7 LAND USE SUSTAINABILITY MONITORING

Overview

- The first stage of Otarao Catchment Project is underway, and a baseline for water quality in the catchment is hoped to be established in December 2003
- Preliminary results indicate that rainfall and run-off appear to significantly affect stream health in the catchment
- The second stage of the project will concentrate upon changes to land management

Annual Plan Performance Targets

To continue to develop and implement a prioritised State of the Environment monitoring programme based on the Regional Policy Statement and Regional Plans, by:

- **Contributing funding to and participating in national environmental performance indicator development/trial projects for soils**

The Otarao Catchment Project

The Otarao Catchment Project is a joint venture between the Northland Regional Council and the catchment's landowners and wider community. The first stage of the project is a baseline-monitoring component, in order to determine the existing water quality of the catchment, and to identify any issues that may exist. This characterisation is based upon the physical and chemical properties of the water, but also takes into account a number of geographic features (such as land cover, geology and stream type), all of which can affect water quality and health of ecosystems within the catchment. The five-year project began in July 2002

Once a baseline has been established, the project's next goal will be to work with landowners in the catchment to mitigate any contaminant issues that might be highlighted in the initial study. Water quality and invertebrate monitoring will continue to see how changes in land management will affect the stream. Riparian management is likely to become a major focus of the next stage.

Scenery across the Otarao catchment

7.1 Monitoring Programme

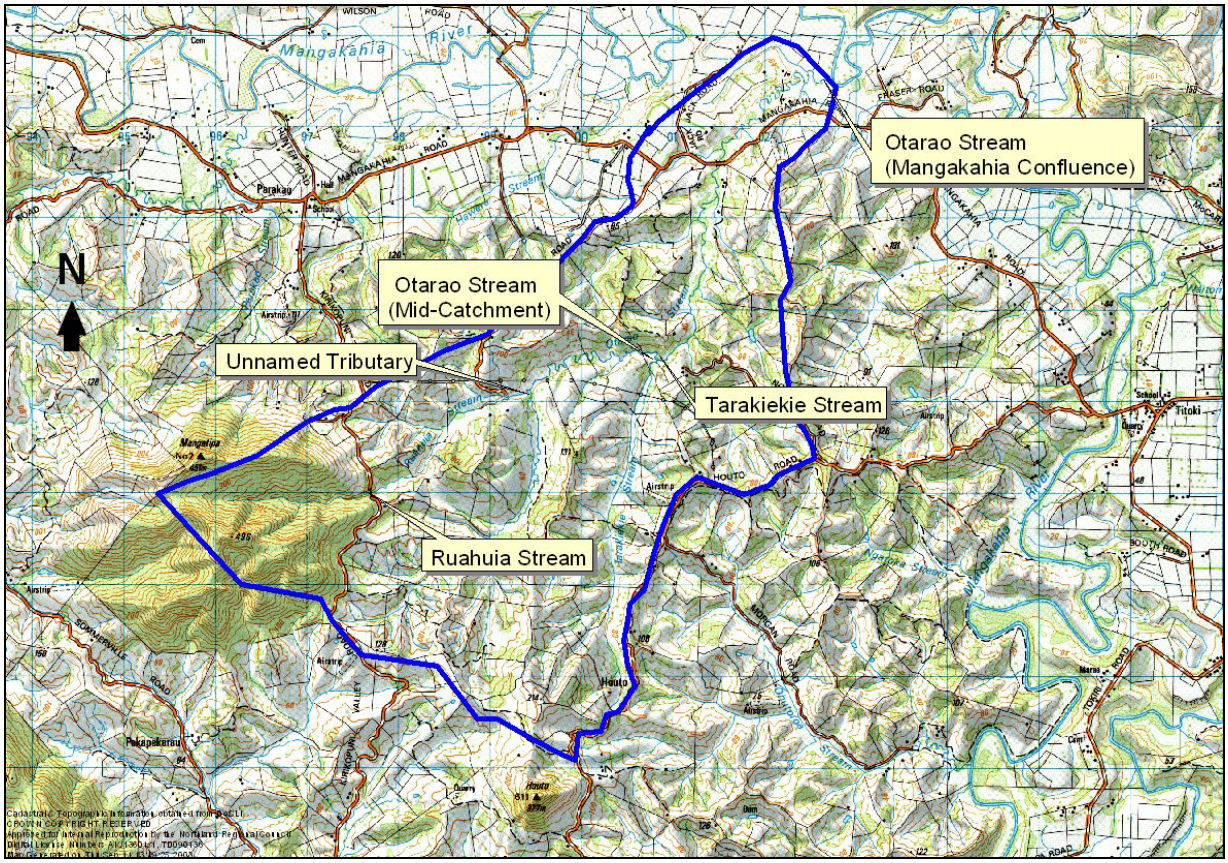

Figure 7-1 The Otarao Catchment Project monitoring sites

Five sites within the catchment (Figure 7-1) have been monitored, covering a number of geographic variables as detailed in Table 7-1. Samples from these sites have been analysed for eight parameters: dissolved oxygen, temperature, visual clarity, pH, conductivity, turbidity, nutrients (phosphorous and nitrogen), and bacteria (specifically *E. coli*). Landowners have been encouraged to participate in the monitoring process.

Table 7-1 Geographic features of the Otarao Catchment Project monitoring sites

Site	Land cover	Underlying geology	Stream Order	Stream Gradient
Otarao Stream near the Mangakahia River Confluence	Pastoral	Soft sedimentary	Middle Order	Low gradient
Unnamed tributary to Otarao Stream (end of Coxhead Rd)	Pastoral (some exotic forest)	Soft sedimentary	Middle Order	Low gradient
Ruahuia Stream at Viaduct (where the stream exits the native bush)	Indigenous Forest	Volcanic acidic	High Order	High gradient
Tarakiekie Stream near Otarao confluence (Otarao Stream tributary)	Pastoral (some exotic forest)	Soft sedimentary	High Order	Low gradient
Otarao Stream at mid-catchment	Pastoral	Soft sedimentary	Middle Order	Low gradient

The type of land cover is a major determinant of run-off (both quality and quantity), and of erosion rates. Underlying geology affects a number of parameters, but is most obviously a control upon turbidity, as sedimentary stream bottoms contribute much more sediment than volcanic-derived stream bottoms. High order streams have few, if any tributaries, and as the order of a stream lowers it becomes harder to distinguish between sources of contaminants as the number of tributaries increases. Stream gradient is a major control upon flow-rates, turbulence and thus greatly influences dissolved oxygen levels, as well as turbidity.

7.2 Results

Table 7-2 Results Summary from the first 12 months of sampling

Site	Water Quality Compliance	Recreational Contact Compliance
Ruahuia Stream	73 %	33 %
Tarakiekie Stream	60 %	67 %
Otarao Steam (mid catchment)	55 %	75 %
Unnamed Tributary	52 %	92 %
Otarao Stream (confluence)	26 %	55 %

The catchment (in terms of water quality) appears to be greatly affected by climatic processes, as increased rainfall appears to have caused increased run-off. Above average rainfall during the winter of 2002 has perhaps biased results, as results during the initial stages were significantly higher than that measured over the rest of the sampling period. Both water quality and *E. Coli* levels were much more variable during periods of low rainfall. Future monitoring will determine the validity of these current speculations.

7.3 Future Developments

As previously stated, the next stage will focus upon changes to land management. This will include the preparation of farm environmental plans, colour photo mapping of the catchment, riparian management workshops, and demonstrations of a visual soil assessment kit for landowners and farmers within the catchment. It will be essential that monitoring of the catchment continue after the completion of the baseline study, in order to gauge the success of any future developments. The Mangakahia Landcare Group wish to use the study area to promote the wise management of land within the greater Mangakahia River catchment, and it is likely that the area will host field days and workshops. A regional integrated catchment management (ICM) workshop is planned for late 2003 to discuss the concept of ICM with interested landowners, industry and agency people.

Sampling from the Ruahuia Stream