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A RESOURCE INVENTORY FOR THE
RUAMAHANGA CATCHMENT, WAIRARAPA,
NEW ZEALAND

A thesis presented in partial fulfilment of the requirements
for the degree of
Masters of Applied Science
at Massey University, Palmerston North,
New Zealand

Leila Margaret Chrystall

2007
Abstract

Currently, there is concern around various water management issues in the Ruamahanga Catchment, Wairarapa. This concern has prompted discussion among the stakeholders of the catchment about implementing an Integrated Catchment Management (ICM) Plan in the area. A prerequisite of an ICM plan is to have a detailed resource inventory that documents the current state of the catchment, the level and areas of research already carried out in the catchment, and the specific problems occurring in the catchment. This report constitutes the Resource Inventory for the Ruamahanga Catchment and will serve as a discussion document that can be used by the stakeholders to implement an ICM plan.

This Inventory organises information under twelve topic headings that range from land and climate, water resources and land use, to freshwater ecology and public perceptions on the state of the water resources in the catchment.

Significant issues indentified in the catchment include; deteriorating water quality in the Ruamahanga River as it flows southwards; a significant increase (~14,000 kg/year) in dissolved reactive phosphorus (DRP) loading in the Ruamahanga River segment between Te Ore Ore and Gladstone, which in most part, is a result of the Masterton Sewage Treatment Plant discharge; unsatisfactory bathing water quality at some sites on the Ruamahanga River; a lower diversity of freshwater species than the rest of the Wellington Region; current and future land use intensification which is leading to increasing demands for water; and fully allocated surface water zones and groundwater aquifers.

Recommendations are provided on how to improve the quality of data in this inventory, and also on how to proceed in the future with the findings of this report in mind. Faced with similar water quality issues as the Manawatu Catchment, stakeholders of the Ruamahanga Catchment should be aware of the outcomes of Horizon Regional Council’s One Plan, and observe any success and failures of the One Plan when implementing an ICM Plan in the future.
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## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>asl</td>
<td>Above sea level</td>
</tr>
<tr>
<td>BOD$_5$</td>
<td>Biochemical Oxygen Demand</td>
</tr>
<tr>
<td>CDC</td>
<td>Carterton District Council</td>
</tr>
<tr>
<td>CHI</td>
<td>Cultural Health Index</td>
</tr>
<tr>
<td>CINZAS</td>
<td>Central Index of New Zealand Archaeological Sites</td>
</tr>
<tr>
<td>CliDB</td>
<td>National Climate Database</td>
</tr>
<tr>
<td>CMS</td>
<td>Conservation Management Strategy</td>
</tr>
<tr>
<td>Cumecs</td>
<td>Cubic metres per second</td>
</tr>
<tr>
<td>DEV</td>
<td>Daily Effluent Volumes</td>
</tr>
<tr>
<td>DO</td>
<td>Dissolved Oxygen</td>
</tr>
<tr>
<td>DoC</td>
<td>Department of Conservation</td>
</tr>
<tr>
<td>DCDC</td>
<td>Digital Cadastral Database</td>
</tr>
<tr>
<td>DRP</td>
<td>Dissolved Reactive Phosphorus</td>
</tr>
<tr>
<td>DSIR</td>
<td>Department of Scientific and Industrial Research</td>
</tr>
<tr>
<td>E-Coli</td>
<td><em>Escherichia coli</em></td>
</tr>
<tr>
<td>ED</td>
<td>Ecological District</td>
</tr>
<tr>
<td>ENSO</td>
<td>El Nino – Southern Oscillation</td>
</tr>
<tr>
<td>ER</td>
<td>Ecological Regions</td>
</tr>
<tr>
<td>FC</td>
<td>Faecal Coliforms</td>
</tr>
<tr>
<td>FFNZ</td>
<td>Federated Farmers New Zealand</td>
</tr>
<tr>
<td>GWRC</td>
<td>Greater Wellington Regional Council</td>
</tr>
<tr>
<td>GWSOE</td>
<td>Groundwater State of Environment Monitoring</td>
</tr>
<tr>
<td>GV</td>
<td>Guideline Value</td>
</tr>
<tr>
<td>HCA</td>
<td>Hierarchical Cluster Analysis</td>
</tr>
<tr>
<td>IBI</td>
<td>Index of Biotic Integrity</td>
</tr>
<tr>
<td>IGNS</td>
<td>Institute of Geological and Nuclear Sciences</td>
</tr>
<tr>
<td>IPO</td>
<td>Interdecadal Pacific Oscillation</td>
</tr>
<tr>
<td>LCDB</td>
<td>Land Cover Database</td>
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<tr>
<td>LINZ</td>
<td>Land Information New Zealand</td>
</tr>
<tr>
<td>LRI</td>
<td>Land Resource Inventory</td>
</tr>
<tr>
<td>LUC</td>
<td>Land use capability</td>
</tr>
<tr>
<td>LWDS</td>
<td>Lower Wairarapa Development Scheme</td>
</tr>
<tr>
<td>LWW</td>
<td>Lake Wairarapa Wetlands</td>
</tr>
<tr>
<td>MAF</td>
<td>Ministry of Agriculture and Forestry</td>
</tr>
<tr>
<td>MALF</td>
<td>Mean Annual Low Flow</td>
</tr>
<tr>
<td>MAV</td>
<td>Maximum Acceptable Value</td>
</tr>
<tr>
<td>MCI</td>
<td>Macroinvertebrate Community Index</td>
</tr>
<tr>
<td>MDC</td>
<td>Masterton District Council</td>
</tr>
<tr>
<td>MfE</td>
<td>Ministry for the Environment</td>
</tr>
<tr>
<td>Mn</td>
<td>Manganese</td>
</tr>
<tr>
<td>MSRL</td>
<td>Maximum Species Richness Line</td>
</tr>
<tr>
<td>N</td>
<td>Nitrogen</td>
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</table>
NGMP  National Groundwater Monitoring Program
NH₄-N  Ammoniacal Nitrogen
NIWA  National Institute for Water and Atmospheric Research
NNN  Nitrate-Nitrite Nitrogen
NO₃-N  Nitrate Nitrogen
NO₂-N  Nitrite Nitrogen
NRWQN  National Rivers Water Quality Network
NSD  National Soils Database
NTU  Nephelometric Turbidity Unit
NZAA  New Zealand Archeological Association
NZBS  New Zealand Biodiversity Strategy
NZFFD  New Zealand Freshwater Fish Database
NZHPT  New Zealand Historic Places Trust
NZLRI  New Zealand Land Resource Inventory
NZSC  New Zealand Soil Classification
P  Phosphorus
RAP  Recommended Areas for Protection
REC  River Environment Classification
RMA  Resource Management Act (1991)
RPS  Regional Policy Statement
RSoE  River State of Environment
SO₄²⁻  Sulphate
SQMCI  Semi-Quantitative Macroinvertebrate Community Index
SWDC  South Wairarapa District Council
TA  Territorial Authority
TDS  Total Dissolved Solids
TN  Total Nitrogen
TOC  Total Organic Carbon
TP  Total Phosphorus
WELA  Wairarapa Engineering Lifelines Association
WRIT  Wairarapa Regional Irrigation Trust
WWD  Wairarapa Wetlands Database
Zn  Zinc
%EPA  % Ephemeroptera, Plecoptera and Trichoptera Taxa

ha  Hectare
L/s  Litres per second
m³/day  cubic metres per day
m³/s  cumecs
L/s/km²  litres per second per square kilometer
Ma  Million years ago
ka  Thousand years ago
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