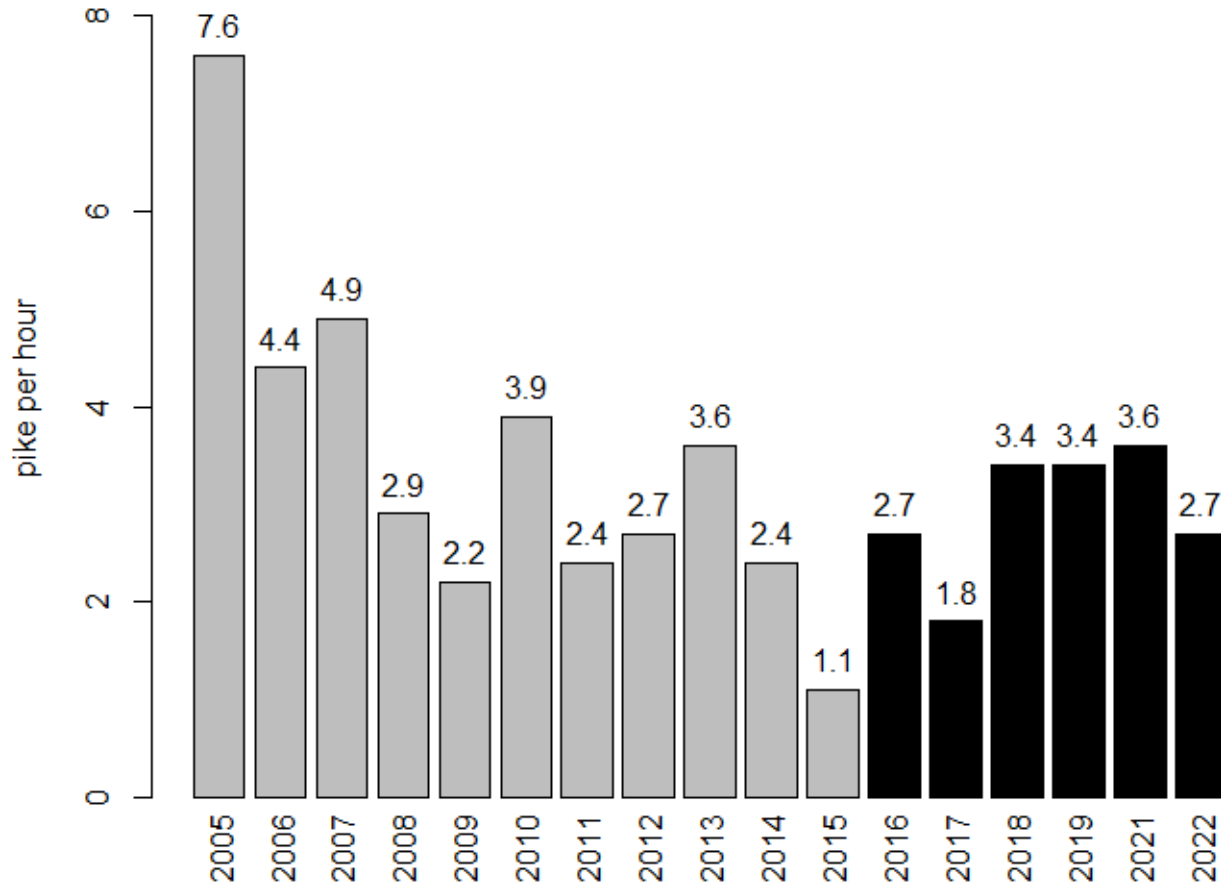


Figure 3. Northern Pike catch rates per hour (CPUE) for project 98b from 2005 – 2022. Project 125 data are not included in this figure. Caution should be exercised when comparing total catch from 2005 – 2015 (gray) to total catch from 2016 – 2022 (black). Changes to Northern Pike removal and data collection methodology were implemented beginning in 2016 wherein effort was focused primarily in backwaters and the entire main channel was no longer electrofished. Total electrofishing effort (in hours) was reduced. Catch rates for 2016-2022 (black) are therefore biased higher than catch rates from 2005 – 2015 (gray). Non-standard figure by Katherine Lawry.

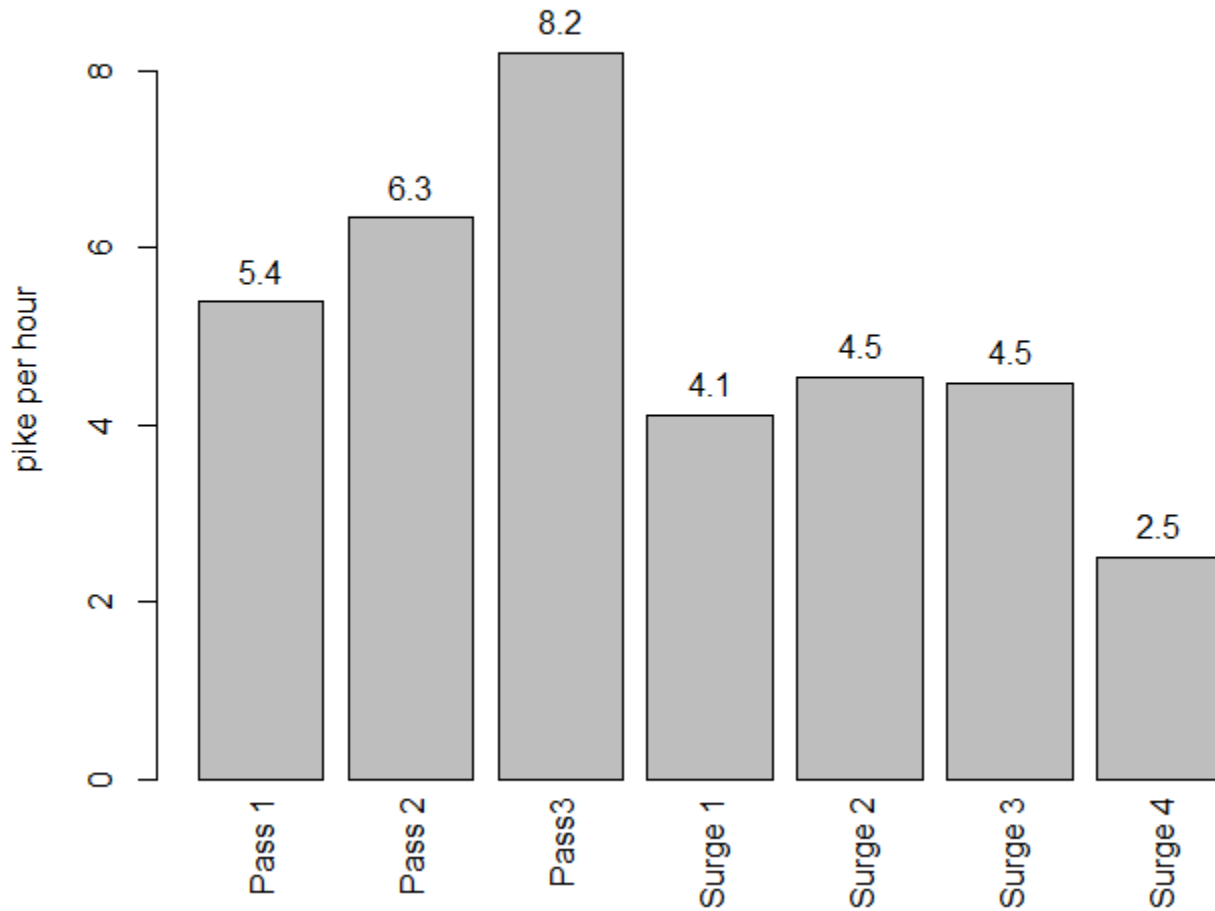


Figure 4. Catch rates for Northern Pike by pass in 2022. The first three electrofishing passes were for Project 98b. The remaining passes were conducted as part of the surge (Project 125). Non-standard figure by Katherine Lawry.

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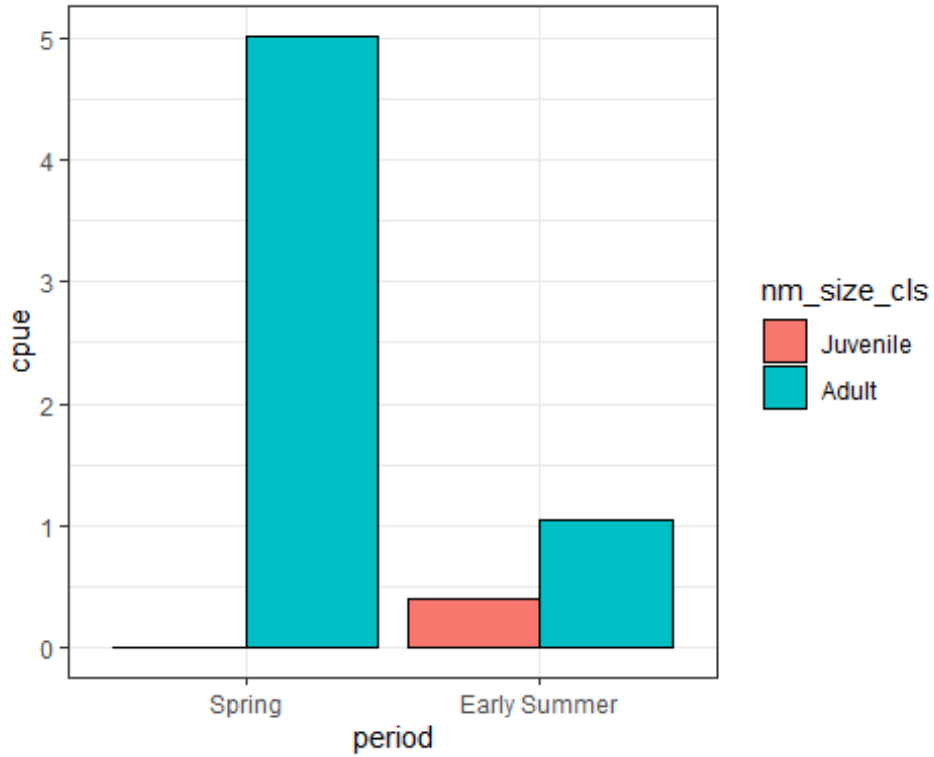


Figure 5. Northern Pike CPUE by time period during 2022 within Middle Yampa River, Reach – B. Standardized figure by Chris Michaud.

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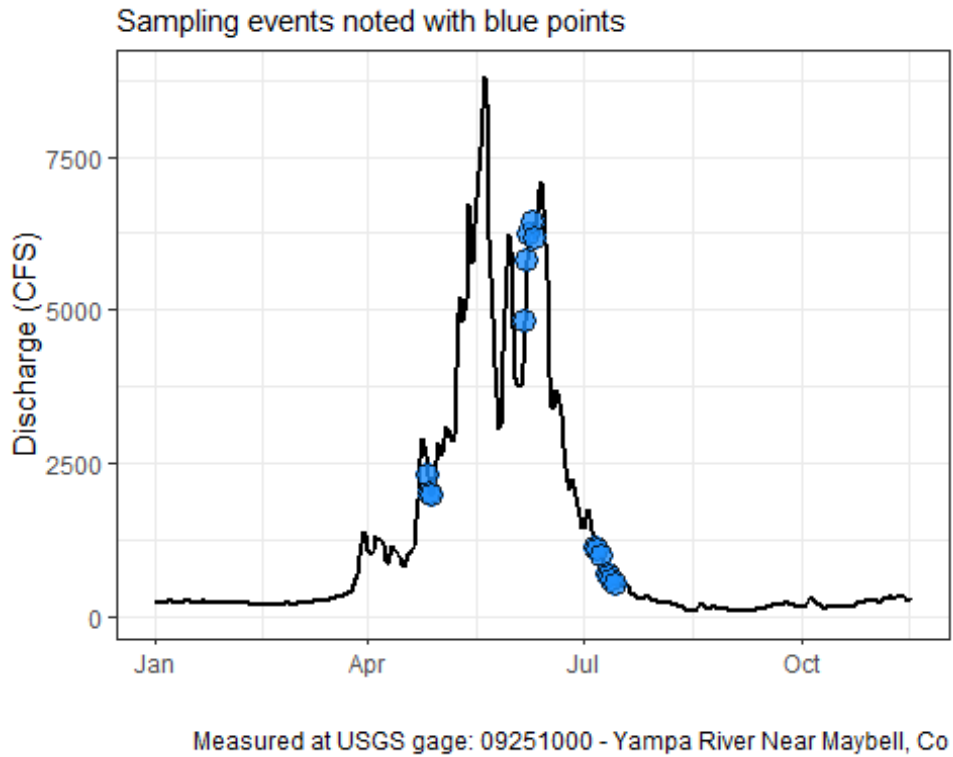


Figure 6. Electrofishing events and discharge on the Green River through the 2022 field season. Standardized Figure by Chris Michaud.

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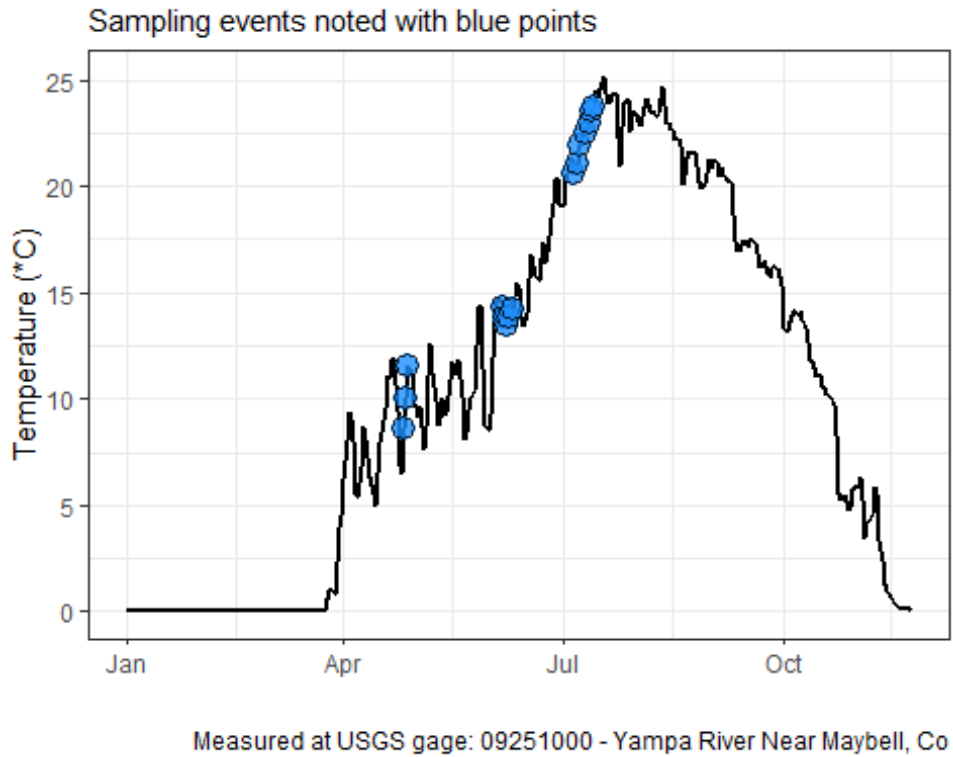


Figure 7. Electrofishing events and temperatures on the Green River through the 2022 field season. Standardized figure by Chris Michaud.

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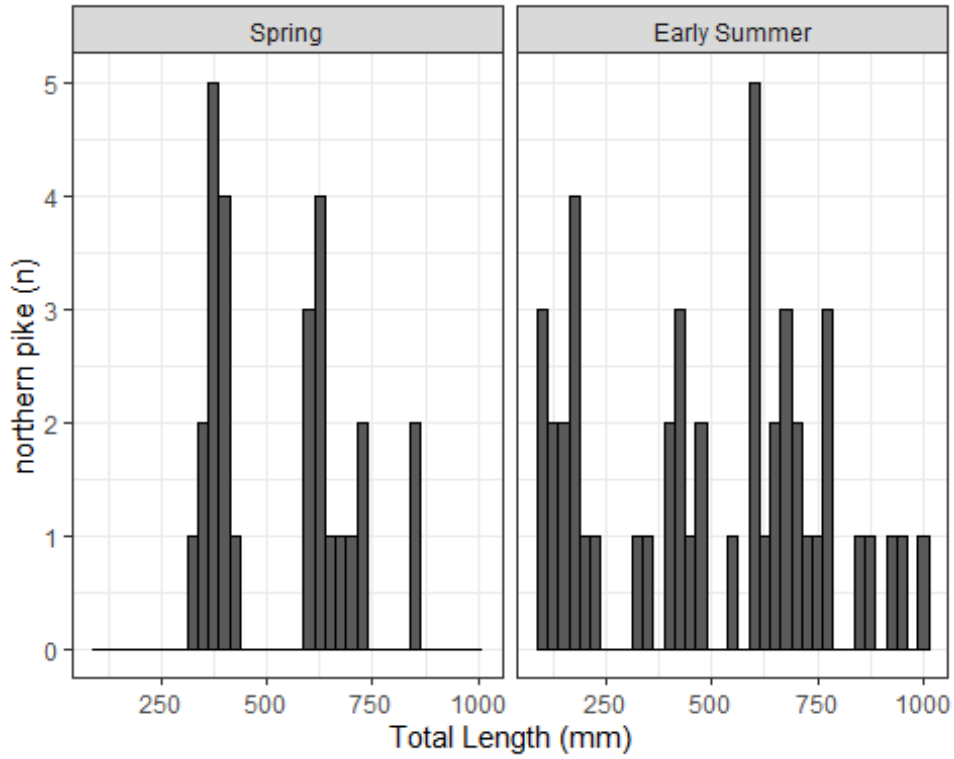


Figure 8. Length frequency histogram for northern pike encountered on the Middle Yampa River - Reach-B - Northern Pike by time-period. Standardized figure by Chris Michaud.

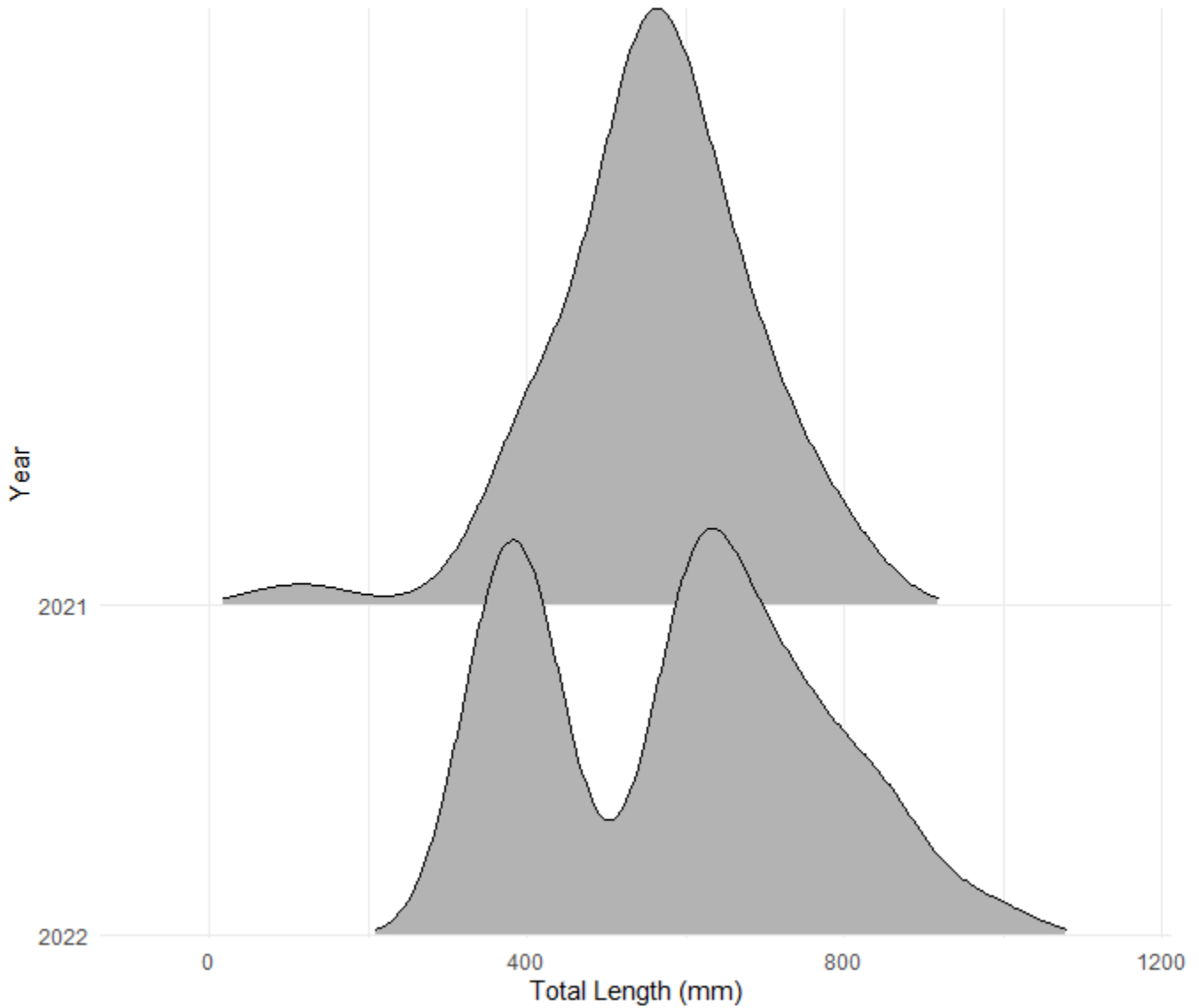


Figure 9. Length frequency (plotted as density) of Yampa River Northern Pike captured via boat electrofishing in Project 98b, 2021-2022. Note that this figure contains only fish captured during the spring backwater electrofishing passes. This figure does not include fish captured during the surge passes (which tend to be shorter in length). Non-standard figure by Katherine Lawry.