# Catchment Management Planning and Landcare in the Little River Catchment

Little River Big Picture

Little River Landcare Group Inc.

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## Foreword

The aim of this booklet is to promote the achievements so far of the Little River Landcare Group (LRLG) since its inception in 1998. The group was formed to develop overall catchment management strategies for the Little River, which, it was felt, couldn't be done effectively by the fourteen individual smaller groups.

From these beginnings, the LRLG committee successfully sought Natural Heritage Trust (NHT) funding to develop a plan that would ensure the long-term sustainability of the Little River community and its flora and fauna.

The plan has been developed in three stages:

- Stage 1: A description of the catchment and its present situation
- Stage 2: Best management options and an integrated catchment plan
- Stage 3: Socio-economic analysis

We are especially grateful to Sheila Donaldson for emphasising and basing her work (Stages 1 and 2) on a clear understanding of soil from which our flora and fauna, biodiversity and farming systems survive or die. It is a recurrent theme in this booklet.

At all stages during the planning, as much community input as possible was sought to cover all their concerns and aspirations for their catchment.

The community is now poised to begin implementing many of the best management options (BMOs) recommended by the plan in those areas identified as being most in need of attention.

A dedicated and hard working committee has done its utmost to keep control of its destiny at all stages of the planning and we hope that this booklet will provide you with a reasonably detailed summary of our situation now and our future direction. We are confident that these plans will ensure the sustainability not only of the Little River community, but also play some part in helping those communities downstream.

Thank you to all those who have played some part in getting us to where we are today, especially the preceding chairmen, Don Bruce and Trevor Coady, and their committees. We look forward to your continued support.

Geoff Tonkin
Chairman LRLG (2001–present)

## EXECUTIVE SUMMARY

Little River Landcare Group Inc. has a vision "to promote a healthy, productive and diverse biological and social environment". The Group has developed a Catchment Management Plan (CMP) over the five year period 1998–2003 with funding from the Natural Heritage Trust and TARGET project. The Little River is a tributary of the Macquarie River in the Central West of NSW and lower in the Macquarie Catchment are the Macquarie Marshes, an internationally significant wetland. The Macquarie is one of 21 priority catchments for the National Action Plan for Salinity and Water Quality and is part of the Murray-Darling Basin. The Little River Catchment covers 250,000 hectares (2,500 $km^2$) and has over 300 farm holdings.

The CMP is divided into three logical stages and has two supplementary reports. Stage 1 is introductory and covers the objectives, issues to be addressed and describes the current condition of the catchment. Stage 2 covers the actions, identifying priorities to target and twenty different management strategies to be used in the catchment. Stage 3 covers money issues and provides estimates of costs and benefits of each management strategy. The supplementary reports profile sustainability of agriculture in the catchment and biodiversity surveys of the flora and fauna of the catchment.

The Little River, north of Yeoval. CSIRO (Julian Seddon)

A widely used measure of environmental health is water quality and, in particular, salt content of the water. Currently the discharge from the Little River into the Macquarie is better than World Health Organisation drinking water quality standards for less than 30% of the time.

As with many other catchments, the Little River Catchment faces many challenges today and into the future, which can be summarised as:

- acidity
- dryland salinity
- soil degradation
- water quality
- native vegetation and biodiversity decline
- pasture degradation and weeds
- declining stream health
- pests

*"Sometimes it looks to me as if we'd got to go all the way back to the Indians and begin all over again to undo all the damage our grandpappies have done to this poor country."*

Anonymous member of a US veterans' agricultural training class.

Awareness of these challenges is the first step towards a solution; the second step is to act on these challenges.

Management for change and priority actions for the future in the catchment are grouped into the following categories: land management, native vegetation, water, pest animals and farming systems. An economic analysis of priority actions concluded that the estimated costs of implementing the strategies, over the 10 year period of the Plan, were around $100 million and the tangible, financial benefits were estimated at $60 million. This valuation of benefits did not include valuation of improvements in natural resource status such as water quality or biodiversity.

The strategies were then analysed based on whether they are achievable, affordable, whether there are tangible benefits and whether they are consistent with the Central West Catchment Blueprint. This analysis selected the following seven strategies as being the highest priorities for the catchment:

- use of soil ameliorants (such as lime)
- strategic/rotational grazing
- native vegetation conservation
- conservation farming
- perennial mixed pastures
- strategic tree planting
- buffer strips for riverside zones

The cost of implementing these, over the 10 year period of the Plan, is an estimated $46 million and the estimated benefits are $59 million, leaving an estimated 10 year profit of $13 million. This figure excludes the less tangible environmental benefits within the catchment and further downstream.

In the process of change there are some barriers to overcome. There are economic and social issues and there are needs for education and research. A catchment survey found that money issues are one of the major barriers that hold landholders back from doing more environmental work, especially where it is perceived as not having a significant positive impact on production or profits.

The final, and most important, part of the Plan is to put it into practice.

## CATCHMENT MANAGEMENT PLAN OVERVIEW

A Catchment Management Plan is valuable for the whole community involved. It should highlight the needs and problems of the area and how they can be fixed—in a coordinated, 'team-effort' manner. Some problems can be fixed individually but many, especially catchment ones, need coordinated efforts to address them. An example of this is dryland salinity, where the cause and effect are usually separate. Catchment Management Plans can help landholders in a region improve both profit and sustainability by setting common goals, they can help attract funding including enhanced access to government programs (e.g. National Action Plan for Salinity and Water Quality, Natural Heritage Trust).

A Plan should not remain set in stone but should change and adapt as situations and circumstances vary over time.

### Background, History & Planning Process

The Little River Catchment Management Plan (CMP) has been developed in three stages:

- Stage 1 identifies the objectives and issues to be addressed and provides a description of the current condition of the catchment.
- Stage 2 goes on to identify priority areas to target and to cover the Best Management Options (BMOs) and how to implement them.
- Stage 3 covers the costs and benefits of putting the plan into practice.

The final stage of the plan, and the most important, is to put it into practice.

The CMP provides a framework for natural resource management programs and also specific action that is necessary to address the problem issues in the catchment. This includes on-ground projects and incentives to encourage uptake of the Plan.

There are a number of other natural resource planning initiatives, which are relevant to the CMP. One is the Central West Catchment Management Blueprint. The Blueprint incorporates natural resource management targets for the Central West Catchment, of which the Little River is part, and which will be binding when the State Government has approved them. This is also how the Murray-Darling Basin Commission (MDBC) Salinity Strategy will be put into practice at the local catchment scale.

> *"I get really worried about policy that isn't evidence based and the adequacy of science underpinning some State legislation."*
>
> Dr John Williams, CSIRO Land and Water Division Chief.

Secondly, the Central West TARGET Project is a collaboration between the NSW State Government (Salinity Strategy funding) and the MDBC, in cooperation with local community groups, to put on-ground works into practice. This project aims to make land use changes in specific areas of the Macquarie, Castlereagh and Lachlan Catchments including the Little River. Around $640,000 has been allocated for the Little River and DIPNR (formerly DLWC) staff are working with Little River Landcare to allocate and manage this funding, with all funding to have been allocated by September 2003.

Thirdly, the Mid Macquarie Regional Plan (MMRP) has been developed by Mid Macquarie Landcare Inc. (MML). There has been close collaboration between MML and Little River Landcare in the development of both the MMRP and the Little River CMP.

## Vision & Objectives

The vision of the Little River Landcare Group is “to promote a healthy, productive and diverse biological and social environment”.

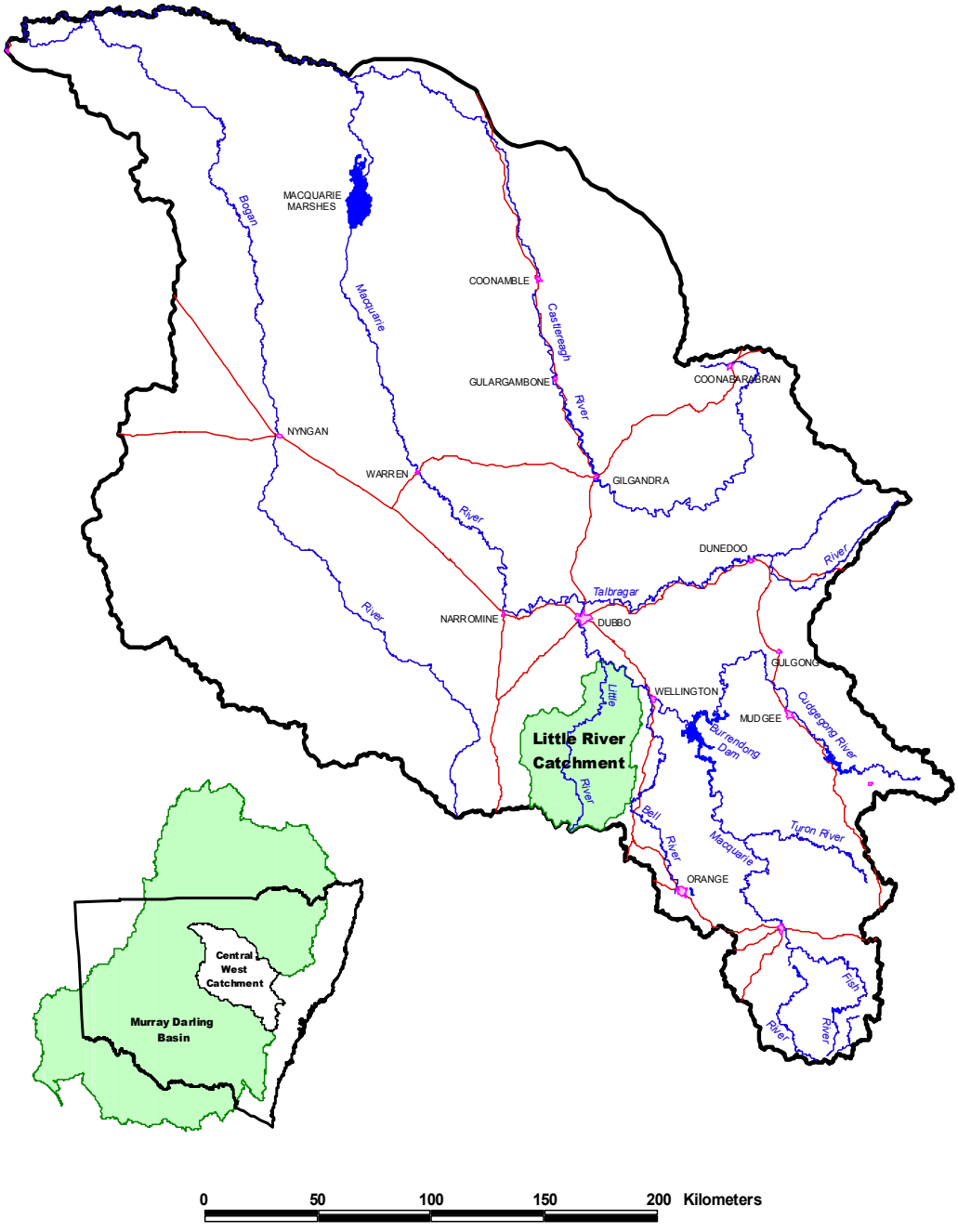
Eight objectives for the CMP have been identified:

| | |
|---|---|
| Objective 1 | Land managed in an integrated manner to achieve long-term sustainability |
| Objective 2 | Improved terrestrial biodiversity and landscape function through increased levels of native vegetation |
| Objective 3 | Healthy riparian zones and streams, capable of supporting a full range of aquatic life and suitable for all domestic and productive uses |
| Objective 4 | Pest animals reduced to levels that do not result in economic losses or environmental damage |
| Objective 5 | Sustainable (non-degrading) farming systems implemented across agricultural land |
| Objective 6 | Profitable enterprises based on sustainable management of natural resources and human capital |
| Objective 7 | Well-informed community with the necessary skills to manage natural resources in a way that will achieve a viable and stable district |
| Objective 8 | The plan and associated processes and arrangements are relevant, effective and reflect the current conditions |

> *“We borrow environmental capital from future generations with no intention or prospect of repaying. They may damn us for our spend-thrift ways, but they can never collect on our debt to them. We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions. But the results of the present profligacy are rapidly closing the options for future generations.”*
>
> Our Common Future,
> the Brundtland Report, 1987.

## CATCHMENT DESCRIPTION

Figure 1: Location map of the catchment in the Central West and Murray-Darling Basin



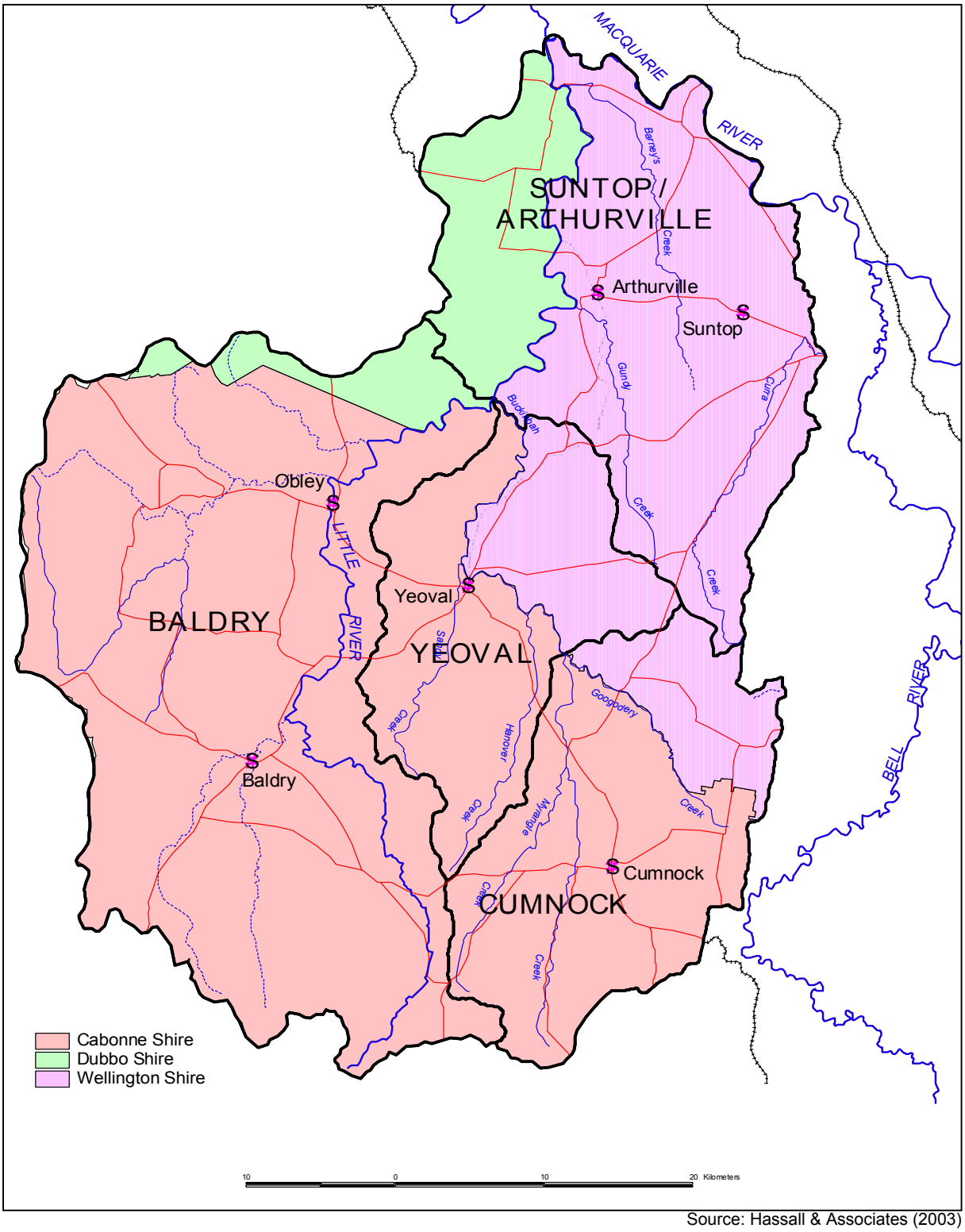

Source: Hassall & Associates (2003)

Table 1: Sub-catchment areas of the Little River Catchment

| Little River sub-catchment areas | Total Area (ha) |
|---|---|
| Baldry | 111134 |
| Cumnock | 43990 |
| Suntop/Arthurville | 66933 |
| Yeoval | 36266 |
| **TOTAL** | **258323** |

Source: Donaldson (2000)

Figure 2: Infrastructure map of the catchment showing sub-catchment areas




Source: Hassall & Associates (2003)

## Climate

There is significant climate variation within the catchment—mainly due to variation in elevation. Elevation increases towards the south of the catchment, which is cooler and has a higher rainfall. Rainfall is slightly summer dominant.

Tables 2 and 3 summarise the climate of the region.

Table 2: Average rainfall, temperature and evaporation at Wellington

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual | No. years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily max temp (°C) | 31.0 | 30.1 | 27.4 | 23.0 | 18.4 | 14.7 | 14.0 | 15.6 | 18.8 | 22.6 | 26.2 | 29.9 | 22.6 | 45 |
| Daily min temp (°C) | 17.5 | 17.4 | 15.0 | 10.9 | 7.6 | 4.5 | 3.5 | 4.2 | 6.6 | 9.9 | 12.6 | 15.9 | 10.5 | 45 |
| Evaporation (mm) | 267 | 216 | 192 | 126 | 78 | 51 | 53 | 74 | 102 | 155 | 204 | 267 | 1785 | 27 |
| Rainfall (mm) | 66.4 | 59.1 | 52.0 | 44.4 | 49.3 | 40.0 | 47.2 | 49.0 | 45.4 | 64.4 | 57.2 | 50.7 | 625.2 | 55 |

Source: Bureau of Meteorology (2003)

Table 3: Average rainfall and temperature at Molong

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual | No. years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily max temp (°C) | 31.0 | 30.1 | 27.5 | 22.5 | 17.4 | 14.0 | 12.9 | 14.7 | 18.6 | 22.6 | 26.4 | 29.5 | 22.3 | 68 |
| Daily min temp (°C) | 13.3 | 13.2 | 10.4 | 6.0 | 2.7 | 0.9 | -0.1 | 0.6 | 2.4 | 5.4 | 8.4 | 11.5 | 6.2 | 68 |
| Rainfall (mm) | 69.8 | 56.7 | 55.6 | 50.6 | 55.0 | 60.7 | 59.9 | 62.6 | 54.3 | 60.7 | 58.6 | 62.3 | 706.8 | 112 |

Source: Bureau of Meteorology (2003)

## Soils

Soils are an integral part of the agricultural production system and their limitations are one of the key factors in deciding the most appropriate land use and management practices. Their distribution in the catchment is complex and is influenced by the geology. In the Little River Catchment there are nine major soil groups, listed in table 4 and mapped in figure 3.

**Alluvial** soils are uniform sands or loams with moderate fertility and with a weak structure. They tend to have moderate to high water holding capacity, salinity, flood hazard and streambank erosion. Erosion hazard will increase when ground cover is low. Alluvial soils are concentrated in the north of the catchment and along some creek valleys and drainage lines.

**Red Solodic** soils are duplex soils and often have a hard setting sandy loam topsoil with a clayey sodic subsoil. They have low fertility, dispersible subsoils resulting in gully erosion, seasonal waterlogging, low available water holding capacity, acidity and salinity. Red Solodic soils tend to occur on the mid and footslopes of the Dilladerry Volcanics.

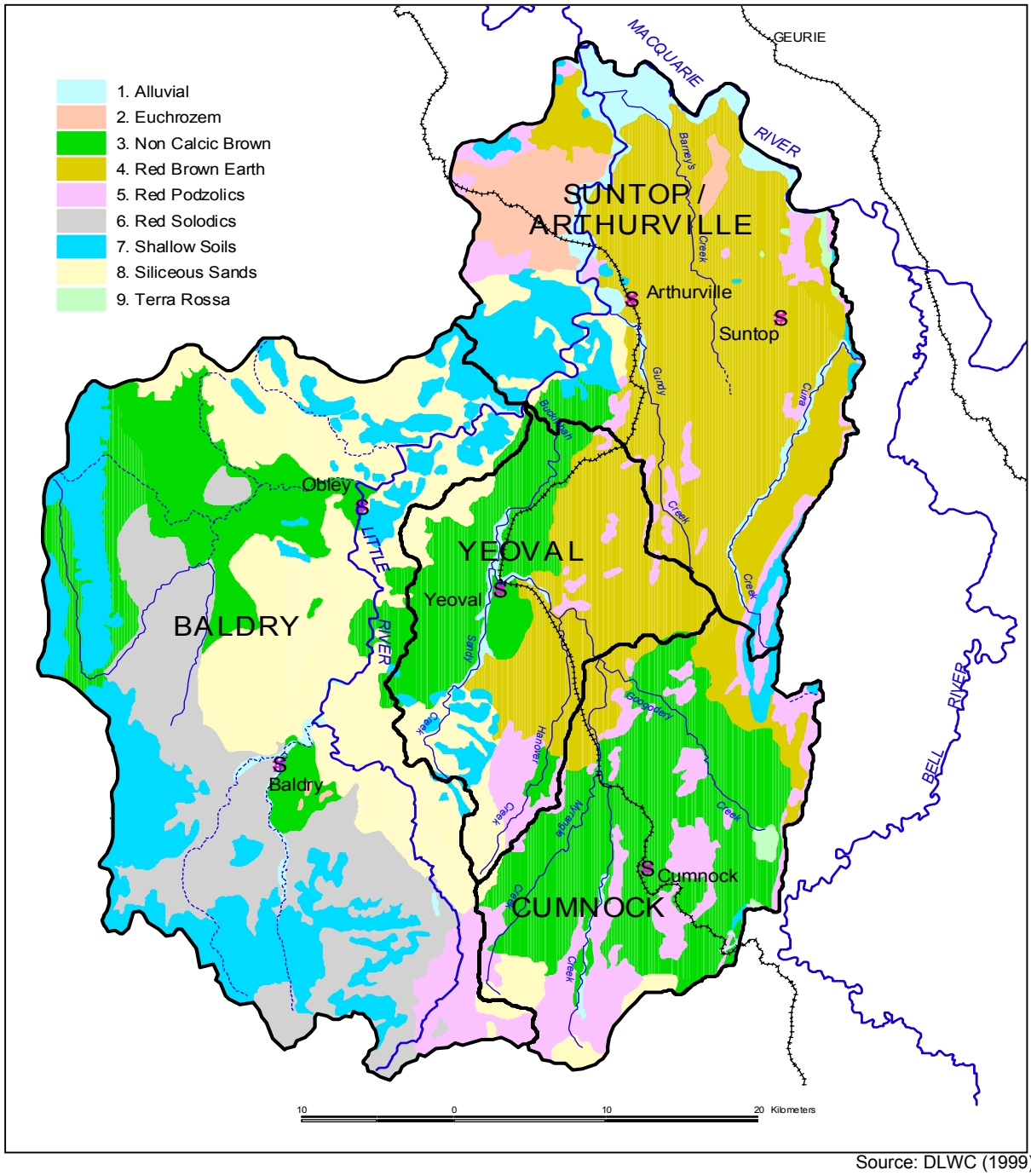
**Red Brown Earths** are duplex or texture contrast soils—with a light textured topsoil above a clay subsoil. They have a poorly structured topsoil which easily erodes when cultivated or under low ground cover, low to moderate fertility, moderate acidity, small areas of salinity, moderate to high water holding capacity and low to moderate permeability. Red Brown Earths are concentrated in the north east of the catchment.

**Non Calcic Brown** soils have a sandy loam topsoil over a clayey subsoil. They tend to be well drained, have moderate fertility, be very erodible when cultivated, have a moderate water holding capacity and waterlogging, some acidification and salinity. Non Calcic Brown soils are mainly found in the south of the catchment and the Yeoval district on the mid to lower slopes.

**Shallow soils** have a poorly structured topsoil over a basic subsoil which is normally very thin (usually less than 50cm). They usually occupy steep slopes (of greater than 30%), have very low fertility and water holding capacity, high permeability, seasonal

waterlogging, erosion hazard and acidic topsoils. They are typically stony with scattered rock outcrops.

Figure 3: Location map of the nine major soil groups of the catchment




Source: DLWC (1999)

**Siliceous Sands** have loose to hard setting sandy topsoils over a sandy loam subsoil with poor structure. These soils have low fertility, salinity and acidity, are highly erodible when cultivated and have a high permeability, seasonal waterlogging, low available water holding capacity and sodic subsoils. Siliceous Sands occur on acidic parent material.

**Red Podzolics** are texture contrast soils with a sandy loam topsoil over a clay loam to medium clay subsoil. They have low to moderate fertility, are very erodible when cultivated, have a moderate available water holding capacity, seasonal waterlogging, soil

structure decline, rock outcrops and some salinity and acidification. Red Podzolic soils occur on intermediate to acidic parent materials.

**Euchrozems** have a clay loam topsoil over a medium clay subsoil containing carbonates. They tend to be moderately fertile, have a moderate to high erosion hazard, high potential to shrink and swell and have moderate permeability and potential salinity.

**Terra Rossa** soils are reddish brown light clays. They are moderately fertile, shallow soils with a moderate to high erosion hazard. Terra Rossa soils are very variable and are associated with limestone.

Table 4: Areas (ha) of major soil groups in the Little River sub-catchments

| Area (ha) | Baldry | Cumnock | Suntop / Arthurville | Yeoval | Total |
|---|---|---|---|---|---|
| Alluvial | 853 | 310 | 6,200 | 746 | **8,110** |
| Euchrozem | 79 | | 5,831 | | **5,910** |
| Non Calcic Brown | 19,799 | 25,077 | 1,287 | 11,891 | **58,054** |
| Red Brown Earth | | 4,865 | 38,890 | 14,439 | **58,193** |
| Red Podzolic | 3,761 | 10,308 | 5,319 | 2,829 | **22,218** |
| Red Solodic | 26,507 | | | | **26,507** |
| Shallow Soil | 25,371 | 822 | 6,815 | 1,250 | **34,258** |
| Siliceous Sand | 34,764 | 2,248 | 2,293 | 5,111 | **44,417** |
| Terra Rossa | | 359 | 296 | | **656** |

Source: DLWC (1999)

## Land Capability

Land can be classified to give an indication of what landuse an area can support in a long term, sustainable way. This is done according to physical characteristics such as soil, slope and drainage. Land capability was mapped by the Soil Conservation Service using 1988 air photos, so it is important to remember that circumstances have changed in the last 15 years, one example being outbreaks of dryland salinity in some areas.

**Class 1** is arable land that requires no special soil conservation practices. It is top quality land, fairly level, very fertile and suitable for irrigation but may be subject to flooding. **Class 2** is arable land that requires simple soil conservation measures. This land could be as productive as Class 1 but needs conservation management practices to avoid soil degradation. It occurs on valley floors and gentle footslopes. **Class 3** is arable land that requires intensive soil conservation measures, normally has a slope of between 3 and 8% and is on the lower slopes with deep, reasonably fertile soils. It is suitable for cropping and pastures in rotation and is the predominant class in the catchment. This class has been extensively cleared, often beyond the recommended 10% tree cover.

**Class 4** is grazing land that requires no special soil conservation practices. It is not suitable for regular cultivation due to slope, erodibility, shallowness, rockiness or a combination of these. Pasture improvement, stock control to prevent overgrazing and minimal cultivation are all important. **Class 5** is grazing land that requires structural soil conservation measures. It is not suitable for regular cultivation for the same reasons as for Class 4 and is usually less fertile. Absorption banks or diversion banks may be beneficial as well as the recommendations for Class 4. Both Class 4 and 5 have a recommended minimum tree cover of 15%. **Class 6** is steep grazing land requiring

conservation management. This land usually has a slope of more than 17% and tends to be the less productive grazing country. Recommended management includes preventing fire, vermin control, strategic grazing management and limiting stock numbers. A minimum 50% tree cover is recommended.

**Class 7** is reserved for timber due to inaccessibility or other limitations. It is mostly hilly, shallow soils. Limitations are infertility, erodibility, slope and stony shallow soils. The best management is to retain 100% tree cover with minimal grazing and fire damage. **Class 8** is land not suited to agriculture, grazing or forestry. It includes cliffs, rock outcrops and very steep land and should be left to conserve native vegetation.

Table 5: Area (ha) and distribution of each land capability class across the sub-catchments

| Land Capability Class | Baldry | Cumnock | Suntop/ Arthurville | Yeoval | TOTAL |
|---|---|---|---|---|---|
| 1 | | | 990 | | **990** |
| 2 | 5530 | 3702 | 15017 | 3928 | **28177** |
| 3 | 17371 | 28302 | 35547 | 22726 | **103946** |
| 4 | 30509 | 7418 | 6550 | 5057 | **49532** |
| 5 | 18200 | 2728 | 1559 | 2545 | **25033** |
| 6 | 10749 | 700 | 1999 | 1778 | **15226** |
| 7 | 8239 | 782 | 4574 | | **13596** |
| 8 | 112 | 9 | 523 | | **645** |
| Crown Land under timber | 20424 | 202 | | | **20625** |
| Urban or other | | 147 | 174 | 233 | **553** |
| **TOTAL** | **111134** | **43990** | **66933** | **36266** | **258323** |

Source: Donaldson (2000)

The timbered Crown land in the catchment is mainly found in the Goobang National Park. This class of land is valuable as remnant vegetation and fauna habitat. Native and feral animal control and fire prevention management may be necessary. Urban areas cover a small area in the catchment, including the towns of Yeoval, Cumnock, Baldry and Obley.

Table 6: Recommended Tree Cover for Land Capability Classes

| Land Capability Class | Recommended Tree Cover % | Total Area in Catchment (ha) | Recommended Area of Trees (ha) |
|---|---|---|---|
| 1 | 5 | 990 | 50 |
| 2 & 3 | 10 | 132123 | 13212 |
| 4 & 5 | 15 | 74565 | 11185 |
| 6 | 50 | 15226 | 7613 |
| 7 & 8 | 100 | 14241 | 14241 |
| Crown Land | 100 | 20625 | 20625 |
| Urban | 0 | 553 | 0 |
| **Total** | **26** | **258323** | **66926** |

Source: Donaldson (2000)