# Envirolink Project

**Prepared for Horizons Regional Council**

May 2006

## Examination of the Water Quality management approach proposed in the One Plan

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David Wheeler - AgResearch
Dr Brent Clothier - HortResearch
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# 1. Objective

To identify any gaps or weaknesses in the water quality management approach proposed in the One Plan and, for each issue identified, set out a work programme that provides Horizons Regional Council with the information to progress the proposal to the next stage.

# 2. Background

The task was tackled in a half day workshop organised and held on the 30th March at AgResearch Grasslands, Palmerston North.

### Participants

| | |
|---|---|
| Alistair Beveridge | Manager and Sponsor Horizons Regional Council. Expertise in policy development. |
| Dr Roger Parfitt | Landcare Research Ltd: Expertise in nutrient dynamics in agro-ecosystems and nutrient loadings in the Regions major river system |
| Dr Brent Clothier | HortResearch: Expertise in water and solute movement in soils |
| Dr Tessa Mills | HortResearch: Expertise in nutrient and land use requirements of horticultural crops |
| Dr Alec Mackay | AgResearch: Expertise in land use |
| David Wheeler* | AgResearch: Expertise in nutrient Management and Decision support software development (Overseer). |

**Note*** Joined the second part of the workshop via a conference phone link.

### Workshop

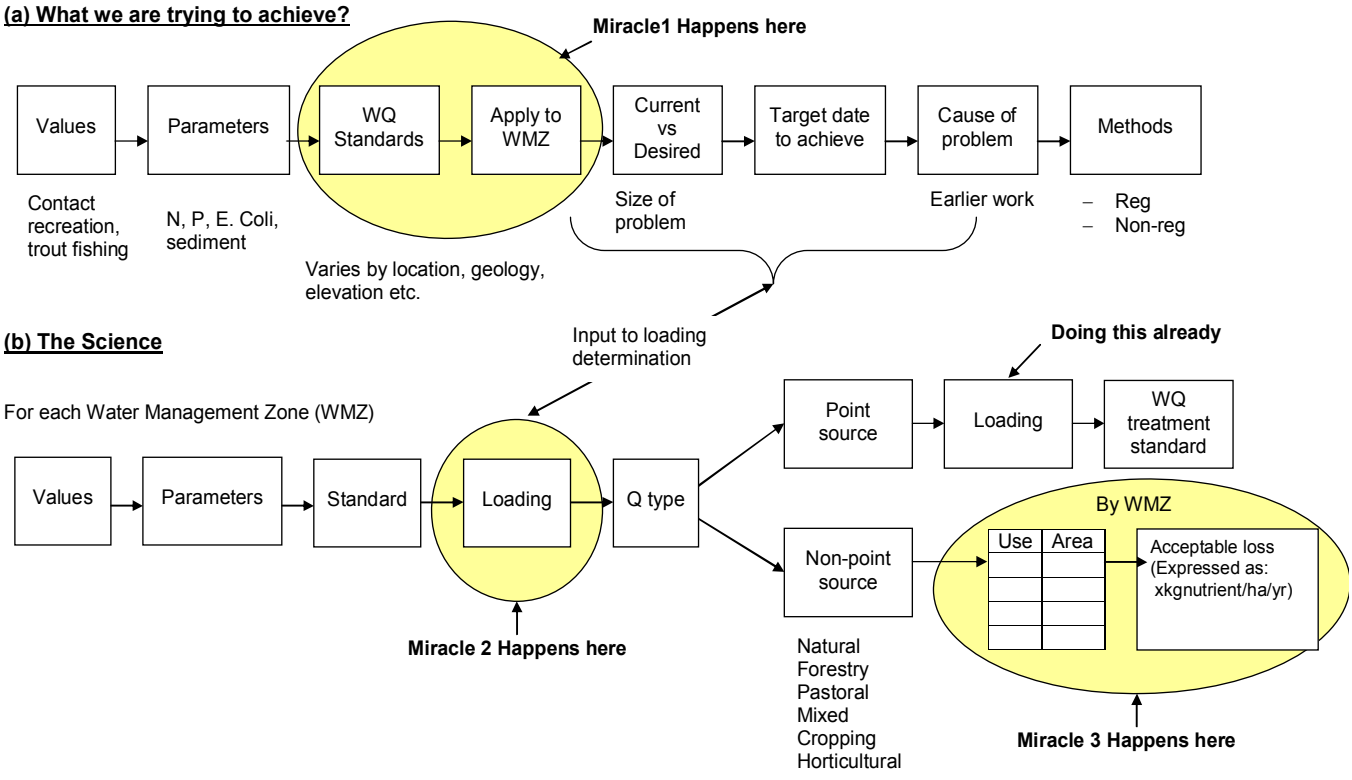
The workshop was run in two parts. The water quality management approach proposed in the One Plan was presented by A. Beveridge (Fig.1 and Notes) in the first session. Following points of clarification on the proposal and discussion on the current thinking within Council on how best to advance non-point source nutrient management, a brainstorming session was held.

During the brainstorming session three major gaps emerged. A work programme to tackle each gap was then drafted. The gaps along with the proposed work programme have been dubbed Miracles 1, 2 and 3. These are incorporated into Fig.1.

## 3. Part 1- Presentation of water quality management approach proposal in the One Plan

This is summarised in Fig.1, with the accompanying notes exploring possible approaches for advancing nutrient management from non-point sources. Council is well advanced in the management of point source contaminants.

**Fig.1 Water Quality Management Proposal One Plan.**



**Notes - Non Point Source Pollution (NPSP) – How do we make it work?**

1. All land uses will require a resource consent (probably a controlled activity) if the current or proposed land use results in the loss of nutrients to the environment.

   Exclusions – where inputs to systems < acceptable loss for that water management Zone (WMZ)

   - DoC land; native forestry {now talking also of dissolved organic Carbon (DOC)}
   - Small blocks, e.g. <3ha.

2. All properties must supply a Nutrient Management Plan (NMP) as part of the consent requirements.

   - NMP produced using OVERSEER (or equivalent)
   - NMP produced by trained and qualified independent person, e.g. consultant, fertiliser company representative
   - If NMP shows actual losses ≤ acceptable loss then landowner must maintain levels with no increase in discharge amount (Grant consent for 35 years).
   - If NMP shows actual losses > acceptable loss then landowner is set target dates to achieve the required nutrient loss reduction.(Grant consent for 35 years)

3. Resubmit/review (this is the compliance phase) NMP output 5-yearly and at WMZ common expiry review date.

4. Will still need a consent to discharge effluent to land because of potential for things to go wrong (and odour issues) but ultimately these could disappear and become permitted as part of the nutrient management plan. The NMP will be used to highlight opportunities for improvement around the management of nutrient pathways. The use of CoP/BMPs (e.g. Spread/FertMark) will put pressure back on the productive sectors to improve and innovate.

| Pro's | Con's |
|---|---|
| Tackles the problem | Lots of work still required to make work |
| Supports innovation | Involves additional regulation & compliance costs |
| Sectors take control | Model based |

Required education of all workers on farm (incl contractors)

Encourage CoP/BMP development

Issues:

- Capacity shortage – could roll this out across the region, eg. Eastern part by 2008, southern by 2010 – worst area targeted first.
- Huge consent requirement – this is less than the alternative (i.e. input-based or activity-based) and will make farmers more efficient = $ saved
- Resistance from farmers and councillors – it is coming anyway, several agricultural sectors have started moving down this path
- Science gaps – as defined by miracles 1-3

# 4. Part 2 Identification of gaps and development of action plan

Three major gaps were identified in the brainstorming session. In addition to clarifying the key questions, a programme of work was developed as part of the process to provide to Horizons Regional Council with the information required to progress the proposal to the next draft.

## 4.1 Miracle (1)

There are 110 Water Management Zones (WMZ) (which could be one catchment or collections of smaller catchments) within Horizons Region Council. The community will be consulted to establish the values for each WMZ. To advance miracle 1 the following will need to be addressed in the work programme.

- Identify the parameters that must be considered as determinants of water quality, e.g. Nitrogen, Phosphorus, Coliform bacteria and sediment

- Establish the relationship between each of these parameters and the values sought by community (e.g. contact recreation, trout fishing) by developing a set of quantitative water quality measures (Table 1). As part of the process, define the critical concentration at which the values sought by community are threatened for each of the WMZ.

Table 1

| **Values** Annual/ Seasonal | **Quantitative measures** | **Seasonal and annual critical loadings** | | | |
|---|---|---|---|---|---|
| | | Nitrogen | Phosphorus | Coliform bacteria | Sediment |
| 1. Contract recreation | | | | | |
| 2. Native fisher | | | | | |
| 3. Natural State | | | | | |
| 4. Drinking Water etc | | | | | |
| 5. etc | | | | | |

- Convert the quantitative water quality measurements into seasonal and annual loadings for each contaminant for each WMZ and define the critical seasonal and annual loading of each contaminant at which the values sought by community are threatened for that WMZ

- As part of the process include an assessment and provide a commentary on the international context within which nutrient management is occurring (e.g. International performance measures, consumer expectations, etc). This may be an important additional driver in defining critical loadings and time scales for implementation of nutrient management/reduction, in addition to the domestic context as communities of interest compare targets and processes for meeting them. In contrast, aspects of water quality, other than those influenced by nutrient loadings, will be defined at a regional-scale by community.

The work programme for Miracle 1 will be lead by Horizons (Olivier Ausseil and Jon Roygard) and will call on the expertise of NIWA and SLURI. While the work will ultimately feed into Miracle 2 and 3, it does not need to be completed before work on Miracle 2 and 3 starts. The two work streams can run in parallel.

## 4.2 Miracle (2)

The current loading of pollutants including N, P, Coliform bacteria and sediment to each WMZ will be determined and a comparison made with the critical seasonal and annual pollutant loading for each WMZ established as part of the work programme described in Miracle 1. The critical and current loadings of any particular waterway for each season will differ, depending on the values set by community for that WMZ.

The work programme will provide options which will allow the translation of the current and critical pollutant loadings into quantities of each of the pollutants lost from land to water within a given WMZ. By translating loadings of each pollutant within a given WMZ to discharge rates from land to water, Horizons Regional Council can then advise all land owners of the impact of current land use on non-point source discharge rates of each pollutant on current and critical loadings in each WMZ. This provides land owners with knowledge of the impact of their current land use on the receiving WMZ, and insight into the scope (both up and down) they have to shift. By making the direct link between land use and the pollutants to receiving water bodies, Horizons and land owners can discuss the impacts of current and future land use on the water quality goals for the regions WMZ's. Part of this discussion can include time frames where there is a mismatch between current and critical loadings.

## 4.3 Miracle (3)

To provide tools that will allow Horizons to develop policy for strategic nutrient management of current and future land use within the region. There was considerable discussion on the way forward on how to evaluate/reduce non-point source pollutions. The notes accompanying the proposed water quality management approach discuss how it might be advanced, without exploring the implications to current and future land use.

To advance Miracle 3 and Miracle 2 a case study WMZ in the upper Manawatu River catchment, which has well defined relationships between water quality and past and current land use, will be used by the SLURI team, with support from NIWA to

- evaluate the processes used to determine pollution discharge,
- translate loadings of each pollutant in the upper Manawatu to discharge rates from existing land uses
- compare current discharge rates with the critical seasonal and annual loading of each contaminant at which the values sought by community for that WMZ are threatened
- examine the options for closing the gap, that includes time scales and an outline of the pros and cons of each, where current discharge rates exceed critical loadings,

The key objectives of the upper Manawatu River Catchment case study are to

- assess the robustness of the policy process as outlined so far. The pros and cons of the approach will be documented at each stage and
- inform the debate to lead to the development of equitable and sustainable policies for land use management. This will allow stakeholders and policy makers to make well informed decisions on the various options and for the region's water to be of the quality sought by the community.

# 5. Recommendations

To advance the water quality management approach proposed in the One Plan three further interlinked Envirolink projects are recommended.

**Project 1** (Miracle 1)

- To identify the parameters that must be considered as determinants of water quality, e.g. Nitrogen, Phosphorus, E. Coli and sediment,
- To establish the relationship between each of these parameters and the values sought by community (e.g. contact recreation, trout fishing) by developing a set of quantitative water quality measures. As part of that process, define the critical concentration at which the values sought by community are threatened for each WMZ.
- To convert the quantitative water quality measurements into seasonal and annual loadings in water for each contaminant for key WMZ and define the critical seasonal and annual loading of each contaminant at which the values sought by community are threatened for that WMZ.

The programme of work would be lead by NIWA, with support from SLURI.

**Project 2** (Miracle 2 and Miracle 3)

To advance both Miracles, a case study of the upper Manawatu River catchment where there has been extensive water quality monitoring in the past and current land use, will be used by the SLURI team, with support from NIWA to

- evaluate the processes that control pollution discharge,
- establish relationships between loadings of each pollutant in the upper Manawatu waters and the discharge rates from existing land uses
- compare current discharge rates with the critical seasonal and annual loading in water of each contaminant at which the values sought by community for that WMZ are threatened
- Where current discharge rates exceed critical loadings, examine the options, including time scales, and outline the pros and cons of each for closing the gap.

**Project 3**

Present and discuss the draft of the water quality management approach proposed in the One Plan that incorporates the findings of Project 1 and 2 in two forums. The first forum would examine the robustness of the science approach with the science community and the second forum the effectiveness of the policy approach with policy agents representing regional and national government. The project team (SLURI, NIWA) would then draft a set of recommended amendments to Horizons Regional Council proposed water quality management plan.