



**Wimmera CMA**

**NRMPCC Modelling**

## **Agricultural Land Protection**

**Wimmera CMA**

**Natural Resource Management Plan for Climate Change**

April 2015

FOR MORE INFORMATION CONTACT

Wimmera CMA

24 Darlot Street

PO Box 479 HORSHAM VIC 3400

Phone: 03 5382 1544

Fax: 03 5382 6076

Email: [gis@wcma.vic.gov.au](mailto:gis@wcma.vic.gov.au)

# Introduction

The WCMA NRMPPCC aims to assess future projects in terms of their value by taking into account biodiversity, agriculture and carbon. In order to be a robust and informed plan, these three factors need to be balanced within the plan’s modelling framework.

The inclusion of an agricultural factor in this framework was achieved by defining priority areas for protection of agricultural lands. This priority for protection has been based on 5 key landscape features; soil type, presence of vegetation, land tenure, slope and aspect. These features are analysed using multi-criteria decision analysis to produce an overview of areas with a greater potential for primary production and sustainable use.

The multi-criteria decision analysis was based primarily on soil types, with weighting factors applied based on the remaining 4 landscape factors. Landscape features and weightings used in the analysis were selected by expert staff at WCMA and through consultation with stakeholders.

## Landscape Factors

### Geomorphology of Victoria

<http://services.land.vic.gov.au/catalogue/metadata?anzlicId=ANZVI0803002863&publicId=guest&extractionProviderId=1>

The Geomorphology of Victoria was used to define a regions’ base priority for protection. It was decided that soil type typically guides agricultural production. Soil groupings were used at the third tier to define priorities. These definitions are included below:

Soil Group (GMU_2)	Base Priority				
	Horsham	Upper Catchment	West Wimmera	Yarriambiack	Hindmarsh
<b>2.1.2</b>	na	80	na	na	na
<b>2.1.3</b>	na	40	na	na	na
<b>2.1.4</b>	40	40	na	na	na
<b>2.1.5</b>	80	60	na	na	na
<b>2.1.6</b>	na	100	na	na	na
<b>2.1.7</b>	na	100	na	na	na
<b>2.2.1</b>	20	20	na	na	na
<b>2.2.2</b>	20	20	na	na	na
<b>2.2.3</b>	40	100	20	na	20
<b>2.3.1</b>	80	na	na	na	na
<b>2.3.2</b>	40	na	40	na	40
<b>2.3.4</b>	80	na	80	na	na
<b>4.1.1</b>	80	na	na	80	80
<b>4.1.2</b>	60	na	na	80	80
<b>4.2.1</b>	80	100	na	80	na

Soil Group (GMU_2)	Base Priority				
	Horsham	Upper Catchment	West Wimmera	Yarriambiack	Hindmarsh
<b>4.2.2</b>	100	100	na	80	80
<b>4.2.3</b>	80	na	na	80	80
<b>4.3</b>	80	na	na	na	na
<b>5.1.3</b>	100	na	na	100	100
<b>5.1.4</b>	na	na	na	na	100
<b>5.1.5</b>	na	na	na	80	80
<b>5.2.1</b>	100	na	60	na	60
<b>5.2.2</b>	60	na	60	na	60
<b>5.3.3</b>	80	na	80	na	80
<b>5.4</b>	100	na	na	100	100
<b>5.5.1</b>	na	na	100	na	100
<b>5.5.2</b>	80	na	80	na	na
<b>5.5.3</b>	60	na	na	na	na
<b>5.6</b>	40	na	na	na	na
<b>6.2.1</b>	na	na	60	na	60
<b>mine</b>	0	0	0	0	0
<b>wbody</b>	10	10	10	10	10
<b>wland</b>	10	10	10	10	10

### NaturePrint Vegetation Extent

<http://services.land.vic.gov.au/catalogue/metadata?anzlicId=ANZVI0803005186&publicId=guest&extractionProviderId=3>

NaturePrint's vegetation extent dataset was used to define is an area has been used for agriculture. If native vegetation is dominant, it is assumed that that area is not in use for agriculture. Where vegetation is absent, it is assumed that the area is in use by the agricultural sector. Non-native vegetation is scored similarly to an absence of vegetation, with an assumption that the area is used by the agricultural sector. In the case of non-native vegetation, the scored value is slightly lower than areas of no vegetation.

Vegetation	Weighting
Existing native vegetation	0.0
Existing non-native vegetation	0.8
No recorded vegetation	1.0

### VicMap Public Land Management

<http://services.land.vic.gov.au/catalogue/metadata?anzlicId=ANZVI0803003978&publicId=guest&tractionProviderId=1>

The public land management dataset was used to identify areas of public land which are assumed not to be in use by the agricultural sector. Two datasets feed into this dataset, PLM25 and Government Road Areas.

Tenure	Weighting
Private Land	1.0
Public Land	0.0

### SRTM Elevation – Slope

<https://catalog.data.gov/harvest/object/912f8558-e9dd-40bc-ab56-4cb0406cfd22/html>

Slope has been generated from the SRTM elevation 1 arc-second dataset for use in this Analysis. Slope can impact on agricultural productivity and therefore has been identified as impacting on protection priority.

Slope	Weighting
0-20 degrees	1.0
20-30 degrees	0.5
60+ degrees	0.0

### SRTM Elevation – Aspect

<https://catalog.data.gov/harvest/object/912f8558-e9dd-40bc-ab56-4cb0406cfd22/html>

Aspect has been generated from the SRTM elevation 1 arc-second dataset for use in this Analysis. Aspect can impact on agricultural productivity and therefore has been identified as impacting on protection priority. The application of a weighting factor based on aspect is only applied where slope is greater than 20 degrees.

Aspect	Weighting
South	1.0
South East	0.9
East	0.8
South West	0.7
North East, North West, West	0.6
North	0.5

## Methodology

The multi-criteria decision analysis follows the model:


$$P = G * V * T * A * S$$

Where:

**P** = Priority for agricultural land protection

**G** = Soil priority

**V** = Vegetation weighting

**T** = Tenure weighting

**A** = Aspect weighting

**S** = Slope weighting

The multi-criteria decision analysis was conducted using rasterized datasets converted and processed using the Geographic Data Abstraction Library (GDAL: [www.gdal.org](http://www.gdal.org)). Scripts manage the calls to GDAL and are available upon request.