Catchments of the Esperance region of Western Australia

S T. Gee

John Andrew Simons

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Catchments of the Esperance Region of Western Australia

Prepared by:
S.T. Gee and J.A. Simons
Department of Agriculture
Esperance, Western Australia

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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Acknowledgments

Spatial information (cartographic data) analysis and map production completed by Stephen Gee. Topographic catchment boundaries based on drainage and 10 metre contour lines digitised from the Department of Land Administrations (DOLA) topocadastral 1:50 000 map series. Digital cadastral information supplied by DOLA.

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


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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<td>West Patch</td>
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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’.


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
Map 2: Regional Catchments and Drainage Areas and associated numbers
### Summary Table

<table>
<thead>
<tr>
<th>Catchment number</th>
<th>Catchment name</th>
<th>Approx. total area (ha)</th>
<th>Approx. farmland area (ha)</th>
<th>Est. No. agricultural properties</th>
<th>Rainfall range (mm)</th>
<th><em>Waterlogging</em> hazard rating</th>
<th><em>Salinity</em> hazard rating</th>
<th><em>Water erosion</em> hazard rating</th>
<th><em>Soil erosion</em> hazard rating</th>
<th><em>Wind erosion</em> hazard rating</th>
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### CATCHMENTS OF THE ESPERANCE REGION OF WESTERN AUSTRALIA

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<thead>
<tr>
<th>#</th>
<th>Catchment</th>
<th>Area (ha)</th>
<th>Population (people)</th>
<th>Population Density (ppl/km²)</th>
<th>Rainfall (mm)</th>
<th>Slope (%)</th>
<th>Land Use (%): Urban, Agriculture, Forest</th>
<th>Aquifer%</th>
<th>Water Quality</th>
<th>Water Supply</th>
<th>Environmental Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Roberts Swamp</td>
<td>25400</td>
<td>11</td>
<td>low medium</td>
<td>350 - 400</td>
<td>low</td>
<td>low high low medium low medium No Extremely low: &lt; 5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Salmon Gums West and North</td>
<td>133500</td>
<td>54</td>
<td>low</td>
<td>300 - 350</td>
<td>low low</td>
<td>low low low low low low NA Extremely low: &lt; 5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>West Patch</td>
<td>72300</td>
<td>50</td>
<td>Low medium</td>
<td>350 - 450</td>
<td>low low</td>
<td>low medium low medium low medium NA Extremely low: &lt; 5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>high</td>
<td>low</td>
</tr>
</tbody>
</table>

**Soil hazard ratings**

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>medium</td>
</tr>
</tbody>
</table>

**Vegetation**

<table>
<thead>
<tr>
<th>Major drainage line vegetated (Riparian buffer zone)</th>
<th>Level of remnant vegetation on farmland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

**Public assets**

- Recreational activities on coast - camping and fishing.
- Contains ‘Conservation Category’ wetlands.
CATCHMENTS OF THE ESPERANCE REGION OF WESTERN AUSTRALIA
**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**

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>medium-high</td>
<td>medium-high</td>
<td>low</td>
</tr>
</tbody>
</table>

**Soil hazard ratings**

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low-medium</td>
<td>medium</td>
</tr>
</tbody>
</table>

**Vegetation**

<table>
<thead>
<tr>
<th>Major drainage line vegetated (Riparian buffer zone)</th>
<th>Level of remnant vegetation on farmland</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

**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.
- 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**

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>medium</td>
<td>high</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Soil hazard ratings**

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Vegetation**

<table>
<thead>
<tr>
<th>Major drainage line vegetated (Riparian buffer zone)</th>
<th>Level of remnant vegetation on farmland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Very low 5 - 10 %</td>
</tr>
</tbody>
</table>

**Public assets**

- Contains Ewarts Swamp:
  - important waterbird habitat; and
  - fresh water in Swamp used for drought relief purposes.
- Recreational activities on coast - camping and fishing.
- Contains declared rare flora.

**Local community groups**
CATCHMENTS OF THE ESPERANCE REGION OF WESTERN AUSTRALIA

BLACKBOY CREEK CATCHMENT

MAP LEGEND
- CATCHMENT BOUNDARY
- DRAINAGE
- LAKE
- SWAMP
- WINTER WET AREA
- ROAD
- LOCATION BOUNDARY
- E1365 LOCATION NUMBER

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**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

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>medium</td>
<td>high</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Soil hazard ratings

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>Medium</td>
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</tbody>
</table>

### Vegetation

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

### 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
CATCHMENTS OF THE ESPERANCE REGION OF WESTERN AUSTRALIA

MAP LEGEND
- CATCHMENT BOUNDARY
- DRAINAGE
- LAKE
- SWAMP
- WINTER WET AREA
- ROAD
- LOCATION BOUNDARY
- LOCATION NUMBER

COOBIDGE CREEK CATCHMENT

18
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**

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>medium</td>
<td>high</td>
<td>low</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Soil structural decline</th>
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<tbody>
<tr>
<td>low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Vegetation**

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</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

**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
CATCHMENTS OF THE ESPERANCE REGION OF WESTERN AUSTRALIA
**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

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low-high</td>
<td>low-high</td>
<td>low</td>
</tr>
</tbody>
</table>

### Soil hazard ratings

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low-medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

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<table>
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</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low-medium</td>
<td>medium-high</td>
<td>low</td>
</tr>
</tbody>
</table>

### Soil hazard ratings

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
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<tbody>
<tr>
<td>low-medium</td>
<td>medium</td>
</tr>
</tbody>
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<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Extremely low &lt; 5%</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Salinity</th>
<th>Waterlogging</th>
<th>Water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>medium</td>
<td>high</td>
<td>low</td>
</tr>
</tbody>
</table>

### Soil hazard ratings

<table>
<thead>
<tr>
<th>Soil structural decline</th>
<th>Wind erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>medium</td>
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</tbody>
</table>

### Vegetation

<table>
<thead>
<tr>
<th>Major drainage line vegetated (Riparian buffer zone)</th>
<th>Level of remnant vegetation on farmland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partially</td>
<td>Extremely low &lt; 5%</td>
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</table>

### 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 Monjingup Advisory Development Group