Wolford Mountain Reservoir

Fishery Management Report

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Introduction

Wolford Mountain Reservoir (WMR) is a 1550- acre storage reservoir approximately 5 miles north of Kremmling. It is owned and operated by the Colorado River Water Conservation District (CRWCD), which charges a use fee (daily or annual) for access. WMR provides good fishing for Rainbow and Brown Trout, Kokanee Salmon and a few other assorted species. The lake is also home to one of the most dense crayfish populations in the area, which serve as a good food source for larger trout. Standard statewide fishing regulations apply, except that public access and fishing are prohibited within 150 feet of the kokanee spawning trap deployed by Colorado Parks and Wildlife (CPW) between October 1 and December 1. No snagging of Kokanee Salmon is allowed.

An illegal introduction of Northern Pike was confirmed in WMR in 2007. This species is incompatible with CPW's management goals for the recreational fishery, and CPW has worked to manage the invasion of this species. CRWCD and CPW have partnered to offer an angler harvest incentive of $20 for each Northern Pike caught and turned in with the camp host. The purpose of this harvest incentive is to enlist the help of anglers to control the number of Northern Pike in the lake.

Figure 1. Wolford Mountain Reservoir. Stars indicate gillnet sampling locations.

Stocking

All stocking is accomplished by CPW's State Fish Hatchery system. WMR has always been a good Brown Trout fishery, with the potential to produce large fish supported by the abundant crayfish prey base. However, Brown Trout do not have access to large amounts of quality spawning habitat, so the population is sustained through stocking of fingerlings (Table 1).

With regard to fingerling Rainbow stocking, in 2017

Table 1. Wolford Mountain Reservoir stocking history, 2017-2021.

	10" Catchable Rainbow	3-5" Fingerling Rainbow	1.5" Kokanee	2" Brown trout	3" Cutbow
2017	18,200	50,000	121,000	50,000	50,000
2018	12,200	52,800	120,000	66,700	110,800
2019	17,000	-	100,000	36,200	100,000
2020	25,500	-	120,000	42,300	100,000
2021	17,900	13,200	120,000	30,000	80,000

Table 2. Stocking of catchable Rainbow Trout by month. Numbers represent the percent of that year's catchable Rainbows stocked in a given month.

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
2017			17			50		33
2018		30				70		
2019		21		60				18
2020		20	21			8		51
2021		31	35					34

and 2018 we shifted focus to stocking Rainbow-Cutthroat hybrids. This was partially in response to availability in our hatchery system and partially an experiment to ascertain whether cutbow fingerlings may be more successful in WMR than the strains of fingerling Rainbows that we have stocked in recent years. We do not yet know if this is the case.

Our sampling data suggests that when catchable Rainbows are stocked relatively late in the year at WMR, these fish persist over the winter, grow some amount, and are still present the following spring as higher-quality Rainbows (Figure 4). This observation has led us to focus more catchable Rainbow stocking in the fall (Table 2). This stocking strategy has the added benefit of making use of fall hatchery production of catchable Rainbows when there is less statewide demand for them.

Fish population surveys

We have conducted spring gillnet surveys annually except for 2017. The survey consists of six gillnets set overnight in the same locations every year on a single night in mid-May (Figure 1, previous page).

Roundtail Chub (Figure 3) are a native fish that were apparently present in Muddy Creek at the time the reservoir was built. They have contributed 10% of the gillnet

Figure 3. Roundtail chub.

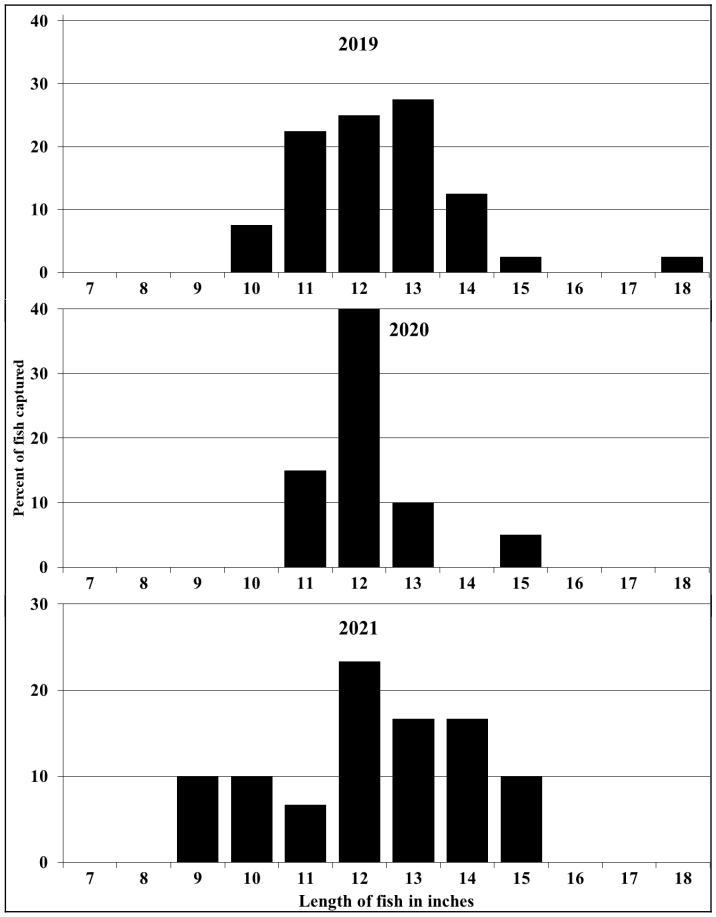

Figure 4. Size distribution of Rainbow Trout captured in gillnet surveys at Wolford Mountain Reservoir, 2019-2021. The date of all three surveys was May 14.

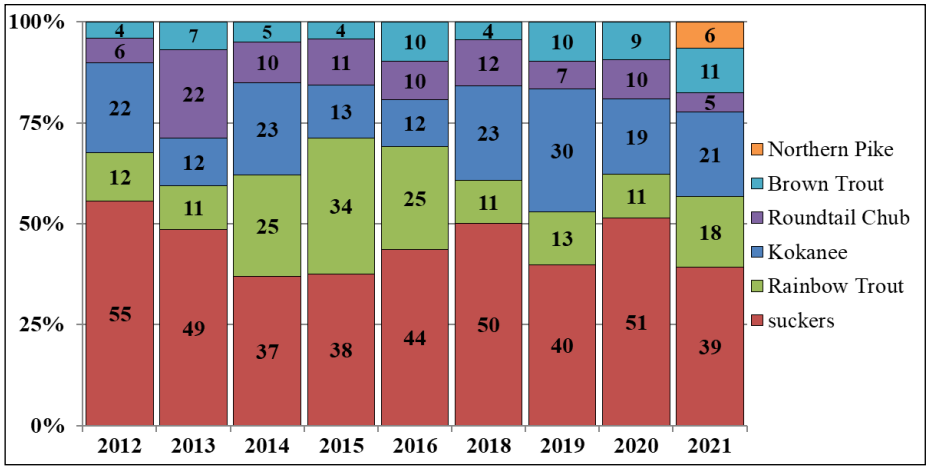

Figure 2. Species composition by percent in gillnet catch,Wolford Mountain Reservoir 2012-2021

catch on average over the past nine survey occasions. We have captured a wide range of sizes, providing evidence that successful natural reproduction occurs regularly. WMR is the only reservoir in Colorado known to have a reproducing population of this species. It is also unique in the sense that this is one of the "desert" fishes native to the Colorado River, and their range extends downstream through the entire lower river. WMR represents the farthest upstream known occurrence of the species in the Colorado River watershed.

For the past three years, no catchable Rainbows had been stocked prior to that year's gillnet survey, so all the Rainbows in the catch had been in the lake through at least one winter. The majority of the Rainbows that we have captured in these surveys appear to have originated as catchable-size stocked fish rather than fingerlings. The success of fingerling Rainbow stocking appears to be minimal at this point. The size distribution of Rainbows that we have observed in the spring provides evidence of good overwinter growth and survival (Figure 4, previous page).

Kokanee catch in the spring gillnet surveys appears to have predicted the record-setting Kokanee egg collection season that we experienced in 2019 (discussed below). Catch of 5" fish (Age-1 fish stocked in 2017) in 2018 was the highest that we have observed, and the following year these fish formed the strong 9-12" size group that made up the bulk of the spawning run that fall (Figure 6). The kokanee catch in the 2020 and 2021 surveys does not lead us to believe that another record-setting egg take will occur in 2022 or 2023.

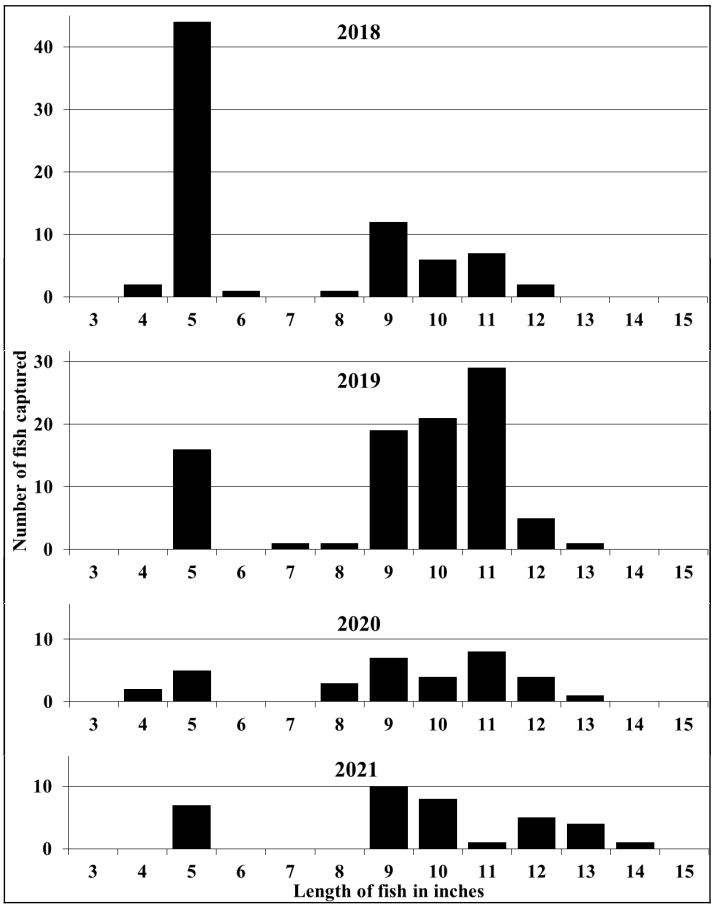

Figure 6. Size distribution of kokanee captured in spring gillnet surveys, Wolford Mountain Reservoir 2018-2021.

Figure 5. A 29", 13-pound Rainbow Trout captured in 2021. This is the largest Rainbow captured to date in CPW gillnet surveys at Wolford Mountain Reservoir.

Kokanee spawn operations

CPW has collected kokanee eggs at WMR since 2012. While other nearby egg sources (Williams Fork and Granby reservoirs) have struggled in this period, WMR has proven itself to be the most valuable kokanee egg source in the area, with an average annual egg take of 1,930,000 eggs—more than 16 times the number that we stock there annually. As a result, WMR can provide eggs for many other reservoirs in the area and throughout the state.

The inlet of Muddy Creek at the upstream end of WMR does not provide good spawning habitat for kokanee in the fall, and flows that time of year tend to dwindle to extremely low levels. Therefore, CPW has never stocked kokanee at the inlet, but rather directly into the lake. Mature kokanee have long been observed to congregate over gravel beds along the western shoreline of the lake, from the boat ramp south to the dam. We have made use of a Merwin trap to capture these aggregations of spawning fish. Our entire spawn operation is contained on a spawn barge that we dock with the trap on spawn days (Figure 9). We established the current location for the trap in 2014, and after determining that it was viable, in 2015 we began stocking kokanee at this location rather than at the boat ramp, in an attempt to increase site fidelity of returning spawners.

2018 and 2019 stand out as the most productive spawn years to date (Figure 8). The reasons for the excellent runs in these two years are not fully known; however, as noted previously, the year class that produced the record egg take in 2019 was detected by the spring gillnet surveys in 2018 and 2019. A number of factors may have contributed to these excellent returns, including changing the stocking location in 2015, fewer days of reservoir surface spill in

Figure 7. The Merwin trap full of spawning kokanee.

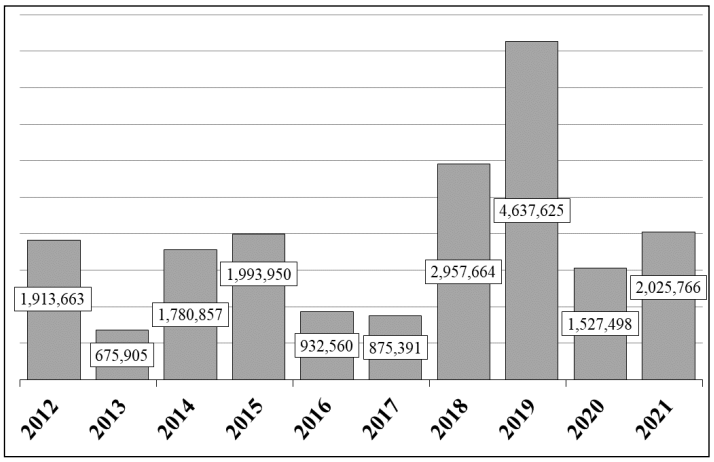

Figure 8. Kokanee egg collections by year at Wolford.

Figure 9. Merwin trap and spawn barge.

Figure 10. The lead and wings portion of the Merwin trap.

the years leading up to 2018, and a low level of predation by Northern Pike.

The timing of the kokanee spawn has varied widely, with peak egg take occurring as early as October 19 in 2020 (we clearly missed the front half of the spawn that year) and as late as November 8, in 2021 (Figure 11). Reasons for this variation in spawn timing are also not known, although the 2021 spawn occurred at the lowest lake elevation to date and this appeared to contribute to fish coming in at a slower rate. The timing of the 2021 spawn was the most widely spread — the peak egg take was the lowest peak day in the history of the operation, yet the total number of eggs that we collected in 2021 was slightly above the long-term average. In 2018 and 2019, we ended collection efforts before the fish were done spawning, leaving the unanswered question of how many eggs were actually available in those years.

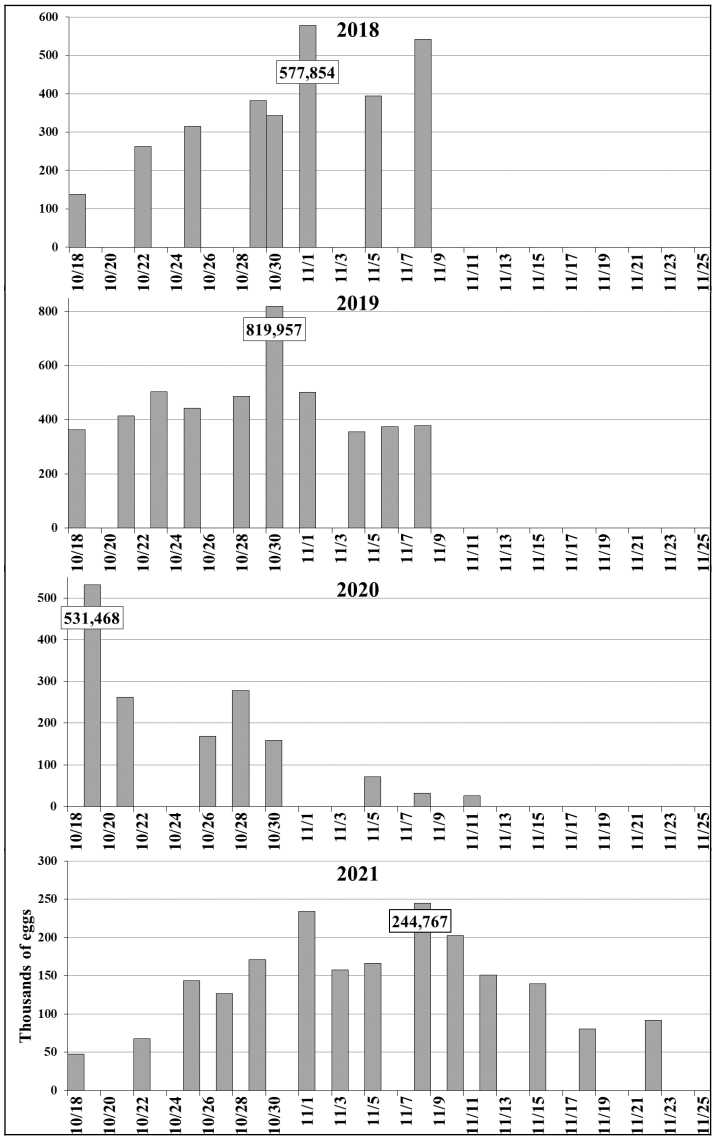

Figure 11. Wolford kokanee egg take by day, 2018-2021. Largest single-day egg take from each year is labeled. Note changing Y-axis.

Northern Pike control efforts

Northern Pike were illegally introduced to WMR and confirmed to be present in May 2007. Their presence threatens the fishery in the reservoir as well as in the Colorado River downstream. CPW seeks information regarding this or other illegal stocking activities. Callers may remain anonymous by contacting Operation Game Thief at 1-877-265-6648 or email at game.thief@state.co.us, and may be eligible for a cash reward.

In order to control Northern Pike numbers in the lake, CPW and CRWCD have partnered on a two-pronged approach consisting of trapping and removing pike that are attempting to spawn at ice-out, and offering an angling harvest incentive in which anyone that catches pike in the reservoir can present it to the camp host and receive a $20 payment per fish caught.

The presence of this species in the lake threatens the viability of the kokanee broodstock, which has become extremely valuable to our statewide kokanee program. In most cases in Colorado, stocked hatchery fish make up the majority of prey for Northern Pike, making them extraordinarily expensive to manage. An additional control strategy would be to cease all stocking of Rainbow and Brown Trout in order to deprive Northern Pike of a prey base. However, in WMR the two problems with this strategy would be that it would greatly increase predation pressure on the Roundtail Chub population, and in all likelihood this native species would be eliminated from the lake. The other risk would be to the kokanee broodstock, which may become less prolific under increased predation.

Figure 12. A typical catch of Northern Pike in spring 2018.

The recent history of Northern Pike population dynamics in WMR offers a cautionary tale regarding pausing control efforts. Prior to 2020, the two-pronged control effort appeared to be maintaining satisfactory control of the population. Despite the production of some stronger year-classes, our efforts were generally successful. For instance, there appeared to be a successful year class born in 2016 which can be seen in the 10-16" size range in 2017 and 19-25" in 2018 (Figure 14). However, in 2019 it appeared that our efforts had limited the success of this group. The number of fish turned in by anglers during this time (2017-2019) correlates strongly with the number that we captured by spring trapping (Figure 13).

In the spring of 2020, due to the COVID pandemic, restrictions on vehicle and boat occupancy made it impossible for us to conduct our annual spring trapping operation. The number of fish turned in by anglers subsequently rose to a record level in 2020. By 2021 when we resumed spring trapping, we saw that the largest juvenile year class yet observed in WMR had been born in 2020 when we were unable to disrupt spawning activity. In 2021, new records were set for the number of pike we captured in spring trap netting, the number that we captured in our gillnet survey, and the number turned in by anglers. The next 2-3 years will be critical in determining whether or not we are able to regain control of the number of pike in the lake.

One habitat factor that we believe can help suppress Northern Pike reproduction in WMR is the high level of turbidity during spring runoff. In high runoff years when the lake becomes very turbid immediately after ice-off, we commonly observe large female pike retaining all of their eggs into late May, beyond the normal spawning period. We believe that these fish are ultimately unsuccessful in spawning and thus the juvenile year class from that spring is either nonexistent for small in number as a result.

As of this writing, the illegal introduction of Northern Pike into WMR has cost the CRWCD and CPW hundreds of thousands of dollars combined in labor, equipment, angler harvest incentives, and stocked trout consumed. Control efforts will be necessary indefinitely, and if we are not able to regain control over the numbers of fish present, additional measures will be considered and likely pursued.

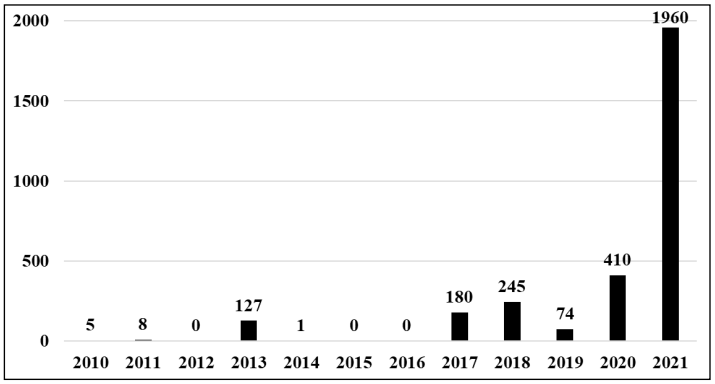

Figure 13. Number of Northern Pike turned in by anglers for the harvest incentive program, Wolford Mountain Reservoir.

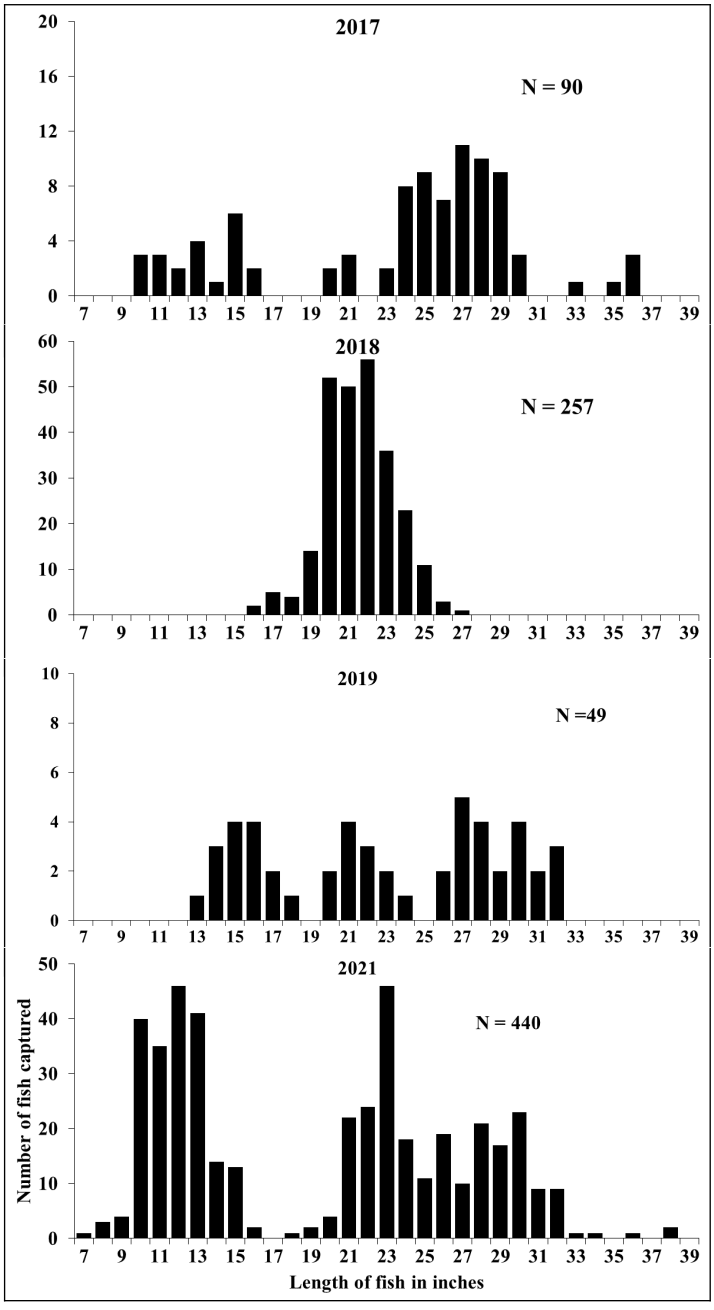

Figure 14. Northern Pike captured in spring trapping efforts, Wolford Mountain Reservoir 2017-2021. No trapping took place in 2020.