

Water Analysis Report

Rustenberg Treatment and Control dam

November 2004

Effect of treatment on *Daphnia* populations

Daphnia are very sensitive to changes in their environment and can therefore act as bio indicators for the environmental conditions of the surrounding water body. During the treatment there was an obvious increase in the *Daphnia* populations in the treated dam in comparison with the untreated dam. It is clear that the increase in the organic load (total phosphorous and total nitrogen) because of the treatment had a positive influence on the abundance of *Daphnia* populations in the treated dam. Recent research by Mazumber & Edmundson (2002) showed that fertilization of production dams in Alaska has enhanced the size and biomass of the *Daphnia* populations in the dam. This again had an enhancing effect on the growth and productivity of the sockeye salmon (*Oncorhynchus nerka*) that was produced (Mazumber & Edmundson, 2002). It is also clear through this treatment that the enriching of the treated dam enhanced the abundance of the *Daphnia* populations in the dam.

The increase in the abundance of *Daphnia* might have a positive influence on the total fish production in the dam and will only be seen after fish has been harvested and weighed. According to literature large *Daphnia* (>1.4 mm) are useful indicators of habitat and food conditions for rainbow trout (*Oncorhynchus mykiss*). Galbraith (1975) found that poor rainbow trout (*Oncorhynchus mykiss*) lakes had less than 100 large daphnids per net haul and good rainbow trout (*Oncorhynchus mykiss*) lakes had more than 150 large daphnids per net haul (Galbraith, 1975). *Daphnia* can therefore be related to rainbow trout (*Oncorhynchus mykiss*) stocking success (Galbraith, 1975).

Fish population

Rainbow trout fingerlings were stocked at 250g in May 2004 and harvested at 1.25 kg on the 25 October 2004. Fish were fed daily on artificial diets with a feed biomass load of 1-2% of the bodyweight of the fish. The 2004 harvest produced the best quality fish, in terms of meat colour and fish size, for the last four years. The fish quality can be ascribed to a healthy water environment and efficient management.