



# Boise River New Dry Creek Side-Channel Spawning Project

Revision 4: 9/1/2020

## Problem Statement:

Loss of spawning gravel is a systemic problem below hydroelectric dams and is a known issue in the Boise river system that is limiting trout reproduction. (Asbridge and Bjornn 1988). IDF&G electroshocking surveys (Figure 1, IDFG 2016) show that the Boise river has a good population of rainbow and brown trout but the lack of spawning habit limits their ability to reproduce.

Gravel augmentation is an approach to improve trout spawning habitat that has been done in the Boise river by the Ted Trublood chapter of Trout Unlimited with their latest project being at Heron Park in Garden City. These gravel additions have been successful with trout spawning being documented the following season and higher fry densities being counted by IDF&G in areas where gravel augmentation and woody debris projects have been done (Figure 2, Cassinelli 2020).

## Proposal and Goals

Side channels are the best areas for habitat improvement (Asbridge and Bjornn 1988). We propose to do gravel augmentation to a side channel of the Boise river between the head of Eagle Island and the New Dry Creek diversion. IDF&G survey shows good populations of adult trout in this area but fewer numbers of fry compared to other areas in the river. The side channel has good existing habitat for trout including year-round flows, good tree canopy and some areas of large woody debris. We aren't proposing to add gravel to the entire side-channel but to target several areas that have the right depth and flow to support successful spawning. A secondary goal is to learn the general gravel augmentation process so

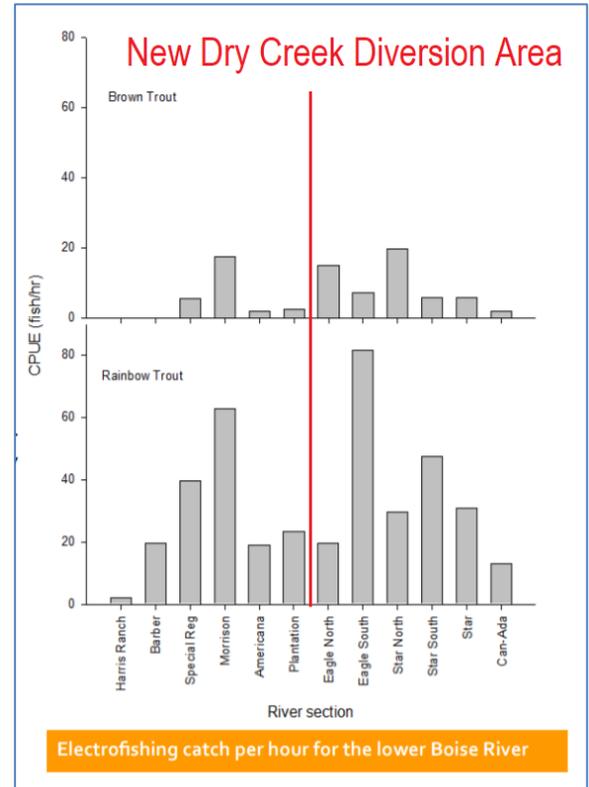


Figure 1

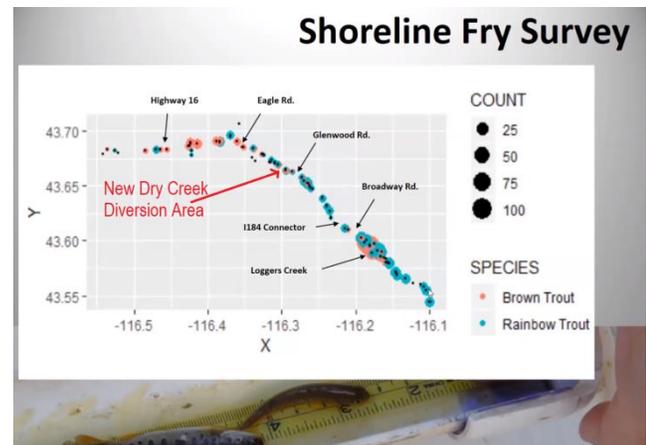


Figure 2

that it can be applied to additional spots on the Boise river and potentially other tailwater rivers in the area such as the Owyhee.

## Target Area

The New Dry Creek Diversion has two small side-channels, one on the north and one on the south. The side channel has year-round flow, good tree canopy and some good large woody debris as shown in Figure 3. Trout have been observed in the side channel as well as some limited rainbow trout spawning activity. During the flood-level spring runoff of 2017 the south-side channel expanded significantly and the Boise Flood District has been working to repair the damage while still retaining adequate flow in the side-channel for trout and we plan to partner with

them to make the side-channel good habitat for rainbow and brown trout.



Figure 3: Side channel example Large Woody Debris

## Trout Spawning Habitat Needs

Trout need the right size gravel with adequate streamflow to keep the redds clean from sediment and provide oxygen to the eggs. The preferred gravel depth for spawning is 1 to 4 feet deep at the side or tailout of a run/glide where there is sufficient flow and the right gravel. We reviewed the side channel with Dr. Tracy Hillman, an ecologist with Bio Analytists who specializes in trout habitat restoration and he helped us identify three areas for gravel augmentation.

## Spawning Gravel

Rainbow and Brown trout like to spawn in gravel that is 1 cm to 6cm (0.4" to 2.4") in size. Smaller trout need smaller gravel sizes. The gravel must be round stream or drain rock of the appropriate size. The rock should be washed clean of all sand, clay and fines. Under no circumstances should you use cracked or crushed rock for spawning gravel (Raleigh, 1984). The gravel used by Trout Unlimited at their Heron Park per IDF&G recommendation was a mixture of sizes ranging from 3/8" to 1 1/2" and the gravel distribution used was: 20% 3/8" (0.95cm), 30% 1/2" (1.27cm), 30% 3/4" (1.9cm) and 20% 1 1/2" (3.81 cm). The gravel was obtained through PG&E in Caldwell.

## Fry Habitat

Cover is an important feature for the survival of rainbow trout fry. Large Woody Debris (LWD), boulders, and undercut banks have been described as key cover components for trout (Bjornn and Reiser 1991). The channel currently has some good large woody debris but it would be good to have more near the areas where we are adding gravel. We are working with Mike Dimmick, project manager for Boise Flood District 10 to let them know about our plans to add gravel to the side channel and look for the opportunity to leave LWD on their next maintenance cycle this winter.

## Boise River Flows

The Boise river is dam controlled. In May, when rainbow trout are spawning flows average around 1,500cfs but range from 700cfs on a “low snowpack” year to 6,000cfs on a “high snowpack” year with occasional flows even higher. Summer flows are typically 1,000-1,200cfs. This year (2020) was considered a “low snowpack” year and flows were around 700cfs in May and have stayed around 800cfs all summer. In late Fall when Browns are spawning the Boise is much lower. Flows are typically 250cfs and pretty consistent. IDF&G is lobbying to increase the winter flows to 350cfs in the Boise river to help provide better habitat for trout, but that will take several years.

## Side Channel Depth and Flow

Flows in the side channel are good for rainbow trout spawning but not all areas will be suitable for brown trout spawning because of the lower winter river flows. The Boise flood district has added rocks at the entry of the side channel to help control the amount of water that enters. 2020 was a lower flow year and during the summer of 2020 the side channel depths ranged from 1 – 4 feet deep with most areas being 2 -3 feet deep. In a more typical year there would be more water in the side channel. As a part of repairing the flood damage from 2017 the flood district wants to ensure adequate flows for fish passage may adjust the rocks at the entry.



Figure 4: Rainbow Trout, caught near side-channel in March 2020. She needs some place to spawn!

## Permits

The TU Heron Park project required Army Corps 404 permits and Idaho Dept Water Resources Stream Channel Alteration permits. We will need to apply for both permits to do gravel augmentation.

## Materials Cost

The primary cost is for the spawning gravel. Our proposal is to add gravel to 3 key areas in the side channel. Each area is about 5' wide by 20' long. At a 6 inch depth this is about 5 ½ cubic yards. TU got their gravel from Precision Grading and Excavation in Caldwell, and we have a request in for a price quote from them but haven't heard back. Sunroc gave us a quote of \$200 for 6 yards of ¾" round (washed, non-crushed) gravel, delivered. That cost could change after talking with IDF&G due to a change in rock type or mix of sizes. I would expect the cost for gravel would stay under \$500.

## Effort and Timing

We want to coordinate placing the gravel when Mike Dimmick's flood district crew will be working in the area, which will be mid-winter (Dec-Jan). If we make the gravel available then they will try to place it while doing their yearly maintenance. We will likely need to go into the channel after they move the

gravel to groom it into place. It is possible that there will be some areas where machinery cannot place gravel and we will need volunteers to carry and deposit sacks of gravel to the side channel.

## Project Monitoring and Management

It is expected that the gravel will migrate downstream with spring high flows, although the protected nature of the side-channel will likely limit that except in the highest runoff years. Over the next few years we would like to monitor both the use of the new spawning gravel by rainbow and brown trout as well as determine how often it needs to be replenished or otherwise maintained to continue to promote spawning. It would also be good to review IDF&G's trout fry and adult trout electroshocking survey results to see if there is an increase of fry, and later adults, in the area.

## Side Channel Details

The New Dry Creek south-side channel is approximately 1,000 feet long, 15 - 20 feet wide with year-round flow, areas with good woody debris and an excellent tree canopy. During the summer of 2020 it ranged from 1 – 4 feet deep with an average depth of 2 – 3 feet. The last 200 feet of the side channel is slower and deeper with more sediment. There are 4 or 5 areas that have the right water speed and depth for trout to spawn and we have selected three of them for adding spawning gravel. Here is an overview map with the approximate areas marked as well as photos of key areas.





1. Side-channel entry from main river. May need to be adjusted to ensure minimum winter flows for spawning brown trout. All flow notes are based on measurements taken when the river was 750cfs.



2. Gravel Addition #1 is located below the fast-water at the top entry between the main deep flow and the far bank.



3. Diversion Dam “Crossing” area. Spot used to cross side-channel by anglers and portage boats around diversion dam.



4. The second gravel addition is below the “Diversion Crossing” area, in the center next to the deeper heavier flow on the far bank.



5. This Fast-water area had some spawning activity in 2020.



6. Gravel Addition #3 is next to a deeper pool below a faster water chute where the water slows approximately 200 feet from the end of the side channel.



## Project Outline

1. Verify that improving spawning habitat in the Boise river is needed. Evaluate project interest with BVFF officers and confirm potential to collaborate with the Flood District. (Done)
2. Review Boise river flows during spawning months and photograph side channel (June - Nov)
3. Ask IDF&G about gravel augmentation and their egg-box project (June)
4. Review the literature for recommendations on good spawning habitat and how to do gravel augmentation. (Complete)
5. Review current and past spawning habitat projects on the Boise and learn from Trout Unlimited's work (Troy, Jim, Tom: Summer)
6. Identify key areas to place spawning gravel and estimate volume of gravel needed. (Complete)
7. Review plan with IDF&G (John Cassinelli) and BVFF officers Jim and Tom. (Sept BVFF meeting)
8. Review proposal with Mike Dimmick and determine approximate timeline. (Fall)
9. Submit BVFF paperwork and present to BVFF board for approval and funding. (Fall)
10. Implement plan over the winter season of 2020/2021. Recruit volunteers from BVFF as needed to work with Mr. Dimmick to install gravel. (Winter)
11. Monitor spawning activity during the spring of 2021 (rainbow trout) and Fall of 2021 (brown trout) and report back to BVFF.
12. Evaluate gravel movement after spring 2021 and 2022 high water flows and propose gravel refresh cycle if needed.

## People and Recognition

The following are people who have worked on this project to date. Troy, Mike and Tracy all live in the neighborhood adjacent to the side-channel and have adopted it as a neighborhood effort. Recognition needs to go to Mr Dimmick who is proactively seeking to improve the side channel for trout habitat and ultimately was the inspiration for this project. We were very lucky to get some of Dr. Hillmans time—thank you very much, Tracy. And lastly, a big thank you to Andy Brunell for helping us understand the TU gravel augmentation projects.

- Troy Pearse, BVFF coordinating conservation officer
- Tom Old, BVFF President, site investigations and project document reviewer
- Jim Kazakoff, BVFF Treasurer, site investigations and project document reviewer
- Mike Dimmick, Boise Flood District 10 Project Manager
- Dr. Tracy Hillman, Fisheries Biologist and CEO of Bio Analysts
- Andy Brunell, Boise chapter of TU, project logistics consultant

## References

- Asbridge and Bjornn 1988, SURVEY OF POTENTIAL AND AVAILABLE SALMONID HABITAT IN THE BOISE RIVER
- Bjornn and Reiser 1991, Habitat Requirements of Salmonids in Streams
- Cassinelli 2020, BREN presentation on Fish of the Boise River
- IDFG 2016, IDF&G SW Idaho Newsletter
- Raleigh 1984, HABITAT SUITABILITY INFORMATION: RAINBOW TROUT

<https://www.deq.idaho.gov/media/1118351/habitat-suitability-information-rainbow-trout.pdf>