

Planning

The northern 300 square miles of Eppalock Catchment were the most severely ravaged by erosion. The part yielding the greatest volume of silt into main streams was, therefore, located immediately adjacent to the site of Lake Eppalock. Soil washed from these eroded lands had a very short distance to travel before being deposited in the storage.

For this reason the Authority concentrated its energies in the earlier years in getting catchment improvement and erosion control works under way in these most severely eroded areas in the near vicinity of the lake.

Individual sub-catchments were delineated and assessed for priority for planning and works.

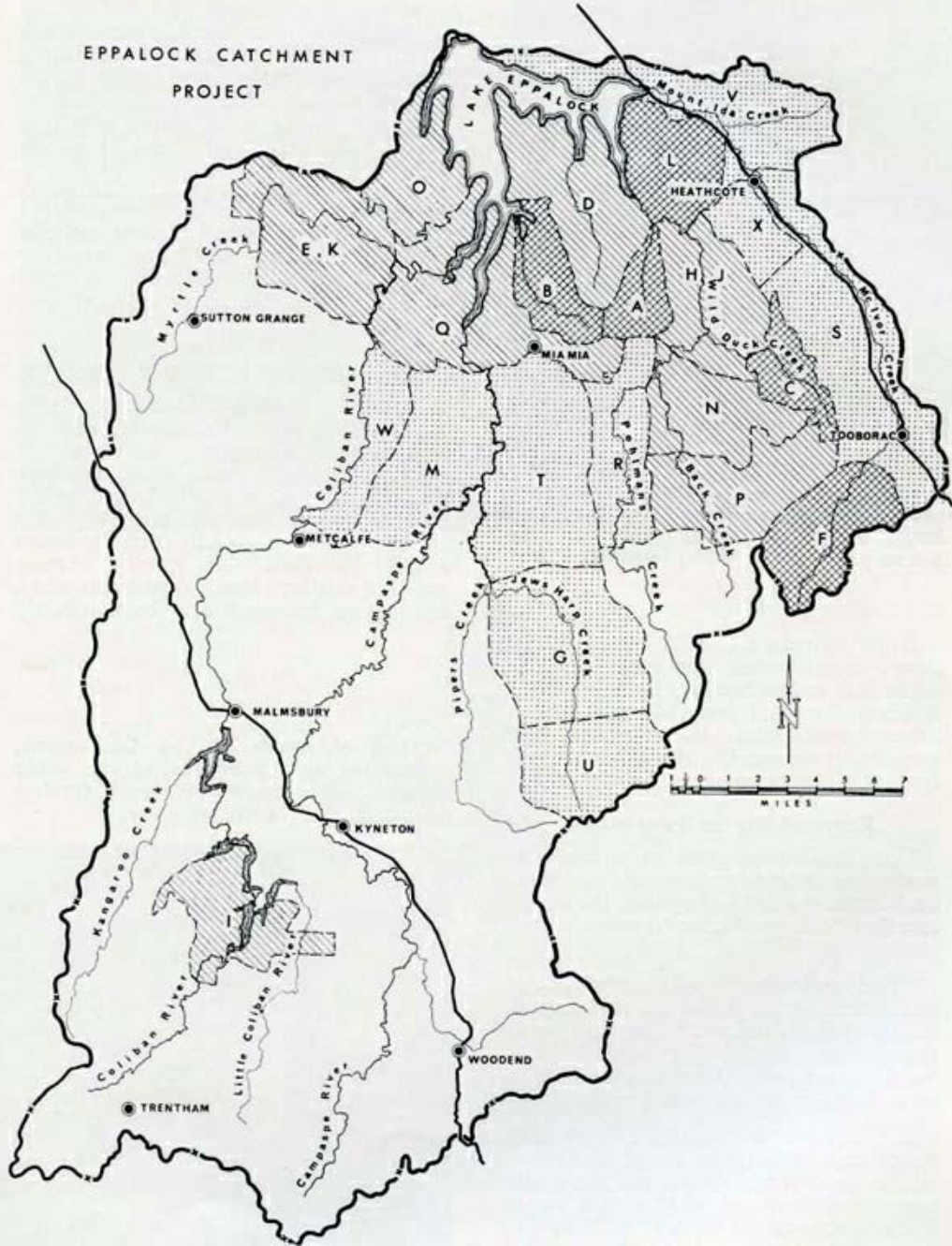
Details of these sub-catchments are set down as follows:-

Code	Name of Subcatchment	Area (acres)	Number of Properties	Year Works Commenced	Finished.
A	Goodalls Creek	4,340	10	1960	1967
B	Native Dog Creek	5,250	11	1961	1967
C	Dairy Creek	5,120	7	1961	1968
D	Meadow Valley Creek	12,480	12	1961	
E	Myrtle Creek No. 1	5,570	6	1962	
F	Toobarac Granites	9,980	17	1962	1969
G	Jews Harp Creek No. 1	12,160	14	1967	
H	Spring Flat No. 1	3,330	8	1962	1969
I	Coliban – Lauriston	5,310	6	1965	
J	Spring Flat no.2	6,590	17	1962	1969
K	Myrtle Creek No. 2	5,890	7	1963	
L	One Eye Forest	7,100	9	1963	1968
M	Back Creek	11,200	23	1968	
N	Mountain Creek	7,100	10	1964	
O	Kimbolton Forest	9,470	3	1963	1970
P	Polhman's Creek No. 1	10,430	17	1965	
Q	Redesdale – Mia Mia	12,670	32	1965	
R	Polhman's Creek No. 2	9,220	16	1966	
S	Mclvor Creek	14,720	42	1966	
T	Watch Box	15,800	23	1969	
U	Jews Harp Creek No. 2	10,820	18	1969	
V	Mount Ida Creek	11,460	31	1969	
W	Metcalfe north	6,080	12	1969	
X	Argyll	2,620	22	1968	
	Total	204,710 320 sq. m	373		

The location of these sub-catchments are shown by Code reference on the map of the Eppalock Catchment on the page below.

It will be seen that, with one exception, these sub-catchments embrace an area adjacent to and surrounding Lake Eppalock. The exception, the Upper Coliban-Lauriston Sub-catchment, treats badly eroded land immediately surrounding the old established Upper Coliban Reservoir.

EPPALOCK CATCHMENT
PROJECT



Responsibility of doing works

Upon landholders to agreeing to carry out planned catchment improvement (conservation) works the Authority meets the cost of installing "non-productive" erosion control works.

"Non-productive" works are considered to be those works which are necessary to control serious erosion but are not directly revenue producing. The cost of these works cannot be considered to be justified as a charge on the individual landholder.

It will be appreciated that while such works might be regarded as non-productive within the confines of a single farm, they have a high degree of public benefit and so in the context of the locality, the State and country they may in fact be regarded as productive. The carrying out of such works prevents the spoiling of adjoining farm land and protects such public utilities as roads and reservoirs.



The office which was built at Heathcote is the centre for operations for the project. Behind the office there is a large storeyard, sheds and a tree nursery.

GULLY CONTROLS STRUCTURES:

Works on non-vegetative nature, such as reinforced concrete gullyhead drops or chutes; concrete, stone-in-mesh, or timber silt traps; weirs; groynes; rock packing; or revetment work.

GULLY REINSTATEMENT WORKS:

Complete or partial gully battering; gullyhead shaping; grassed chutes. The aim in such works is to stabilize gullied areas with vegetation. Larger gullies which will continue to carry a relatively large flow of water are planted with trees or shrubs which are protected from stock by enclosing fences and/or individual tree guards. Lesser gullies in smaller "local" catchments which are pasture improved may be completely battered and sown to pasture and temporarily protected by a ring fence and/or an earthen diversion or trainer bank.



Typical of much of the Catchment, "stumped up" paddocks, severe sheet erosion, active tunnelling and, further downhill, the inevitable gully.

PROTECTIVE FENCING: Vulnerable areas taken out of production by fencing so that they might be re-vegetated for their own improvement and that of surrounding areas.



This is the first year's growth of improved pasture.

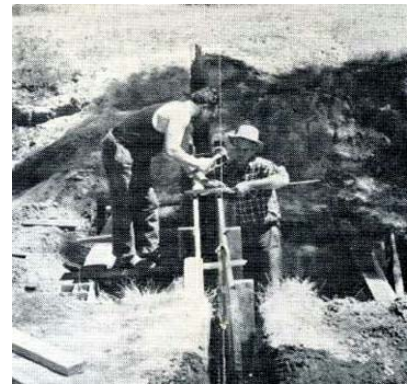


Improved pasture consisting of phalaris, Currie cocksfoot, perennial ryegrass and subterranean clover.



Filling in a small gully which will become unnoticeable when the paddock is chisel-seeded and sown to improved pasture.

Members of a works team erecting forms for a concrete gullyhead structure.



Bulldozing a gully which will be sown to improved pasture.



It is important to correctly site and survey the placing of concrete structures.



Chisel ploughing in the autumn is a familiar sight.



Guide lines being ripped to ensure that chisel ploughing is carried out on the contour.

Building a grassed chute which will cope safely with run-off from the small catchment behind.





The healing effect of soil conservation works in the paddock is shown in this gully which is no longer eroding.



Here a gully had threatened the Shire road. This concrete structure is preventing any further erosion.



In many places in the Catchment loose stones were plentiful. They have been used here to build a silt trap in a large gully. Trees and other vegetation have been planted and are well established.

EROSION CONTROL EARTHWORKS: Diversion, wind and trainer banks designed to collect and deliver water from sites of erosion damage to sites of safe disposal. Gully plugs and gully plug dams. Contour furrowing and ripping designed to increase water absorption and reduce the rate and volume of water run-off.

MISCELLANEOUS: Tunnel ripping and battering; mulching of badly denuded or eroded areas; special treatment of salted areas.

“**Productive**” catchment improvement works are vital to the success of a soil conservation scheme in the type of environment encountered in the Eppalock Project. These works are carried out by the landholders. They have the double benefit of not only improving catchment conditions but also increasing production. The most important of such works are:

PASTURE IMPROVEMENT: If a soil surface can be changed from a sparse overgrazed native pasture with widespread surface skinning and sheet erosion to a dense improved pasture the advantages are obvious.

FARM SUBDIVISION: It is important that the various parts of a farm should be used according to their potential and limitations. Particularly in grazing country, this can rarely be achieved without carefully planned fence location.

Also, as carrying capacity is increased by pasture improvement, it frequently becomes desirable to reduce paddock sizes.

WATER SUPPLY: it is vital in a balanced soil conservation scheme that there be ample quantities of water available at carefully selected locations in properly designed facilities.

STOCK SHELTER: It is desirable that the important aspect of protection of stock against the extremes of heat and cold be carefully planned and provided. Badly located stock camps can be the focal points of erosion.

FARM MANAGEMENT: Farm improvement programmes bring the need for thoughtful adjustment to stock and farm management to ensure that the maximum benefit is realized from these improvements.

There are some works which have elements of both productive and non-productive work. These are regarded as shared work towards which both the Authority and the landholders contribute on a basis determined by the proportions of productive and non-productive elements in each.

The most important of these shared works, and in fact the most important single item of work carried out in this project, is contour chisel seeding.

From the outset the Authority realized that to avoid having to build erosion control structures and earthworks of unnecessarily large capacities, the amount of run-off from the broad acres of relatively steep, poorly vegetated country has to be reduced. Chisel ploughing of these areas not only achieved such an effect, but also created the opportunity for the Authority to persuade landholders to provide at the same time the seed and fertilizer for sowing to achieve improved pasture. This ensured both a long-term reduction to run-off, the objective of the Authority, and improved productivity for the landholder.

Conditional upon the landholders agreeing to provide the recommended quantity and variety of pasture seed and fertilizer, and to subsequently top-dress in accordance with recommendations and otherwise correctly manage such new sown pastures, the Authority meets the cost of the contour chisel working,

Pasture improvement has tremendous impact in improving the general condition of a catchment, easing the pressure on drainage lines and reducing the size, number and cost of erosion control structures. For this reason the Authority actively encourages landholders to proceed as individuals and carry out pasture improvement in advance of the detailed planning of sub-catchments. Assistance to these individual landholders was made available by the Authority where chisel seeding was done on Land Class *4b* country (land which cannot be safely cultivated in the orthodox manner but which may be surface worked with a tined implement for the purpose of sowing to improved pasture).

Over a ten-year period more than 45,000 acres previously sheet eroded Class 4b land have been chisel seeded to introduce subterranean clover and perennial grasses (mainly *Phalaris tuberosa*). Not only has the carrying capacity of such chisel seeded areas been at least trebled in many cases but the soil surface conditions have been dramatically improved. This is reflected in the decreased rate and volume of water run-off and the resultant erosion control benefit.

Sometimes a properly located and constructed dam can serve the dual purpose of controlling erosion and a necessary source of water. In such cases the Authority makes an assessed contribution towards the cost of the dam.

Where eroded sites (tunnelled, salted, gravel stripped, shallow gullies, & c.) can be bought back into useful production the cost of rehabilitation works may be shared.

Planning procedure – With the aid of specially flown aerial photographs land feature drawings are prepared on a grid basis.

These drawings at the scale of 1 inch – 10 chains show such features as roads, streams, erosion, timber and fencing.

It is on to these drawings that the proposed soil conservation plan is superimposed.



One of the hundreds of concrete silt traps that were built to prevent silt from reaching the reservoir.



The same structure today; hundreds of cubic yards of silt have been trapped and vegetation holds it from further erosion.

However, the foundation to any sound conservation plan is a careful study of all relevant background data.

Such background data includes:

1. **Geology** – Provides useful information about the likely potential of soils formed over particular parent materials.
2. **Topography** (Shape, slopes, aspects) – Frequently places a limit on what use can be made of the land. May be modified, for instance by the use of a variety of contour works, to make safe a certain type of land use which otherwise may not be.
3. **Climate** – Cannot be changed but understanding it helps to ensure the greatest advantage is taken.
4. **Soils** – Both the physical and chemical composition of the soils, and the distribution of these soils are studied. Consideration is given to how these might be modified and improved.
5. **Natural Vegetation** – Can give a guide to production potential and most suitable forms of land use.
6. **Past and Present Land Use** – Influences the present condition of an area and provides information as to whether such forms of land use are safe or are realizing the full potential of the area.
7. **Incidence, Type and Severity of Soil Erosion** - Gives information as to how wrong past land use may have been.

By a study of such background information, areas can be classified into units of similarity and differences and thus produce a Land Class Plan.

The Land Class plan maps the various parcels of land which can be grouped safely or need to be separated to enable special management and use.

The Land Class Plan is the foundation upon which the Conservation Plan is drawn up.

Land Classes used by the Authority area:

1. Land suitable for cropping without the need for erosion control measures.
2. Land suited for cropping, but in need of erosion control measures –
 - (a) no mechanical works are needed, but broad rotations (e.g. pasture for at least 3 years out of 5) and/or special cultivation practices (e.g., stubble mulch) are required.
 - (b) in need of the use of the contour principle, namely contour cultivation alone or together with closed banks or graded banks and waterways.
3. Land suitability for grazing without the need for erosion control measures.**
4. Land suitable for grazing but in need of erosion control measures –
 - (a) can be ploughed for pasture improvement and can be contour banked, furrowed, or ripped.
 - (b) cannot be ploughed but can be surface worked for pasture improvement and can be contour furrowed or ripped.

* Not suitable of cropping because of unfavourable soils, topography, surface conditions, or climate. e.g. On the stony rises tone outcrops prohibit cultivation. Some heavy soils are not suited to cropping because of climate limitations.

5. Land suitable for strictly controlled grazing where no mechanical erosion control measures can be undertaken and a vegetative cover must be carefully maintained.
6. Land not suitable for agricultural production because of roughness, stoniness, wetness, dryness, infertility or extreme erosion hazard.

The Land Classes most commonly encountered in the Eppalock Project are *2b*, *4a*, *4b*, and *5* and the greatest potential for improvement is found in Land Classes *4a* and *4b*.

The first stage in planning is to produce a Land Class overlay transparency which when superimposed on the base feature drawing provides vital basic information in deciding desirable fence location and the areas which might be sown to improved pasture wither by contour chisel seeding (*4b* land) or perhaps by more orthodox means (*2b* and *4a* land).

Planning is approached in the knowledge that the landholders are to carry out productive works and their part of shared works while the Authority will carry out the non-productive erosion control works and contribute towards the agreed shared works.

Productive works are aimed at eliminating the cause of erosion and improving catchment conditions. Satisfactory completion of these works has a vital influence upon the nature and cost of the non-productive erosion control works. It is important, therefore, that sound and adequate productive works are planned and that the landholders are encouraged to carry out as extensive a programme of such works as possible.

For success in carrying out a group soil conservation scheme it is important that a high degree of mutual understanding and co-operation be generated between landholders as individuals and as neighbours, and the planning officers, of the Authority. It is vital that landholders have a clear understanding of the nature of works planned to be done on their properties, why such works are considered necessary, and how they fit into the over-all scheme of planning in the subcatchment. After plans are evolved in broad terms, therefore, the land holders are brought into close collaboration in refining these plans. Each landholder is provided with a copy of that part of the plan embracing his property and with other supporting data such as pasture improvement, recommendations and other details aimed at explaining the scheme. Care is taken to produce plans which can be easily read and understood.



Note the different kinds of groynes (stone and timber) on the right-hand side of the gully which prevent further bank erosion. See also the trees which have been planted both in and around the gully.

When the detailed planning of subcatchment is completed, a meeting of landholders in the scheme is arranged at which the co-ordinated proposals are outlined. Such meetings served a valuable purpose not only in seeing that all participants in the project are familiar with what is required of them but also in generating an attitude of co-operation in the scheme of significant community importance.