

Uretara Catchment Restoration by Community Action

Monitoring summary 2008 to 2012

Task:

Ongoing monitoring programme

- Monitor stream health indicators at points within the catchment before and after fencing: water quality; biological indicators, habitat quality and bank stability. Use NIWA's Stream Restoration Toolkit for measures of restoration success.
- Carry out pest surveillance to determine the need for management of rabbits, rats and possums (which threaten plant establishment, and local biodiversity)
- Collate and analyse information gathered through separate annual surveys undertaken by (i) BOPRC (ii) BOP Polytech students and (iii) additional information gathered by consultant (bi-annual fish surveys) and Katikati College students.

Deliverables:

A report summarising monitoring and survey results from different groups and the management actions needed to address issues identified through this process.

- *Data gathered from BOPRC, BOPP projects, consultant Paul Woodard, our community Bioblitz and students from KK College (supported by WaNZ) has been summarised and discussed in slides 8 – 15. The main points the monitoring programme highlighted are:*
 - *the ongoing need to monitor stream bank erosion (and potential loss of plant cover)*
 - *A coordinated monitoring programme needs to be developed between UEM and BOPRC to take full advantage of the useful information that will be generated from this large scale restoration project*

Some items not covered by the standard set of indicators are plant pest re-invasion 'pressure', native plant growth rate (and which plant species are doing well in different habitat/positions), stabilisation resulting from stream bank planting (changes over time, and especially after flooding), variations in periphyton cover of substrate (a problem in unshaded section of streams), blockages and obstructions with potential to cause erosion, and variations in land management near the riparian areas such as intensive grazing and construction of drainage channels.

All of these observations are currently being made through regular walkthroughs by the project manager, the planting contractors when they carry out routine maintenance (including infill planting) and the assorted monitoring activities by students and volunteers.

A report summarising opportunities for water sustainability initiatives (year 2-3), including the location, size and status of wetlands distributed throughout both catchments.

- *As noted in last year's report WBOPDC and BOPRC developed a water sustainability strategy early last year. Low flow studies by BOPRC monitoring staff are ongoing at Boyd stream and this presents another opportunity for collaboration. BOPRC LMO Braden Rowson and UEM project manager have identified wetlands suitable for management at Rueggs/Henrys, Gordons and planting has already begun at the Thonkeo-Surtees property.*

Uretara Catchment Restoration Project



Project scope

1. Working with land owners, local authorities and schools to retire, fence and replant the most fragile sections of two sub-catchments of Uretara Stream with particular emphasis on stream bank stabilization and re-establishment of native plant species for erosion protection and habitat expansion.
2. Removing and/or minimising existing and potential contamination from farm dumps and other common sources including overland and sub-surface flow paths. Identifying and protecting wetlands and springs/seeps is an important part of this task.
3. Identify needs and opportunities for implementing sustainable water sustainability strategies.

Project partners: landowners, Ministry for the Environment, Western Bay of Plenty District Council, Bay of Plenty Regional Council.







Catchment issues

- Unprotected, unstable stream banks are being washed out and this material is transported downstream and deposited in the lower catchment. Flood damage is exacerbated by these thick deposits, especially when they divert high energy flows on to unstable banks. The banks of the floodplain between Wharawhara and Rawaka bridges is particularly susceptible.
- Some sediment is temporarily held within the stream bed and moves downstream slowly as 'bed load'. This sediment engulfs (or embeds) cobbles and gravels preventing colonisation by stream invertebrates and fish. Dirty streams have very little stream life and do not provide important aquatic 'ecosystem services'.
- Finer material (sand, silt and clay sized particles) are flushed into Uretara estuary where they accumulate and provide habitat for mangroves to colonise.
- Stock that have access to the stream cause damage to banks and contamination of the waterway.
- Stock entering bush remnants cause damage to existing native trees and also trample and graze native seedlings which are important for forest regeneration.
- Many scattered bush remnants and shrublands in the catchment are not protected from pest animals or invasive weeds.
- Wetlands are degraded by infestation with weeds, and functions compromised by drainage. Wetlands are highly valued on some farms because they trap nutrients, absorb runoff (reducing downstream flood flows) and provide valuable habitat for wildlife. Less than 1% of pre-European wetland areas remain in the Bay of Plenty. It is illegal to drain any wetland.

Uretara Catchment Project and Monitoring Sites



Project sites 2008-2012

- Completed
- Priority areas to be completed
- Potential partnership

Monitoring sites 2008-2012

- UEM, KK College, BOPP
- ▲ BOPRC

Monitoring activities were carried out by UEM, KK College and BOPP over the course of the project to gather baseline information so long-term trends could be determined. Significant studies have also been conducted by BOPP graduates on freshwater fish and macroinvertebrate abundance and diversity, suspended sediment v stream flow, and a recently completed (June 2012) catchment ground-truth survey completed by BOPRC has provided useful information about riparian condition including bank erosion.

Environmental monitoring

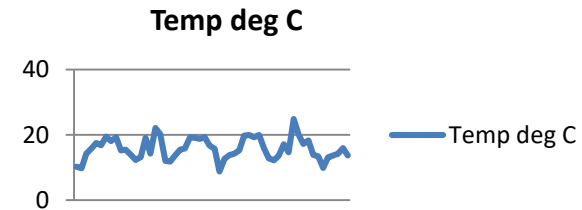
Monitoring is carried out by a variety of agencies and community groups including Katikati College for a variety of purposes.

- BOP Regional Council carries out State of Environment monitoring near Henry Road ford and compliance monitoring at sites including Katikati Quarry and Puketua Farm (Cooper property).
- Uretara Estuary Managers carry out a range of monitoring activities on behalf of the Ministry for the Environment to determine long-term changes resulting from their catchment restoration project.
- Katikati College Year 9 Science monitor water quality and aquatic life for an ecology unit and Year 12 Biology students use a more advanced process for an Achievement Standard assessment.
- Bay of Plenty Polytech year three degree students have monitored stream sediment, macroinvertebrates, and freshwater fish in recent years.
- Animal pest threats, invasive weeds and biodiversity measures for native birds, terrestrial invertebrates has been initiated through a Bioblitz process using expertise within our local community.
- Measurements of stream bank stability (erosion potential) and other measures of riparian condition has recently been gathered by BOPRC.
- A new strategy for monitoring will be developed between UEM, WaNZ and UEM over the next few months.

1. Water Quality

Bay of Plenty Regional Council

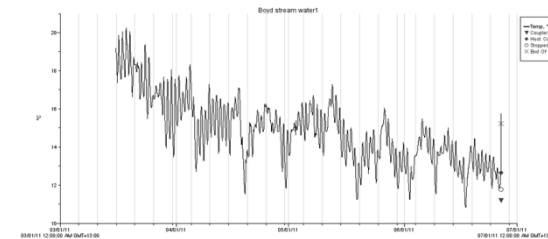
Date	Uretara site	Temp	Turbidity NTU	Sus solids g/m ³	Land Use
May -11	Henry Rd	16	2.1	4.4	Horticulture/Pasture
June -11	Henry Rd	13.7	1	0.89	Horticulture/Pasture



UEM has been provided with BOPRC data gathered from 2001. Most parameters score within an acceptable (non-trigger value) range, such as DO, pH, TN, TP and bacteria but temperature and suspended solids are often outside recommended guideline values. We intend to work more closely with BOPRC over coming years to supplement their data gathering process, which is relatively infrequent and not focused on the periods when various stressors are likely to be greatest (such as mid-summer water temperatures, suspended sediment levels in high flows).

Katikati College

Date	Location	Temp	Clarity m	Flow m/s	Land Use
March -12	Quarry Qs1	17.3°C	0.88	0.1	Horticulture/Pasture
March -12	Boyd Bs1	14.8°C	1.5	0.1	Horticulture/Pasture



Katikati College students work in small groups and are closely supervised during the data gathering process. Back in class data is scrutinised and discussed, outlier values discarded (if found to be inaccurate) and group data averaged. The four surveys conducted by senior students each March on three separate occasions provides a useful insight into water quality and can be used to track trends.

Annually collected water quality data is not adequate for assessing water quality trends. Embeddedness of stream bed substrate together with low abundance and diversity of stream life provide compelling evidence that high levels of suspended sediment are causing significant degradation of both tributaries. The revised BOPRC/UEM monitoring regime will be more robust and enable peak values and trends to be determined.

2. Macroinvertebrates

BOP Regional Council conduct regular macroinvertebrate surveys near the Henry Rd crossing. Katikati College Year 12 Biology and Year 9 Science students also use this site, and two upstream sites on both Quarry and Boyd catchments are regularly monitored by year 12 biology students. A more extensive monitoring process (including matched upstream sites on both catchments) has been initiated recently, involving Bay Of Plenty Polytechnic students in a series of research projects.

2.1 Invertebrate samples collected by BOP Regional Council were used to calculate the Macroinvertebrate Community Index (MCI) as an indication of the ecological health of the stream.

A score between 125-200 rates as excellent and <75 rates as poor.
MCI 2001 – 2011 average 108

These scores are indicative of the stream currently being in a 'fair' ecological condition.

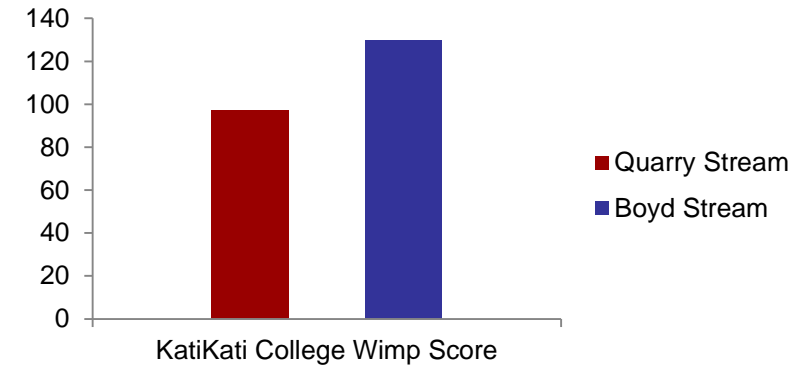
2.2 More frequent presence/absence monitoring by college students (following the Wai Care Invertebrate monitoring protocol – WIMP) showed considerable variability in species diversity and population sizes.

No mayflies were found in Quarry Stream from 2003 (the start of the college monitoring programme) to 2008, but after the brief cameo disappeared again until 2012. Despite this WIMP scores for both sites are quite similar (Quarry average = 131, Boyd average = 159) and long-term monitoring is needed to more accurately determine trends and the relationship between catchment various factors and macroinvertebrate community composition. Unsurprisingly the population sizes at each create an entirely different picture. Intensive sampling at Quarry collected just 36 individuals while similar effort resulted in a bountiful 196 from Boyd stream. No doubting which stream could sustain populations of native fish.

Although water clarity (and levels of suspended sediment) are considerably better in Boyd catchment WIMP monitoring also highlighted the level of degradation within this catchment, mainly due to substrate embeddedness and poor habitat quality. Downstream drift is simply inadequate to maintain invertebrate populations and diversity at a level that can contribute to key ecological functions.

2.2 cont'd Katikati College macroinvertebrate surveys March 2009-12 (average scores)

Macroinvertebrate	Boyd	Quarry	Uretara (at BOPRC site)
Mayfly	28	4	28
Stoneflies	0	0	1
Cased Caddis	40	10	12
Free living Caddis	34	2	70
Dobsonflies	6	6	2
Snails	46	0	18
Dipteran	4	0	14
Shrimp	4	2	2
Damselflies	0	2	0
Leeches	0	2	0
Worms	34	8	16
Total number	196	36	163



Average WIMP scores in the two streams are quite similar (130 Boyd, 97 Quarry) but the macroinvertebrate populations within each catchment are significantly different. Both sets of data reflect the generally poor habitat within the two catchments and the severe impact of quarry operations on the Quarry catchment.





2009 -12 macroinvertebrate monitoring sites lower catchment

3.1 Bird monitoring

Area	Gordons bush remnant						
Bird species	Fantail	Tui	Kereru	Pukeko	Silvereye	Harrier hawk	Magpie
Count 1	2	0	0	0	0	1	
Count 2	3	0	0	1	1	0	

Standard 5 minute bird counts revealed that there are very few bird species in any of the bush remnants. Pest pressure and a lack of suitable/diverse food sources together with an absence other good quality habitat in the area may account for this result. Pest management within this area will begin late winter.

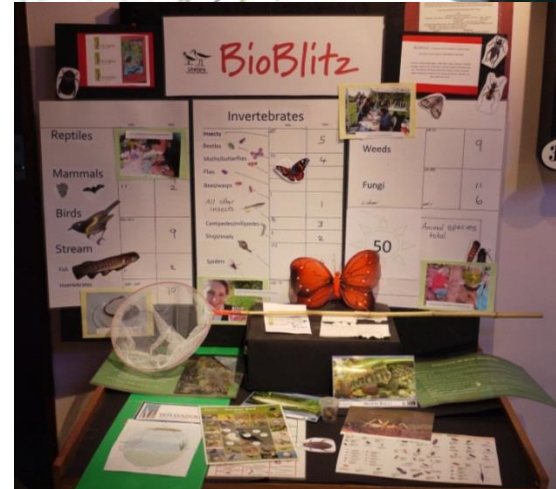
3.2 Animal pest monitoring

Area	Gordons bush remnant			
I.D	U1	U2	U3	U4
Species Tracked	Rats	Rats	Rats	Rats Possum

Pest surveys were carried out using tracking tunnels using the one tracking night protocol and 'chew cards'. All tunnels contained rodent tracks and 25% of chew cards showed signs of possum 'interest' indicating high density of predators, and certainly enough to attract mustelids into these areas on a regular basis. Similar surveys have been initiated by UEM recently at a QE 11 bush block further up the catchment with similar results. Newly developed bait stations and an automatic trap will be tried at both locations over the next 12 months and some guidelines developed for landowners on best practice management of retired bush blocks and protection lots.

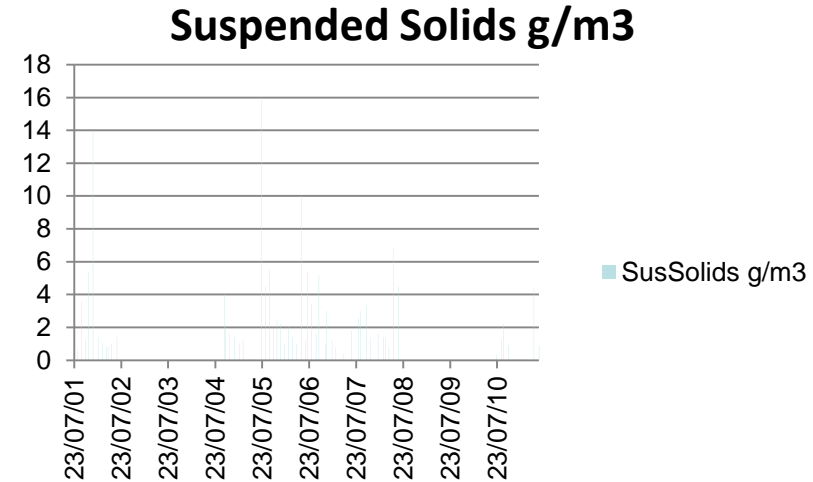
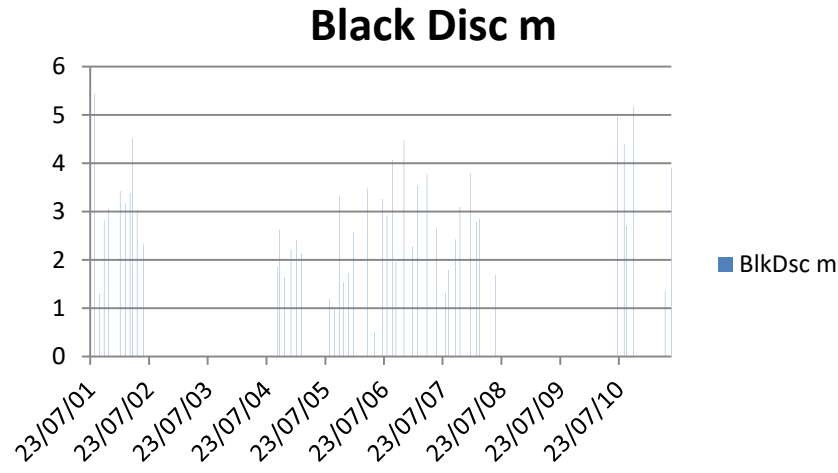
BioBlitz

The success of our first Bioblitz has provided us with plenty of ideas for creating a larger event that blends 'scientific' monitoring with an engaging community driven process to produce data that is useful for catchment monitoring purposes, and for communicating key messages about our local environment to our target groups - landowners and councils.



Monitoring programme beyond 2011-12

UEM and BOPRC



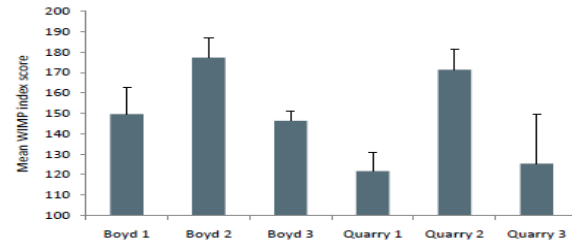
Recently obtained BOPRC data has highlighted the need for a collaborative effort to design a monitoring programme for meeting project goals over the next decade. Land Management Officer Braden Rowson and Environmental Scientists Paul Scholes and Alastair Suren will meet with UEM project manager Andrew Jenks late August to design a programme that includes suitable reference sites (probably existing UEM sites plus BOPRC downstream location) and select key indicators and timescales. WBOPDC have committed some funding for ongoing monitoring and we hope this will be matched (as cash or in-kind) by BOPRC.

The photos below show some of the sediment sources we have tackled over the last four years and all have been significantly reduced through retirement, planting and bank regrading where necessary. KK Quarry Ltd has been under the spotlight too and has just completed an 18 point sediment management improvement plan under the direction of BOPRC. UEM have been invited to visit the site in July to see what has changed.

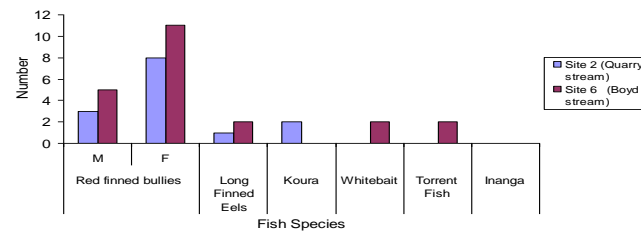


Monitoring programme beyond 2011-12 UEM and BOPP

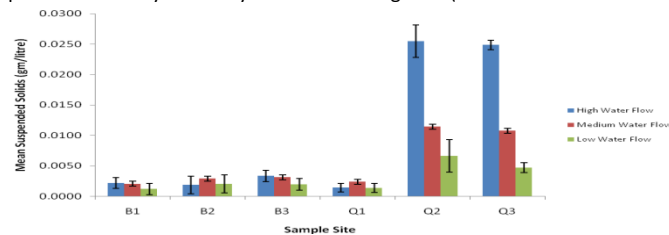
A good relationship has been established between WildNZ/UEM and Bay of Plenty Polytechnic over the last four years through a series long-term research projects undertaken by year 3 students. A number of these fit very well with our long-term monitoring objectives and we will continue to work with BOPP to ensure this information is collected at regular intervals. Guidance and support provided by WildNZ will ensure QA aspects are well managed.



Macroinvertebrate studies are popular and useful new methods were developed through a study that concluded recently. Light trapping caddis adults is proving to be a sensitive tool for monitoring invertebrate diversity and abundance. The Wai Care WIMP index was also put through its paces. We also found that community gathered data (by students and volunteers) is quite comparable with data from year 3 research students after a QC exercise.



Native fish have proven to be highly variable in their distribution and abundance over the last few years and we intend to repeat these surveys annually at six contrasting sites (which are also used for WIMP surveys).



The levels of suspended sediment within the catchment is one of the most important measures for our stream retirement project, and provide a measure of the effectiveness of the retirement process and warning of ongoing bank instability and/or sediment entering the stream from farm tracks, KK Quarry operations etc.



Boyd site 1

Boyd site 2



Boyd site 3

Quarry site 1



Quarry site 2

Quarry site 3

Photos: Boyd and Quarry stream study sites (Photos by Brendon Barnett).

Project outcomes

- Increase awareness of catchment issues and their causes
- Increase participation in environmental protection by landowners in this catchment
- Reduction of suspended sediment in streams and estuary sedimentation
- Reduce stream bank erosion
- Reduce stream water temperature and nutrient export from catchment
- Improve instream and terrestrial habitat and connectivity within catchment
- Provide educational opportunities for students and landowners
- Increase participation in monitoring, including identification of channel obstructions and bank erosion

The goals set in 2008 at the outset of this project are still valid and feedback from an ongoing robust monitoring process is important for ensuring desired outcomes are fully achieved and maintained over the long-term.

