LITTLE RIVER

CATCHMENT MANAGEMENT PLAN

STAGE 1 REPORT

Including

Catchment Description
&
Situation Statements

Prepared for
Little River Landcare Group

May 2000

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Disclaimer:

The data collated and analysed in this publication may be out of date soon after its collection. Some pieces of data used in the report are at least several years old; however, it provides a point of origin for the assessment of land degradation and the quantification of impacts within the Little River Catchment area. Where possible, the most up to date data has been utilised for this report to ensure assessments and recommendations are relevant and appropriate.

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EXECUTIVE SUMMARY

A Catchment Action Plan is being developed for the Little River catchment to address land degradation problems such as salinity, acidity and poor water quality. The Little River Landcare Group successfully applied for funds from the Natural Heritage Trust in 1998 and appointed Donaldson Planning & Management Services (Tamworth) to assist with planning.

A series of community consultations meetings were held throughout the catchment to identify the problems and concerns of landholders. Problems identified were not only environmental, but also economic pressures and concerns about the social fabric of the community. Goals and objectives have been defined by the Steering Committee, which outline the improvements hoped to be achieved by the Catchment Action Plan over the next fifteen years.

Maps and data have been placed on computer in a Geographic Information System (GIS) located at Wellington DLWC office so the catchment managers can view the area in more detail to assist in making management decisions about the catchment. Data includes soils, acidity, geology, land capability, landuse, vegetation, saline sites, streambank erosion, sheet and rill erosion and gully erosion. Additional information sets can be added as future decisions are made and the implementation of the plan can be tracked.

The Little River Catchment

The Little River Catchment Plan Area covers all the Little River catchment plus a small part of the Bell River catchment, particularly the Curra Creek and Eurimbla districts. For planning purposes it has been divided into four subcatchments.

Subcatchment	**Baldry**	**Cumnock**	**Suntop/ Arthurville**	**Yeoval**	**TOTAL**
Area (ha)	111 134	43 990	66 932	36 266	**258 322**
Percentage %	43	17	26	14	**100**

Local Government is a key player in maintaining physical and economic resources and the social fabric of communities. The Plan area is situated almost completely within the Cabonne, Wellington and Dubbo City Local Government Areas.

Local Government Area	**Cabonne**	**Wellington**	**Dubbo**	**Parkes & Narromine**
% Catchment	62.8	28.4	8.6	0.2
% Shire	27.0	18.0	6.7	~0

The area straddles the boundaries between "northern" and "southern" NSW, including most State agencies and political boundaries, making the coordination of services especially challenging.

Geology and Soils

Little River Catchment is located on the highly complex Lachlan Fold Belt, much of which was laid down in a marine environment. This means that some rocks contain naturally high

levels of salt, which can be released when the rain infiltrates through the soil and into the rock formations.

Soils in the area are also highly variable as they are strongly influenced by geology. They are mostly old, with low to moderate fertility, poor soil structure and are prone to becoming acidic with prolonged cropping unless lime is applied.

Land Capability

Land needs to be used according to its capability if it is to remain in a sustainable condition. Problems such as erosion, poor soil structure, acidity and salinity are the result of using the land for more intensive production than it is capable of maintaining. Eventually, the long-term costs exceed the short-term economic gains - or worse still - the land will no longer be suitable for farming and may not be available for use by future generations of Australians.

Areas of Land Capability by Subcatchment (ha)

Subcatchment	Baldry	Yeoval	Cumnock	Suntop	Total
Cropping Classes 1-3	22901.5	26654.3	32003.6	51553.4	133112.8
Grazing Classes 4-6	59456.8	9379.3	10846.1	10108.3	89790.5
Timber Classes 7-8	28775.5	232.5	1140	5270.9	35418.9

The majority of the cropping land is found in the east of the catchment, while most of the Baldry subcatchment, to the west, is best suited to grazing & timber.

However, much of the cropping country has been overcleared, with little or no tree cover remaining. This has not only impacted on land degradation, but has also caused production losses, particularly during the grazing phase of a mixed farming rotation.

Recommended Tree Cover on Land Capability Classes (%)

Land Class	1	2-3	4-5	6	7-8
Tree Cover %	5	10	15	50	100

Dryland salinity

Despite Little River being rated as a catchment at high risk for salinisation and a significant contributor of salt to the Macquarie River, there have been few studies undertaken to provide information on how the ground water system functions, or identifying areas at risk. Monitoring is also inadequate to track changes in the watertable levels or instream salinity. A preliminary study of Standing Water Levels around Wellington indicates that there have been average rises of 1.6 metres over the last ten years i.e. 16 cm closer to the ground surface every year.

Dryland salinity occurs when the salts in the soils and rocks are brought to the surface by rising watertables. Rising watertables are the result of water draining through the soil (deep drainage) into the groundwater system (recharge). If there are no dissolved salts in the water, the result is waterlogging, not dryland salinity.

Clearing of trees, fallowing for annual crops and lack of perennial grasses in pastures are all responsible for allowing deep drainage and subsequent excess recharge. Acidity worsens the situation by reducing plant vigour and growth.

In the Little River, saline seepages often occur at the break of slope. These are commonly associated with changes in soil type, where heavier clays are found lower on the slope. The soil water cannot move through clays as easily as sandy and loamy soils, so water accumulates and is forced up to the surface.

While there are major geological structures within the catchment that allow for the regional movement of water, preliminary studies suggest that dryland salinity is due to local geology and soil conditions in at least some locations. Local systems mean that changes to landuse, by small groups of farmers within the immediate vicinity of the salinity outbreak, can prevent further salinisation and may be able to reverse current degradation.

The area known to be salinised within the Little River Catchment has increased four fold in the last decade and is continuing to grow.

Area of Dryland Salinity Outbreaks (ha)

Subcatchment	**Baldry**	**Yeoval**	**Cumnock**	**Suntop**	**TOTAL**
1988	274	173	269	358	**1074**
1998	**779	859	1180	1590	**4408**

*** only *49% of the Baldry subcatchment mapped in 1998*

In the 6 months between December 1998 and May 1999, an average of 400 tonnes of salt/day passed through Dubbo in the Macquarie River, of which Little River contributed approximately 12%. The situation is worse in winter due to the retention of upper catchment water in Burrendong dam, because most of the flow in the upper Macquarie River comes from the Talbragar and Little Rivers (both highly salinised), and the Bell River.

Work undertaken by the Central West Catchment Management Committee has rated Little River as having a Very High Salinity Hazard.

The Murray Darling Basin Salinity Audit painted the grimmest scenario for the Macquarie River of all the NSW inland rivers. It has been predicted that the salt load will have almost reached the 1500 EC threshold by 2020 and far exceeded it by 2050 (ie options for consumptive use and irrigation are restricted and the aquatic environment affected.) By 2050, Little River will be contributing 50 t/day of salt into the Macquarie River.

The current costs of dryland salinity within the Little River Catchment have been estimated at $1.7 mill per annum. These do not take into account the offsite impacts eg. in the downstream irrigation areas, costs to local councils such as Dubbo who are already suffering road and infrastructure damage or losses in the wetlands. These costs are predicted to rise in the future.

Cost of Dryland Salinity in Little River Catchment ($)

Type	**Farmers**	**Households**	**Businesses**	**Councils**	**Agencies**	**TOTAL**	**Reduced Property Values**	**TOTAL**
Annual Cost $	770 743	177 943	39 097	74 188	392 816	**1 454 786**	212 777	**1 667 563**
%	46.2	10.7	2.3	4.4	23.6		12.8	**100**

Soil Acidity

Acidity is a naturally occurring process caused by acids in rain or from soil biological processes. The loss of nitrates through leaching and removal of alkalis through produce harvest i.e. hay and grain, as well as the effect of pasture improvement has resulted in quite severe acidification throughout some parts of the catchment.

The situation is predicted to continue to decline if liming is not implemented to counteract both the natural acidification processes and farming impacts. Liming should begin prior to topsoil acidification becoming severe, or subsoil acidity developing. If subsoil acidity is present, it is very difficult to reverse and the cost of raising the soil pH is unlikely to be recouped.

Different landuses affect the pH of soils to varying degrees, eg the removal of 1 tonne of lucerne is 20 times more acidifying than 1 tonne grain.

Soil acidification not only has direct impacts on productivity, but also reduces plant vigour and growth, which can result in significant deep drainage and subsequent rises in watertables and salinisation. Poor ground cover also creates a high erosion risk.

In the Little River Catchment, acidification is generally worst in shallow soils, red podzolics and siliceous sands. Moderate acidification can also be a problem in red brown earths and non-calcic brown soils; the main cropping soils.

Acid Action data has been collected by nine Landcare groups across the area. The results showed that decreasing pH was associated with increasing Exchangeable Aluminium, which is toxic to plants. pH readings as low as 4.0 were recorded in most groups, with the Saddleback area having the lowest average pH (4.17). Results for Saddleback, Yahoo Peaks, Burgoon, Yeoval Central and Baldry all showed an average topsoil and subsoil pH of less than 5.0.

Some very preliminary estimates indicate that the initial cost of liming may be as much as $19 million to reverse the existing trends within the catchment.

Soil Erosion and Structure Decline

Erosion results in significant costs to agricultural production, due to nutrient losses, poor access and the need for on-farm remedial works. It also incurs high offsite impacts including the cost of siltation of roads, poor water quality affecting pumping capacity for irrigators and added treatment costs for urban water supplies.

A major cause of erosion in cropping country is poor soil structure brought about by continual cultivation and machinery compaction, low fertility and the removal of stubble residues to protect the soil surface.

Grazing land can also suffer from poor soil structure due to set stocking, which can result in compaction, limits root development and subsequent improvement to soil structure. Overgrazing, as well as soil acidification and dryland salinity, reduces ground cover, and can subsequently increase the risk of erosion.

The most recent estimates of the extent of erosion in the Little River Catchment come from surveys undertaken in the late 1980s. The results show that 36% of the catchment is subject to sheet and rill erosion. The same survey showed that Little River was the second most degraded area in the Macquarie valley after the Bathurst district.

Sheet & Rill Erosion in Little River (ha)

Minor to Moderate Rill Erosion	Severe to Very Severe Rill Erosion	Minor to Moderate Sheet Erosion	Severe to Very Severe Sheet Erosion	Erosion caused by salinity
1188	364	72141	18724	1074

Gully Erosion in Little River (km)

Minor	Moderate	Severe	Very Severe	Total
122.5	87.9	156.7	126.2	493.2

Water Quality

Little River and Bell River are the only two major tributaries that flow into the Macquarie downstream of Burrendong Dam before the Talbragar River enters at Dubbo. This is significant as these waters make up most of the stream flow during the winter months when water is being collected in the dam for irrigation purposes.

Both Talbragar and Little River carry high salt loads, so following periods of high flow in these tributaries, there is a rise in the salt concentration in the Macquarie. This is a serious issue to town water supply, downstream irrigators and the integrity of the Macquarie Marshes.

By 2020, the Murray Darling Basin Commission estimates there will be 508,400 tonnes of salt a year flowing in the Macquarie River, with a third of this being pumped onto irrigation land and almost half ending up in the Macquarie Marshes. Action in the upstream catchments, with the help of the downstream users, is required immediately to prevent this scenario.

Fate of Salt Load in Macquarie R at Narromine (000's tonnes)

	1998	**2020**	**2050**	**2100**
Irrigation Diversions	77.9	169.9	225.4	271.8
Wetland & instream losses	111.6	243.3	322.8	389.3
Stock & Domestic Use	1.0	2.2	2.9	3.5
Flows to the Darling R	43.9	93.1	126.4	154.3
% Wetland health threshold exceeded	<5	10	15	20
TOTAL in River	**234.4**	**508.4**	**677.4**	**818.9**

There is virtually no water quality monitoring on Little River, with only one gauging station at Obley, and no measurements are taken at the point of entry into the Macquarie River. Current data has been gained by analysing records from sites on the Macquarie River.

Little River is rated as moderately stressed due to water extraction levels. Unregulated surface water licenses from Little River and its tributaries are available for approximately 430 hectares of irrigation, while 1100 hectares of land is irrigated from the Macquarie River within the catchment area. There are additional licenses drawing groundwater from the shallow alluvium found near the junction of the Macquarie and Little Rivers.

There are moderate phosphate levels instream, which sometimes cause algal outbreaks. These are likely to be due to phosphate fertiliser applications and sedimentation.

Contamination of groundwater though septics in the village of Yeoval is a serious concern to both Local Government and residents. This problem is particularly apparent during winter when watertables reach the ground surface.

Riverine Environment

NSW Fisheries regard Little River as a "special place", with abundant stocks of native fish. It is rated as having a high conservation value in order to protect these stocks, which are thought to be adapting to changes in river conditions. Limited cropping along most of the river has kept chemical pollution to a minimum. The department considers carp numbers to be no worse than many inland rivers and considerable stretches of river are quite clear and suitable for fish breeding. However, local residents cite carp as being in large numbers and damaging to stream health.

Vegetation along much of the river system is generally degraded due to clearing and grazing, and weeds are a problem in some areas eg Barneys Creek. Typha and cumbungi, signs of saline waters, are found in many of the creeks.

The stability of the bed and banks of Little River and its tributaries varies considerably. There is bed instability in places in Little River, such as below Balrudgery and Buckinbah Creeks, and in Tuckwell and Chain of Ponds Creeks. Some streams such as Sandy Creek and Doughboy Creek have suffered considerable bank damage due to livestock frequenting the river. Continual stocking is preventing regeneration along the riparian zone and adding to bank instability. Loombah Creek shows a lot of algal growth suggesting high nutrient levels.

Tree Decline

Prior to European settlement, the district was generally covered with savannah woodlands, and forests were found only in the limited higher rainfall areas. Clearing for agricultural production began on the lower slopes and thinning was undertaken later in the steeper country.

The only remaining large tracts of timber are found in the infertile soils on steep slopes, mostly on Crown land. The percentage of land covered with green timber is generally well below the levels recommended for long term sustainability and what remains is highly fragmented and generally highly degraded, with virtually no understorey. The understorey layer has been almost entirely removed by grazing, and substantial changes have been made to the composition of the grasses and forbs layer through grazing pressure and pasture improvement.

Habitat fragmentation can lead to reduced growth rates, breakdown of natural processes, tree death and the loss of fauna. Many trees are old and will die of old age in the near future, hastened by the degraded nature of the ecosystem.

Tree decline is associated with rising water tables, salinity, soil structure decline, erosion, declining water quality, reduced agricultural stability and productivity, loss of habitat for wildlife and diminishing economic returns. A number of threatened fauna species are predicted to occur within the catchment area.

Pasture Degradation and Weeds

Overstocking and continuous grazing, along with difficult seasons, have resulted in degraded pastures in much of the catchment. Best management practice recommends that ground cover levels should be at least 70% in native grasses and higher in improved pastures all year round to avoid erosion, deep drainage and weed invasion and to maximise plant and animal production. Pastures dominated by annual species, whether desirable legumes or weeds, do not achieve these objectives.

A variety of weeds have invaded pastures. Broadleaf weeds and thistles occur widely, but are not really perceived as a major concern by graziers. Eurimbla and Yeoval Landcare Groups report burrs as an issue. Unpalatable grasses such as spiny burr grass are a problem in some areas, particularly in the Middlearm Landcare Group area, whilst *vulpia* is increasing in the Hervey Ranges area. Obley Landcare Group reports production impacts due to Heliotrope, St Johns Wort and Horehound.

Woody weeds are also only considered to be a slight problem, with blackberry and boxthorn the two main species. Pests such a rabbits and foxes are associated with woody weeds, and can cause significant production losses eg. to wool quality.

Crop weeds are seen as a moderate problem over the entire catchment; however, farmers regard them as being part of the farming system, not as a resource management issue. Crop weeds including grasses and thistles, turnips and other broadleafs, are increasing.

Local Councils are very concerned about the spread of noxious weeds, particularly along the rivers. Cooperation of farmers and all councils is required to achieve control of difficult weeds.

Stage II

During Stage II, the steering committee along with the local people in the district, with the help of the consultant and other local advisory staff and experts will consider the following questions.

- *Which are the priority areas to start work?*
- *What are the best solutions to the problems?*
- *How much will these changes cost?*
- *How much can farmers afford to pay?*
- *Who else has some responsibility to pay?*
- *What incentives are needed for people to change?*
- *Who should administer any funding?*
- *How will change affect our communities?*
- *What skills and training are required to help people implement new techniques?*
- *Is it worth investing government $?*

The outcomes of these deliberations will be the subject of the Stage II report.