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Catchments of the Esperance region of Western Australia

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Catchments of the Esperance Region of Western Australia

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Resource Management Technical Report No. 165

Disclaimer

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

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Number of agricultural properties per catchment/area based on Agriculture Western Australia (Spatial Resource Information Group) 1995 Client Database.

Water and Soil hazard ratings extrapolated from Rod Short's Hydrogeological Zones in Platt, J. (1996) Esperance Region Catchment Planning Strategy. Agriculture Western Australia, Misc. Publication 10/96 Agdex 527, (see Methodology for more information).

Remnant vegetation analysis completed by Brendan Moore using satellite imagery and aerial photography, (see Methodology for more information).

Public assets compiled by Klaus Tiedemann in relation to State and national estates, and conservation characteristics. Additional information collected by John Plan and Gerry Skinner via community survey.

Data collation and presentation completed by John Simons using Microsoft ACCESS®.

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Introduction

John Simons and Rod Short

This document provides a catalogue of the cultural and physical characteristics of the 32 catchments and internally drained areas in the Esperance agricultural region. Nineteen topographic catchments externally drain to the coast and the remaining 13 areas drain internally within their own boundaries.

Two recently launched strategies: 'Western Australian Salinity Action Plan' and 'Southern Prospects a strategy for managing natural resources and developing rural communities on the South Coast of Western Australia' have recommended that the community in consultation with the State Government agencies will be required to identify 'Focus' catchments within their region. These two strategies have a number of implications for natural resource planning and management in the Esperance region and the manner in which State and Federal Government 'landcare' funding will be managed in the future.

There must be community ownership of any strategies put in place and this will involve the input of all stakeholders. The Esperance Land Conservation District Committee best represented the regional community in the decision making process. A holistic approach to natural resource land management (e.g. Landcare) requires consideration of social, economic and environmental issues. To select focus catchments we need to consider all of these issues in the analysis. The process must we believe, be credible, defensible and achievable with limited resources. Objective data should be used where possible.

To aid the decision making process, the Esperance Catchment Support Team from the Department of Agriculture documented all available natural resource and cultural data on a catchment by catchment basis and produced the following report titled 'Catchments of the Esperance Region of Western Australia'.

Footnote: Definition of 'Focus' catchment from the Salinity Action Plan (1996) pp17.

Focus catchments - selected sub-catchment groups will have guaranteed access to catchment support teams providing the technical and economic information needed for site-specific decisions on best management practices under a services agreement. In return land holders will be asked to enter into a formal agreement to implement them.

Methodology

Water and soil hazard ratings

Brendan Nicholas & Rod Short

Water and soil hazard ratings have been taken from the Esperance Region Catchment Planning Strategy.

In the Esperance Agricultural District, fourteen hydrogeological zones have been identified. Hydrogeological zones have been based on geology and geomorphology.

Using this information, hazard ratings have been assigned for five major forms of land degradation within the fourteen hydrogeological zones. As more than one zone may occur in a catchment it is possible there will be a range of hazard ratings reflecting the variability of landform and soils within a catchment or area.

Hazard ratings are defined as:

- Low No hazard or a small hazard risk at present that may increase in the medium term.
- Medium A moderate hazard risk that needs attention now.
- High A large hazard that will be expensive to treat.

Each type of hazard is described below.

Wind erosion

Susceptibility to wind erosion is related to the level of disturbance required to bring the soil to an erodible condition.

A loose soil surface is more susceptible than one that is firm or hardsetting. As soil texture becomes more clayey, the soil becomes less susceptible to wind erosion. Gravel, stones and plant cover reduce the amount of soil surface exposed and create roughness which reduces wind erosive velocity. Highly susceptible soils are those with a loose sandy surface and include Heart Echo, Fleming sands, Sadden sand and Circle Valley sand. The larger the percentage of soils with loose sandy topsoils in a catchment the greater the risk of wind erosion.

Water erosion

Water erosion can occur on all soils and is caused by rainfall run off and soil detachment. Run off is controlled by land form factors such as slope angle, length of slope and the potential for water to run onto the site. Soil detachment depends on soil texture, surface conditions and the stability of soil aggregates. Loose sandy topsoils and sodic subsoils are widespread in the Esperance region, these soils can have a high soil hazard rating mainly due to their landscape position (slopes greater than 3 per cent).

Soil structural decline

Soil structural decline occurs on loamy and clayey topsoils. Sandy topsoils usually have no structure. Structural decline in shallow sand over clay duplex soils can occur by two mechanisms. Mixing during cultivation to form a massive and hardsetting sandy loam to sandy clay loam topsoil or by wind erosion stripping the thin sandy topsoil exposing the sodic clayey B horizon. Shallow phases of Scaddan and Circle Valley sands are prone to these two methods of structural decline. The Kumarl and Dowak clays are prone to structural decline due to instability of the clayey topsoil on wetting. The more shallow duplex soils and clay soils in a catchment the higher the hazard of soil structural decline.

Water logging

Water logging occurs when a soil is saturated and air is excluded from the root zone. Characteristics which contribute to waterlogging are low landscape relief, poor external drainage, water run off from higher parts of the landscape and low permeability in the soil profile. Duplex soils across the district have impermeable clayey subsoils that develop perched water tables during winter. In the Esperance district, level landforms, poor external drainage and duplex soils are considered to have the highest water logging hazard.

Salinity

Salt affected land is defined as having excess salts in the root zone such that the potential yield of salt sensitive crops and pastures are reduced. In almost all cases, salinity is associated with waterlogging, water erosion, and sodicity or where watertables have risen to within two metres of the ground surface. In its milder form it changes the composition of pastures and encourages salt-tolerant grasses such as Barley Grass. The extent of salinity may only be seen if landholders grow salt-sensitive crops, pastures or trees, or if they try to manage the land with a higher intensity (e.g. heavier grazing, attempting high yielding crops, planting trees).

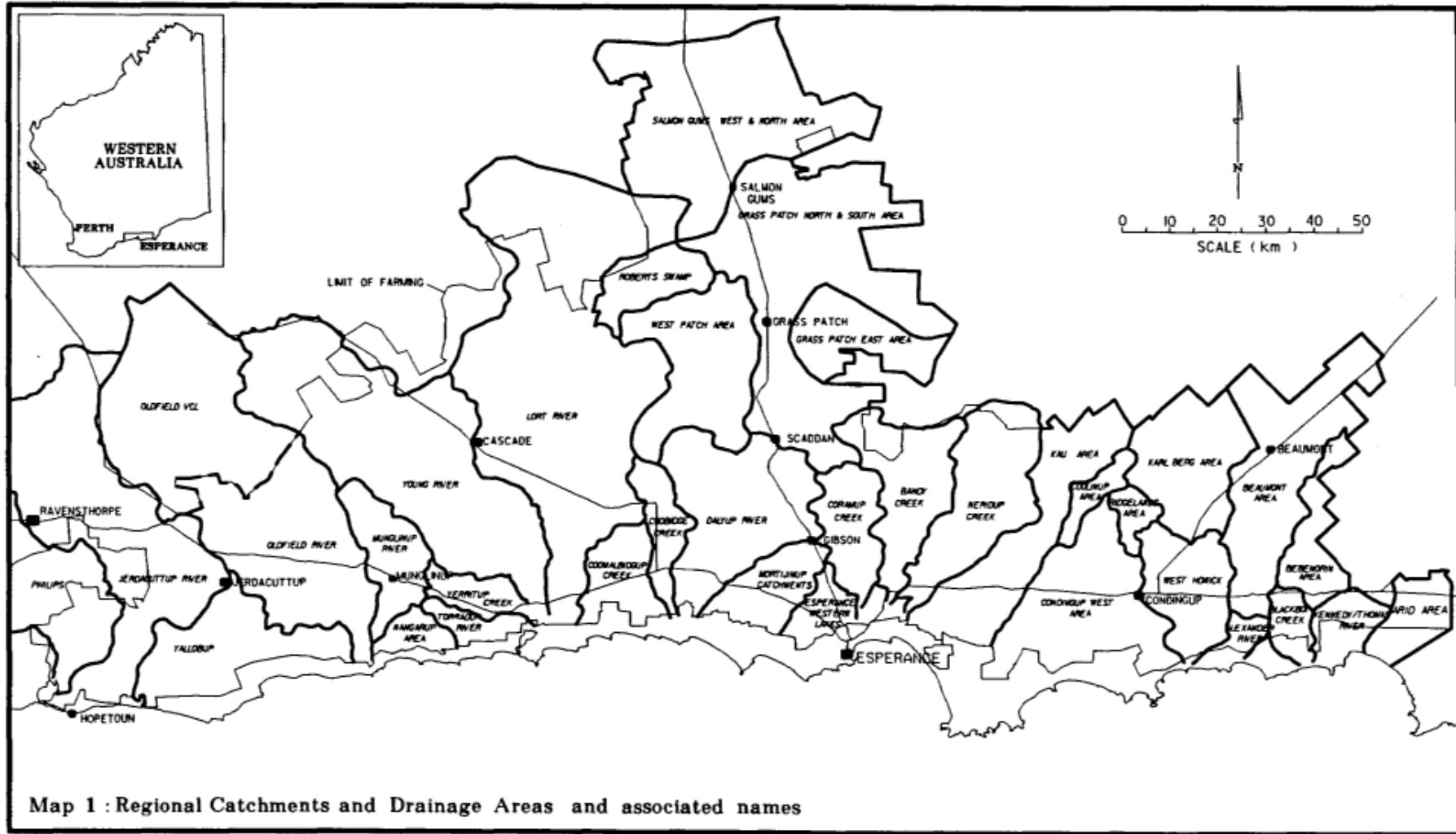
Level of remnant vegetation on farmland

Brendan Moore

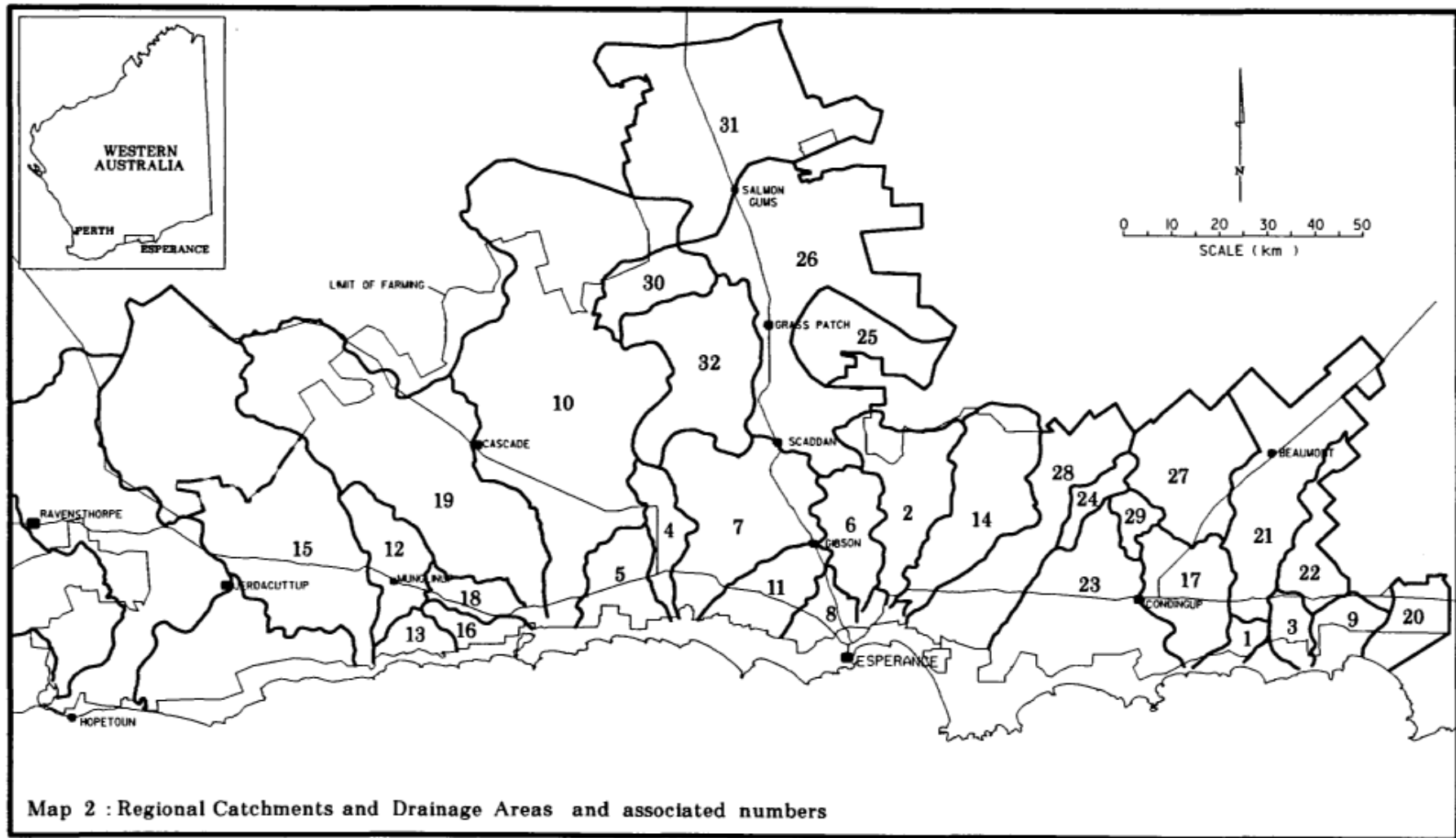
The percentage of remnant vegetation was calculated using primarily the February 1988 Landsat TM satellite images (1:100,000) with cross referencing to the 1992/93 black and white (1:50,000) and the 1995/96 colour (1:25,000) aerial photography.

The figures are an estimate of remnant vegetation within farmland and does not include:

- blocks of remnant vegetation smaller than 9 hectares;
- road, river, water or gravel reserves;
- flora and fauna reserves;
- Aboriginal Land Trust reserves;
- forestry and recreation reserves; and
- vacant crown land.



Map 1 : Regional Catchments and Drainage Areas and associated names



Summary Table

Catchment number	Catchment name	Approx. total area (ha)	Approx. farmland area (ha)	Est. No. agricultural properties	Rainfall range (mm)	*Waterlogging hazard rating	*Salinity hazard rating	*Water erosion hazard rating	*Soil hazard rating	*Wind erosion hazard rating	Drainage line vegetated	Level of remnant vegetation on farmland
1	Alexander Bridge	8000	5700	3	500 - 550	high	medium	low	low	medium	Yes	Extremely low < 5%
2	Bandy Creek	50500	45300	62	450 - 600	medium-high	medium-high	low	low-medium	medium	No	Extremely low < 5%
3	Blackboy Creek	12200	8500	4	500 - 550	high	medium	low	low	medium	Yes	Very low 5 - 10%
4	Coobidge Creek	20700	20500	19	450 - 600	high	medium	low	low	medium	No	Extremely low < 5%
5	Coomalbidgup Creek	29600	25300	30	500 - 600	high	medium	low	low	medium	No	Extremely low < 5%
6	Coramup Creek	31000	30700	38	450 - 600	low-high	low-high	low	low-medium	medium	No	Extremely low < 5%
7	Dalyup River	76300	76300	71	450 - 600	medium-high	low-medium	low	low-medium	medium	No	Extremely low < 5%
8	Esperance West Lake System	13500	12300	29	550 - 650	high	medium	low	low	medium	Partially	Extremely low < 5%
9	Kennedy/ Thomas River	15700	9400	9	500 - 550	high	medium	low	low	medium	Yes	Date not available
10	Lort River	257000	173600	75	400 - 600	low-high	low-medium	low-medium	low-medium	medium	Yes	Extremely low < 5%
11	Mortijinup Lake	29300	27400	37	550 - 650	high	medium	low	low	medium	Yes	Extremely low < 5%
12	Munglinup River	32300	27800	26	400 - 550	low-high	low-medium	low-medium	low-medium	medium	Yes	Low 11 - 20%
13	Nanarup	10800	10300	9	550 - 600	high	medium	low	low	medium	Yes	Low 11 - 20%

14	Neridup Creek	62600	54200	32	450 - 600	medium-high	medium-high	low	low-medium	medium	No	Extremely low < 5%
15	Oldfield River	217200	50800	48	400-550	low-high	low-medium	low-medium	low-medium	medium	Yes	Low 11 - 20%
16	Torradup River	7400	7400	3	550-600	high	medium	low	low	medium	No	Low 11 - 20%
17	West Howick	41000	41000	18	500 - 550	high	medium	low	low	medium	Yes	Extremely low < 5%
18	Yerritup Creek	15000	14400	5	500 - 600	low-high	low-medium	low-medium	low	medium	Yes	Very low 5 - 10%
19	Young River	170000	112600	38	350 - 550	low-high	low-medium	low-medium	low-medium	medium	Yes	Low 11 - 20%
20	Arid	18200	1400	6	450 - 500	high	medium	low	low	medium	NA	Data not available
21	Beaumont	84600	79100	29	400 - 550	medium-high	medium-high	low	low-medium	medium	NA	Extremely low < 5%
22	Bebenorin	25400	10400	9	400 - 500	medium-high	medium-high	low	low-medium	medium	NA	Extremely low < 5%
23	Condingup West	77200	76800	48	500 - 600	medium-high	medium-high	low	low-medium	medium	NA	Extremely low < 5%
24	Coolinup	11100	8300	4	450 - 500	low-medium	low-high	low	low-medium	medium	Partially	Very low 5 - 10%
25	Grass Patch E	37400	31800	14	350 - 400	low	low	low	low	medium	NA	Extremely low < 5%
26	Grass Patch North and South	157900	148900	89	350-400	low	low	low	low	low-medium	NA	Extremely low < 5%
27	Karl Berg	56200	44900	28	400 - 500	low-medium	low-high	low	low-medium	medium	NA	Extremely low < 5%
28	Kau	68000	57900	59	400 - 600	low-high	low-high	low	low-medium	medium	NA	Extremely low < 5%
29	Ridgeland	8900	8900	7	450 - 500	medium	high	low	medium	medium	NA	Very low 5 - 10%

30	Roberts Swamp	25400	22200	11	350 - 400	low-medium	low	low-high	low-medium	low-medium	No	Extremely low < 5%
31	Salmon Gums West and North	133500	102800	54	300 - 350	low	low	low	low	low	NA	Extremely low < 5%
32	West Patch	72300	69900	50	350 - 450	Low-medium	low	low	low-medium	low-medium	NA	Extremely low < 5%

See Methodology for definitions, summary of catchment and area characteristics

Alexander River**Catchment number: 1**

Drainage system:	External
Approximate total catchment area:	8,000 ha
Approximate farmland area:	5,700 ha
Estimated number of agricultural properties:	3
Rainfall range:	500 - 500 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
Medium	high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low	medium

Vegetation

Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
Yes	Extremely low < 5%

Public assets

- Recreational activities on coast - camping and fishing.
- Vacant Crown Land near coast proposed addition to Cape Arid National Park (CALM South Coast Regional Management Plan 1992-2002).
- Contains 'Conservation Category' wetlands.



Bandy Creek**Catchment number: 2**

Drainage system:	External
Approximate total catchment area:	50,500 ha
Approximate farmland area:	45,300 ha
Estimated number of agricultural properties:	62
Rainfall range:	450 - 600 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
medium-high	medium-high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low-medium	medium

Vegetation

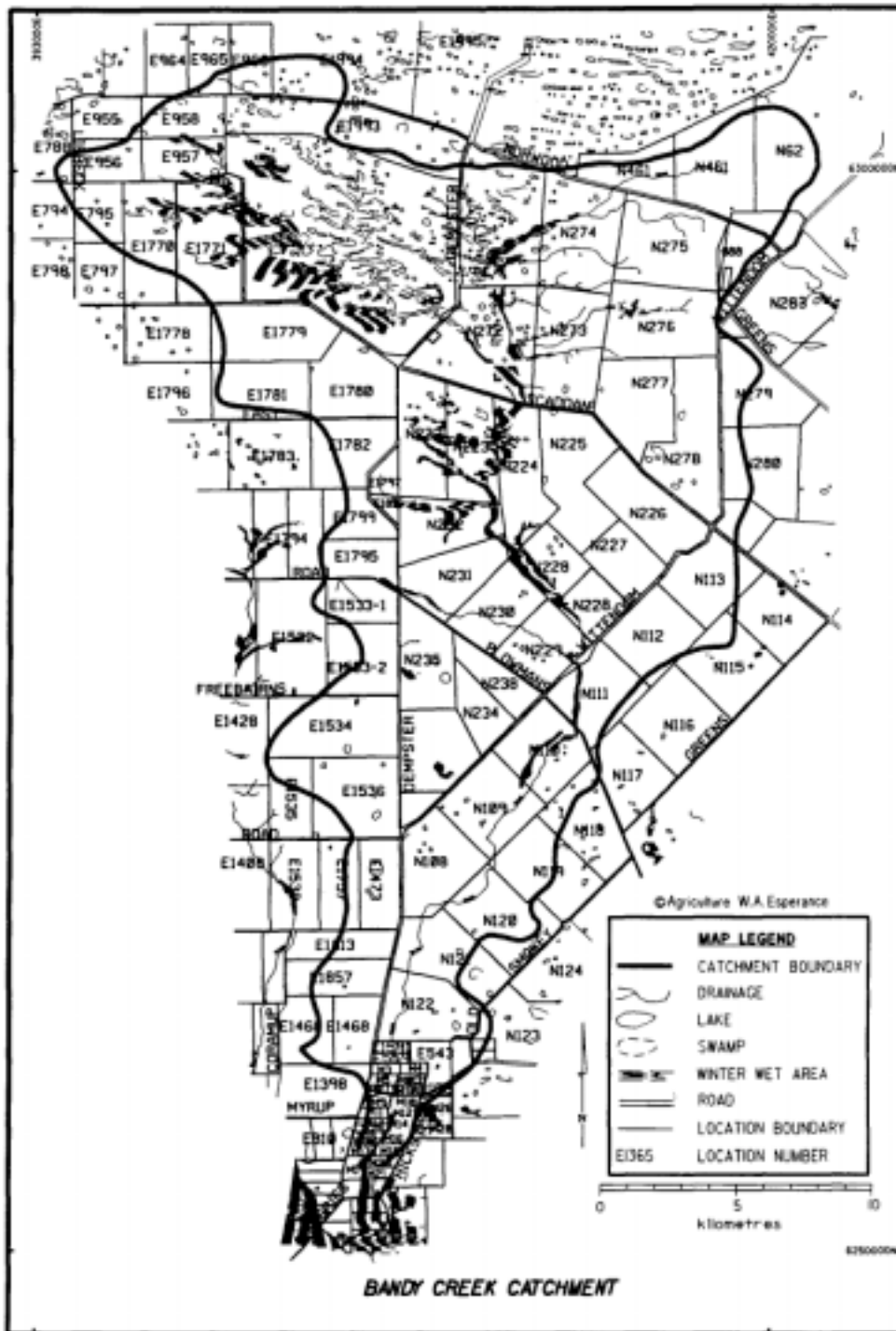
Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
No	Extremely low < 5%

Public assets

- Drains into Ramsar listed "Wetland of International Importance".
- Wetland contains key bird breeding sites.
- Contains declared rare flora
- Wetland is also listed on National Estate Register.
- Wetland habitat protects 17 waterbird species cited in the Japan-Australia *Migratory Birds Agreement* (JAMBA) and *China-Australia Migratory Birds Agreement* (CAMBA).
- Catchment drains into Bandy Creek boat harbour.
- Contains 'Conservation Category' wetlands.
- Mt Burdett Reserve used for tourism.

Local community groups

- West Bandy Creek Landcare Group
- Neridup Soil Conservation Group
- Wittenoom Hills Landcare Group



Blackboy Creek**Catchment number: 3**

Drainage system:	External
Approximate total catchment area:	12,200 ha
Approximate farmland area:	8,500 ha
Estimated number of agricultural properties:	4
Rainfall range:	500 - 550 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
medium	high	Low

Soil hazard ratings

Soil structural decline	Wind erosion
low	Medium

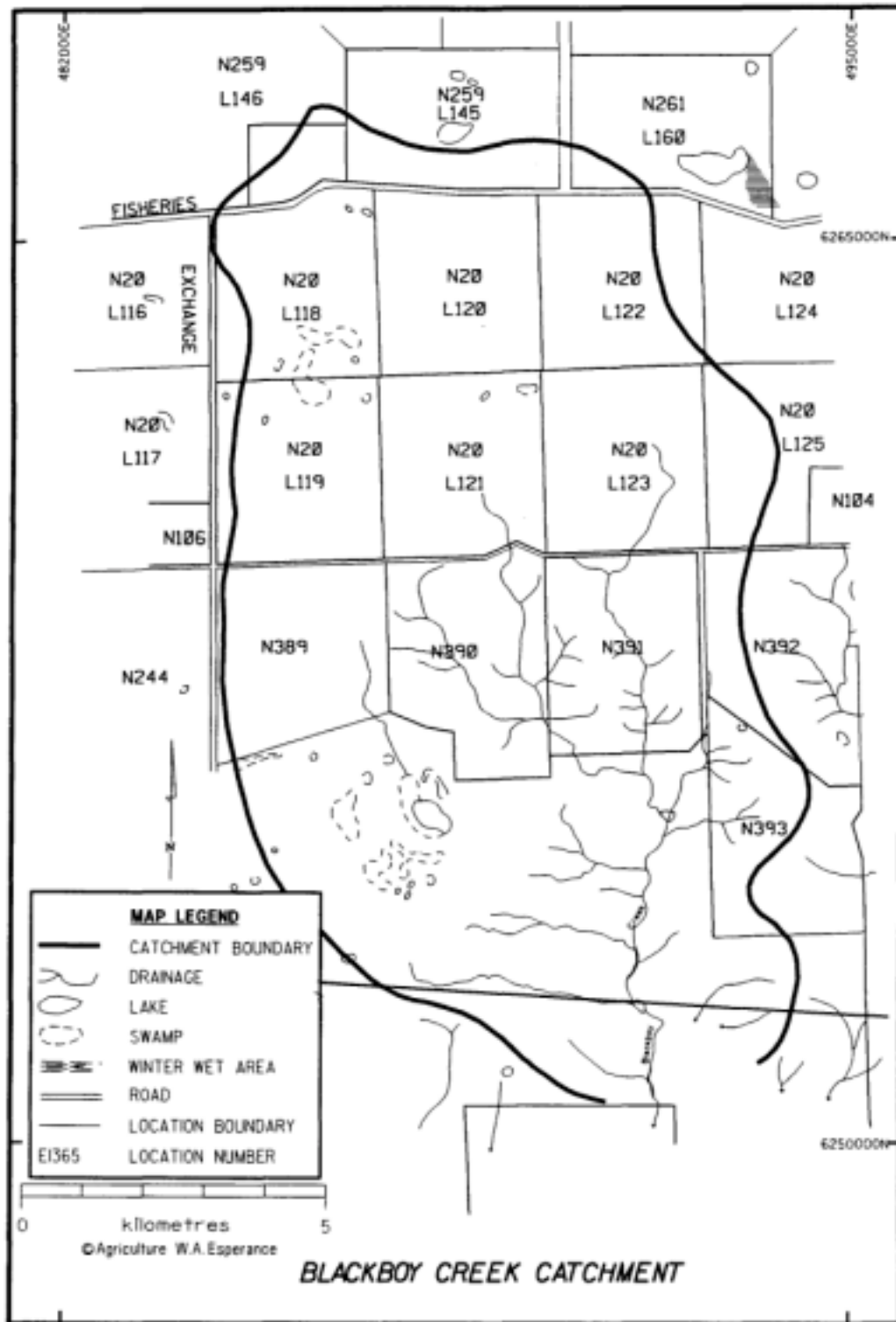
Vegetation

Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
Yes	Very low 5 - 10 %

Public assets

- Contains Ewarts Swamp:
 - important waterbird habitat; and
 - fresh water in Swamp used for drought relief purposes.
- Vacant Crown Land near coast proposed addition to Cape Arid National Park (CALM South Coast Regional Management Plan 1992-2002).
- Recreational activities on coast - camping and fishing.
- Contains declared rare flora.

Local community groups



Coobidge Creek**Catchment number: 4**

Drainage system:	External
Approximate total catchment area:	20,700 ha
Approximate farmland area:	20,500 ha
Estimated number of agricultural properties:	19
Rainfall range:	450 – 600 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
medium	high	Low

Soil hazard ratings

Soil structural decline	Wind erosion
low	Medium

Vegetation

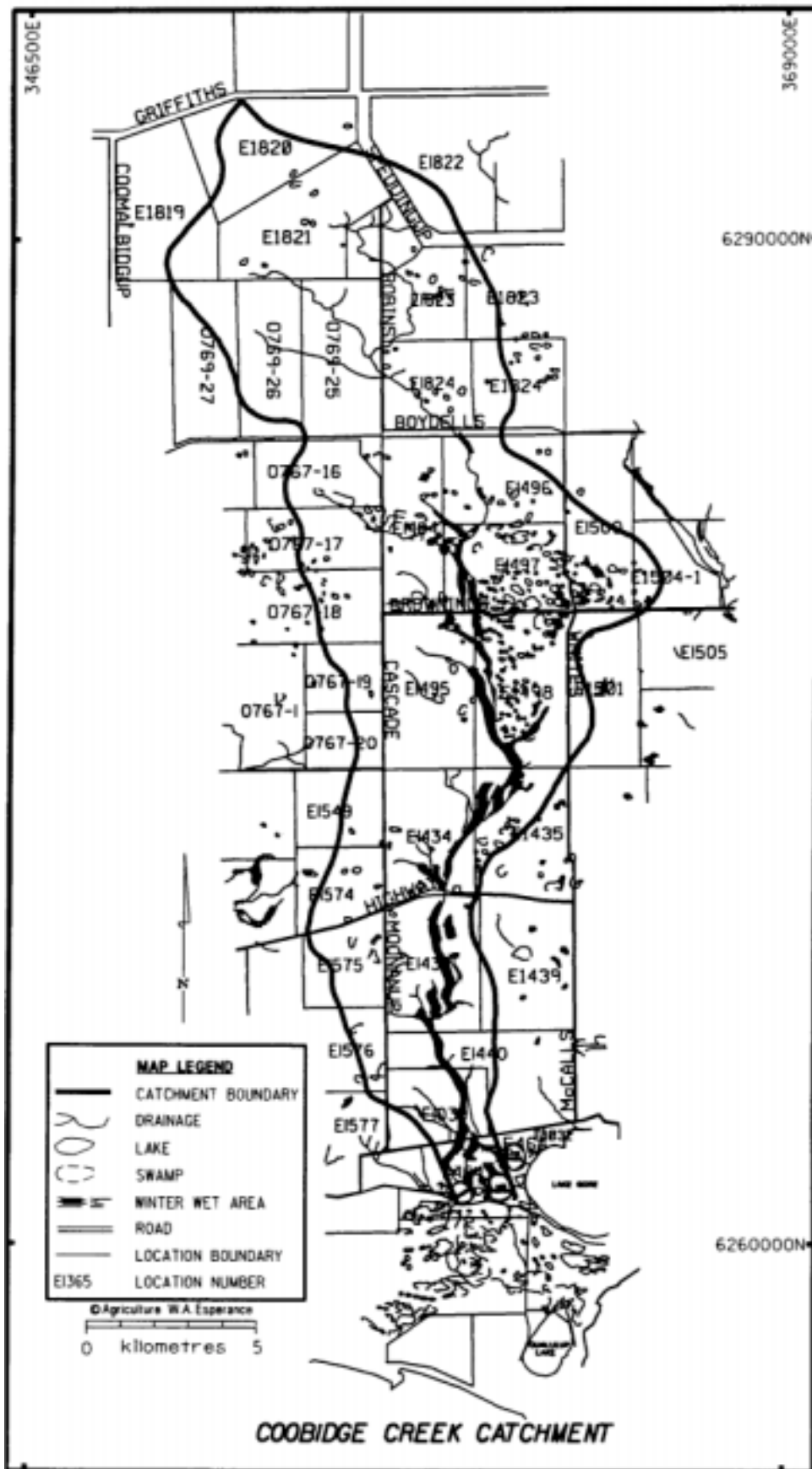
Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
No	Extremely low < 5%

Public assets

- Drains into Lakes Gidong, Kubitch and Carbul. When these lakes and Lake Gore are at capacity they overflow and drain through the coastal nature reserve, ultimately draining into Barkers Inlet.
- Coastal nature reserve used for recreational purposes, this mainly being camping, fishing and surfing.
- Proposed change in purpose from nature reserve to inclusion as part of Stokes National Park. (CALM South Coast Regional Management Plan 1992-2002).
- Contains declared rare flora.
- Contains 'Conservation Category' wetlands.

Local community groups

- Coobidge Landcare Group



Coomalbidgup Creek**Catchment number: 5**

Drainage system:	External
Approximate total catchment area:	29,600 ha
Approximate farmland area:	25,300 ha
Estimated number of agricultural properties:	30
Rainfall range:	500 – 600 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
medium	high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low	Medium

Vegetation

Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
No	Extremely low < 5%

Public assets

- Drains into Coomalbidgup Swamp (vested in Esperance Shire).
- Contains 'Conservation Category' wetlands.
- Feeds into Barkers Inlet.
- Recreational activities on coast - camping and fishing.
- Rivers and Water Commission should have information.

Local community groups

- Coobidge Landcare Group

Coramup Creek**Catchment number: 6**

Drainage system:	External
Approximate total catchment area:	31,000 ha
Approximate farmland area:	30,700 ha
Estimated number of agricultural properties:	38
Rainfall range:	450 - 600 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
low-high	low-high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low-medium	Medium

Vegetation

Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
No	Extremely low < 5%

Public assets

- Drains into Ramsar listed “Wetlands of International Importance”.
- Wetland contains key breeding sites.
- Wetland is also listed on National Estate Register.
- International agreements apply (JAMBA and CAMBA (see page 6)).
- Wetlands surround Esperance townsite, used for recreational purposes and is considered a tourism and landscape asset.
- Catchment contains Benje Benjenup Lake and ‘Conservation Category’ wetlands.

Local community groups

- Coramup Creek Catchment Group

Dalyup River**Catchment number: 7**

Drainage system:	External
Approximate total catchment area:	76,300 ha
Approximate farmland area:	76,300 ha
Estimated number of agricultural properties:	71
Rainfall range:	450 - 600 mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
low-medium	medium-high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low-medium	medium

Vegetation

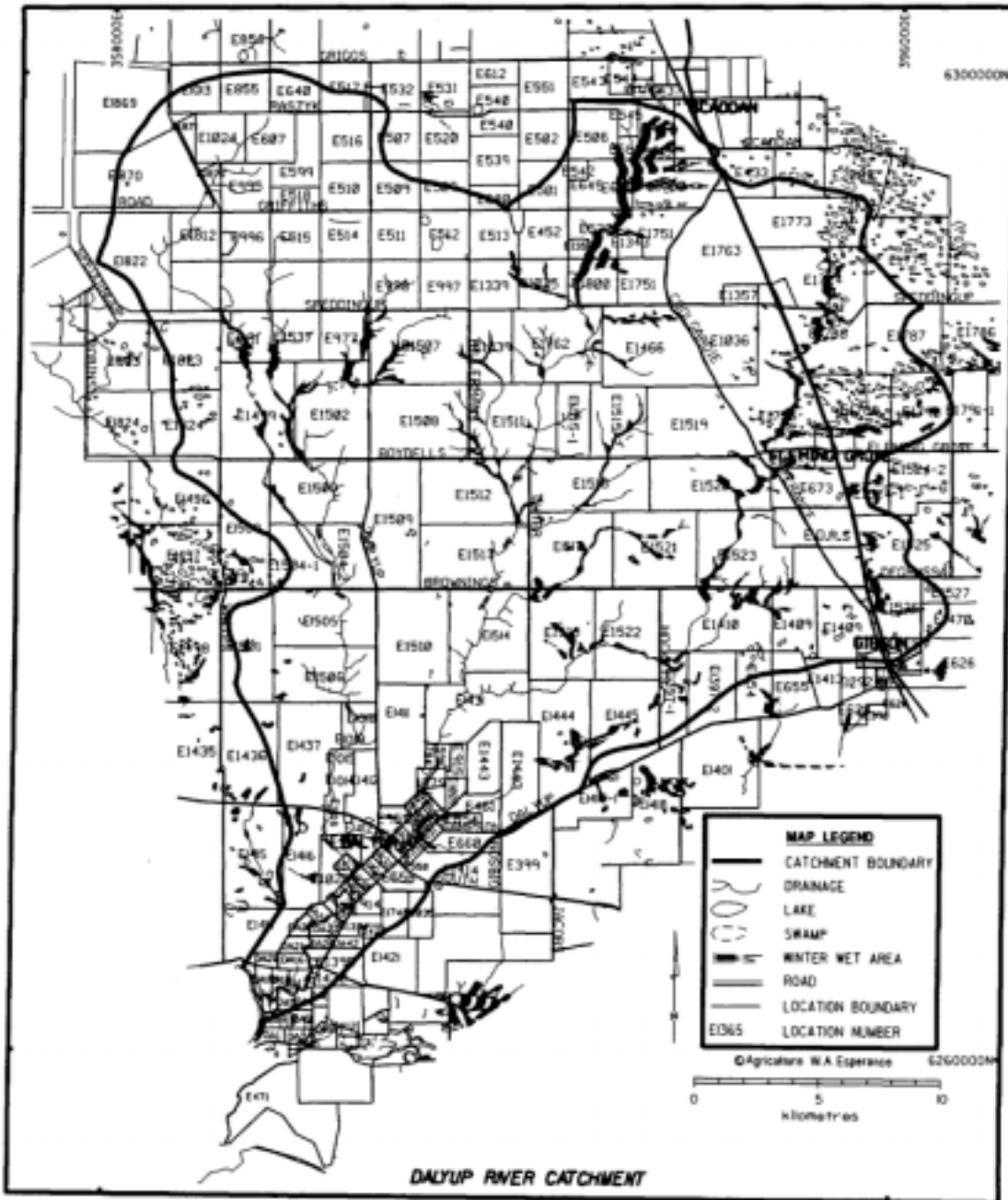
Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
No	Extremely low < 5%

Public assets

- Drains into Lake Gore - important bird breeding lake.
- Wetland listed on National Estate Register.
- Wetland used for recreational purposes.
- Dalyup Reserve used for tourism and recreation.
- Contains 'Conservation Category' wetlands.

Local community groups

- Upper West Dalyup Catchment Group
- Lower Dalyup Catchment Group



Esperance Western Lake System**Catchment number: 8**

Drainage system:	External
Approximate total catchment area:	13,500 ha
Approximate farmland area:	12,300 ha
Estimated number of agricultural properties:	29
Rainfall range:	550 - 650mm

Water hazard ratings

Salinity	Waterlogging	Water erosion
medium	high	low

Soil hazard ratings

Soil structural decline	Wind erosion
low	medium

Vegetation

Major drainage line vegetated (Riparian buffer zone)	Level of remnant vegetation on farmland
Partially	Extremely low < 5%

Public assets

- Drains into Ramsar listed "Wetlands of International Importance" International agreements apply (JAMBA and CAMBA (see page 6)).
- Wetland contains key breeding sites.
- Wetland is also listed on National Estate Register.
- Contains 'Conservation Category' wetlands.
- Wetlands surround Esperance townsite.
- Wetlands considered tourism and landscape asset, e.g. Pink Lake - tourism..
- Contains Helms Arboretum.
- Contains Shark Lake - important fresh water wetland.

Local community groups

- Lake Monjilup Advisory Development Group

