Wyoming Game and Fish Department

Cody Region Angler Newsletter

Volume 16 2022

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Fish Management in the Cody Region

Welcome to the 2022 Cody Region Angler Newsletter! Our work strives to sustain and enhance the amazing aquatic resources in the Bighorn Basin. We are committed to doing our very best to safeguard your resources and offer world-class angling.

We hope you enjoy these highlights and we look forward to seeing you on the water in 2022!

As always, please feel free to contact us with any comments or questions about the aquatic resources in northern Wyoming. Your input is important to us as we manage these resources for *you*, the people of Wyoming. You'll find all of our contact info on the last page of this newsletter.

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Passing Cutthroat Trout on the Wood River – Nick Scribner & Erin Leonetti

The Greybull and Wood rivers support the largest (miles of habitat) population of Yellowstone Cutthroat Trout in Wyoming outside of Yellowstone National Park. While this population occupies over 140 miles of streams, irrigation diversions throughout the drainage block upstream movement of fish. The Wood River Supply Diversion (Lower Sunshine) is located on the Wood River west of Meeteetse and diverts irrigation water for storage in Lower Sunshine Reservoir. In 2021, Bairco construction out of Lovell, WY installed a 275 foot long technical fish ladder, raised the dam crest, installed a new concrete sluicewall, replaced the radial gate seals, and rehabilitated the sluiceway apron.

Overhead view of fish ladder (top) and sluicewall (bottom) additions to the Wood River Diversion.

These improvements will allow upstream movement to over 80 miles of habitat that for decades had been blocked to migrating fish. Connecting habitats provides flexibility for fish to utilize habitat as they see fit throughout the year. In doing so the population will be more robust from one year to the next. The improvements will also likely reduce fish loss into the irrigation canal since the sluicewall height was increased, which may help steer fish down the Wood River versus the canal.

Now that construction is complete, it is time to evaluate the work and see how well the fish are able to pass the diversion. Fish tagging operations will occur in spring 2022 to monitor fish ladder use. All fish of sufficient size will be tagged with a passive integrated transponder tag (PIT) and monitored for two years. Two antennas will be installed (top picture), one at the entrance and one at the exit of the ladder to document travel time through the ladder, passage success, and number of ladder entries. In the end, we will have an understanding of how fish use the ladder and the proportion that successfully passed to the upstream habitat.

Big Wash Pond—A new management strategy

Big Wash Pond is a three acre bentonite reclamation pond that impounds spring water on BLM lands north of Cowley. The reservoir was stocked with Rainbow Trout beginning in the 1990's to create a fishing opportunity close to the community of Cowley. When first stocked, the reservoir grew large trout and created a popular local fishery. In recent years, the reservoir elevation has dropped and the overall productivity of the water appears to have declined. Stocking was changed from Rainbow Trout to Brown Trout in 2010 in an attempt to improve summer survival and capitalize on an abundant population of Lake Chub.

Big Wash Pond looking North West

To evaluate the status of the fish population, gill nets were set overnight in June 2021. The average size of Brown Trout was 9.3 inches, with the largest 15.3 inches. Fish captured were predominately from a single stocking event with two individuals that were likely carry-over from previous years, such as the one pictured below. Results suggest poor survival and growth rates. Also, it did not appear that fish were utilizing the abundant Lake Chub population.

Big Wash Pond has fairly warm water temperatures in the summer with abundant aquatic vegetation and algae. Given the habitat conditions and survey results, it seems best to change the management strategy to a warmwater fishery. In 2022, 100 Largemouth Bass will be stocked into the lake. These individuals will be 6-12 inches, providing an immediate fishing opportunity. Bluegill are also scheduled for 2024 to provide an additional forage base and fishing opportunity for the public. It will take several years of stocking before we can evaluate the performance of bass and Bluegill in this pond but we feel this change will provide a higher quality fishery for anglers.

Largest Brown Trout captured in Big Wash Pond 2021 survey

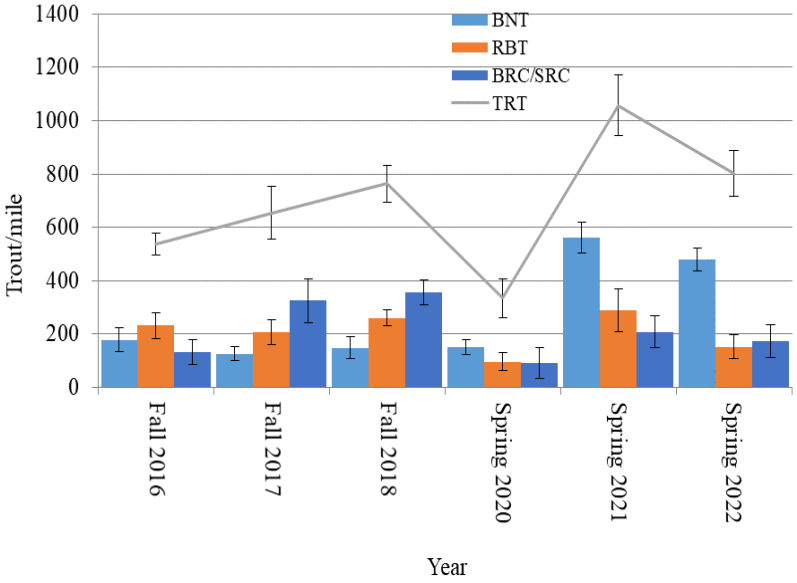
Seeing some improvements on the Shoshone River trout fishery below Willwood Dam

Many frequent readers of our angler newsletter will remember the sediment release from Willwood Dam in the fall of 2016 that killed fish and sparked public concern. The Shoshone River is classified as Blue Color Class (greater than 600 pounds of trout per mile) across three management sections including from Willwood Dam downstream to Mormon Dam. We have been working with Wyoming DEQ, the Willwood Irrigation District, the USGS, the Bureau of Reclamation, University of Wyoming, the Wyoming Water Development Office, the State Engineers Office and others to identify solutions to this complex problem. We are beginning to identify ways we can mobilize sediment and protect the downstream fishery.

The trout fishery below Willwood Dam consists of wild Brown Trout, with Cutthroat Trout and Rainbow Trout stocked to increase angler opportunity. WGFD fish management crews have monitored this section of river annually since 2016.

Mark-recapture population estimates are conducted over a 3.4 mile reach of the Shoshone River below Willwood Dam. A total of 1,335 trout were captured in three days of sampling in 2022 and 1,479 trout were captured in three days in 2021. We handled more than twice as many trout in 2021 and 2022 as we did in the five previous electrofishing surveys. We saw a significant increase in the abundance of wild Brown Trout and better survival of the stocked Cutthroat and Rainbow Trout in 2021 than most prior sampling

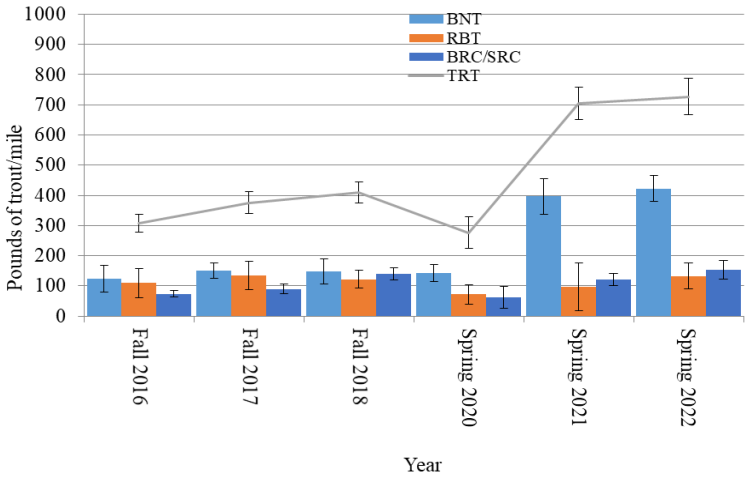
The Shoshone River below Willwood Dam now has a good number of Brown Trout including a few nice ones like these we sampled in March 2021.



The abundance of trout estimated in the Shoshone River 2016 through 2021 with 95% confidence intervals

Shoshone below Willwood Dam (continued)

events. There were an estimated 1,057 trout per mile in spring 2021, most of which were wild Brown Trout. The abundance of each of those species declined slightly between spring 2021 and spring 2022 (803 trout per mile), due to fewer small fish present in the population. However, the strong age classes of the older fish were still present which led to an overall increase in the biomass (the pounds of trout) in this section of the Shoshone River.



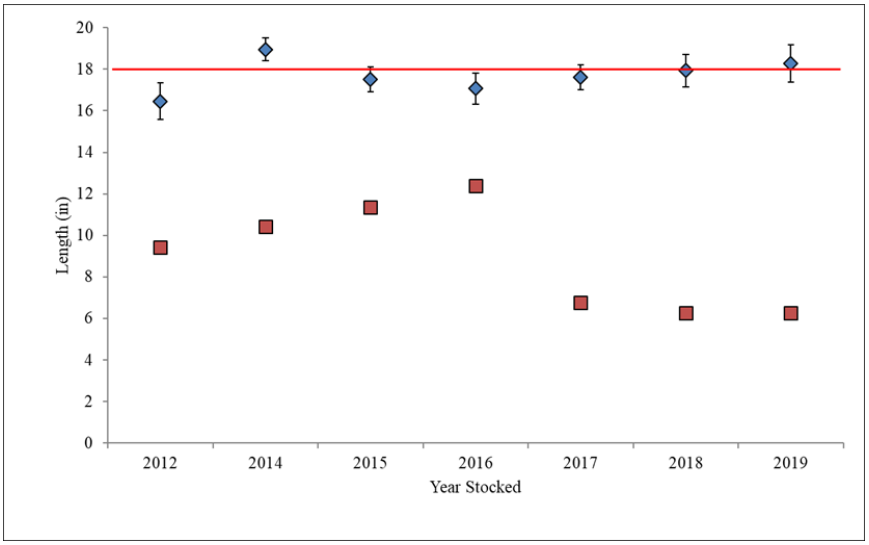
The abundance of trout estimated in the Shoshone River 2016 through 2022 with 95% confidence intervals. While the abundance declined slightly, the biomass (pounds of trout) increased due to a larger average size.

The sampling events in spring 2021 and spring 2022 were the first times this fishery has met its management objective of greater than 600 pounds of trout per mile since the 2016 sediment release. The largest increase in abundance and biomass was experienced in the wild Brown Trout population. This increase, which occurred throughout the Shoshone River, is likely the result of the large water year of 2018. High discharges in 2018 flushed much of the fine sediment out of the Shoshone River and provided improved spawning habitat. Additionally, the higher pool elevations maintained behind Willwood Dam in recent years reduced the amount of sediment released during the winter months contributing to improved overwinter survival of trout. In addition to the increased abundance of trout in this segment of the Shoshone River, the body condition for all species were relatively high, suggesting these fish had ample resources to persist through the winter. Now is a great time to be fishing this section of Shoshone River!

The Shoshone River below Willwood Dam is also producing a few nice rainbow trout like the one here sampled in Spring 2022.

Luce Reservoir—Older isn't always better

Luce Reservoir is a 35 acre waterbody in the Paint Creek drainage that is managed as a trophy fishery and a back-up brood source for the Fall Spawning Rainbow Trout (FRB). Luce Reservoir had a reputation for large trout in the late 90's and early 2000's but beginning in 2004, FRB growth rates and condition began to decline. In 2009, the size of stocked FRB was increased due to concerns that smaller fish were escaping through the outlet structure. Additionally, anglers expressed concerns of diminished fish quality and poor catch rates. Despite a change in stocking, poor growth and small average size (14.5) was observed in 2015 and 2016, which prompted another reduction in stocking density in 2017; 600 sub-catchables (5 inches).

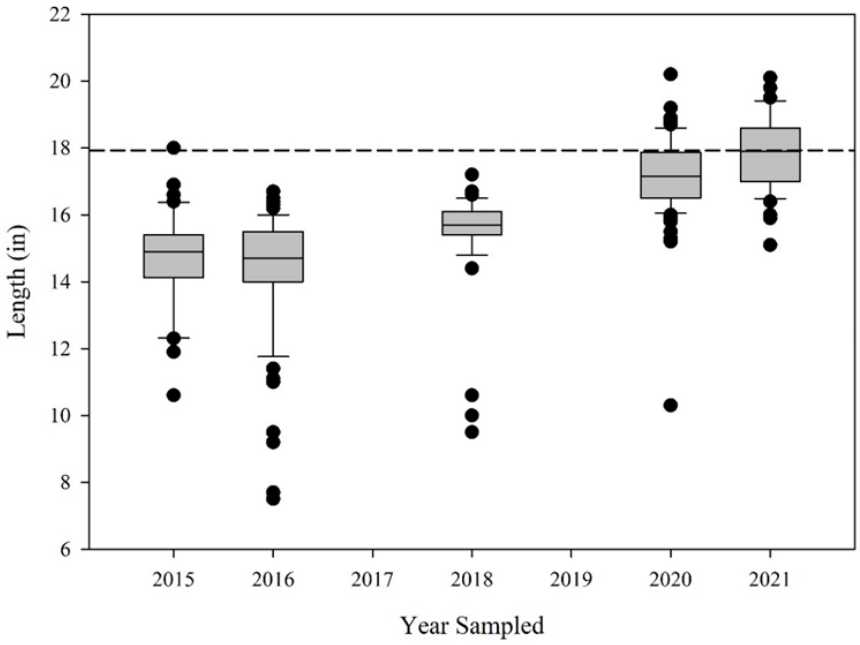


Fall Rainbow Trout length with 95% confidence intervals (diamonds), the size at stocking (squares) and management objective (red line) of the cohorts stocked captured during 2021 in Luce Reservoir.

In 2021, gill nets were set to evaluate the fishery and our stocking strategy. We found a much improved size structure with an average length of 17.9 inches which is very close to our management objective of 18 inches. We found that stocking larger sized individuals reduced growth rates. For example, the 2016 cohort was stocked at the largest size but had the slowest growth rate, whereas the smallest and youngest cohort (2019) had incredible growth, as seen in the figure above. The new stocking strategy is resulting in growth rates of 3.1-8.0 inches/year. While fast growth within the first 3 years is typical with trout, it has not been observed in Luce Reservoir for many years. All of this suggests that the current stocking strategy for Luce Reservoir has this fishery on the right path.

Luce Reservoir—Continued

In 2021, greater than 25% of the individuals sampled were above the management objective. In the recent dataset (2015-2021), no individuals sampled were above the management objective prior to 2020 as seen in the figure to the right.



Box plots of the of FRB TL captured by year in experimental gillnets set in the Luce Reservoir.

The take home message is too many trout was hindering growth rates and body condition. Density was high and remained high due to fish surviving well beyond an expected age. Older individuals were already at their maximum growth potential and taking up resources that prevented newly stocked individuals from realizing fast growth. This can be seen in the photo below comparing two different age rainbows below. Stocking fewer and smaller individuals has produced a higher quality fishery and is guiding Luce Reservoir closer to it's trophy status.

The top fish was 6 years old and the bottom was 2 (19.3 in; 3.5 lbs). As a reference the top and bottom fish were stocked in 2015 and 2019, respectively.

Update—Soldier Creek willow planting

As described in the 2020 Angler Newsletter, a steeljack fence was installed along 2,600 ft of Soldier Creek, a tributary to South Paintrock Creek in the Bighorn Mountains, to address degraded riparian habitat, The next phase was to establish willows inside the steeljack fence exclosure, and to do so with an experimental approach.

The fenced area or exclosure was divided into 13 plots; 11 planted plots and two unplanted plots (figure below). Within planted plots, rooted willow stock and cut willow stakes were planted on alternate banks. Willow stakes were harvested near the Tyrell Ranger Station and 500 rooted stock willows were purchased from Piney Island Native Plants in Sheridan. The planting strategy focused on a random design spacing individual rooted stock, stake and stake clusters at 6 foot intervals with a setback off the fence of 4 feet to prevent browsing. Rooted willow and stakes were quantified for future proportional survival analysis. Plot 7 and plot 13 were left unplanted to evaluate natural willow recovery within the exclosure. With this experimental design we will be able to evaluate three responses of willows along Soldier Creek: (1) natural recovery (unplanted) within and outside the exclosure (2) proportional success of planted and unplanted plots within the exclosure; (3) proportional success of willow stakes vs. rooted willow stock within the exclosure.

A planted willow inside the riparian corridor protected by steel jack fence.

Workers planting cut willow stakes.

Soldier Creek steel jack fence perimeter (blue line), stream segment (red line) protected by the exclosure fence and 13 plot areas. Plot 7 and 13 were not planted.

North Fork tagging project continues.

In 2020 we launched a project that should provide some much needed clarity on management of the trout fishery in Buffalo Bill Reservoir and the North Fork of the Shoshone River. In the 2020 and 2021 newsletters we discussed why we were using the current approach. Each year we learn just a little more about different aspects of this trout population, but it won't be until after the 2024 field season until we really have the opportunity to do a thorough analysis of the data we are collecting.

Each trout will have two tags; one yellow and one green. Reporting the tag number from one of the tags is all that we need.

We were able to capture and tag 2,594 trout in nine days of sampling during April and May of 2021. We conducted recapture passes in June, but the drought conditions scuttled our planned sampling in July and August.

To date there have been 3,943 trout captured during tagging events in April and May 2020 and 2021, and 3,045 trout captured during recapture events in June-August 2020 and June 2021. Of the 3,943 encounters during tagging events 114 trout have been recaptures. Of the 3,045 trout encountered during recapture events 95 have been recaptures.

Between January 18 and December 24, 2021 a total of 211 angler captured tagged trout were reported to WGFD. Tagged fish were caught throughout the calendar year in Buffalo Bill Reservoir but only between April 21 and August 18 in the North Fork above Newton Creek. Only two tagged fish were captured on the North Fork, below Newton Creek, prior to the closure and tagged trout were also caught from July 1 through August 25 on this stretch of river.

We will continue to tag as many as 2,000 trout in the North Fork Shoshone River through 2024. Calling Game and Fish to report the capture of a tagged fish is critical to the success of the project. You also will be entered to win a Yeti cooler or a Traeger Grill! Prizes are sponsored by the Adiposse Chapter of Trout Unlimited.

Sunlight Creek brookie abundance

Over the last five years we have been fielding phone calls and answering angler questions about the status of the Brook Trout population in Sunlight Creek. The majority of which were concerned about low catch rates. A few anglers even said they heard a rumor that we chemically removed these fish. Let me assure you there have been no clandestine Brook Trout removals and the brookies in Sunlight Creek were found to be doing quite well in 2021.

Population estimates were conducted at four stations on Sunlight Creek, three of which were to assess the population response to the Sunlight Creek habitat restoration project (two sites on the Sunlight WHMA) and one downstream on private land. One spot was sampled on Sunlight Creek near Company Creek. At each site, Brook Trout averaged between 5.9 and 7.3 inches long. Population estimates for all trout ranged from 634/mile at the downstream most site to 1,205/mi near Company Creek. The biomass estimates (pounds of trout per mile) ranged from 110 pounds/mile to 194 pounds/mile.

Brook Trout at all sites were in excellent condition—very plump. Through the Sunlight Creek habitat restoration project, there was a 196% increase in the biomass of Brook Trout when compared to the non-restoration (control) sites sampled.

Number sampled, mean length (in), number per mile with standard error, mean weight (lbs), and pounds per mile with standard error from multiple-pass depletion population estimates for fish captured from three stations on Sunlight Creek August, 2021.

Species	Size Group	Number	Mean Length	Number/mi ± SE	Mean Weight	Pounds/mi ± SE
Elevation 6725, 1,105 ft reach, near White Mountain, downstream control						
Brook Trout	≥1.0	119	6.7	634 ± 34	0.19	110 ± 8
Brook Trout	≥6.0	78	8.0	398 ± 18	0.24	96 ± 7
Elevation 6,740 ft, 650 ft reach, upstream from Cabins, treatment reach						
Brook Trout	≥1.0	114	7.3	1,019 ± 50	0.2	194 ± 18
Brook Trout	≥6.0	89	8.1	780 ± 36	0.23	180 ± 17
Elevation 6,775 ft, 1,150 ft reach, WGFD Sunlight campground, upstream control						
Brook Trout	≥1.0	212	6.5	1,063 ± 36	0.15	147 ± 16
Brook Trout	≥6.0	120	7.9	573 ± 15	0.2	117 ± 13
Elevation 6,055 ft, 530 ft reach, near Company Creek						
Brook Trout	≥1.00	96	5.9	1,205 ± 149	0.18	175 ± 23
Brook Trout	≥6.00	48	7.8	505 ± 27	0.25	125 ± 16

Bigger pools = bigger fish—Medicine Lodge Creek restoration

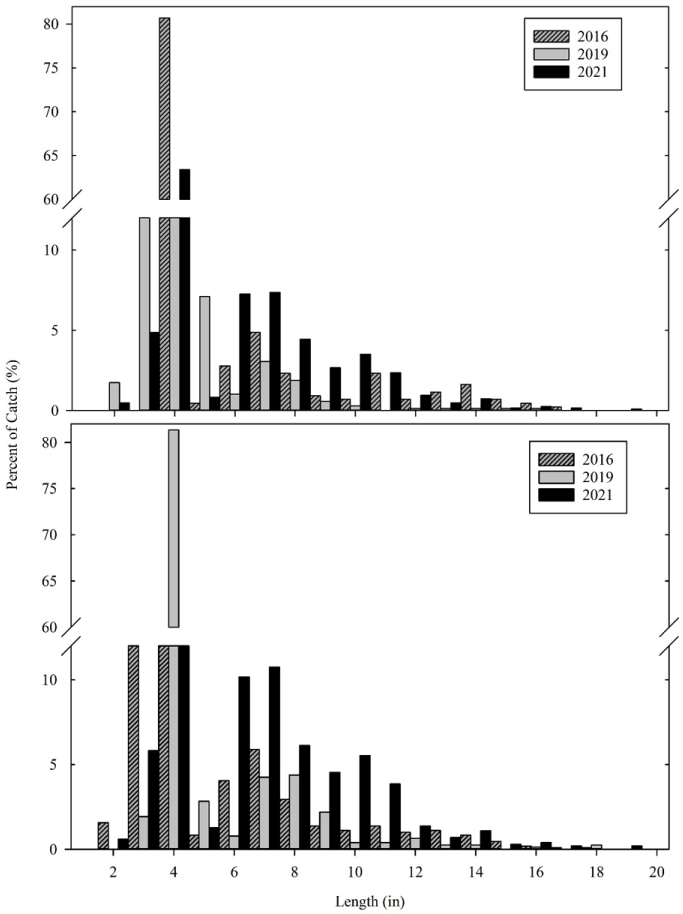
In 2017, the WGFD, in coordination with Wyoming State Parks and the private user of the irrigation diversion, repaired channel degradation across 0.7 mile of Medicine Lodge Creek. Construction started in September 2017 and was completed in spring of 2018.

The goal of the project was to improve stream form, function, and habitat for trout. A secondary benefit of improved habitat conditions was the potential to shift the size structure of the Brown Trout population to a higher proportion of larger individuals. If successful, we anticipated an increase in the pounds of the Brown Trout.

Streams in the Big Horn Mountains are very productive and Medicine Lodge Creek is no exception. It historically boasted ~ 300 pounds per mile, which might seem high and have you dreaming of large trout to angle, but the majority of those pounds are fish < 6.0 inches. If you know anything about Brown Trout, especially the larger sized ones, they desire deep pools and lots of overhead cover—not the dominant habitat that existed in Medicine Lodge Creek prior to the restoration project.

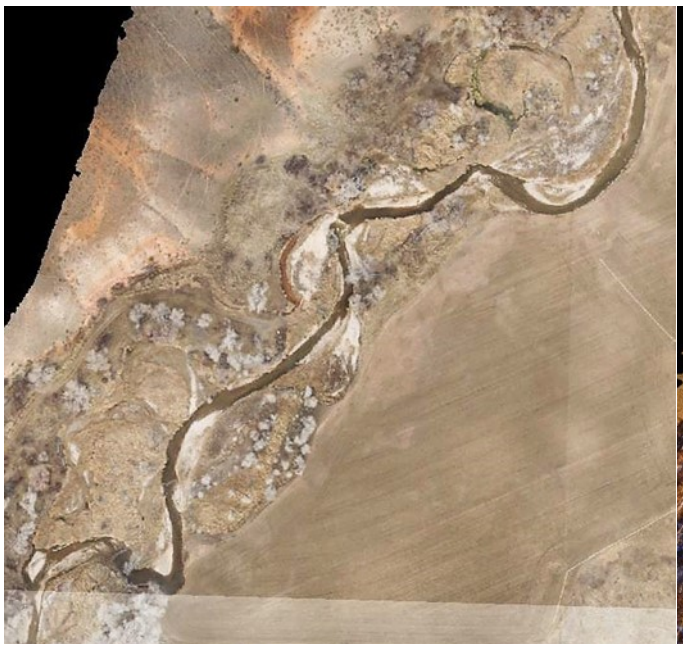
The habitat improvements resulted in increased number and size of pools. Those pools now boast a higher number of pounds of fish with a larger size structure. This shift in size structure can be observed in the figure showing the difference in Brown Trout sizes through time at the control site compared to the sites with habitat improvements.

Improving habitat conditions for any system is a great benefit to how a stream functions. Being able to see those benefits impact the fishery in a positive way is even better.

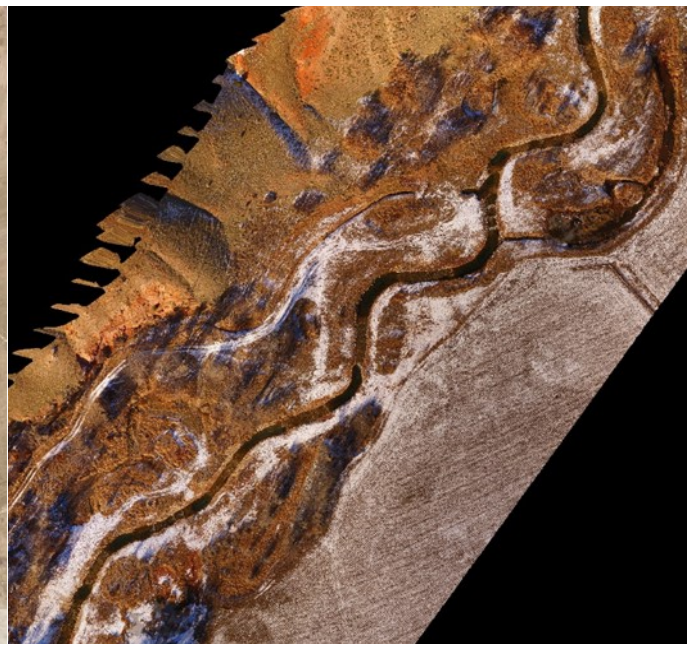


Length frequency for Brown Trout by year for area not improved (top) and project area (bottom) sites on Medicine Lodge Creek.

Bigger pools = bigger fish—Medicine Lodge Creek Restoration



Aerial imagery of stream section prior to habitat improvements.



Same stream section as left picture after habitat improvements (above).

Stream prior to habitat improvements looking downstream. Note the wide channel and steep cut bank.

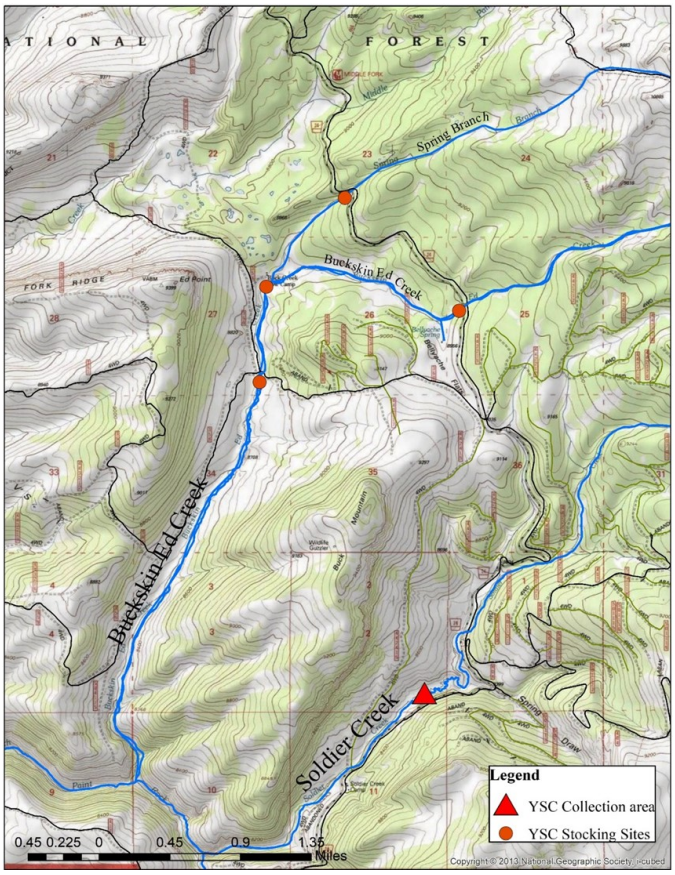
Stream looking upstream after habitat improvements (below).

Buckskin Ed Creek—Once again a Yellowstone Cutthroat Trout population

Chemical treatments occurred in the headwaters of the South Paintrock drainage from 2008-2012 to remove Brook Trout in order to expand a small conservation population of Yellowstone Cutthroat Trout. In 2017, Brook Trout showed back up in Buckskin Ed Creek, one of the streams within the original project area. This discovery prompted chemical treatments to remove the Brook Trout in 2018, 2019 and 2020. Only one Brook Trout was found during the 2020 treatment. Better yet, electrofishing and DNA sampling in 2021 determined that Buckskin Ed was free of Brook Trout.

On August 23, a total of 792 Yellowstone Cutthroat Trout were collected from the Soldier Creek meadows and transplanted to four locations on Buckskin Ed Creek as shown in the figure to the right.

Now that Buckskin Ed Creek is re-established with cutthroat, we can continue to work on the habitat to bolster conditions and provide improved resiliency for our largest population in the Bighorn Mountains. The most cost affective way to do so is by utilizing beavers as ecosystem engineers. Unlike Soldier Creek, Buckskin Ed has the density and distribution of willows needed to sustain a beaver population. In the next few years you can expect to have ample fishing opportunities for Yellowstone Cutthroat Trout in a variety of habitat that will hopefully include numerous beaver ponds.



Map of Yellowstone Cutthroat Trout collection location on Soldier Creek (red triangle) and four stocking locations on Buckskin Ed Creek (red circles).

USFS Fisheries Biologist Casey Barby stocking cutthroat in Buckskin Ed Creek.

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Conserving Wildlife-Serving People

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Important Dates to Remember in 2022

- June 4, 2022— **Kids Fishing Day (Cody) and Wyoming's Free Fishing Day** *The kids fishing event will be held at the Beck Lake Park.*
- June 25, 2022— **Bighorn National Forest Kids Fishing Day.** *This event is sponsored and led by the Bighorn National Forest and will be held at the Porcupine Ranger Station Pond.*
- March 1—November 30—**Aquatic Invasive Species Boat Inspections** *All watercraft transported into the state from March 1 through November 30 are required to undergo a*

We welcome all questions and comments on this newsletter or about the fisheries resources within the Cody Region. Please feel free to give us a call at 307 527-7125 or send an email to:

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