

The Department of Land and Water Conservation incorporates the former
Departments of Conservation and Land Management and Water Resources

CATCHMENT INFORMATION

FOR THE

HARDEN LANDCARE AREA

This report, and the original maps associated with it, have
been scanned and stored on the custodian's intranet.
S.J. Lucas April 2014

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June 1995

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Produced by:

The Department of
Land and Water Conservation

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ACKNOWLEDGMENTS

This exercise collated existing information and knowledge from various sources and the efforts of those people deserve mention.

- Mick Dwyer and Noo Porima - map production and prints from Geographic Information System
- comment on maps
- A.R Joy
- J. Scown - undertook land capability mapping
- D.Goldrick
- L. Brown - undertook erosion mapping
- K. Emery
- Margaret Thompson - typing report
- Tim Gardiner
- Don Russell - editorial review
- Richard Goode
- John Dyson
- Paul Parker - degradation summary input
- Geoff Pitson
- Peter Holding - Landcare contact

CONTENTS

Acknowledgments

SUMMARY	1
1 INTRODUCTION	5
2 INFORMATION AVAILABLE	7
2.1 Introduction	
2.2 NSW Land Degradation Survey 1987-88	
2.3 Protected Land Mapping	
2.4 1:100,000 Rural Land Capability Mapping	
2.5 NSCP 1:100,000 Soil Erosion and Use Survey	
2.6 Technical Manuals	
2.7 Land and Water Management Studies	
2.8 Farm Plans and Property Plans	
2.9 Photography and Landsat	
3 CATCHMENT INFORMATION PROVIDED	13
4 MAJOR ISSUES	21
4.1 An overview	
4.2 Land Degradation	
4.3 Land Use and Land Capability	
4.4 Overcoming Land Degradation	
5 RECOMMENDATIONS	29
6 CONCLUSIONS	42
APPENDIX	
A Soil Conservation District Boundaries	43
B Detailed GIS Data for Subcatchments	44
C Contacts for Landcare Groups in the Harden Region	54
D Activities Within or Relevant to Harden Landcare	56

LIST OF TABLES

TABLE 1	Land Degradation in Harden Subcatchments
TABLE 2	Subcatchments in the Harden Landcare area
TABLE 3	Land Capability Classification
TABLE 4	Summary Statistics for the Harden Landcare catchment area
TABLE 5	Summary Statistics for Individual Subcatchments

LIST OF FIGURES

Figure 1	Location Map
Figure 2	Map Sheet Location
Figure 3	Reliability of Degradation Mapping
Figure 4	Sheet Erosion Hazard in Harden Landcare Subcatchments

LIST OF MAPS

Map 1	Erosion - Harden Landcare area
Map 2	Forest Cover and Salinity - Harden Landcare area

SUMMARY

This report was produced at the request of the Harden Landcare area Group. It is accompanied by two maps collated from existing CaLM land resource data. Together they summarise information available for the catchment covering the Harden Landcare area, and describe the various land degradation issues present and some of the requirements to overcome them.

Catchment maps have been produced for erosion; and forest cover and salinity at a scale of 1:100,000. Other information available for the catchment is identified (Section 2). Statistics for degradation, land use and land capability are presented on a subcatchment basis (Section 3).

Major land degradation issues in subcatchments are identified and discussed (Section 4). These include:

- * rising watertables, waterlogging and salinity
- * severe sheet/rill erosion hazard
- * soil acidity
- * tree decline
- * wind erosion
- * gully erosion and streambank erosion are major problems in eastern subcatchments which also have moderate sheet erosion hazard.

Available data for the various forms of land degradation are presented and hot spots significant at the regional scale are identified.

Degradation was found to correlate with geology, topography and landuse, and was summarised using three such units (Section 4.1).

There is evidence:

- * soil water use/groundwater is significantly out of balance
- * some land is being used beyond its capability
- * tree cover is below preferred levels.

A series of recommendations are presented in Section 5. The main points are restated below:

- * update erosion and salinity data, particularly in eastern subcatchments
- * gather information on soil acidity

- * hydrogeological assessment to be undertaken for the entire catchment
- * encourage the treatment of major gully erosion and streambank erosion
- * continue to encourage all landholders to prepare comprehensive individual property plans as part of an integrated approach to catchment planning
- * use existing property plans as models for improved management
- * Landcare groups and members to discuss issues and proposed solutions with other Landcare groups
- * involve Shires and other relevant Agencies in the development of catchment management plans
- * develop an integrated catchment strategy for the whole Harden landcare area, and Action Plans for individual subcatchments as supported by landholders.

Figure 1

Location Map for Harden Landcare Catchment area

* I know this page is out of order.



TABLE: 1 Summary of Land Degradation in Harden Landcare Subcatchments

Subcatchment Area	Salinity	Water- ! logging	Tree Decline	Soil ! Acidity	Streambank Erosion	Gully Erosion	Structural Decline	Steep Lands	Wind ° Erosion	Sheet Erosion
Wombat Creek	**	**	***	***		*	**		**	***
Demondrille Creek	**	**	**	***		*	**	*	**	***
Coonaughtmans Creek	**	*	***	***		*	***		**	**
Cole Creek	***	**	**	***		*	***		**	***
Moppity Creek	**	**	**	***		*	**		**	**
Lower Currawong Creek	*	**	**	***		*	**		**	***
Cunningham Creek	*	*	**	***		*	**	*	**	**
Douglas Creek	*	*	***	***	*	**	***		**	**
Upper Spring Creek	*	*	***	**	**	***	*		**	**
Spring Creek	*	*	**	***			**		**	*
Upper Cooneys Creek	**	**	**	***		*	**	*	*	***
Lower Cooneys Creek		**	***	***	*	*	*	**	*	**
Illalong Creek	*	**	**	***	**	***		**	*	**
Bungalal Creek	*	*	**	***	**	**		*	*	**
Mid Jugiong Creek	*	*	***	***			*		*	*
Lower Jugiong Creek	*	*	***	***					*	*
Bundarbo		*	***	***					*	*

! estimate (NSW Agriculture, Cootamundra and Young)

° NSW Land Degradation Survey

* Minor/developing

** Moderate

*** Severe

1. INTRODUCTION

This report and associated maps document existing data held by CaLM for the subcatchments relating to the Harden Landcare area. It covers 242,467 hectares and includes Cunningham, Spring, Jugiong and Cooneys Creeks and minor tributaries to the Murrumbidgee River (see figure 1.) Water from the Bogolong Creek catchment does flow into the landcare area by this area is covered by the Bookham Landcare Group.

The catchment has been broken into 16 subcatchments to allow more detailed analysis of data.

Table 2 Subcatchments in the Harden Landcare Area

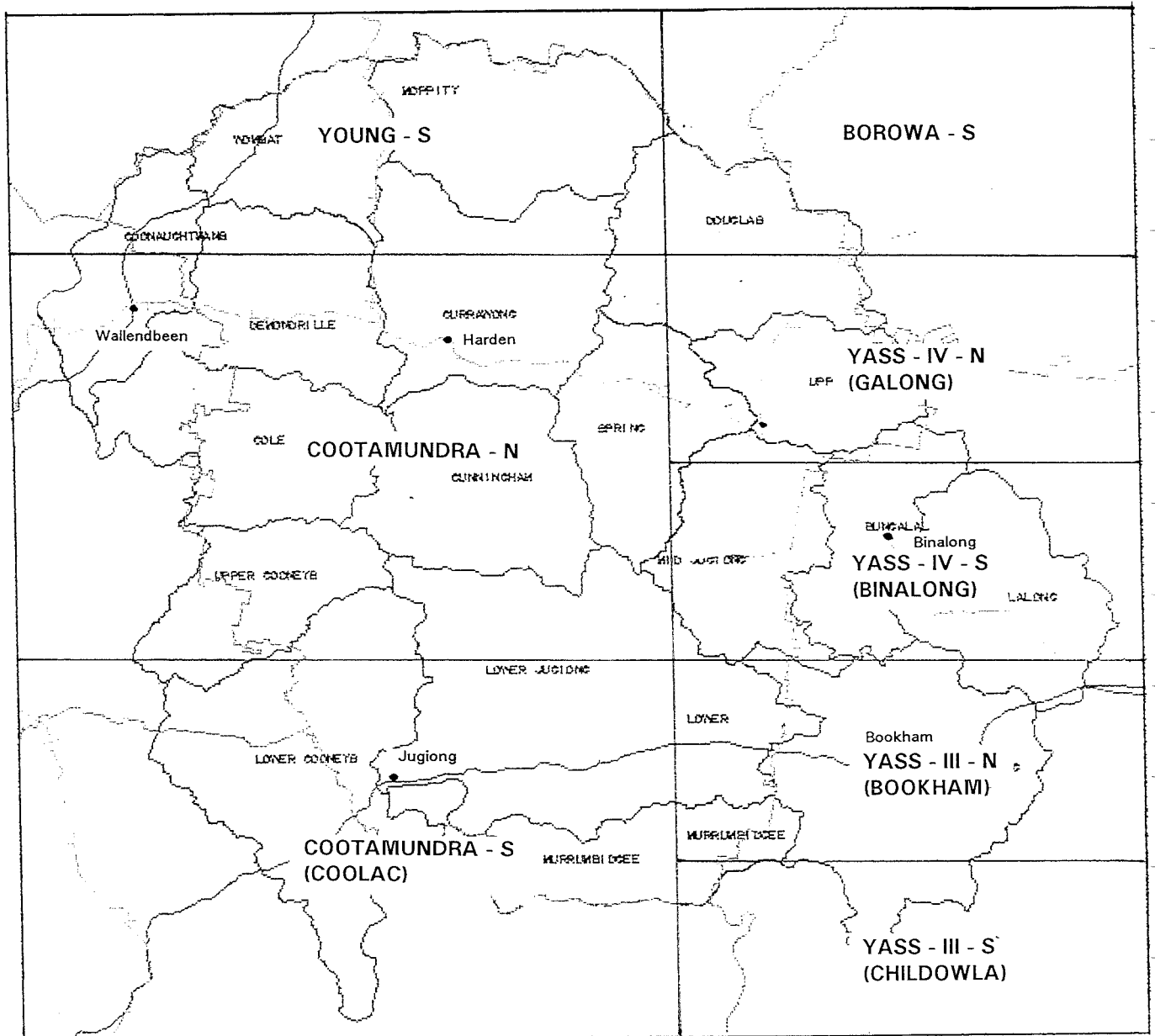
Subcatchment	Area (ha)
Wombat Creek (incl. Back Creek)	10 078
Coonaughtmans Creek	9 365
Demondrille Creek	12 912
Cole Creek (incl. Spring Creek)	14 575
Moppity Creek (incl. Upper Currawong Creek)	14 711
Lower Currawong Creek (incl. Blind Creek)	17 228
Cunningham Creek	14 912
Douglas Creek	15 546
Upper Spring Creek	8 747
Spring Creek	11 415
Upper Cooneys Creek (incl. Kyron and Deep Creeks)	10 251
Lower Cooneys Creek	25 649
Illalong Creek (incl. Kuriong and Dunderallingo Creeks)	13 743
Mid Jugiong Creek (incl. Cumbamurra and Bobbara Creeks)	12 265
Bungalal Creek	9 336
Lower Jugiong Creek (incl. Reedy, Coppabella and Five Mile Cks)	32 861
Bundarbo (incl. Murrumbidgee adjacent, Oak and Sawyers Creeks)	9 418

The catchment is located in the Council areas of predominantly Harden, but also includes small areas of Cootamundra, Yass and Gundagai (see figure 1). Soil conservation districts servicing the area are Cootamundra, Young and Yass (see Appendix A).

The report and associated maps provide material to help define degradation and land management problems within the Harden Landcare Catchment area, and to emphasise the catchment perspective when addressing these issues. Similar data has already been provided for the subcatchments falling in the Young SCS District in a seminar presented by Tim Gardiner, the District Soil Conservationist.

When requesting map information, it is important to be aware of which maps your area is located on. Figure 2 shows the various map scales and breakdowns covering the Harden Landcare catchment area.

Figure 2 Map Sheet Locations



2 INFORMATION AVAILABLE

2.1 Introduction

There have been several land resource surveys undertaken by the Department of Conservation and Land Management and the former Soil Conservation Service covering the Harden Landcare area. These include the:

- * Land Degradation Survey of New South Wales (1987-88);
- * Protected Land Mapping;
- * 1:100,000 Rural Land Capability Mapping for the Eastern and Central Divisions of NSW;
- * Soil Erosion and Land Use Survey of the Headwaters of the Murray-Darling Basin in NSW (1989-91).

Other sources of data covering part of the catchment include the:

- * Cootamundra, Yass and Young SCS District Technical Manuals;
- * Farm Plans/Property Plans.

A brief description of these surveys and where information can be found are set out below.

2.2 NSW Land Degradation Survey 1987-88

A state-wide survey of land degradation in NSW was completed in July 1988. Ten forms of land degradation were assessed on a 10 kilometre by 5 kilometre grid sampling system. They were:

- * sheet and rill erosion;
- * irrigation salinity;
- * gully erosion;
- * scalding;
- * mass movement;
- * induced soil acidity;
- * wind erosion;
- * soil structure breakdown;
- * dryland seepage salinity;
- * woody shrub infestation.

The survey results are presented in a booklet. Map scale is 1:5,000,000 (1 cm = 50 km). Data from this survey is not discussed in this report. The booklet is available from the District Offices of CaLM.

2.3 Protected Land Mapping

Protected Land Mapping (1:125,000) has been gazetted for the Harden Landcare area. This mapping identifies Category A Land with slopes greater than 18° (33%).

Several creeks are "designated streams" and covered by Category B of the Protected Land Legislation. These being Blind, Cunningham, Coonaughtmans, Cooneys, Douglas, Jugiong and Spring Creeks.

A program is presently being undertaken to prepare mapping at 1:25,000 to map further lands recommended for inclusion under the Protected Land Legislation. This includes identifying existing and potential land degradation hazards for inclusion under Category C of Protected Land: "Land . . . affected or liable to be affected by soil erosion, siltation or land degradation".

Four principal features are being identified at a scale of 1:25,000 for the third category of Protected Land. These are:

- * dryland salinity - saline water seepages and the immediate contributing catchment;
- * mass movement;
- * shallow soils with moderate to high erodibility on sedimentary country;
- * erodible soils on granite country.

Gazetted Protected Land mapping is available from the District Office of CaLM. It is not discussed further in this report.

2.4 1:100,000 Rural Land Capability Mapping

As part of the program to prepare maps of rural capability for the Eastern and Central Divisions of NSW, the SCS mapped the Harden Landcare area between 1982 and 1984 (A.R. Joy, J.Scown and D. Goldrick). The method used was the eight class system for evaluating rural land (Emery, 1985).

The classification determines the types of rural land uses appropriate for a particular area of land and the land management practices needed to prevent land degradation and maintain the long-term sustainability of the land (see Table 3).

National Parks, State Forests and urban areas were not covered by the Land Capability assessment, although area figures for these land uses are presented.

Table 3: Land Capability Classification

SCS Classification	Description	
Class I		Best cropping country.
Class II	Potential cropping land	Very good cropping country. Management techniques will ensure long term productivity.
Class III		Good cropping country if some erosion control works and erosion management techniques in place.
Class IV	Better grazing land Poorer grazing	Very good grazing with pasture improvement and fertiliser input. Cultivate only to establish pastures.
Class V		Grazing country, requires similar input to IV, but also erosion control works.
Class VI		Grazing land, no cultivation. Requires good management, fertiliser and controlled grazing.
Class VII	Better under trees	Sensitive and fragile land best left under trees, and with strictly controlled grazing.
Class VIII		No agricultural use.

2.5 1:100,000 Soil Erosion and Land Use Mapping

Mapping of land degradation and land use within the Harden Landcare area was undertaken as part of two different programs. These being Emery et.al (1985) and Brown in 1990-91. Although the methodology was the same the reliability of the mapping varies as shown in Figure 3. Both have a final mapping scale of 1:100,000 which is compatible with the land capability maps.

The various forms of land degradation were identified by interpretation of aerial photographs and verified with field checking. The following general land use categories were mapped:

- * crop land (grain, fibre or fodder);
- * native or improved pasture;
- * forest;
- * softwood plantations;
- * urban.

The smallest mapped unit is 10 ha in size. Consequently small units such as groups of trees within crop and pasture lands were not able to be included.

The soil erosion map shows the location and extent of areas affected by sheet, rill and gully erosion, salinity, streambank erosion and mass movement. The following classes were identified:

- * no appreciable erosion;
- * sheet erosion hazard (4 classes);
- * gully erosion (16 classes), differentiated on the basis of the characteristics of the gully, the degree of instability, branching characteristics and depths;
- * rill erosion hazard (4 classes);
- * wind erosion (4 classes);
- * mass movement (4 classes);
- * streambank erosion (4 classes);
- * dryland salinity (7 classes);
- * areas treated by soil conservation works and their status.

A description of erosion classes is presented in Appendix B.

The maps show the observed active erosion, except for areas of sheet, rill and wind erosion, which were mapped on a hazard basis because the actual erosion features occur infrequently and are masked or obliterated by land management practices and changing seasons.

Maps are held by each of the relevant District offices of CaLM. Digital data can be accessed at Wagga Wagga and Sydney CaLM GIS offices.

Figure 3. Reliability of Degradation Mapping



2.6 Technical Manuals

These documents were prepared by the former SCS. Four manuals cover the Harden Landcare area. Reports having similar formats present maps and discussion relating to:

- * geology;
- * landform;
- * climate;
- * soils;
- * vegetation;
- * land use;
- * erosion;
- * general soil conservation practices, and design;
- * land classification and farm planning; and
- * agronomic recommendations.

Although maps are presented at 1:250,000 (1 cm = 25 km), there is good technical data presented and discussed in these manuals. Copies of Technical Manuals are available at District CaLM Offices and local libraries.

2.7 Soil Mapping

Soil landscape mapping for the Goulburn 1:250,000 sheet covers the eastern subcatchments. Additional mapping is in progress which will complete coverage for the Harden area.

2.8 Land and Water Management Studies

CaLM and the Harden Landcare group are presently undertaking mapping in several of the eastern subcatchments (Douglas, Spring, Cumbamurra, Bungala and Illalong Creek subcatchments) and for the Galong and Binalong Subgroups. This information will be used by the groups to produce catchment management plans. The Harden Landcare Group has submitted a proposal for NLP funding to continue this work across the rest of the Landcare area.

The preparation of this mapping involves extensive collection of data including:-

- * slope;
- * terrain;
- * land use;
- * community form;
- * tree cover
- * areas of regeneration;
- * rock outcrop, thin soils;
- * wet areas and salinity;
- * groundwater levels (DWR).

This data is stored in the Geographic Information System (GIS) at the Wagga District office of CaLM, and can be retrieved and used to generate a range of degradation hazard maps and land management options maps.

2.9 Farm Plans and Property Plans

As part of the SCS earthworks extension activities many "farm plans" were prepared for landholders. These consisted of an enlarged air photo with land capability and proposed earthworks drawn on them.

In recent times (1985-92) comprehensive "property plans" were undertaken for landholders on a part cost recovery basis. These addressed a wide range of land degradation issues and were accompanied by a comprehensive report. These plans are valuable models for the surrounding properties with similar country and land degradation issues.

At least three (3) GIS property plans have been undertaken within the Landcare Catchment area. These being:

Property	Owner	Subcatchment
"Rocky Ponds"	Woodhead	Upper Spring
"Bobbara Station"	McCoy (Manager)	Spring/Mid Jugiong
"Mibey"	Baldry	Cole

Approximately 28 farm plans were prepared for landholders in the area. Most of these appear to be in the Young Soil Conservation district. Plans that are known to have largely been implemented include "Colenso" (S. Hume), "Weirview" (Piririki Pastoral Company) and "Willow Wee"(C & R Keyworth).

The Farming For The Future (FFTF) program provides assistance to landholders who wish to prepare their own property plans in a series of group workshops. The program facilitates landholders to prepare individual property plans which reflect the management needs of the overall catchment. The Binalong subgroup and Bookham group are following this approach.

2.10 Photography and Landsat

The Department holds copies of 1991 Landsat scenes in digital format and has copies of photos for the area. 1994 1:50,000 colour photos are held by Crown Land offices (Wagga and Goulburn) and 1986 1:50,000 black and white photos are held at local Soil Conservation Service District Offices. 1:50,000 uncontrolled mosaics based upon 1960's air photographs are available for the area. Earlier photography may be available in archive.

3. CATCHMENT INFORMATION PROVIDED

The Department's Geographic Information System (GIS) was used to retrieve existing mapping for the Harden Landcare area. It is presented at the publication scale of 1:100,000 to allow direct overlay with the map of Harden Shire which has Landcare members properties identified on it. Separate maps have been prepared for:

- * erosion;
- * tree cover and salinity

These maps are simplified versions of the published maps. Individual classes have been amalgamated to simplify the maps.

The GIS was also used to generate statistics associated with this mapping. A summary of this information for the Harden Landcare Catchment area, and the 18 subcatchments associated with the area, is presented in Table 4 and Table 5, respectively.

Reduced copies of the erosion, and salt/forest cover maps are on pages 18 and 19.

Table 4: Summary Statistics for Harden Landcare Catchment Area*

Feature		Harden Catchment (%)	
Erosion			
Minor gullies	(km)	439	(66.2)
Major gullies	(km)	122	(18.4)
Streambank	(km)	102	(15.4)
Land Use			
Sheet erosion	(ha)	90,527	(37.3)
Salinity	(ha)	1154	(0.5)
Mass movement	(ha)	82	(<0.1)
Land Use			
Crop/Horticulture	(ha)	39,806	(16.4)
Pasture	(ha)	197,739	(81.6)
Timber	(ha)	2362	(1.0)
Other	(ha)	2560	(1.0)
Land Capability			
Potential cropping	(ha)	78,243	(32.3)
Better pasture	(ha)	120,525	(49.7)
Poorer pasture	(ha)	35,387	(14.8)
Best under trees	(ha)	7,591	(3.1)
Other	(ha)	721	(0.3)
Total Area	(ha)	242,467	

* not including Bogolong Creek area

Table 5: Summary Statistics for Individual Subcatchments

Subcatchment	Wombat	Coonaughtmans	Demondrille	Cole *	Upper Cooneys
Erosion					
Minor gullies +	3 (0.03)	3 (0.03)	18 (0.14)	18 (0.12)	3 (0.03)
Major gullies +	1 (0.01)	<1 (0.01)	4 (0.03)	2 (0.01)	<1 (<0.01)
Streambank +	-	-	<1 (<0.01)	-	-
Sheet erosion %	31	24	21	25	13
Salinity %	1.1	1.5	1.1	2.4	1.3
Mass movement %	-	-	-	-	-
Land Use					
Cropping %	22	24	18	24	8
Pasture %	68	75	82	75	92
Timber %	<1	<1	<1	<1	<1
Horticulture	8	-	-	-	-
Other	<1	<1	<1	<1	-
Land Capability					
Potential cropping %	91	85	48	42	9
Better pasture %	9	15	41	51	72
Poorer pasture %	<1	<1	11	7	17
Better under trees %	-	-	-	-	2
Other ³	-	<1	1	-	-
Total Area of Subcatchment (ha)	10,078	9,365	12,912	14,575	10,251
Landcare Coverage	Harden (part)	Harden	Harden	Harden	Harden (part)

* includes Spring Creek

+ units are km and (km per 100 ha)

³ includes State forests, National Parks, urban areas

Table 5 (Cont.) : Summary Statistics for Individual Subcatchments

Subcatchment	Moppity	Lower Currawong	Cunningham	Lower Jugiong	Lower Cooneys
Erosion					
Minor gullies +	18 (0.12)	24 (0.14)	18 (0.12)	57 (0.17)	21 (0.08)
Major gullies +	9 (0.06)	2 (0.01)	2 (0.01)	17 (0.05)	9 (0.04)
Streambank +	-	-	<1	11 (0.03)	7 (0.03)
Sheet erosion %	25	28	21	26	19
Salinity %	0.6	0.6	0.2	0.1	<0.1
Mass movement %	-	-	-	0.1	-
Land Use					
Cropping %	24	28	21	4	8
Pasture %	72	70	79	95	91
Timber %	4	<1	-	<1	<1
Other	<1	2	-	<1	-
Land Capability					
Potential cropping %	70	82	17	2	10
Better pasture %	28	15	64	69	58
Poorer pasture %	<1	<1	19	24	28
Better under trees %	2	2	-	5	5
Other ³	<1	-	-	-	-
Total Area of Subcatchment (ha)	14,711	17,228	14,912	32,861	25,049
Landcare Coverage	Harden	Harden	Harden	Harden	Harden (part)

+ units are km and (km per 100 ha)

³ includes State forests, National Parks, urban areas

Table 5 (Cont.) : Summary Statistics for Individual Subcatchments

Subcatchment	Douglas	Upper Spring	Spring	Mid Jugiong	Bundarbo
Erosion					
Minor gullies +	43 (0.27)	44 (0.50)	30 (0.27)	46 (0.37)	28 (0.29)
Major gullies +	8 (0.05)	16 (0.19)	8 (0.07)	<1 (0.01)	2 (0.02)
Streambank +	11 (0.07)	19 (0.21)	-	2 (0.02)	4 (0.05)
Sheet erosion %	67	65	27	78	52
Salinity %	0.1	-	0.1	-	-
Mass movement %	-	-	-	0.2	0.4
Land Use					
Cropping %	38	31	28	11	<1
Pasture %	57	69	72	89	95
Timber %	5	<1	<1	<1	5
Other	-	-	-	-	-
Land Capability					
Potential cropping %	68	45	28	<1	3
Better pasture %	23	41	65	71	34
Poorer pasture %	6	14	7	19	35
Better under trees %	4	-	-	9	28
Other ³	-	-	-	-	-
Total Area of Subcatchment (ha)	15,546	8,747	11,415	12,265	9,418
Landcare Coverage	Harden (Galong sub.)	Harden (Galong sub.)	Harden (Galong sub.)	Harden (Galong sub.)	Harden (part)

+ units are km and (km per 100 ha)

³ includes State forests, National Parks, urban areas

Table 5 (Cont.) : Summary Statistics for Individual Subcatchments

Subcatchment	Bungalal	Illalong	Bogolong
Erosion			
Minor gullies +	41 (0.44)	97 (0.71)	134 (0.59)
Major gullies +	9 (0.10)	29 (0.21)	60 (0.22)
Streambank +	16 (0.17)	31 (0.23)	50 (0.22)
Sheet erosion %	88	80	81
Salinity %	-	0.2	<0.1
Mass movement %	-	<0.1	0.1
Land Use			
Cropping %	4	2	-
Pasture %	94	98	98
Timber %	<1	<1	2
Other	2	<1	-
Land Capability			
Potential cropping %	-	-	-
Better pasture %	82	77	66
Poorer pasture %	16	23	30
Better under trees %	<1	-	4
Other ³	2	-	-
Total Area of Subcatchment (ha)	9,336	13,743	22,660
Landcare Coverage	Harden (Binalong sub.)	Harden (Binalong sub.)	Bookham Group

+ units are km and (km per 100 ha)

³ includes State forests, National Parks, urban areas

4. MAJOR ISSUES

4.1 An overview

Land degradation and community issues were identified from CaLM resource data and input by District Soil Conservationists. Landholders may wish to add further issues or details.

Land degradation issues occurring over the whole area are:

- * rising watertables, waterlogging and salinity problems
- * sheet/rill erosion hazard
- * induced soil acidity (reduced pasture and crop options, pasture cover, water use and productivity)
- * tree decline
- * wind erosion
- * deterioration of water quality in creeks
- * damage to infrastructure (road pavement, poor paddock access)
- * loss of remnant vegetation and ecological diversity.

Land degradation tends to correlate with particular geology, topography and land use. Three combinations have been used to summarise land degradation in the Harden Landcare Catchment area. These being undulating granite rises - cropping; rolling low granite hills - mainly grazing, and rolling low volcanic hills - mainly grazing.

Particular problems or more severe expressions of degradation occur in these various land types.

Undulating granite rises - cropping

- * areas of waterlogging and salinity are expanding rather than developing. suggesting groundwater levels are close to the surface over large areas of subcatchments
- * sheet/rill erosion hazard is moderate to severe due to cropping
- * soil structure decline due to cropping and lack of perennial pastures
- * gully erosion isolated and minor.

Subcatchments within the above category are Douglas Creek, lower areas of Spring Creek, and the tributaries of Cunningham Creek including Wombat, Demondrille, Coonaughtmans, Cole, Moppity, Currawong and Cunningham subcatchments.

Rolling low granite hills - mainly grazing

- * waterlogging and salinity in developing stage
- * sheet/rill erosion hazard is moderate associated with hard grazing and occasional cropping
- * gully erosion (shallower than 3m) is a problem in some areas.

Rolling low volcanic hills - mainly grazing

- * waterlogging and salinity in developing stage
- * gully erosion a widespread major problem

- * sheet/rill erosion hazard is moderate to severe due to hard grazing
- * streambank erosion is a problem in many creeks.

Subcatchments within the above category are Upper Spring Creek, Illalong Creek tributaries, Mid Jugiong Creek tributaries, Lower Jugiong Creek tributaries, and Murrumbidgee tributaries.

An assessment of the severity of the various forms of land degradation on a subcatchment basin is presented in Table 1 (page 3).

4.2 Land Degradation

(a) Gully Erosion

The erosion survey shows gully erosion is a serious problem in localised sections of the catchment although it is not a widespread problem. 561 km of gullies occur within the Harden Landcare Catchment area. Of these 122 km are major gullies and 439 km are minor gullies. Subcatchments affected most are:-

- * Illalong Creek subcatchment (minor and major gully erosion a major concern)
- * Upper Spring Creek subcatchment (minor and major gully erosion a major concern)
- * Mid Jugiong, Bundarbo, Spring and Douglas subcatchment (minor gully erosion is significant).

Gully erosion does occur in the other subcatchment but the extent and severity are not significant from a regional perspective. Detailed breakdown of the various gully classes occurring in each subcatchment are present in Appendix B.

Hot spots for gully erosion, in order of severity, are:-

- * Connors Creek (Bookham Landcare Group)
- * Dunderillago Creek (Binalong Sub Group)
- * Bogolong Creek (Bookham Landcare Group)
- * Upper Spring Creek (Galong Sub Group)
- * Upper Bungalal Creek (Binalong Sub Group)
- * Kuriong Creek (Binalong Sub Group)

(b) Streambank erosion

There are 102 km of streambank erosion in the catchment. It is a major problem in most of the eastern steeper subcatchments. The main occurrences are along:-

- * Upper Spring Creek tributaries
- * Illalong Creek tributaries
- * Bogolong tributaries (Bookham Landcare Group)

(c) Sheet Erosion

Across the whole catchment, the areas of land having sheet erosion hazard is around 37%. It is significant in most subcatchments varying from 13% of Upper Cooneys to 88% of Bungalal (see Table 5). Erosion was obvious in cropping paddocks after the rain

on May 13, 1995, and rated a mention on the "Cross Country" TV show a few weeks later.

Figure 3 shows the extent of various sheet erosion hazard classes for each of the subcatchments. This shows:-

- * Grazing Subcatchment - large proportion of catchment at risk but risk is mainly minor
- * Cropping Subcatchment - proportional of catchment at risk is smaller, but the magnitude of the erosion hazard is much higher (moderate, severe, extreme).

Options to reduce sheet erosion hazard are presented in Section 5.1.

(d) Dryland Salinity and Rising Groundwaters

In a total catchment situation, the current problems of dryland salinity are significant and in several subcatchments it are becoming a serious concern. Areas of dryland salinity are shown on the maps under the heading "Salt Outbreak".

Survey work completed in 1991 and 1985¹ identified 1154 ha as having a salt problem. Of this area 44 ha are affected by severe salt scalds, 299 ha by minor scalds, with the remaining 810 ha in the early stages of development. These developing salt scalds (Soil Erosion Class 15) are characterised by the loss of clovers and the dominance of salt tolerant grasses such as sea barley grass, couch and annual beard grass.

Subcatchments most affected by salt outbreaks are:-

- * Cole Creek subcatchment (including Spring Creek)
- * Coonaughtmans Creek subcatchment
- * Upper Cooneys Creek subcatchment
- * Demondrille Creek subcatchment
- * Wombat Creek subcatchment.

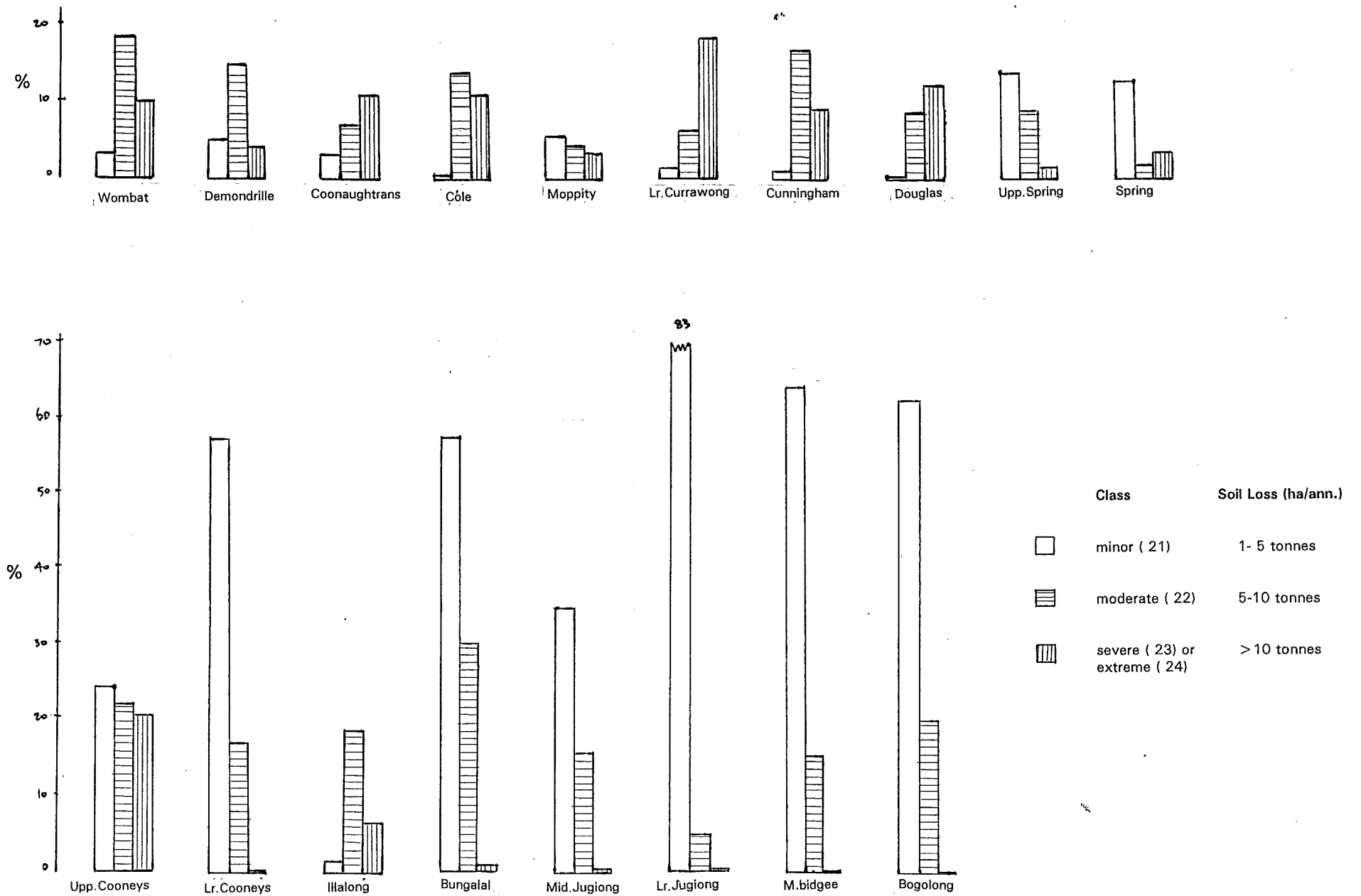
Salinity hot spots significant at a regional scale occur at:-

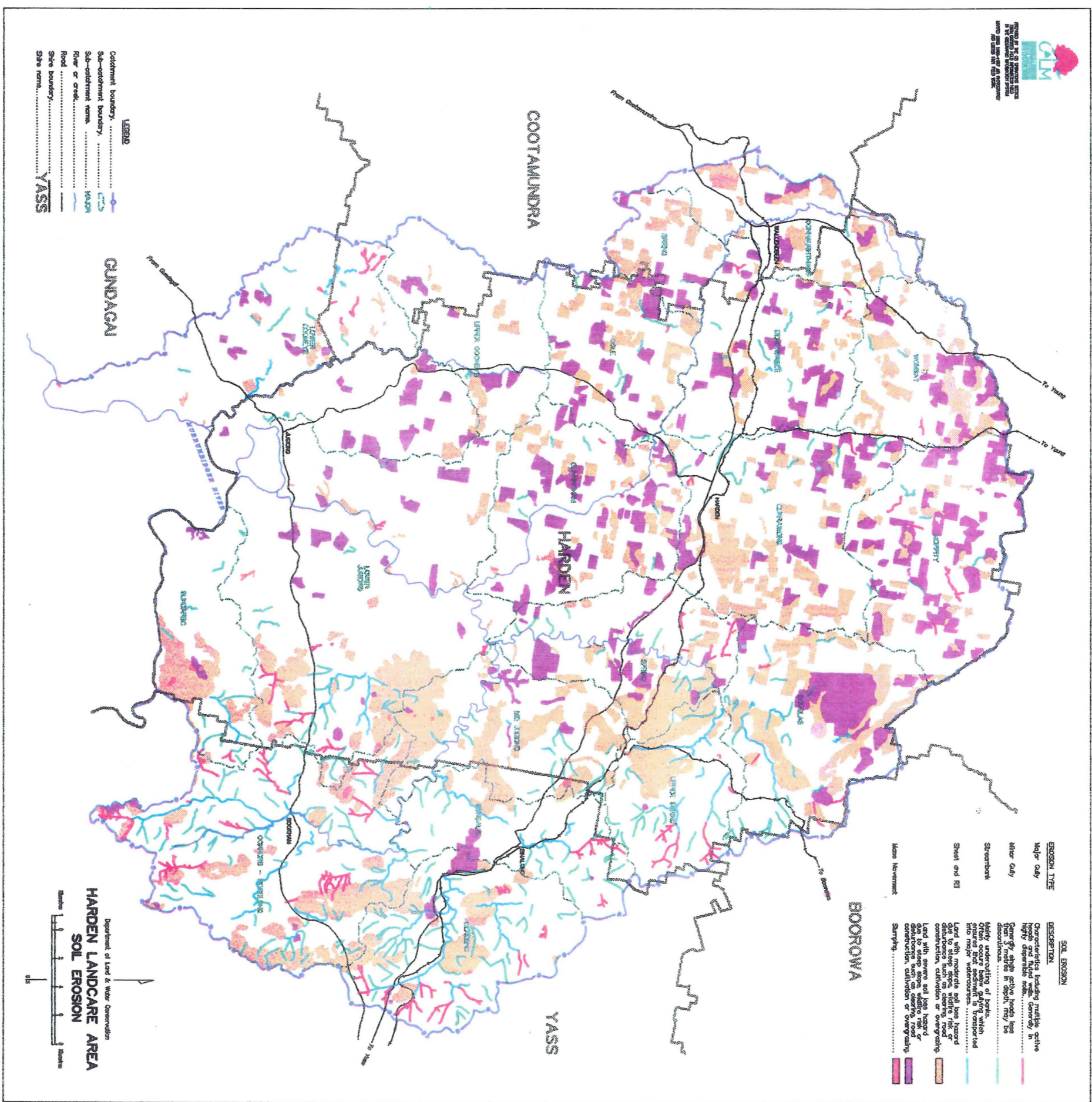
- * Cole Creek (above Barbers Road)
- * Spring Creek (around Cullinga Road)
- * Demondrille Creek (eastern side)
- * Coonaughtmans Creek (north of Wallendbeen)
- * Upper Blind Creek
- * Upper Wombat Creek.

Although only relatively small areas of dryland salinity have been identified within the sub catchments (Table 5) casual observations reveals the extent of salinity has worsened, and it has become more widespread. This is likely to continue until major land management changes are put in place. In several other landcare areas DWR has identified areas where groundwater levels and pressures are rising and areas are at risk

¹ see data reliability map (Figure 2 page 6).

Figure 3. Sheet Erosion Hazard in Harden Landcare Subcatchments



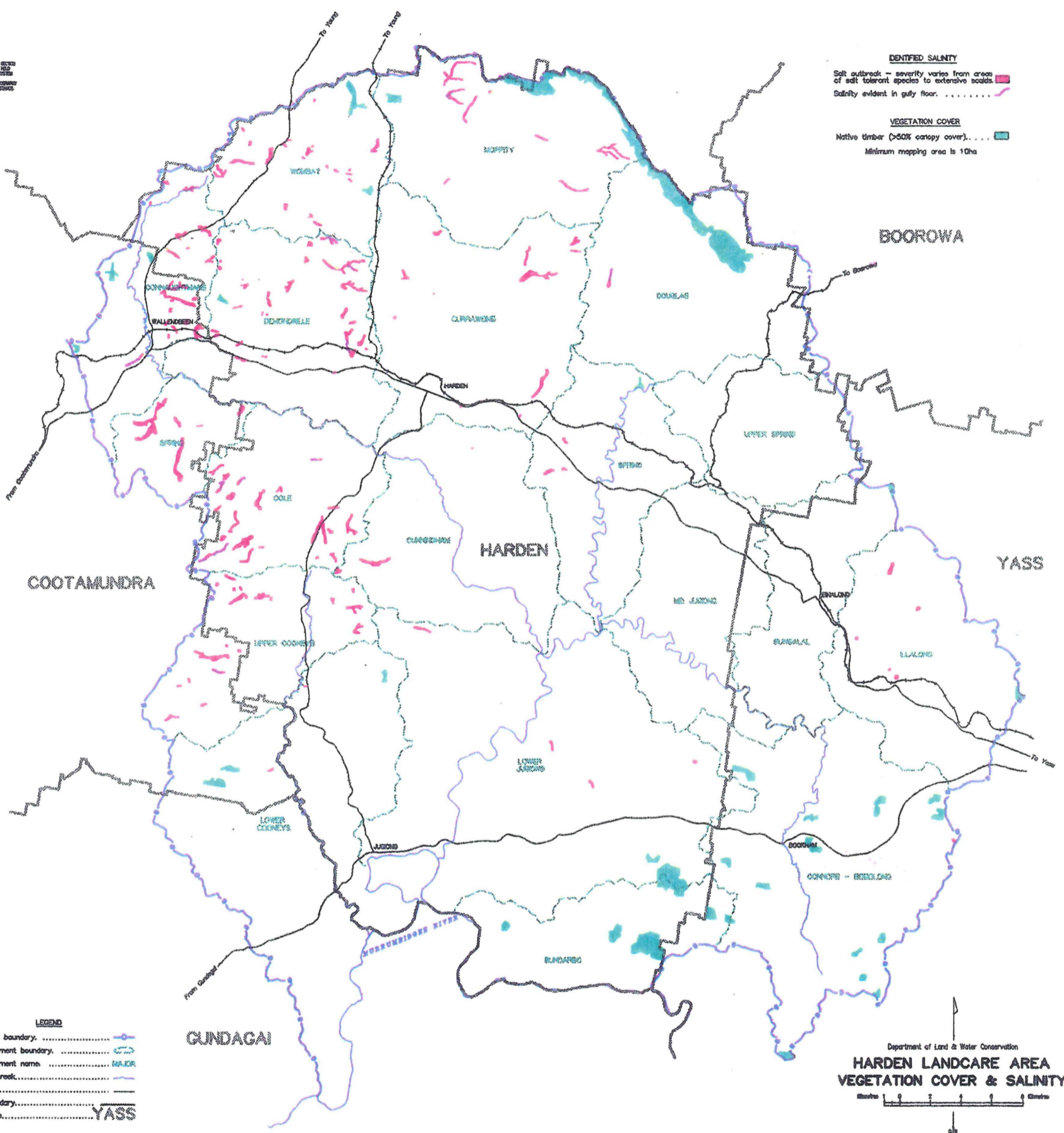




PREPARED BY THE SOIL CONSERVATION SERVICE
 FROM AIRBORNE PHOTO INTERPRETATION DATA
 IN THE GEOSPATIAL INFORMATION SYSTEM
 MAPS ARE NOT TO BE USED FOR UNAUTHORIZED
 FIELD WORK AND CANNOT BE GUARANTEED

IDENTIFIED SALINITY
 Salt outbreak - severity varies from areas
 of salt tolerant species to extensive sods. [Pink box]
 Salinity evident in gully floor. [Pink dashed line]

VEGETATION COVER
 Native timber (>60% canopy cover). [Green box]
 Minimum mapping area is 10ha



LEGEND

Catchment boundary. [Dashed line]

Sub-catchment boundary. [Dotted line]

Sub-catchment name. [Text]

River or creek. [Blue line]

Road. [Black line]

Shire boundary. [Dashed line]

Shire name. [YASS]

Department of Land & Water Conservation
HARDEN LANDCARE AREA
VEGETATION COVER & SALINITY

Scale 0 1 2 3 4 5 Kilometres

0m

of developing salinity.

The major concern is that the land affected, and at risk, are the better quality lands with a high potential for agriculture. Action needs to be taken to identify the extent of problem of rising groundwater and salinity in the remaining parts of the catchment, and adopt management techniques to address these problems.

(e) Soil Acidity

Many of the soils of the South-West Slopes tended to be slightly acid in the virgin state. High input, improved pastures and cropping have lowered soil pH, initially in the surface.

CSIRO sampling to the south-west of the Harden Landcare area, and field testing associated with individual property plans (see Section 2.9 p 12) gives an indication of soil acidity levels. pH readings and associated acidity problems vary according to soil type and land use history.

Alluvial creek soils have values between 5.0 and 6.0 and do not have an acidity problem. Drainage line soils and lower footslope soils with "spewy" or pale "pipe clay" subsurfaces, tend to be acid down to 30 cm, with values of 4.3 to 4.8 and have high Aluminium and Manganese levels. Hill soils vary considerably, with values between 4.3 and 5.0, but subsurface values generally have not declined below 5.0.

Within the same soil type, acidity problems vary according to paddock history. Soil acidity problems increase moving from native pasture to improved clover pasture, further in cropping areas and worst on legume hay making paddocks.

(f) Tree Decline

Tree decline is a significant problem in many subcatchments (pers. comm CaLM District staff). At the broadest level a quick look at Table 5 reveals some concern regarding excessive clearing. Land capability *best under trees* and land use *timber* should be roughly the same.(see Table 5). Some subcatchments do seem to have tree cover shortfalls. For example Bundarbo, where the shortfall is 23%(*land best under trees* 28% *minus timber land use* 5%).

A more detailed assessment can be undertaken using the same principle. CaLM recommends the following minimum tree cover according to land capability.

Land Capability	Tree Cover %
Class 1 2 3	5
Class 4 and 5	10
Class 6	25
Class 7 and 8	100

Applying these values to the land capability figures in Table 4, across the whole area a preferred recommended CaLM figure for tree cover would be about 10% compared to

1% shown by landuse mapping, leaving a shortfall of 9%. A similar calculation for the subcatchments reveals large tree shortfalls exist for:-

- * Bundarbo (33%)
- * Mid Jugiong (16%)
- * Lower Cooneys (15%)
- * Lower Jugiong (14%)

These figures should be interpreted only at the broadest scale as the timber land use data is severely limited by the minimum mapping unit of around 10 ha (23 acres). There will be a major improvement in the detail of tree cover data when 'Basincare" mapping becomes available from the Land Information Centre in Bathurst, as this delineates down to areas of 0.25 ha..

Detailed descriptions of data related to the above sections are presented on a subcatchment basis in Appendix B.

4.3 Land Use and Land Capability

The land capability information presented in the tables describes preferred uses of the land based upon the inherent limitations of the land. Land use was mapped from the air photos used in the erosion mapping (1976 and 1986). The minimum mapping area was 10 ha.

Degradation issues for each of the subcatchment are summarised in Table 1. Several points can be drawn after comparing data presented in Table 5.

Wombat subcatchment

- high sheet erosion due to horticulture, over cropping or inappropriate management
- salt is a major problem, negligible forest cover.

Coonaughtmans, Demondrille*, Cole* and Upper Cooneys* subcatchments

- high sheet erosion due to over cropping or inappropriate management(* and cropping unsuitable lands)
- salt is a major problem, negligible forest cover.

Moppity, Lower Currawong, Cunningham, Douglas and Spring subcatchments

- high sheet erosion due to over cropping, inappropriate management or cropping unsuitable land
- salt is becoming an increasing problem, negligible forest cover on farming land.

Lower Cooneys, Bundarbo, Lower Jugiong and Mid Jugiong* subcatchments

- sheet erosion hazard of significant areas due to rough country being excessively cleared and poorer pastures on the steeper slopes being overstock at critical times (* Mid Jugiong also due to unsuitable land being cropped).

The most severe gully and streambank erosion occurs in the subcatchments with high

proportions of the subcatchment subject to sheet erosion hazard and hence exacerbate runoff and flash flooding problems.

The land degradation indicates some land is :

- * being used beyond its capability
- * soil water use/groundwater is significantly out of balance
- * tree cover is below preferred levels.

4.4 Overcoming Land Degradation

Land degradation is major environmental and production problem within the Harden Landcare Catchment area. This has primarily occurred as a result of widespread clearing, rabbits and aggressive farming practices.

However much has been done to reduce these problems, particularly by landcare members. The Soil Conservation Service (SCS) of NSW, (now incorporated within the Department of Land and Water Conservation) is the State's leading land management and Landcare support agency. Practical assistance is available to individual landholders and community groups including:-

- * advice on how to deal with land degradation, including tree establishment;
- * technical and administrative support to landcare groups;
- * design and construction of soil conservation earthworks through the Plant Hire Scheme, Soilworks;
- * sustainable landuse recommendations from individual property plans to catchment wide planning;
- * design of stock and domestic water supply schemes.

In recent years the SCS has assisted with numerous land conservation demonstrations within the Harden and adjoining districts (see Appendix 2). These projects have stimulated widespread interest and should continue to play an important role in finding solutions to these problems

5. RECOMMENDATIONS

5.1 General Framework

The tables below titled "Methods to Address Issues" provide a detailed framework for landholders in the Harden Landcare catchment area to address land degradation. These include the following actions:

- * measure the extent of the problem, and predict future trends
- * use vegetative cover (crops, pasture, trees) to increase soil water use
- * reduce surface and groundwater problems with engineering solutions
- * maintain adequate protective cover on pasture and cropped areas at all times
- * treat active gullies, and their causes
- * treat active streambank erosion, and reduce risk of further outbreaks.

More specific recommendations drawn from the degradation data are presented on page

METHODS TO ADDRESS ISSUES

Problem : Waterlogging, rising watertables, salinity

Action : Measure the extent of the problem, and predict future trends

Recommendation	Reason	Method	Target Result
Landholders map areas affected by waterlogging and salt. CaLM to collate	Show extent of problem, and see the need for catchment approach	Property and catchment planning sessions to produce maps	Map area with groundwater level - <2m and 2-10m from surface, - increments of rise cm/annum
Undertake hydrogeological survey	Determine extent of present problem and expected future movements	Landholders record all bores, levels in upland and lowland areas, DWR and CaLM co-ordinate and evaluate	Map of present salty and wet areas
Undertake terrain surveys	Combine with groundwater information to access expected ramifications on the land	Slope/Terrain mapping, topographic surveys	Map of areas at risk of developing waterlogging/salinity
Monitor representative bores or install a small numbers of piezometer at important sites	Confirm rising trends, and show association with problem (eg. salt , road pavement damage)	Choose sites from assessment of bore survey/hydrogeologist, interest groups etc.	On going measures to allow objective association

Information:

CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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METHODS TO ADDRESS ISSUES

Problem : Rising watertables, waterlogging, soil acidification lower productivity

Action : Use perennial pasture to increase soil water use

Recommendation	Reason	Method	Target Result
Increase the area under perennial based summer active pastures on farms	To lower recharge and keep the watertable below 2m these pastures use water - for longer growing seasons - from deeper in the soil profile	Present economics benefits on perennial (direct and external) to landholders.	As determined by property plans (CaLM, NSW Ag. consultants with landholders).
	To reduce rate of NO3 leaching and acidification	Present information on best bet species and establishment and management.	Generally improved perennial based pastures on Class 1-V1 lands ,direct drilled on undulating land. Land used for cropping to have perennial pasture in pasture phase.
	Improve cover at susceptible periods and lower erosion risk	Landholders assess soil fertility and soil acidity and address prime pasture program material "Perennials pay"	X% of various land classes X,000 ha of catchment
	Improve productivity/reduce overgrazing and effect of drought	Finance through Advance Scheme on recharge areas	
Retain and encourage native perennial pasture species on lower productivity steeper lands	Natives are adapted to these areas requiring lower fertiliser inputs, are drought resistant and often summer active with rainfall.	Subdivision fencing to exclude stock at time of seed set and lightly rotational grazing the remainder	Native perennial based pastures on Class V111, V11 and rocky shallow Class V1 lands

Information :

CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

METHODS TO ADDRESS ISSUES

Problem : Rising watertables, waterlogging, lower productivity

Action : Use vegetative cover to increase soil water use

Recommendation	Reason	Method	Target Result
Increase the area under perennial based summer active pastures on farms	<p>To use more soil moisture, over a longer growing period and from a greater soil depth, lower recharge and keep the watertable below 2m</p> <p>To reduce rate of NO₃ leaching and acidification</p> <p>Improve cover at susceptible periods and lower erosion risk</p> <p>Improve productivity/reduce overgrazing and effect of drought</p>	<p>Establish perennials, assess soil fertility and soil acidity, and address prime pasture program. Prepare material, confirming "Perennials Pay"</p> <p>Finance through Advance Scheme on recharge areas</p>	<p>As determined by individual property plans, in liaison with CaLM, NSW Ag., consultants, and with reference to catchment plan</p> <p>Establish Yha or z% of farms each year</p> <p>X% of various land classes X,000 ha of catchment by targets Yr 2000 and 2020.</p> <p>Class VIII ,VII, rocky VI lands</p>
Retain/encourage native pasture on low productivity steeper lands	Natives are deep rooted perennials (drought tolerant), and adapted to these areas	Fence, exclude stock at time of seed set, and otherwise lightly graze	

Information : CaLM, NSW Ag., DWR, NSW Ag, Consultants, and other Landcare groups

METHODS TO ADDRESS ISSUES

Problem : Rising watertables (water balance)

Action : Use pasture/crops to increase soil water use

Recommendation	Reason	Method	Target Result
Address nutrient and soil structure problems	Increased plant growth means; - increased soil water use, (reduced recharge and acidification) and - more feed and grain (\$)	Use extension methods and material (eg. Field Days, Lime It Programs, Prime Pasture Groups) to show benefits.	All cost effective areas as shown by soil tests, NSW Ag economics, and property planning workshops.
Address soil acidity	To allow successful establishment of perennials, and high value crops, pH and fertility may have to be raised To improve sustainable production - less overgrazing and drought risk - improved soil water balance	Addition of lime finance through Advance Scheme on recharge areas Acid tolerant species, native species for hill country.	Not to allow subsoils to become acid. Maintain topsoils pH above 4.8
Soil test results to be obtained on a paddock/soil basis as part of property planning process	Soil limitations be identified for each management unit, to allow evaluate of management options	Landholders retrieve all existing soil test dates and determine gaps Landcare groups/NSW Ag/CaLM to collate for data for catchments	Catchment wide evaluation of soil acidity and nutrients levels. Reliable soil data at paddock level to base crop and pasture management.

Information : CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

METHODS TO ADDRESS ISSUES

Problem : Rising watertables, soil acidification (water balance)

Result

Action : Use pasture/crop management to increase soil water use

Recommendation	Reason	Method	Target Result
Adjust crop and pasture management to maximise water use. Include perennial pasture in the cropping cycle	<p>To reduce groundwater input, as maximum growth rate give maximum water use and;</p> <p>To reduce acidification rate (nitrate leaching)</p>	<p>Minimise cultivation and cropping.</p> <p>When cropping use early sowing varieties to use more water.</p> <p>Pasture 4-6cm heights (except lucerne) give maximum production and water use. Aim to maintain pasture at this height</p> <p>Fence and stock pastures according to land capability and pasture production</p> <p>Understanding/improved stock condition pay \$ in long term. Maintain conservative stocking rates.</p> <p>Improve stock management with fencing, watering, laneways, improved agronomy, and perennial based pastures.</p> <p>NSW Agriculture Prime Pastures groups and field days</p>	Reduce recharge and acidification rate over the entire catchment, particularly to protect more productive areas and where rising watertables are rising.

Information:

CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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METHODS TO ADDRESS ISSUES

Problem : Rising watertables (water balance), tree decline, reduced biodiversity

Action : Use trees to increase soil water use

Recommendation	Reason	Method	Target Result
Maintain existing trees	To reduce recharge and lower groundwater in critical areas.	Discourage all clearing. Encourage care with tillage, fire and chemicals.	Locate future trees to address recharge/ discharge efficiently, and maximise other tree related benefits
Strategically increase tree cover across the catchment	Protect stock, crop and pasture from wind and sun Provide habitat for flora/fauna and maintain/re-plenish ecological diversity Improve rural aesthetics and capital value of properties. Provide firebreaks for stock and buildings. Provide direct income Drought fodder reserve. Trees reduce land degradation(erosion ,salinity and habitat), and are valuable to landholders and the community.	Fence windbreaks, stream surrounds and remnant areas. Utilise public lands, (Shire roads, Crown roads, RLPB)etc. Food/shelter for range of plants and animals. Regenerate/re-establish trees Windbreaks include fire retardant trees Encourage agroforestry, specially timbers. Government investigate and develop markets. Advance scheme, taxation incentives. Property and catchment plans.	Location and management of existing and future trees, set out on property/catchment plans Select areas in low productivity or problem areas such as gullied, rocky hills or along existing or planned fences and laneways. Plan tree management/production to maximise benefits. Develop tree policy for the landcare group for entire catchment

Information : CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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METHODS TO ADDRESS ISSUES

Problem : Rising watertables (water balance)

Action : Reduce surface and groundwater problems with engineering solutions

Recommendation	Reason	Method	Target Result
Increase groundwater withdrawal for stock and domestic uses	To lower groundwater levels and compensate for recharge	Use suitable quality groundwater via bores equipped and connected to troughs, or more extensive reticulation	Use bores in priority areas in fractured rock aquifers, and other sites with levels close to the surface to draw down watertables
Manage runoff to stop water flowing onto waterlogged saline areas	To reduce recharge, and lessen the problems associated with waterlogging	Diversion banks in upslope positions; designed by CaLM, financed through the Advance Scheme	Works as determined on property plan and catchment plan implemented to protect problem areas
Integrated surface water management	To reduce flooding, inundation and waterlogging caused by surface water moving between properties	Form drainage groups including Councils, DWR and CaLM to assist with waterways and drainage proposals	Safe disposal of surface water without adversely affecting the rights of the community or individual landholders

Information : CaLM, DWR, NSW Ag, Consultants, (Vic), farm consultants, Hume Shire, and other Landcare group

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METHODS TO ADDRESS ISSUES

Problem : Sheet erosion hazard

Action : Maintain adequate protective cover on pasture and cropped areas at all times

Recommendation	Reason	Method	Target Result
Implement recommendation for "use pasture/crops to increase soil water use".	(See above sections)	(see above sections)	(See above sections)
Maintain cover during autumn break and cyclic drought	Period of least cover and greatest risk of erosion	> 70% pasture protects land from sheet erosion.	
Restrict cropping to suitable land and use conservation farming techniques.	Over cultivation and cropping of unsuitable slopes and soil lead to erosion, physical deterioration of soil, contamination of waterways, and recharge	Maintain adequate stored fodder and grain, and reserve paddocks eg. lucerne Avoid cropping unsuitable land	Use land according to it's capability and not cause degradation on or off site. Priorities being areas of problem soils, high recharge and high watertable levels
Promote and implement conservation farming techniques on cropped land	To maintain cover, reduce erosion risk and the need for earthworks	Adopt reduced/or direct drill tillage particularly pasture establishment	All cropped areas
Implement integrated earthworks design to reduce paddock erosion and safe disposal of runoff	To protect steeper and longer slopes expose crop land from sheet and rill erosion	Adopt reduced/or direct drill tillage. Maintain soil organic carbon levels by retaining crop/pasture residue, using rotations with an extended pasture phase, including adequate legumes Property planning with CaLM input	Regular cropped areas at most risk

Information : CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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METHODS TO ADDRESS ISSUES

Problem : Gully erosion

Action : Treat active gullies, and their causes

Recommendation	Reason	Method	Target Result
Practice good management on catchment by implementing recommendations for "sheet erosion"	Runoff and sheet erosion activates gully erosion	(see above section)	Stabilised shallow and less active gullies
Treat active gullies and trap sediment within channel systems	<p>Gullies cause management problems, productivity decline and decrease land value</p> <p>Off site gully erosion causes sedimentation of waterways, reduced water quality, turbidity and nutrient and algae blooms</p>	<p>Identify active gullies in property/catchment plans</p> <p>Dam and rehabilitate minor gullies</p> <p>Fence major gullies and surrounds, install sediment traps and plant out with trees, shrubs etc.,</p> <p>Divert water if possible, maintain works (banks etc)</p> <p>Encourage special uses agroforestry, apiary, bird habitat etc.</p>	<p>Success of any earthworks or structures constructed is ensured.</p> <p>Reduced off site problems caused by gully erosion, and better utilised gullied areas increasing value to the landholder</p>

Information : CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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METHODS TO ADDRESS ISSUES

Problem : Streambank erosion

Action : Treat active areas and reduce risk of further outbreaks

Recommendation	Reason	Method	Target Result
<p>Implement recommendation for "sheet and gully" erosion.</p> <p>Stabilise active streambank erosion, and manage riparian areas to maintain stable cover on banks</p>	<p>Streambank erosion often occurs below areas affected by sheet and gully erosion</p> <p>Streambank erosion results in loss of productive alluvial soil, damage to public and private infrastructure</p> <p>Streambank erosion leads to reduced water quality and deterioration of riverine habitat</p>	<p>(see above sections)</p> <p>Fence channel and channel surrounds, plant tree shrubs and maintain cover</p> <p>Investigate past realignments, culverts, bridges etc. as causes of problem Assess possible channel works to reduce problem</p> <p>Provide alternative stock watering points</p>	<p>(see above sections)</p> <p>Areas of streambank erosion identified on property plans and catchment plan Strategy for treatment developed.</p>

Information : CaLM, DWR, NSW Ag, Consultants, and other Landcare groups

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5.2 Specific Points

(a) Degradation mapping

- * landholders to evaluate maps and data provided with this report
- * update erosion and salinity data, particularly in eastern subcatchments. This will largely have been achieved by Galong and Binalong subgroup catchment planning with Natalie Brown
- * gather information on soil acidity, as this is a common thread to several forms of degradation, and directly related to production and productivity
- * support landholders in subcatchment to undertake more detailed catchment planning. The priority subcatchments are:-

(b) Groundwater/salinity

- * hydrogeological assessment to be undertaken for the entire catchment. Priority areas are nominated in Section 4.2 (d)
- * continue to monitor watertable movement, and expansion or decline of waterlogged and saline discharge areas.

(c) Soil Erosion

- * prepare pasture management guidelines for poorer grazing lands and timbered lands
- * encourage the treatment of major gully erosion and streambank erosion. Priority areas are nominated in Section 4.2 (a) and (b). Works to be undertaken in association with the Soil Conservation Service and Department of Water Resources and possible assistance with incentives/funding.

(d) Streambank erosion

- * contact the Department of Water Resources to obtain specialist information and advice to address streambank erosion
- * determine likely causes and appropriate action to existing and anticipated problems.

(e) Property planning and further catchment planning

- * continue to encourage property planning in all areas
 - group workshops are effective for raising the awareness of catchment related problems and improved land management
 - at least one comprehensive individual property plan in each

subcatchment would be helpful to provide an example of the preferred fully integrated approach. Existing GIS property plans to be utilised where they have been undertaken (Section 4.9)

- * use existing property plans as models for improved management and information flow to farmers slower to new techniques
- * encourage tree regeneration/replanting of low productivity and/or degraded areas

(f) Liaison

- * Landcare groups and members to discuss issues and proposed solutions with other Landcare groups
- * in conjunction with Rural Lands Protection Board, develop a co-ordinated long term control program to address:
 - weeds on private and public land
 - vermin/feral animals on private and public land
- * involve Shires and other relevant Agencies in the development of catchment management plans, and site specific actions affecting public land (eg roads, rail, underground cables, power lines, etc).

(g) Catchment Policy:

- * new land developments should consider the catchment-wide perspective as well as the local affects.
- * develop an integrated catchment strategy for the whole landcare area, and Action Plans for individual subcatchments as supported by landholders.

6. CONCLUSIONS

Landcare and Agency activity, such as demonstrations, property planning workshops, and catchment planning in the eastern subcatchments have drawn attention to the land degradation issues in the catchment.

This report, and associated maps, presents land degradation data for the whole of the catchment affecting the Harden Landcare group. The problems of rising groundwater levels, salinity, tree decline, induced soil acidity, the predominance of annual pastures, soil structure decline and erosion are significant. Land degradation in some Harden subcatchment is significant at a regional scale.

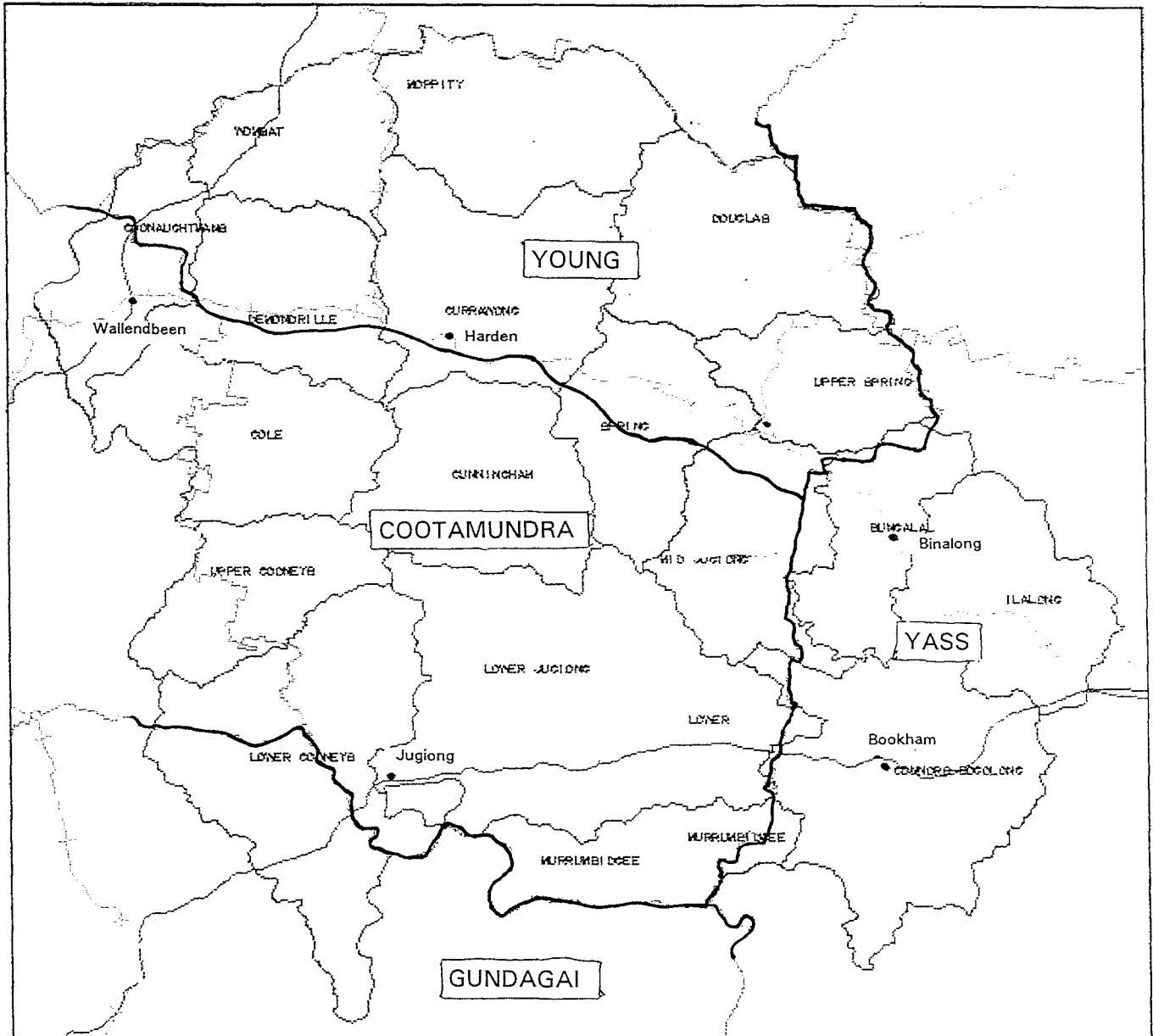
The different types of degradation should not be viewed in isolation. Many are interrelated, and not addressing one can have a detrimental effect on the other issues. More important, treating one problem (eg acidity) can have a beneficial effect on treating other forms of land degradation. In mixed farming and cropping areas, addressing water balance problems is not as straight forward as in grazing areas. Solutions to problems will be more integrated, involving landholders reassessing their crop and pasture management and manipulating their crop types and rotation systems.

The preparation of catchment or subcatchment plans and integrated individual property plans is probably the best way to move towards overcoming the effects of land degradation. Much has been done to show the management techniques to address land degradation in the Harden area (see Appendix D). This could be further enhanced by liaison with other local landcare groups and support Agencies. There are many active landcare groups which have similar land use and problems as the Harden group, who are similarly working towards solution.

For example, the West Hume Landcare Group have received NLP funds to produce "Economic Assessment for Land and Water Management Plans". A consultant will be undertaking various analyses including "What if we do nothing?". (Contact Mr Bob Holdworth - West Hume Landcare on (060) 293237 for further information). A list of Landcare groups in the Harden region is presented in Appendix C.

Similarly CaLM and NSW Agriculture have prepared relevant material such as "Dryland Salinity - 5. Crop Management for Central and Southern NSW". Rutherglen Research Centre and the Agricultural Research Institute (Wagga) have been undertaking study on acidity for several years. National Parks and Wildlife Service can assist with habitat and biodiversity considerations. The Soil Conservation Service has been assisting landholders to address soil erosion for over 50 years. Now incorporated into the Department of Land and Water Conservation, it is the State's front line land management agency. It is recommended the group liaise widely to obtain a multi-disciplinary or holistic approach to property planning, catchment planning and land management.

APPENDIX A - SOIL CONSERVATION SERVICE DISTRICT BOUNDARIES



APPENDIX B - DETAILED GIS DATA FOR SUBCATCHMENTS

Legend for Land Degradation Classes

AREAL FEATURES			
Code	Erosion Class	Sub-Class	SOILOSS (tonnes/ha/yr)
11 15	No appreciable	Salting	
21 22 23 24 25	Sheet	Minor Moderate Severe Extreme Salting	< 1 1-5 5-10 10-25 > 25
31 32 33 34	Wind	Minor Moderate Severe Extreme	1-10 10-20 20-40 > 40
41 42 43 44 45	Rill	Minor Moderate Severe Extreme Salting	1-5 5-10 10-25 > 25
91 92 93 94	Mass movement	Slumps Slides Soil debris avalanche Rock debris avalanche	

LINEAR FEATURES			
Code	Erosion Class	Description	Depth
51 52 53 54 55	Minor gully	Isolated discontinuous linear gullies, confined to primary or minor drainage lines Salting	< 1.5 m 1.5-3.0 m 3.0-6.0 m > 6.0 m -
61 62 63 64 65	Moderate gully	Continuous linear gullies confined to primary or drainage lines Salting	< 1.5 m 1.5-3.0 m 3.0-6.0 m > 6.0 -
71 72 73 74 75	Severe gully	Discontinuous or continuous gullies branching into minor drainage lines or multiple branching within primary drainage lines Salting	< 1.5 m 1.5-3.0 m 3.0-6.0 m > 6.0
81 82 83 84 85	Extreme	Discontinuous or continuous branching gullies or sub-parallel gullies Salting	< 1.5 m 1.5-3.0 m 3.0-6.0 m > 6.0 m -
101 102 103 104	Streambank		> 1.5 m 1.5-3.0 m 3.0-6.0 m > 6.0 m

WOMBAT SUBCATCHMENT (MAPSHEET - 8529)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
WOMBAT.11	6864.59	12	68.12
WOMBAT.15	99.20	21	0.98
WOMBAT.21	314.23	10	3.12
WOMBAT.22	1746.83	36	17.33
WOMBAT.23	1037.90	21	10.30
WOMBAT.24	1.34	1	0.01
WOMBAT.25	6.21	2	0.06
WOMBAT.41	5.89	3	0.06
WOMBAT.45	1.42	4	0.01
TOTAL IN HECTARES	10077.62	110	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
WOMBAT.51	390.11	1	8.58
WOMBAT.61	1092.13	3	24.01
WOMBAT.62	1049.32	1	23.07
WOMBAT.65	291.81	1	6.42
WOMBAT.71	436.51	2	9.60
WOMBAT.72	1288.93	3	28.34
TOTAL IN METERS	4548.81	11	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
WOMBAT.C	2260.36	36	22.43
WOMBAT.H	839.94	32	8.33
WOMBAT.M	1.62	1	0.02
WOMBAT.P	6894.87	39	68.42
WOMBAT.T	80.83	2	0.80
TOTAL IN HECTARES	10077.62	110	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
WOMBAT.2	300.04	3	2.98
WOMBAT.3	8829.73	1	87.62
WOMBAT.4	858.63	29	8.52
WOMBAT.5	45.75	1	0.45
WOMBAT.6	43.47	3	0.43
TOTAL IN HECTARES	10077.62	37	100.00

DEMONDRIE CREEK SUBCATCHMENT (MAPSHEET - 8528 8529)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
DEMONDR.11	10036.49	17	77.73
DEMONDR.15	106.27	22	0.82
DEMONDR.21	429.69	5	3.33
DEMONDR.22	858.17	25	6.65
DEMONDR.23	1428.95	26	11.07
DEMONDR.25	28.23	5	0.22
DEMONDR.41	8.82	6	0.07
DEMONDR.42	13.92	3	0.11
DEMONDR.45	1.67	3	0.01
TOTAL IN HECTARES	12912.21	112	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
DEMONDR.101	512.45	1	1.99
DEMONDR.51	7343.49	10	28.48
DEMONDR.52	1635.83	2	6.34
DEMONDR.61	7172.80	14	27.82
DEMONDR.62	749.76	1	2.91
DEMONDR.65	1080.60	3	4.19
DEMONDR.71	378.94	1	1.47
DEMONDR.81	3926.44	8	15.23
DEMONDR.82F	2985.27	5	11.58
TOTAL IN METERS	25785.58	45	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
DEMONDR.C	2301.20	53	17.82
DEMONDR.H	9.66	1	0.07
DEMONDR.M	9.42	2	0.07
DEMONDR.P	10538.62	48	81.62
DEMONDR.T	53.32	8	0.41
TOTAL IN HECTARES	12912.21	112	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
DEMONDR.2	41.87	2	0.32
DEMONDR.3	6093.91	15	47.19
DEMONDR.4	5117.60	29	39.63
DEMONDR.5	225.19	9	1.74
DEMONDR.6	1406.66	20	10.89
DEMONDR.M	26.99	1	0.21
TOTAL IN HECTARES	12912.21	76	100.00

COONAUGHTMANS CREEK SUBCATCHMENT (MAPSHEET - 8528 8529)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
COONAUT.11	7000.70	15	74.75
COONAUT.15	79.95	16	0.85
COONAUT.21	447.71	14	4.78
COONAUT.22	1428.41	30	15.25
COONAUT.23	345.63	8	3.69
COONAUT.25	60.76	8	0.65
COONAUT.41	2.07	1	0.02
TOTAL IN HECTARES	9365.24	92	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
COONAUT.51	1164.44	1	32.64
COONAUT.61	833.83	3	23.37
COONAUT.71	639.69	1	17.93
COONAUT.75	929.60	1	26.06
TOTAL IN METERS	3567.56	6	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
COONAUT.BC	14.66	1	0.16
COONAUT.C	2195.94	50	23.45
COONAUT.H	15.53	3	0.17
COONAUT.M	2.07	1	0.02
COONAUT.P	7018.87	29	74.95
COONAUT.T	68.46	7	0.73
COONAUT.U	49.69	1	0.53
TOTAL IN HECTARES	9365.24	92	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
COONAUT.2	268.69	2	2.87
COONAUT.3	7656.89	7	81.76
COONAUT.4	1364.70	22	14.57
COONAUT.6	34.32	3	0.37
COONAUT.U	40.65	1	0.43
TOTAL IN HECTARES	9365.23	35	100.00

COLE SUBCATCHMENT - MAPSHEET NUMBERS - 8528

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
COLE.11	10595.66	7	72.70
COLE.15	225.92	21	1.55
COLE.21	58.26	7	0.40
COLE.22	2068.25	27	14.19
COLE.23	1461.52	22	10.03
COLE.25	114.91	6	0.79
COLE.41	19.94	8	0.14
COLE.42	8.58	3	0.06
COLE.44	5.44	1	0.04
COLE.45	16.01	5	0.11
TOTAL IN HECTARES	14574.51	107	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
COLE.61	13949.16	20	71.66
COLE.62	1467.98	3	7.54
COLE.65	2148.02	3	11.03
COLE.75	375.18	1	1.93
COLE.81	247.71	3	1.27
COLE.82	568.56	1	2.92
COLE.85	709.84	1	3.65
TOTAL IN METERS	19466.44	32	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
COLE.C	3553.28	55	24.38
COLE.Cb	80.85	1	0.55
COLE.P	10850.88	48	74.45
COLE.Pb	82.29	2	0.56
COLE.T	7.20	1	0.05
TOTAL IN HECTARES	14574.51	107	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
COLE.2	79.43	1	0.54
COLE.3	6035.20	1	41.41
COLE.4	6720.98	24	46.11
COLE.5	720.38	22	4.94
COLE.6	1018.52	30	6.99
TOTAL IN HECTARES	14574.51	78	100.00

UPPER CONNEYS SUBCATCHMENT - MAPSHEET NUMBERS - 8528

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
BEGANCK.11	8734.64	2	85.21
BEGANCK.15	82.64	16	0.81
BEGANCK.21	569.29	11	5.55
BEGANCK.22	452.36	9	4.41
BEGANCK.23	327.80	4	3.20
BEGANCK.24	1.46	3	0.01
BEGANCK.25	44.94	2	0.44
BEGANCK.41	29.93	5	0.29
BEGANCK.42	6.63	1	0.06
BEGANCK.45	0.87	1	0.01
TOTAL IN HECTARES	10250.55	54	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
BEGANCK.61	2661.00	7	68.74
BEGANCK.71	656.05	1	16.95
BEGANCK.75	553.89	1	14.31
TOTAL IN METERS	3870.93	9	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
BEGANCK.C	804.31	18	7.85
BEGANCK.P	9437.59	35	92.07
BEGANCK.T	8.65	1	0.08
TOTAL IN HECTARES	10250.55	54	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
BEGANCK.3	921.73	7	8.99
BEGANCK.4	6480.06	6	63.22
BEGANCK.5	894.78	20	8.73
BEGANCK.6	1768.50	15	17.25
BEGANCK.7	185.48	4	1.81
TOTAL IN HECTARES	10250.55	52	100.00

MOPPITY CREEK SUBCATCHMENT (MAPSHEET - 8529)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
MOPPITY.11	10935.81	23	74.34
MOPPITY.15	82.07	8	0.56
MOPPITY.21	174.42	8	1.19
MOPPITY.22	946.20	28	6.43
MOPPITY.23	2047.26	32	13.92
MOPPITY.24	483.29	6	3.29
MOPPITY.25	1.42	1	0.01
MOPPITY.41	8.73	2	0.06
MOPPITY.42	17.60	7	0.12
MOPPITY.43	9.18	2	0.06
MOPPITY.45	4.68	1	0.03
TOTAL IN HECTARES	14710.65	118	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
MOPPITY.51	1237.15	2	4.58
MOPPITY.61	2957.49	7	10.96
MOPPITY.62	8047.44	13	29.81
MOPPITY.71	5853.41	22	21.68
MOPPITY.72	5692.44	6	21.09
MOPPITY.73	2098.72	2	7.77
MOPPITY.82	449.66	5	1.67
MOPPITY.85	658.55	1	2.44
TOTAL IN METERS	26994.85	58	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
MOPPITY.BC	402.03	10	2.73
MOPPITY.BP	421.34	9	2.86
MOPPITY.C	3183.10	60	21.64
MOPPITY.FP	2.77	1	0.02
MOPPITY.H	13.59	2	0.09
MOPPITY.M	0.92	1	0.01
MOPPITY.P	10148.13	28	68.98
MOPPITY.T	538.77	7	3.66
TOTAL IN HECTARES	14710.65	118	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
MOPPITY.2	323.11	5	2.20
MOPPITY.3	9931.14	3	67.51
MOPPITY.4	3112.52	24	21.16
MOPPITY.5	1000.73	3	6.80
MOPPITY.6	83.14	2	0.57
MOPPITY.8	257.31	2	1.75
MOPPITY.S.F.	2.71	4	0.02
TOTAL IN HECTARES	14710.65	43	100.00

MURRUMBIDGEE SUBCATCHMENT - MAPSHEET NUMBERS - 8528 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
MURRUMB.11	4472.50	11	47.49
MURRUMB.21	3285.24	11	34.88
MURRUMB.22	1508.37	9	16.02
MURRUMB.23	54.80	2	0.58
MURRUMB.41	36.56	3	0.39
MURRUMB.42	0.86	1	0.01
MURRUMB.43	26.30	3	0.28
MURRUMB.93	33.00	4	0.35
TOTAL IN HECTARES	9417.63	44	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
MURRUMB.101	2723.24	1	8.14
MURRUMB.102	1518.09	2	4.54
MURRUMB.51	15965.90	27	47.74
MURRUMB.52	1305.28	3	3.90
MURRUMB.61	6798.45	22	20.33
MURRUMB.62	860.67	1	2.57
MURRUMB.71	2430.92	10	7.27
MURRUMB.82	1508.14	3	4.51
MURRUMB.83	335.35	1	1.00
TOTAL IN METERS	33446.05	70	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
MURRUMB.C	45.19	1	0.48
MURRUMB.P	8919.59	36	94.71
MURRUMB.T	452.85	7	4.81
TOTAL IN HECTARES	9417.63	44	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
MURRUMB.2	304.92	2	3.24
MURRUMB.4	2372.05	17	25.19
MURRUMB.5	828.77	8	8.80
MURRUMB.6	3319.93	16	35.25
MURRUMB.7	2482.98	11	26.37
MURRUMB.8	108.99	2	1.16
TOTAL IN HECTARES	9417.63	56	100.00

BUNGALAL CREEK SUBCATCHMENT - MAPSHEET NUMBERS - 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
BUN,BIN.11	958.38	7	10.27
BUN,BIN.21	7761.58	9	83.13
BUN,BIN.22	450.54	9	4.83
BUN,BIN.23	2.45	1	0.03
BUN,BIN.24	2.82	1	0.03
BUN,BIN.44	160.62	1	1.72
TOTAL IN HECTARES	9336.40	28	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
BUN,BIN.101	11684.77	9	12.37
BUN,BIN.102	3567.84	5	3.78
BUN,BIN.103	617.48	1	0.65
BUN,BIN.51	7837.85	11	8.30
BUN,BIN.51B	3084.54	4	3.27
BUN,BIN.51F	2059.29	4	2.18
BUN,BIN.61	18995.14	30	20.12
BUN,BIN.61F	8651.80	13	9.16
BUN,BIN.62	1249.38	1	1.32
BUN,BIN.62F	4673.74	9	4.95
BUN,BIN.71	13165.28	29	13.94
BUN,BIN.71F	5866.87	9	6.21
BUN,BIN.81	7740.23	18	8.20
BUN,BIN.81B	1133.58	1	1.20
BUN,BIN.81F	2469.72	3	2.62
BUN,BIN.82	1631.96	5	1.73
TOTAL IN METERS	94429.47	152	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
BUN,BIN.BC	30.83	1	0.33
BUN,BIN.BP	70.55	3	0.76
BUN,BIN.C	308.83	5	3.31
BUN,BIN.M	2.82	1	0.03
BUN,BIN.P	8721.14	14	93.41
BUN,BIN.PB	11.98	1	0.13
BUN,BIN.T	13.30	1	0.14
BUN,BIN.U	176.95	2	1.90
TOTAL IN HECTARES	9336.40	28	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
BUN,BIN.4	4338.27	15	46.47
BUN,BIN.5	3303.80	19	35.39
BUN,BIN.6	1493.74	22	16.00
BUN,BIN.7	36.85	1	0.39
BUN,BIN.U	163.74	1	1.75
TOTAL IN HECTARES	9336.40	58	100.00

DOUGLAS SUBCATCHMENT - MAPSHEET NUMBERS - 8528 8529 8628 8629

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
DOUGLAS.11	4411.24	16	28.39
DOUGLAS.15	5.50	1	0.04
DOUGLAS.21	5368.29	25	34.55
DOUGLAS.22	3592.25	33	23.12
DOUGLAS.23	2151.84	12	13.85
DOUGLAS.41	2.23	2	0.01
DOUGLAS.42	7.06	1	0.05
TOTAL IN HECTARES	15538.41	90	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
DOUGLAS.101	7504.30	4	11.81
DOUGLAS.102	3416.61	7	5.38
DOUGLAS.51	12354.66	19	19.44
DOUGLAS.51F	3191.10	4	5.02
DOUGLAS.52	1209.33	1	1.90
DOUGLAS.53	1393.68	3	2.19
DOUGLAS.55	722.15	1	1.14
DOUGLAS.61	15130.76	26	23.81
DOUGLAS.61F	1626.56	2	2.56
DOUGLAS.62	1936.97	3	3.05
DOUGLAS.71	9739.27	17	15.32
DOUGLAS.72	821.02	1	1.29
DOUGLAS.73	2798.70	2	4.40
DOUGLAS.81	1112.62	5	1.75
DOUGLAS.83	600.11	1	0.94
TOTAL IN METERS	63557.85	96	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
DOUGLAS.C	5920.61	51	38.10
DOUGLAS.Cb	5.40		0.03
DOUGLAS.P	8815.75	3	56.74
DOUGLAS.Pb	0.37	1	0.00
DOUGLAS.T	796.27	5	5.12
TOTAL IN HECTARES	15538.41	90	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
DOUGLAS.2	453.85	3	2.92
DOUGLAS.3	10138.49	9	65.25
DOUGLAS.4	1868.31	25	12.02
DOUGLAS.5	1650.60	16	10.62
DOUGLAS.6	855.47	7	5.51
DOUGLAS.7	92.48	2	0.60
DOUGLAS.8	479.20	2	3.08
TOTAL IN HECTARES	15538.41	64	100.00

UPPER SPRING CREEK SUBCATCHMENT - MAPSHEET - 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
UPP_SPR.11	2845.36	6	32.53
UPP_SPR.21	4194.49	13	47.95
UPP_SPR.22	1503.65	7	17.19
UPP_SPR.24	8.86	1	0.10
UPP_SPR.42	194.36	2	2.22
TOTAL IN HECTARES	8746.72	29	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
UPP_SPR.101	18504.03	15	23.20
UPP_SPR.51	8969.44	11	11.24
UPP_SPR.52	687.59	1	0.86
UPP_SPR.52B	529.55	1	0.66
UPP_SPR.61	2472.27	4	3.10
UPP_SPR.61F	846.35	1	1.06
UPP_SPR.63	879.02	1	1.10
UPP_SPR.71	31541.81	62	39.54
UPP_SPR.72	9555.88	20	11.98
UPP_SPR.81	311.27	1	0.39
UPP_SPR.83	5478.53	10	6.87
TOTAL IN METERS	79775.74	127	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
UPP_SPR.C	2654.03	11	30.34
UPP_SPR.Cb	34.40	1	0.39
UPP_SPR.M	8.86	1	0.10
UPP_SPR.P	5859.55	13	66.99
UPP_SPR.PS	9.81	1	0.11
UPP_SPR.Pb	180.07	2	2.06
TOTAL IN HECTARES	8746.72	29	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
UPP_SPR.2	92.53	1	1.06
UPP_SPR.3	3865.78	1	44.20
UPP_SPR.4	2071.95	14	23.69
UPP_SPR.5	1488.40	11	17.02
UPP_SPR.6	1228.06	12	14.04
TOTAL IN HECTARES	8746.72	39	100.00

SPRING CREEK SUBCATCHMENT - MAPSHEET NUMBERS - 8528 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
SPRING.11	8011.63	12	70.18
SPRING.15	13.92	3	0.12
SPRING.21	190.76	8	1.67
SPRING.22	2088.92	16	18.30
SPRING.23	459.19	13	4.02
SPRING.24	299.78	3	2.63
SPRING.41	28.18	13	0.25
SPRING.42	39.57	10	0.35
SPRING.43	54.89	4	0.48
SPRING.44	228.60	6	2.00
TOTAL IN HECTARES	11415.44	88	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
SPRING.51	2283.68	6	5.76
SPRING.51F	1532.50	2	3.86
SPRING.61	26365.41	51	66.47
SPRING.62	1703.66	2	4.30
SPRING.72	704.17	1	1.78
SPRING.81	2691.80	7	6.79
SPRING.82	4382.74	7	11.05
TOTAL IN METERS	39663.95	76	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
SPRING.C	2906.55	40	25.46
SPRING.Cb	213.63	3	1.87
SPRING.Cf	38.56	1	0.34
SPRING.M	1.88	1	0.02
SPRING.P	8155.99	39	71.45
SPRING.Pb	83.42	3	0.73
SPRING.T	15.43	1	0.14
TOTAL IN HECTARES	11415.44	88	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
SPRING.3	3219.00	3	28.20
SPRING.4	5866.83	14	51.39
SPRING.5	1574.97	25	13.80
SPRING.6	754.64	7	6.61
TOTAL IN HECTARES	11415.44	49	100.00

MID JUGIONG SUBCATCHMENT - MAPSHEET NUMBERS - 8528 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
MID JUG.11	2514.17	6	20.50
MID JUG.21	5740.07	2	46.80
MID JUG.22	3611.34	23	29.45
MID JUG.23	143.99	5	1.17
MID JUG.24	26.05	1	0.21
MID JUG.41	5.15	1	0.04
MID JUG.42	119.68	5	0.98
MID JUG.44	78.77	4	0.64
MID JUG.93	25.41	3	0.21
TOTAL IN HECTARES	12264.63	50	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
MID JUG.101	1157.91	2	2.28
MID JUG.103	790.02	2	1.55
MID JUG.51	15763.43	34	31.01
MID JUG.61	22166.20	46	43.60
MID JUG.61F	2464.41	7	4.85
MID JUG.63	810.91	1	1.60
MID JUG.71	7683.62	10	15.11
TOTAL IN METERS	50836.50	102	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
MID JUG.C	1374.92	14	11.21
MID JUG.P	10692.16	28	87.18
MID JUG.PS	197.55	8	1.61
TOTAL IN HECTARES	12264.63	50	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
MID JUG.3	93.12	1	0.76
MID JUG.4	6189.16	10	50.46
MID JUG.5	2532.83	25	20.65
MID JUG.6	2316.52	20	18.89
MID JUG.7	1133.01	8	9.24
TOTAL IN HECTARES	12264.63	64	100.00

CURRAWONG CREEK SUBCATCHMENT (MAPSHEET - 8528 8529)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
CURAWOG.11	12230.13	18	70.99
CURAWOG.15	62.83	8	0.36
CURAWOG.21	318.29	8	1.85
CURAWOG.22	2966.51	42	17.22
CURAWOG.23	1582.30	25	9.18
CURAWOG.25	35.58	4	0.21
CURAWOG.41	24.99	8	0.15
CURAWOG.42	7.64	1	0.04
CURAWOG.45	0.09	1	0.00
TOTAL IN HECTARES	17228.36	115	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
CURAWOG.51	1579.46	3	5.73
CURAWOG.52	1899.32	1	6.89
CURAWOG.61	7144.88	16	25.93
CURAWOG.62	8793.43	19	31.91
CURAWOG.63	667.55	1	2.42
CURAWOG.71	4540.35	7	16.48
CURAWOG.72	1080.57	1	3.92
CURAWOG.72 u	1848.59	3	6.71
TOTAL IN METERS	27554.13	51	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
CURAWOG.BC	80.32	3	0.47
CURAWOG.BP	323.95	4	1.88
CURAWOG.C	4787.85	74	27.79
CURAWOG.P	11665.43	31	67.71
CURAWOG.T	6.26	1	0.04
CURAWOG.U	364.54	2	2.12
TOTAL IN HECTARES	17228.36	115	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
CURAWOG.2	251.86	2	1.46
CURAWOG.3	13788.67	5	80.04
CURAWOG.4	2294.84	42	13.32
CURAWOG.5	337.49	6	1.96
CURAWOG.6	132.15	6	0.77
CURAWOG.U	421.59	1	2.45
TOTAL IN HECTARES	17226.60	62	100.00

CUNNINGHAM CREEK SUBCATCHMENT (MAPSHEET - 8528)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
CUNIHAM.11	11610.14	3	77.86
CUNIHAM.15	31.75	2	0.21
CUNIHAM.21	17.66	1	0.12
CUNIHAM.22	1296.34	33	8.69
CUNIHAM.23	1470.80	26	9.86
CUNIHAM.24	398.78	6	2.67
CUNIHAM.41	44.91	13	0.30
CUNIHAM.42	32.66	10	0.22
CUNIHAM.43	8.91	2	0.06
CUNIHAM.45	0.26	1	0.00
TOTAL IN HECTARES	14912.22	97	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
CUNIHAM.61	13361.06	27	66.24
CUNIHAM.71	4656.41	25	23.09
CUNIHAM.81	1553.00	4	7.70
CUNIHAM.83	599.09	2	2.97
TOTAL IN METERS	20169.55	58	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
CUNIHAM.BC	158.61	3	1.06
CUNIHAM.C	3025.44	69	20.29
CUNIHAM.P	11728.17	25	78.65
TOTAL IN HECTARES	14912.22	97	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
CUNIHAM.3	2531.40	9	16.98
CUNIHAM.4	8866.43	7	59.46
CUNIHAM.5	655.34	12	4.39
CUNIHAM.6	2859.05	16	19.17
TOTAL IN HECTARES	14912.21	44	100.00

COONEYS CREEK SUBCATCHMENT (MAPSHEET - 8528)

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
COONEYS.11	20101.13	23	80.25
COONEYS.15	3.52	2	0.01
COONEYS.21	3225.95	31	12.88
COONEYS.22	419.82	12	1.68
COONEYS.23	816.94	16	3.26
COONEYS.24	266.88	3	1.07
COONEYS.41	149.03	30	0.59
COONEYS.42	65.36	11	0.26
TOTAL IN HECTARES	25048.64	128	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
COONEYS.101	4931.30	5	13.27
COONEYS.102	2292.74	3	6.17
COONEYS.51	926.23	3	2.49
COONEYS.61	13948.61	29	37.54
COONEYS.62	1441.24	3	3.88
COONEYS.71	4217.87	8	11.35
COONEYS.81	9106.40	28	24.51
COONEYS.83	289.55	1	0.78
TOTAL IN METERS	37153.93	80	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
COONEYS.C	2079.35	44	8.30
COONEYS.P	22872.94	80	91.31
COONEYS.T	96.34	4	0.38
TOTAL IN HECTARES	25048.64	128	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
COONEYS.2	1289.17	10	5.15
COONEYS.3	1130.44	7	4.51
COONEYS.4	12357.18	19	49.33
COONEYS.5	2070.30	28	8.27
COONEYS.6	6895.90	31	27.53
COONEYS.7	1217.87	15	4.86
COONEYS.8	87.79	7	0.35
TOTAL IN HECTARES	25048.64	117	100.00

LOWER JUGIONG SUBCATCHMENT - MAPSHEET NUMBERS - 8528 8628

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
LOW JUG.11	24015.07	14	73.08
LOW JUG.15	16.32	3	0.05
LOW JUG.21	4613.94	16	14.04
LOW JUG.22	2977.38	25	9.06
LOW JUG.23	687.31	18	2.09
LOW JUG.24	178.48	7	0.54
LOW JUG.41	293.93	50	0.89
LOW JUG.42	53.68	12	0.16
LOW JUG.43	1.19	1	0.00
LOW JUG.45	2.70	1	0.01
LOW JUG.93	20.56	2	0.06
TOTAL IN HECTARES	32860.56	149	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
LOW JUG.101	10761.34	7	12.34
LOW JUG.51	16704.45	29	19.15
LOW JUG.51F	1873.18	3	2.15
LOW JUG.52	537.77	1	0.62
LOW JUG.61	25216.25	66	28.92
LOW JUG.62	5977.78	6	6.85
LOW JUG.71	8875.60	18	10.18
LOW JUG.72	13020.20	22	14.93
LOW JUG.81	4240.79	19	4.86
TOTAL IN METERS	87207.37	171	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
LOW JUG.C	1454.85	35	4.43
LOW JUG.Cb	1.09	1	0.00
LOW JUG.M	3.33	1	0.01
LOW JUG.P	31179.56	104	94.88
LOW JUG.PS	12.78	2	0.04
LOW JUG.Pb	28.37	2	0.09
LOW JUG.T	180.59	4	0.55
TOTAL IN HECTARES	32860.56	149	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
LOW JUG.2	509.81	3	1.55
LOW JUG.3	91.67	1	0.28
LOW JUG.4	17942.18	16	54.60
LOW JUG.5	4778.06	32	14.54
LOW JUG.6	8029.58	64	24.44
LOW JUG.7	1463.47	14	4.45
LOW JUG.8	45.78	3	0.14
TOTAL IN HECTARES	32860.55	133	100.00

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
CON, BOG.11	4042.63	26	17.84
CON, BOG.21	14073.13	21	62.11
CON, BOG.22	4354.34	29	19.22
CON, BOG.23	11.18	4	0.05
CON, BOG.24	8.42	1	0.04
CON, BOG.42	52.40	1	0.23
CON, BOG.43	11.70	1	0.05
CON, BOG.44	75.00	2	0.33
CON, BOG.45	3.63	1	0.02
CON, BOG.93	2.13	2	0.01
CON, BOG.94	25.62	1	0.11
TOTAL IN HECTARES	22660.20	89	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
CON, BOG.101	27136.99	23	10.53
CON, BOG.102	22250.88	21	8.63
CON, BOG.51	51832.13	93	20.11
CON, BOG.51B	2531.81	5	0.98
CON, BOG.51F	2784.32	7	1.08
CON, BOG.52	4912.68	12	1.91
CON, BOG.61	40223.77	92	15.61
CON, BOG.61F	4374.83	8	1.70
CON, BOG.62	9026.54	10	3.50
CON, BOG.71	27852.33	47	10.81
CON, BOG.71B	233.12	1	0.09
CON, BOG.71F	7565.57	15	2.94
CON, BOG.72	7734.45	10	3.00
CON, BOG.73	2174.46	5	0.84
CON, BOG.73F	586.08	1	0.23
CON, BOG.81	27866.88	72	10.81
CON, BOG.81F	45.61	1	0.02
CON, BOG.82	9868.25	14	3.83
CON, BOG.82B	739.32	3	0.29
CON, BOG.82F	4907.47	9	1.90
CON, BOG.83	3064.57	7	1.19
TOTAL IN METERS	257712.06	456	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
CON, BOG.BP	64.40	3	0.28
CON, BOG.M	8.42	1	0.04
CON, BOG.P	22170.00	62	97.84
CON, BOG.PB	10.51	1	0.05
CON, BOG.T	406.87	22	1.80
TOTAL IN HECTARES	22660.20	89	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
CON, BOG.4	6832.06	29	30.15
CON, BOG.5	8099.44	18	35.74
CON, BOG.6	6752.74	38	29.80
CON, BOG.7	975.95	16	4.31
TOTAL IN HECTARES	22660.19	101	100.00

RILL AND SHEET EROSION AND MASS MOVEMENT

CODE	AREA	FREQUENCY	PERCENT
ILALONG.11	2611.46	15	19.00
ILALONG.21	8768.32	2	63.80
ILALONG.22	2043.50	12	14.87
ILALONG.23	19.64	1	0.14
ILALONG.24	61.61	4	0.45
ILALONG.25	7.30	3	0.05
ILALONG.42	4.04	1	0.03
ILALONG.44	208.32	1	1.52
ILALONG.45	16.61	2	0.12
ILALONG.94	2.63	1	0.02
TOTAL IN HECTARES	13743.43	42	100.00

STREAMBANK AND GULLY EROSION

CODE	LENGTH	FREQUENCY	PERCENT
ILALONG.101	26984.01	18	15.65
ILALONG.102	4119.59	4	2.39
ILALONG.51	36410.04	60	21.11
ILALONG.51B	463.47	1	0.27
ILALONG.51F	1700.96	4	0.99
ILALONG.52	1852.40	3	1.07
ILALONG.61	28627.44	43	16.60
ILALONG.61F	758.55	1	0.44
ILALONG.62	1982.46	3	1.15
ILALONG.71	28353.16	50	16.44
ILALONG.71F	2424.11	4	1.41
ILALONG.72	11952.63	23	6.93
ILALONG.72F	9449.37	20	5.48
ILALONG.73	4739.46	9	2.75
ILALONG.81	6203.95	18	3.60
ILALONG.82	6452.81	9	3.74
TOTAL IN METERS	172474.41	270	100.00

LANDUSE

CODE	AREA	FREQUENCY	PERCENT
ILALONG.C	258.67	2	1.88
ILALONG.M	12.21	3	0.09
ILALONG.P	13401.80	30	97.51
ILALONG.PS	5.97	1	0.04
ILALONG.Pf	21.40	1	0.16
ILALONG.T	43.38	5	0.32
TOTAL IN HECTARES	13743.43	42	100.00

RURAL LAND CAPABILITY

CODE	AREA	FREQUENCY	PERCENT
ILALONG.4	4412.16	15	32.10
ILALONG.5	6183.51	8	44.99
ILALONG.6	3147.77	19	22.90
TOTAL IN HECTARES	13743.44	42	100.00

APPENDIX C - CONTACTS FOR LANDCARE GROUPS IN THE HARDEN REGION

Alma Park/Pleasant Hills L/C Group
Mrs. Mary Dixon
"Mallemblah"
R.M.B. 118
WALLA WALLA N.S.W. 2659

Bolero Landcare Group
Royce Day
"Glengarry"
ARDLETHAN N.S.W. 2665

Borambola Landcare Group
Mr Geoff Withers
"Old Borambola", Tarcutta Road
WAGGA WAGGA N.S.W. 2650

Burkes Creek Landcare Group
Mr B. Dann
"Roston, R.M.B. 875
WAGGA WAGGA N.S.W. 2650

Coffin Rock Landcare Group
Marlene McRae
R.M.B. 151
OLD JUNEE N.S.W. 2652

Downside Landcare Goup
Janette Donahue
R.M.B. 266, Downside Via
WAGGA WAGGA N.S.W. 2650

Galore Landcare Group
Mrs K. McCleary
"Kingston"
GALORE N.S.W. 2650

Gilmore Landcare Group
James Hayes
"Havilah"
ADELONG N.S.W. 2729

Harden-Murrumburrah Landcare Group
Mr S. Hume
"Colenso"
HARDEN N.S.W. 2587

Harefield Landcare Group
Mr David Lamont
P.O. Box 830
WAGGA WAGGA N.S.W. 2650

Benerembah Landcare Group
Mr I. Blight
"Gum Creek"
WILLBRIGGIE N.S.W. 2680

Bombowlee Goobarragandra Landcare Group
Ms Rebecca Smith
Box 342
TUMUT N.S.W. 2720

Brookong Landcare Group
Mrs A. Doherty
23 Drummond Street
LOCKHART N.S.W. 2656

Carabost Landcare Group
Mr P. Jeffrey
"Coorong" Carabost Road
HUMULA N.S.W. 2652

Conapaira West Landcare Group
Jock Munro
"The Brae"
RANKIN SPRINGS N.S.W. 2669

Dudauman-Frampton Landcare Group
Mr Andy Russel
"Buronga"
COOTAMUNDRA N.S.W. 2590

Gillenbah-Euroley Landcare Group
Mr C. Lott
"Caringal"
NARRANDERA N.S.W. 2700

Green Gully Landcare Group
Cadell Land & Water Management Plan Group
Ms J. Ferguson
RMB 2520
MOAMA N.S.W. 2731

Harden Urban Landcare Group
Lorraine Brown
Albury Street
HARDEN NSW 2587

Holbrook Landcare Group
Mr N. Passelaqua
"Jayfields", RMB 878
WAGGA WAGGA N.S.W. 2650

Houlaghans Valley Landcare Group
Mr K. Lord
"Homeview"
P.O. Box 80
JUNEE N.S.W. 2663

Jindalee Landcare Group
Mr. Andrew Roberts
"Hillside"
COOTAMUNDRA NSW 2590

Junee Reefs Landcare Group
Mr G. Curry
"Glenfield"
ILLABO N.S.W. 2590

Koraleigh District Land & Water
Angela Skipsy
P.O. Box 51
KORALEIGH N.S.W. 2650

Lake Albert Landcare Group
Mr J.A. Simpson
P.O. Box 809
Clifton Mail
WAGGA WAGGA N.S.W. 2650

Lower Lachlan Valley L/Care Group
R.A.P. Circuit
"Waljeera"
HAY N.S.W. 2711

Matong District Landcare Group
Mr Brian Jones
"Cactus"
MATONG N.S.W. 2652

Memagong/Tumbleton
Mr Tony Jenkins
"Tyril Tyril"
YOUNG N.S.W. 2594

Mid Billabong (Illabo) Landcare Group
Andrew Hamilton
"Rosevale"
ILLABO N.S.W. 2590

Morangarell Landcare Group
Mrs Sam Marchant
"Morengarell"
BRIBBAREE N.S.W. 2594

Humula Agriculture Bureau
Mrs Elizabeth McCallum
"Tintenback"
Humula Road
TARCUTTA N.S.W. 2652

Junee Urban Landcare Group
Mrs Debbie Pickles
P.O. Box 235
JUNEE N.S.W. 2663

Kinilibah Landcare Group
M. Margaret Seymour
"Glen Iris"
R.M..B 109
MARRAR N.S.W. 2652

Kyeamba Valley Landcae Group
Mr Mark McMeekin
1 Azalea Place
WAGGA WAGGA N.S.W. 2652

Lower Billabong Landcare Group
Ken Collins
"Billabong Station"
Nangus Via
GUNDAGAI N.S.W. 2722

Lower Tarcutta Landcare Group
Mr R. Heffer
"Deloraine"
TARCUTTA N.S.W. 2652

Mangoplah Landcare Group
Sandy McMaster
"Kaloona"
MANGOPLAH N.S.W. 2652

Methul Landcare Group
Patrick O'Brien
"Kildare"
Methul Via
COOLAMON N.S.W. 270

Mitta Mitta Landcare Group
Mr. Gilbert Champain
"Glen Logie"
BETHUNGRA NSW 2590

Mullengandra Landcare Group
Mr R. Sloane
"Lindfield"
MULLENGANDRA N.S.W. 2642

Myall Park Landcare Group
Mr Rod Gribble
52 Henry Street
YENDA N.S.W. 2681

Oberne-Tarcutta Landcare Group
Mr I. Parsons
P.O. Box 207
TARCUTTA N.S.W. 2652

Scenic Road L/Care Group
Mr B. Walker
"Ellendalee"
WIRRIMAH N.S.W. 2803

Strontian Road Landcare Group
Mr Bruce Whitby
"Wilga"
NARRANDERA N.S.W. 2700

Tumbarumba Landcare Group
Ms Judy Cameron
Jingellic Road
Mannus Via
TUMBARUMBA N.S.W. 2653

Uranquinty Landcare Group
Judy Morton
"Mendip"
RMB 921, Holbrook Road
WAGGA WAGGA N.S.W. 2650

Wakool Landcare Group
Land & Water Management Plan
Mr John Lolicato
"Whymoul"
BARHAM N.S.W. 2732

Wantiool Landcare Group
Mrs S. Heffernan
" Claris Park"
JUNEE N.S.W. 2663

West Hume Landcare Group
Judy Frankenburg
R.M..B 4230
HOWLONG N.S.W. 2643

Yaven Creek Landcare Group
Greg White
"Wongadrah"
ADELONG N.S.W. 2729

Oak Creek Landcare Group
Mr A. Waugh
"Picadilly" Via
COOLAC N.S.W. 2727

Oura Landcare Group
Mr John Mahon
"Hillview"
Oura Via
WAGGA WAGGA N.S.W. 2650

Stockinbingal Landcare Group
Sally Last
"Sunnydale"
STOCKINBINGAL N.S.W. 2725

Trungley Hall Landcare Group
Trevor Penfold
82 Gray Street
TEMORA N.S.W. 2666

Upper Tarcutta Landcare Group
Barbara Adams
"Taradale"
Taradale Road
TUMBARUMBA N.S.W. 2653

Wagga Urban Landcare Steering Committee
Mrs Mary Ann Sheahan
18 Benedict Avenue
San Isadore Via
WAGGA WAGGA N.S.W. 2650

Wantabadgery landcare Group
Mr Fred Hazelwood
"Karrowarra"
R.M.B. 395
JUNEE N.S.W. 2663

Wattle Creek Landcare Group
Mr N. Male
"Marabou"
HENTY N.S.W. 2658

Winchendonvale Landcare Group
Mr G. Wray
"Merindah" RSS 3610
Coolamon Road
TEMORA N.S.W. 2666

Young Community Landcare Group
Larry Wordsworth
P.O. Box 1044
YOUNG N.S.W. 2594

APPENDIX D - ACTIVITIES WITHIN OR RELEVANT TO HARDEN L/C

Young and Cootamundra Soil Conservation District (1987-1994)

1. INVESTIGATIONS AND DATA COLLECTION

- * Salinity Investigations - "Rosemont", Bendick Murrell (1987-1993).
- * Land Degradation Survey - Scenic Road Landcare Project (1989)
- * Land Degradation Survey - Harden Murrumburrah Landcare Group (1990)
- * Piezometer Network
 - Harden Shire Council (1991)
 - Scenic Road Landcare Project (1989) #
 - Young Shire Council (1991) #
- * Electromagnetic Survey of Scenic Road Landcare Project (1990) #
- * Salinity Investigations - "Warringham" Galong (1990)
- * Sustainable Farming Data Base - Harden Murrumburrah Landcare Group (1993)

2. ONGROUND SALT LAND AGRONOMY DEMONSTRATIONS

- * Salt Tolerant Pastures Establishment Trial - "Rosemont" Bendick Murrell (1987) #
- * Agroforestry Demonstration - "Hillcrest" Monteagle (1988) #
- * Casuarina Inoculation Trial - "Lower Solferino" (1988) #
- * Commercial Forestry Trial - "Springview" Young (1989) #
- * Saltbush Species Evaluation Demonstration - "Avoca" Young (1991) #
- * River Red Gum Trial - "Rockcliff" Monteagle (1991) #
- * Discharge Area Revegetation - Scenic Road Landcare Project (1989-92) #
 - "Avoca" (1991)
 - "Homefarm" (1991)
 - "Hillcrest" (1988)
 - "Killarney" (1991)
 - "Ellendale" (1989)
 - "Berton Park" (1991)
 - "South View" (1991)
 - "Yarrah" (1991)
 - "Rosemont" (1991)
 - "Sunnyside" (1989)

not in harden Landcare area but in similar country adjacent

- "Kooramin" (1992)
- "Bankside" (1992)
- "Springview" (1989)
- "Spring Park" (1990)
- "Rockdale" (1991)
- "Sunnyside" (1991)
- "Spring Park" (1990)
- * Upper Cole Creek Salt Action Project - "The Meadow" (1992-)
- * Saline Pasture Establishment Demonstration - "Leacliff" Young (1993) #
- * Salt Action Funding - Harden Murrumburrah Landcare Group
 - "Bobbara Station", Galong 1994/95

3. EARTHWORK AND ENGINEERING DEMONSTRATIONS

- * Sub-surface Drainage Demonstrations
 - "Petal Falls" Kingsvale (1989)
 - "Ellendale" Wirrimah (1989) #
- * Soil Conservation Demonstration - "Colenso" Harden (1989-1991)
- * Plastic Lined Dams
 - "Kikiamah" Thuddungra (1989) #
 - "Fernbank" Crowther (1991) #
- * Roadside Gully Stabilisation Products - Wirrimah (1990) #
- * Bidim Flumes
 - Young Shire Council, Geegullagong Rd (1987) #
 - Young Shire Council, "Orizaba" (1988) #
 - C Anderson, "Springfield" (1989) #
- * Erosion Control Demonstration - Scenic Road L/C Group (1989 -1992) #
 - Storm water pipes, "Torry Hill" (1990)
 - Plastic flume, "Avoca" (1991)
 - Concrete flume, "Narooma" (1990)
 - SCS earthworks, "Homefarm" (1991)
 - SCS earthworks, "Spring Park" (1992)
 - Vegetative flume, "Sunnyside" (1988)
 - Salt trap, "Kayridge" (1992)
 - 300mm trickle pipes, "Yarrah" (1989)
 - Soil Conservation earthworks, "Killarney" (1992)
 - Gully control works, "Coolegong" (1992)
 - Dam spillway repair, Monteagle Stock Route (1990)
 - Soil Conservation earthworks, "The Gums" (1991)
 - Concrete weir - State Rail Authority (1992)
 - Concrete dam spillway - Chinamans Dam Project (1994)
- * Mounding of Saline Sites - Scenic Road Landcare Project (1991) #
 - "Avoca" (1991)
 - "Yarrah" (1991)
 - "Rosemont" (1991)

- "Killarney" (1991)
- * Surface Drainage Demonstration
 - "Cloverdene" Bendick Murrell (1991) #
 - "Sunnyside" Bendick Murrell (1991) #
- * Roadside Batter Stabilisation Trial (1988) #

4. TREE PLANTING

- * Tree Arboretums
 - North Young Primary School (1991) #
 - "Hillcrest" (1992) #
- * Recharge Tree Planting - Scenic Road Landcare Group (1989-1992) #
 - "Stoneridge" (1990)
 - "Heathdale" (1991)
 - "Bundarie" (1992)
 - "Nindethana" (1991)
 - "Cobbadah" (1991)
 - "Solferino" (1989)
 - "Tobruk" (1992)
 - "Rosemont" (1991)
- * Tree Establishment Demonstration-Harden/Murrumburrah L/C Group (1990)
 - "Camden Springs" (1990)
 - "Linden View" (1990)
 - "Derneveagh" (1990)
 - "Milgadara" (1990)
- * Tree Establishment & Herbicide Evaluation
 - "Miltara" Thuddungra (1990) #
 - "Rocky Ponds", Galong (1993)
- * Gravel Pit Restoration - Paradise Pit, Murringo (1991) #
- * Direct Seeding of Trees - Young/Harden (1991-1993)
 - "Colenso" (15.10.91)
 - Scenic Road (27.9.91) #
 - "Sunnyside" Wirrimah (27.9.91) #
 - "Rockdale" (27.9.91) #
 - "Coolegong" (27.9.91) #
 - Harden Shire (27.8.92)
 - "Rocky Ponds" (27.8.92)
 - "Kooramin Bywong" (16.9.92) #
 - "Templemore" (27.8.92) #
 - "Alderley" (15.9.92) #
 - "Windrush" (27.8.92) #
 - Mullany's (15.9.92) #
 - "Dutton Park" (16.9.92) #
 - Scenic Road (28.8.92) #
 - "Rockdale" (28.8.92) #
 - "Fairfields" (28.8.92) #
 - "Coolegong" (28.8.92) #

- Harden Murrumburrah School (1992)
- "Colenso" (27.8.92)
- "Blantyre" (11.10.93) #
- "Colenso" (27.9.93)
- "Rothesay" (7.9.93) #
- "Dutton Park" (11.10.93) #
- "Stoneridge" (11.10.93) #
- "Blantyre" (18.10.93) #
- "Fairfields" (7.9.93) #

5. CONSERVATION FARMING DEMONSTRATIONS

- * Perennial Pasture Establishment Trial
 - "Robin Hill" Wirrimah (1990) #
 - "Kooramin" Monteagle (1993) #
- * Liming Trials - Scenic Road Landcare Project (1990) #
 - "Rockdale" (1990)
 - "Umeralla" (1990)
 - "Bundarie" (1990)
- * Crop Rotation and Lime Trial - "Miltara" (1988-1991) #
- * Modified Tillage Point Trial - "Sunnyside", Harden (1991-1995)
- * Reduced Tillage & Stubble Farming Demonstration - "Rocky Ponds" Galong (1991-1995)
- * Sustainable Farming Trial - "Oxton Park", Harden (1991-1994)
- * Total Catchment Management Demonstrations
 - "Spring View" Young (1989-1992) #
 - "Spring Park" Monteagle (1989-1992) #
- * Land Management Options for Dryland Salinity Control (1992-1994) #
 - "Kooramin" (1992-1994)
 - "Flatview" (1992-1994)
 - "Stoneridge" (1992-1994)
 - "Spring Park" (1992-1994)
 - "Dutton Park" (1992-1994)
 - "Wootoona" (1992-1994)
- * Harden Murrumburrah Landcare Funding - Native Pasture Trial (1994)
 - Moppity property
- * Perennial Pasture Establishment Demonstrations (1994)
 - "Windrush" Young #
 - "Moeyan" Young #

6. PROPOSED PROJECT

- * Farm Forestry Program - " Moppity"

LANDCARE GROUP PROJECTS FUNDING - YASS DISTRICT - Since 1990

GROUP NAME	DATE	FUNDING TYPE	AMOUNT
Salt Action Program - Ostrowski's Jerrawa Demonstration Area - Rehabilitation - earthworks, fencing, tree planting			\$15,000
Salt Action Program - Gorham's Rugby Demonstration Area - Rehabilitation - earthworks, fencing, tree planting			\$15,000
Boorowa & Rye Park L/C Group	90/91	Salt Action - piezometers	\$25,000
Rye Park Landcare Group	90/91	Salt Action Demonstration	\$7,500
Boorowa Community L/C Group	90/91	Salt Action Demonstration	\$8,500
Roger Clarke, Hillrose, Boorowa. Pasture & Tree planting Salinity Demonstration - Lucerne, tree seed, saltbush and piezo's			
Boorowa Community L/C Group	90/91	Salt Action Demonstration	\$9,800
Eric Smith, Frogmore. Vegetation Effects on Ground Water Levels - Fencing, piezos, grass seed & saltbush.			
90/91 Salt Action Program - Rapid Appraisal Techniques for Dryland Salinity, Upper Lachlan Catchment			\$50,000
91/92 " " " " " "			\$60,000
Yass District L/C Group	91/92	S/A Groundwater Monitoring	\$55,750
Yass District L/C Group	91/92	S/A Saltbush & Bluebush	\$13,500
J. Weatherstone, Lyndfield Park, Gunning - W.A. Saltbush & Bluebush Establishment Techniques			
Yass L/C - SCS & DWR	91/92	Salt Action	\$25,000
Yass L/C - SCS & DWR	91/92	S/A Surfwater Upper Lachlan	\$10,000
Boorowa Community L/C Group	91/92	NSCP	\$5,200
Boorowa & Rye Park L/C	92/93	Salt Action	\$30,360
Boorowa Community L/C Group	92/93	Salt Action	\$19,780
Boorowa & Rye Park L/C Groups	92/93	Salt Action	\$30,360
Limestone/Kangiara L/C Group	92/93	Salt Action	\$7,000
Bookham Ag. Bureau(now L/C Group)	92/93	Salt Action	\$10,600
Boorowa Community L/C Group	93/94	NLP	\$137,139
Implementation of the Boorowa River Salinity Catchment Plan (3 yr pasture program)			
Jerrawa Creek L/C Group	93/94	NLP	\$4,700
Rye Park L/C Group	93/94	Salt Action	\$33,100
Salinity Project addressing 13 sites			
Jerrawa Creek L/C Group	94/95	Rivercare - DWR	\$9,130
Rivercare funding on 3 properties: Chain of Ponds protection - Establishment of wetlands, riverbank erosion control.			

Boorowa Com.L/C & B'wa Shire	94/95	NLP	??
Enhancement of Superb Parrot Habitat on Salt Affected area.			
Boorowa Community L/C Group	94/95	NLP	\$77,847
Implementation of Boorowa River Salinity Catchment Plan Stage II.			
Boorowa Community L/C Group	94/95	NLP	\$127,000
Implementation of Boorowa River Salinity Catchment Plan (Year 2)			
Boorowa Community L/C Group	94/95	S/A Allendale Monitoring	??
Monitoring of Catchment Control of Salinity at "Allendale", Boorowa.			
Rye Park Landcare Group	94/95	NLP	\$33,007
Rye Park Landcare Group	94/95	Salt Action	\$12,200
Rye Park Landcare Group	94/95	TCM Enhancement	\$9,200
Rehabilitation of severely salt affected gully -Rye Park/Rugby Road.			
Limestone/Kangiarra L/C Group	94/95	TCM Enhancement	\$10,392
Limestone/Kangiarra L/C Group	94/95	Rivercare - DWR	\$6,580
Clearance of trees from creek, revegetation of creek.			
Limestone/Kangiarra L/C Group	94/95	NLP	\$16,447
Limestone/Kangiarra L/C Group	94/95	Environmental Trust	\$95,100
Rehabilitation of old Kangiarra Copper Mine			
Bookham Landcare Group	94/95	Rivercare - DWR	\$10,870
3 sites for river erosion works			
Burrinjuck Landcare Group	94/95	TCM Enhancement	\$3,250
Construction & materials for shade house			
Yass Urban Landcare Group	94/95	Rivercare - DWR	\$8,410
Removal of Willows from Yass River and Chinamans Creek			
Gundaroo Landcare Group	94/95	Rivercare - DWR	\$8,000
Re-alignment of Creek bed			