2003 Tin Cup Dam Repair Project - Fisheries Monitoring Report

On July 1, 2004, I visited Tin Cup Dam to check compliance with the terms and assumptions that were made in the fisheries Biological Assessment and Evaluation (BA/BE, dated September 2, 2003).

The BA/BE identified two primary impacts of concern: (1) sediment production; and (2) the potential for crushing fish by fording Tin Cup Creek with a spider-excavator. Since the spider-excavator was not walked up the trail, the concern about crushing fish is null and void.

I walked the spillway (Photos #1 and #2) and the lower gradient section of Tin Cup Creek downstream of the dam and looked for signs of unusual sedimentation. I did not find any unusual sediment deposits or indications that adverse sediment increases had occurred as a result of the repairs. Sediment levels looked similar to those that were monitored in 2000-01.

Photo #1. The spillway, looking out towards Tin Cup Lake.


Photo #2. The spillway looking downstream.

There are about 20 sandbags on the bottom of the spillway near the area where the spillway narrows and increases in gradient (Photo #3). There is also a large pile of sandbags stacked near this area, on the south bank of the spillway.

Photo #2. Sandbags in the bottom of the spillway.

The biggest change that I noticed since my last visit to the dam in October, 2001 is the presence of a parshell flume in Tin Cup Creek about 20 feet downstream of the outlet pipe in the dam (Photos #4 and #5).

Photo #4. The flume below Tin Cup Dam. The boards making up the wingwalls are leaking some flow.

Photo #5. From the dam crest, looking downstream at the boulder deflecting water and the flume.

This flume was not present in 2001, and I do not know if the flume was installed as part of the 2003 repair project, or if it was already present prior to 2003. If the flume was installed as part of the 2003 repair project, then the BA/BE was incorrect in stating that all of the work at the dam would occur in areas outside of live water because the installation of the flume had to have occurred at a time when live water was flowing down Tin Cup Creek. In any case, the installation of the flume does not appear to have increased sediment levels in Tin Cup Creek. If anything, it has resulted in a channel structure that has flushed more sediment from the low gradient section of Tin Cup Creek directly below the outlet pipe. Instead of a channel primarily composed of lower gradient riffle and a couple of shallow pools, there is now a large pool above the flume, a high gradient riffle/cascade at the outlet of the flume, and a larger pool below that. Upstream fish passage is not a concern at the flume because the flume is located very near to the impassable outlet pipe of the dam. Fish can easily pass downstream through the flume. In any event, the short, low gradient section of Tin Cup Creek that is being impacted by the flume is not permanently inhabited by fish. Fish that are washed out of the outlet pipe may hold in this area during the summer months, but do not survive the winter due to very low water levels and freezing.

I made a couple of other unrelated observations during my visit to the dam.

There is a large boulder (one of the boulders used for rip-rap) in Tin Cup Creek about three feet directly downstream of the outlet pipe (Photo #6).

Photo #6. Boulder deflecting the full force of the water coming out of the Tin Cup Dam outlet pipe.

This boulder deflects the full force of the water coming through the outlet pipe, shoots the water several feet into the air in a "fountain effect", and then steers the thalweg of the stream towards the opening in the flume. I don't know if the placement of this boulder was accidental or intentional, but I recommend that the boulder be left alone because it is currently doing several good things. It is dissipating the considerable power of the water shooting through the outlet pipe, it is protecting a small island from erosion, and it is helping to steer the thalweg into the opening of the flume. If the boulder were to be removed, the island would almost certainly be blown away, and the full force of the water coming out of the outlet pipe would not enter the opening of the flume cleanly. It would hit the wooden boards that funnel water into the flume and cause additional leakage through the boards (which are already leaking a small amount).

The breach in the dam was filled in 2003, but the crest of the dam at the site of the breach is currently unvegetated and has rilled and eroded during recent rains (Photos #7 and #8).

Photo #7. The filled-in portion of the dam breach. Rilling is visible on the downstream (right) slope.

Photo #8. A wider-angle view of the dam crest and filled-in breach, looking north.

The mudflat area between the dam crest and spillway does not appear to have been disturbed much by the 2003 repairs. Vegetation is returning to the mudflat, mostly grasses, forbs, and very small shrubs (Photo #10).


Photo #10. The mudflat area between the dam and spillway.

I pulled about a dozen small knapweed plants on the mudflat. It was more knapweed than I saw anywhere along the trail. There were also a few tall buttercup plants. Vegetation is making a good recovery along the outer ring of the lake, particularly in the wetter areas.

The butt of a snapped-off spruce log is currently resting on the cage of the headgate structure, with its top end resting on the rip-rap of the dam face (Photo #11). The log does not appear to be attached to the cage by any man-made means.

Photo #11. Spruce log caught on the headgate cage.

To summarize, the BA/BE predicted that the 2003 repair project would not produce meaningful sediment inputs, and would have an insignificant effect on bull trout and westslope cutthroat trout. My observations at the dam were consistent with those predictions.

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July 2, 2004