Wilsons River Catchment Management Plan

Report Prepared for Rous Water
By Ecos Environmental Consulting

October 2009

Document Information

Revision*	Status	Prepared by	Issued to	Date	Reviewed by	Approved
1.0	Table of Contents Draft	Suzie Moore	Rous Water	11 Aug 2008	Nick O'Connor	Nick O'Connor
2.0	Working Draft	Suzie Moore	Working Group, Rous Water	13 Nov 2008	Nick O'Connor	Nick O'Connor
3.5	Draft	Suzie Moore	Working Group, Rous Water	25 May 2009	Nick O'Connor	Nick O'Connor
3.6	Final draft: Public Exhibition	Suzie Moore	Rous Water, Public Exhibition	9 June 2009	Nick O'Connor	Nick O'Connor
3.7	Final	Suzie Moore	Rous Water	12 Oct 2009	Nick O'Connor	Nick O'Connor

by Ecos Environmental Consulting Pty Ltd

ABN 11 086 102 383, ACN 086 102 383

Suite 3, Level 1, 339 Whitehorse Rd, Balwyn, Victoria 3103

Mail PO Box 1064G North Balwyn
Victoria 3104

Tel +61 3 9830 7740

Fax +61 3 9830 7741

Mob 0408 520 579 (Nick)

Email ecos@ecosec.com.au

Web www.ecosec.com.au

File name \\ECOSSERVER\EcosDocs\Ecos Projects\1142 - Rous Water - Wilsons River CMP\Final Report\Wilsons River Catchment Management Plan - Final V3.7 - 12-10-09.docx

Client Anthony Acret

Name of organisation Rous Water

Name of project Wilsons River Catchment Management Plan

Name of document Wilsons River Catchment Management Plan V3.7.doc

Document version 3.7

Cover Images and logos are © Ecos Environmental Consulting

Sensitivity This document and the information, ideas, concepts, methodologies, technologies and other material it contains remain the intellectual property of Rous Water and Ecos Environmental Consulting P/L. The document is not to be copied without the express permission of at least one of the above parties.

Table of Contents

List of Figures

List of Tables

Acknowledgments

Rous Water, Ecos Environmental Consulting and Sustainable Futures Australia would like to thank members of the Wilsons River Catchment Working Group (see the Section 10 (Appendix) for a list of members in the Working Group) and the following organisations for their contribution in developing the Wilsons River Catchment Management Plan:

Australian Macadamia Society, Ballina Shire Council, Big Scrub Environment Centre, Big Scrub Rainforest Landcare Group, Byron Shire Council, Coopers Creek Water Users Group, Department of Environmental and Climate Change (EPA), Department of Planning, Department of Primary Industries (Agriculture), Department of Primary Industries (Fisheries), Department of Water and Energy, EnviTE, Far North Coast Canoe Club, Far North Coast Weeds, Lismore Chamber of Commerce, Lismore City Council, Macleans Ridges Community Group, NORCO, Northern Rivers Catchment Management Authority, NSW Farmers Association, NSW Health, Pecan Growers Association, Richmond Landcare Inc., Richmond/Wilson Tidal Water Users Association, W.I.R.E.S., Australian Wetlands (representing Richmond River Estuary Management Planning Process), Widjabul People, Wilsons River Landcare Group, Wilsons Creek/Huonbrook Landcare Group.

Rous Water, Ecos Environmental Consulting and Sustainable Futures Australia would also like to thank Colin Cooksey and Trevor Worden for use of their photographs within this document.

Executive Summary

Rous Water is a special purpose local government authority – a county council - on the North Coast of New South Wales, providing bulk water supply services to approximately 100,000 people in the local government constituencies of Ballina, Byron, Lismore and Richmond Valley.

In the past, water supplied by Rous Water has been primarily sourced from Rocky Creek Dam and Emigrant Creek Dam. In 1995 Rous Water developed the *Rous Regional Water Supply Strategy* which showed that a new major water source, or combination of water sources, would be required by around 2010. The strategy identified a range of options to meet water requirements, four of which were adopted. One of these options was to develop the Wilsons River Lismore Source (referred to as the Wilsons River Source), where water is abstracted from the upper reaches of the tidal pool of the Wilsons River at Howards Grass near Lismore. Rous Water completed construction of the Wilsons River Source in 2008.

Due to the open nature of the Wilsons River catchment, a comprehensive catchment (risk) management program will be a key component of the operation of the Wilsons River Source. This Catchment Management Plan (CMP) is a risk-based catchment and investment strategy to direct activities aimed at protecting drinking water quality at the Wilsons River Source and an environmental monitoring program to underpin the ongoing adaptive management of the water source catchment.

Effective catchment management requires a whole-of-government and a whole-of-community approach and Rous Water recognises that it is unable to achieve significant change on a whole-of-catchment basis by working in isolation. It is for this reason that it established the Catchment Working Group comprising many organisations and individuals, so that creative partnerships could be established between groups having shared natural resource management interests and objectives.

There are many existing natural resource management plans, initiatives and strategies established at a local, State and Federal Government level that apply to the North Coast (and therefore apply to the Wilsons River catchment). Many of these plans and strategies share common objectives and this is acknowledged within this CMP. In particular, Rous Water in this CMP adopts a Total Catchment Management approach at a local level, recognising and building upon the strategies and actions established by previous catchment management committees that have operated in the Richmond River catchment.

A key purpose of the Wilsons River CMP therefore is to identify opportunities for working together where shared interests can result in positive outcomes for the catchment, positive outcomes for the regional water supply, and positive outcomes for all participants in the projects and initiatives.

The present report is one of five written as part of the CMP project. The five project components contributed to the development of the CMP, and involved extensive data collation, analysis and community consultation. Hazards to water quality were identified by undertaking a screening level risk assessment process, incorporating

issues identified in a preliminary study by the Department of Commerce, and also those identified during the Community Consultation Program.

The vision for the Wilsons River catchment developed during the project was:

> *"Our vision for the Wilsons River catchment is to have a productive living space with healthy ecosystems that provide clean water."*

The guiding principles to ensure the visions fulfilment are:

> *"The vision will be fulfilled by supporting and promoting a culture of sustainability, working and learning together and focussing on mutually beneficial outcomes. We need to adopt an inter-generational perspective involving small steps toward long-term goals."*

To meet these guiding principles key outcome areas (KOA's) and management programs and plans were identified, each with associated goals and aims. The KOA's and their aims are as follows:

KOA 1: Environmental Management

Our Aim:

Protect and restore ecological systems and support land managers to improve waterway health and water quality.

KOA 2: Agronomic Land Management Practices

Our Aim:

Effective resource management to minimise transport of contaminants to waterways, maximise long-term farm viability and improve the natural environment.

KOA 3: Management of Built Environments

Our Aim:

Ecologically sustainable development that minimises transport of contaminants to waterways and supports a healthy catchment and riverine ecosystem services.

KOA 4: Governance

Our Aim:

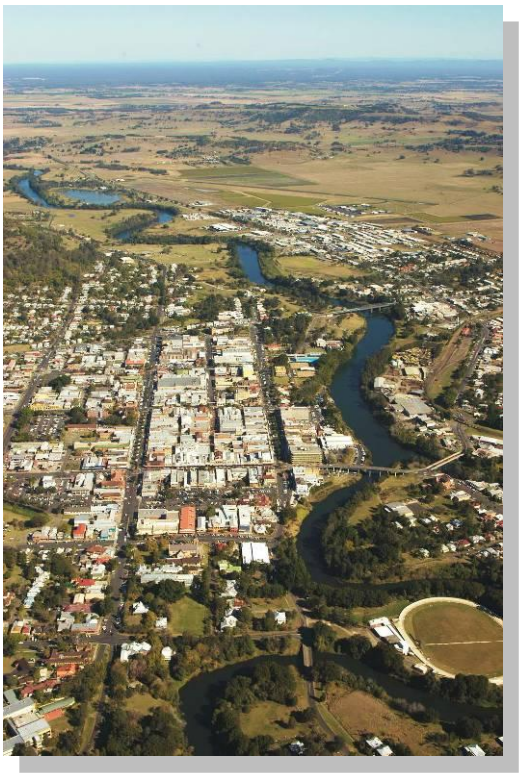
Coordinated catchment and waterway management involving key stakeholders with effective resourcing of actions and regular review of management performance and catchment condition.

Water quality parameters that will be improved under each management program or plan were identified and the programs/plans were prioritised for each sub-catchment, as was an indicative costing for their implementation.

1 Introduction

1.1. Rous Water and Water Supply in Rous County

Rous Water is a special purpose local government authority – a county council - on the North Coast of New South Wales, providing bulk water supply services to approximately 100,000 people in the local government constituencies of Ballina, Byron, Lismore and Richmond Valley.



Wilsons River tidal pool at Lismore

In the past, water supplied by Rous Water has been primarily sourced from Rocky Creek Dam and Emigrant Creek Dam. Rocky Creek Dam was constructed in 1953 and has a capacity of 14,000 ML and a safe yield of about 9,500 ML per annum. Emigrant Creek Dam was completed in 1968 to provide a water supply to Lennox Head and Ballina and is currently used to supplement the supply from Rocky Creek Dam. The capacity of Emigrant Creek Dam is 820 ML with a safe yield of about 2,600 ML/annum although this will be reduced to 1,600 ML/annum in the future to provide for environmental flow requirements.

In 1995 Rous Water developed the *Rous Regional Water Supply Strategy* which indicated that by 2050 the potable demand for Rous County would be 30,000 ML per year. The strategy showed that a new major water source, or combination of water sources, would be required by around 2010. The strategy identified a range of options to meet water requirements and Rous Water adopted four actions from the strategy:

- To manage demand;
- To investigate and develop alternative water sources such as reuse where appropriate;
- To develop the Wilsons River Lismore Source; and
- To develop the Dunoon Dam.

To date Rous Water has successfully implemented a demand management program and investigated and developed several alternative water resources.

Since development of the strategy in 1995, however, it had become apparent that the secure yield of water was less than originally estimated. The estimated secure yield of the Rous Water Regional Water Supply was reduced as a result of revised hydrological modelling undertaken in 2003 and the proposed introduction of

environmental flow requirements at Emigrant Creek Dam (Rous Water 2002). In addition there is a preference to avoid the use of bore water where possible because of a lack of control over water quality. The reduction in secure yield from Emigrant Creek and the avoidance of bore water resulted in a reduction in secure yield of Rous Water's potable water supply to approximately 11,000 ML per year. Currently, potable water demand in the Rous County is 12,600 ML per year, and therefore prior to construction of the Wilsons River Lismore Source the prevailing water supply scheme could not deliver adequate quantities of water to meet current or future demand without more frequent water restrictions (Parsons Brinkerhoff 2006). Climate change also poses significant risks to the secure water supply yield (Kirono *et al.*, 2007).

To meet the shortfall, Rous Water developed the Wilsons River Lismore Source (now referred to as the Wilsons River Source) which involves water abstraction from the upper reaches of the tidal pool of the Wilsons River at Howards Grass near Lismore. Rous Water completed construction of the Wilsons River Source in 2008.

1.2. The Wilsons River Source and the Need for a Catchment Management Plan

The Wilsons River Source

The Wilsons River Source project was first identified in the Rous Regional Water Supply Strategy, and was described as follows: '*The Wilsons River abstraction source option involves pumping water from the tidal pool on the Wilsons River at a site adjacent to Howards Grass pumping station which is on the Lismore trunk main. Water would be extracted, treated and pumped into the Rous system.'*

Since adoption of the strategy in 1995, the Wilsons River Source project was validated, developed and refined through a series of planning studies, concept designs, hydrological yield analysis and environmental impact assessments. Construction was completed in 2008, with operation commencing in 2009.

The Wilsons River Source consists of a pump station abstracting up to 30 ML/day of water (an average annual volume of 3,400 ML) from the upper reaches of the tidal pool in the Wilsons River. The point of abstraction is approximately 5 km upstream of Lismore (at Howards Grass). Following abstraction, water is pumped 14 km directly to Habie Habib Nightcap Water Treatment Plant for subsequent supply to consumers through existing water distribution infrastructure.

Rous Water pump station at Howards Grass extraction point

Due to the open nature of the Wilsons River catchment (meaning that the majority of the catchment area is in private ownership, with unrestricted access to the catchment), a comprehensive catchment (risk) management program will be a key component of the operation of the Wilsons River source to ensure that raw water extracted from the river will be of a suitable quality to meet drinking water guidelines after appropriate treatment.

1.3. Objectives of the Catchment Management Plan

The Wilsons River Catchment Management Plan (CMP) is a risk-based catchment and investment strategy to direct activities aimed at protecting drinking water quality at the Wilsons River Source and an environmental monitoring program to underpin the ongoing adaptive management of the water source catchment. The present CMP report has been developed as a point of reference to support catchment management activities. Management issues and options identified in the plan were derived from the CMP project risk assessment, literature review, community consultation and catchment modelling (this involved modelling of river flows and contaminant loads and concentrations using the E2 software package).

Wilsons River at Lismore

Separate documentation of these project components was undertaken to avoid the CMP becoming an unwieldy technical document. Key outcomes and/or summaries from these four technical support documents have been included in the present CMP report. For further detail the reader is referred to the individual reports of interest.

Rous Water engaged Ecos Environmental Consulting (Ecos) to prepare the Wilsons River CMP. The Ecos project team included the consulting firms Sustainable Futures Australia and Fluvial Systems.

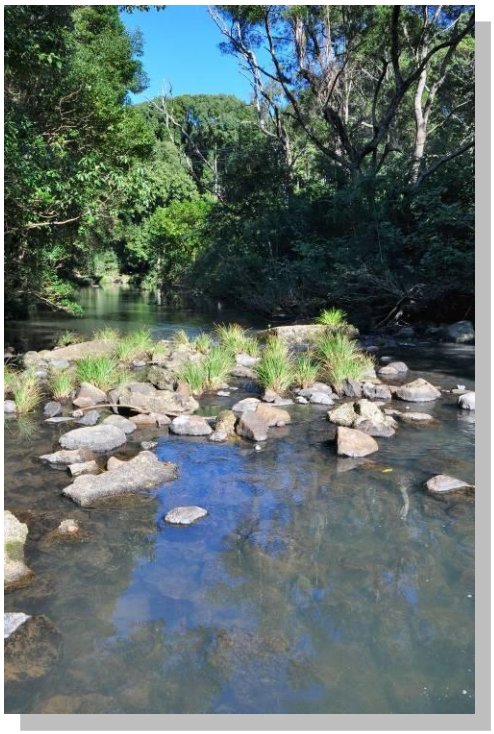
1.4. Institutional Framework and the Role of the Catchment Management Plan

The Wilsons River CMP has been prepared to guide catchment management, investment and monitoring activities aimed at protecting and enhancing water quality and catchment health associated with the Wilsons River source, as well as to inform the operating strategy for the source.

Effective catchment management requires a whole-of-government and a whole-of-community approach and Rous Water recognises that it is unable to achieve significant change on a whole-of-catchment basis by working in isolation. It is for this reason that it established the Catchment Working Group comprising many

organisations and individuals, so that creative partnerships could be established between groups having shared natural resource management interests and objectives (refer Section 1.5 for further information).

There are many existing natural resource management plans, initiatives and strategies established at a local, State and Federal Government level that apply to the North Coast (and therefore apply to the Wilsons River catchment). Many of these plans and strategies share common objectives. For example, the key natural resource management initiative in the region is the Catchment Action Plan established by the Northern Rivers Catchment Management Authority (CMA). Whilst the Catchment Action Plan contains comparable objectives and programs across the whole of the Northern Rivers CMA region, the CMA does not necessarily have the same priorities in the Wilsons River catchment as Rous Water. Nevertheless, this does not prevent Rous Water from working together with the CMA - the Wilsons River CMP identifies the critical water quality and catchment health issues to be addressed in the Wilsons River catchment, allowing Rous Water to partner with the CMA where the interests of the respective organisations are aligned. Similarly, this would also allow Rous Water to work with all other stakeholders in a similar way.



Upper Wilsons Creek

The approach adopted therefore by Rous Water in the Wilsons River CMP is a Total Catchment Management approach at a local level. The Wilsons River CMP recognises and builds upon the strategies and actions established by previous catchment management committees that have operated in the Richmond River catchment, and includes the involvement of many of the same organisations and individuals.

A key purpose of the Wilsons River CMP therefore is to identify opportunities for working together where shared interests can result in positive outcomes for the catchment, positive outcomes for the regional water supply, and positive outcomes for all participants in the projects and initiatives.

Rous Water recognises that other partners in the catchment management process will have their own interests and priorities. However provided that any proposed action is consistent with the Wilsons River CMP then Rous Water will work together with all partners for the benefit of the environment.

1.5. The Wilsons River Catchment Working Group (CWG)

To facilitate and encourage community and stakeholder involvement in the planning process for the Wilsons River CMP, a Wilsons River Catchment Working Group (CWG) was formed by Rous Water, as part of the adopted community consultation program.

The working group was established with former members of the Lismore Source Project Reference Group, representatives from the local community (sourced through personal invitation and representatives of relevant interest groups in the catchment) and from the Widjabul people. A parallel process of meetings with the Widjabul people was also arranged.

Four CWG meetings were held during the project. The manner in which information from the four CWG meetings were incorporated into the management plan is presented in Figure 1-1. The fourth CWG meeting contained a strategic planning process facilitated by Sustainable Futures Australia that used The Planning Web™. This process enabled the CWG to provide feedback and additional input into the core structure and strategic planning aspects of the CMP (Section 8 (appendix)). The agendas and minutes of these meetings can be found in Section 1 of the Community Consultation Background CD.

Input towards, and feedback on, the draft documents was also provided by CWG members between meetings via email and a wiki-space.

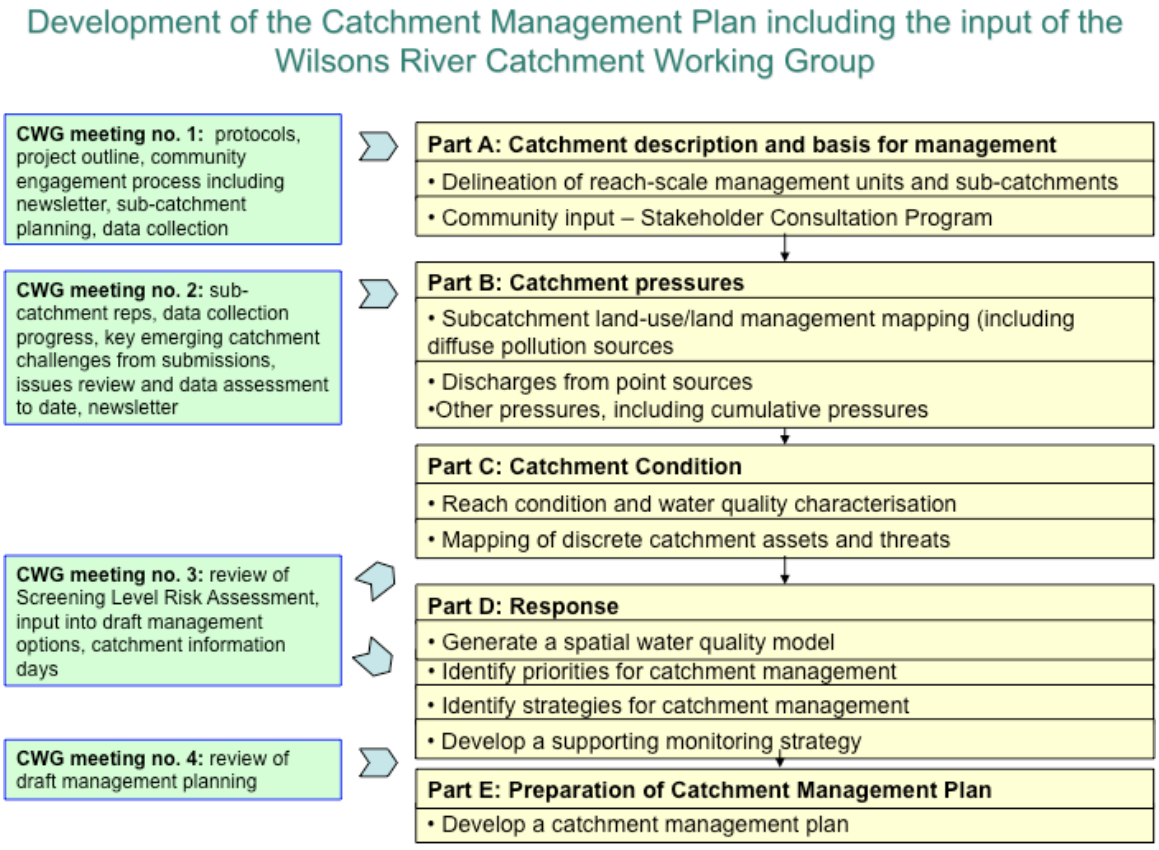


Figure 1-1. How the community Catchment Working Group meetings informed the development of the Wilsons River Catchment Management Plan.

1.6. Implementation Timeframe and Process

The current water quality and catchment health status of the Wilsons River Source catchment is a reflection of over 100 years of land use history that has impacted on catchment values. Clearly it is not possible to make major catchment-wide improvements in a short period of time. The Wilsons River CMP should therefore be viewed as a strategic document that aims to identify the strategic direction required to achieve long-term improvements in water quality and catchment health. Nevertheless it is important that the effectiveness of the CMP is assessed within the context of an adaptive management framework and an initial 10 year implementation timeframe has been established.

This document outlines the range of programs and actions that Rous Water will pursue in the Wilsons River catchment over the 10 year period commencing in 2009/10 and finishing in 2018/19. It is important that effective monitoring and evaluation arrangements are put in place so that the effectiveness of the Wilsons River CMP can be regularly reviewed.

During 2009/10 Rous Water shall be completing strategic financial planning for a 30 year timeframe, which shall allow confirmation of the availability of Rous Water funding for the identified catchment initiatives over this period. Nevertheless, Rous Water is only one organisation that is interested in catchment improvement. In the interim, Rous Water will actively work together with the Catchment Working Group, and all other interested parties and catchment landholders to promote positive change in the water catchment area of the Wilsons River Source.

1.7. The Catchment Management Plan Project

The development of a Catchment Management Plan was recognised as an important part of initiating a catchment management program. A consulting consortium led by Ecos Environmental Consulting was engaged to undertake a project whose ultimate outcome would be the development of a Catchment Management Plan (CMP) for the Wilsons River catchment.

In order to develop the CMP a range of initiatives were undertaken to identify issues that may adversely affect water quality, establish current water quality, and allow for prioritisation of management options. The Catchment Management Plan project therefore had the following objectives:

- Conduct a risk assessment to identify which issues in the catchment pose the greatest threat to water quality;
- Determine the current state of the water quality in the catchment and key assets and threats to water quality;
- Develop management units within the Wilsons River catchment that would facilitate the delivery of programs, community consultation, monitoring and reporting;
- Undertake water quality modelling to test management scenarios; and

- Develop strategic management actions and priorities to address the identified catchment assets and threats for adaptive management of the water supply catchment area.

The present report is one of five written as part of the Catchment Management Plan project. The five project reports are as follows:

- Establishing sub-catchments;
- Catchment water quality risk assessment;
- Quantitative modelling of contaminant transport with E2 (catchment modelling software);
- State of the Catchment; and
- Wilsons River Catchment Management Plan (this report).

The five project components contributed to the development of the Wilsons River Catchment Management Plan, and involved extensive data collation, analysis and community consultation (Figure 1-2). To ensure that the Catchment Management Plan was a practical management tool, these technical components of developing the management plan were addressed in accompanying documents (Table 1-1). The present document, therefore, only presents information on the community consultation component of the project (Section 4), a summary of the risk assessment (Section 6) and presents the management strategies (Section 8).

Detailed methodology of each of the project components can be found in the relevant reports (Table 1-1). Thus, in the present document only detailed methodology of the consultation program and development of the management plan are given.

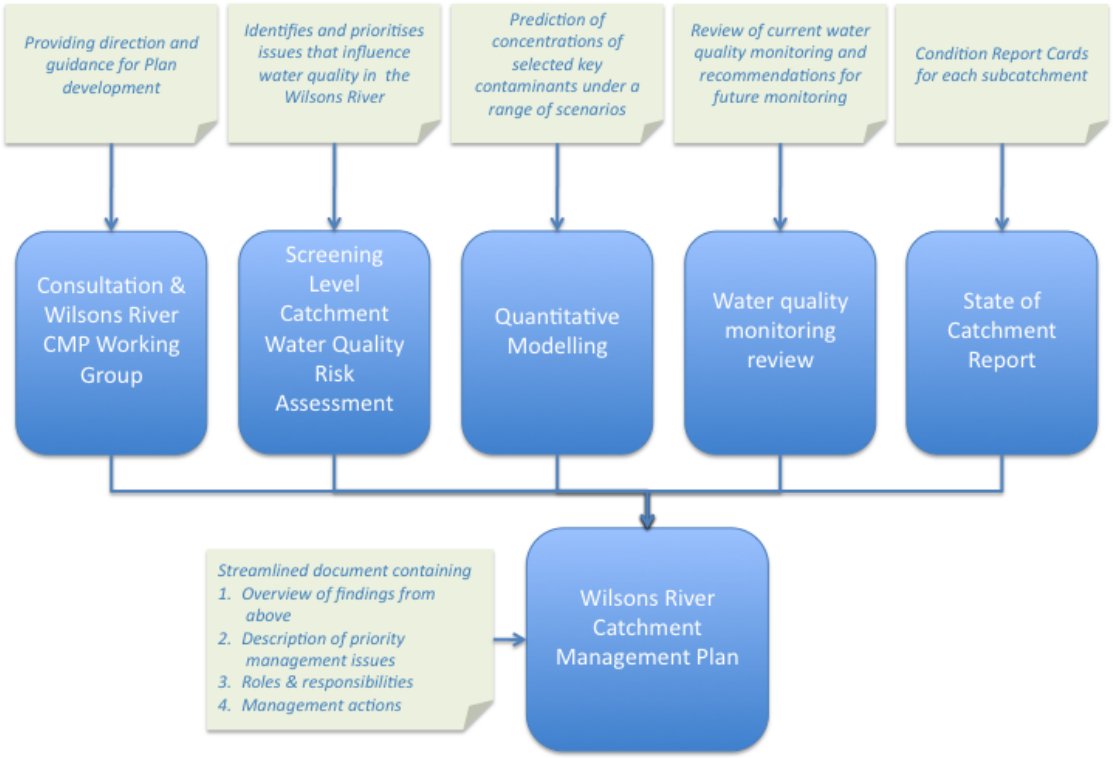


Figure 1-2. Project components undertaken to develop the Wilsons River Catchment Management Plan.

Table 1-1. Documents that address the project components as presented in Figure 1-2.

Project component	Document relating to the project component
Consultation and Wilsons River Catchment Working Group	• Wilsons River CMP: Establishing sub-catchments; and • Wilsons River Catchment Management Plan (present document)
Screening Level Catchment Water Quality Risk Assessment	• Wilsons River CMP: Catchment Water Quality Risk Assessment
Quantitative Modelling of Contaminant Transport	• Wilsons River CMP: Quantitative modelling of contaminant transport with E2
Water Quality Monitoring Review	• Wilsons River Water Quality Monitoring Review and State of the Catchment Report
State of Catchment Reporting	• Wilsons River Water Quality Monitoring Review and State of the Catchment Report
Wilsons River Catchment Management Plan	• Wilsons River Catchment Management Plan (present document)

1.8. Developing the Management Strategies

Hazards to water quality were identified through the following (see Table 7-1 for details):

- A screening level risk assessment process undertaken by Ecos Environmental Consulting for Rous Water (see Ecos 2009b);
- Incorporating issues identified in the Department of Commerce risk assessment report (NSW DoC 2005); and
- Hazards identified by the CWG during the Community Consultation Program.

All hazards described in the above documents and identified by the CWG along with issues identified in Section 0 (also see Section 11) were compiled into a master list and then categorised into broad groups of key catchment challenges and opportunities that had been identified at the second CWG meeting. The resulting list of hazards classed by catchment challenges and opportunities was reviewed by the CWG in early 2009.

Once issues that are likely to affect water quality in the catchment were identified, the vision and guiding principles for the plan were developed by the CWG during a CWG Meeting (Meeting No. 4 on November 26th 2008). Also at this meeting Key Outcome Areas (KOAs), related goals and related management programs to achieve the vision were developed using the Planning Web™ strategic planning model (described in Section 8.1). The management programs/plans were developed taking into consideration how the management initiatives are likely to be delivered within the sub-catchments. The workshop material was written up by the consulting team and subsequently reviewed by the CWG in early 2009 using Wikispaces (an internet forum for group comment and discussion).

2 Vision and Key Guiding Principles

In order to address the hazards to water quality in the Wilsons River catchment, the present Catchment Management Plan was developed, with the following vision for the catchment:

> *"Our vision for the Wilsons River catchment is to have a productive living space with healthy ecosystems that provide clean water."*

The guiding principles to ensure the visions fulfilment are:

> *"The vision will be fulfilled by supporting and promoting a culture of sustainability, working and learning together and focussing on mutually beneficial outcomes. We need to adopt an inter-generational perspective involving small steps toward long-term goals."*

In order to fulfil the vision, key outcome areas and management programs and plans were identified, each with associated goals and aims. These are presented Section 3 and Section 8 respectively.

3 Key Outcome Areas

The following key outcome areas (KOA's) have been identified to focus our actions on the broad range of challenges and opportunities in catchment management, to help achieve our vision. Details of how the KOA's were identified can be found in Section 8. Our KOA's and their associated aims are:

KOA 1: Environmental Management

Our Aim:

Protect and restore ecological systems and support land managers to improve river health and water quality.

KOA 2: Agronomic Land Management Practices

Our Aim:

Effective resource management to minimise transport of contaminants to waterways, maximise long-term farm viability and improve the natural environment.

KOA 3: Management of Built Environments

Our Aim:

Ecologically sustainable development that minimises transport of contaminants to waterways and supports a healthy catchment and riverine ecosystem services.

KOA 4: Governance

Our Aim:

Coordinated catchment and waterway management involving key stakeholders with effective resourcing of actions and regular review of management performance and catchment condition.

4 Community Consultation

4.1. Community Involvement

A community consultation program was integrated into the CMP development process. It included a range of ways to get involved with the project and have productive input. Aspects of community consultation included:

- specific information and local knowledge about sub-catchments;
- a working group of interested stakeholders to meet 4 times throughout the project; and
- information days in various sub-catchments and at the Big Scrub Rainforest Day, a series of newsletters, and information provided on the Rous Water website and to an e-list of interested community members.

Key stakeholders that are being consulted included:

- government authorities and local councils;
- local Aboriginal community;
- commerce and industry (rural and urban based); and
- community and interest groups (including conservation, Landcare and sub-catchment communities).

The primary task of the community consultation program was to answer the question "What are the water quality and catchment issues of significance for the community and key stakeholders?" and to integrate this information into the catchment management planning process.

4.2. Community Consultation Program (CCP) stages

The community consultation process was designed to incorporate past community involvement in the area and continue into the future (i.e. it was linked with previous programs such as the Lismore Source Project Reference Group (PRG) and the Water Walks, and is continuing into future programs such as Reconnecting to Country). A key part of the CCP was the Wilsons River Catchment Working Group (see Section 1.5). The stages for the development of the Catchment Management Plan in relation to community consultation were as follows:

- ***Inception***: The CCP began with the transition of the PRG into the first Wilsons River Catchment Working Group (CWG) meeting; the collation of information from previous consultation processes into an Issues Paper; and the first round of media releases and newsletters.
- ***Identification of issues and responses***: This stage included the second CWG meeting (which involves representatives from the sub-catchments, and explored issues raised) and a series of Information Days in the sub-catchments of the Wilsons River.

- ***Draft plan options***: This stage involved the collation of all individual issues raised and responses to them into an integrated response which formed the development of potential management options for the CMP, which were presented to the third and fourth CWG meetings.
- ***Final Draft Plan***: The plan was developed based on feedback on the draft plan options and placed on public exhibition in June and July 2009 when Rous Water became the primary contact point and received all formal submissions.
- ***Report finalisation***: Submissions were collated and categorised in preparation for integration into the Final CMP.

4.3. Preparation of Issues Paper

Sustainable Futures Australia (SFA, part of the Ecos Environmental Consulting project consortium) prepared an Issues Paper based on a review of major community consultation processes relevant to catchment management of the Wilsons River catchment. The purpose of the Issues Paper was to identify and document issues of concern or relevance for the management of the Wilsons River Catchment. The documents reviewed included:

- Your Words on Water (1995);
- Richmond Catchment Management Strategy (1996);
- Water Quality and River Flow Interim Environmental Objectives for the Richmond River Catchment (1999);
- Healthy Rivers Commission Report on North Coast Rivers; and
- Lismore Source Project Reference Group (2004-7).

Section 11 (Appendix) contains a copy of the Issues Paper. Also shown in the Issues Paper is a cross-reference to where the respective issues identified are addressed in the CMP.

4.4. Newsletters, advertisements and media releases

Newsletters were written to encourage people to seek further information on the project. The newsletters contained highly summarised information and colourful graphics to attract public interest in the project. Detailed information was made available on the dedicated WRCMP section of the Rous Water website. People without web-access could phone SFA and be sent a copy of detailed information printed from the website.

Print media and radio were utilized during the project to source interested stakeholders, to inform stakeholders of the projects progress, and to advertise Information Days and the Public Exhibition of Final Draft CMP.

Media releases were prepared and sent to local radio stations, regional newspapers, and small local newsletters (e.g. Rosebank Times, Clunes Clues, Bangalow

Heartbeat, Dunoon Gazette). The newsletters and poster/advertisements are shown in Section 12 (Appendix) and a sample of published advertisements and media articles is contained in Section 13.2 (Appendix) and in Section 2 of the Community Consultation Background CD.

4.5. Information days

Information Days were held in four locations central to the Community Consultation Program sub-catchments: Bangalow, Lismore, Corndale and Rocky Creek Dam. Two of these information days were combined with larger community events (Fatherhood Festival and Big Scrub Rainforest Day). The main goals of these information days were to interest the community in the Catchment Management Plan process, provide information and answer queries that local communities had about the plan, and collect feedback and input from stakeholders that could later be integrated into the plan. Section 13.3 (Appendix) of this plan and Section 3 of the Community Consultation Background CD contains a short report on these Information Days.

Section 13.1 (Appendix) of this plan contains a brief report on the outcomes of the point of reference and Section 5 of the Community Consultation Background CD also contains all associated forms and a spreadsheet containing details of all correspondence.

4.6. Website

A dedicated section of the Rous Water website was set up at the beginning of community consultation that focused on the Wilson's River CMP Project. This section of the website was accessible from the front page of Rous Water's website throughout the project. A link to this location was created on the Sustainable Futures Australia website.

The Wilsons River CMP web pages contained:

- updated project information;
- registration of interest forms;
- newsletter series;
- all written reports, including the draft CMP; and
- a formal submission form for the Final Draft CMP.

The Wikispace internet discussion forum was set up after the last CWG meeting to assist the CWG in providing feedback on the draft CMP. This Wikispace was extended for use in the public exhibition period for the wider community to provide direct feedback on the Final Draft CMP. Section 4 of the Community Consultation Background CD contains sample pages from the web-pages and wiki-space.

4.7. Enquiries, collation of issues and feedback

Sustainable Futures Australia (SFA) was the main point of reference for enquiries during the project. This point of contact was promoted in components of the engagement process (see Section 13 (Appendix)).

A procedure was put in place for the collation of issues and feedback: Sustainable Futures Australia recorded and collated issues, information, feedback and questions provided by stakeholders and then passed these onto the relevant party involved in the project (e.g., Ecos Environmental Consulting, Rous Water, the Working Group, Widjabul) for them to make contact with the particular stakeholder.

Over ninety responses from community members were received by SFA prior to the public exhibition period, including registration of interest forms, emails and telephone calls.

Section 5 of the Community Consultation Background CD contains a brief report on the outcomes of the point of reference, all associated forms, and a spreadsheet containing details of all correspondence.

4.8. Public exhibition and finalisation of the CMP

Printed copies of the Final Draft WRCMP were made available by Rous Water at several locations within the catchment including the Rous Water office; Lismore City, Ballina Shire, Byron Shire and Richmond Valley Council offices; branches of the Richmond-Tweed Regional Library; and several general stores. An electronic version of the document was also available on the Rous Water website and Wikispace. In all locations (including the website), a form for writing submissions was supplied. The latest newsletter and poster were also displayed at each location at the time.

All submissions were delivered, posted or emailed to Rous Water, and these submissions were combined with those received via the Wikispace. Rous Water staff collated all submissions received, which included comments received via the website and Wikispace, and by mail and email to Rous Water. The receipt of all submissions was recorded by Rous Water in the same way that all previous feedback had been (i.e., including time and date; name and contact details of stakeholder; mode of contact; details of input from stakeholder; category / outcome area; whether a personal response is requested/required). A brief response was made by Rous Water within 5 working days to each submission indicating that their submission had been received and the steps that shall be taken to integrate their ideas and concerns into the Final WRCMP. After the closing date of submissions, all submissions were sent to Sustainable Futures Australia for review and categorisation and then sent on to Ecos for analysis, response and integration into the final CMP. A summary of the submissions received and Rous Water's response is presented in Appendix 14.

Section 6 of the Community Consultation Background CD contains a copy of the submission feedback form and a summary of submissions.

5 Wilsons River catchment description

5.1. General catchment description

Location of main waterways

The catchment of the Wilsons River is located in the north-western headwaters of the Richmond River (Figure 5-1). The main waterways of the Wilsons River catchment are Coopers Creek, which drains the western area of the catchment, and Wilsons River which drains the eastern area. Coopers Creek joins the Wilsons River near Lismore. The Wilsons River converges with the Richmond River downstream of Lismore at Coraki.

The headwaters of Wilsons River and Coopers Creek begin on the southern, deeply dissected, slopes of a volcanic plateau in the far north of the catchment, which form part of the Koonyum and Nightcap ranges. The waterways then flow across broad river valleys, forming wide flood plains, before their confluence upstream of Lismore. At this stage the waterway is referred to as the Wilsons River (Figure 5-2).

Physical description of climate and catchment

The Wilsons River Catchment has a sub-tropical climate characterised by long growing seasons, moderately high temperatures and high rainfall (Parsons Brinckerhoff 2006). The main urban centre, Lismore, experiences warm summers (average January maximum = 29.9°C) and mild winters (average July maximum = 19.9°C) and has a summer-dominated subtropical rainfall pattern with most rain falling between December and April (McKee *et al*. 2001). At this time of year rainfall generally exceeds evaporation (Parsons Brinckerhoff 2006) and the resultant high soil moisture supports high rates of plant growth. The highest average monthly rainfall occurs in March (191.8mm); the lowest average monthly rainfall occurs in September (51.7mm), while average annual rainfall is 1354 mm (McKee *et al*. 2001).

The northern area of the Wilsons River catchment is characterised by steep topography that is heavily vegetated. The southern areas of the catchment have a lower gradient than the north and are mostly cleared of vegetation. The southern catchment area is a highly productive agricultural landscape.

The Wilsons River converges with the Richmond River approximately 47 km downstream of Lismore. Due to tidal influences water from the Richmond River can enter the lower Wilsons River but is not expected to reach as far upstream as Lismore. However water from river reaches several kilometres downstream of Lismore may be expected to move upstream of Lismore. For this reason, the catchment area downstream of Lismore has been included in this study. Tidal influences extend around 12 km upstream of Lismore (Bishop 1999).

Transport

The catchment is dissected by a network of roads, including both sealed and unsealed roads (Figure 5-3). Three major roads occur in the catchment: the Pacific Highway which traverses the catchment to the east; the Bangalow-Lismore Road which

connects Lismore to the Pacific Highway for north-bound traffic and crosses the Wilsons River twice, and the Bruxner Highway to the south of the catchment. A railway line runs through the catchment but is no longer in use.

Key features and statistics

The area of Wilsons River Catchment is 56,656 ha (estimated from GIS data). The catchment population estimated from 2006 Australian Bureau of Statistics Census data is approximately 37,000. This includes the major regional centre of Lismore, a number of small villages plus farm areas.

The total number of properties in the Catchment is 14,197, excluding urban properties less than 1 ha, this number is 3,557 (Table 5-1)

Table 5-1. Breakdown of property numbers by size

Area (ha)	Number
< 1	10,640
1 to 10	2,078
10 to 20	574
20 to 30	309
30 to 40	230
40 to 50	184
50 to 75	133
75 to 100	27
100 to 200	20
> 200	2
Total	14,197
Total excluding properties < 1 ha	3,557

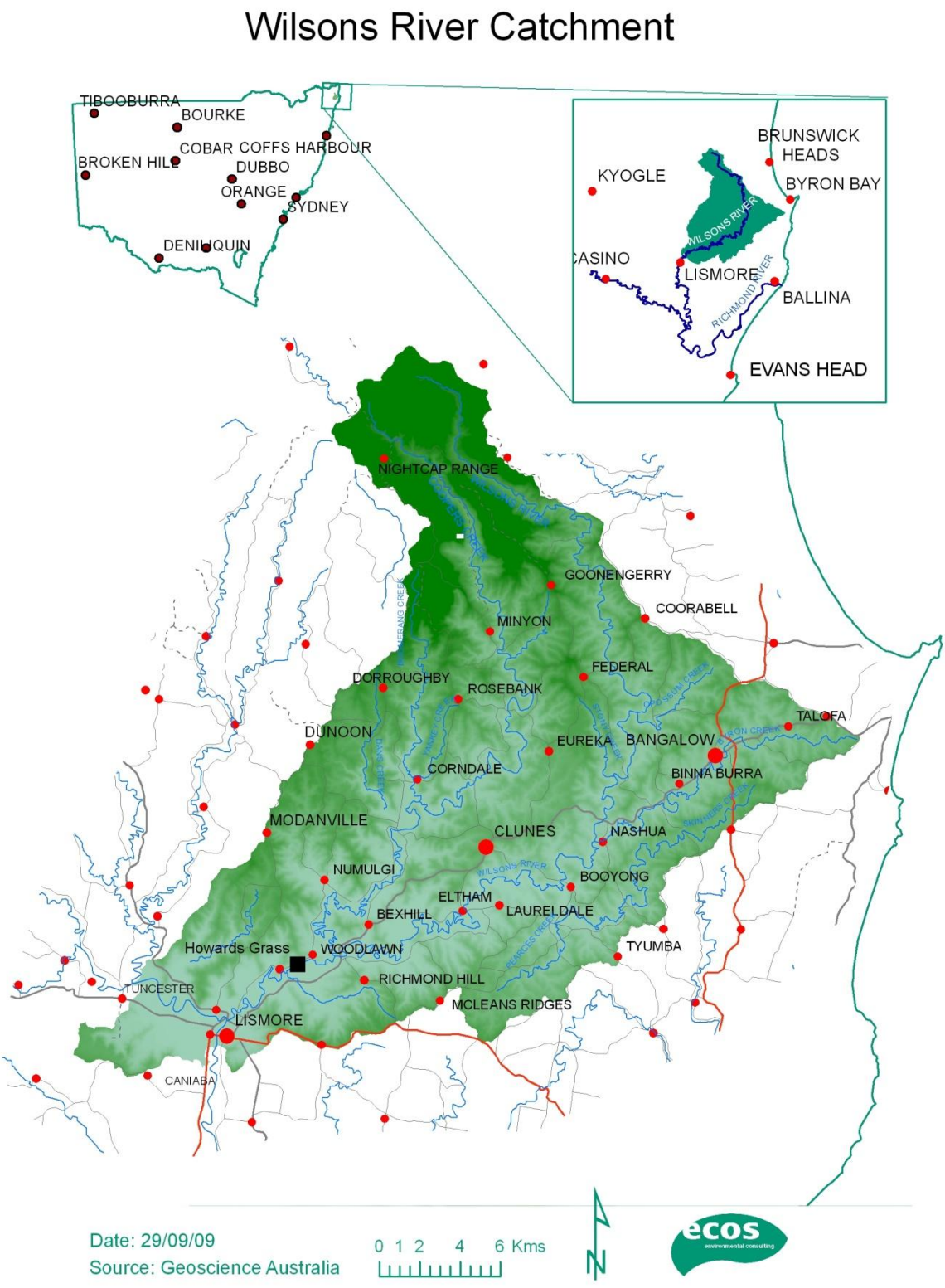


Figure 5-1 Wilsons River catchment.

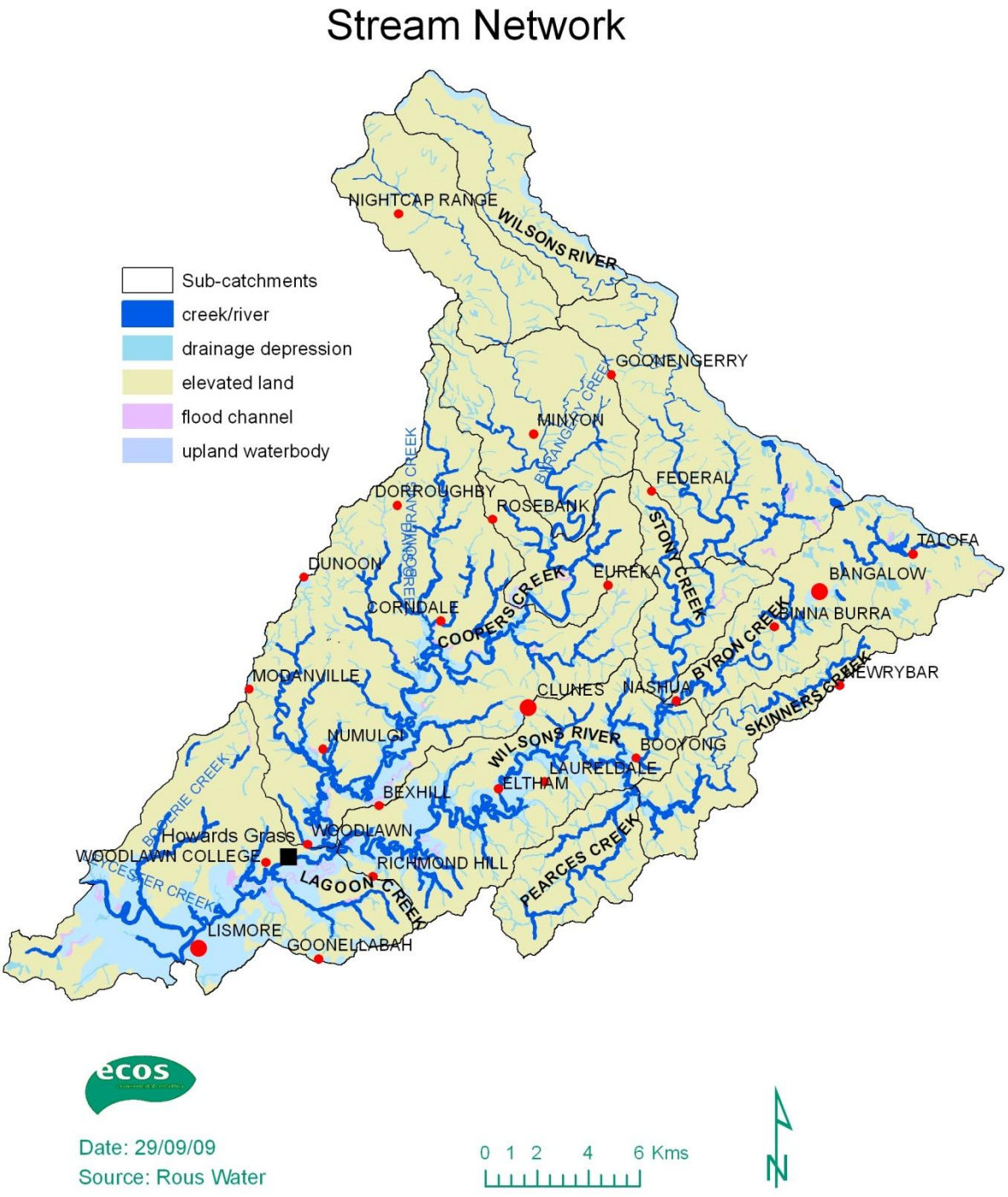


Figure 5-2. Waterways in the Wilsons River catchment. Black lines indicate the boundaries of the risk assessment sub-catchment units.

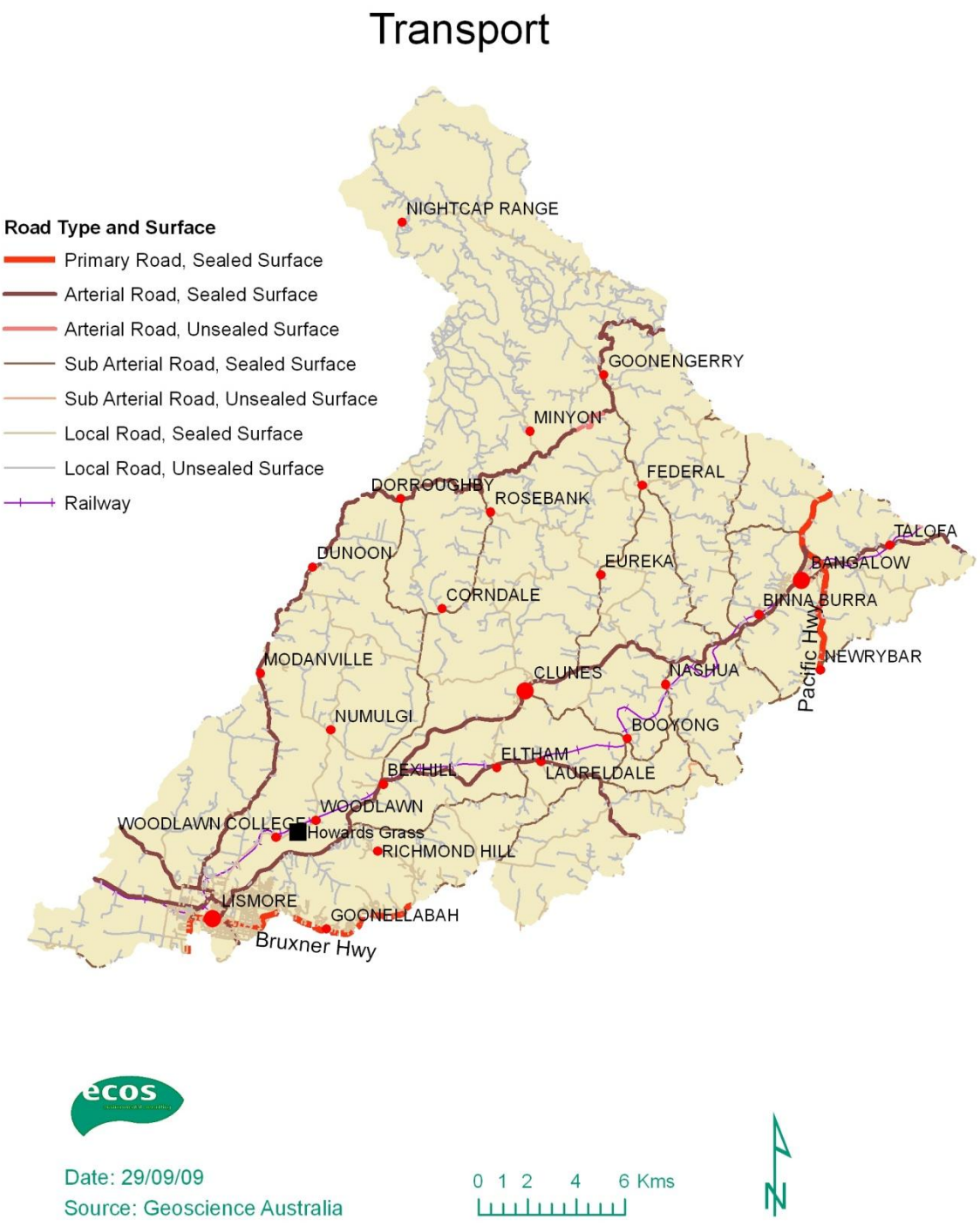


Figure 5-3 Transport network and road surface types within the Wilsons River catchment.

5.2. Sub-catchments

An initial assessment of the Wilsons River catchment indicated that the risk assessment undertaken to identify management issues required dividing it into sub-catchment units (Ecos 2009a)[1]. Through a process of modelling, research of previous catchment and river work in the area, and community consultation, 12 sub-catchments were determined (Figure 5-4).

In order to facilitate the delivery of management initiatives, monitoring, reporting and consultation with the community these 12 sub-catchment units were grouped into six larger sub-catchments (Figure 5-4). Sub-catchments and sub-catchment units are listed in Table 5-2.

Table 5-2. Sub-catchments and sub-catchment units

Sub-catchment	Sub-catchment Unit
Wilsons River Tidal Pool	1
Lower Wilsons Creek	2, 3
Lower Coopers Creek	4
Middle Wilsons Creek	5, 6, 8, 9
Upper Coopers Creek	7, 10, 11
Upper Wilsons Creek	12

[1] See: *Wilsons River Catchment Management Plan: Catchment Water Quality Risk Assessment. Report prepared by Ecos Environmental Consulting for Rous Water, Lismore, NSW*.

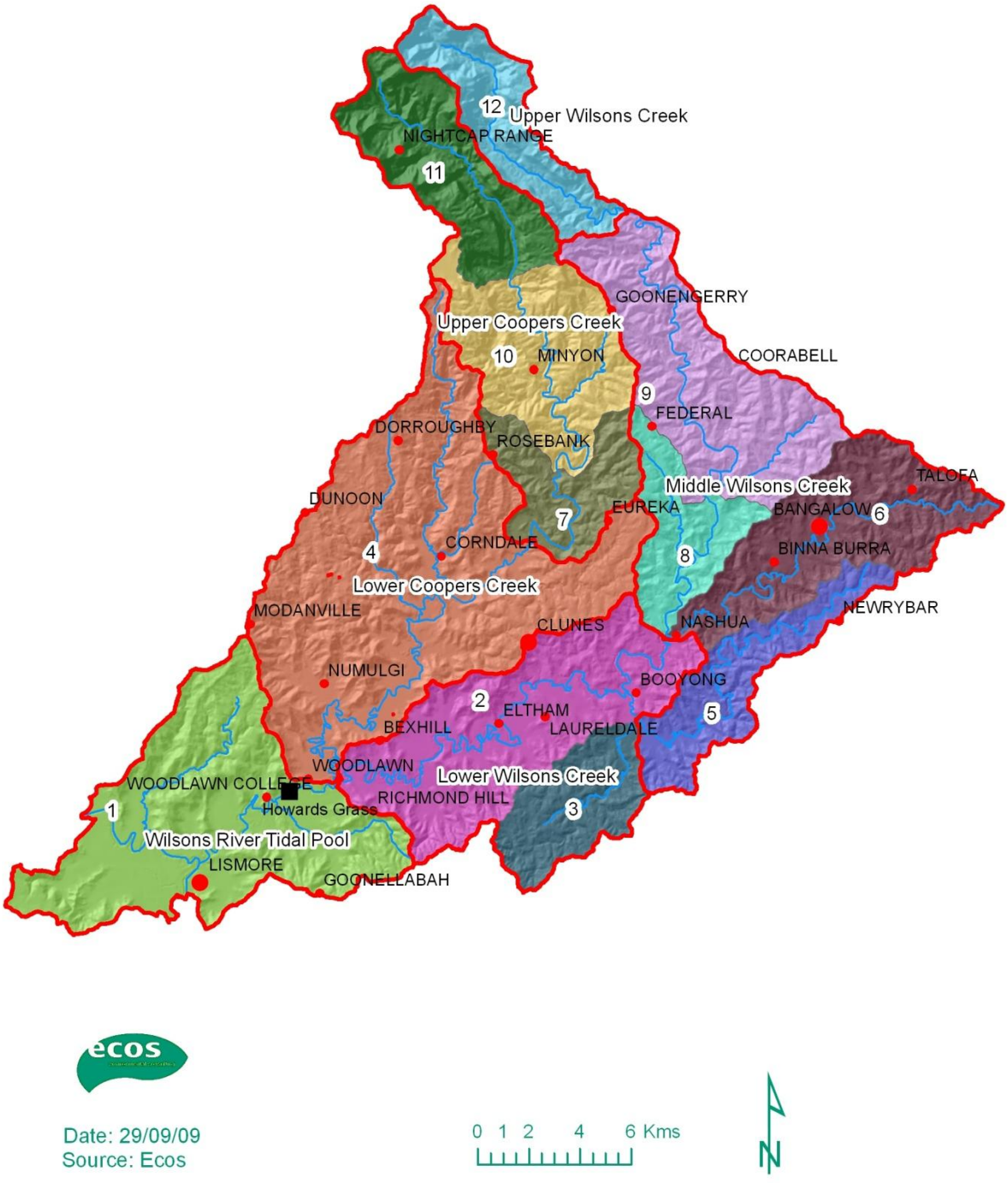


Figure 5-4. The 12 risk assessment sub-catchment units (shaded differently) established in the Wilsons River catchment for the risk assessment and the six sub-catchments (outlined in red) used for monitoring and reporting and the future management planning and implementation of the Wilsons River Catchment Management Plan.

5.3. Topography

The highest elevation in the Wilsons River catchment is approximately 849 m above sea level and is in the northern part of the catchment, while the lowest elevation is approximately 1.2 m at Lismore (Figure 5-5). The elevated areas to the north are characterised by steep slopes where the headwaters of Wilsons River and Coopers Creek cut deeply through the volcanic plateau to create steeply sided valleys (Figure 5-5, Figure 5-6).

5.4. Geology

The Wilsons River catchment is dominated by Tertiary aged Lismore Volcanics which have formed a basalt plateau in the north of the catchment, and Quaternary Riverine Plains that dissect the basalt in the southern part of the catchment (Figure 5-7).

As a result of this geology, the area is dominated by red loamy soils, in the steeper areas of the catchment that tend to be pH neutral and highly fertile, while in the floodplain areas the soils tend to be more clayey and acidic. Before European settlement these basalt soils supported large stands of subtropical rainforest, known as the 'Big Scrub'.

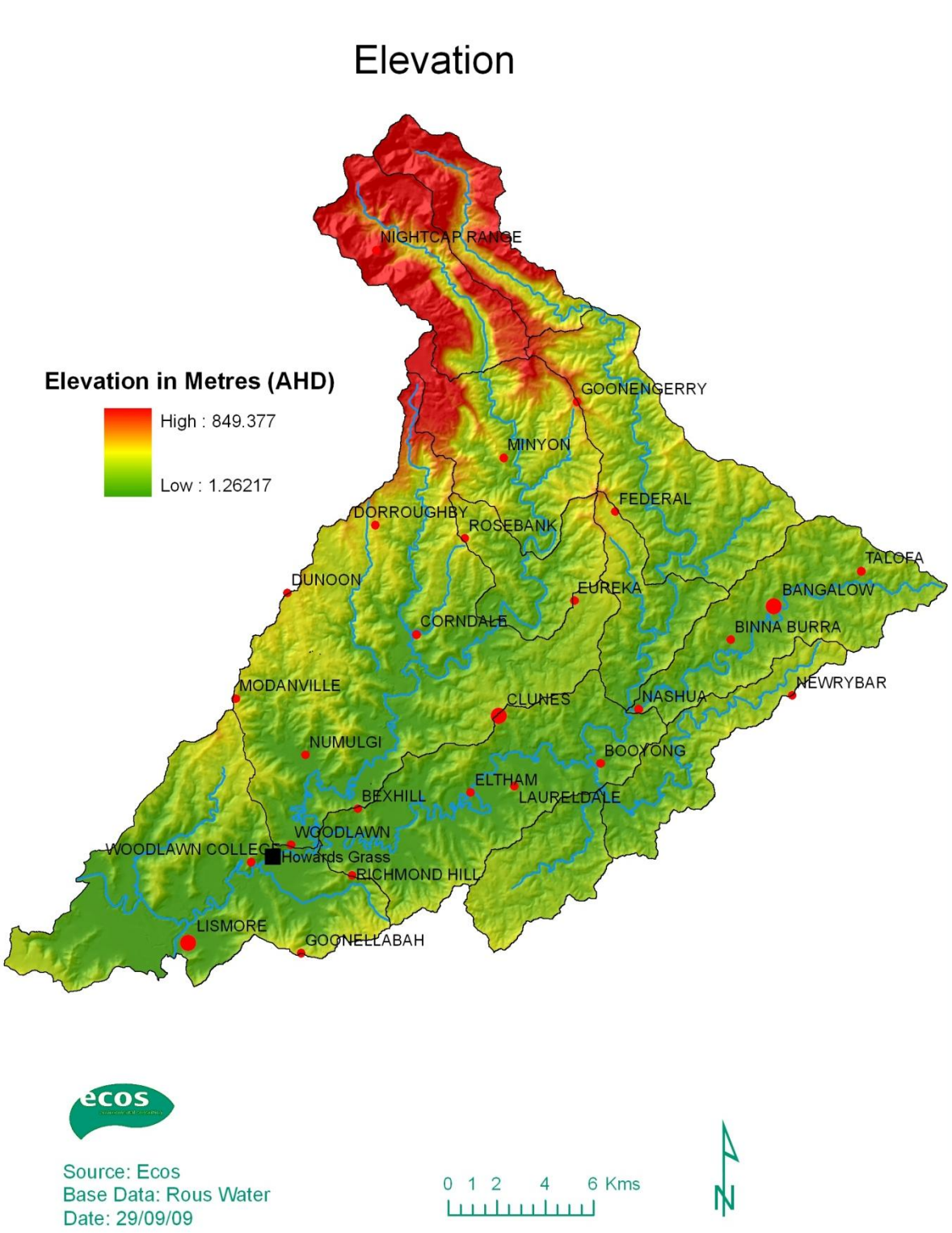


Figure 5-5. Wilsons River catchment elevation (AHD). Black lines indicate the boundaries of the risk assessment sub-catchment units.

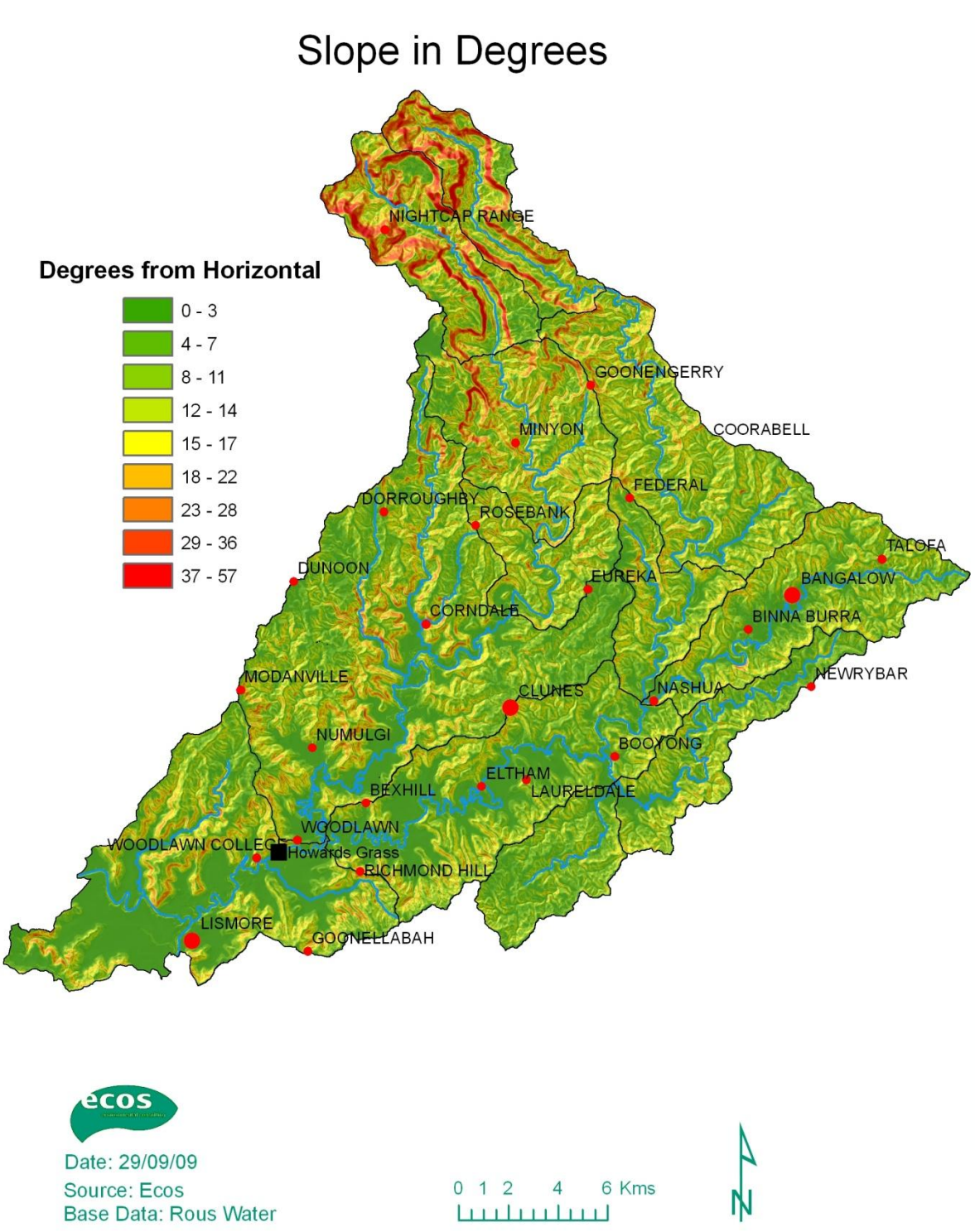


Figure 5-6. Wilsons River catchment slope in degrees. Black lines indicate the boundaries of the sub-catchments used in the risk assessment.

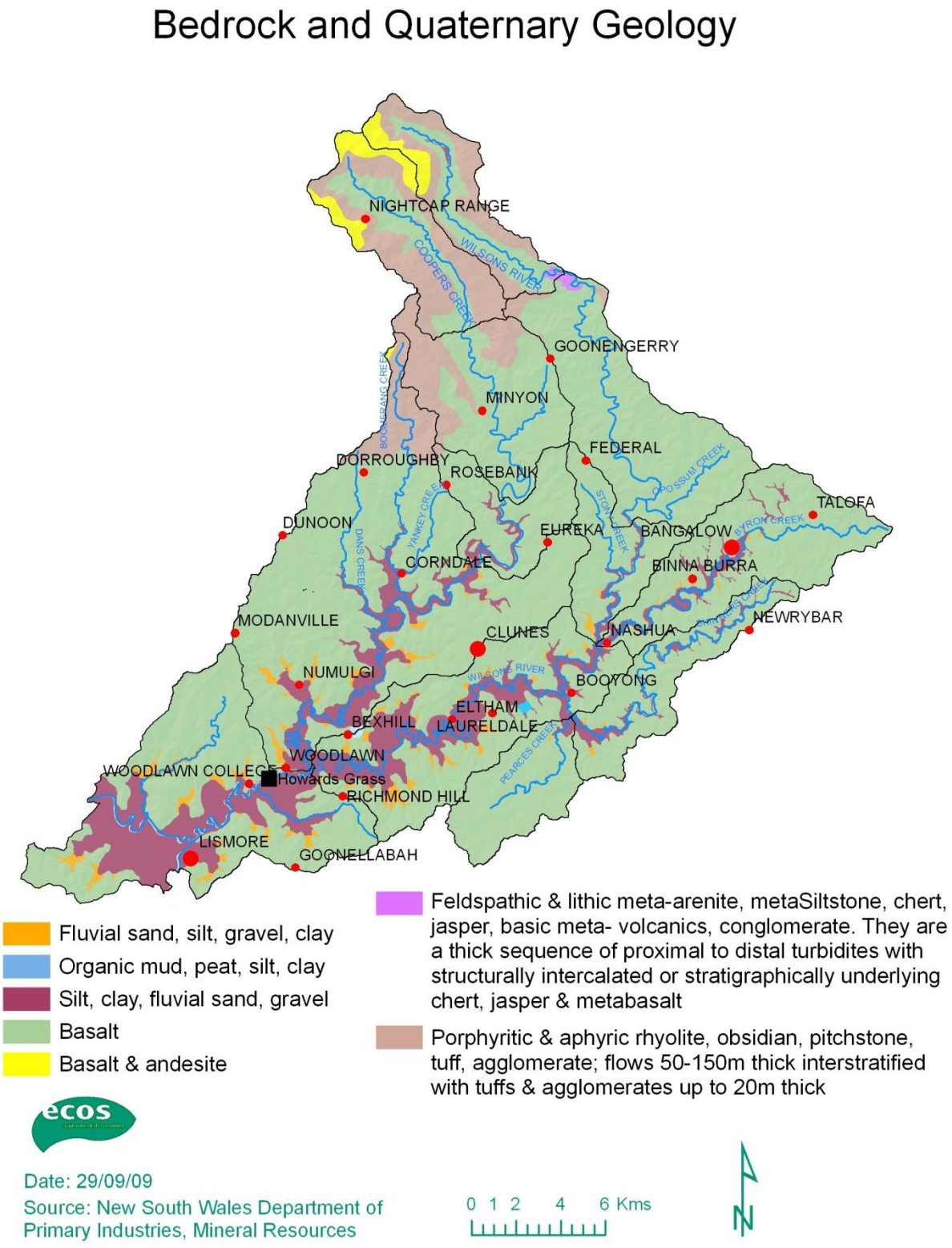


Figure 5-7. Wilsons River catchment geology. Black lines indicate the boundaries of the risk assessment sub-catchment units.

5.5. Vegetation, landuse and land parcel size

The Wilsons River catchment supports a number of landuses. The northern part of the catchment is characterised by forested slopes, with the bottom of the valleys dominated by cleared land parcels that front sealed roads. The catchment south of these forested areas is cleared for agriculture.

In the southern parts of the catchment grazing predominates and there is urban development around Lismore in the far south. Throughout the area, land parcel size is relatively small (Figure 5-8).

Overall, 30% of the catchment is under native forest cover, a further 13% is orchard with the balance being urban land or pasture. Around 11% of land is in reserves (including National Park and State Forest) (see Figure 5-9).

In the central part of the catchment landuse is dominated by the grazing of cattle and horticultural activities including the growing of macadamias and avocadoes. There are broad areas of tree cover in this region, but they are dominated by camphor laurel (*Cinnamomum camphora*), an introduced species that thrives along the waterways of the region.

5.6. Shires and land ownership

There are three municipal councils within the Wilsons River catchment: Byron Shire Council in the north and south-east; Lismore City Council in the south-west and Ballina Shire Council along its south-eastern (Figure 5-10).

The majority of the central and southern areas of the catchment are in private ownership, while the northern part of the catchment has a large area of crown land (Figure 5-11).

5.7. Local Aboriginal Land Councils and Traditional Owners

There are three Local Aboriginal Land Councils within the Wilsons River catchment: Tweed Byron in the north; Ngulingah in the south-east; and Jali in the south-east (Figure 5-12).

The catchment area for the Wilsons River Source is located within Widjabul country. The Widjabul people are one of the tribes of the Bundjalung Nation. Rous Water recognises that the Widjabul people are the traditional owners and custodians of the lands, waters, animals and plants of this water catchment.

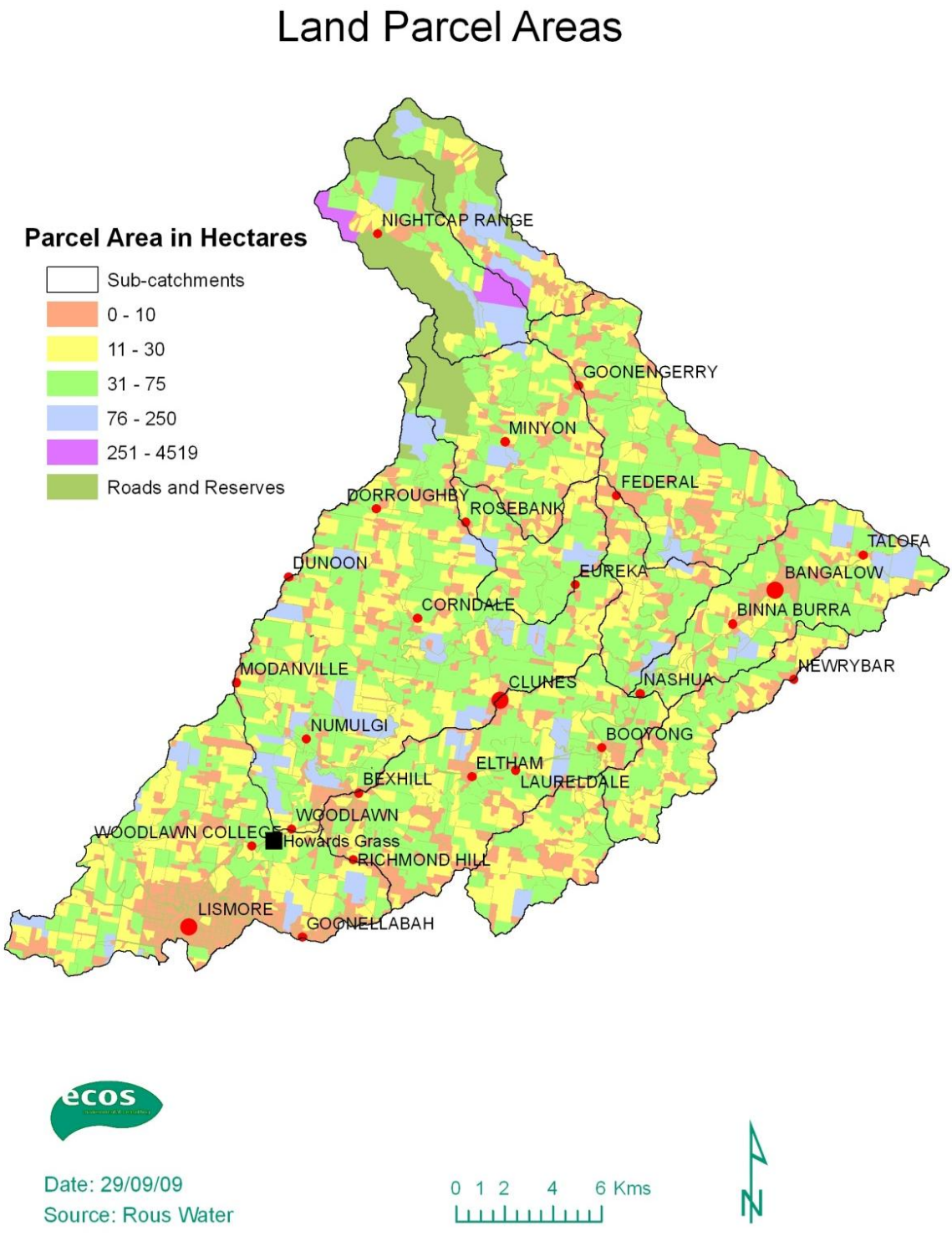


Figure 5-8. Land parcel area in the Wilsons River catchment. Black lines indicate the boundaries of the risk assessment sub-catchment units.

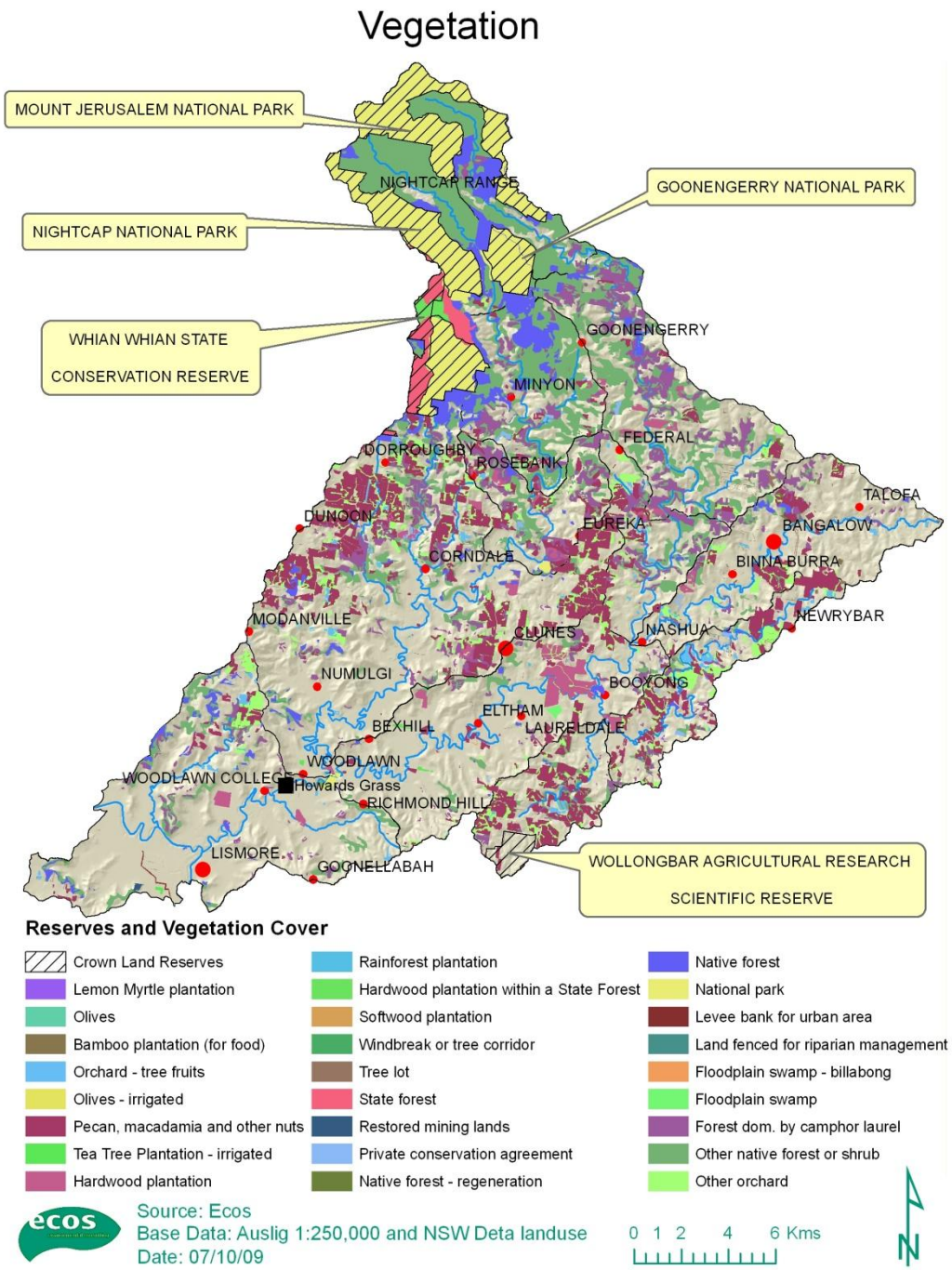


Figure 5-9. Vegetation cover and Reserves within the Wilsons River catchment.

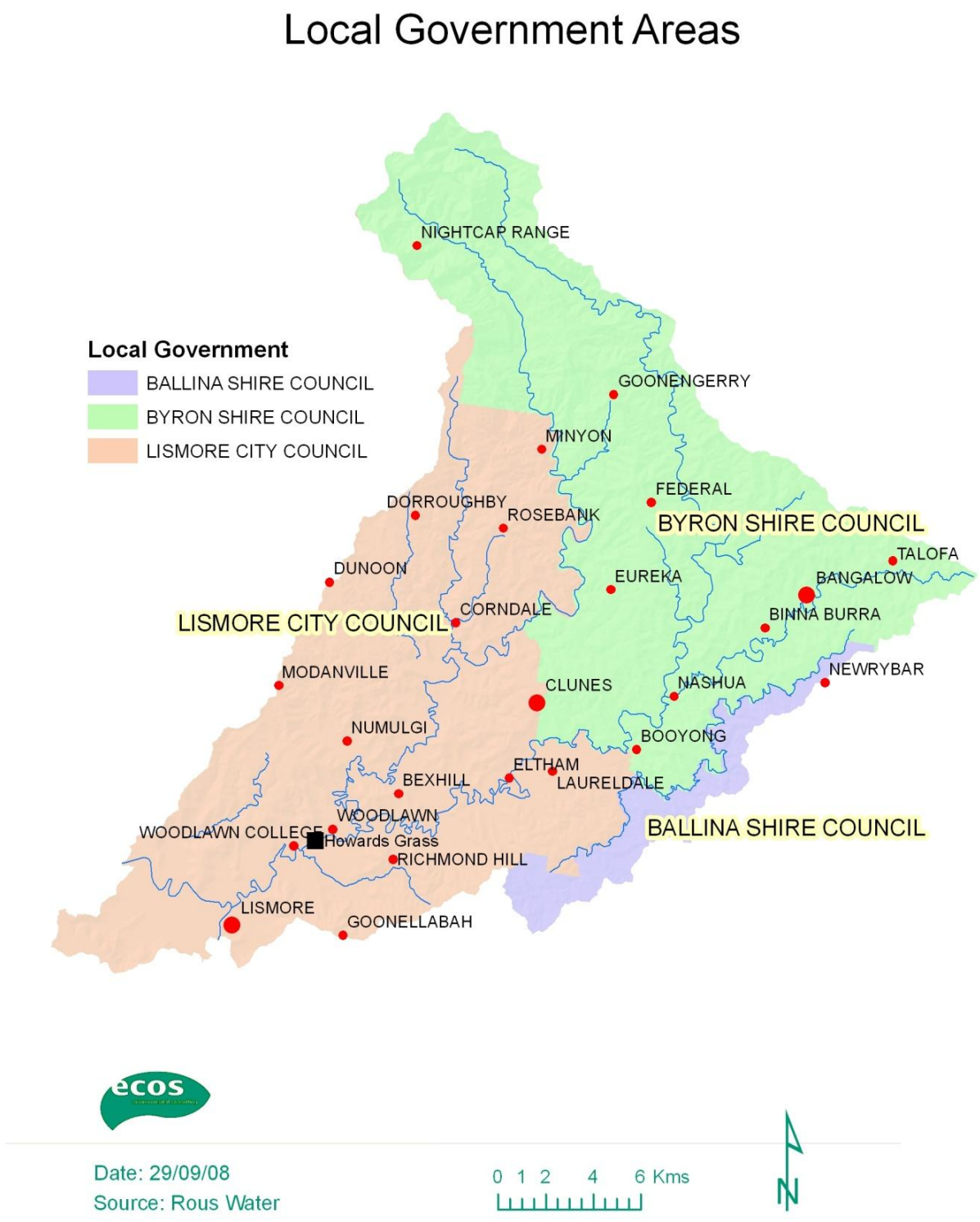


Figure 5-10. Shire councils within the Wilsons River catchment.

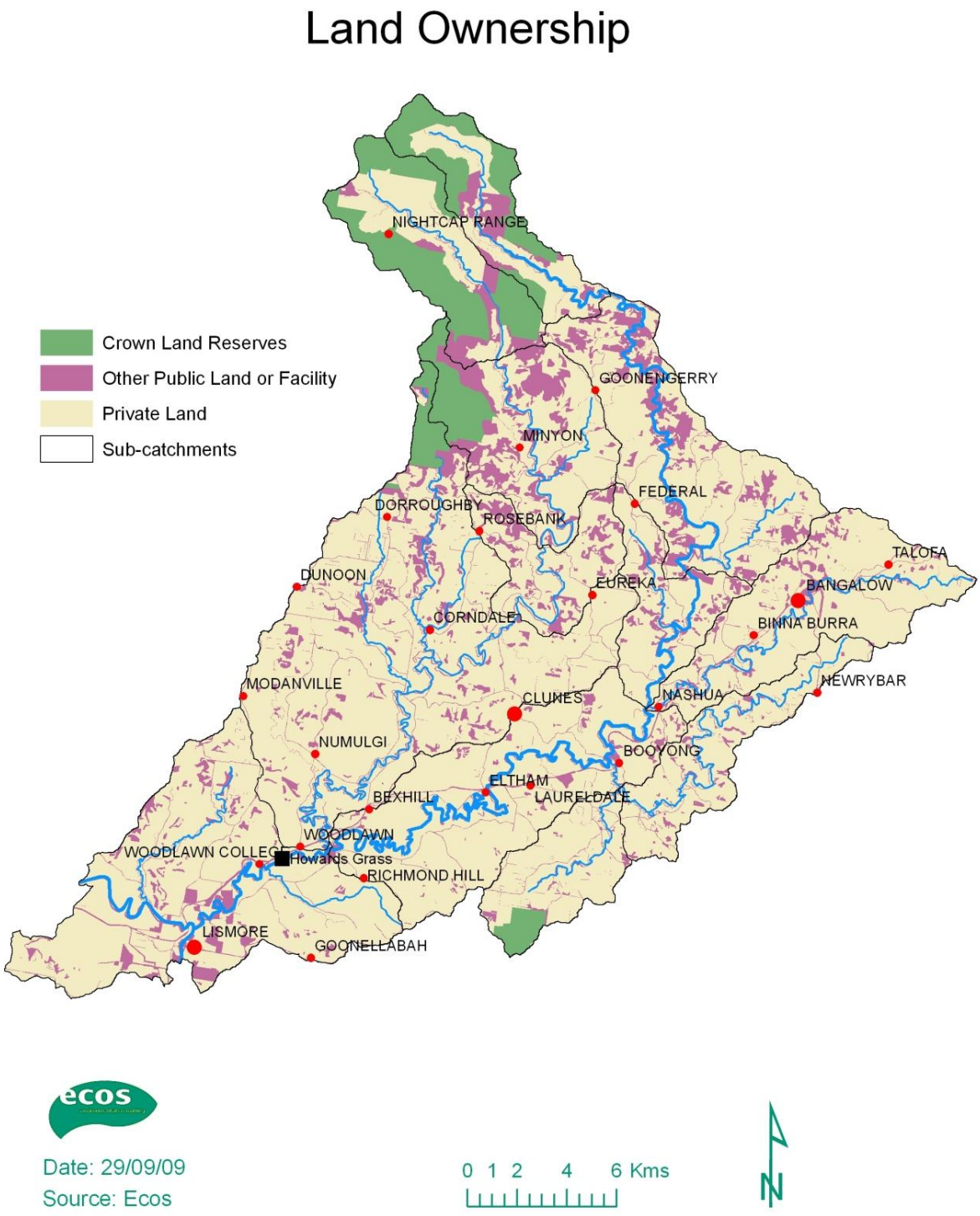


Figure 5-11. Private and public land in the Wilsons River catchment. Public land includes facilities that may be a privately owned, but provide a public function, such as an electricity substation or airport. Black lines indicate the boundaries of the risk assessment sub-catchment units.

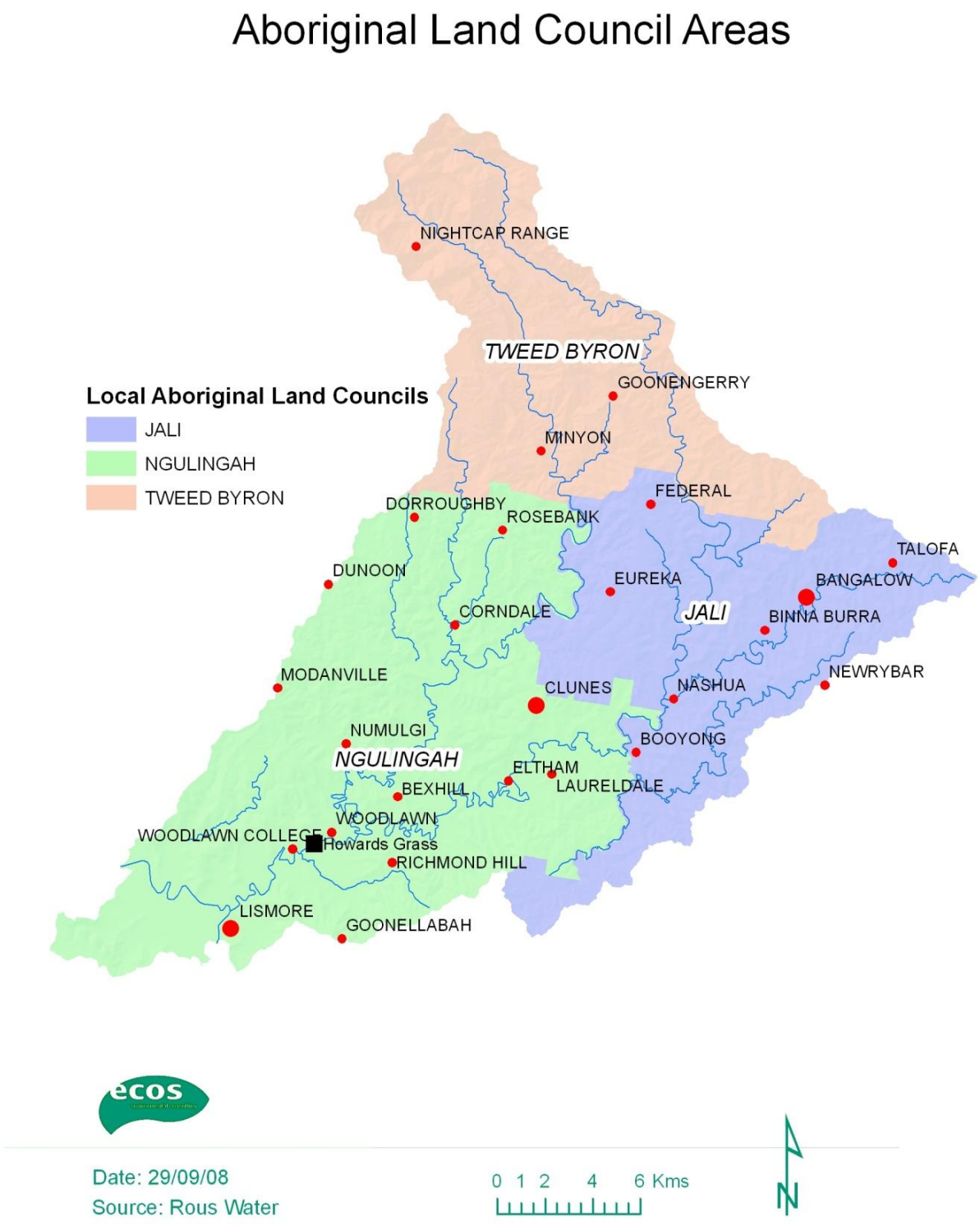


Figure 5-12. Aboriginal land councils within the Wilsons River catchment.

6 Water quality and river health issues in the Wilsons River catchment

6.1. Overview of the catchment risk assessment

Threats to water quality and catchment health arise from many sources and are largely determined by the nature of land use and location within the catchment. Consequently an assessment framework based on landuse categories and sub-catchment classification was developed for the Wilsons River Catchment Water Quality Risk Assessment (Ecos 2009b)[2].

An initial assessment of the Wilsons River catchment indicated that the risk assessment would require the division of the Wilsons River catchment into sub-catchments. Through a process of modelling, research of previous catchment and river assessment work in the area, and community consultation, 12 sub-catchments units were determined for use in the risk assessment. Furthermore, to facilitate the delivery of management initiatives, monitoring, reporting and consultation with the community these 12 risk assessment sub-catchment units were grouped into six sub-catchments that were used as the focus for the Catchment Management Plan.

For the risk assessment potential hazards were identified at a broad level with the exception of biocides, which were separately itemised. The focus was on hazards that would affect water quality and for which reasonable estimates of their likely values could be obtained or estimated. Types of contaminants were classed as biocides or non-biocides and their source as either point or diffuse. Point sources are known locations where significant volumes of contaminants are discharged on a regular basis or may be discharged under some circumstances. Diffuse sources are parcels of land of varying size from which rainfall runoff will pick up contaminants and transport them to waterways.

During the risk assessment 21 landuse categories were identified within the Wilsons River catchment. Landuse classification was conducted according to the Australian Landuse Management Classification system (Bureau of Rural Sciences 2006). Note that this required that some landuses be aggregated for planning and assessment purposes. The landuse that covered the greatest area in the catchment was beef grazing, which covered approximately 50 % of the catchment (Figure 6-1, Figure 6-2). The next largest landuse in the catchment, covering approximately 14 % are rural residential areas, followed by reserves (11 %), tree nut production (primarily macadamias (8 %)) and reserves dominated by the noxious weed, camphor laurel (5.5 % of the catchment). In total these five landuses cover 88 % of the catchment (50,190 ha out of a total catchment area of 56, 656 ha).

The risk assessment methodology incorporated weighting factors based on the distance of a hazard source to the nearest waterway and on the distance as the stream flows to the water supply offtake at Howards Grass. The weighting factors allowed for the effect of dilution and decay of contaminants as they are transported downstream.

---

[2] *See: Wilsons River Catchment Management Plan: Catchment Water Quality Risk Assessment. Report prepared by Ecos Environmental Consulting for Rous Water, Lismore, NSW. 2009*

Consequently hazards that were located closer to a waterway or were relatively close to Howards Grass tended to receive higher risk scores.

It was estimated that at least 38 biocides are used in the catchment, 21 of which are herbicides, 12 insecticides, four fungicides and one rat poison. In general, non-biocide risk was lowest in the northern and north-eastern areas of the catchment, moderate in the central area of the catchment and moderately high south of Howard Grass.

Houses in the Wilsons River catchment, with the exception of those in the towns of Lismore and Bangalow, are unsewered. Of the 3,555 unsewered houses identified in the catchment, 87 houses had the highest house risk score. These houses were located not only adjacent to the Wilsons River, but also along its tributaries. Approximately 20 % of these high risk houses were near Howards Grass, with the high risk scores being due to the house's proximity to a waterway and the short distance to the off-take.

There were 2,629 farm buildings identified in the catchment. It was found that 57 (approximately 2 %) of the farm buildings had the highest risk score, with 16 of these farm buildings near Howards Grass. A moderately high risk was scored by 375 farm buildings (approximately 14 %). Approximately a third of the farm buildings in the catchment had the lowest house risk score. Most of these low risk farm buildings are in the northern and north-eastern area of the catchment and are found along the elevated ridges of the catchment.

As with houses, farm buildings with a moderate risk score were located in the central area of the catchment, along valleys throughout the catchment, and in the area south of Howards Grass.

There were numerous dip sites within the catchment and 11 EPA licensed discharge points or registered contaminated sites. Seven of these locations are in the south of the catchment, near the Howards Grass off-take and, therefore, are likely to pose a greater risk to water quality than the remaining four sites that are further from the off-take.

The highest risk road crossings are associated with streams near the Howards Grass off-take. The road crossings closest to the off-take are along Woodlawn Road which runs just to the north of Wilsons River, and Bangalow Road, which runs to the south of the river.

There were only small forested areas near the off-take that could pose a fire risk. In the moderate fire risk areas of the catchment there were small scattered reserves (north of the off-take). The large forested areas that represent the greatest risk of uncontrollable fire in the catchment were a considerable distance from the off-take. Thus, fire was assessed as posing a low risk to water quality.

Three colonies (or camps) of bats occur within the Wilsons River catchment. They were included as a potential point source of water quality contamination in the present project as they are a potential reservoir of disease that may affect humans. However, none of the diseases of concern are believed to be waterborne and are therefore, at present, considered a low risk to water quality.

See the Wilsons River Catchment Water Quality Risk Assessment (Ecos 2009b) for further information on hazards to catchment water quality and catchment health.

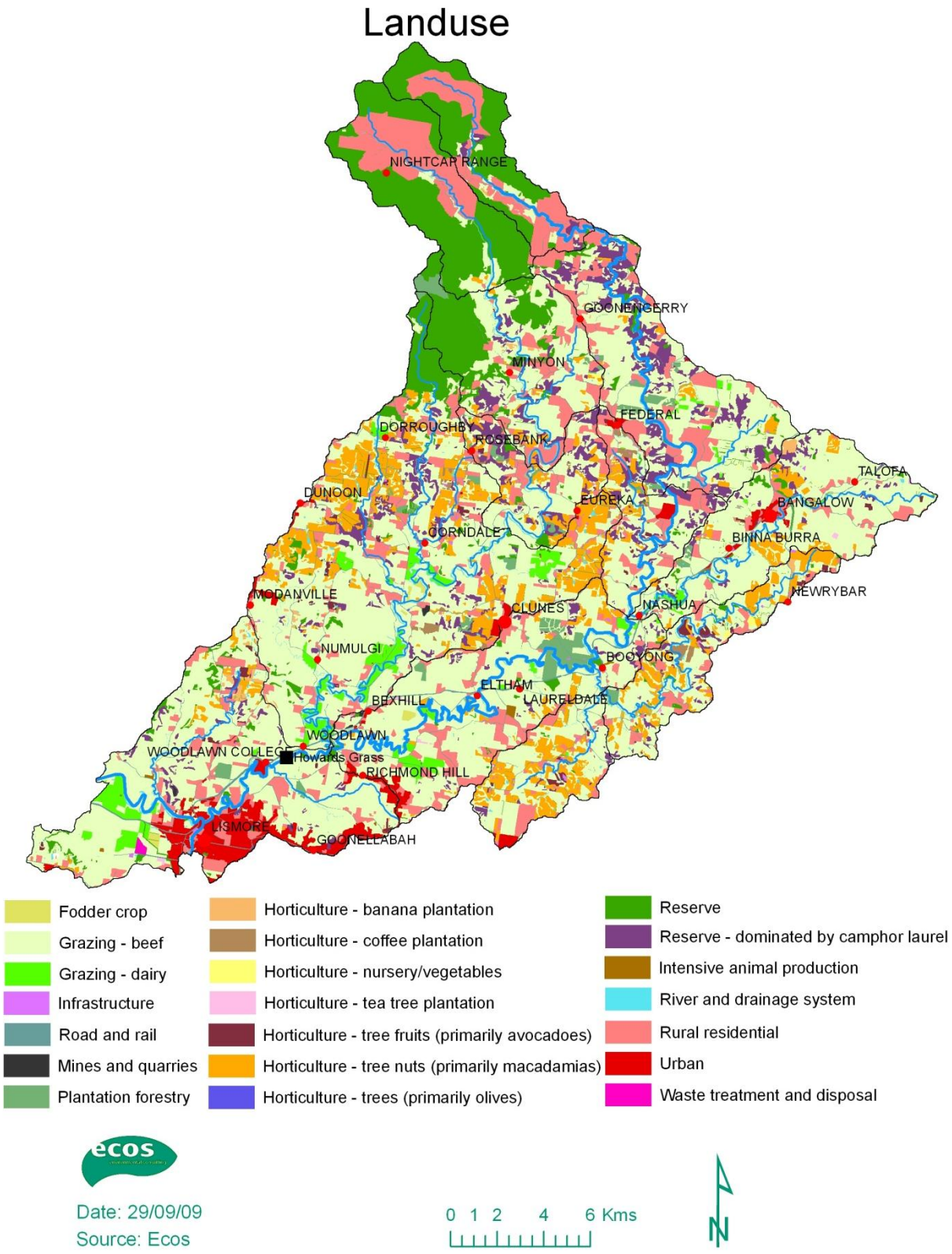


Figure 6-1. Landuse in the Wilsons River Catchment

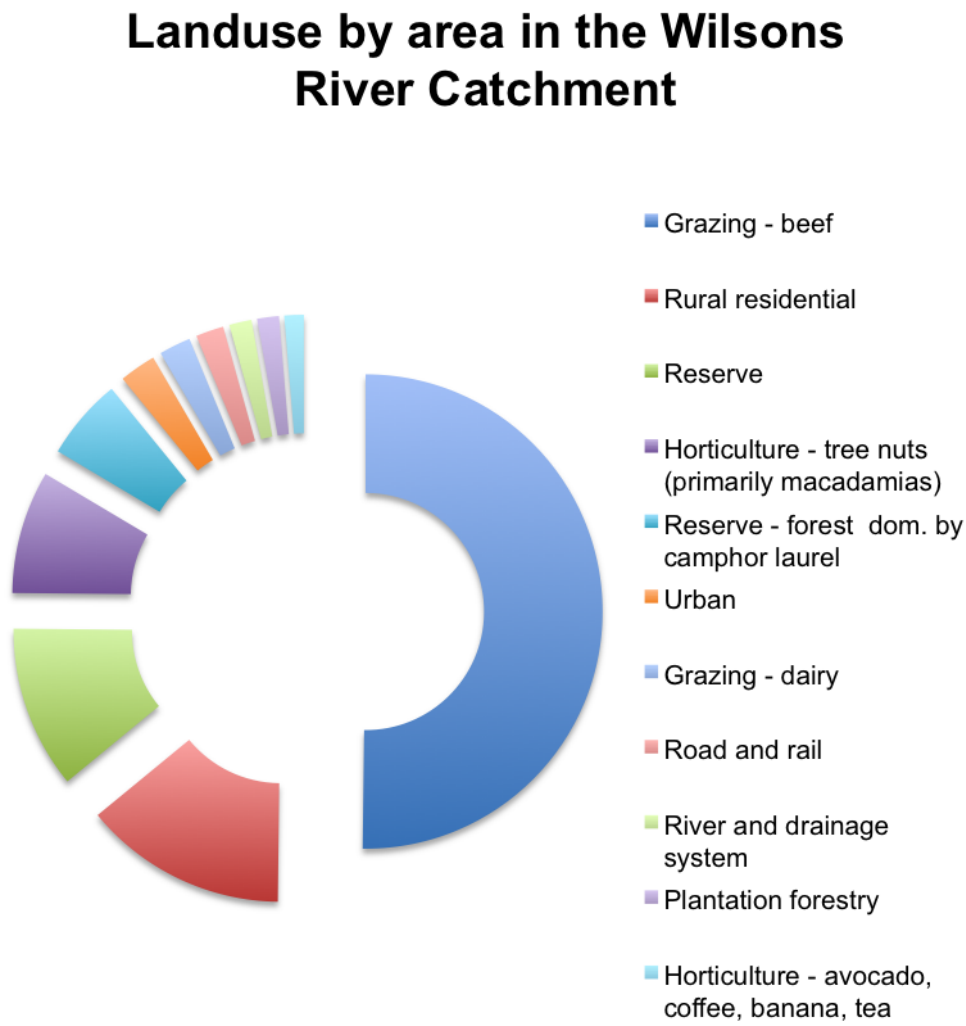


Figure 6-2. The top eleven landuse categories by area in the Wilsons River catchment. The landuses in the key are listed in descending order of the area they cover in the catchment. Thus grazing – beef is the dominant landuse in the catchment.

6.2. Habitat for the Eastern Freshwater Cod

The recovery plan developed for the endangered Eastern freshwater cod shares many of the goals of the Wilsons River Catchment Management Plan and for this reason, it is included in this plan.

6.2.1. Background

Eastern freshwater cod (*Maccullochella ikei*) are a large, predatory, freshwater fish native to only the Clarence and Richmond Rivers in northern New South Wales, where they were once abundant. Although similar to the Murray cod, they are a separate species. Populations of Eastern freshwater cod apparently collapsed in the 1920s and 1930s and continued to decline until the 1980s, when the species was protected (NSW Fisheries

2004). Rowland (1993) considered that natural populations of Eastern freshwater cod had become extinct in the Richmond River basin, however since that time Department of Primary Industries (Fisheries) and Project Big Fish (a community organisation aiming to protect Eastern freshwater cod) have undertaken stocking of Eastern freshwater cod in the Wilsons River and there is some evidence that self-sustaining populations of the species may now have established in the upper Wilsons River (Econcern 2004).

6.2.2. Recovery Plan

The Eastern freshwater cod is listed as 'endangered' under both the (Australian Government) *Environment Protection and Biodiversity Conservation Act 1999* and the (NSW) *Fisheries Management Act 1994*. In 2004, NSW Fisheries released a Recovery Plan for Eastern freshwater cod (NSW Fisheries 2004) which was prepared in accordance with the threatened species provisions (Part 7A) of the NSW *Fisheries Management Act 1994*.

The objective of the recovery plan is to provide a comprehensive list of actions and strategies to facilitate the recovery and natural viability of Eastern freshwater cod populations. As part of the plan, public and government support and action is to be focussed on effectively reducing threats (Table 6-1) to assist in the recovery of the species.

Table 6-1. Threats to the survival of Eastern freshwater cod populations in the Wilsons River Catchment

Category of threat	Threat
Habitat loss and degradation	• Sedimentation. Increased runoff of sediments from catchment activities fills in deep pools and reduces water clarity and photosynthesis.
	• Large woody debris (snag removal). Woody debris provides spawning sites and shelter.
	• River flows. Reduced flows due to increased demand for agricultural and urban water supplies changes habitat availability and affects water quality.
	• Barriers to fish migration. Barriers such as weirs and dams built across watercourses can prevent fish from reaching spawning and feeding areas.
	• Riparian vegetation. Provides in-stream habitat through woody debris, shelter from overhanging vegetation and improves water quality by filtering catchment runoff.
	• Water pollution. Affects on water temperature, turbidity, pH, oxygen concentrations, nutrients and loads of various toxins including heavy metals and biocides can all affect cod survival. Post bushfire runoff can also be problematic.
Impacts from fish introductions	• Risks from stocking of Murray Cod. A genetically similar species that could hydridise with Eastern freshwater cod.
	• Genetically unsuitable Eastern freshwater cod. Cod with poor genetic make up could reduce the vigour of the species.
	• Introduced species. These can compete with cod for habitat or prey upon young cod.
Illegal fishing	• Illegal fishing. This is believed to include the use of destructive netting and explosives and can have a major impact on the survival of cod populations.

6.2.3. Synergies with the Wilsons River Catchment Management Plan

The recovery plan objectives have many synergies with the aims of the Wilsons River Catchment Management Plan (particularly in relation to habitat loss and degradation) and effective coordination of catchment protection and enhancement activities could see multiple benefits to both Eastern freshwater cod populations and water quality in the Wilsons River Catchment. Since Eastern freshwater cod is at the top of the aquatic food web in the Wilsons River, protection of its habitat requirements provides an effective contribution to the habitat requirements of other aquatic species including other fish species and aquatic macroinvertebrates.

6.3. Overview of the State of the Catchment

A review of the state of the Wilsons River catchment with respect to water quality and catchment features that may affect water quality was conducted. In order to achieve this, existing water quality data were analysed and features in the catchment that could enhance (i.e. assets) or adversely affect water quality (i.e. threats) were identified. The latter process was limited to information that had previously been compiled as part of the risk assessment study (Ecos 2009b). State of the catchment information is presented on either a catchment wide or sub-catchments basis (Ecos 2009c)[3].

Wetlands and forested areas in each sub-catchment were identified as assets that have the potential to improve water quality or river health, while landuse, areas of steep terrain, areas known to be infested with weeds and point sources of contaminants (e.g. EPA licensed discharges, houses, farms and road crossings) were identified as potential threats.

Water quality data were available from seven sites, however, data limitations restricted analysis of these data to two sites. With the exception of Laverty's Gap weir, all sites were in the lower part of the catchment. Data have been collected by a number of different organisations at different times since 1994. The most consistent long-term data were that collected by Rous Water since 2003 to the present. The parameters monitored by Rous Water are total phosphorus, total nitrogen, electrical conductivity, turbidity, dissolved oxygen, *E. coli* and total coliforms

Analysis of the Rous Water data showed that there was a tendancy for high rainfall periods to be associated with elevated turbidity, particularly at the Ballina Street and Leycester Creek monitoring sites and at a site in Maori Creek in the eastern part of the catchment. The relationship between rainfall and turbidity was less pronounced for the remaining sites in the catchment. For most sites there was a strong correlation between turbidity and total phosphorus, suggesting much of the turbidity in the water in the Wilsons River catchment is likely to be due to eroded catchment sediment.

[3]). *Wilsons River Catchment Management Plan: State of the Catchment. Report prepared by Ecos Environmental Consulting for Rous Water, Lismore, NSW. 2009.*

High rainfall was also found to correlate with lower dissolved oxygen concentrations than during dry periods, suggesting that high loads of organic material are entering waterways when it rains, resulting in elevated biological activity.

High *E. coli* concentrations were also found to occur during high rainfall periods, and may be due to faecal material in catchment run-off or the failure of on-site sewage treatment systems. In particular, *E. coli* concentrations were highly variable at Ballina Street, as were total nitrogen concentrations. There appears, therefore, to be a source of faecal contamination in the vicinity of this site. Such contamination in an urban site could be due to leakage or exfiltration from a sewer.

In the lower section of the catchment total nitrogen and total phosphorus concentrations both showed a trend of being higher during periods of high rainfall, with the trend in phosphorus concentrations being strongly correlated with high turbidity. In the western section nutrient concentrations were more variable.

6.4. Overview of E2 quantitative modelling

An important component of the Wilsons River Catchment Management Plan is the assessment of the magnitude and characteristics of the impact of land management practices in the catchment on water quality at the water supply off-take at Howards Grass. Central to this component is the development of a catchment contaminant transport model. The Wilsons River Catchment model was developed using the E2 software package (Ecos 2009d)[4]. The model predicts river flows and contaminant loads and concentrations for individual sub-catchments and for river locations within the Wilsons River catchment. The particular contaminants modelled were sediments (suspended solids), nutrients (total nitrogen, total phosphorus) and microbial pathogens. The microbial pathogens used in modelling were the reference pathogens recommended by the World Health Organisation for microbial risk analysis namely *Cryptosporidium* (protozoa), *Campylobacter* (bacteria) and Rotavirus (viruses).

The primary statistics used to gauge the effectiveness of each scenario were the average monthly loads and average annual loads at Howards Grass which is the site of the water supply off-take. For sediments and nutrients, this approach is well supported by the scientific literature and available data. However for pathogens the results should be seen as more speculative due to the current state of scientific knowledge of pathogen survival in the environment. For this reason, the statistic used to assess pathogens for each modelled scenario was a load index based on the average number of organisms transported to Howards Grass per month.

Six groups of scenarios were modelled with some groups consisting of two or more related scenarios involving partial to full implementation of particular management actions. In total 11 management scenarios were modelled including current management. Scenarios were based on Key Outcome Areas (KOAs) and Management

[4] *Wilsons River Catchment Management Plan: Quantitative (E2) Modelling. Report prepared by Ecos Environmental Consulting and Fluvial Systems for Rous Water, Lismore, NSW. 2009.*

Programs identified in the Sections 8.3 to 8.6 of this draft management plan. The scenarios were:

- Scenario 1: Base Case, Current Management
- Scenario 2: Implementation of Riparian Best Management Practice (BMP)
    - Scenario 2a: Implementation of BMP for riparian zones within grazing land use only
    - Scenario 2b: Implementation of BMP for riparian zones for all land uses across the catchment (excluding existing forested landuses)
- Scenario 3: Implementation of "Improved Grazing Management" BMP
    - Scenario 3a: Implementation on 20 % of grazing properties'
    - Scenario 3b: Implementation on 50 % of grazing properties'
    - Scenario 3c: Implementation on 100 % of grazing properties'
- Scenario 4: Implementation of BPM for Horticulture (primarily Macadamias)
    - Scenario 4a: Implementation of BMP on 20 % of horticulture properties
    - Scenario 4b: Implementation of BMP on 50 % of horticulture properties
    - Scenario 4c: Implementation of BMP on 100 % of horticulture properties
- Scenario 5: Implementation of BMP for urban stormwater runoff
- Scenario 6: Water quality impacts of catchment roads

As noted earlier, the Best Management Practice (BMP) programs for each KOA are listed in Sections 8.3 to 8.6. The BMPs consist of lists of potential actions that could be used to achieve the goals of each KOA.

It should be noted that for modelling purposes, and at the suggestion of the CWG, modelling of the Animal Production BMP (described in Section 8.4) was focussed on improved grazing management (hence the name of Scenario 3: Implementation of "Improved Grazing Management" BMP). This change was made in order to distinguish aspects of Scenario 3 from the Riparian BMP implementation modelled in Scenario 2.

Modelling results are summarised in Table 6-2 below. Scenarios 2 (Riparian BMP), 3 (Grazing BMP) and 4 (Horticulture BMP) were markedly effective at reducing constituent loads at Howards Grass whilst Scenarios 5 (Urban Stormwater BMP) and 6 (Catchment Road Improvements) were not effective as modelled. The difference between the two groups of scenarios reflects the relatively small areas of the catchment taken up by Urban and Road landuses compared to Grazing and Horticulture. In relation to Scenario 6, recent evidence suggests that site-specific factors exert a strong influence over the magnitude of sediment transport from unsealed roads (Croke *et al.* 2005). Therefore the findings of Scenario 6 should be treated with caution. A possible improvement in the modelling approach for catchment roads would be to identify problematic sites by ground-based survey and include their sediment and nutrient contributions as point sources in future modelling.

Full implementation of BMPs provided the greatest improvements in water quality. For suspended solids grazing and horticulture BMPs were of similar benefit, whilst for nutrients, nitrogen was most influenced by the Grazing BMP and Phosphorus by the Horticulture BMP. Riparian and Grazing BMPs were the most effective at reducing pathogen loads but the gains are likely to be significant from a management perspective only when implemented to the full extent possible.

Table 6-2. Summary of changes in average annual loads of sediments and nutrients and load indexes for pathogens for each scenario compared with the base case

	Percent change for each scenario compared to the base case current management scenario									
Item	2a	2b	3a	3b	3c	4a	4b	4c	5	6
Suspended Solids	-10.4	-20.7	-6.2	-11.3	-19.9	-3.9	-9.7	-19.0	-0.5	-1.0
Total Nitrogen	-13.5	-25.6	-10.5	-25.6	-50.4	-6.6	-15.8	-31.0	-0.4	-0.7
Total Phosphorus	-4.8	-22.8	-3.0	-9.1	-18.9	-13.7	-34.3	-69.0	-0.1	-1.5
Cryptosporidium load index	-1.4	-20.2	-1.3	-3.2	-6.3	n/a	n/a	n/a	-1.4	n/a
Campylobacter load index	-1.4	-20.2	-4.1	-10.4	-21.0	n/a	n/a	n/a	-4.5	n/a

The list of scenarios modelled to date and the nature and location of their implementation in the model are relatively broad at this stage. Further detailed modelling is possible using the Wilsons River Catchment model to assess specific management actions at specific locations in the catchment. The model in its current form is a valuable regional asset to support management decisions arising from the future implementation of the Wilsons River Catchment Management Plan. In addition, if supported by additional data (e.g. riparian condition survey, surveys of significant erosion points, etc.), the model may be refined to improve sensitivity to more detailed or local scale management actions.

6.5. Wilsons River Catchment Conceptual Model

The use of graphical conceptual models within regional ecosystem management and environmental education is becoming increasingly common and is recommended in new environmental science texts (University of Maryland website http://ian.umces.edu/principles/). Based on the studies conducted as part of the development of the Wilsons River Catchment Management Plan a conceptual graphical model of the catchment was developed (Figure 6-3). The model aims to convey to the observer an immediate impression of the issues of significance with respect to water quality and catchment processes within the catchment. The principal messages that the model seeks to convey are:

- The structure of the catchment;
- The major landuses including;

- grazing in the lower catchment;
- macadamia horticulture in the central regions;
- forested reserves and extensive rural residential development in the upper reaches;

- The tidal nature of the lower reaches;
- The location of the water supply offtake; and
- Catchment and biological processes.

The model has been developed using the Adobe Illustrator software package and has been used in literature and open days to support the community consultation component of the Catchment Management Plan. During the future implementation phases of the plan it is envisaged that the Conceptual Model will be updated as new information becomes available and that it will continue to serve an education role.

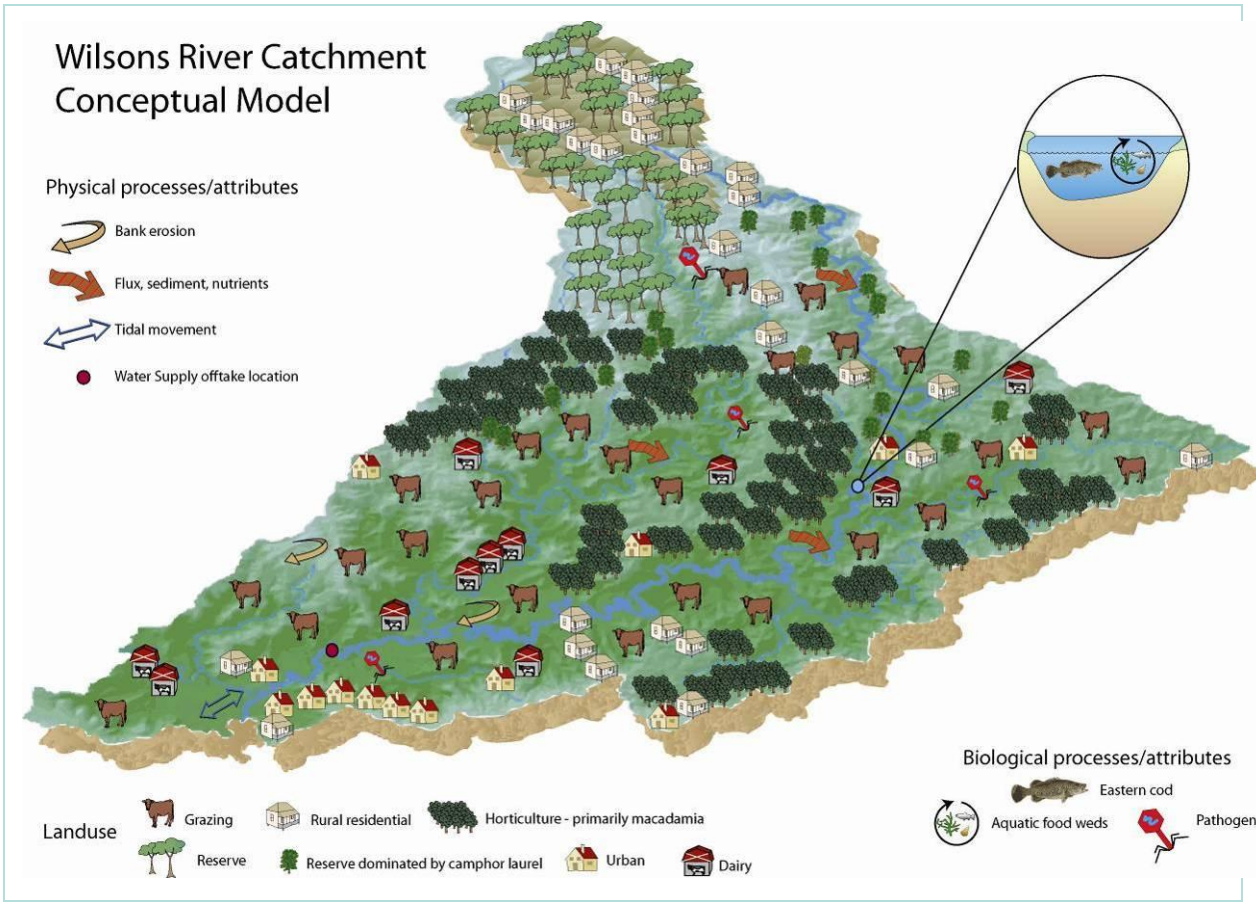


Figure 6-3. Conceptual model of catchment processes in the Wilsons River Catchment. Note that icons illustrate general catchment processes and attributes and do not necessarily represent specific locations of such phenomena.

6.6. Process conceptual models

In 2004 a water monitoring program was developed for the Emigrant Creek catchment which is adjacent to the Wilsons River Catchment. As part of the program a number of conceptual models were developed that described processes in the catchment that can affect water quality. The concepts that were identified in that catchment, in general, apply to the Wilsons River catchment. Key examples of these conceptual models, therefore, have been included in the present report. All figures and text are from Sinclair Knight Merz (2004). As noted in Section 6.5, the conceptual models provide a convenient medium for summarising our current state of understanding of key catchment processes and a useful tool for communicating that understanding to others.

6.6.1. Groundwater

A 3-stage water circulation pattern was used to describe groundwater movement in the Alstonville Plateau, within which lies the Emigrant Creek catchment. The stages are as follows (see Figure 6-4):

1. Approximately 30 % of the rainfall onto the Plateau infiltrates the soil profile due to the well-drained, poor-sealing clays (overlaying basalt bedrock) of the area. During low intensity rainfall events, most of the rainfall is held within the soil profile and there is little runoff. During high intensity events, direct runoff occurs after the top of the soil profile has become saturated.
2. Water that infiltrates below the soil profile either percolates to the water table (the first fractured basalt layer is at 5 -15 m) or seeps along the soil/rock interface to emerge downslope in gullies as minor springs. This water contributes to the base flow of streams.
3. Water that reaches the water table either moves laterally through the upper basalt aquifer to discharge as springs or flow in the major streams, or percolates to the deeper aquifers. A large percentage of the baseflow of the major streams during dry periods is made up of groundwater from this source.

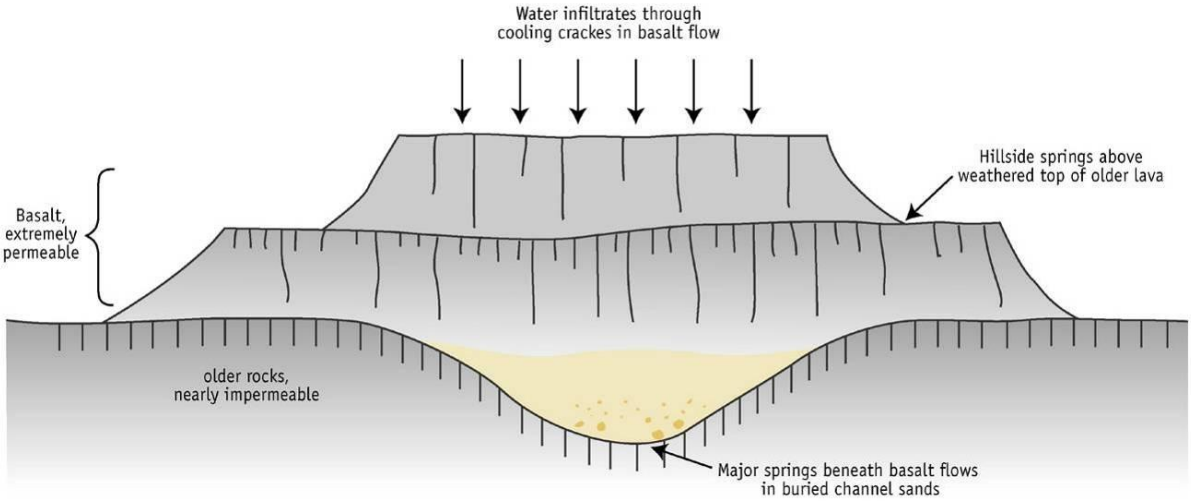


Figure 6-4. Presumed Groundwater Movement Model for the Alstonville Plateau (Sinclair Knight Merz 2004).

6.6.2. Macadamia Farms

Biocides are applied as sprays onto macadamia trees to control nut borers, trunk canker and spotting bugs. Many macadamia nut farms are located near waterways and the sprays used on the farms can enter the waterway, and cause harm to aquatic biota, directly as spray drift or the biocide can be washed in at a later stage after being deposited in the catchment (Figure 6-5). Riparian vegetation can provide a screen to prevent some wind-blown biocides from reaching the creek. Biocides are also used to reduce rodent numbers by removing their understorey habitat, which is often associated with riparian vegetation.

Fertilisers are also used periodically and are a source of nutrients in the catchment. Biocides and fertilisers bind to sediment and are carried by surface runoff into the creek. Riparian vegetation helps prevent these contaminants from entering the creek through trapping and binding to sediment particles as the runoff is intercepted and slowed. Biocides can be toxic to aquatic biota, and fertilisers contribute to the nutrient load of the creek. Since harvest techniques require minimum or zero groundcover under the trees, rain can loosen and wash soil particles downhill. Young macadamia farms in particular can allow higher erosion rates due to the thinner vegetation coverage and subsequent raindrop impact.

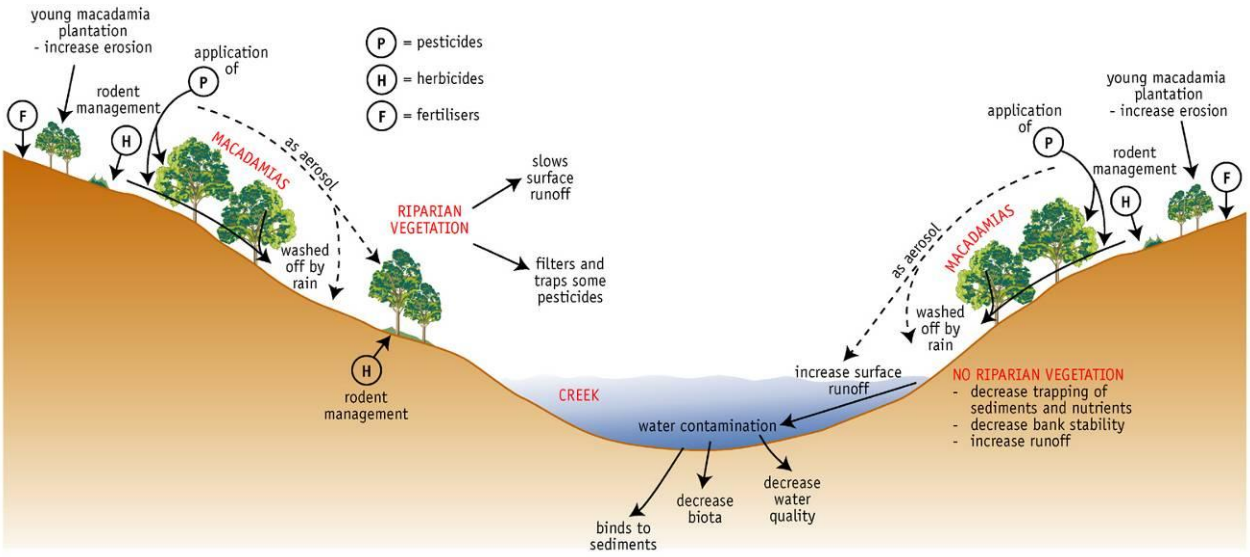


Figure 6-5. Macadamia Farms (from Sinclair Knight Merz 2004).

6.6.3. Grazing Farms

Cattle grazing is widespread throughout Emigrant Creek catchment as it is in the Wilsons River Catchment. Cattle cause compaction of soil, leading to decreased infiltration and greater surface runoff (Figure 6-6). Runoff from grazing farms and access of cattle to stream banks increases loads of suspended sediment, nutrients and pathogens in the water, leading to possible eutrophication and risks to human health. On farm properties where cattle are either fenced off from the creek, or where healthy riparian vegetation (including groundcover and grass) limits cattle movement, disruption of the stream bank is prevented. In addition, contamination of the creek with nutrients and pathogens from faeces is reduced. Riparian vegetation also traps and filters contaminants such as nutrients and pathogens through intercepting and slowing runoff and allowing increased binding of contaminants to sediment particles.

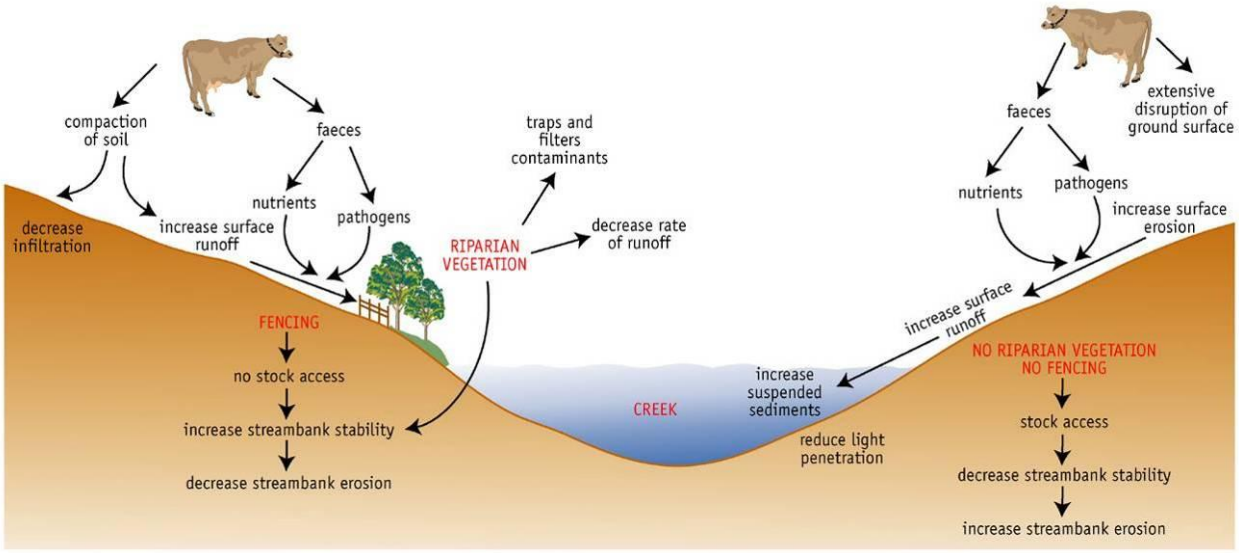


Figure 6-6. Grazing Farms (from Sinclair Knight Merz 2004).

6.6.4. Erosion and Sediment

Sediment can be transported by water or wind. Water is the predominant mechanism for the transportation of sediment and contaminants within the Emigrant Creek catchment Figure 6-7). If vegetation is lacking, for example due to overgrazing, then surface runoff is increased. Similarly, the steeper the slope the higher the rate of runoff, which leads to higher rates of erosion. Erosion is a detrimental process as it enhances the loss of sediment, nutrients and organic matter from the soil and in turn leads to infertile soils. The sediment carried by runoff enters the creek increasing turbidity, reducing photosynthesis, and smothering benthic habitat. Sediment transported downstream is deposited at low stream flows in pools reducing habitat quality and availability.

The root system of riparian vegetation stabilises the soil profile, therefore decreasing stream bank erosion and increasing bank stability. The presence of riparian vegetation including groundcover and grasses also decreases the rate of surface runoff and increases sediment deposition by intercepting the surface flow.

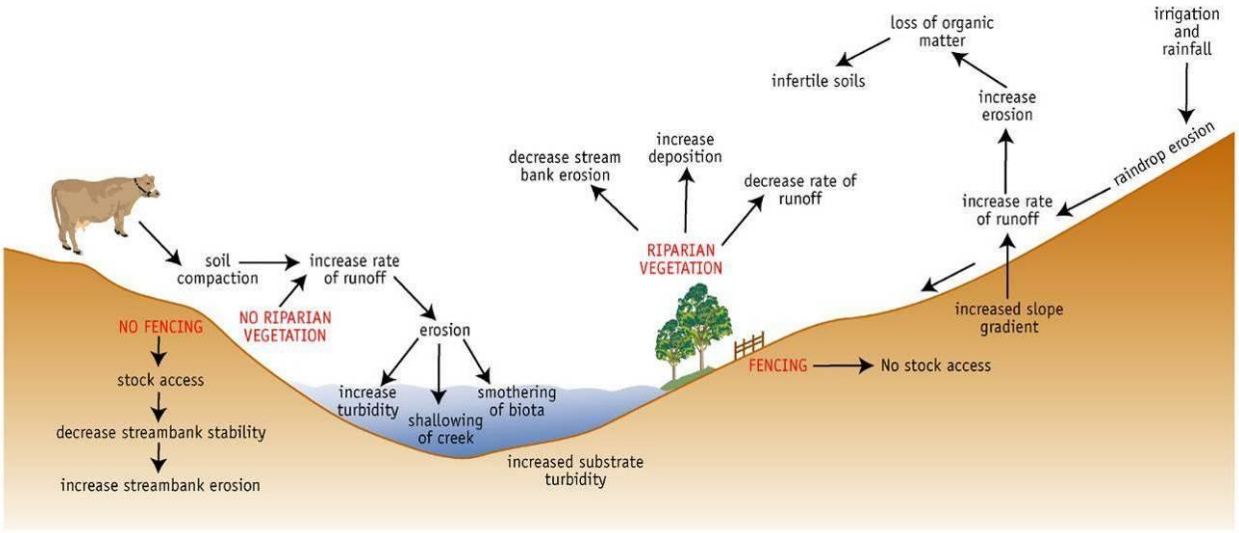


Figure 6-7. Erosion and Sediment (from Sinclair Knight Merz 2004).

7 Summary of catchment hazards

In this section catchment hazards and the reason for their identification are summarised (Table 7-1).

Table 7-1. Hazards to water quality, the reasons for their identification as a hazard, and the proposed management programs required to address the hazards. Note that hazards are in random order.

Hazard identified	Reason for hazard identification	Management Implementation Committee or plan in which hazard is managed
Direct stock access to waterways	• Uncontrolled stock access is a well-established cause of stream bank erosion and pathogen and nutrient inputs, and increased turbidity and suspended solids in waterways. Mechanisms for erosion include loss of protective vegetation cover through trampling and grazing, and pugging of soil and bank collapse by cattle hooves. Mechanisms for nutrient inputs are soil erosion (phosphorus binds to soil particles), and stock manure and urine inputs on the stream bank and directly to the water. Cattle manure is also the primary source of protozoan pathogens (e.g. *Cryptosporidium* and *Giardia*); and bacterial pathogens (*Campylobacter jejuni* and various pathogenic strains of *E. coli* such as *E. coli O157*). • In the Wilsons River Catchment, cattle grazing occurs in over 50 % of the catchment area. • Review of water quality monitoring data indicates guideline exceedence for turbidity, total phosphorus, total nitrogen, coliforms, and dissolved oxygen	Animal Production BMP Program
Poor riparian vegetation	• Riparian vegetation protects stream banks from erosion and acts as sediment trap for overland flow. • Riparian vegetation provides food and habitat for stream biota such as fish and macroinvertebrates and generally supports biodiversity of aquatic fauna	Riparian and In-stream Health BMP Program
Poor in-stream and wetland flora and fauna habitat	• Habitat restoration for Eastern cod has been identified as a priority in the Wilsons River by NSW Fisheries • Barriers to fish passage are common in NSW. To date an assessment has been completed for Council-owned barriers to fish passage in the Wilsons River catchmen (NSW DPI 2006). The report does not assess on farm or private landholder watercourse crossings. • Floodplain levees isolating wetlands from the river are common in NSW but no assessment of this issue has been undertaken in the Wilsons River catchment. Isolation of wetlands from the river interferes with organic carbon transfer which supports riverine and wetland food webs • Reduced river flows due to water extraction or climate change can adversely affect fish habitat and migratory and spawning behaviour.	Riparian and In-stream Health BMP Program
Stream bank erosion and slumping	• Stream bank erosion and slumping contributions sediment to the stream leading to increased turbidities, concentrations of suspended solids and related parameters such as phosphorus. The sediment is transported downstream where it fills in deep pools which are a preferred fish habitat. The phosphorus attached to sediment particles can fuel algal blooms in the Wilsons River tidal pool and in the Richmond River estuary.	Riparian and In-stream Health BMP Program

Hazard identified	Reason for hazard identification	Management Implementation Committee or plan in which hazard is managed
Camphor laurel in the riparian zone	• Camphor laurel is an introduced woody weed which grows in dense stands along waterways in the Wilsons River Catchment. Camphor laurel stands out-compete native vegetation and appear to destabilise stream banks due to water flow undercutting the shallow root system and reduced ground covers surrounding such stands. Control of Camphor laurel has been identified as priority in the Wilsons River Catchment by Far North Coast Weeds. They are a declared Noxious Weed under the NSW Weeds Act.	Riparian and In-stream Health BMP Program
Weeds other than camphor laurel in the riparian zone	• Apart from Camphor laurel, a wide variety of weeds can impair the functioning of Riparian zones through a variety of mechanisms such as choking of channels and enhancing erosion.	Riparian and In-stream Health BMP Program
Aquatic weeds	• Aquatic weeds can reduce habitat for native flora and fauna.	Riparian and In-stream Health BMP Program
In-stream dumping	• Dumping of material such as clean fill or waste including chemical drums, domestic waste and litter can be a source of toxins, can threaten native wildlife through entanglement, loss of habitat and ingestion and is unsightly. The unintentional habit of leaving chemical drums in unsecure locations on the river bank or floodplain where they are at risk of being washed away in the next flood can also be a source of toxins.	Riparian and In-stream Health BMP Program, Animal Production BMP Program, Horticulture Production BMP Program, Urban Land Management Program
Runoff from piggeries and dairies	• Runoff from intensive animal production can be a significant source of nutrients and pathogens unless properly managed	Animal Production BMP Program
Runoff from horticulture	• Runoff from horticulture is a source of nutrients and suspended solids and under some circumstances can be a source of biocide residues in river water	Horticulture BMP Program
Runoff from urban land	• Urban stormwater runoff is commonly of poor quality with high loads of nutrients and pathogens and suspended solids. New water sensitive urban design approaches can lessen transport of contaminants	Urban Land Management Program
On-site waste disposal	• On-site disposal of domestic sewage through septic tanks or aerated waste water treatment systems under some circumstances can be a significant source of human viral, bacterial and protozoan pathogens and of nutrients. Unsewered rural residential development occuring across 14 % of the Wilsons River Catchment indicates that management of on-site wastewater is an important issue for the Wilsons River Catchment Management Plan.	Rous Water On-site Wastewater Management Guidelines
Unsealed roads	• Unsealed roads can be a significant source of erosion sediments and phosphorus to waterways. The impacts of these contaminants have been described above.	Road Management Program
Controlled burning	• Controlled burning, while a necessary land management activity has the potential to cause poor water quality if activities get out of control, or are ill-timed or ill-located in relation to water supply infrastructure. Lack of coordination between state agencies can exacerbate such threats.	Hazard Management Program
Bush fires	• Bushfires can cause major dirty water events if heavy rains occur in the immediate post-fire period. Long slopes and steep slopes are the source of the greatest risk. Forest recovering after bushfire has a much greater water demand which can reduce local stream yields by as much as 50 % in the decades following the fire.	Hazard Management Program

Hazard identified	Reason for hazard identification	Management Implementation Committee or plan in which hazard is managed
Chemical spillage	• Chemical spills in the catchment are a potential source of contaminants with risks increasing with the volume of chemicals spilt and with proximity to the water supply offtake.	Hazard Management Program
Dip sites	• A number of old cattle tick dip sites are located in the Wilsons River Catchment. Disturbance of dip sites can lead to the transport of toxic chemical residues downstream, although the relatively small quantity of chemicals mobilised in such events and dilution in waterways mitigates much of the impact.	Animal Production BMP Program
Development controls	• Lack of effective development controls could see an increase in higher risk, more intensive landuses across the Wilsons River Catchment. In particular, increased numbers of subdivisions (sewered and unsewered) and risky individual developments (e.g. large unsewered resort developments near the Howards Grass water supply off-take pose a risk to water quality and river health.	Rous County Town and Land Use Planning Strategy
Sewage treatment plant (STP) disinfection	• Ineffective disinfection of treated sewage effluent discharged to catchment waterways poses a risk from human sewage pathogens. Although disinfection is part of the sewage treatment process, process failures can occur.	Sewage Treatment Plant (STP) Management Plan
STP nutrient removal	• Insufficient removal of nutrients at STPs can promote eutrophication (excessive plant growth including algal blooms and reduced oxygen concentrations) which is deleterious to river health	STP Management Plan
STP during wet weather	• STP wet weather discharges can sometimes occur due to stormwater loads entering the STP. Wet weather discharges are a source of pathogens and nutrients.	STP Management Plan
Infiltration of saline groundwater into Leycester Creek and Wilsons River at Ballina Street	• Water quality monitoring indicates that saline groundwater is entering Leycester Creek and Wilsons River above Lismore. While such flows can be a natural process, the extent to which they have been modified by human activity and their effect on river health requires further investigation.	Riparian and In-stream Health BMP Program
High nitrogen and *E. coli* at Ballina Street	• Water quality monitoring indicates sources of nitrogen and faecal pollution entering the Wilsons River above Lismore. This could be due to discharges from a broken sewer.	Urban Land Management Program
Utility security plan	• Water supply infrastructure and water quality can be contaminated in by vandals or terrorists.	Hazard Management Program
Use of algaecides by utility	• Inappropriate use of algaecides in sewage treatment lagoons and subsequent discharge of treated effluent with algaecide residues poses a risk to water quality and river health.	STP Management Plan
Agency co-ordination	• Lack of coordination of catchment agencies could see management of catchment water quality and river health issues "fall between the cracks" and catchment management programs that are, to varying degrees, inappropriate, inefficient and ineffective.	Inter-agency and Stakeholder Catchment Management Committee/Working Group
Program integration	• Lack of an integrated approach to catchment management could lead to a management program that suffers from the problems described in the last point.	Inter-agency and Stakeholder Catchment Management Committee/Working Group

8 Key Outcome Areas (KOA) and their Programs/Plans

8.1. The Wilsons River CMP Planning Web ™

Our Management Plan provides an integrated approach to create, implement and adjust a coordinated range of measures and programs, in a prioritised manner, over a long time period. A strategic planning model called *The Planning Web*™ is used to establish this framework for action, working towards a shared long-term vision. The framework helps us work together, identifying what we need to achieve, the range of the ways to go about it, and how they can be best combined in our planning process, programs and action plans.

Outline of the Wilsons River CMP Planning Web ™

The Management Plan is designed as an integrated web of goals and relevant actions to achieve a specific Vision for the future. This vision is our central focus, supported by the Planning Web approach.

Four Key Outcome Areas (KOA's) have been identified for the Plan, reflecting the main focus and actions required, in order to work towards and achieve our Vision. We can set targets or benchmarks to strive for based on the aim and goals of these KOA's). Our performance and progress towards achieving them can be measured and reported on, with actions for improvement or adjustment recommended where necessary.

Twelve Goals have been identified, three under each KOA, based on the values to protect and challenges associated with achieving our Vision. These goals surround and focus on our intent, establishing anchor points to help create and maintain a strong web of combined strategic actions, programs and projects.

Our Key Outcome Areas:

(1)	Environmental Management	Goals 1, 2 & 3
(2)	Agronomic Land Management Practices	Goals 4, 5 & 6
(3)	Management of Built Environments	Goals 7, 8 & 9
(4)	Governance	Goals 10, 11 & 12

The goals can be linked outward from the Web to similar regional, state, national and international goals for sustainable water use and catchment management. This shows that our Management Plan is part of the wider global approach to meet this challenge.

Programs, Partnerships and Projects are developed to help us meet the goals, and may include Targets, Timelines and Performance Indicators to measure our success in working towards achieving our vision. Woven together these strands establish the integrated Planning Web.

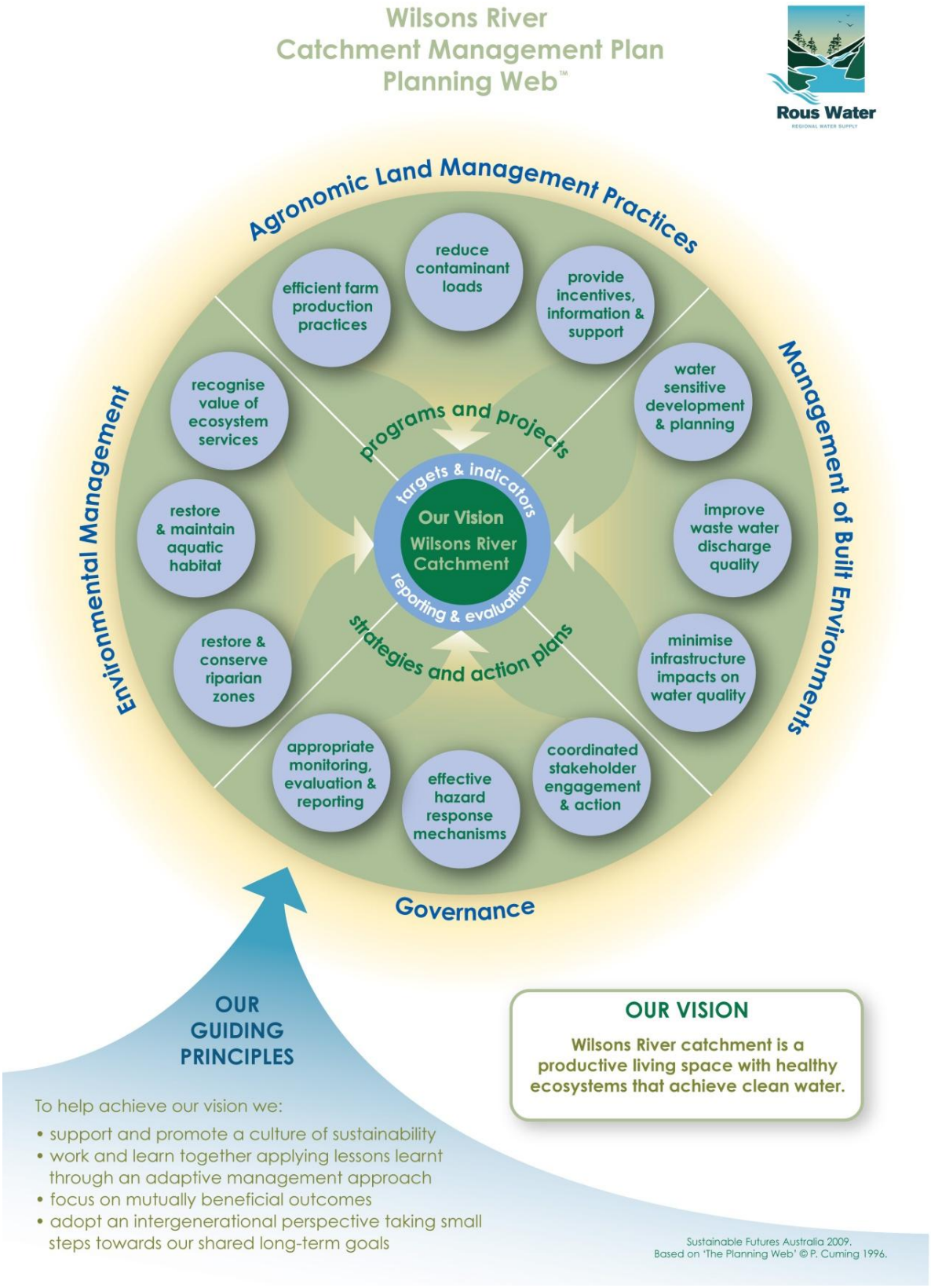


Figure 8-1. The Wilsons River Catchment Management Plan Planning Web™ (Sustainable Futures Australia).

Guiding Principles are adopted to use in planning and decision-making, as well as considering when programs and actions are being carried out, to help weave a strong Web through the integrated actions.

The Wilsons River CMP Planning Web however, is only as strong as its weakest strands. This reminds us that all goals are important to achieve, and therefore all programs and action plans need to be supported and weaved together successfully. Over time we need to review the Plan, create new tasks and adjust our approach. This will reflect lessons learnt, our changing awareness, new ideas and ways of thinking, and the long-term nature of the Plan and its vision for the catchment.

8.2. Vision and Key Guiding Principles and Key Outcome Areas (KOA's)

In order to address the hazards to water quality in the Wilsons River catchment, the following vision was developed for the catchment:

Vision for the Wilsons River catchment

"Our vision for the Wilsons River catchment is to have a productive living space with healthy ecosystems that provide clean water."

The guiding principles to ensure the vision's fulfilment are:

Guiding Principles to ensure the visions fulfilment

"The vision will be fulfilled by supporting and promoting a culture of sustainability, working and learning together and focussing on mutually beneficial outcomes. We need to adopt an inter-generational perspective involving small steps toward long-term goals."

To meet these guiding principles key outcome areas (KOA's) and management programs and plans were identified, each with associated goals and aims.

8.3. KOA 1: Environmental Management

Our Aim:

Protect and restore ecological systems and support land managers to improve waterway health and water quality.

Our Goals:

Goal 1 Restore and conserve riparian zones including floodplain wetlands to protect water quality and aquatic biodiversity.

Goal 2 Restore and maintain in-stream aquatic habitat to support aquatic biodiversity and ecological processes.

Goal 3 Recognise the value of ecosystem services provided by healthy rivers and riparian zones.

Programs and their key elements:

Riparian and In-stream Health Management Program

- Map riparian and in-stream habitat quality and extent, including identification and location of serious infestations (weeds), and the state of stream banks (i.e. stable, eroded, slumped).
- Include habitat conservation for Eastern Freshwater Cod.
- Investigate floodplain wetland water requirements on public land.
- Encourage and facilitate wetland restoration activities on public and private land.
- Assess the effect of privet and coral tree on in-stream health.
- Prioritise areas to manage weeds on private and public land.
- Encourage and facilitate weed management on private land *(links to Animal and Horticulture BMP programs).*
- Improve riparian vegetation, including planting of over-storey plants where absent, and rehabilitation of poorly vegetated areas and ecologically significant and sensitive areas.
- Utilise existing Landcare groups and establish River Reach groups to plan and implement effective Landcare riparian activities *(links to Animal and Horticulture BMP programs).*
- Encourage community involvement with water quality testing.
- Investigate groundwater infiltration to waterways, particularly into Leycester Creek and Wilsons River near Ballina Street.
- Review the effect of water sharing plans (e.g. Alstonville Groundwater and Cooper Creek) on in-stream health.
- Investigate effect that dams along waterways may have on water quality and in-stream health.

- Develop a prioritised long-term strategy for weed control on public land *(links to Inter-agency Catchment Management Committee).*
- Raise awareness on the adverse affects of chemical dumping *(links to Animal Production BMP and Horticulture BMP programs and Urban Land Management Program).*
- Secure funds for indigenous restoration teams.

Key partners: Rous Water[5], Local councils, DPI, DECC, NRCMA, North Coast Weeds, relevant community, industry and nature conservation groups, and landholders.

[5] Suggested lead agencies appear in bold type

8.4. KOA 2: Agronomic Land Management Practices

Our Aim:

Effective resource management to minimise transport of contaminants to waterways, maximise long-term farm viability and improve the natural environment.

Our Goals:

Goal 4 Identify and widely adopt efficient farm production practices that support long-term farm viability and improve the natural environment.

Goal 5 Reduce contaminant loads from agricultural land to appropriate levels that protect water quality.

Goal 6 Provide incentives, information and support across rural industries to encourage farm practices that protect water quality and improve environmental outcomes.

Programs and their key elements:

(1) Animal Production Best Management Practice (BMP) Program (including grazing, dairying and piggeries)

- Raise awareness amongst catchment residents, government agencies, emergency services and local businesses that they are living in a water supply catchment.
- Recognise and encourage Best Management Practices, including whole farm planning and biocide and nutrient management to reduce runoff.
- Focus on land management support by undertaking the following:
    - encourage Best Management Practices to maximise soil retention;
    - encourage cell grazing (rotation of pasture); and
    - encourage appropriate stocking rates to minimise erosion.
- Establish riparian zones (*links to Riparian and In-stream Health BMP Program*).
- Fencing of riparian zones where required (including a combination of permanent and temporary to meet fencing needs and financial constraints).
- Control / manage weeds in riparian zones.
- Establish off-stream water points with shade available to encourage livestock to stay away from river banks in hot weather.
- Manage herd health (treatment and monitoring) to reduce the risk of scouring calves (the main source of *Cryptosporidium*). Prevent scouring calves from having direct access to waterways.
- Encourage better drainage of driveways and access roads (links to *Road Management Program*).

- Prevent run-off from animal wash-down areas from entering waterways.
- Discourage the dumping of dead livestock in waterways.
- Encourage appropriate storage and disposal of chemicals.
- Avoid chemical dumping by supporting a drum disposal muster.
- Train landholders in chemical usage.
- Identify dip sites close to waterways (i.e. those that could be potentially hazardous if disturbed) and educate the landholders of their ongoing responsibilities to reduce the hazard.
- Encourage minimal burn-off on properties.
- Identify hobby farmers and encourage:
    - weed control in general, including Permaculture-type systems; and
    - sustainable land management.

Key partners: DPI, DECC, Rous Water, NSW Farmers Association, Landcare, other relevant community and industry associations and landholders

(2) Horticulture Best Management Practice (BMP) Program (inc. tree nuts, fruits and forestry)

- Raise awareness amongst catchment residents, government agencies, emergency services and local businesses that they are living in a water supply catchment.
- Encourage Best Management Practices, including whole farm planning and biocide and nutrient management to reduce runoff (specifically achieve reduction of contaminant loads to guideline levels for water quality protection identifying best practice planting, maintenance and harvesting).
- Focus on land management support by undertaking the following:
    - encourage the establishment of horticulture techniques to reduce erosion; and
    - work with and utilise existing organisations and communication resources (e.g. Macadamia and Pecan Forestry Industry websites) to communicate and disseminate information on best practice horticultural techniques.
- Establish protected riparian zones (links to Riparian Management Program).
- Control / management of weeds in riparian zones.
- Re-establish natural vegetation, particularly in non-productive areas, riparian areas and ecologically significant and sensitive areas. The protection and restoration of Big Scrub vegetation should be a priority.

- Encourage better drainage of driveways and access roads (links to *Road Management Program*).
- Investigate chicken manure use on macadamia farms and its potential runoff into waterways.
- Encourage appropriate storage and disposal of chemicals.
- Avoid chemical dumping by supporting a drum disposal muster.
- Train landholders in chemical usage.
- Encourage minimal burn-off on properties.
- Identify hobby farmers and encourage:
    - weed control in general, including Permaculture-type systems; and
    - sustainable land management.

Key partners: DPI, DECC, Rous Water, NSW Farmers Association, Landcare, other relevant community and industry associations and landholders.

8.5. KOA 3: Management of built environments

Our Aim:

Ecologically sustainable development that minimises transport of contaminants to waterways, and supports a healthy catchment and riverine ecosystem services.

Our Goals:

Goal 7 Appropriate water sensitive planning and development across all urban and rural residential zones, including density controls and environmental constraints mapping.

Goal 8 Minimise adverse impacts on waterways through continuous improvement in stormwater and recycled water discharge quality and reduction in contaminants.

Goal 9 Ensure infrastructure development and management programs, such as bridges and culverts, roads and sewerage treatments plants minimise water quality impacts.

Programs and their key elements:

(1) Urban Land Management Program

- Raise awareness amongst catchment residents, government agencies, emergency services and local businesses that they are living in a water supply catchment.
- Rous Water to be involved in the preparation and review of Local Environment Plans (LEP's) and Development Control Plans (DCP's), and major development projects.
- Appropriate sewage treatment systems in place for all major towns and villages.
- Investigate stormwater run-off as a source of water for irrigation and other uses.
- Investigate the reason for high *E. coli* counts and nitrogen concentrations in Wilsons River at Ballina Street.
- Encourage better drainage at road/waterway crossings (*links to Road Management Program*).
- Encourage use of Water Sensitive Urban Design (WSUD) in urban areas.

Key Partners: Rous Water, Byron Shire Council; Lismore City Council; Ballina Shire Council *(lead agency depending on location in catchment).*

(2) Road Management Program

- Identify road/waterway crossings that potentially contribute high sediment loads into waterways.
- Prioritise road/waterway crossings that require improved drainage management.
- On private land, encourage better drainage of roads and tracks, with runoff diverted onto grassed areas prior to drainage into waterways.
- Check compliance of Environmental Management Plans when roads are constructed.

Key Partners: Byron Shire Council; Lismore City Council; Ballina Shire Council, Roads & Traffic Authority, and landholders *(lead agency depending on the road's location in catchment).*

(3) On-site Wastewater Management Guidelines

- Continue to implement the Rous Water On-site Wastewater Management Guidelines.

Key Partners*:* Byron Shire Council; Lismore City Council; Ballina Shire Council, Rous Water, Department of Water and Energy and landholders *(lead agency depending on location in the catchment).*

(4) Sewage Treatment Plant (STP) Management Plan

- Investigate water recycling options.
- Regularly audit and adjust management for disinfection and algal management during high and low flow periods.
- Ensure resourcing of the STPs is adequate in order to comply with the relevant guidelines.
- Investigate the location of sewer overflow points (emergency release structures) and the likely frequency that they come into action.
- Eliminate sewer/stormwater cross connections in sewered towns.

Key Partners*:* Byron Shire Council; Lismore City Council; Ballina Shire Council, Rous Water, Department of Water and Energy and landholders *(lead agency depending on location in the catchment).*

8.6. KOA 4: Governance

Our Aim:

Coordinated catchment and waterway management involving key stakeholders with effective resourcing of actions and regular review of management performance and catchment condition.

Our Goals:

Goal 10 Coordinated stakeholder engagement and action, including an integrated government agency response, to implement and review the management plan.

Goal 11 Effective hazard response mechanisms in place, including natural disasters and chemical spills to protect & minimise impacts on catchment health & water quality.

Goal 12 Appropriate monitoring, evaluation and reporting systems in place to review catchment management performance and catchment condition.

Programs and their key elements:

(1) Inter-agency and Stakeholder Catchment Management Committee/Working Group

- Establish an inter-agency and stakeholder committee/working group. Landholder representatives would be a representative from each sub-catchment.
- Ensure Rous Water has the opportunity to contribute to the development of Local Environmental Plans.
- Develop a catchment protection policy recognised under Local Environment Planning laws for the Wilsons River Catchment.
- Clearly identified planning zones, environmental overlays, and appropriate development in zones.
- Development controls, in particular:
    - minimise the creation of more lots (properties) with river frontages; and
    - maintain the riparian zone as a single, preferably public, title.
- Management of private water sources to minimise over/inappropriate extraction.
- Establishing Rous Water as a development referral authority.
- Co-ordinate stakeholder engagement and action.

- Aim to secure adequate resourcing and implementation for all programs (including resourcing and/or incentives to farmers to facilitate the adoption of best management practices including off-stream watering, fencing and revegetation).
- Conduct and audit existing programs.
- Conduct and audit existing restoration projects.
- Prioritise actions for implementation.
- Ensure there are allocations for recurring budget items.
- Aim to secure adequate resourcing for implementation of actions.
- Regular meetings to discuss joint funding and management opportunities, and program priorities.
- Co-ordinate revegetation activities on public land.
- Identify recreation opportunities on public land (picnicking, bushwalking, canoeing etc.) that will enhance the community's appreciation of the natural environment.
- Lease of some Crown land parcels along the Wilsons River, Coopers Creek and other major waterways is overseen by the Department of Lands. As these leases are renewed, refining of conditions to achieve riparian or grazing best management practice may be appropriate.

Key partners: Rous Water, Local councils, DPI, DECC, NRCMA, North Coast Weeds, Department of Lands, relevant community, industry and nature conservation groups, and landholder representatives.

(2) Sustainability Action through Application of Aboriginal Cultural Knowledge

- Support the protection and maintenance of cultural heritage associated with waterways and surrounding land.
- Promote on-going consultation with local Aboriginal Traditional Owners and local Aboriginal agencies through involvement with the Catchment Working Group.
- Promote the involvement of Aboriginal people in the implementation, monitoring and review of the plan.
- Respect Bundjalung cultural knowledge obtained in the process of consultation and assist in the development of educational resources to promote cultural awareness in the broader community.
- Respect Bundjalung cultural heritage, custodianship and maintenance of cultural sites, land, people, plants and waterways, including appropriate protocols.

- Identify opportunities for enhancing training and employment opportunities for Aboriginal people in natural resource management activities within the catchment.

Key partners: Widjabul people of the Bundjalung Nation, Ngulingah Local Aboriginal Land Council, Jali Local Aboriginal Land Council, Tweed-Byron Local Aboriginal Land Council,Bundjalung Elders Council, and other Aboriginal organisations and 'green teams.'

(3) Hazard Management Program

- Develop early warning and response systems for fire, chemical spillage or security events that may require cessation of pumping from Wilsons River.
- In relation to emergency response activities, plan for relevant committee members to conduct emergency response practice days.
- Develop a chemical spillage notification and clean-up procedure for all relevant agencies.
- Conduct practice days for emergency responses to spills and natural disasters.
- Encourage and co-ordinate community interest and support in response to catchment conditions and emergencies.

Key partners: Northern Rivers District Emergency Management Committee, NSW Rural Fire Service, State Emergency Service, Rous Water, NSW Police, relevant community and industry association representatives.

(4) Monitoring and Reporting Program

- Benchmark existing agronomic practices and water quality impacts, using measurable systems as a feedback mechanism to identify areas for focused catchment management actions.
- Undertake water quality monitoring.
- Establish measurable systems and timeframes.
- Develop local indicators (e.g. from Waterwatch programs data).
- Monitor, review and evaluate the present Catchment Management Plan and programs and plans implemented. Include an assessment of compliance with planned program implementation timetables, targets and catchment condition expected outcomes.
- Undertake reporting and actions to improve the Catchment Management Plan implementation based on the monitoring and evaluation.

Key partners: Rous Water, Local councils, DPI, DECC, NRCMA, North Coast Weeds, relevant community, industry and nature conservation groups, and landholder representatives.

8.7. Management Programs and Plans effectiveness, prioritisation and cost

In this section the water quality parameters that will be improved under each management program or plans is presented (Table 8-1). Prioritisation of the management programs and plans for each sub-catchment are also presented (Table 8-2), as is their likely cost (Table 8-3).

A broad prioritisation of the management programs within the sub-catchments was undertaken using the results of the risk assessment and State of Catchment report (Table 8-2).

Definitions of priorities were as follows:

- **High Priority**: Management issues that will significantly contribute to the improvement of water quality in the catchment.
- **Medium Priority:** Management issues that will make a moderate contribution to the improvement of water quality in the catchment or will contribute to the long-term maintenance of water quality.
- **Low Priority:** Management issues that will make a modest contribution to the improvement of water quality.

If required, further differentiation of high priority areas is possible with additional analysis of regional spatial data (i.e. GIS data) and the risk scoring results described in Ecos (2009b).

Table 8-1. Management sectors and issues in the Wilsons River catchment and which water quality parameters are expected to be improved if management to address these issues is undertaken. Where ✓= where the management program or plan will improve the water quality parameter indicated and, - = where the management program or plan will have no affect on the water quality parameter indicated.

Key Management Sectors and Management Program	Water Quality Parameters					
	Nitrogen	Phos-phorus	Turbidity	Pathogens	Biocides	Other Contam-inants
Environmental Management						
Riparian and In-stream Health Management Program	✓	✓	✓	✓	✓	-
Agronomic Land Management Practices						
Animal Production BMP Program	✓	✓	✓	✓	✓	-
Horticulture BMP Program	✓	✓	✓	✓	✓	✓
Management of Built Environments						
Urban Land Management Program	✓	✓	✓	✓	✓	✓
Road Management Program	-	✓	✓	-	-	-
On-site Wastewater Management Guidelines	✓	✓		✓	-	-
STP Management Plan	✓	✓	✓	✓	-	-
Governance						
Inter-agency Catchment Management Committee	✓	✓	✓	✓	✓	✓
Monitoring Program	✓	✓	✓	✓	✓	✓
Hazard Management Program	-	-	✓	-	-	-

Table 8-2. Program priorities by sub-catchments ■ = High priority, ▲ = Medium priority, O = low priority. Priorities were determined using information from the Wilsons River water quality risk assessment.

Key Management Sectors and Programs	Sub-catchments					
	Wilsons River Tidal Pool	Lower Coopers Creek	Upper Coopers Creek	Lower Wilsons Creek	Middle Wilsons Creek	Upper Wilsons Creek
Sub-catchments	1	4	7, 10, 11	2, 3	5, 6, 8, 9	12
Environmental Management						
Riparian and In-stream Health Management Program	■	■	▲	▲	▲	O
Agronomic Land Management Practices						
Animal Production BMP Program	■	■	▲	▲	▲	O
Horticulture BMP Program	■	■	▲	▲	▲	O
Management of Built Environments						
Urban Land Management Program	■	■	O	▲	▲	O
Road Management Program	■	■	O	▲	▲	▲
On-site Wastewater Management Guidelines	■	■	■	■	■	■
STP Management Plan	■	O	O	O	■	O
Governance						
Inter-agency Catchment Management Committee	■	■	■	■	■	■
Monitoring Program	■	■	■	■	■	■
Hazard Management Program	■	■	▲	■	▲	■

Table 8-3. Risk to water quality before (raw risk) and after (residual risk) the implementation of the different management programs and the likely cost of initially developing the management program and then potential on-going costs. Within the Wilsons River catchment some elements within the management programs are already being addressed as part of existing strategies and plans and these are also presented.

Key Management Sectors and Management Program	Before	After	Initial program MP development cost	Ongoing (annual)
Environmental Management				
Riparian and In-stream Health Management Program	**H**	**L**	$ 150,000 *(incl. stream survey, mapping and prioritisation)*	$ 100,000 support funding of Landcare/River Reach groups. Cost of weeding, planting and fencing will depend on requirements as determined from the stream survey.
Agronomic Land Management Practices				
Animal Production BMP Program	**H**	**L**	$ 120,000	$ 200,000 (incl. extension officer and support costs) + fencing cost which will depend on requirements
Horticulture BMP Program	**H**	**L**	$ 80,000	$ 100,000 (incl. extension officer and support costs)
Management of Built Environments				
Urban Land Management Program	**H**	**M**	$ 50,000	$ 500,000
Road Management Program	**M**	**L**	$ 80,000 *(incl. audit of road/waterway crossings)*	Cost will depend on requirements as identified from the audit.
On-site Wastewater Management Guidelines	**H**	**M**	*Completed*	$ 20,000
STP Management Plan	**M**	**L**	$ 80,000 (incl. investigating recycling)	$ 20,000
Governance				
Inter-agency and Stakeholder Catchment Management Committee/Working Group	**H**	**L**	$ 275,00	$ 10,000
Monitoring Program	**H**	**L**	$ 20,000 (*Water quality developed as part of CMP, other components e.g. benchmarking riparian veg. still to do)*	$ 75,000
Hazard Management Program	**H**	**L**	$ 30,000	$ 20,000

8.7.1. Management Challenges

This Catchment Management Plan sets out an ambitious but achievable program of goals and programs to support the key outcome areas. A challenge for the Catchment Working Group charged with taking the plan forward is to work together collectively to secure the funding required to implement the programs.

9 References

Bureau of Rural Sciences (2006) 'Guidelines for land use mapping in Australia: principles, procedures and definitions. A technical handbook supporting the Australian Collaborative Land Use Mapping Programme. Edition 3.' Canberra.

Bishop, K. (1999). Characterisation of fish communities and habitats within the upper arms of the Richmond River estuary with an emphasis on the potential effects of altered salinity structure arising from freshwater abstraction in the upper estuary. Appendix B, in Pierson, W, Bishop, K., Nittim, R. and Chadwick (eds). An investigation of the potential ecological impacts of freshwater abstraction from the Richmond River tidal pool, WRL Technical Report 1999/51.

Croke, J. Mockler, S. Fogarty, P. and Takken, I. (2005). Sediment concentration changes in runoff pathways from a forest road network and the resultant spatial pattern of catchment connectivity. Geomorphology 68:257-268

Econcern (2004). Identification of Priority Areas and Actions for Rehabilitation of Eastern Cod (*Maccullochella ikei*) habitat in a demonstration reach of the Richmond River Catchment. Final Milestone Report: Priority Areas and Actions. December 2004. Consultant's Report prepared by Jim Tait of Econcern for NSW Fisheries.

Ecos (2009a). Wilsons River Catchment Management Plan: Establishing sub-catchments. Report prepared by Ecos Environmental Consulting, Water Futures, Fluvial Systems and Sustainable Futures for Rous Water, Lismore, NSW.

Ecos (2009b). Wilsons River Catchment Management Plan: Catchment Water Quality Risk Assessment. Report prepared by Ecos Environmental Consulting for Rous Water, Lismore, NSW.

Ecos (2009c). Wilsons River Catchment Management Plan: State of the Catchment. Report prepared by Ecos Environmental Consulting for Rous Water, Lismore, NSW.

Ecos (2009d). Wilsons River Catchment Management Plan: Quantitative (E2) Modelling. Report prepared by Ecos Environmental Consulting and Fluvial Systems for Rous Water, Lismore, NSW.

Kirono, D., Podger, G., Franklin, W., and Siebert, R. (2007). Climate Change Impact on Rous Water Supply. Water. Journal of the Australian Water Association. March 2007.

McKee, L., Eyre, B., Hossain, S., and Pepperell, P. (2001). Influence of climate, geology and humans on spatial and temporal nutrient geochemistry in the subtropical Richmond River catchment, Australia. Marine and Freshwater Research 52:235-248

NSW DoC. (2005). Wilsons River Risk Assessment: Risk Analysis and Mitigation Measures Report. Reported prepared for Rous Water by the NSW Department of Commerce, NSW

NSW DPI (2006) Reducing the impact of road crossings on aquatic habitat in coastal waterways - Northern Rivers, NSW. Report to the NSW Environmental Trust. NSW Department of Primary Industries, Wollongbar, NSW.

NSW Fisheries (2004). Eastern (Freshwater) Cod (*Maccullochella ikei*) Recovery Plan. NSW Fisheries, May 2004.

Parsons Brinkerhoff (2006). The Lismore Source: Abstraction of water from the Wilsons River at Howards Grass Environmental Impact Statement. Reported prepared for the NSW Department of Commerce by Parsons Brinkerhoff, Sydney NSW.

Rous Water. (1995). Rous Regional Water Supply Strategy Planning Study, Scheme Options. Final Report Document Number LI169. Rous Water Regional Water Supply, Lismore, NSW.

Rous Water. (2002). Rous Water Regional Water Strategy. Rous Water Regional Water Supply, Lismore, NSW.

Rowland SJ. (1993). *Maccullochella ikei*, an Endangered Species of Freshwater Cod (Pisces: Percichthyidae) from the Clarence River System, NSW and *M. peelii mariensis*, a New Subspecies from the Mary River System, Qld. Records of the Australian Museum 1993;45: 121-145.

Sinclair Knight Mertz (2004). Emigrant Creek Water Monitoring Program. Report prepared for Rous Water Regional Water Supply, January 2004.

10 Appendix – Catchment Management Plan Working Group Members

The following people and organisations were members of the Catchment Management Plan Working Group:

ORGANISATION	PRIMARY CONTACT
GOVERNMENT AGENCIES/ORGANISATIONS:	
State Government:	
Department of Primary Industries (Fisheries)	Patrick Dwyer
Department of Primary Industries (Agriculture)	Richard Swinton
Department of Water and Energy	Tim Rabbidge
Northern Rivers Catchment Management Authority	Peter Boyd / Gerry Ryan
North Coast Public Health Unit	Geoff Sullivan / Greg Bell
Local Government:	
Ballina Shire Council	John Truman
Byron Shire Council	Phil Warner
Lismore City Council	Tony Kohlenberg / Nick Stephens
Rous Water	Wayne Franklin
Rous Water	Anthony Acret
Far North Coast Weeds	Des Boorman / Ross Garsden
COMMUNITY GROUPS:	
Aboriginal groups:	
Widjabul People representative	Irene Harrington
Environment/ Landcare:	
Australian Wetlands (representing Richmond River Estuary Management Planning Process)	Amanda Reichelt-Brushett
Big Scrub Environment Centre, *Wilsons River Tidal Pool Sub-Catchment Rep.*	Vanessa Ekins
Big Scrub Rainforest Landcare Group, *Middle Wilsons Ck. Sub-Catchment Rep.*	Tony Parkes
Richmond Landcare Inc.	James Jackson
Wilson River Landcare Group Inc., *Lower Wilsons Ck. Sub-Catchment Rep.*	Dr Kristin den Exter
Wilsons Creek Huonbrook Landcare Group, *Upper Wilsons Creek Sub-Catchment Rep*.	Dr Barbara Stewart

ORGANISATION	PRIMARY CONTACT
Industry Groups:	
Australian Macadamia Society	Kim Jones
Lismore Chamber of Commerce	Mark Willoughby
Norco	Graham Correy
NSW Farmers Association	John Cade
Pecan Growers Association	Nik Petroff
Other Community Groups:	
Coopers Creek Water Users Group	Selwyn Bryant
Envite, *Lower Coopers Ck. Sub-Catchment Rep*.	Maree Thomson
Far North Coast Canoe Club	Colin Cussel / Steve Sweet
W.I.R.E.S., *Upper Coopers Ck. Sub-Catchment Rep.*	Sharon Mc Grigor
Richmond / Wilsons Tidal Water Users Association	Paul Weir
Macleans Ridges Community Group	Noel Parker
Youth Representative	Ahri Tallon
Project Consultants:	
Ecos Environmental Consulting	Dr Nick O'Connor
Ecos Environmental Consulting	Dr Fiona McKenzie-Smith
Sustainable Futures Australia (facilitator)	Peter Cuming
Sustainable Futures Australia (facilitator)	Dr Elizabeth Bragg
Interested parties **(Not in CWG, but kept informed)**	
Department of Environment and Climate Change	Mark Pittavino / Alex Purvis / Ian Greenbank
Department of Planning	Steve Jensen
Friends of Richmond River	Joe Friend
Paddle For Life	Daniel Clegg

11 Appendix – Issues Paper

Wilsons River Catchment Management Plan
Community Consultation Program
Issues Paper

prepared by

Sustainable Futures Australia

for **Rous Water**

14 April 2008

This report was prepared by Sustainable Futures Australia

for Rous Water in April 2008

Sustainable Futures Australia

PO Box 1933, Byron Bay

NSW 2481 Australia

Phone: +61 (0)2 6685 7198

Fax: +61 (0)2 6685 7190

team@sustainablefutures.com.au

www.sustainablefutures.com.au

ABN 23 657 875 918

Sustainable Futures Project Team

Dr Elizabeth Bragg (preparation of report, analysis of previous community consultation documents)

Kirstie Fisher (analysis of previous community consultation documents)

Peter Cuming (review)

Rous Water Team

Anthony Acret (provision of community consultation documents)

WILSONS RIVER UPPER CATCHMENT MANAGEMENT PLAN

ISSUES RAISED PRIOR TO THIS PROJECT

Draft Report: 9 April 2008

Introduction

The table below presents a summary of catchment management issues raised by previous community consultation processes.

Sustainable Futures Australia has analysed community input from five major sources:

- the Lismore Source Project Reference Group, (LS PRG; 2004-7);
- Richmond Catchment Management Strategy, (date unknown);
- North Coast Rivers, (2003)
- Water Quality and River Flow, (1999)
- Your Words on Water, (1995).

The key issues raised have been summarised and coded according to five key elements of sustainability (environmental; social/cultural; economic; governance; and technical). The issues have then been organised into section of the table according to these elements.

Some issues were highlighted in more than one document. Where this is the case the second reference is noted in with the original source.

Key to the Table

The column labelled **'sustainability'** refers to the main elements of sustainability which this issue relates to: E = environmental; S = social/cultural; $ = economic/financial; G = governance; T = technical/infrastructure

The final column of the table, labeled **'in CMP'** refers to the page number or section of the final catchment management plan where this issue is addressed.

ISSUES RAISED	SOURCE	sustainability					Section In CMP
		E	S	$	G	T	
ENVIRONMENTAL / ECOLOGICAL							
1. The project should consider and address issues of climate change and sea-level rise	.	X	X	X		X	8.7, KOA 4
2. Improve the health of catchments	Hope: LS PRG 10/3/04	X					8.3, Vision
3. Cross-catchment management should result in good water quality	Fear: LS PRG 10/3/04	X				X	8.3, Vision
4. There is an issue with water quality	Concern: LS PRG 10/3/04	X					6
5. Cumulative environmental impacts of irrigators and Rous Water	Fear: LS PRG 10/3/04	X					8.4, KOA 1
6. Catchment management needs to result in good quality water	LS PRG criteria E1	X					8.3, Vision
7. The impacts on water quality of sewage treatment within the catchments should be known and taken into account (including on-site systems, proposed Clunes STP and Bangalow STP)	LS PRG criteria E2	X					8.6, KOA 3
8. The health of catchments (including groundwater) and ecological systems (including flora and fauna) should not be harmed and possibly improved	LS PRG criteria E3; LS PRG 29/2/08	X					8.3, Vision
9. There should be sufficient water left in the river to retain adequate environmental flows (ie., to maintain healthy ecological systems)	LS PRG criteria E4; LS PRG 29/2/08	X					8.4, KOA 1
10. There should be no adverse cumulative effect of Rous Water's water extraction over existing irrigators.	LS PRG criteria E5; LS PRG 29/2/08	X					8.4, KOA 1
11. Distribution of natural salinity levels in the estuary should not be increased from typically natural occurrence levels	LS PRG criteria E6	X					8.4, KOA 1
12. Land degradation – acid sulphate soils; contaminated land (eg., dip-sites); erosion (sheet, gully, rill mass movement); salinity; soil acidity; soil structure decline	Richmond CMS p7,20,21	X		X			8.5, KOA 2
13. Waste management – minimise production of wastes (solid, liquid, gaseous and hazardous); maximise re-use and recycling; safe waste disposal	Richmond CMS p7,27,28	X	X		X		8.6, KOA 3 8.7, KOA 4
14. Water quality – assessment; pollution; landuse impacts; management of 'natural' waters for domestic and contact recreational use; protection of groundwater	Richmond CMS p8,30-37	X	X		X		6, 8.4, KOA 1 8.5, KOA 2
15. Water supply and storage – water efficient technologies and recycling and re-use; water storage and demand management; integration of all water resources (eg., stormwater)	Richmond CMS p8, 38-40	X			X		8.6, KOA 3
16. Stream management – environmental flows; stream bank erosion; sedimentation; river corridors and the aquatic environment; floodplain management; wetland management and restoration; estuary management	Richmond CMS p8, 41-47 Water Quality and River Flow p 4	X			X		8.4, KOA 1
17. Remnant vegetation management. Ensure long term survival and well being of target	Richmond CMS p9,49,50	X					8.4, KOA 1

ISSUES RAISED	SOURCE	sustainability					Section In CMP
		E	S	$	G	T	
ENVIRONMENTAL / ECOLOGICAL							
remnants and communities.	Your Words On Water p 18						
18. Rare and endangered plant species. Secure the futures of all rare, vulnerable and endangered species and communities, preserving and enhancing biodiversity by ensuring maximum population distribution and genetic diversity.	Richmond CMS p9,52,53	X					8.4, KOA 1 8.7, KOA 4
19. Revegetation. Need to encourage appropriate revegetation with indigenous plants and communities to combat land degradation, loss of habitat and to enhance biodiversity, water quality and community values.	Richmond CMS p9,53 Your Words on Water p 18	X	X				8.4, KOA 1
20. Alienation of agricultural land due to subdivision and other factors (eg., infrastructure)	Richmond CMS p7,22	X		X	X	X	8.6, KOA 3
21. Inappropriate clearing including on hilltops and steep slopes and of sub-tropical rainforests	Richmond CMS p7,23	X		X			6, 8.5, KOA 2
22. Weed management (including aquatic weeds). Minimise weed infestations in native vegetation communities and agricultural land.	Richmond CMS p9,58,59	X		X			8.5, KOA 2
23. Impact of agricultural land uses: lack of control over land use practices in the rural sector, unrestricted access of cattle to watercourses, and a greater need for weed control, especially along riverbanks.	North Coast Rivers p27 Your Words on Water pg 18 Water Quality and River Flow p 4	X					8.4, KOA 1 8.5, KOA 2
24. Aspirations of local Aboriginal people for north coast rivers to be clean enough to drink and swim in and from which they can collect shellfish for human consumption	North Coast Rivers p 35	X	X				8.3, Vision
25. Concern that river health is not adequately considered in the development of and planning of urban development	North Coast Rivers p 27 Water Quality and River Flow p 4	X				X	8.6, KOA 3
26. Protect groundwater resources by managing their use, particularly Alstonville Plataeu	Water Quality and River Flow p 4						8.4, KOA 1
27. Ensuring the health of the Richmond River Estuary system (Wilsons River is an important input to that system)	Richmond River Estuary MP Community Engagement	X					8.3, Vision
28. Protect natural river flows in rivers and creeks as naturally as possible	North Coast Catchments p 36	X					8.4, KOA 1

ISSUES RAISED	SOURCE	sustainability					Section In CMP
		E	S	$	G	T	
ENVIRONMENTAL / ECOLOGICAL							
29. Monitor and account for all uses of the water resources- especially as riparian use of water is increasing	Water Quality and River Flow p 4	X					8.4, KOA 1

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
SOCIAL / CULTURAL							
1. Education and awareness	Your Words on Water p 13		X				8.3, Vision
2. There should be no risk to public health.	LS PRG criteria S1; LS PRG 29/2/08		X				8.3, Vision
3. The community should have a reliable water supply	LS PRG criteria S2		X				8.3, Vision
4. Recreation and tourism – Ensure sustainable and ecologically sound recreational facilities and tourist development and encourage sensitive ecotourism in the catchment	Richmond CMS p7,25		X	X			8.7, KOA 4
5. The implementation of this project should not reduce the responsibilities of communities to use water responsibly	LS PRG criteria S4		X		X		8.7, KOA 4
6. The project should ensure that Aboriginal cultural and heritage values are protected and issues specifically relevant to Aboriginal people are addressed (eg., mens and womens sites, ability for traditional hunting and gathering along the river, economic and social value of river, inclusion in water sharing)	LS PRG criteria S5		X		X		8.7, KOA 4
7. Community awareness of total catchment management (principles and organisations) through education and promotion	Richmond CMS p10,63,64 Water Quality and River Flow p 4		X		X		8.6, KOA 3
8. Community participation and ownership of catchment management – including education for all age groups and targeted programs including particular industries or activities	Richmond CMS p10		X		X		8.6, KOA 3
9. School education for catchment management. Design education packages that are both interesting and educational and designed to meet the specific needs of different age groups.	Richmond CMS p10,65		X		X		8.6, KOA 3
10. Community, including Working Group, needs learn what is happening with Wilson River source (and Wilsons River CMP)	Hope: LS PRG 10/3/04		X		X		8.6, KOA 3 8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
SOCIAL / CULTURAL							
11. Establish mechanisms to involve all communities, including Aboriginal communities, in planning and management processes (developing future strategies and actions associated with the interim environmental objectives)	North Coast Rivers pg 35 Water Quality and River Flow p 4F		X				8.7, KOA 4
12. Protocols to guide agencies and other groups consulting with Aboriginal communities	North Coast Rivers pg 35		X		X		8.7, KOA 4
13. Strong support for provision of assistance to farmers in order to change land use practices	Northern Coast Rivers p28		X		X		8.5, KOA 2
14. Healthy catchment for resource and because of feelings of attachment and wellbeing associated with knowing that the catchment is healthy.	Water Quality and River Flow p 3		X				8.3, Vision
15. Increased efficiency of water use	Water Quality and River Flow p 3		X				8.3, Vision
16. Visual amenity for water looking pleasant and clean	Water Quality and River Flow p 3	X	X				8.4, KOA 1 8.5, KOA 2
17. Respect Aboriginal spiritual and cultural values associated with rivers, creeks, wetlands and lakes; and traditional Aboriginal management roles in, and uses for, these areas – including as a source of traditional foods that are safe to eat.	Water Quality and River Flow p 4	X	X				8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
ECONOMIC / FINANCIAL							
1. Government participation and assistance for catchment management	Richmond CMS p10			X	X		8.7, KOA 4
2. Forestry – plantations; state forests; private native forests (non-plantation). Encourage economically viable, ecologically appropriate, sustainable forests that meet community values.	Richmond CMS p9,54,55	X	X	X			8.5, KOA 2
3. Agriculture. Ensure the agricultural industries of the Wilsons River catchment are sustainable and viable.	Richmond CMS p9,6,57			X			8.5, KOA 2
4. Primary producers should not be disregarded	Fear: LS PRG 10/3/04		X	X	X		8.5, KOA 2
5. Existing water users should retain licensed access to the river	LS PRG criteria F1			X			8.4, KOA 1
6. There should be no socio-economic impact on existing irrigators (particularly during low flows)	LS PRG criteria F3			X			8.7, KOA 4
7. Rous Water should not buy ‘sleeper’ or inactive water licenses for water extraction as a part of this project	LS PRG criteria F4			X			8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
ECONOMIC / FINANCIAL							
8. This project should not impact adversely on water trading	LS PRG criteria F5			X	X		8.7, KOA 4
9. The costs of preventing unacceptable environmental impacts should be economically affordable (eg., preventing contamination of upper catchments with water from lower catchments)	LS PRG criteria F6			X		X	8.7, KOA 4
10. Balance of growth with availability of water	Your Words on Water pg 13		X	X			8.7, KOA 4
11. Recognition of the cost to the community although having a healthy catchment is worthwhile	Water Quality and River Flow p 3			X			8.7, KOA 4
12. Spreading costs throughout the community, rather than targeting a particular sector	Water Quality and River Flow p 3		X	X			8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
GOVERNANCE / COMMUNITY ENGAGEMENT							
1. Integrated catchment planning – coordination of Local Councils' activities in relation to SoE reports; facilitation of integration of catchment planning within LEPs; coordinated approach to catchment management; information needs for planning and decision-making	Richmond CMS p7,26				X		8.6, KOA 3 8.7, KOA 4
2. Water needs to be used more wisely	Hope: LS PRG 10/3/04				X		8.3, Vision
3. Community needs to develop a deeper acceptance of responsible water management	Hope: LS PRG 10/3/04				X		8.3, Vision
4. Community needs an optimal acceptable integrated solution	Hope: LS PRG 10/3/04				X		8.3, Vision
5. Skilling of Working Group will mean they have more access to material and understanding than the general public, and that political pressure from the community without these skills or understanding will undermine the Working Group	Fear: LS PRG 10/3/04				X		8.5, KOA 2 8.6, KOA 3
6. Working Group should function as an effective group and be effective in respecting each other	Hope: LS PRG 10/3/04				X		8.7, KOA 4
7. The general community should be well informed about the project and engaged in the CMP planning process	LS PRG criteria G1				X		8.7, KOA 4
8. The concerns and issues of stakeholders and the community should be addressed	LS PRG criteria G2				X		8.7, KOA 4
9. Conflict should not be created in relation to other water planning initiatives	LS PRG criteria G3				X		8.7, KOA 4
10. Financial outcomes should not be the sole driver for operating rules of the CMP system	LS PRG criteria G5			X	X		8.7, KOA 4
11. The community needs to be represented in ongoing management and review of the project	LS PRG criteria G6; LS				X		8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
GOVERNANCE / COMMUNITY ENGAGEMENT							
	PRG 29/2/08						
12. Public health to have a total water system within the catchment which ensures an acceptable standard	Your Words on Water p 12		X		X		8.3, Vision
13. Need for unified management	Your Words on Water p 13				X		8.7, KOA 4
14. Management of catchment is to be carried out by one authority, proactive and locally based	Your Words on Water p 9				X		8.7, KOA 4
15. Community understanding of balancing the improvement of environmental elements of river health with social and economic goals.	North Coast Rivers pg 37	X	X		X		8.7, KOA 4

ISSUES RAISED	SOURCE	sustainability					In CMP
		E	S	$	G	T	
TECHNICAL / INFRASTRUCTURE / SCIENTIFIC							
1. Continuing use of engineering solutions does not place responsibilities on communities to use water responsibly	Concern: LS PRG 10/3/04				X	X	8.7, KOA 4
2. Implementable solution needs to be provided in a timely manner that addresses concerns and issues of the community and stakeholders	Hope: LS PRG 10/3/04				X	X	8.7, KOA 4
3. An implementable solution needs to be provided in a timely manner	LS PRG criteria T1					X	8.7, KOA 4
4. The models used are appropriate and as accurate as possible using the best available information	LS PRG criteria T3					X	8.7, KOA 4
5. Given there is limited data on which we are basing decisions, the precautionary principle should be applied and the project's technical and management approach need to acknowledge this	LS PRG criteria T4					X	8.7, KOA 4
6. Water supply, storage and usage should be balanced between the environment and economic and social needs of the community	Your Words on Water p 10	X	X		X	X	8.7, KOA 4
7. Waste water – reuse/disposal	Your Words on Water pg 13					X	8.6, KOA 3
8. Population growth – planning, resource demands/ infrastructure	Your Words on Water				X	X	8.6, KOA 3 8.7, KOA 4

References

- Lismore Source Project Reference Group (LS PRG; 2004-7) Minutes of meetings 10/3/04 & 29/2/08; and criteria for choosing options
- Richmond Catchment Management Committee (date unknown) *Richmond Catchment Management Strategy: Community and Government Working Together.*
- Healthy Rivers Commission (2003) *North Coast Rivers – Independent inquiry into the North Coast Rivers*. (Pages 27, 30, 35, 37)
- EPA New South Wales government,(1999) *Water Quality and River Flow Interim Environmental Objectives – Guidelines for River, Groundwater and Water Management Committees*. Water Quality and River Flow. (Pages 3 and 4)
- Tracey Chambers (1995) *Your Words on Water (Results from a series of community workshops on water issues and the future of water in the Richmond Catchment*) (Pages 9, 10, 12, 13 and 18)
- Lismore Focus Group for the Richmond River Estuary Management Plan (2008) Notes from the focus group held in February 2008

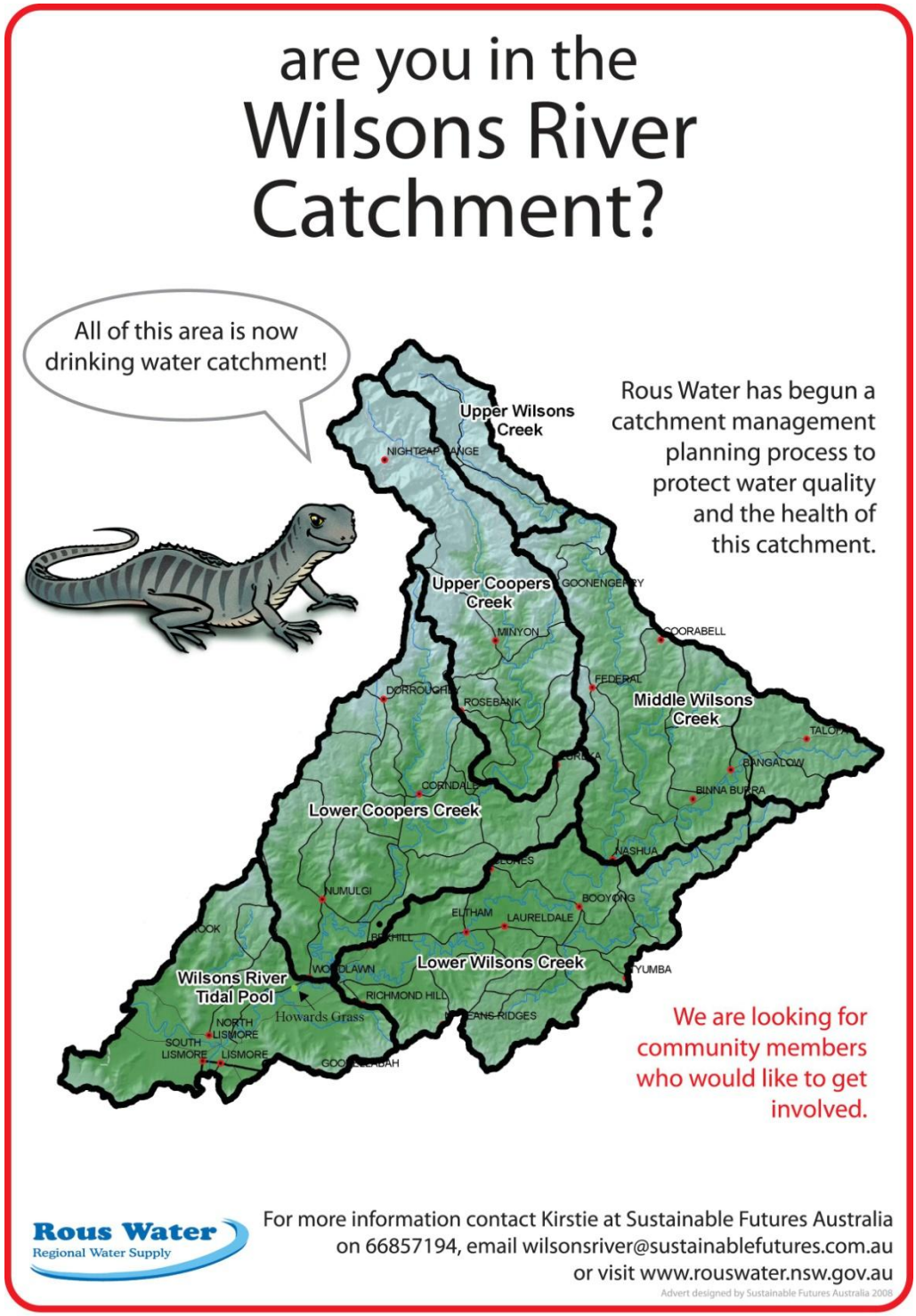
Notes

5/3/08. So far, I have integrated the hopes, fears and concerns of the Lismore Source Project Reference Group (LS PRG), as well as the criteria for examining project options. I have only included issues which still are relevant to the catchment area above the Wilsons River Source and to the CMP project. It should be noted, however, that some of the issues raised were probably meant *in the context of the Lismore Source project* and so I am extending their meaning by including them here. This new meaning can always be checked with new stakeholders and Working Group.

17/3/08. Have also included issues (and some key recommendations) from Richmond Catchment Management Strategy produced by the Richmond Catchment Management Committee (date unknown). It should be noted that the Wilsons River upper catchment is only *one part* of the Richmond catchment and so some issues may be listed here that of reference only to other areas of the catchment. These Richmond issues therefore should be reviewed in this light.

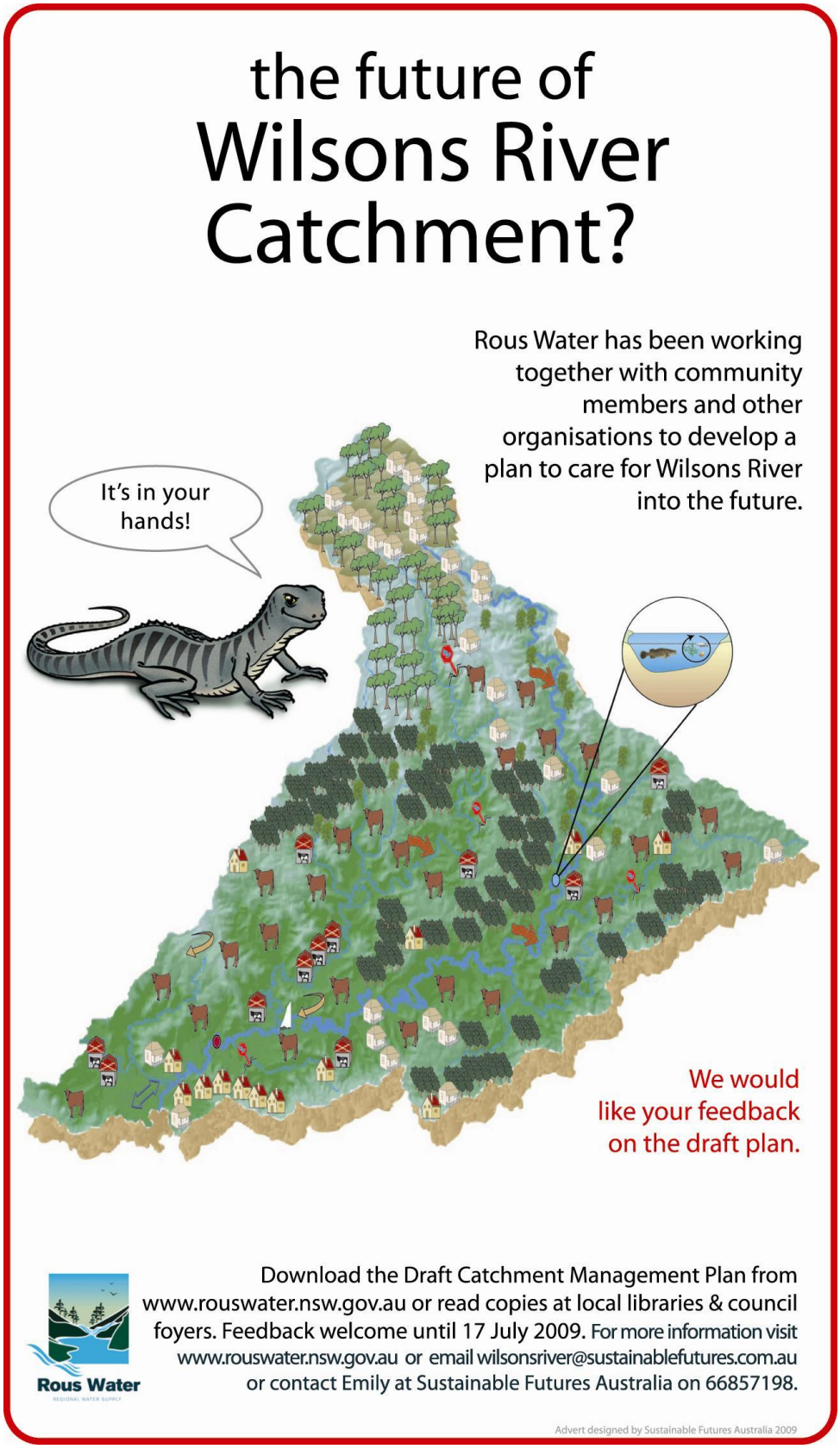
8/4/08. Additional issues have been added from the final 4 references listed at the end of this document. Some issues were highlighted in more than one document. Where this is the case the second reference is noted in with the original source.

12 Appendix – Newsletter and advertisements



Advertisement Number 1, April 2008

Advertisement Number 2, September 2008



Advertisement Number 3, June 2009

In the Flow

Wilsons River Catchment Newsletter - Issue No.1 - May 2008

Newsletter of the Wilsons River Catchment Management Plan Working Group

WILSONS RIVER CATCHMENT MANAGEMENT PLAN

Welcome to the first issue of *'In The Flow'*, the community newsletter from the Wilsons River Catchment Management Plan Working Group.

Rous Water is currently developing a Catchment Management Plan (CMP) for the catchment area upstream of the Wilsons River Source (a major new water source for the Far North Coast region). The project will run throughout the rest of 2008, with the draft CMP due for public exhibition in December.

The Wilsons River Source (previously known as the Lismore Source) involves pumping water from the tidal pool on the Wilsons River adjacent to Howards Grass near Lismore. The water is pumped to the Nightcap Treatment Plant for subsequent supply to consumers through the existing water distribution infrastructure.

The Wilsons River CMP will comprise a risk-based catchment management and investment strategy to direct activities aimed at protecting drinking water quality at the Wilsons Rivers source. It will include an environmental monitoring program to underpin the ongoing adaptive management of the water source catchment. Community consultation is an important part of the catchment management planning process.

The Catchment Working Group

The Wilsons River CMP will be prepared in consultation with representatives from industry, government and community groups who have an interest in the Wilsons River Catchment. These interests include:

- agricultural water users
- landcare and environmental values
- government agencies
- local councils
- public health
- Rous Water
- Aboriginal and cultural values
- landholders

Rous Water invited representatives of these interests to form a Catchment Working Group and the first meeting was held in late April.

The Catchment Working Group will facilitate community involvement in the development of the plan through:

- providing a forum for discussion and exchange of information
- identifying existing and emerging issues and sources of information related to the Wilsons River catchment
- providing feedback on proposed management options and reviewing technical reports including the draft catchment management plan
- acting as a link between Rous Water, technical consultants and the community

This newsletter was prepared by Sustainable Futures Australia in April 2008, based on information provided by Rous Water and Ecos Consulting and reviewed by members of the Working Group. Newsletters printed by Rous Water use Australian made 100% recycled paper & soy-based inks.

Rous Water
Regional Water Supply

Newsletter No. 1, page 1, May 2008

CATCHMENT MANAGEMENT ISSUES

Issues and concerns raised by the community relevant to the Wilsons River catchment have been drawn from a range of previous projects. These include the Lismore Source Project Reference Group (2004-7); Richmond Catchment Management Strategy (1996); The Healthy Rivers Commission Report on North Coast Rivers (2003); Water Quality and River Flow Environmental Objectives for the Richmond River Catchment (1999) and Your Words on Water (1995).

These issues have been summarised and linked to five aspects of sustainability relevant to this project: environmental, social/cultural, economic, governance and technical. A detailed Issues Report has been presented to the Working Group and a summary of the issues is listed here. Feedback from the Working Group and broader community may identify additional issues that will be added to this comprehensive list of issues to be referred to in preparation of the CMP.

Environmental / Ecological

- Address climate change
- Improve health of catchments
- Water quality (inc. sewerage management, pollution, protection of groundwater)
- Protect and ensure environmental flows
- Address land degradation
- Land-use management issues
- Minimise waste management impacts
- Water supply and storage
- Remnant vegetation management
- Rare and endangered species
- Alienation of agricultural land due to subdivision and other factors
- Inappropriate clearing including on hilltops and steep slopes
- Weed management
- Concerns that river health is not adequately considered in urban development
- Protection of groundwater resources
- Ensure the health of the Richmond River estuary system
- Protect natural river flows in rivers and creeks as naturally as possible
- Monitor and account for all uses of the water resources
- Protection and rehabilitation aquatic habitat
- Aspirations of local Aboriginal people for north coast rivers to be clean enough to drink and swim in and collect shellfish for eating

Economic / Financial

- Government participation and assistance
- Forestry – encourage economically viable, ecologically appropriate and sustainable forests (including plantations, state forests and private native forests)
- Agriculture – viable and sustainable
- Existing water users to retain licences to access the river
- No adverse impact to water trading
- Costs to prevent environmental impacts should be economically affordable
- Regard for primary producers
- Sharing costs equitably across the community

Newsletter No. 1, page 2, May 2008

Social / Cultural

- No risk to public health
- Reliable water supply for the community
- Recreation and tourism
- Aboriginal culture and heritage values are protected and issues addressed
- Community awareness of total catchment management through education and promotion
- Community participation and ownership of catchment management
- School education for catchment management

Governance / Community Engagement

- Integrated catchment planning
- Community responsibility for water management
- General community well informed about the project and engaged and well represented in the CMP process
- Financial outcomes should not be the sole driver for operating rules of the CMP system
- Management of the catchment by one authority
- Community understanding of the need to balance environmental, social and economic goals

Technical / Infrastructure / Scientific

- Solutions provided in a timely manner
- Scientific models used are appropriate and as accurate as possible
- The precautionary principle should be applied and acknowledged in the management approach
- Total reuse of waste water where possible & disposal
- Water supply, storage and usage should be balanced
- Population growth planning should consider resource demands and infrastructure

Technical consultants for the project, Ecos Environmental Consulting, are requesting sources of information about these catchment management issues from the community. They are also interested in any additional issues which you think may not have been identified to date.

Do you know of any other catchment issues?

Magill the water dragon from Widjabul Country

If so, please email wilsonsriver@sustainablefutures.com.au or call (02) 6685 7194 before 30 May 2008.

In the Flow Wilsons River Catchment Newsletter - Issue No.1 - May 2008

Newsletter No. 1, page 3, May 2008

Who are we working with?

Rous Water and the Working Group are working with a specialised team of consultants preparing the Wilsons River Catchment Management Plan.

Ecos Environmental Consulting are the project directors, managing the multidisciplinary project team, and are focusing on the catchment water quality, sub-catchment planning and natural resource management. They are writing the plan.

Water Futures are working on the public health and water supply systems.

Fluvial Systems are specialists in hydrology and geomorphology studies and are conducting the hydrological studies.

Sustainable Futures Australia is facilitating the community consultation for the project including producing the communication materials, facilitating the working group meetings and information days, media and liaison with the community. Based on the North Coast, they are your local point of reference for the project.

How can you get involved?

Provide information
Please contact us with any information or other key issues that will assist the project before 30 May 2008

Join the E-list
and we will send you regular e-newsletters

Websites
Visit www.rouswater.nsw.gov.au or www.sustainablefutures.com.au

for whole of project information

On-the-ground projects
Participate in practical catchment management activities

Info Days
Attend one of the information days to be held in September including a workshop at this year's Big Scrub Rainforest Day.

Aboriginal cultural events
Join in on-the-ground projects with Widjabul custodians

Register your Interest
Tell us how you'd like to be involved by filling out a Registration of Interest form

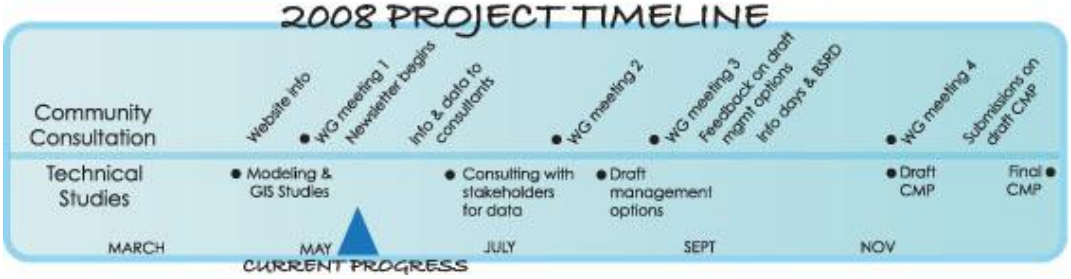
Working Group
Join the community gallery at the next meeting

CONTACT US...

For a registration of interest form, to provide information or inquire about the project, please call Sustainable Futures Australia on (02) 6685 7194 or email wilsonsriver@sustainablefutures.com.au

HEALTHY CATCHMENTS PROGRAM

2008 PROJECT TIMELINE



Newsletter No. 1, page 4, May 2008

This page intentionally blank

In the Flow

Wilsons River Catchment Newsletter - Issue No.2 - August 2008

Newsletter of the Wilsons River Catchment Management Plan Working Group

Wilsons River Catchment Management Plan

Welcome to the second issue of *'In The Flow'*, the community newsletter from the Wilsons River Catchment Management Plan Working Group.

Rous Water is currently developing a Catchment Management Plan (CMP) for the catchment area upstream of the Wilsons River Source. *For more background information on the project, including the first issue of 'In The Flow', please go to www.rouswater.nsw.gov.au*

Project Update: Since the first issue of *'In The Flow'* was released in May 2008, Ecos Environmental Consulting has reviewed the catchment issues raised during the community consultation process to date. They have also completed a number of technical studies modelling and quantifying factors that could lead to contamination of water in the catchment. In association with this work, they have reviewed procedures used for monitoring water quality.

The next stage of work will involve preparation of draft management options for further review. These options will reflect the technical studies and the community consultation process.

The Catchment Working Group - with representatives from industry, government, environmental and community groups - have met twice. We have been presented with detailed information about the project; provided input into Ecos' technical studies; and raised and discussed catchment management challenges and opportunities for the Wilsons River catchment.

Water quality has been identified as a very important consideration by the community consultation process.

Information Days coming to your local Sub-Catchment

Caring for our drinking water catchments, both now and in the future, needs to be a collaborative effort, and community involvement is vital. We would like to invite you to participate in this process and attend upcoming Information Days where you can find out more about this project.

As part of the consultation process, the project team has identified six subcatchment areas within the Wilsons River catchment. See the map on the back of this newsletter to find out which subcatchment you live or work in.

Each of these six subcatchments has a representative on the project Catchment Working Group. To find out more about what is happening in your subcatchment area, you can contact your local representative and or come along to an Information Day.

Four Information Days are planned during September 2008. The locations for these Information Days have been chosen to provide a range of options within driving distance of people from all the subcatchments.

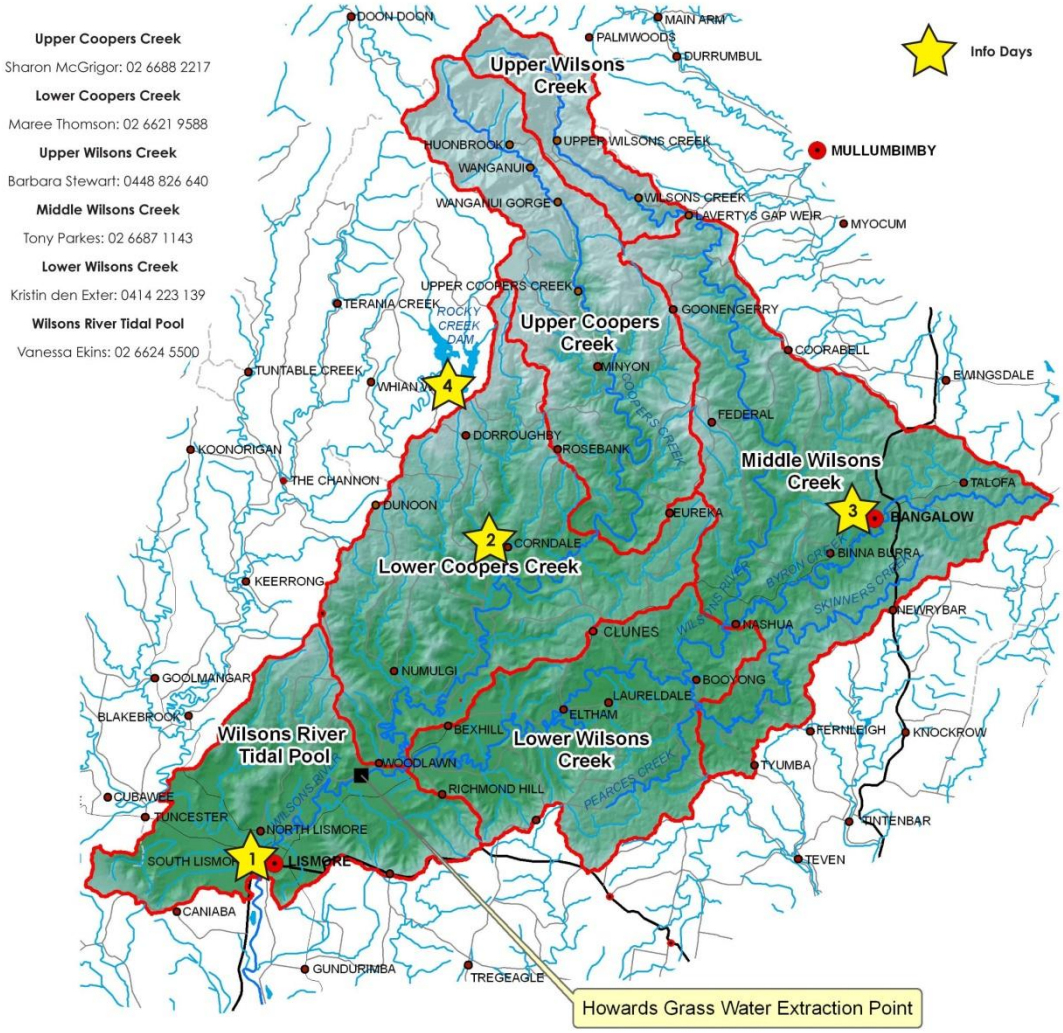
	Event	Location	Date & Time
1	Riverside Info Day	Heritage Park Lismore	9am - 12 **Sat 6th Sept**
2	Info Day	Corndale Hall	9am - 12 **Sun 7th Sept**
3	EnviroDad Tent Fatherhood Festival	Bangalow	1pm - 4 **Sun 7th Sept**
4	Big Scrub Rainforest Day	Rocky Creek Dam	Sunday **14th Sept**

This newsletter was prepared by Sustainable Futures Australia in August 2008, based on information provided by Rous Water and Ecos Consulting and reviewed by members of the Working Group. Newsletters printed by Rous Water use Australian made 100% recycled paper & soy-based inks.

Rous Water
Regional Water Supply

Newsletter No. 2, page 1, August 2008

Which Subcatchment do you live or work in?

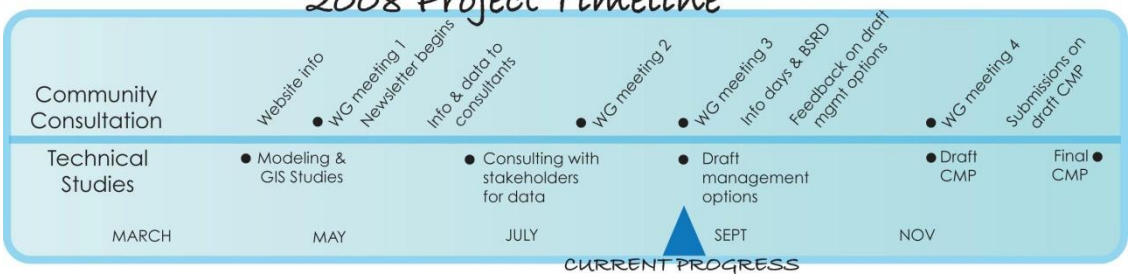


Contact us...

For a registration of interest form, to provide information or inquire about the project,
please call Sustainable Futures Australia on (02) 6685 7194
or email wilsonsriver@sustainablefutures.com.au

HEALTHY CATCHMENTS PROGRAM
Rous Water

2008 Project Timeline



Newsletter No. 2, page 2, August 2008

This page intentionally blank

In the Flow

Wilsons River Catchment Newsletter - Issue No.3 - June 2009

Newsletter of the Wilsons River Catchment Management Plan Working Group

Wilsons River CMP - A Project Update

Welcome to the third issue of *'In The Flow'*, the community newsletter from the Wilsons River Catchment Management Plan Working Group. This follows on from Issue 1 (May 08) and Issue 2 (August 08) which introduced the project, key catchment issues and invited you to a series of Information Days (see picture below right).

Rous Water is currently developing a Catchment Management Plan (CMP) for the catchment area upstream the Wilsons River Source (the regions new source of drinking water at Howards Grass). For background information on the Wilsons River CMP project, including the first two issues of 'In The Flow', please go to **www.rouswater.nsw.gov.au**

Since the last issue of '*In The Flow*', Ecos Environmental Consulting has prepared draft management options to address key catchment challenges and opportunities. These were reviewed by the Catchment Working Group. We endorsed the general approach and suggested a number of changes which were considered by Ecos and incorporated into our initial draft Catchment Management Plan.

At our last meeting in November 2008 we worked on our collective vision and guiding principles for the plan. Building on the technical groundwork carried out by Ecos, the Working Group established key areas of action and goals where positive outcomes are needed. They also identified key programs that can help to achieve these aims.

The Draft Catchment Management Plan is now ready for public exhibition and submissions. We encourage you to review it and provide us with feedback.

In This Issue

In this issue of 'In The Flow' you will find important information about the Draft Wilsons River Catchment Management Plan (CMP). This includes:

- The purpose of the CMP
- How the Plan was developed and who has been involved in the process to date
- Who the Plan will affect and who will implement the plan
- Key background studies carried out and why they are important
- An overview of the draft plan and key actions proposed in order to achieve healthy ecosystems that help provide clean water
- How you can review the draft plan and make submissions for consideration

This newsletter was prepared by Sustainable Futures Australia in April 2009, based on information provided by Rous Water and Ecos Consulting and reviewed by members of the Working Group. Newsletters printed by Rous Water use Australian made 100% recycled paper & soy-based inks.

Rous Water

THE WILSONS RIVER CATCH

The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality for human and environmental health. The plan sets out the strategic direction to be used in order to deal with key challenges and take advantage of opportunities to achieve this.

The Plan is the collective vision of a wide range of stakeholder groups, who have developed it together and are committed to implementing the Plan now and into the future. The Plan establishes key aims and goals to achieve through the implementation of existing and new programs and actions through our combined effort and resources.

The Process of Plan-making

The Wilsons River became a major source of 'raw' drinking water in 2008 when Rous Water began pumping water from the River at Howards Grass near Lismore. All the activities occurring within the catchment area not only affect the natural environment, but have an impact on the quality of water that is treated for us to drink and use.

Changes in land use activities over the past 100 years mean we will see long term impacts on river health into the future. Rous Water see the need for a long term strategic plan responding to this challenge and in doing so helping to secure clean water. It requires our coordinated actions and activities within the catchment. A Catchment Management Plan that supports this approach was needed.

Key stakeholders have been involved in developing the draft plan. They include representatives from community interest groups, local Aboriginal people, commerce and industry, government authorities and local Councils who formed the Working Group.

An initial question asked through this engagement was 'What are the water quality and catchment issues of significance for the community?'. The Working Group used the 'Issues Paper' (collated from past community consultation processes and plans) as a basis for addressing this question. The issues that were raised, and the opportunities for change they provided, were then grouped into four Key Outcome Areas (KOAs) by the Working Group (see opposite page).

During this time, a series of environmental studies were undertaken by Ecos Environmental Consulting as part of the research for and development of the plan.

In its last meeting, the Working Group created a Planning Web™ (see photo on left) by looking at the issues and results from the scientific studies and then exploring what the management responses should be. The Working Group has placed existing programs under the KOAs and has identified gaps where new programs are needed.

Key Studies

Over 1000 hours of scientific investigation have been undertaken by Ecos Environmental Consulting. This investigation has informed our decision-making regarding the direction of the plan. The studies have highlighted the threats we are facing both to catchment health and water quality and have pinpointed where those threats are greatest. That information has resulted in developing the management responses incorporated into the plan.

The key studies were:

- **Catchment Water Quality Risk Assessment** involving intensive data gathering, mapping and prioritising the issues and necessary action responses.
- **State of the Catchment Report** - an analysis of water quality and other environmental monitoring data.
- **Quantitative Modelling** - A computer model has been developed for the Wilsons River catchment that predicts the behaviour of a subset of key water quality parameters over time. By changing various attributes of the model, scientists were able to predict the effects on water quality of a range of future management scenarios for the catchment.
- **Review of the Scientific Literature** - this has shown lessons learnt from past actions.

Rous Water are developing a meta-database of scientific information collected in the development of the Plan. This database is intended to be a resource for use by our community.

Newsletter No. 3, page 2, June 2009

tMENT MANAGEMENT PLAN

Strategic Intent

OUR VISION:
The Wilsons River catchment is a productive living space with healthy ecosystems that achieve clean water

OUR GUIDING PRINCIPLES:

- We support and promote a culture of sustainability
- We work and learn together applying lessons learnt through an adaptive management approach
- We focus on mutually beneficial outcomes
- We adopt an intergenerational perspective taking small steps towards our shared long-term goals

KEY OUTCOME AREAS:
Environmental Management, Agronomic Land Management Practices, Management of Built Environments and Governance

PARTNERSHIPS:
The key intent of the plan is to strengthen partnerships between stakeholder groups to work together on key programs to implement the Plan (see below). For more detail on the key programs and their associated partnerships refer to the Draft CMP Section 5.3.

Key Outcome Area 1: **Environmental Management**
Aim: Protect and restore ecological systems and support land managers to improve river health and water quality

Key Programs:
The Riparian and In-stream Health Management Program including

- Riparian Restoration Projects
- Instream Health Projects

Key Outcome Area 2: **Agronomic Land Management Practices**
Aim: Efficient resource management to minimise transport of contaminants to waterways, maximise long-term farm viability and improve the natural environment.

Key Programs:

- Animal Production Best Management Practice (BMP) Program (including; grazing, dairy & piggeries)
- Horticulture Best Management Practice (BMP) Program (including; tree nuts, fruits and forestry)

Key Outcome Area 3: **Management of Built Environments**
Aim: Ecologically sustainable development that minimise transport of contaminants to waterways, and supports a healthy catchment and riverine ecosystem services.

Key Programs:

- Urban Land Management Program
- Road Management Program
- On-site Wastewater Management Guidelines
- Sewage Treatment Plant (STP) Management Plan

Key Outcome Area 4: **Governance**
Aim: Coordinated catchment and waterway management involving key stakeholders with effective resourcing of actions and regular review of management performance and catchment condition.

Key Programs:

- Inter-agency and Stakeholder Catchment Management Committee/Working Group
- Hazard Management Program
- Monitoring and Reporting Program

Newsletter No. 3, page 3, June 2009

Implementing The Plan

When it comes to caring for our water supply and the environment, everyone's actions are important. Everyone from individuals, small to large businesses have a role to play in maintaining healthy ecosystems that help achieve clean water.

Development of the Wilsons River CMP has been a collaborative effort involving passionate individuals, community interest groups, commerce and industry, government authorities and local councils.

The relationships formed prior to and through the creation of the draft plan are really valuable. They will be built on over time as we work together on programs to achieve our agreed aims and outcomes for a healthy catchment. Through the implementation of the plan a range of partnerships are being built upon.

For example, Rous Water is working together with local community members, Landcare groups and local councils on a series of environmental improvement projects throughout the Wilsons River catchment as part of the Reconnecting to Country project.

The focus of the Working Group is now shifting from developing the plan to the implementation phase. Once the draft plan is adopted, Rous Water and the Working Group will identify key priority actions to be implemented in the short term as part of a longer term approach.

A ten year implementation timeframe has been established to achieve long-term improvements in water quality and catchment health. Monitoring and evaluation arrangements shall be established with the Working Group so that the effectiveness of the plan's management responses can be assessed and regularly reviewed.

How To Review the Plan

The draft Plan is now available for you to review, and we encourage you to read it and make a submission to help make sure it is effective and achievable.

Hard Copy and Hand Written Submissions. Printed copies of these documents (and submission forms) are available at the Rous Water office, all branches of the Richmond-Tweed Regional Library, Lismore City Council, Ballina Shire Council and Byron Shire Council offices. To make a submission to the draft CMP fill in the submission form, mail it to 'Wilsons River CMP, Rous Water, PO Box 230 Lismore 2480' or alternatively you can drop it into the front desk at Rous Water.

Electronic Copy and Online Submission. Electronic copies are available to download from **www.wilsonsriver.wikispaces.com** You can provide your comments by downloading the electronic submission form and emailing it to water@rouswater.nsw.gov.au Alternatively, you can join Wikispaces, then participate in our online Discussion Forum.

The closing date for submissions is **17th July 2009**. Submissions will be collated and considered by Ecos Consulting and Rous Water. Changes to the draft plan based on submissions will be included in the final draft CMP which is planned to be presented to Rous Water for adoption in August 2009.

CONTACT US...

For more information about the project or how to access the plan.
please call Sustainable Futures Australia on (02) 6685 7198
or email wilsonsriver@sustainablefutures.com.au

PROJECT TIMELINE

13 Appendix – Examples of Community Consultation

This Appendix contains summaries and examples from the following aspects of the Community Consultation Program:

1. Enquiries, Collation of Issues and Feedback
2. Media Releases and Articles
3. Information Days

13.1. Enquiries, Collation of Issues and Feedback

Organisations Represented

The Community Register received enquiries from a total of 23 different groups or organisations. Not all people making enquires stated which group they represented so the scope of organisations and groups engaged in the process may be far greater than listed.

The following is a list of those groups and organisations:

Australian Wetlands, Byron Council (2), Camphor Laurel Research Centre, CMA Northern Rivers, Country Energy, Department of Natural Resources, Department of Primary Industries, Dunoon Community Group, Econcern, ENVITE NSW, independent "specialist scientist" (2), Landholder (3), Macleans Ridges Landcare (2), The Water Carbon Group, Pets n Saddles, Southern Cross University (6), Richmond River Action Carers, Whian Whian Landcare, Wilsons Creek Huonbrook Landcare Group, Wilsons Creek Public School, Wires and the WRCMP Working Group.

Individuals Represented

The Community Register received 93 enquires. These were between April 2008 and April 2009. Ten percent of enquires occurred just after the first advertisement went into the papers (April 2008); Twenty five percent of enquires happened around the time of the first *In The Flow* newsletter and the media coverage that happened around May, June and July 2008; Twenty five percent of enquires happened just after the information days held in September 2008. All other enquires occurred intermittently.

Some individuals made several enquiries. The following is a list of the 80 individuals that made enquires:

Shan Baunach, Paul and Robyn Berrington, Richard Billson, Peter Boyd, Lorraine Briggs, Andrew Brooks, Michael Broughton, Marion Brownlie, Daniel Clegg, Denise Coster, Jenny Dowell, Peter Currie, Colin Cusser, Kristin den Exter, Mark Donovan, Mark Farrell, Daryl Firth, Jo Friend, Marie Glover, Sam Gould, Alan Graham, Suzanne Grainer, Wayne Gregory, Andrew Hall, Stan Heywood, Cathy Hillard, Lisa Jobson, Dr Scott Johnston, Martin Kanton, Nathan Kesteven, Tanya Knowles, Steve Knowles, Anne Lane, Leonie Lane, Frankie Lee, Jessica Loe, Mark Lubbock, Manuela

Matheson, Jude Mason, Martin Mcanany, M McCasker, Sharon McGrigor, Geoff McLennan, Bill Moore, Nick Oliver, Perina Oliver, Monica Oreilly, Patrick Morrisey, Chris Osborne, Noel Parker, Tony Parkes, Nik Petroff, Frank Pirlo, David Pont, Tim Rabbidge, Amanda Reichelt Brushett, Jim Richardson, Thomas Rose, Judy Rumble, Daniel Sheridan, Joanne Smith, Robert Stavron. Emma Stone, Laurie Stubs, Geoff Sullivan, Richard Swinton, Jim Tait, Maree Thompson, Peter Toedter, Steve Toneguzzo, Paula Vaughan, Phil Warner, Garry Wergs, Gerry Wergs, Andrew Wilson, Linda Wirf, Julie Woods, Jim Yeo, Christie Young, Lincoln Lucinda.

Mode of Contact

There were four ways that people made contact for the Community Register.

- Direct phone = 26 %
- Email = 33 %
- Registration of Interest Forms = 34 %
- Signing the guest book at the Info Days = 7 %

Types of Enquires

There were several types of enquires received. These included enquires about the following:

- General interest about the CMP and asking to be kept updated through the e-list.
- Questions about the Working Group (WG) and wanting to be kept updated regarding the WG process
- Education – wanting to create water education within the community
- How to make applications to undertake funded works on private property once the plan is implemented
- How the needs of specific species are being met. These range from Eastern Freshwater Cod to Lizards.
- How management of invasive flora and fauna species are being incorporated into the plan. These range from Carp to Camphor Laurel
- How Landcare and its associated activities will be affected
- Types of activities in the catchment that will be restricted by the Plan
- How landowners will be affected by the Plan
- Requests for copies of specific aspects of the Plan for example: *The Risk Assessment Report* and *The Draft Catchment Management Plan*. These were then followed up with some feedback on those documents.
- Wanting to provide information to the consultants for example: *A Report on Macadamia Farm Erosion in the Richmond.*

Ways enquires were dealt with

Firstly those enquires that were general in nature such as signing up to be on the e-list or questions about the process of the WG were processed by Sustainable Futures Australia. Examples of this are as follows:

- A teacher at SCU called in (after hearing about the CMP) wanting information for creating a poster assignment for first year Fine Art students around the theme of 'Water'. E. Bragg liaised with her to develop materials and process for the students to focus on their relationship with water in the local catchments.
- A Lismore resident requested a waterproof camera so that she could take photos in her local area of oil slicks, dead stock in the river and bank encampments. She was provided with a camera and created a fabulous media story that was published in the Northern Star that raised awareness of pollution in our waterways.
- A man requested information regarding the WG and their meetings. He was put on the e-list to be kept updated and also invited to come to the next WG meeting and sit at the Community Chair.

Secondly, enquiries that were technical in nature, or people that wanted to provide technical information to the project were referred to the relevant body, be that Rous Water or Ecos Consulting. Examples of this are as follows:

- A man emailed wanting specific information regarding how the Eastern Freshwater Cod needs are being met. The email was forwarded to Ecos and Rous Water who followed it up in the appropriate way.
- A woman was concerned that the proposed Lismore City Council Clunes Sewerage Outfall is a contradiction to the CMP. Her enquiry was forwarded to Rous Water and the appropriate action was taken.

All relevant enquiries and offers of information were either passed directly to Ecos Environmental Consulting or they were provided with the Community Data Gathering Form or Community Feedback Form which they could fill out and send directly to Ecos. The response to Community Feedback elicited during the public consultation stage is contained in Appendix 14.

13.2. Media Releases and Articles

ALL WILSONS RIVER NOW A DRINKING WATER CATCHMENT

MEDIA RELEASE

for week Saturday 19/4/08 to Friday 25/4/08

Our drinking water is now sourced not only from the relatively pristine Rocky Creek Dam, but also from the Wilsons River, just upstream from Lismore at Howards Grass. Rous Water has developed this new water source for the region's water security.

This means that the whole of the Wilsons River catchment area becomes our drinking water catchment, stretching from Upper Wilsons Creek and Upper Coopers Creek in the north to Byron Creek in the east (near Bangalow) and Pearces Creek in the south (near Mcleans Ridges). All flow into Wilsons River and westwards towards Lismore.

The 'raw' water from the river is piped to the Nightcap Treatment Plant near Rocky Creek Dam, where it will be treated to a high level for our use. However, the quality of the water that goes into treatment influences the level of treatment that is required and the ultimate quality of our drinking water. *If you live, work or play anywhere in the Wilsons River catchment area, your actions could be directly affecting the quality of our drinking water supply.*

To this end, Rous Water has initiated a catchment planning process to improve the health of the catchment and its water quality before it even reaches the treatment plant. As Anthony Acret, Catchment Assets Manager of Rous Water, says: "The best way to ensure healthy water is to protect and enhance the natural ecosystems in the catchment area which produce clean water. Healthy catchments mean healthy water."

Rous Water have engaged environmental scientists, Ecos Environmental Consulting, to develop a Catchment Management Plan that builds on the considerable work that has been done in the region up to this date. It will be based on the most up to date information and scientific modeling, and linked with other management plans (like the new Richmond Estuary Management Plan). Local consultants, Sustainable Futures Australia, are facilitating the community engagement aspect of the catchment planning process. This consultation aims to find out from people in the catchment what they value about the catchment area, the main catchment management issues and get feedback on draft management options.

Ways for people to get involved through the plan making which has just started and continues through 2008, includes access to a webpage, newsletters and e-list, information days and a catchment planning working group. The first working group meeting was held last Tuesday the 15th of April at the Lismore Workers Club and participants included representatives from the Big Scrub Environment Centre, NSW Farmers , macadamia and pecan industries, Landcare groups, Rous Water and key NSW government agencies.

Sustainable Futures Australia are looking for more people in the local community who would like to get involved in caring for our new drinking water catchment. You can email them at wilsonsriver@sustainablefutures.com.au or call Kirstie Fisher on 66857194.

FOR FURTHER INFORMATION:

Contact Kirstie Fisher or Elizabeth Bragg at Sustainable Futures Australia 66857194 *(Note: three photos by Peter Cuming and Kirstie Fisher and captions were included with media release)*

YOUR CATCHMENT NEEDS YOUR

COLLECTIVE EFFORT

MEDIA RELEASE 25th August 2008

James Jackson's property at Federal borders the Wilsons River. He is a member of Jasper Landcare Group, and the overarching Richmond Landcare Inc., which is restoring the land bordering Wilsons River, our new source of drinking water.

James was invited by Rous Water to be part of the Wilsons River Catchment Management Plan Working Group, which has been established to make sure there is plenty of community input to management of activities in the catchment of the Wilsons River.

The Catchment Working Group "may well help Rous Water to identify issues that may not be visible to them. It fast tracks the identification of such issues, it fast tracks the public sensitivities and the mood toward a plan and allows interest groups, whether that's the canoe group, the dairy farmers association or the local councils to a forum to express the views that are important to them." says James

This is reinforced by Graham Correy from Norco, who is an industry representative on the Working Group, who said, "Each stakeholder has his or her own area of expertise, and being able to discuss that is important. The benefit to the catchment is that all the issues related to the catchment are being identified and being addressed as part of the plan. It's a much better way than if it was just being done internally by Rous Water. "

Graham also lives in the Wilsons River catchment on Coopers Creek, and is personally interested in its water quality. From his industry perspective, however, Graham says that "Norco has renewed its focus on the environment and are looking at what they can do to keep the water healthy."

James Jackson "encourages Rous Water to educate and assist landholders in the continuing repair, revegetation and regeneration of the catchment ….as it essentially all comes down to farming practices on private property."

You too can have your say about what you think is important to manage in the Wilsons River catchment, or take the opportunity to find out about what work has been done already towards a Catchment Management Plan.

More details about the Wilsons River Catchment Management Plan are available by emailing wilsonsriver@sustainablefutures.com.au or visiting www.rouswater.nsw.gov.au

Background Information:

Our drinking water is now sourced not only from the relatively pristine Rocky Creek Dam, but also from the Wilsons River, just upstream from Lismore at Howards Grass. This means that the whole of the area that drains into the Wilsons River is becoming our drinking water catchment.

This is a key reason why so many Landcare Groups in the area have become involved in this project. They can see that the revegetation projects that they carry out are directly helping to control the quality of the water that is entering the Wilsons River. If good quality water enters the river, then the financial and environmental costs of treating that water once it is pumped out for drinking purposes, will be less.

So not only is vegetation along water ways good for the environment, it also helps reduce the cost of treating water from those waterways, before it is pumped out to homes and industry.

Rous Water have engaged environmental scientists, Ecos Environmental Consulting, to develop a Catchment Management Plan that builds on the considerable work that has been done in the region up to this date. It will be based on the most up to date information and scientific modeling, and linked with other management plans, such as the Richmond Estuary Management Plan.

Local consultants, Sustainable Futures Australia, are facilitating the community engagement aspect of the catchment planning process. This consultation aims to find out from people in the catchment what they value about the catchment area, the main catchment management issues they see and to obtain their feedback on draft management options that are developed for the Wilsons River Catchment Management Plan.

Following on from the consultation for this plan, Sustainable Futures Australia will be working with interested members of the community in an additional 'Reconnecting to Country' project. This project will include working closely with representatives of the local Aboriginal community to develop educational material and job opportunities related to management and interpretation of 'country' and 'water' in a holistic cultural sense.

FOR FURTHER INFORMATION:

Contact Elizabeth Bragg or Shannon Baunach-Greenfields at Sustainable Futures Australia 66857194

Attached photos and proposed captions:

Members of the Wilsons River Catchment Working Group - Graham Correy (Strategic Development Manager of NORCO) and Anthony Acret (Catchment Assets Manager of Rous Water)- discuss water quality in the Wilsons River across the river from the Norco building.

MEDIA RELEASE

MEDIA RELEASE

MEDIA RELEASE

DRAFT CATCHMENT MANAGEMENT PLAN ON PUBLIC EXHIBITION

or CATCHMENT PLAN FOR WILSONS RIVER

MEDIA RELEASE

Monday 22 June 2009

The draft catchment management plan for the Wilsons River is now on public display for review and comment. This plan was funded by Rous Water as a part of their development of the Wilsons River Source (this region's new source of 'raw' drinking water). As Anthony Acret, Catchments Assets Manager of Rous Water explains, "The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality and environmental health improvements."

Although the plan was initiated by Rous Water, the process of its development involved independent scientific investigation and community consultation, and has built upon the considerable amount of work previously done in the region. As Anthony says, "The plan is the collective vision of a wide range of stakeholder groups, who have developed it together and are committed to implementing the plan. A Catchment Working Group was formed specifically for this project, and members include government agencies, Landcare, farmers, industry, environmental and other community groups. They have been actively involved over the past year in a facilitated process that integrated technical information and strategic planning."

Ecos Environmental Consulting was engaged to undertake detailed studies which form the basis of the plan. Nick O'Connor, principal consultant from Ecos, says "Over one thousand hours of scientific investigation have been undertaken, including a review of existing research; identifying risks to water quality in the catchment; analysing water quality and other environmental data; and running computer modeling of potential contaminants in the catchment. These studies have highlighted the threats we are facing both to catchment health and to water quality and have

pinpointed where those threats are the greatest. That information has been used to help develop the management responses incorporated into the draft plan."

The draft plan, and all background scientific studies, can also be accessed and downloaded from www.wilsonsriver.wikispaces.com along with an electronic submission form.

Printed copies of the draft Wilsons River Catchment Management Plan will also be available for viewing at the Rous Water offices in Lismore, at branches of the Richmond-Tweed Regional Library within Lismore City, Ballina Shire and Byron Shire, and at the head offices of Lismore City Council, Ballina Shire Council and Byron Shire Council. Rous Water welcomes community comments and feedback on the plan, and so printed submission forms are also available at these locations that need to be returned to Rous Water by Friday 17 July 2009.

For more information about how to access the plan and prepare a submission, please email wilsonsriver@sustainablefutures.com.au or call Emily at Sustainable Futures Australia on 66857198. To learn more about the project, visit www.rouswater.nsw.gov.au

Background Information:

Our drinking water is now sourced not only from the relatively pristine Rocky Creek Dam, but also from the Wilsons River, just upstream from Lismore at Howards Grass. This means that the whole of the area that drains into the Wilsons River is becoming our drinking water catchment.

This is a key reason why so many Landcare Groups in the area have become involved in this project. They can see that the revegetation projects that they carry out are directly helping to control the quality of the water that is entering the Wilsons River. If good quality water enters the river, then the financial and environmental costs of treating that water, once it is pumped out for drinking purposes, will be less.

So not only is vegetation along water ways good for the environment, it also helps reduce the cost of treating water from those waterways, before it is pumped out to homes and industry.

Rous Water has engaged environmental scientists, Ecos Environmental Consulting, to develop a Catchment Management Plan that builds on the considerable work that has been done in the region up to this date. The plan is based on the most up to date information and scientific modeling, and linked with other management plans, such as the Richmond Estuary Management Plan.

Local consultants, Sustainable Futures Australia, are facilitating the community engagement aspect of the catchment planning process. This consultation aims to find out from people in the catchment what they value about the catchment area, the main catchment management issues they see and to obtain their feedback on draft management options that are developed for the Wilsons River Catchment Management Plan.

Following on from the consultation for this plan, Sustainable Futures Australia is now working with interested members of the community in an additional 'Reconnecting to

Country' project. This project includes working closely with representatives of the local Aboriginal community developing educational material and job opportunities related to management and interpretation of 'country' and 'water' in a holistic cultural sense.

FOR FURTHER INFORMATION:

Contact Anthony Acret or Wayne Franklin at Rous Water on 66218055

Attached photos and proposed captions:

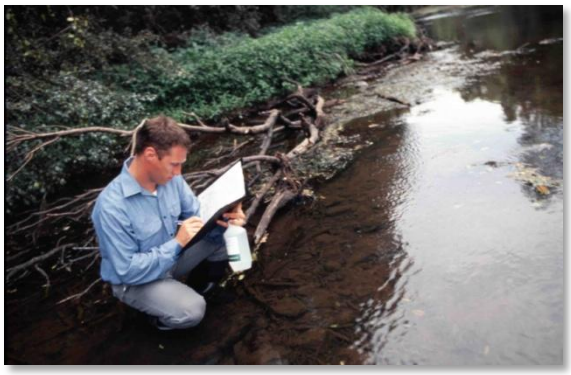


Photo 1: Water testing by Rous Water in the Wilsons River catchment.

Photo 2: Members of the Wilsons River Catchment Working Group engaged in strategic planning process facilitated by Sustainable Futures Australia

Alternative Photo 2.

Photo 3: Anthony Acret, Catchment Assets Manager from Rous Water in the Wilsons River catchment area.

Articles

10 May 6, 2008 *Byron Shire Echo*

Comment

Echo

Vol 22 #47 *May 6, 2008*

Protecting water supply

Regional water authority Rous Water (www.rouswater.nsw.gov.au) is currently seeking public input to its Wilsons River Catchment Plan. You can see the catchment map on its website and also find out how to make a submission.

The Plan follows on from its 'creation' of the Wilsons River Source – previously known as the Lismore Source until someone probably pointed out the catchment involved people beyond Lismore. This Source involves 'pumping water from the tidal pool on the Wilsons River at a site adjacent to Howards Grass and pumping to Nightcap Water Treatment Plant for subsequent supply to consumers through the existing water distribution infrastructure'. It's not exactly a low energy means of supplying water but it gives you some idea of how demand has increased if such measures are necessary. In any case, Rous Water's concern is how those who live in the river's catchment might affect the quality of the water. It is an important concern, and it is up to industry and individuals to be aware of what they put into any drain, stream or river.

Since the drought of 2003 we've been pretty lucky with our water supply – as of May 2, the Rocky Creek Dam level was at 100%. And thankfully the previous Australian government's harebrained scheme to pipe local water to south-east Queensland to support the construction of more McMansions has disappeared from the federal agenda.

However there is no reason to be complacent and many residents have realised this, investing in rainwater tanks and water saving devices. The abuse of a water source can result in disaster, as illustrated by *Catalyst*'s report last week on the Murray/Darling – it seems that only when the drinking water supply of a city the size of Adelaide is in danger will governments stumble slowly into action.

Byron Shire Council is represented on the board of Rous County Council, the body allegedly in control of Rous Water, by Crs Ross Tucker and Richard Staples. We are sure they would be happy to give you more information about local water supply.

Media Article #3 6th Mav 2008

www.echo.net.au

Rous Water consults on water quality of catchment

Local water authority Rous Water has initiated a catchment planning process to improve the health of the catchment and its water quality before it reaches the treatment plant.

According to Anthony Acret, Catchment Assets Manager of Rous Water, 'The best way to ensure healthy water is to protect and enhance the natural ecosystems in the catchment area which produce clean water.'

Local drinking water is now sourced not only from Rocky Creek Dam but also from the Wilsons River, just upstream from Lismore at Howards Grass. This means that the whole of the Wilsons River catchment area becomes our drinking water catchment, stretching from Upper Wilsons Creek and Upper Coopers Creek in the north to Byron Creek in the east (near Bangalow) and Pearces Creek in the south (near Mcleans Ridge). All flow into Wilsons River and westwards towards Lismore.

The 'raw' water from the river is piped to the Nightcap Treatment Plant near Rocky Creek Dam, where it will be treated to a high level for use.

Rous Water has engaged environmental scientists Ecos Environmental Consulting to develop a Catchment Management Plan. It will be linked with other management plans (like the new Richmond Estuary Management Plan).

Local consultants Sustainable Futures Australia are facilitating community consultation – this aims to find out from people in the catchment what they value about the catchment area, the main catchment management issues and get feedback on draft management options.

Ways for people to get involved in the plan making, which continues through 2008, include access to a webpage, newsletters and e-list, information days and a catchment planning working group.

Sustainable Futures Australia is looking for more people in the local community who would like to get involved in caring for the new drinking water catchment.

You can email wilsonsriver@sustainablefutures.com.au or call Kirstie Fisher on 6685 7194.

■ Comment, page 10

Media Article #4 6th May 2008

www.echo.net.au Byron Shire Echo, Aug 19 08

Local News

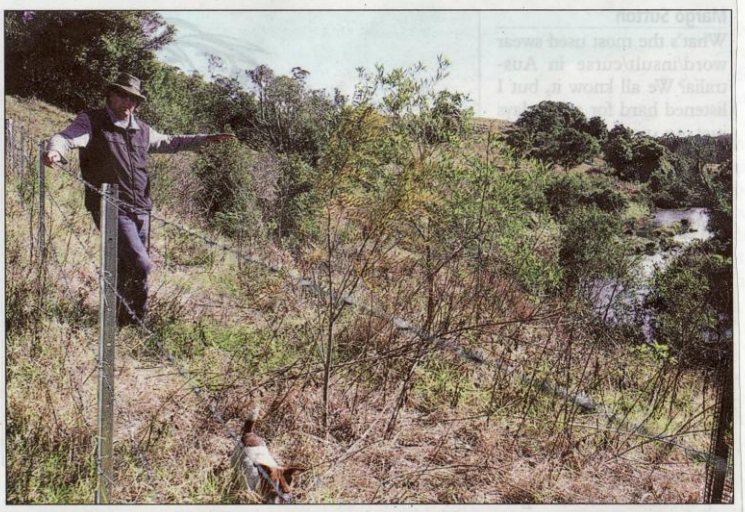
Your catchment needs your help

James Jackson's property at Federal borders the Wilsons River. He is a member of Jasper Landcare Group, and the overarching Richmond Landcare Inc, which is restoring the land bordering Wilsons River, our new source of drinking water.

James was invited by Rous Water to be part of the Wilsons River Catchment Management Plan Working Group, which has been established to make sure there is plenty of community input to management of activities in the catchment of the Wilsons River.

The Catchment Working Group 'may well help Rous Water to identify issues that may not be visible to them,' says James. 'It fast tracks the identification of such issues, it fast tracks the public sensitivities and the mood toward a plan and allows interest groups, whether that's the canoe group, the dairy farmers association or the local councils to a forum to express the views that are important to them.'

This is reinforced by Graham Correy from Norco, who is an industry representative on the Working Group, who said, 'Each stakeholder has his or her own area of expertise, and being able to discuss that is important.



James Jackson (and LuLu) stand behind the cattle fence that protects the new plants along the riparian zone on his Federal property.

The benefit to the catchment is that all the issues related to the catchment are being identified and being addressed as part of the plan. It's a much better way than if it was just being done internally by Rous Water.'

Graham also lives in the Wilsons River catchment on Coopers Creek, and is personally interested in its water quality. From his industry perspective, however, Graham says that 'Norco has renewed its focus on the environment and are looking at what they can do to keep the water healthy.'

You too can have your say about what you think is important to manage in the Wilsons River catchment, or take the opportunity to find out about what work has been done already towards a Catchment Management Plan. A series of four information days are planned for early September.

These will be held in Lismore, Corndale, Bangalow and at the Big Scrub Rainforest Day. In Lismore go to Riverside Park next to the bridge on Saturday 6 September 6, 9am-noon; Corndale Hall on Sunday September 7, 9am-noon; the EnviroDad tent at the Fatherhood Festival in Bangalow on Sunday September 7, 1pm-4pm; or to Big Scrub Rainforest Day at Rocky Creek Dam on Sunday September 14, 10am-1pm. More details about the info days are available by emailing wilsonsriver@sustainablefutures.com.au or visiting www.rouswater.nsw.gov.au.

Media Article #5 19th August 2008

CATCHMENT BUSINESS: Working group members Graham Correy (strategic development manager of NORCO) and Anthony Acret (catchment assets manager at Rous Water) discuss water quality in the Wilsons River.

Care for the catchment

Information sessions on how to protect Wilsons River

JAMES JACKSON's property at Federal runs along the Wilsons River.

He is a member of Jasper Landcare Group, and the overarching Richmond Landcare Inc, which is restoring the land bordering the river.

Mr Jackson was invited by Rous Water to be part of the Wilsons River Catchment Management Plan Working Group.

The group was set up to make sure there was plenty of community input on the way activities in the catchment of the Wilsons River are managed.

"The catchment working group may well help Rous Water to identify issues that may not be visible to them," Mr Jackson said.

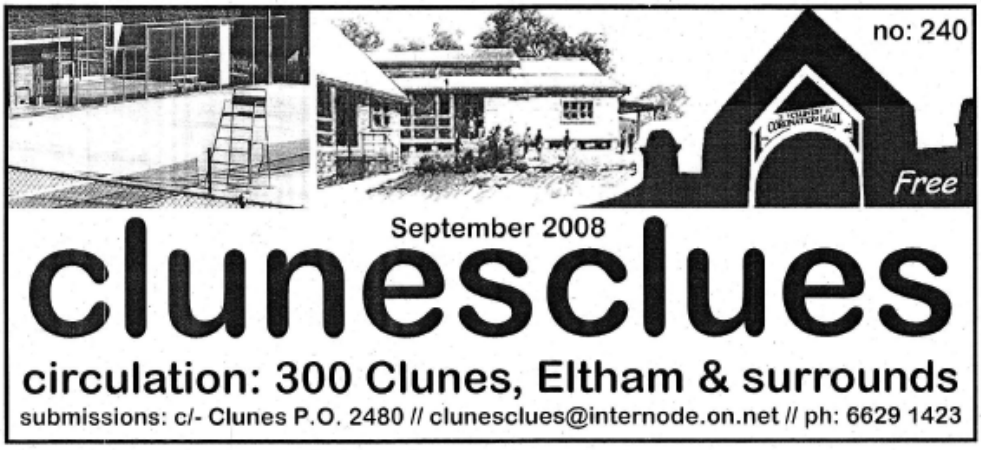
"It fast-tracks the identification of such issues, it fast-tracks the public sensitivities and the mood towards a plan, and allows interest groups – whether that's the canoe group, the dairy farmers' association or the local councils – to express the views that are important to them."

You too can have your say about what you think is important to manage in the catchment.

Information days are being held next month in Lismore, Corndale, Bangalow and at the Big Scrub Rainforest Day.

Details of times and locations of the information days are available by emailing wilsonsriver@sustainablefutures.com.au or visiting www.rouswater.nsw.gov.au.

Media Article #7 23rd August 2008



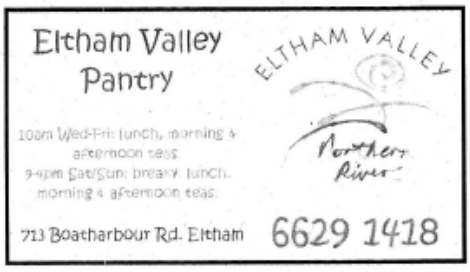
YOUR CATCHMENT NEEDS YOUR COLLECTIVE EFFORT

Our drinking water is now sourced not only from the relatively pristine Rocky Creek Dam, but also from the Wilsons River, just upstream from Lismore at Howards Grass. This means that the whole of the area that drains into the Wilsons River is becoming our drinking water catchment.

So not only is vegetation along water ways good for the environment, it also helps reduce the cost of treating water from those waterways, before it is pumped out to homes and industry.

You can have your say about what you think is important to manage in the Wilsons River catchment, or take the opportunity to find out about what work has been done already towards a Catchment Management Plan. A series of four information days are planned for early September.

These will be held in Lismore, Corndale, Bangalow and at the Big Scrub Rainforest Day. In Lismore go to Riverside Park next to the bridge on Saturday 6 September from 9am - 12 noon; Corndale Hall on Sunday 7 September from 9am - 12 noon; the EnviroDad tent at the Fatherhood Festival in Bangalow on Sunday 7 September from 1 - 4pm; or to Big Scrub Rainforest Day at Rocky Creek Dam on Sunday 14 September from 10 - 1pm. More details about the info days is available by emailing wilsonsriver@sustainablefutures.com.au or visiting www.rouswater.nsw.gov.au.



Media Article #8 September 2008

LOCAL NEWS

Lismore promotes the delights of Wilsons River, but the reality is vastly different from the hype

We're drinking it

By PETER WEEKES
peterweekes@northernstar.com.au

AUSTRALIA's long distance kayaking champion Marion Brownlie has perfected her stroke on the Wilsons River over the last 10 years. Now the Lismore woman has a new passion – to see the once scenic river cleaned up.

After talking with Sustainable Futures about the poor state of the Wilsons, which runs through the heart of Lismore and is used in promotions to attract tourists, Ms Brownlie was given a camera to document what she found.

"It was shocking," she said. "Within a couple of kilometres of the CBD I photographed a bloated dead cow floating in the river. I also came across what I think were cow lungs, oil slicks and all types of rubbish.

"When there is heavy rain, the stormwater overflows into the sewerage system and it all just pours into the river."

Yet what concerns Ms Brownlie most, and many other water experts, is that water from the Wilsons River now forms part of the drinking water supplied by Rous Water.

Water from the Wilsons was added to Rous Water's catchment area last year to supplement Rocky Creek Dam as the region's population outgrew the dam's capacity.

HOW IMPORTANT IS A HEALTHY RIVER?
Phone 6624 3266 or SMS 0428 264 948

DRINKING WATER: What appears to be a cow's lung floating near the Lismore CBD in the Wilsons River.
Pictures of Wilson River: MARION BROWNLIE

Water from the Wilsons is extracted from tidal pools near Howard Grass, downstream from where Ms Brownlie photographed the rotting cow, decaying lung and oil slick.

"To see these pictures is certainly a concern," said Rous Water's Catchment Assets Manager Anthony Acret.

"Water quality in the tidal pool is a reflection of water quality upstream."

He said while there was no immediate public health threat due to pollution in the river – all water was treated before being sent to households – it meant more money was needed to purify the water before it reached household taps.

As a futher precaution Rous Water stopped pumping from the Wilsons whenever there was heavy rainfall.

Professor Bradley Eyre of Southern Cross University Biogeo chemistry facility measured the water quality of rivers on the Northern Rivers back in 1994 and found the system was degraded due to the combination of agricultural and urban uses.

He said while it was fairly simple to bring the river system back to health, it came at a financial cost.

"What happens in the catchment areas is critically important," he said.

"People know what to do to bring the system back to health, but funding it may be difficult."

A recent study by Lismore City Council found while faecal, nitrogen, phosphorus and turbidity levels in most local rivers were within recommended levels, some waterways were not.

Goolmangar Creek, near Stoney Chute Road, close to Nimbin and Numulgi Creek at Bexhill surpassed the recommended levels for faecal content.

Lismore Council's manager of Environmental and Building Services Tony Kohlenberg said the council was working with businesses and residents to reduce pollution in the area's rivers.

He urged anyone who saw rubbish in any of the area's waterways to ring the council.

■ EDITORIAL, PAGE 12

Media Article #9 July 2009

The Northern Rivers Echo July 2, 2009

Wilsons River catchment on display

Rous Water have got their draft catchment management plan for the Wilsons River on public display for review and comment.

According to Rous catchment assets manager Anthony Acret, "The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality and environmental health improvements."

Since Rous started pumping water from the Wilsons River at Howards Grass in 2008, the whole area that drains into the river is part of our drinking water catchment.

Since then over 30 groups have been involved in projects to help control the quality of the water that enters the river. Rous engaged Ecos Environmental Consulting, which undertook more than 1000 hours of scientific investigation of the catchment including identifying risks to water quality in the catchment, which was used to develop responses in the draft plan.

The draft plan of management and all the background studies can be downloaded from *www.wilsonsriver.wikispaces.com* or printed copies are available at the Rous water office, 218-232 Molesworth St, Lismore, at branches of the Richmond -Tweed Regional Library and at Lismore, Ballina and Byron council offices.

Submissions should be returned to Rous Water by July 17.

July 2, 2009 The Northern Rivers Echo **Page 17**

Media Article #10 July 2009

www.northernstar.com.au

Our say

STAR VIEW

SUE SHORT
EDITOR
opinions@northernstar.com.au

Water – even more precious than gold

WATER is our most precious resource; more important than gold or uranium.

Without it we cannot survive.

We are blessed in Northern NSW with many rivers and high rainfall that keep our region green and luscious most of the time, but it is not a bounty we should ever take for granted.

Keeping our water supply and our river systems as pristine as possible should be a high priority for every one of us.

Naturally, the region's advances, including population growth, urban development and greater agricultural use and light industry, while offering economic growth, can also come at a high cost to the environment.

But it is equally essential to keep in mind that the region's pristine environment is also what brings people to the region, either for tourism or a change of lifestyle. If people decided to stop coming here we would find our economy dwindling rapidly.

Without the population to support them, local business, industry and development would surely die.

So it is the responsibility of not only our councils, but the region's communities, to keep a watchful eye on how we treat and support our local environment.

Recent evidence of the poor state of some of our rivers shows why we need to be vigilant.

And the fact that the Wilsons River is now part of our supplied drinking water is a huge reminder of why we need to keep our rivers and environment as clean as possible.

For if we ruin our water sources we will be creating a barren legacy for our children in the future.

Media Article #11 June 2009

CATCHMENT PLAN FOR WILSON RIVER

The draft catchment management plan for the Wilsons River is now on public display for review and comment. This plan was funded by Rous Water as a part of their development of the Wilsons River Source (this region's new source of 'raw' drinking water). As Anthony Acret, Catchments Assets Manager of Rous Water explains, "The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality and environmental health improvements."

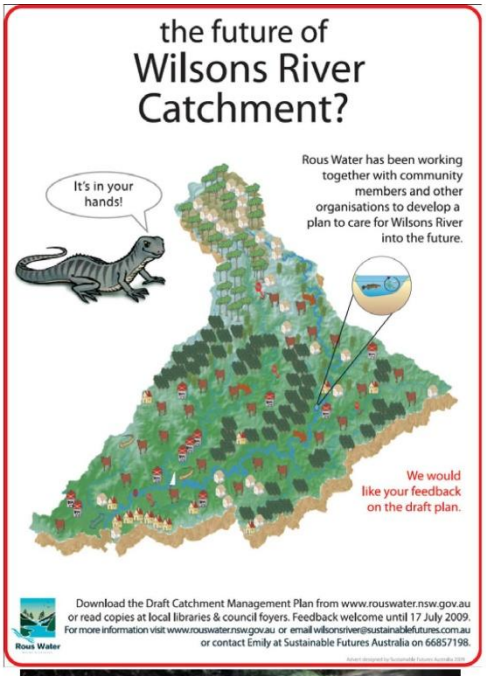
Although the plan was initiated by Rous Water, the process of its development involved independent scientific investigation and community consultation, and has built upon the considerable amount of work previously done in the region. As Anthony says, 'The plan is the collective vision of a wide range of stakeholder groups, who have developed it together and are committed to implementing the plan. A Catchment Working Group was formed specifically for this project and members include government agencies, Landcare, farmers, industry, environmental and other community groups. They have been actively involved over the past year in a facilitated process that integrated technical information and strategic planning'.

Ecos Environmental Consulting was engaged to undertake detailed studies which form the basis of the plan. Nick O'Connor, principal consultant from Ecos, says 'Over one thousand hours of scientific investigation have been undertaken, including a review of existing research; identifying risks to water quality in the catchment; analysing water quality and other environmental data; and running computer modeling of potential contaminants in the catchment. These studies have highlighted the threats we are facing both to catchment health and to water quality and have pinpointed where those threats are the greatest. That information has been used to help develop the management responses incorporated into the draft plan.'

The draft plan and all background scientific studies, can also be accessed and downloaded from www.wilsonsriver.wikispaces.com along with an electronic submission form.

Printed copies of the draft Wilsons River Catchment Management Plan will also be available for viewing at the Rous Water offices in Lismore, at branches of the Richmond-Tweed Regional Library within Lismore City, Ballina Shire and Byron Shire and at the head offices of Lismore City Council, Ballina Shire Council and Byron Shire Council. Rous Water welcomes community comments and feedback on the plan and so printed submission forms are also available at these locations that need to be returned to Rous Water by Friday 17 July 2009.

For more information about how to access the plan and prepare a submission, please email wilsons-river@sustainablefutures.com.au or call Emily at Sustainable Futures Australia on 6685 7198. To learn more about the project, visit www.rouswater.nsw.gov.au.



Media Article #12 June 2009

YOUR INPUT WANTED FOR WILSONS RIVER CATCHMENT MANAGEMENT PLAN

The draft catchment management plan for the Wilsons River is now on public display for review and comment. This plan was funded by Rous Water as a part of their development of the Wilsons River Source (this region's new source of 'raw' drinking water). As Anthony Acret, Catchments Assets Manager of Rous Water explains, "The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality and environmental health improvements."

"A Catchment Working Group was formed specifically for this project, and members include government agencies, Landcare, farmers, industry, environmental and other community groups. They have been actively involved over the past year in a facilitated process that integrated technical information and strategic planning."

Ecos Environmental Consulting was engaged to undertake detailed studies which form the basis of the plan. These studies have highlighted the threats we are facing both to catchment health and to water quality and have pinpointed where those threats are the greatest. That information has been used to help develop the management responses incorporated into the draft plan.

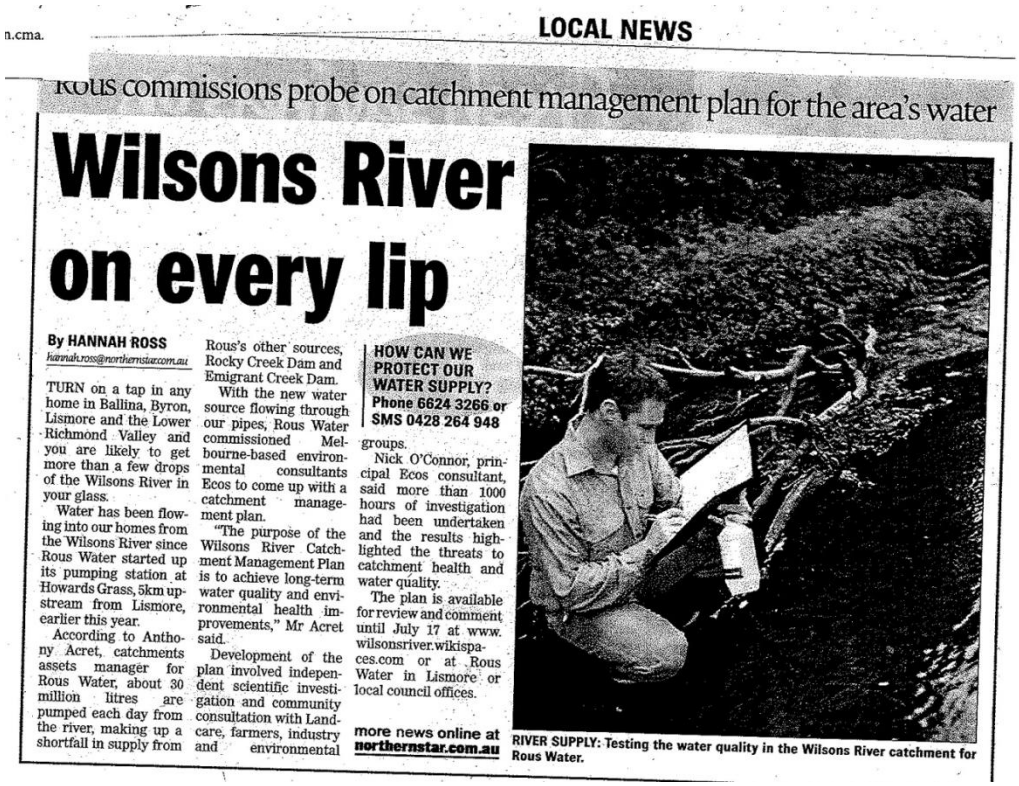
The draft plan, and all background scientific studies, can also be accessed and downloaded from www.wilsonsriver.wikispaces.com along with an electronic submission form.

SALON 29

Printed copies of the draft Wilsons River Catchment Management Plan will also be available for viewing at the Rous Water offices in Lismore, at branches of the Richmond-Tweed Regional Library within Lismore City, Ballina Shire and Byron Shire, and at the head offices of Lismore City Council, Ballina Shire Council and Byron Shire Council. Rous Water welcomes community comments and feedback on the plan, and printed submission forms are available at these locations and need to be returned to Rous Water by Friday 17 July 2009.

For more information about how to access the plan and prepare a submission, please email wilsonsriver@sustainablefutures.com.au or call Emily at Sustainable Futures Australia on 66857198. To learn more about the project, visit www.rouswater.nsw.gov.au

Media Article #12 June 2009



n.cma.

LOCAL NEWS

Rous commissions probe on catchment management plan for the area's water

Wilsons River on every lip

By HANNAH ROSS
hannah.ross@northernstar.com.au

TURN on a tap in any home in Ballina, Byron, Lismore and the Lower Richmond Valley and you are likely to get more than a few drops of the Wilsons River in your glass.

Water has been flowing into our homes from the Wilsons River since Rous Water started up its pumping station at Howards Grass, 5km upstream from Lismore, earlier this year.

According to Anthony Acret, catchments assets manager for Rous Water, about 30 million litres are pumped each day from the river, making up a shortfall in supply from Rous's other sources, Rocky Creek Dam and Emigrant Creek Dam.

With the new water source flowing through our pipes, Rous Water commissioned Melbourne-based environmental consultants Ecos to come up with a catchment management plan.

"The purpose of the Wilsons River Catchment Management Plan is to achieve long-term water quality and environmental health improvements," Mr Acret said.

Development of the plan involved independent scientific investigation and community consultation with Landcare, farmers, industry and environmental groups.

Nick O'Connor, principal Ecos consultant, said more than 1000 hours of investigation had been undertaken and the results highlighted the threats to catchment health and water quality.

The plan is available for review and comment until July 17 at www.wilsonsriver.wikispaces.com or at Rous Water in Lismore or local council offices.

HOW CAN WE PROTECT OUR WATER SUPPLY?
Phone 6624 3266 or SMS 0428 264 948

more news online at northernstar.com.au

RIVER SUPPLY: Testing the water quality in the Wilsons River catchment for Rous Water.

Media Article #13 June 2009

JUNE 25, 2009 Byron Shire News | NEWS

Catchment plan on exhibition

The draft catchment management plan for the Wilsons River is now on public display for review and comment.

This plan was funded by Rous Water as a part of its development of the Wilsons River Source – this region's new source of 'raw' drinking water.

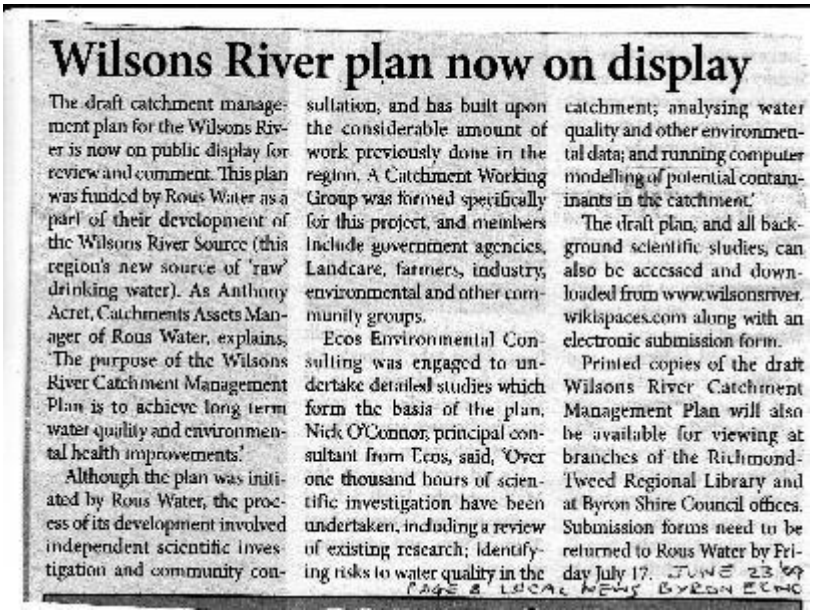
Although the plan was initiated by Rous Water, the process of its development involved independent scientific investigation and community consultation, and has built upon the considerable amount of work previously done in the region.

The draft plan, and all background scientific studies, can also be accessed and downloaded from www.wilsonsriver.wikispaces.com along with an electronic submission form.

Rous Water welcomes community comments and feedback on the plan, and printed submission forms are also available that need to be returned to Rous Water by Friday July 17.

For more information about how to access the plan and prepare a submission, you can send an email to wilsonsriver@sustainablefutures.com.au

Media Article #14 June 2009



Wilsons River plan now on display

The draft catchment management plan for the Wilsons River is now on public display for review and comment. This plan was funded by Rous Water as a part of their development of the Wilsons River Source (this region's new source of 'raw' drinking water). As Anthony Acret, Catchments Assets Manager of Rous Water, explains, 'The purpose of the Wilsons River Catchment Management Plan is to achieve long term water quality and environmental health improvements.'

Although the plan was initiated by Rous Water, the process of its development involved independent scientific investigation and community consultation, and has built upon the considerable amount of work previously done in the region. A Catchment Working Group was formed specifically for this project, and members include government agencies, Landcare, farmers, industry, environmental and other community groups.

Ecos Environmental Consulting was engaged to undertake detailed studies which form the basis of the plan. Nick O'Connor, principal consultant from Ecos, said, 'Over one thousand hours of scientific investigation have been undertaken, including a review of existing research; identifying risks to water quality in the catchment; analysing water quality and other environmental data; and running computer modelling of potential contaminants in the catchment.'

The draft plan, and all background scientific studies, can also be accessed and downloaded from www.wilsonsriver.wikispaces.com along with an electronic submission form.

Printed copies of the draft Wilsons River Catchment Management Plan will also be available for viewing at branches of the Richmond-Tweed Regional Library and at Byron Shire Council offices. Submission forms need to be returned to Rous Water by Friday July 17. JUNE 23 '09

PAGE 8 LOCAL NEWS BYRON ECHO

Media Article #15 June 2009

13.3. Information Days

Report on September 2008 Information Days

We are pleased to report on the success for The Wilsons River Catchment Management Plan Information Days held in early September 2008. Thankyou to all the sub-catchment representatives from the Working Group and other local residents who helped make the days engaging and informative for the wider community.

The Draft Catchment Water Quality Risk Assessment was on display and members of the community engaged well with the material. Fiona McKenzie-Smith (Ecos Environmental Consulting) was at the Information Days to clarify aspects of the report and take feedback. Anthony Acret and Rodney Holland (Rous Water) were also there and engaged with the community on issues relating to the Catchment Management Plan.

Shannon Baunach-Greenfields and Emily Coleing (Sustainable Futures Australia) were also present facilitating community input on the Wilsons CMP material and recruiting interest in Reconnecting To Country.

The community got their hands dirty with some Reconnecting To Country banner painting of the creek and river systems, facilitated by Barbara Jensen (Rous Water). In addition Barb kept the children busy with a giant catchment puzzle and other activities relating to water health in the catchment.

More than twenty residents, farmers and landcare members attended the **Corndale Hall** Info Day. Fiona and Rodney answered questions one on one and then in a group question time. In addition, Maree Thomson and Sharon McGrigor (the Lower Coopers Creek and Upper Coopers Creek Sub-Catchment representatives) were there engaging the community. Maree created an Envite display alongside Julie Woods who

displayed some of Rosebank Landcare activities. Emma Stone was there to talk to the community about Whian Whian Landcare activities.

Figure 1: Corndale Info Day at Corndale Hall.

Figure 2: Fiona Mackenzie-Smith of Ecos Environmental Consulting showing community member draft material.

At the Fatherhood Festival in **Bangalow**, Barbara Stewart and Tony Parkes (the Upper Wilsons Creek and Middle Wilsons Creek Sub-Catchment representatives) were engaging with the public, along with Sue Riley, who displayed the activities of the Wilsons Creek Huonbrook Landcare. The information day was a success because we had some quality interactions over the CMP with the community.

Vanessa Ekins and Kristin den Exter (the Wilsons River Tidal Pool and Lower Wilsons Creek Sub-Catchment representatives) were at the Heritage Park Info Day in **Lismore** with landcare displays. We only had a small group from the community attend this info day, however a lengthy and lively discussion was had between Fiona and one community member.

The Big Scrub Rainforest Information Day was great! There was a steady stream of people interested in the Catchment Management Plan and there was lots of engagement with the Draft Management Options. We received feedback on aspects relating to the CMP and that has been forwarded to Ecos Environmental Consulting.

Overall, the Information Days were a success; Information was provided and people had an opportunity to ask questions and provide feedback. Additionally, we had about 13 people register their interest in the Wilsons River Catchment Management Plan and 18 people registered their interest in Reconnecting to Country.

Figure 3. Bangalow Info Day @ Fatherhood Festival. Community members admiring subcatchment banner that they helped paint

Figure 4. Whole Catchment Info Day @ Big Scrub Rainforest Day. Rodney Holland of Rous Water liaises with community member.

14 Appendix – Responses to submissions received on the draft Catchment Management Plan

Eight submissions were received during the public exhibition phase. The comments from each submission, the response from Rous Water and the nature of any follow up actions are recorded in the table below.

Sub-mission	Name	Affiliation	Comments	Rous Water response	Actions
	Stanley Wilson Snr	None stated	Four comments: 1. Dredge tidal water 2. Retarding basin to reduce flooding (runoff) 3. Plant willows to improve water quality 4. Terraced ploughing of hillside & planting of suitable trees, native preferred	1. Unfortunately it is not clear what is meant by this comment. For the Wilsons River catchment area that is the subject of this plan, no issues have been identified that would benefit from dredging activity. The need for dredging of the tidal pool, which forms part of the Richmond River estuary, is a matter for consideration through the planning process established for the Richmond River Estuary Management Plan. 2. The management of floodwaters is the responsibility of the local council and is beyond the scope of this plan. The establishment of basins and similar types of detention/infiltration areas can however have water quality benefits as well as providing flood mitigation, and these types of water sensitive urban design measures are provided for through the plan as part of the Urban Land Management Program. 3. Riparian zone restoration is an important management action identified with the Environmental Management KOA. Any replanting work will follow regional re-vegetation guidelines. These are unlikely to specify the use of willows. 4. Improvement in horticulture practices to reduce erosion has been identified as an important management action in the CMP under the Horticulture Best Management Practice (BMP) Program.	*Refer comments on retarding basins to committee for Urban Land Management Program under KOA 3: Management of built environments*

Sub-mission	Name	Affiliation	Comments	Rous Water response	Actions
2	Andrew Hall	None stated	Four comments: 1. On reading this submission I was dismayed to realise that you are mixing treated water from the polluted Wilson's River with the pure water of Rocky Creek Dam. The Dam is 100% full. Why degrade the water quality? As I understand it, treatment does not get rid of hormones and other chemicals. Have users been warned? 2. Using Wilsons River water before the catchment has been cleaned up is akin to putting the horse before..... 3. I see Rous Water wants input on LEPs and DCPs. Not content with interfering with water quality, it wants to interfere with Council process. 4. I see no indication of the mechanisms of this process, or where the money is to come from.	1. Operation of the Wilsons River Source does not involve the transfer of any water from the Wilsons River to Rocky Creek Dam, and so there will be no degradation of water quality within the dam. While not pristine, the Wilsons River is arguably not polluted. Rous Water is permitted to commence operation of the Wilsons River Source when the level in Rocky Creek Dam falls to below 95% capacity. Nightcap Water Treatment Plant includes an ozonation process which breaks down organic material including micro-pollutants like hormones into more biodegradable compounds which are then removed by biologically activated carbon filters a description of this water treatment process is on the Rous Water website. Development of the Wilsons River source involved extensive public consultation and awareness raising. All water supplied shall be consistent with the Australian Drinking Water Guidelines. 2. This is a statement of opinion. While the Wilsons River CMP seeks to protect and improve water quality from the Wilsons River Catchment, cost-effective water treatment technologies are available for make use of the current quality of water. 3. Rous Water is a local government authority operating under the NSW Local Government Act 1993 and seeks to supply safe potable quality water to the regional population. Since inappropriate development proposals can pose a threat to catchment water quality, it is appropriate for Rous Water to oppose or seek improvements to such development. Rous Water is working with the constituent Councils to ensure that issues of significance to the regional drinking water supply are considered through the development planning and assessment process. 4. Under the Governance KOA the first program is the Inter-agency and Stakeholder Catchment Management Committee/Working Group. The first action item for this group is its establishment - a task which will be undertaken by Rous Water. The Governance KOA will be reworded to make this clearer. Funding of these initiatives will be dependent upon allocations made through the Rous Water Management Plan and Budget and the effectiveness of the CWG in securing funds from State and Federal Government programs.	*No further action required.*

Sub-mission	Name	Affiliation	Comments	Rous Water response	Actions
3	Joe A Friend	None stated	Brief submission requesting citing of report by Wood and Rochford (2007) and requesting further information on monitoring of Volatile Organic Compounds (VOCs). Report details: *Wood, J and Rochford, L. (2007). Background for the Investigation of Water Quality and Ecosystem Health of the Wilson River, Lismore. Report prepared for the Living River Richmond Group by the Environmental Defenders Office, 9 February 2007.*	A copy of the Wood and Rochford report was requested from Environmental Defenders Office (EDO) and the EDO kindly supplied a copy of the report for review. The report contains a list of compounds (insecticides, weedicides (i.e. herbicides), tip dip toxins, and compounds possibly leached from several species of invasive plants. For each compound there is a brief review of guidelines where available, potential for lab analysis, sampling plans and toxicity assessment methods. Unfortunately the only justification for the listing of these compounds is that they were recommended by Mr Friend. None of the compounds were identified in the Ecos water quality risk assessment study with the possible exception of Carbaryl which may occur as a residue due to historical use at dip sites. Although Camphor was not identified as a potential problem compound, Camphor Laurel was identified as an invasive species in the CMP documentation. With reference to VOC's the risk assessment process identified appropriate priority chemicals for monitoring based on the prevalence of their use in the catchment and general toxicity. There are no plans to monitor for VOC's at the moment. Furthermore due to their volatile nature, they are among the least likely substances to be found. In general, chemical substances that are persistent, bioaccumulative, or toxic (also known as PBT substances) and are present in the catchment in significant quantities should be the focus for monitoring.	*A copy of report by Wood and Rochford (2007) has been lodged at Rous Water for follow up review by the implementation committees responsible for (i) Monitoring and Reporting Program under the KOA 4: Governance, and (ii) Horticulture Best Management Practice (BMP) Program (inc. tree nuts, fruits and forestry under KOA 2: Agronomic Land Management Practices*
4	Tracey King	Ngulingah LALC	Detailed submission: Requesting consideration of Aboriginal Community Involvement in CMP implementation.	*The submission addressed a wide range of issues, some of which extended beyond the scope of the CMP. The submission was reviewed by Rous Water and included in the CMP under Section 8.6 Governance.*	*No further action required*
5	Cathy Hillard	None stated	Detailed submission: suggesting an additional KOA for Local Bundjalung Cultural Maintenance and Economic Development	*The submission addressed a wide range of issues, some of which extended beyond the scope of the CMP. The submission was reviewed by Rous Water and included in the CMP as program under Section 8.6 Governance rather than as a separate KOA.*	*No further action required*
6	Elizabeth Bragg	Sustainable Futures Australia (SFA)	Comments received on quality of images and introduction to section 8, and also a range of minor typographical and formatting improvements	Suggested changes were undertaken. Image formatting and resolution was checked with SFA before finalising the reports. Figures in draft were low resolution to enable electronic transmission.	*Corrections and image improvements were made for the final CMP document*

Sub-mission	Name	Affiliation	Comments	Rous Water response	Actions
7	Nick Stephens	Lismore City Council	Brief submission: 1. Believes document is very good 2. Requests inclusion of section on vegetation similar to sections on geology, etc in Ch. 5 3. Seeking additional statistics on catchment attributes including area, no. of properties, population, % catchment vegetated, size class of properties, % with creek frontage. 4. Request clarification of "Reserve" classification, what is meant by "Reserve"; is it National Park or other type of reserve. 5. Suggests study by Reid (2002) on soil and nutrient loss in macadamia farms should be cited and used to support estimates of soil loss from macadamia lands. Report: *Reid, G. (2002). Soil and Nutrient Loss in Macadamia Lands: A Pilot Study. NSW Dept of Agriculture HRDC Project: AA0001 (30 Aug 2002).*	1. Comment noted and welcomed 2. The available vegetation data is at a broad scale (1:250,000 regional AUSLIG data) and a map has been included in the CMP based on this data. The map scale means that at the scale of the Wilsons River Catchment some minor inaccuracies may be apparent to people with good local knowledge of the catchment. 3. These statistics are now included in Section 5 with the exception of "% with creek frontage". Calculation of this statistic requires that the current GIS stream layer be validated and streams classified according to stream order to avoid errors. It is suggested that if this statistic is considered of value by the Committee for the Riparian and In-stream Health Management Program under KOA 1: Environmental Management, then the the task should be conducted at the implementation stage. 4. The new vegetation map now included provides a clearer distinction between reserve types. 5. Study by Reid (2002) was used extensively to support the sediment and nutrient loss calculations in the supporting study: *Ecos (2009). Wilsons River Catchment Management Plan: Quantitative (E2) Modelling. Report prepared by Ecos Environmental Consulting and Fluvial Systems for Rous Water, Lismore, NSW*	*Clarifications and additional information were included in the final CMP document. No further action required.*

Sub-mission	Name	Affiliation	Comments	Rous Water response	Actions
8	Various	Rous Water Council	Feedback provided to Anthony Acret of Rous Water as part of Council review process. 1. Question on accuracy of land use classification at the scale of individual properties. 2. Comment that water quality data is held by Byron Shire Council (BSC) but did not appear to have been used in the State of Catchment report.	1. Land use classification was based on the DPI supplied land use GIS layer. It appears to have been based on automatic digitising and is not bonded tightly to the cadastral layer (i.e. land use is based on say satellite imagery rather than a property by property classification). Therefore it is not necessarily 100% accurate. An accuracy of 95% is an industry standard and is more than sufficient for our modelling and assessment purposes as riverine water quality tends to average out the effects of different catchment sources. Furthermore, overlays of the land use with the aerial photography indicated that the match was very good. Furthermore for modelling and risk assessment purposes, certain land uses with similar runoff characteristics were aggregated due to the fact that not all landuses have published and validated runoff co-efficients (i.e. rates of sediment, nutrient and contaminant loss/transport). A note to the fact that the landuse classification consists of aggregated data has been included in Section 6.1. 2. It is true that BSC water quality data was not used, although requests were made to BSC and other agencies for data during the early stages of the plan development and none was received from BSC. Following receipt of this comment, BSC has been very helpful in supplying data for the BSC region of the catchment and this data has been incorporated into an updated version of the State of Catchment Report.	*No further action required.*