ABANDONED CLINTON CREEK ASBESTOS MINE

Fish Salvage July 31-August 02, 2003

under Licence No. 03-19

by

Patrick Roach (report author DIAND)
Rem Ricks (W.R. Ricks Consulting)

Clayton Dyck (DIAND)
Tracy Aldridge (DIAND)
Hugh Copland (YTG EMR)

Northern Affairs Program

300 - 300 Main St.

Whitehorse, Yukon Y1A 2B5

SUMMARY

A salvage of fish from the Clinton Creek channel, downstream of the impoundment known as Hudgeon Lake, was conducted in late July through early August, 2003. The construction of gabion structures in the Creek, require that the flow from the Lake to the upper portion of Clinton Creek, be interrupted for as long as two weeks. In order to prevent a loss of fish in the Creek they were collected and moved either to the Lake or the reach of Clinton Creek below the intersection of Wolverine Creek, depending on which was the shorter distance to transport. A backpack electro-fishing unit was employed with limited success as the conductance of the water is high at 391 mS. While Slimy Sculpin and Longnose suckers succumbed readily to the unit, the majority of the Arctic graying were only subdued for a an extremely brief period of time, if at all. Consequently most of the fish were collected by hand with dip nets, with assistance of seines to assist in grouping the fish. The use of a "home made" Bromo Seltzer™ type product to induce bicarbonate narcosis was planned, but not used, owing to the size of the residual ponds.

The salvage was conducted from the area immediately downstream of the coffer dam inserted to stop the flow, through the gabion structure, and downstream through the "canyon" portion of Clinton Creek to the ford on the mine road. Springs enter the Creek immediately below the "canyon" area and provide a substantial flow of fresh, estimated 6 degree Celsius, water. The flows were of sufficient quantity to provide adequate habitat from this location, past the ford, and downstream as far as Wolverine Creek. Two additional springs were observed entering the Clinton Creek channel, below the ford and above the Wolverine Creek input. It was decided that the fish in the lower reach were in good habitat and moving them below the Wolverine Creek input, which was the original concept, would only stress them to no good purpose.

Owing to the speed required to move the fish, as a combined consequence of the distance to be moved and a warm day, an exact count of their numbers was lost, but sufficient records exist to present an approximate number that we are confident is close to an exact count. The total number of fish relocated from all points of the Creek are: Arctic grayling: 1,345, Slimy sculpin: 264, Longnose sucker: 101, Chinook Salmon: 3 (young of year). In consultation we find that these numbers are probably a bit conservative, but are sufficient to convey the volume encountered in the Creek. Mortalities of grayling were light at an observed 30. The sculpins, owing to their nature of hiding in the gravels and frequenting shallower portions of the Creek channel experienced a much higher mortality. Observed mortalities for the Sculpin were in the range of 100. The suckers proved amazingly durable and only two were observed as mortalities. There were no observed salmon mortalities, which is probably related to their extremely limited presence in this section of the drainage.

Introduction

The Cassiar Asbestos mine at Clinton Creek experienced unstable waste rock conditions in the early years of operation. The waste rock slid down-slope and blocked the passage of Clinton Creek, which formed an impoundment in the Creek valley over time. This impoundment is known as Hudgeon Lake, so named after a mine employee. The Creek channel below the waste rock plug has become incised over the years, to the point at which erosion is threatening to fail the plug and allow the Lake to drain suddenly. In order to prevent the erosion from continuing, a series of rock filled wire baskets are being constructed in the channel below the Lake. It is the placement of these gabion structures that necessitates the temporary elimination of flow in this area of the Creek. The initial structures were placed in 2002 with the aid of a diversion pipe to limit the amount of dry channel required. The work in 2003 does not allow for the use of a diversion and consequently a larger portion of the Creek was required to be dry for the period of construction. It was originally intended that the portion of Clinton Creek, above the confluence of Wolverine Creek, would be allowed to drain and this required that the fish in this section were removed.

Site Overview

Hudgeon Lake drains through a constructed decant channel into the gabion structures placed in 2002. The gabions drain into a boulder garden and plunge pool, prior to entering a narrow portion of the Creek channel. This area is composed of an incised channel with steep walls and a boulder field bottom, known conventionally as the "canyon". Below the reach of the canyon, the channel enters an open rock plain before it reaches the old mine road. This area is a ford, as the original bridge has been unusable for some years. After the ford, Clinton Creek adopts a braided nature and these channels now terminate in two recently constructed beaver dams, prior to the confluence of Wolverine Creek. This is the section of Creek in which the collection program focussed.

Methods

The original design for the collection program involved a barrier net placed immediately above the confluence of Wolverine and Clinton Creeks and one located at the ford. These would be installed prior to the blockage of Creek flow, in order that a majority of the fish could be removed without the pressures of rapidly diminishing flows. A backpack electro-shocker was

intended for use in collecting as many fish as possible in the two days preceding the blockage of flow, after which hand collection methods would be employed.

On 31 July, 2003, the barrier nets were placed and a two person team employed the shocker, while other team members moved collected fish in buckets downstream of the barrier net. While the shocker was effective on sculpin and suckers, the success with grayling was muted. The water leaving the Lake has a conductivity of 391mS and was apparently more conductive than the fish themselves. The primary usefulness of the shocker was limited to "driving" the fish. After working this method for several hours, with limited success (see Table 1), the attempt was abandoned and a new plan devised. It was decided that successful fish collection would only be possible with reduced flow, causing the formation of pools, which could then be netted by hand.

As a follow up to the lower channel work, an effort to remove fish from portions of the gabion structure was undertaken. This met with somewhat greater success, in that the fish were in a confined area and more amenable to netting than in an open channel. The shocker had some increased success through the suspected aid of metal clips in the structures. These staples, while grounding the current, occasionally provided improved performance of the shocker by allowing the current to ground through the fish if they were unfortunate enough to be adjacent to a staple when the current was applied. A number of fish (Table 1) were removed from the structure, but the fish in one portion could evade into the spaces in the rock baskets, which make up the gabions, and were difficult to secure. Again, the primary success with the shocker was obtained by using the fright zone to drive the fish into a barrier net where they could be hand picked. Several passes reduced the numbers in the structure to a small extent, but the overall results were as dismal as in the lower channel. The plunge pool below the structure was investigated and the shocker/net/pick method again proved to be the most productive.

Construction requirements delayed the installation of the coffer dam until the morning of 02 August. After the placing of the coffer dam and the expenditure of a suitable period for the channel to drain, a collection in the canyon portion of the Creek was undertaken. The gabion structure was hand picked of fish immediately after installation of the dam and a surprising number of fish collected (see Table 2). Again the open nature of the rock baskets allowed some grayling to "escape" into the matrix of the baskets and these were lost.

The salvage in the canyon portion was accomplished primarily through hand netting. All fish were collected in buckets and then transferred to a lift bucket which had a rope attached. A lid was closed on the bucket and team members would pull the bucket up the face of the canyon cliffs. At the top they were transferred to coolers in the back of a truck and transported to the nearest body of water. The fish suffered this rather extensive handling with good grace and no mortalities were observed for any fish alive when placed in the lift bucket. A note should be

forthcoming to the manufacturers of Milk Bones™ for the excellent quality of their buckets, especially the lids and handles.

Results

Table 1.

31 July SITES

Site	Description	FISH	Co-ordinates
Gabion structure	In gabions	AG 70 LNS 1	64°27.13 140°43.91
Plunge pool	Immediately below gabion structure	AG 30 CS 1	64°27.13 140°43.90
Clinton channel	Immediately below ford	AG 15 SS 4	64°26.97 140°42.93
Clinton channel	Above Beaver Ponds	AG 60 SS 20 LNS 50	64°26.97 140°42.58

SS = slimy sculpin
AG = arctic grayling
CS = chinook salmon

Table 2.

02 August SITES

Site	Description	FISH	Co-ordinates
Below dam	Above gabion structure in channel	0	64°27.13 140°43.93
Gabion structure	In gabions	AG 70	64°27.13 140°43.91
Plunge pool	Immediately below gabion structure	AG 80	64°27.13 140°43.90
Above canyon	Downstream of gabion structure	AG 60	64°27.13 140°43.87
In canyon	Canyon area	AG 900 SS 200 LNS 50	From above to: 64°27.03 140°43.25
Above ford	Spring area above the ford in Clinton Creek	AG 60 CS 2 SS 40	64°27.01 140°42.98

SS = slimy sculpin
AG = arctic grayling
CS = chinook salmon

Conclusions

The large numbers of fish removed and the range of species indicate that Clinton Creek in its entirety is a significantly productive body of water. The number of fish was impressive, but the quality and size need to be conveyed. While grayling observed in many locations were svelte, these grayling were distinctly round in shape. The range of sizes was predictable, but not the quantity of truly large grayling encountered. We lost track of the number of large (30 to 50 millimetre) fish encountered. These large and decidedly plump fish are obviously well fed, which again speaks to the productivity of the system. The suckers ranged in size from 5 mm to 40 mm, with the average in the middle to lower end of the scale. As this was not considered to be "prime" sucker habitat, the volume present was surprising. They were also observed in the Lake, prior to our movement of fish, which indicates that they must somehow be surviving in the littoral zone around the edges, owing to the toxic nature of the majority of the Lake bottom. The limited number of salmon fry was in keeping with past experience in the canyon area, but the one captured in the plunge pool area of the gabion structure is exceptional to our prior experience. This one fish opens up new speculation on the availability of passage to fish in the canyon and their opportunities for reaching Hudgeon Lake.

Errata

A few short notes of observation by the author are in order. It is clear that the volume of seepage water that constitutes the overall flow in Clinton Creek is significant. This clean, cold, flow might explain the invitation to fish to explore the Creek below the canyon. It certainly explains the desire of young of year salmon to over winter in the Creek. The quality of the fish moved in the exercise indicates a tremendous productivity in a system that I had once thought quite poor.

An observation in fish behaviour was available to me after we had altered the "demographics" of Clinton Creek below the Wolverine Creek confluence. Our addition of large numbers of Grayling to the area from the upper reach of the Creek produced an odd effect. While standing on the shore of Clinton Creek I could observe possibly 200 fish, all lined up in rows and pointing upstream, immediately below the decant of Wolverine Creek. While it is supposition that they were trying to smell their home turf, the interesting behaviour aspect was that they were sorted by size. The largest fish composed the front row of those hovering in the channel and the trend continued down the line, with the smallest members of the group composing the final row.

The last comments go to the equipment performance. The shocker was largely useless in water of this conductivity, except for "herding" the fish. This proved to be the most productive method in the areas that leant themselves to the use of barrier nets. In order of susceptibility: Longnose suckers, then Slimy sculpin, then Arctic grayling, succumbed to the shocker. I am unsure how

the salmon fit in, as we never did shock one. The dip net method is productive, but becomes even more so when two or more are used in conjunction. The trapping of fish between the two nets as they come together was much more productive than flailing with a single dip net. We also highly recommend the use of Milk Bone™ buckets with the snap lids and extremely durable handles for anyone interested in moving fish, especially vertically.