

Sacred Waters CO Foundation Fish Stocking Assessment

Conservation

Advocacy

Rehabilitation

Education

By: Joseph Eichelberger

Over the last 125 years of domestic fish stocking/planting in Southwest Colorado, the rainbow trout has become the most popular species of trout planted in our local fisheries. A majority of these areas have gone from being working ranches or forest river valleys to vacation ranches, sub-divisions, and as our human/angler population grows this happens way more often in higher numbers. This all has led to long-term and consistent loss of the wild trout population.

Colorado has some of the most diverse river systems in the United States. This has allowed generations of anglers' unique challenges in every new stretch of water they may have set their feet in. However, today the abundance of fishes that was once known to every Colorado Native has since diminished into only a glimpse of what once was a healthy habitat. Fishes locally migrate farther and more often than fishes in other part of the country, much of this due to the years of the mismanagement of the river's resources, paired with overstimulating population of hatchery fish year after year.

Each year millions of fish are planted/stocked throughout Colorado with minimal concern to the health of the fisheries. It is part of Sacred Waters CO Mission to educate landowners and anglers so that together we can improve the health of our local fisheries.

Concerns:

#1.) Waterways change! Some people may not understand or like it... With a lot of private waters that have had poorly designed &/or even illegal stream habitat work done on them over the years 2019 heavy run-off changed, rerouted/rechanneled streams.

CAUTION: When using heavy equipment in our waters!

Heavy equipment can demolish the insect population in the area you intend to create a better habitat for the fishes and take from 1 year to over a decade to recuperate if at all depending on the invertebrate species. While you may have created a more ideal habitat, there is no food to entice the fishes to stay. Also, the sediment that is kicked up during the use of the heavy equipment will settle in that great pool downstream, forcing the etymology to change or die much farther downstream. The fish that once settled in those pools are often then suffocated or they just move out. This also threatens the eggs and fry of spawning fish. It is important to consult the professionals before commissioning river work which would require any heavy equipment or stream adjustment. If not, you may pay a lot of money to never see another fish in your waters.

#2.) Planting/stocking of full sized domestic/hatchery fishes believing to be helpful to fish populations. Unfortunately, this is not the case. Planting/stocking of full-size/catchable hatchery fish will aid in the destruction of the wild fish population. Due to many factors touched on throughout this paper. Like, High aggression/competition of Domestic/Hatchery fishes displacing Native/wild fishes. Hatchery fishes very low introgression rates in spawning with wild fishes & if successful passing on poor genetics & possibly disease. Hatchery fishes decimating aquatic invertebrate(food) sources changing the entire ecosystem of the area and aiding in higher aquatic vegetation growth. Proper species and fingerling size at the right time & location can work better because they will be young enough to adapt to the wild environment.

Why might full size, older, catchable domestic hatchery fish aid in the destruction of a Native/Wild Trout Fishery?

1st. A full-grown catchable size fish is older &/or overfed.

As a fish is raised in captivity, their DNA genomes literally start to change with 1 year. Their survival/wild animal instincts start to fade as time goes by, spawning success diminishes, and aggression levels rise.

2nd. Hatchery raised trout are more aggressive!

As they are raised in tight quarters fed pellets, they must feed more aggressively to compete with all the hundreds to thousands of other fishes in the trough or pond just to get a bite to eat. When placed in a wild trout fishery they will tend to out compete the wild / native fishes and with the wild fishes having survival instincts many will just leave to find areas with less competition, more food and/or to just survive more peacefully. In turn if this location that had been stocked with hatchery fish is your private fishing area you pushed out the wild & native fishes to other areas as for public waters or possibly private waters that aren't properly managed or regulated and those true survivors, the truly wild parents of the optimal species/sub-species for the particular habitat/fishery may just get killed by other anglers and never reproduce, never return to their favorite home waters, of your property, etc.. Some people see aggression as a positive and yeah it can make fishing way easier at times, but this also relates to lack of fear response to not avoid predators, anglers, and even eat items that are not even food or digestible. Plus, it is just Not Real Fishing!

3rd. Seasons and water conditions.

As the weather and water conditions change these domestic fishes may not have the survival instincts to adapt properly to changing conditions. We have a drought and they do not know to migrate to deep pools, cooler headwaters, or springs, and the like get trapped and die. Same goes for Winter or Run-off, wild born fishes or even planted small young fishes that grew up in a waterway know where to go as per the conditions. Many of you may have heard me over the years speaking of Wintering Pools, Summer runs/pockets, Sanctuary waters and such.

4th. Spawning/reproduction.

Many hatchery fishes lose the ability to successful spawn especially the longer they are domesticated. Some are purposely sterile. Some hatcheries only sell just females, or only males. Some are just so totally inbred, crossbred, just plain old genetically inferior all around. This too if some do successfully bred/spawn with existing native/wild fishes it is watering down the gene pool and passing on inferior traits and genetics throughout the fishery.

5th. Diseases!

Like most closely contained, overly dirty, feed strange unnatural or contaminated food, domesticated animals tend to be more apt to catching and transferring diseases. Good example 2 of our 4 hatcheries have been shut down out of business over the years because of outbreaks of diseases, parasites, etc.... Like Whirling Disease! This is highly monitored and regulated but not 100% effective that it cannot be spread through our fisheries by total accident.

Side Note:

Whirlings Disease is a serious domestic/hatchery fish problem. Like many diseases it is caused & spread by unsanitary conditions, overcrowding/overpopulation, inbreeding, cannibalism, etc. Whirlings disease had decimated the rainbow trout population in the US and especially the Western States in the early-eighties through the mid- late nineties and now that it is in our fisheries and it may be here to stay permanently. Whirlings Disease, has the worst terminally fatal impact to rainbow trout, followed by cutthroat & cutt-bows, it is rarely even an issue to brown trout or brook char.

Conclusion:

If you put all these factors together and you have a Never-Ending Cycle of expensive intrusive stream habitat work &/or maintenance all while buying and stocking inferior fishes year after year. As this cycle continues throughout time the recovery on the fishery may never happen if your goal is to try to be self-sustaining and wild. The odds of something like disease and overpopulation of 1 sex, which leads to a lack of successful spawning, the list goes on and on. Bottom line you will spend a lot of money to watch the fishery never achieve its potential.

Resolutions/Best Practices for a healthy, sustainable, native/wild trout fishery:

(Listed in order from most invasive, time consuming & expensive fixes to cheapest and easiest fixes here below.)

1. Keep heavy equipment/mass excavation to a bare minimum and generally only use if rehabilitating human caused damage.
2. Best use of heavy equipment would be in aiding in the ability of quicker bank stabilization through placing fertile topsoil and planting/establishing native vegetation.
3. Expensive & time consuming but if/when able consult professionals (fisheries scientists, highest quality guides, fisheries management consultants, and stream/habitat engineering firms) to do scientific data collection to evaluate average water volume (population capacity), habitat diversity, biomass of food sources, current biomass of fishes, and overall water quality.
4. Only stock/plant domestic hatchery fishes if f totally necessary because of extreme human caused &/or natural disasters. Only do so by finding out the majority/dominate native or wild species already present and match species. Plant/stock the youngest/smallest fishes at the right places, at the right times, and expect varying results/returns on investment, this is a long-term commitment.

5. Hire a professional highly rated, experienced, ethical Outfitter/Guide. Many people don't even know what they have, how good of quality fisheries they are fishing due to a lack of angling knowledge, experience, wrong time of the year, wrong type of water/habitat for a time of year, wrong flies, &/or lack of overall angling skills. You could fish an area for the first time or even multiple times, with poor results. A knowledgeable local guide can help correct all of these issues possibly in just one guided trip by evaluating the waters to utilized the best habitat at that time, knows the food sources and local insect activity to choose the proper flies that fish are feeding on, improve your skill sets be it proper approach/presentation, improve casting abilities, improve line control/drift, and overall fishing success. So that area that did not have any fish every time you fished it did have fish and with your improved skillset & knowledge just showed you that there was never poor habitat or low fish population problem/s. Your Guide should also teach you proper fish fighting techniques and safe handling. Should coach you along on how to fight a fish as quickly as possible be it by using the right equipment for the job at hand, techniques of use water currents and rod angle in your favor and how to properly successfully net the fish. The Guide should teach you how to safely handle your catch to not hurt/damage the fish, remove the hook as quickly & safely as possible, and how to release or revive the fish.
6. Keep livestock &/or mechanical equipment (vehicles, tractors, excavation machinery, atv's/ohv's) out of the water and/or far away from the water. Fairly simple, easy, cheaper improvements by keeping these things away from the stream will keep riparian habitat/streambank vegetated as explained above, keep streambanks from being trampled/crushed into the streambed which when it does happen creates weak spots for rechanneling of the stream, shallows & widens the stream which may make it uninhabitable water, accelerates the warming of the water temperature, that may even effect the entire drainage with thermal issues the rest of the way downstream. Finally, pollution if livestock freely urinates & defecates in and along the water or same with toxic chemicals from mechanic equipment (fuel, oils, antifreezes, etc.) can be deadly to the fishes and insects.
7. Do not stock/plant domestic hatchery fishes &/or invasive species unless absolutely necessary.
8. Protect your spawning grounds and spawning fishes. Be aware of and maintain spawning habitat, do not harass, do not fish for spawning fishes, do not allow humans or livestock to wade &/or drive over spawning habitat, or redds.
9. Practice the safest Catch and Release or Selective Harvest with single barbless hooks of artificial lures & flies, rubber bagged nets, and wet hands.
10. Do Not fish in warm/hot waters stop fishing if water temperatures reach or rise above 68F. Check water temperatures often throughout the day.

**(Please reference this entire document for more information/details about this list of 10 practices/resolutions as needed.) **

By the Numbers: Morality, Spawning, Migration, & Growth:

Average Mortality Rate per year of Trout/Char:

Native/Wild Fishes – 30% - 65%

Hatchery Fishes – 80% - 95%

**(These are conservative mortality rates, best case scenario numbers most all studies referenced for this paper showed a mortality rate of greater than 95% most more around 99-99.99% morality.) **

Native/Wild Fishes Introgression(hybridization/Crossbreeding) with Domestic Hatchery Fishes in an equally mixed Wild & Domestic fishery:

90-95% Pure/Wild/Native DNA

5-10% Introgression (*even with low numbers of introgression the offspring will always be genetically inferior and lower overall long-term survival rates & sustainability.*)

<5% Hatchery

Stocked Domestic Hatchery Trout Migration/redistribution within 7 days of planting/stocking:

70% redistribute 1.25mls. or less

20% redistribute 1.5mls. – 6mls.

10% redistribute 6.25mls. or more

Brown Trout migrate the Least, Rainbow Trout migrate the Most, and Cutthroats & Brook Char- Migration distance/s vary based on water temperature/s, overall size/population of more dominant species, etc...

Fishes planted in the Fall tend to have a lower rate of mortality, tend to migrate downstream, and have a lower growth rate per year.

Fishes stocked if the Spring tend to have a higher rate of mortality, tend to migrate upstream, and have a higher rate of growth per year.

The Data:

(generic baseline projections based off averages & varies greatly on fishery that is being supplemented with Domestic Hatchery Fishes due to many factors such as habitat, food, predation, floods, &/or droughts.)

Example: Fish purchasing Budget of \$3500.00 at on average (rainbow trout) \$5.00 per lb. with fishes 9"-Larger or \$0.25 per inch on fishes under 9".

(Hatcheries' pricing structures vary and other species, brown trout, brook char, cutthroats are generally higher costs @ \$0.30 an inch and Exotics/Hybrids tigers, palominos, cutt-bows, splake, even higher costs @ \$0.35 an inch or more.)

\$3500.00 Budget: Total= 14,000 total inches or 700lbs. of Rainbow Trout

*(Baseline prices and quantities at \$0.25 per inch or \$5.00 per lb. for Rainbow Trout Only. Planted /stocked evenly through 1.25mls. of water at center point of property up/down of mile mark 2.5 within a property/stream that's 5mls in total length. As well as exact even quantity of size range/s of fish purchased, and with even up & downstream migration all of which is uncontrollable and unpredictable.)

Size by the inch	Qty. of Fish per Inch <9" or per LB >9".	Qty. of fish purchased	Fish Stocked / planted between 2-3-mile mark evenly per ¼ ml. (center of property) 1.25mls total distribution	Fish that will remain @1.25mls. of release point	Loss due to Migration off Property within 1-2 weeks of Planting / Stocking	Total # of fishes remaining on property after initial migration/s	Surviving Fishes @ 1 yr. Qty#/% of loss on initial investment	1 Yr. of Growth (Size Inches)	2 nd Yr. Population Survival Qty#/% of Loss on initial investment	3 rd Yr. survival Qty#/% of Loss on initial investment	Average Return/ Gains on Initial Investment
1-2"	50/50 1 & 2" fish = 14000"	9334	1867	6534	1970	7364	3682 / 96.05%	8-11"	107 / 98.86%	50 / 99.46%	1.88%
3-4"	50/50 3 & 4" fish =14000 "	4000	800	2800	844	3156	316 / 91.35%	9-13"	101 / 97.47%	45 / 98.88%	4.1%
5-6"	50/50 5 & 6" fish =14000 "	2546	509	1782	538	2008	301 / 88.17%	10-15"	105 / 95.88%	43 / 98.31%	5.88%
7-8"	50/50 7 & 8" fish =14000 "	1866	373	1306	394	1472	294 / 84.24%	11-17"	112 / 94%	43 / 97.7%	8.02%
9-10"	3.5 fish per LB. = 700 lbs.	2450	490	1715	517	1933	290 / 88.16%	12-18"	119 / 95.14%	42 / 98.29%	6.14%
11-12"	1.5 fish per LB. = 700 lbs.	1050	210	735	221	829	83 / 92.09%	13-19"	32 / 96.96%	10 / 99.05%	3.97%
13-14"	.5 fish per LB. = 700 lbs.	350	70	245	73	277	14 / 95.71%	14-20"	4 / 98.86%	1 / 99.72%	1.9%

