Prediction of Areas at Risk Of Salinity: The Agricultural area of Western Australia Report Number: CMIS 01/183

A report from the NHT-funded Land Monitor project

Robert Dunne and Peter Caccetta

CSIRO Mathematical and Information Sciences
Leeuwin Centre for Earth Sensing Technologies
Private Bag 5, P.O., Wembley, Western Australia, 6013

Brian Beetson
(Agriculture Western Australia)

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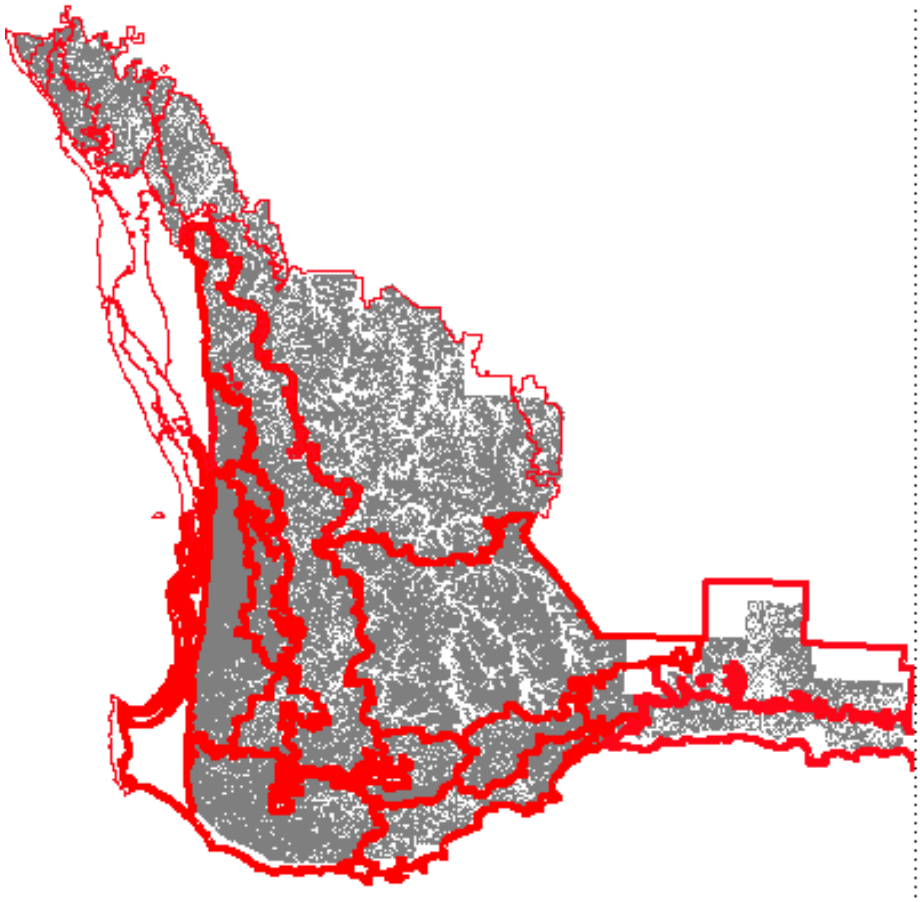

1 Background

This report summarizes the prediction of areas at risk of salinity for the agricultural region depicted in figure 1. The prediction is based on hydrologists expert opinion of areas at risk of salinity for sample areas. The extrapolation is achieved by modeling procedures using DEM-derived variables and Landsat derived land cover variables. This report describes the current prediction maps. The data is provided on the accompanying data CD. Appendix A describes the format of the data.

Four accompanying reports describe in more detail the data and the validation procedure, accuracy and limitations for particular areas. The four reports are:

1. **Prediction of Areas at Risk Of Salinity: The Central districts and Eastern Wheatbelt** Report Number: CMIS 01/134
2. **Prediction of Areas of Shallow Water Table and Salinity Risk: Ravensthorpe (109/83) Esperance (108/83) Landsat TM Scenes** Report Number: CMIS 01/170
3. **Prediction of Areas of Shallow Water Table and Salinity Risk: Mt Barker (111/084), Bremer Bay (110/084) and surrounding areas** Report Number: CMIS 01/169
4. **Prediction of Areas of Shallow Water Table and Salinity Risk: The Bencubbin Landsat TM Scene (112/81) and Surrounding Areas** Report Number: CMIS 01/151

These reports describe the:

- data used in the processing, both ground data supplied by catchment hydrologists, the LandMonitor Digital Elevation Models and the bush mask;
- the methodology; and
- the accuracy assessment, limitations and liabilities.

for each area in greater detail. Figure 1 indicates the processed area and the NRAG zones. These zones were used to determine the boundaries between different models.

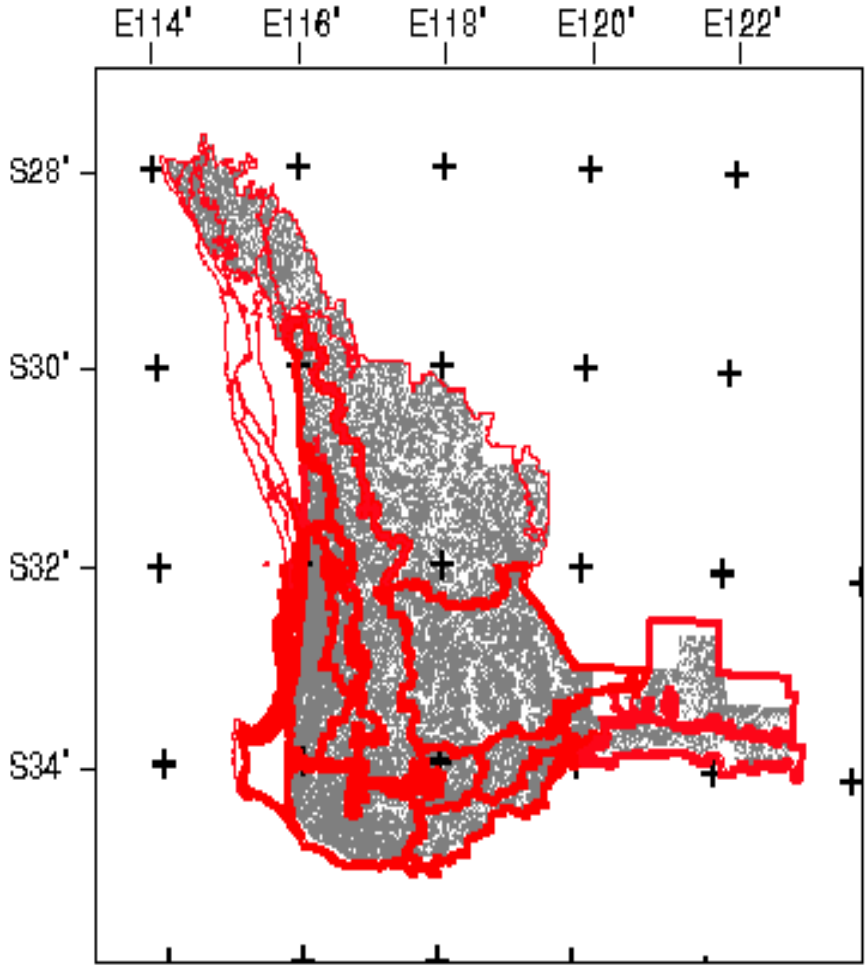

Figure 1: *The extent of the study area considered is shown in grey. NRAG landscape zones are shown in red.*

2 The Study Area

The region considered is shown in figure 1. It lies between Latitudes 27:30 and 35 degrees South and Longitudes 114 and 123 degrees East. It includes the area covered by the following Landsat TM scenes:

- Esperance, path 108, row 83;
- Ravensthorpe path 109, row 83;
- Southern Cross, path 110, row 82;
- Newdegate, path 110, row 83;

- Bremer Bay, path 110, row 84;
- Jackson path 111, row 81;
- Kellerberrin, path 111, row 82;
- Dumbleyung, path 111, row 83;
- Mt Barker, path 111, row 84;
- Bencubbin path 112, row 81;
- Perth, path 112, row 82;
- Collie path 112, row 83;
- Pemberton, path 112, row 84;
- Mullewa/Yalgoo path 113, row 80;
- Moora, path 113, row 81;
- Jurien Bay, path 113, row 82;
- Geraldton path 114, row 80;
- Ajana path 114, row 79.

3 The areas not processed

A number of coastal and high rainfall areas within the agricultural region were not processed for the salinity risk product. These were omitted for one or both of the following reasons:

- training data was not available and it was recognized that the omitted areas differed from those areas for which training data was available;
- the areas was judged to have little or no risk of salinity.

The areas omitted include the Swan coastal plain and the West Midlands west of the Darling Fault, the sunklands and the high rainfall coastal areas in the south-west corner.

An earlier DEM-derived product known as "height above flow paths and areas at risk of high water table" is available for these areas, but has not been validated.

4 The Data

The data used in producing the risk map include information provided by AgWA hydrologists in the form of interpreted areas at risk for sample areas. AgWA also provided advice on major zones for stratification. The National Resources Assessment Group (1999) zones were used.

In addition the data used derived from LandMonitor digital elevation models and a LandMonitor bush mask.

The final product on the accompanying disks is a mosaic of the areas described in the following three reports. The mosaicing is based on the National Resources Assessment Group (1999) landscape zones. Figure 1 shows the landscape zones.

Detailed task reports, held by CSIRO Mathematical and Information Sciences, describe each of the processing steps.

5 Area of Land At Risk

Table 1 shows the area of at risk land for the local government authority "Lake Grace," which is largely within the the Newdegate Landsat TM scene. Such summaries can be calculated for any sub-region of interest within the scene.

Lake Grace	hectares	percent
total area	1032577	100%
area at risk 2000	251295.44	24.3%

Table 1: *Summary of the area of salt-affected land for the local government authority "Lake Grace." Approximately 99.7% of the "Lake Grace" shire is within the the Newdegate Landsat TM scene.*

6 Viewing the Data

As described in section A the data comes in two files:

- a mask file containing the integers:
  - 0 – the area was not processed
  - 1 – the area is not at risk of salinity
  - 2 – the area is at risk of salinity
- a "height above" file containing the height above flow-paths in centimeters (0-200) for the areas at risk and 0 else where.

There are two options for viewing the data:

- if the users interest is in the "risk/non-risk" prediction then only the mask file should be used
- if the users interest is in the height above flow-paths then both files must be used. The reason for this is that a 0 in the 'height above" file may mean 0 centimeters above the flow-path or no risk of salinity. The way to view this file is the following:

  If mask $= 2$ then display height else display NULL

  where "mask" is the value in the mask file and "height" is the value in the "height above" file.

7 Limitations and Liabilities

The information contained in these shallow ground water risk maps is necessarily based in part upon various assumptions and predictions. The Land Monitor Project (comprising the Western Australian State Government agencies, Agriculture Western Australia, Department of Conservation and Land Management, Department of Environmental Protection, Department of Land Administration, Main Roads Western Australia, and The Water and Rivers Commission and the Commonwealth agency CSIRO Mathematical and Information Sciences) accepts no responsibility for any inaccuracies in these shallow ground water risk maps and persons relying on these maps do so at their own risk.

References

National Resources Assessment Group (1999). Soil-landscape systems.

A Data format

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This CD contains the data files for the Shallow Water Table
and Salinity Risk Prediction as processed in for the LandMonitor project.
All raster files are 25 metre resolution,  AGD66 TMAMG50 projection.

                                    Robert Dunne
                                    June 2001


This CD contains the following files in ERMAPPER format;

1) central_districts_and_eastern_wheatbelt_mask
     This is a single-band image file.
           - the class labels are:
             0 = not processed, outside common overlap area
             1 = not ar risk
             2 = at risk

2) central_districts_and_eastern_wheatbelt
     This is a single-band image file.
            - 0-200 height in centimeters above flow paths


3) vector files showing approximate zone boundaries
          processed_zone
          processed_zone.erv

4) a vector file showing the location(s) (bounding window) of the accuracy asse
       test_areas
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       test_areas.erv

5) the final report for the scene, report.pdf.
   This is sved as a .pdf (Portable Document Format) file.
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