Inventory of GIS datasets held by the Murray-Darling Basin Commission August 1999

Compiled by GIS Unit

Preface

This inventory contains information, or 'metadata', about natural resource data held by the Geographical Information Systems (GIS) Unit in the Office of the Murray-Darling Basin Commission (MDBC) as at August 1999. The GIS Unit is part of the *Natural Resources Management Evaluation and Communication* group and is involved in the coordination of collection and analysis of many types of natural resource data to support the Murray-Darling Basin Initiative.

Metadata explains the origins and processing history of any particular data set, and allows for an understanding of potential limitations through statements about attribute and positional accuracy and general data quality.

The metadata is presented in a standard format agreed by the Australia and New Zealand Land Information Council (ANZLIC) by the ANZLIC Working Group on Metadata in July 1996. The Working Group has prepared a document – *ANZLIC Guidelines: Core Metadata Elements Version 1* – describing a standard set of attributes that should be included in spatial metadata. These attributes allow a user to determine whether data exists on a required issue (using search words), the geographic area covered by a data set and summary information about the content and quality of the data set. The MDBC's GIS Unit uses this standard as a basis for all its spatial metadata.

This document consists two main sections. The first describes datasets that belong to the *Murray-Darling Basin Mapping* project. These datasets generally cover the entire Murray-Darling Basin, although there are some exceptions. The second section describes datasets that belong to the *River Murray Mapping* project. As the title suggests, datasets under this project will generally cover the River Murray for New South Wales, Victoria and South Australia. There is also two appendices, one providing Murray-Darling Basin Commission contact details for the datasets outlined in this inventory and the second providing details of the ANZLIC standard spatial metadata structure.

Contents

Section 1: Murray-Darling Basin Mapping

Background

The Murray-Darling Basin Commission (MDBC) has invested significant funds in the generation of Basin-wide data sets to monitor the status of natural resources and help support decision making from the community to the Ministerial level. There is now an agreed MDBC priority to facilitate the transfer and adoption of project outcomes to the user community. The *Murray-Darling Basin Mapping* project seeks to address the priority for the special case of spatial natural resource data.

Introduction

Accurate, consistent and timely information about the Murray-Darling Basin depends on an accurate, consistent and up-to-date mapping base. The mapping base selected for the entire Murray-Darling Basin is six-band digital orthorectified 1994-95 Landsat Thematic Mapper satellite imagery that is spatially accurate to standard 1:100,000 mapping-scale specifications.

One of the data sets likely to be in relatively high demand is Basin-wide structural (woody) vegetation. This information has been generated by a Natural Resource Management Strategy (NRMS) project named "BasinCare" and is based upon an interpretation of 1991 Landsat Thematic Mapper imagery using a consistent specification. Other NRMS-funded data for the Basin includes soils, geology, hydrogeology, and wetlands. The full-range of Basin-wide data are to be released under *Murray-Darling Basin Mapping* as a series of CD-ROM-based products called "Basin-in-a-Box" late in 1999.

Ultimately the data could be used to recommend further studies or used to advise policy and decision making. This highlights the need to build high quality spatial data sets on solid foundations.

This section describes the data sets that fall under *Murray-Darling Basin Mapping*.

Projection Information

All *Murray-Darling Basin Mapping* products are available in the following projection:

Projection name:	Lambert Conformal conic
Units:	Metres
Datum:	WGS 84 or GDA94
Spheroid:	WGS 84 or GDA94
Parameters:	6378160 6356775 (semi-major axis & semi-minor axis)
First standard of parallel:	-34 30 00
Second standard of parallel:	-28 30 00
Central meridian:	146 00 00
Latitude of origin:	-31 30 00
False easting:	0.0
False northing:	0.0

Climate data for the Murray-Darling Basin

TITLE: Climate data for the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
Data for evaporation, rainfall, rain-days, dewpoint, radiation, relative humidity and wet and dry-bulb temperature have been calculated for the whole of the Murray-Darling Basin. The data contains over 42,000 points that were derived as the spot height closest to a 5-kilometre grid sample. The points are not regularly spaced but reflect the variation in the AUSLIG spot height data. The final data does not contain any spot height information, as the MDBC is not licensed for the original AUSLIG data.

SEARCH WORDS: CLIMATE AND WEATHER

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: Unknown

ENDING DATE: Unknown

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not planned

STORED DATA FORMAT: DIGITAL ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms and Conditions)

LINEAGE:
Data for evaporation, rainfall, rain-days, dewpoint, radiation and wet and dry-bulb temperature have been calculated for the whole of the Murray-Darling Basin. Over 42,000 irregularly-spaced points of known height have been extracted from AUSLIG digital data and the location and elevation have been used as input to the ESOCLIM climate model from Centre for Research in Earth Sciences (CRES) at the Australian National University in Canberra. ESOCLIM gives long-term monthly mean values for the requested climate parameters that are then ascribed to the original known point. None of the original spot-height data is present in the database.

Mathematical surfaces have been created from the various types of data (evaporation, rainfall, etc.) and polygons of equal value formed.

The relative humidity formulae were obtained from American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Inc. Handbook – "1995 Fundamentals/SI Edition", pages 6.4 to 6.9.

POSITIONAL ACCURACY: 1:250,000 accuracy

ATTRIBUTE ACCURACY: 1:250,000 accuracy

LOGICAL CONSISTENCY: A number of coverages have full polygon topology: BIOMDB, YEARMXTP, YEARRAD, YEARRAIN, YEARRH9, YEARH15. The others described on the following pages have point attributes.

COMPLETENESS: Complete for the Murray-Darling Basin

METADATA DATE: May 1999

ADDITIONAL METADATA:

Data Dictionary:
All datasets are in ARC/INFO format.

Layer Name: DEWPOINT
Description: Average temperature at which dew forms (in °C) at 9am and 3pm per month and year total.

Description of point attributes for dew point (°C) at 9am:

Item Name	Description	ARC/INFO item definition
Dew9-jan	Average dew point at 9am for January	4,8,F,2
Dew9-feb	Average dew point at 9am for February	4,8,F,2
Dew9-mar	Average dew point at 9am for March	4,8,F,2
Dew9-apr	Average dew point at 9am for April	4,8,F,2
Dew9-may	Average dew point at 9am for May	4,8,F,2
Dew9-jun	Average dew point at 9am for June	4,8,F,2
Dew9-jul	Average dew point at 9am for July	4,8,F,2
Dew9-aug	Average dew point at 9am for August	4,8,F,2
Dew9-sep	Average dew point at 9am for September	4,8,F,2
Dew9-oct	Average dew point at 9am for October	4,8,F,2
Dew9-nov	Average dew point at 9am for November	4,8,F,2
Dew9-dec	Average dew point at 9am for December	4,8,F,2
Dew9-year	Average dew point at 9am for a year	4,8,F,2

Description of point attributes for dew point (°C) at 3pm:

Item Name	Description	ARC/INFO item definition
Dew15-jan	Average dew point at 3pm for January	4,8,F,2
Dew15-feb	Average dew point at 3pm for February	4,8,F,2
Dew15-mar	Average dew point at 3pm for March	4,8,F,2
Dew15-apr	Average dew point at 3pm for April	4,8,F,2
Dew15-may	Average dew point at 3pm for May	4,8,F,2
Dew15-jun	Average dew point at 3pm for June	4,8,F,2
Dew15-jul	Average dew point at 3pm for July	4,8,F,2
Dew15-aug	Average dew point at 3pm for August	4,8,F,2
Dew15-sep	Average dew point at 3pm for September	4,8,F,2
Dew15-oct	Average dew point at 3pm for October	4,8,F,2
Dew15-nov	Average dew point at 3pm for November	4,8,F,2
Dew15-dec	Average dew point at 3pm for December	4,8,F,2
Dew15-year	Average dew point at 3pm for a year	4,8,F,2

Layer Name: DRYWET
Description: Average dry-bulb, wet-bulb and relative humidity at 9am and 3pm per month and year total.

Description of point attributes for dry-bulb temperatures (°C) at 9am:

Item Name	Description	ARC/INFO item definition
Dry9-jan	Average dry-bulb temperature at 9am for January	4,8,F,2
Dry9-feb	Average dry-bulb temperature at 9am for February	4,8,F,2
Dry9-mar	Average dry-bulb temperature at 9am for March	4,8,F,2
Dry9-apr	Average dry-bulb temperature at 9am for April	4,8,F,2
Dry9-may	Average dry-bulb temperature at 9am for May	4,8,F,2
Dry9-jun	Average dry-bulb temperature at 9am for June	4,8,F,2
Dry9-jul	Average dry-bulb temperature at 9am for July	4,8,F,2
Dry9-aug	Average dry-bulb temperature at 9am for August	4,8,F,2
Dry9-sep	Average dry-bulb temperature at 9am for September	4,8,F,2
Dry9-oct	Average dry-bulb temperature at 9am for October	4,8,F,2
Dry9-nov	Average dry-bulb temperature at 9am for November	4,8,F,2
Dry9-dec	Average dry-bulb temperature at 9am for December	4,8,F,2
Dry9-year	Average dry-bulb temperature at 9am for a year	4,8,F,2
Dry15-jan	Average dry-bulb temperature at 3pm for January	4,8,F,2

Description of point attributes for dry-bulb temperatures (°C) at 3pm:

Item Name	Description	ARC/INFO item definition
Dry15-jan	Average dry-bulb temperature at 3pm for January	4,8,F,2
Dry15-feb	Average dry-bulb temperature at 3pm for February (in deg C)	4,8,F,2
Dry15-mar	Average dry-bulb temperature at 3pm for March	4,8,F,2
Dry15-apr	Average dry-bulb temperature at 3pm for April	4,8,F,2
Dry15-may	Average dry-bulb temperature at 3pm for May	4,8,F,2
Dry15-jun	Average dry-bulb temperature at 3pm for June	4,8,F,2
Dry15-jul	Average dry-bulb temperature at 3pm for July	4,8,F,2
Dry15-aug	Average dry-bulb temperature at 3pm for August	4,8,F,2
Dry15-sep	Average dry-bulb temperature at 3pm for September	4,8,F,2
Dry15-oct	Average dry-bulb temperature at 3pm for October	4,8,F,2
Dry15-nov	Average dry-bulb temperature at 3pm for November	4,8,F,2
Dry15-dec	Average dry-bulb temperature at 3pm for December	4,8,F,2
Dry15-year	Average dry-bulb temperature at 3pm for a year	4,8,F,2

Description of point attributes for wet-bulb temperatures (°C) at 9am:

Item Name	Description	ARC/INFO item definition
Wet9-jan	Average wet-bulb temperature at 9am for January	4,8,F,2
Wet9-feb	Average wet-bulb temperature at 9am for February	4,8,F,2
Wet9-mar	Average wet-bulb temperature at 9am for March	4,8,F,2
Wet9-apr	Average wet-bulb temperature at 9am for April	4,8,F,2
Wet9-may	Average wet-bulb temperature at 9am for May	4,8,F,2
Wet9-jun	Average wet-bulb temperature at 9am for June	4,8,F,2
Wet9-jul	Average wet-bulb temperature at 9am for July	4,8,F,2
Wet9-aug	Average wet-bulb temperature at 9am for August	4,8,F,2
Wet9-sep	Average wet-bulb temperature at 9am for September	4,8,F,2
Wet9-oct	Average wet-bulb temperature at 9am for October	4,8,F,2
Wet9-nov	Average wet-bulb temperature at 9am for November	4,8,F,2
Wet9-dec	Average wet-bulb temperature at 9am for December	4,8,F,2
Wet9-year	Average wet-bulb temperature at 9am for a year	4,8,F,2

Description of point attributes for wet-bulb temperatures (°C) at 3pm:

Item Name	Description	ARC/INFO item definition
Wet15-jan	Average wet-bulb temperature at 3pm for January	4,8,F,2
Wet15-feb	Average wet-bulb temperature at 3pm for February	4,8,F,2
Wet15-mar	Average wet-bulb temperature at 3pm for March	4,8,F,2
Wet15-apr	Average wet-bulb temperature at 3pm for April	4,8,F,2
Wet15-may	Average wet-bulb temperature at 3pm for May	4,8,F,2
Wet15-jun	Average wet-bulb temperature at 3pm for June	4,8,F,2
Wet15-jul	Average wet-bulb temperature at 3pm for July	4,8,F,2
Wet15-aug	Average wet-bulb temperature at 3pm for August	4,8,F,2
Wet15-sep	Average wet-bulb temperature at 3pm for September	4,8,F,2
Wet15-oct	Average wet-bulb temperature at 3pm for October	4,8,F,2
Wet15-nov	Average wet-bulb temperature at 3pm for November	4,8,F,2
Wet15-dec	Average wet-bulb temperature at 3pm for December	4,8,F,2
Wet15-year	Average wet-bulb temperature at 3pm for a year	4,8,F,2

Description of point attributes for relative humidity (%) at 9am:

Item Name	Description	ARC/INFO item definition
Relhum9-jan	Average relative humidity at 9am for January	4,8,F,2
Relhum9-feb	Average relative humidity at 9am for February	4,8,F,2
Relhum9-mar	Average relative humidity at 9am for March	4,8,F,2
Relhum9-apr	Average relative humidity at 9am for April	4,8,F,2
Relhum9-may	Average relative humidity at 9am for May	4,8,F,2
Relhum9-jun	Average relative humidity at 9am for June	4,8,F,2
Relhum9-jul	Average relative humidity at 9am for July	4,8,F,2
Relhum9-aug	Average relative humidity at 9am for August	4,8,F,2
Relhum9-sep	Average relative humidity at 9am for September	4,8,F,2
Relhum9-oct	Average relative humidity at 9am for October	4,8,F,2
Relhum9-nov	Average relative humidity at 9am for November	4,8,F,2
Relhum9-dec	Average relative humidity at 9am for December	4,8,F,2
Relhum9-year	Average relative humidity at 9am for a year	4,8,F,2

Description of point attributes for relative humidity (%) at 3pm:

Item Name	Description	ARC/INFO item definition
Relhum15-jan	Average relative humidity at 3pm for January	4,8,F,2
Relhum15-feb	Average relative humidity at 3pm for February	4,8,F,2
Relhum15-mar	Average relative humidity at 3pm for March	4,8,F,2
Relhum15-apr	Average relative humidity at 3pm for April	4,8,F,2
Relhum15-may	Average relative humidity at 3pm for May	4,8,F,2
Relhum15-jun	Average relative humidity at 3pm for June	4,8,F,2
Relhum15-jul	Average relative humidity at 3pm for July	4,8,F,2
Relhum15-aug	Average relative humidity at 3pm for August	4,8,F,2
Relhum15-sep	Average relative humidity at 3pm for September	4,8,F,2
Relhum15-oct	Average relative humidity at 3pm for October	4,8,F,2
Relhum15-nov	Average relative humidity at 3pm for November	4,8,F,2
Relhum15-dec	Average relative humidity at 3pm for December	4,8,F,2
Relhum15-year	Average relative humidity at 3pm for a year	4,8,F,2

Layer Name: EVAPRAIN
Description: Average ratio of evaporation (mm) to rainfall (mm) per month and year total.

Description of point attributes for evaporation/rainfall ratio:

Item Name	Description	ARC/INFO item definition
Evrn-jan	Average ratio of evaporation to rainfall for January	4,8,F,2
Evrn-feb	Average ratio of evaporation to rainfall for February	4,8,F,2
Evrn-mar	Average ratio of evaporation to rainfall for March	4,8,F,2
Evrn-apr	Average ratio of evaporation to rainfall for April	4,8,F,2
Evrn-may	Average ratio of evaporation to rainfall for May	4,8,F,2
Evrn-jun	Average ratio of evaporation to rainfall for June	4,8,F,2
Evrn-jul	Average ratio of evaporation to rainfall for July	4,8,F,2
Evrn-aug	Average ratio of evaporation to rainfall for August	4,8,F,2
Evrn-sep	Average ratio of evaporation to rainfall for September	4,8,F,2
Evrn-oct	Average ratio of evaporation to rainfall for October	4,8,F,2
Evrn-nov	Average ratio of evaporation to rainfall for November	4,8,F,2
Evrn-dec	Average ratio of evaporation to rainfall for December	4,8,F,2
Evrn-year	Average ratio of evaporation to rainfall for a year	4,8,F,2

Layer Name: RADRAIN
Description: Average radiation (MJ/sq m/day) per month and year total interpolated using rainfall data from the RAINFALL coverage.

Description of point attributes for average radiation (MJ/sq m/day):

Item Name	Description	ARC/INFO item definition
Radn -jan	Average radiation for January	4,8,F,2
Radn -feb	Average radiation for February	4,8,F,2
Radn -mar	Average radiation for March	4,8,F,2
Radn -apr	Average radiation for April	4,8,F,2
Radn -may	Average radiation for May	4,8,F,2
Radn -jun	Average radiation for June	4,8,F,2
Radn -jul	Average radiation for July	4,8,F,2
Radn -aug	Average radiation for August	4,8,F,2
Radn -sep	Average radiation for September	4,8,F,2
Radn -oct	Average radiation for October	4,8,F,2
Radn -nov	Average radiation for November	4,8,F,2
Radn -dec	Average radiation for December	4,8,F,2
Radn -year	Average radiation for a year	4,8,F,2

Layer Name: MAXMIN
Description: Average minimum and maximum temperatures (in °C) per month and year total.

Description of point attributes for maximum temperature (°C):

Item Name	Description	ARC/INFO item definition
Maxt -jan	Average maximum temperature for January	4,8,F,2
Maxt -feb	Average maximum temperature for February	4,8,F,2
Maxt -mar	Average maximum temperature for March	4,8,F,2
Maxt -apr	Average maximum temperature for April	4,8,F,2
Maxt -may	Average maximum temperature for May	4,8,F,2
Maxt -jun	Average maximum temperature for June	4,8,F,2
Maxt -jul	Average maximum temperature for July	4,8,F,2
Maxt -aug	Average maximum temperature for August	4,8,F,2
Maxt -sep	Average maximum temperature for September	4,8,F,2
Maxt -oct	Average maximum temperature for October	4,8,F,2
Maxt -nov	Average maximum temperature for November	4,8,F,2
Maxt -dec	Average maximum temperature for December	4,8,F,2
Maxt -year	Average maximum temperature for a year	4,8,F,2

Description of point attributes for minimum temperature (°C):

Item Name	Description	ARC/INFO item definition
Mint -jan	Average minimum temperature for January	4,8,F,2
Mint -feb	Average minimum temperature for February	4,8,F,2
Mint -mar	Average minimum temperature for March	4,8,F,2
Mint -apr	Average minimum temperature for April	4,8,F,2
Mint -may	Average minimum temperature for May	4,8,F,2
Mint -jun	Average minimum temperature for June	4,8,F,2
Mint -jul	Average minimum temperature for July	4,8,F,2
Mint -aug	Average minimum temperature for August	4,8,F,2
Mint -sep	Average minimum temperature for September	4,8,F,2
Mint -oct	Average minimum temperature for October	4,8,F,2
Mint -nov	Average minimum temperature for November	4,8,F,2
Mint -dec	Average minimum temperature for December	4,8,F,2
Mint -year	Average minimum temperature for a year	4,8,F,2

Layer Name: RADEVAP
Description: Average radiation (MJ/sq m/day) and evaporation (mm) per month and year total interpolated without using rainfall data.

Description of point attributes for average radiation (MJ/sq m/day):

Item Name	Description	ARC/INFO item definition
Radn -jan	Average radiation for January	4,8,F,2
Radn -feb	Average radiation for February	4,8,F,2
Radn -mar	Average radiation for March	4,8,F,2
Radn -apr	Average radiation for April	4,8,F,2
Radn -may	Average radiation for May	4,8,F,2
Radn -jun	Average radiation for June	4,8,F,2
Radn -jul	Average radiation for July	4,8,F,2
Radn -aug	Average radiation for August	4,8,F,2
Radn -sep	Average radiation for September	4,8,F,2
Radn -oct	Average radiation for October	4,8,F,2
Radn -nov	Average radiation for November	4,8,F,2
Radn -dec	Average radiation for December	4,8,F,2
Radn -year	Average radiation for a year	4,8,F,2

Description of point attributes for average evaporation (mm):

Item Name	Description	ARC/INFO item definition
Evap -jan	Average evaporation for January	4,8,F,2
Evap -feb	Average evaporation for February	4,8,F,2
Evap -mar	Average evaporation for March	4,8,F,2
Evap -apr	Average evaporation for April	4,8,F,2
Evap -may	Average evaporation for May	4,8,F,2
Evap -jun	Average evaporation for June	4,8,F,2
Evap -jul	Average evaporation for July	4,8,F,2
Evap -aug	Average evaporation for August	4,8,F,2
Evap -sep	Average evaporation for September	4,8,F,2
Evap -oct	Average evaporation for October	4,8,F,2
Evap -nov	Average evaporation for November	4,8,F,2
Evap -dec	Average evaporation for December	4,8,F,2
Evap -year	Average evaporation for a year	4,8,F,2

Layer Name: RAIN
Description: Average rainfall (mm) and number of rain days per month and year total.

Description of point attributes for average rainfall (mm):

Item Name	Description	ARC/INFO item definition
Rainf -jan	Average rainfall for January	4,8,F,2
Rainf -feb	Average rainfall for February	4,8,F,2
Rainf -mar	Average rainfall for March	4,8,F,2
Rainf -apr	Average rainfall for April	4,8,F,2
Rainf -may	Average rainfall for May	4,8,F,2
Rainf -jun	Average rainfall for June	4,8,F,2
Rainf -jul	Average rainfall for July	4,8,F,2
Rainf -aug	Average rainfall for August	4,8,F,2
Rainf -sep	Average rainfall for September	4,8,F,2
Rainf -oct	Average rainfall for October	4,8,F,2
Rainf -nov	Average rainfall for November	4,8,F,2
Rainf -dec	Average rainfall for December	4,8,F,2
Rainf -year	Average rainfall for a year	4,8,F,2

Description of point attributes for average number of rain days:

Item Name	Description	ARC/INFO item definition
Raind -jan	Average number of rain days for January	4,8,F,2
Raind -feb	Average number of rain days for February	4,8,F,2
Raind -mar	Average number of rain days for March	4,8,F,2
Raind -apr	Average number of rain days for April	4,8,F,2
Raind -may	Average number of rain days for May	4,8,F,2
Raind -jun	Average number of rain days for June	4,8,F,2
Raind -jul	Average number of rain days for July	4,8,F,2
Raind -aug	Average number of rain days for August	4,8,F,2
Raind -sep	Average number of rain days for September	4,8,F,2
Raind -oct	Average number of rain days for October	4,8,F,2
Raind -nov	Average number of rain days for November	4,8,F,2
Raind -dec	Average number of rain days for December	4,8,F,2
Raind -year	Average number of rain days for a year	4,8,F,2

Layer Name: YEARRAIN
Description: Average annual rainfall (mm) expressed in 100mm classes.

Description of polygon attributes:

Item Name	Description	ARC/INFO item definition
Range-code	Code for average annual rainfall (mm) for a year expressed in 100mm classes	4,5,B

Description of item RANGE-CODE:

Range-code value	Description
1	Less than 100 mm
2	100 – 200 mm
3	200 – 300 mm
4	300 – 400 mm
5	400 – 500 mm
6	500 – 600 mm
7	600 – 700 mm
8	700 – 800 mm
9	800 – 900 mm
10	900 – 1000 mm
11	Greater than 1000 mm

Database of Evaporation Disposal Basins, Murray Basin

TITLE: Database of Evaporation Disposal Basins in the Murray Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
Over 150 saline water disposal basins are located within the Murray Geological Basin. The basins are a significant part of local and regional management strategies to ameliorate the consequences of salinisation. An inventory of these saline water disposal basins was released in 1995 by the Australian Geological Survey Organisation (AGSO) (see References), prepared as a contribution to NRMS Project M4042 "Managing disposal basins to maximise their usefulness for salt storage". An update was produced in 1998 that provides information for disposal basins newly documented or created between 1994 and 1998. The inventory documents all known disposal basins in the Murray Basin. It is primarily text-based in a standardised format and contains information on location, operating conditions, engineering, site geology and hydrodynamics for each disposal basin. The document has formed the basis of a digital database relating to evaporation disposal basins within the Murray Basin. The data was captured digitally as part of the MDBC Irrigation Infrastructure GIS project. The report "Database of Evaporation Disposal Basins in the Murray Basin" by Ross Brodie et al. (see References) describes the components, possible uses and limitations of the data. The document and digital data sets have drawn on and overlap with individual state inventories and databases.

SEARCH WORDS: WATER Salinity
AGRICULTURE Irrigation
WASTE Liquid

GEOGRAPHIC EXTENT NAME: Murray Geological Basin

BEGINNING DATE: unknown

ENDING DATE: 1994

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO, Microsoft Access

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO, Microsoft Access
NON DIGITAL – Reports (see References)

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

1. Basin outlines
Primary data used included aerial photographs, orthophotographs, cadastre, pre-existing digital data, topographic maps, engineering plans, management documents. The data source is stored in the item named SOURCE. Basin outlines were digitised from the best available source.

2. Geological cross-sections
Primary data used included water supply bores and observation wells. Stratigraphic cross-sections were interpreted mainly from available borehole data. A data table was created containing downhole lithological descriptions from which borehole profiles were generated. Stratigraphic interpretation was digitised between boreholes and attributes were added and verified.

POSITIONAL ACCURACY: Feature accuracy is variable, reflecting the disparate data sources. The capture scale for the basin outlines is stored in an ARC/INFO polygon item named SCALE.

ATTRIBUTE ACCURACY:
1. Evaporation disposal basin outlines – unknown.
2. Geological cross-sections – accuracy mainly controlled by borehole density.

LOGICAL CONSISTENCY: Full polygon topology

COMPLETENESS: The inventory from which the digital data was derived documents all known disposal basins in the Murray Basin.

METADATA DATE: June 1999

ADDITIONAL METADATA:

Data Dictionary:
The data exists as 5 data sets:
1. Evaporation disposal basin outlines (ARC/INFO)
2. Database of evaporation disposal basin information (Microsoft Access) – this is described in Brodie et al. 1995 (see References).
3. Topographic contours in the vicinity of some evaporation disposal basins (ARC/INFO)
4. Geological cross-sections for some evaporation disposal basins (ARC/INFO)
5. Representative cross-sections near some evaporation disposal basins

Layer Name: EVAPBAS_P
Description: Outlines of saline water disposal basins with annotation and polygon attributes.

Description of polygon attributes for EVAPBAS_P:

Item Name	Description	ARC/INFO item definition
SITE_ID	Unique basin identifier, used to link to attribute database	4,5,b
NAME	Name of evaporation disposal basin	30,30,c
RELEV	Relative elevation category of basin outline	4,5,I
AHD	Relative level of basin outline in metres AHD	4,5,f,2
AHD_RELIAB	Reliability attached to AHD item	4,5,b
SOURCE	Source of basin outline	6,6,c
SCALE	Capture scale, eg. 10000, 25000, 100000	4,6,b
RELIAB	Reliability attached to interpretation of basin outline	4,5,b

Description of item RELEV:

Relev value	Description
10	Intermediate operating levels
20	
30	
40	
50	
60	
70	
80	Maximum operating level
90	Maximum inundation level

Description of item AHD:

AHD value	Description
-9999	Unknown

Description of item AHD_RELIAB:

AHDReliab value	Description
10	Accurate, based on surveys
20	Approximate
30	Uncertain
-9999	Null

Description of item SOURCE:

Source value	Description
A	Air photo
C	Cadastre
D	Pre-existing digital coverage
E	Engineering plan
O	Orthophoto map
R	Rectified air photo
T	Topographic map

Description of item SCALE:

Scale value	Description
-9999	Unknown

Description of item RELIAB:

Reliab value	Description
10	Accurate, based on surveys or definitive air photo interpretation
20	Approximate
30	Uncertain, position in doubt
-9999	Null

Layer Name: TOPO_A
Description: Topographic contours in vicinity of some saline water disposal basins digitised from engineering maps and reports.

Description of arc attributes for TOPO_A:

Item Name	Description	ARC/INFO item definition
TOPO	Topographic elevation in metres, AHD	4,8,f,2

Layer Name: XSECT_L
Description: Plan view of stratigraphic cross-sections in vicinity of saline water disposal basins.

Description of arc attributes for XSECT_L:

Item Name	Description	ARC/INFO item definition
XSECT_L-ID	Borehole identifier that links to the appropriate cross-section ARC/INFO coverage (XSECT*m*_N, where *m* = the ID of the appropriate arc in XSECT_L)	4,5,b

Layer Name: XSECT*m*_N
Description: Downhole logs and stratigraphic interpretation in profile along cross-section '*m*' stored in ARC/INFO coverage XSECT_L. The coverage contains arc, polygon and annotation attributes, as well as a look-up table for the polygon LITH attribute (LITHOLOGY.LUT).

Description of arc attributes for XSECTm_N:

Item Name	Description	ARC/INFO item definition
TYPE	Type of line	2,4,i

Description of item TYPE:

Type code	Description
10	Borehole log
20	Land surface
30	Lake surface
40	Stratigraphic contact
41	Stratigraphic contact approximate
42	Stratigraphic contact inferred
43	Stratigraphic contact uncertain
45	Stratigraphic contact erosional approximate
46	Stratigraphic contact erosional inferred
50	Fault
90	No boundary

Description of polygon attributes for XSECTm_N:

Item Name	Description	ARC/INFO item definition
LITH	Code for downhole lithology	2,4,I
UNIT	Code for geological unit	5,6,c

Description of item LITH:

Lith code	Description	Lith code	Description	Lith code	Description
100	Gravel	420	Sandy clayey loam	700	Limestone
110	Conglomerate	430	Clayey loam	705	Sandy limestone
200	Sand	440	Copi	710	Limestone loam
210	Coarse sand	500	Clay	715	Loam clay limestone
220	Medium sand	505	Kaolin	720	Clayey limestone
230	Fine sand	510	Very sandy clay	725	Clay and limestone
240	Parilla	515	Sandy clay	730	Limestone-mudstone
250	Silty sand	520	Sandy silty clay	735	Shaly limestone
260	Loamy sand	525	Loamy sandy clay	740	Limestone-shale
270	Clayey sand	530	Silty sandy clay	745	Cherty limestone
280	Muddy sand	535	Silty clay	750	Dolomite
280	Cemented sand	540	Clayey sandy clay	755	Dolomitic mudstone
290	Sandstone	545	Loamy clay	800	Shale
300	Silt	550	Light clay	810	Limy shale
310	Sandy silt	555	Medium clay	900	Ironstone
320	Clayey sandy silty	560	Heavy clay	910	Silcrete
330	Carbonaceous silt	570	Mud	920	Rock
340	Clayey silty	600	Salt	990	Basement
400	Loam	610	Gypsum		
410	Sandy loam	620	Gypsum mud		

Description of item UNIT:

Unit code	Description
CO	Cambro-Ordovician Shale
CZ	Undifferentiated Cainozoic
Q	Undifferentiated Quaternary
Qa	Coonambidgal Formation
Qdm	Molineux-Lowan Sands
Qdw	Woorinen Formation
Qly	Yamba Formation
Qms	Monoman Formation
Qpc	Blanchetown Clay
Qpci	Irymple member of Blanchetown Clay
Qra	Rufus Formation
T	Undifferentiated Tertiary
TQs	Shepparton Formation
Ter	Renmark Group
Ter3	Upper Renmark Group
Tmg	Geera Clay
Tml	Murray Group Limestone
Tmlc	Cadell Marl
Tmlf	Finnis Clay
Tmll	Lower Murray Group Limestone
Tmlu	Upper Murray Group Limestone
Tmw	Winnambool Formation
Toe	Ettrick Formation
Tpb	Bookpurnong Beds
Tpc	Calivil Formation
Tpn	Norwest Formation
Tps	Parilla Sand
Tpsu	Upper Parilla Sand

References:

Brodie, R, Hostetler, S, and Radke, B, 1995 – *Database of Evaporation Disposal Basins in the Murray Basin.* Australian Geological Survey Organisation Record.
(Note: This document is available in digital form through the MDBC (see Contact information in this document).

Hostetler, S, and Radke, B, 1995 – *An inventory of saline water disposal basins, Murray Basin.* Australian Geological Survey Organisation Record 1995/4, Volumes 1 & 2, 846p.

Sedgmen, H, 1998 – *An inventory of saline water disposal basins, Murray Basin – Additional basins for NSW, Victoria and South Australia*. Australian Geological Survey Organisation Record 1999/21, Volume 3, 60p.

Geology (Simplified Lithostratigraphic Groupings)

TITLE: Geology of the Murray-Darling Basin - Simplified Lithostratigraphic Groupings

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
As part of the collaborative Murray-Darling Basin Soil Information Strategy (MDBSIS) project, the Australian Geological Survey Organisation (AGSO) has integrated the geology of the Murray-Darling Basin (MDB) at 1:250,000 scale.

The map sheets have been compiled into a near-seamless dataset using the ARC/INFO GIS. The database incorporates 92 1:250,000 scale map sheets and combines existing 1:250,000 scale geological, metallogenic and surficial geology mapping from the NSW Dept. of Mineral Resources, the Victorian Dept. of Natural Resources and Environment, the Queensland Geological Survey and AGSO, with more recent 1:100,000 scale mapping where available.

The objectives of the lithological study were:
- to compile all the existing 1:250,000 scale and 1:100,000 scale geological mapping for the MDB,
- to create (as much as possible) a seamless geology dataset for the MDB,
- to provide an overview of the geology of the MDB, and
- to group the geology into the most useful and meaningful dataset for basin-wide studies.

The vast area of the MDB, coupled with the varying geological history of the tectonic units located within the basin, meant that the basin could not be considered as a whole when determining any lithology groupings. Rather than attempt standardisation over the whole of the MDB, the basin was sub-divided into major tectonic units using the framework devised by Palfreyman (1984). Within these tectonic units, rock types were grouped according to dominant lithology in broad time periods (recognising that specific lithologies can be characteristic of particular stratigraphic periods). This provided a simple classification on a lithostratigraphic basis.

SEARCH WORDS: GEOSCIENCES Geology Classification Maps

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: March 1996
ENDING DATE: February 1999

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: As required

STORED DATA FORMAT: DIGITAL - ARC/INFO 7.1.2
NON-DIGITAL – Geology of the MDB (1: 1,000,000) Map

AVAILABLE FORMAT TYPE(S):
DIGITAL - ARC/INFO coverage
NON-DIGITAL – Geology of the MDBC (1: 1,000,000) Map

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

The dataset was compiled from existing geological, metallogenic and surficial geology maps. Data were supplied by the NSW Department of Mineral Resources, Victorian Department of Natural Resources and Environment, and the AGSO. Data was supplied in a variety of formats, including ARC/INFO export format, generate format and Integraph design files. Other data was captured by vector scanning and digitising. A reliability diagram (AGSO Record 1998/21, Figure 4 page 14) illustrates the scale of the source data. The lithology classification was derived by grouping rock units according to dominant lithology in broad time periods (recognising that specific lithologies can be characteristic of particular stratigraphic periods).

Processing steps:

1. Data was sourced from the relevant organisation.
2. Data was edited as required in the ARC/INFO ARCEdit program to fix dangling arcs.
3. Polygon and arc attributes were added as required.
4. Data was built to provide polygon topology.
5. Datasets were merged in the Murray-Darling Basin Commission's Lambert projection (specifications provided AGSO Record 1998/21, Table 1, page 9). See "Projection and Datum" in Additional Metadata.
6. Data was edgematched where possible to produce a seamless geology dataset for the entire MDB.
7. Polygon and arc attributes were checked (both visually and using AMLs) for consistency and accuracy.
8. Metadata added.

POSITIONAL ACCURACY:

Positional accuracy of the Lithology is determined by the accuracy of the base maps that were used to map the original geology. A reliability map has been included in AGSO Record 1998/21 (Figure 4, page 14), and also on the A0-sized 1:1,500,000 scale map that accompanies the publication.

The following reliability categories were utilised:

1:100,000-scale geology mapping
1:250,000-scale geology mapping (post 1987)
1:250,000-scale geology mapping (pre 1977)
1:1 Million-scale geology Murray Basin surficial geology mapping (Note: this data was originally compiled at 1:250,000 scale).

Any use of the map should take in the reliability and data quality statistics provided for each polygon. The map should not be printed or interpreted at scales more detailed then 1:250,000.

ATTRIBUTE ACCURACY:
This data aims to provide a baseline surface geology dataset for input into basin-wide studies. The initial priority is to provide fundamental geological mapping for input into the MDBSIS project, which has a soil resource focus.

The vast area of the Murray-Darling Basin and complex geological history meant that the MDB could not be considered as a whole when determining any lithology groupings. Rather than attempt the classification of the MDB as a whole, the basin was sub-divided into major tectonic units using the framework derived by Palfreyman (1984). Within these tectonic units, rock types were grouped according to dominant lithology in broad time periods (recognising that specific lithologies can be characteristic of particular stratigraphic periods). This provided a simple classification on a lithostratigraphic basis, which is presented in the polygon attribute table fields of LITH_CODE and LITH_GRP.

LOGICAL CONSISTENCY:
The Lithology coverage was created by the conversion of grid to polygon data within the GIS package (ARC/INFO). A visual check of the map was performed to detect flaws in the resulting linework and the attributes described in the plotted key. Topological consistency checking ensured a logical polygon structure and the allocation of one label per polygon.

COMPLETENESS: The digital dataset covers the entire Murray-Darling Basin.

METADATA DATE: Feb 1999

ADDITIONAL METADATA:

Data Dictionary:
The data is in ARC/INFO format and exists as a single coverage (LITH_MDB) with polygon and arc attributes as described below.

Description of arc attributes for LITH_MDB:

Item Name	Description	ARC/INFO item definition
AGSO_CODE	An identification code assigned to the feature as specified in the book - Symbols Used on Geological Maps	8,8,I
CLASS	A measure of the status of a feature ie whether it is accurate approximately concealed etc.	2,2,I
DESC	A description of the feature	100,100,C
FEATURE	Feature type	12,12,C
NAME	The name of a feature eg. Kelly Hills Fault	64,64,C
PLOTRANK	A field used to discriminate plotting from non-plotting and artificial features	2,5,B
POLYBDY	A field used to discriminate polygon boundaries from non-polygon boundaries	1,1,C
UFI	Unique feature identifier	6,6,I
UNITBDY	Used to tell if the arc forms a boundary between different rock units	1,1,C

Description of item FEATURE:

Feature value	Description
LITH_BDY	Lithological unit boundary
FAULT	Fault line
DYKE	Dyke
CATCHMNT_BDY	Surface water catchment boundary
FRAME	Map frame
GEOPHYS_INT	Geophysical interpretation line
WATER_BDY	Water boundary, eg. Lake

Description of item PLOTRANK:

Plotrank value	Description
1	Plotting feature
2	Non-plotting feature
3	Artificial feature

Description of item POLYBDY:

Polybdy value	Description
Y	Polygon boundary
N	Non-polygon boundary

Description of item UNITBDY:

Polybdy value	Description
Y	Unit boundary
N	Non-unit boundary

Description of polygon attributes for LITH_MDB:

Item Name	Description	ARC/INFO item definition
LITH_CODE	Code for simplified lithostratigraphic groupings	4,4,C
LITH-GRP	Simplified lithostratigraphic groupings	100,100,C
UFI	Unique feature identifier	6,6,I

Description of items LITH_CODE and LITH_GRP:

Lith_code value	Lith_grp description
Ci	Carboniferous granites
Cs	Carboniferous metasediments
Cuv	Carboniferous acid volcanics
Cza	Cainozoic alluvium
Czbs	Cainozoic beach sands
Czd	Cainozoic duricrusts
Czl	Cainozoic lacustrine sediments
Czle	Cainozoic estuarine sediments
Czr	Cainozoic colluvial surfaces
Czs	Cainozoic residual and aeolian sands
Czv	Cainozoic volcanics
Ducl	Late Devonian coarse-grained sediments
Dus	Late Devonian fine-grained sediments
Dvr	Devonian volcanics
Es	Cambrian metasediments
Ev	Cambrian volcanics
H2O	Water body
Jm	Jurassic fine-grained sediments
Js	Jurassic coarse-grained sediments

Lith_code value	Lith_grp description
Jv	Jurassic volcanics
Km	Cretaceous fine-grained sediments
Ks	Cretaceous coarse-grained sediments
Os	Ordovician metasediments
Ov	Ordovician volcanics
PRg	Proterozoic granites
PRs	Proterozoic metasediments
PRv	Proterozoic volcanics
Pg	Permian granites
Pm	Permian fine-grained sediments
Ps	Permian coarse-grained sediments
Pv	Permian volcanics
Rg	Triassic granites
Rm	Triassic fine-grained sediments
Rs	Triassic coarse-grained sediments
Rv	Triassic volcanics
SDb	Silurian - Devonian basic rocks
SDcl	Silurian - Early Devonian coarse-grained sediments
SDg	Silurian - Devonian granites
SDgi	Silurian - Devonian I-type granodiorites
SDgs	Silurian - Devonian S-type granodiorites
SDls	Limestones (undifferentiated)
SDs	Silurian - Early Devonian fine-grained sediments
Svr	Silurian volcanics
Um	Cambrian - Permian ultramafic rocks

References:

Kingham, R.A. (1998) *Geology of the Murray-Darling Basin - Simplified Lithostratigraphic Groupings*, Australian Geological Survey Organisation Record 1998/21, Canberra

Historic Trend in Stream Salinity in the MDB

TITLE: Historic Trend in Salt Concentration and Saltload of Streams in the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
To enable the MDBC to upgrade the Salinity and Drainage Strategy and to take a strategic approach to resource allocation for dryland salinity management, a Trends project was initiated. This project was one of a suite of major projects designed to provide an overall picture of the extents and impacts of the problem. A report (and subsequent digital data) entitled *Salt Trends* by D Williamson et al (see References) has established the trend in saltload and salinity for major rivers in the Murray-Darling Basin over the last 20-25 years. The report analyses the historical trends in salinity and saltload in streams throughout the Murray and Darling Drainage Divisions and uses the saltload results for streams contributing to the River Murray to make and initial estimate of future trend at Morgan in South Australia. Some disturbing trends have emerged, with some rivers draining salinised catchments in southern NSW increasing in both saltload and salinity for their entire length.

The digital data describes for each of the major rivers within the Murray-Darling Basin whether the trend is rising, falling, unchanged or unknown. The major rivers are:

Avoca River	Kiewa River
Balonne River	Lachlan River
Barwon River	Loddon River
Billabong Creek	Macquarie River
Bogan River	Maranoa River
Broken River	McIntyre River
Campaspe River	Murray River
Castlereagh River	Murrumbidgee River
Condamine River	Namoi River
Culgoa River	Ovens River
Darling River	Paroo River
Edward River	Wakool River
Goulburn River	Warrego River
Gwydir River	Wimmera River

SEARCH WORDS: WATER Salinity

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: 1965

ENDING DATE: 1994

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

1. Trend Analysis

Detailed lineage can be obtained from Williamson et al 1997 (see References). Data sources were principally the State water agencies that are responsible for collecting stream flow and water quality data. These types of data are collected at hundreds of stream gauging stations within the Murray-Darling Basin. From the historic data available, 87 stations were selected basin on location and the length of record for both EC and flow. The available salinity data are of two main types: EC measurements made in the field during maintenance visits at gauging stations, and laboratory measurements made of samples.

2. Digital Data

Trend data obtained from Williamson et al 1997 (see References) were added to an ARC/INFO coverage containing vectors for each of the major rivers in the Murray-Darling Basin. This coverage was extracted from AUSLIG TOPO250K data. The data were projected from latitude/longitude coordinates into a standard MDBC Lambert coordinate system.

POSITIONAL ACCURACY: 1:250,000

ATTRIBUTE ACCURACY: Unknown.

LOGICAL CONSISTENCY:

All linework intersects correctly and have ARC/INFO line attributes.

COMPLETENESS:

Trend data is available for each of the major rivers in the Murray-Darling Basin.

METADATA DATE: March 1999

ADDITIONAL METADATA:

Data Dictionary:
The data exists as an ARC/INFO coverage named RVSALINT with line attributes.

Description of polygon attributes for RVSALINT:

Item Name	Description	ARC/INFO item definition
NAME	Name of river	50,50,C
SALT	Trend in saltload and salinity	10,10,C

Description of item SALT:

SALT value	Description
FALLING	Falling trend
NO CHANGE	No trend
RISING	Rising trend
UNKNOWN	Unknown trend

References:

D R Williamson, G W B Gates, G Robinson, G K Linke, M P Seker and W R Evans, 1997: *Salt Trends – Historic Trend in Salt Concentration and Saltload of Stream Flow in the Murray-Darling Drainage Division*, Dryland Technical Report No. 1, Murray-Darling Basin Commission, Canberra, 1997.

Hydrogeology of the Darling Basin 1: 1 Million Scale

TITLE: Darling Basin Hydrogeological Map 1: 1 Million Scale

CUSTODIAN: Murray-Darling Basin Commission (MDBC) and Bureau of Resource Sciences (BRS)[1]

[1] *Note the Australian Geological Survey Organisation (AGSO) was a former custodian of the data, but owing to an organisational restructure, the custodian is now Bureau of Rural Sciences (BRS).*

JURISDICTION: Australia

ABSTRACT:
The Murray-Darling Ministerial Council initiated the compilation of Hydrogeological mapping for the Murray Darling Basin in 1987. The first part of the mapping program was to compile a 1:1,000,000 scale map for the Murray Groundwater Basin, followed by 1: 250,000 scale maps of the same area. The second part of the program was to compile a groundwater map of the Darling River Groundwater Basin. The level of detail in the Darling groundwater map is significantly greater than that of the Murray (1: 1,000,000 mapping) as greater time was used in compilation. The map is essentially a representation of the shape and salinity of the water table for the Darling River Groundwater Basin. Other aspects of the groundwater regime, such as the deeper parts of the aquifer system and the location of higher yield areas, are also represented.

Data Available:
Darling Groundwater Basin Boundary
Depth to Watertable in Darling groundwater Basin
Darling Basin Groundwater Flow Lines
Great Artesian Basin Hydraulic Head in the Darling Groundwater Basin
Generalised Geology of the Darling Groundwater Basin
Darling Basin Lat/Long Graticule
Areas of High Yield and Low Salinity in Darling Groundwater Basin
Head difference between Darling Basin unconfined aquifers and uppermost Jurassic aquifer
Reliability Map for Darling Groundwater Basin Maps
Salinity of Groundwater in Darling Groundwater Basin
Spring locations in the Darling Basin
Standing Water Levels in Darling Groundwater Basin (Height above Sea Level)

SEARCH WORDS: WATER Groundwater
GEOSCIENCES Hydrogeology
WATER Salinity

GEOGRAPHIC EXTENT NAME: Darling River Groundwater Basin

BEGINNING DATE: Jan 1988

ENDING DATE: June1995

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO
NON DIGITAL – 1: 1,000,000 Hydrogeological Map

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

1. **Boundary, Flow Lines, Great Artesian Basin Hydraulic Head, and Head difference between Darling Basin unconfined and uppermost Jurassic aquifer**

Original data was digitised into Arc/Info and then transferred to Microstation for map production. This data was later reimported into Arc/Info and transformed from page units to real world coordinates in the form of Lambert Conformable Conic and projected to "Geographic" projection. The boundary coverage was then used as a base for boundary information on all other coverages.

2. **Depth to Watertable, Standing Water Levels, Salinity, Areas of High Yield and Low Salinity, and Spring Locations**

Original Data bore log microfiche entered manually into a Database and used to generate points in Arc/Info. Plots of the point data were used to hand contour standing water levels by integrating the topographic effects at 1:250,000 scale. These plots were then digitised into Arc/Info. The coverages were then built for lines and polygons and appended for the Darling Groundwater Basin Area.

3. **Geology**

The geology has been generalised from available geological mapping at 1:1 000 000 scale and digitised for map production using Intergraph Microstation. Microstation files were imported to Arc/Info and built as a polygon coverage.

4. **Reliability**

Data taken from other maps in series (Areas of High Yield/Low Salinity and Salinity).

POSITIONAL ACCURACY: See Table 1
ATTRIBUTE ACCURACY: See Table 1
LOGICAL CONSISTENCY: See Table 1
COMPLETENESS: See Table 1

Table 1: Description of Positional Accuracy, Attribute Accuracy, Logical Consistency and Completeness for each layer in the Darling Groundwater Basin Hydrogeology dataset

Dataset Title	Positional Accuracy	Attribute Accuracy	Logical Consistency	Completeness
Darling Groundwater Basin Boundary	1km to 10km	Variable	Majority	Full
Depth to Watertable in Darling groundwater Basin	1km to 10km	Variable	Majority	Full
Darling Basin Groundwater Flow Lines	10km to 100km	Unknown	Unknown	Unknown
Great Artesian Basin Hydraulic Head in the Darling Groundwater Basin	10km to 100km	Moderate	Majority	Majority
Generalised Geology of the Darling Groundwater Basin	1km to 10km	Variable	Variable	Full
Darling Basin Lat/Long Graticule	10m to 100m	Unknown	Unknown	13°
Areas of High Yield and Low Salinity in Darling Groundwater Basin	1km to 10km	Variable	Majority	Full
Head difference between Darling Basin unconfined aquifers and uppermost Jurassic aquifer	10km to 100km	Moderate	Majority	Majority
Reliability Map for Darling Groundwater Basin Maps	1km to 10km	High	Majority	Full
Salinity of Groundwater in Darling Groundwater Basin	1km to 10km	Variable	Majority	Full
Spring locations in the Darling Basin	1km to 10km	Variable	Majority	Full
Standing Water Levels in Darling Groundwater Basin (Height above Sea Level)	1km to 10km	Variable	Majority	Full

METADATA DATE: May 1999

ADDITIONAL METADATA:

Data Dictionary:
The dataset exists as a series of ARC/INFO coverages with polygon and/or arc attributes. These are described below.

Layer Name: DAR_BND
Description: Darling Groundwater Basin Boundary

Description of arc attributes for DAR_BND:

Item Name	Description	Arc/INFO item Definition
TYPE	Line type code	4,12,B
LINE_TYPE	Line type	12,14,C

Description of items TYPE and LINE_TYPE:

Type value	Line_Type value	Description
10	Contour	Depth to Unconfined Aquifer (Contour Line)
10	Contour	Standing Water Level Contour line (Standing Water Level coverage)
10	Limit	Boundary between Salinity Classes (salinity coverage)
10	Limit	Boundary between areas of different data reliability (reliability coverage)
10	Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Boundary	Darling Groundwater Basin Boundary
50	Edge of Data	Limit of Useable Data

Layer Name: DAR_DTW
Description: Depth to Watertable

Description of arc attributes for DAR_DTW:

Item Name	Description	Arc/INFO item definition
LINE_TYPE	Line type	12,14,C
WT_DEPTH	Contour value (in metres), depth to unconfined aquifer.	4,5,B

Description of items TYPE and LINE_TYPE:

Line_Type value	Description
Contour	Depth to Unconfined Aquifer (Contour Line)
Contour	Standing Water Level Contour line (Standing Water Level coverage)
Limit	Boundary between Salinity Classes (salinity coverage)
Limit	Boundary between areas of different data reliability (reliability coverage)
Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
Boundary	Darling Groundwater Basin Boundary
Edge of Data	Limit of Useable Data

Description of item WT_DEPTH:

Wt_depth & contour	Value Description
-9997	Limit of Jurassic Aquifer
-9998	Darling Groundwater Basin Boundary
-9999	Limit of Useable Data

Description of polygon attributes for DAR_DTW:

Item Name	Description	Arc/INFO item definition
TYPE	Line type code	4,12,B
RANGE	Depth range of polygon to top of unconfined aquifer	4,5,B
WT_DEPTH	Depth to unconfined aquifer (ie. depth to water table)	4,5,B

Description of items TYPE and LINE_TYPE:

Type value	Description
10	Depth to Unconfined Aquifer (Contour Line)
10	Standing Water Level Contour line (Standing Water Level coverage)
10	Boundary between Salinity Classes (salinity coverage)
10	Boundary between areas of different data reliability (reliability coverage)
10	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Darling Groundwater Basin Boundary
50	Limit of Useable Data

Description of item WT_DEPTH:

Wt_depth value	Description
2	0 - 2 metres
5	2 - 5 metres
10	5 - 10 metres
100	Greater than 10 metres

Layer Name: DAR_GABH
Description: Great Artesian Basin Hydraulic Head

Description of arc attributes for DAR_GABH:

Item Name	Description	Arc/INFO item definition
CONTOUR	Contour value in metres above sea level for hydraulic head for the uppermost Jurassic aquifer.	4,4,B

Description of polygon attributes for DAR_GABH:

Item Name	Description	Arc/INFO item definition
DWL	Median hydraulic head in metres above sea level for uppermost Jurassic aquifer.	4,5,B

Layer Name: DAR_GEOL
Description: Generalised Geology

Description of polygon attributes for DAR_GEOL:

Item Name	Description	Arc/INFO item definition
GEOL	Geological Unit Symbol	12,12,C
DB_GEOL	Geological Unit Symbol	12,14,C

Layer Name: DAR_GRAT
Description: Darling Basin Latitude/Longitude Graticule

Description of arc attributes for DAR_GRAT:

Item Name	Description	Arc/INFO item definition
DEG	Line position in decimal degrees (either Longitude or Latitude)	8,10,F,3

Description of polygon attributes for DAR_GRAT:

Item Name	Description	Arc/INFO item definition
MAP_NAME	The 1:250,000 map sheet name	8,10,C
MAP_NUM	The 1:250,000 map sheet number	20,24,C

Layer Name: DAR_HILO
Description: Areas of High Yield and Low Salinity

Description of arc attributes for DAR_HILO:

Item Name	Description	Arc/INFO item definition
TYPE	Line type code	4,12,B
LINE_TYPE	Line type	14,14,C

Description of items TYPE and LINE_TYPE:

Type value	Line_Type value	Description
10	Contour	Depth to Unconfined Aquifer (Contour Line)
10	Contour	Standing Water Level Contour line (Standing Water Level coverage)
10	Limit	Boundary between Salinity Classes (salinity coverage)
10	Limit	Boundary between areas of different data reliability (reliability coverage)
10	Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Boundary	Darling Groundwater Basin Boundary
50	Edge of Data	Limit of Useable Data

Description of polygon attributes for DAR_HILO:

Item Name	Description	Arc/INFO item definition
HILO	Areas of high yield and low salinity	2,4,C

Description of item HILO:

Hilo value	Description
Y	High Yield
N	Not High Yield

Layer Name: DAR_JUR
Description: Head difference between Darling Basin unconfined aquifers and uppermost Jurassic aquifer

Description of arc attributes for DAR_JUR:

Item Name	Description	Arc/INFO item definition
CONTOUR	Contour in metres	4,12,F,3

Description of polygon attributes for DAR_JUR:

Item Name	Description	Arc/INFO item definition
DWT	Unused	4,5,B

Layer Name: DAR_REL
Description: Reliability

Description of arc attributes for DAR_REL:

Item Name	Description	Arc/INFO item definition
TYPE	Line type code	4,12,B
LINE_TYPE	Line type	12,14,C

Description of items TYPE and LINE_TYPE:

Type value	Line_Type value	Description
10	Contour	Depth to Unconfined Aquifer (Contour Line)
10	Contour	Standing Water Level Contour line (Standing Water Level coverage)
10	Limit	Boundary between Salinity Classes (salinity coverage)
10	Limit	Boundary between areas of different data reliability (reliability coverage)
10	Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Boundary	Darling Groundwater Basin Boundary
50	Edge of Data	Limit of Useable Data

Description of polygon attributes for DAR_REL:

Item Name	Description	Arc/INFO item definition
RELIABILITY	Level of reliability for associated maps	2,4,C

Description of item RELIABILITY:

Reliability	Description
A	Good
B	Moderate
C	Mapping constructed using sparse data

Layer Name: DAR_SAL
Description: Salinity of Groundwater

Description of arc attributes for DAR_SAL:

Item Name	Description	Arc/INFO item definition
TYPE	Line type code	4,10,B
LINE_TYPE	Line type	12,14,C

Description of items TYPE and LINE_TYPE:

Type value	Line_Type value	Description
10	Contour	Depth to Unconfined Aquifer (Contour Line)
10	Contour	Standing Water Level Contour line (Standing Water Level coverage)
10	Limit	Boundary between Salinity Classes (salinity coverage)
10	Limit	Boundary between areas of different data reliability (reliability coverage)
10	Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Boundary	Darling Groundwater Basin Boundary
50	Edge of Data	Limit of Useable Data

Description of polygon attributes for DAR_SAL:

Item Name	Description	Arc/INFO item definition
QUALITY	Water Salinity in mg/L	4,5,B

Description of item QUALITY:

Quality value	Salinity
1	0 - 500 mg/L
2	500 - 100 mg/L
3	1000 - 1500 mg/L
4	1500 mg/L
5	3000 - 7000 mg/L
6	7000 - 14 000 mg/L
7	14 000 - 35 000 mg/L
8	Greater than 35 000 mg/L
20	0-1500mg/L (Fresh)
40	1500-3000mg/L (Brackish)
70	Greater than 3 000 mg/L (Saline)

Layer Name: DAR_SWL
Description: Standing Water Levels (Height above sea level)

Description of arc attributes for DAR_SWL:

Item Name	Description	Arc/INFO item definition
TYPE	Line type code	4,12,B
LINE_TYPE	Line type	12,14,C

Description of items TYPE and LINE_TYPE:

Type value	Line_Type value	Description
10	Contour	Depth to Unconfined Aquifer (Contour Line)
10	Contour	Standing Water Level Contour line (Standing Water Level coverage)
10	Limit	Boundary between Salinity Classes (salinity coverage)
10	Limit	Boundary between areas of different data reliability (reliability coverage)
10	Limit	Boundary between data areas (Areas of High Yield and Low Salinity coverage)
55	Boundary	Darling Groundwater Basin Boundary
50	Edge of Data	Limit of Useable Data

References:

Williams, R.M., Wooley, D.R., Abel, R., Please, P.M., and Evans, W.R., 1994: *Darling Basin Hydrogeological Map - Land & Water Management Issues*, Water Down Under '94 Conference papers, Institute of Engineers, Australia, pp 193-198.

Hydrogeology of the Murray Geological Basin, 1: 1 Million Scale

TITLE: Shallow Groundwater Salinity Map of the Murray Geological Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC),
Bureau of Rural Sciences (BRS) [1]

[1] *Note the Australian Geological Survey Organisation (AGSO) was a former custodian of the data, but owing to an organisational restructure, the custodian is now Bureau of Rural Sciences (BRS).*

JURISDICTION: Australia

ABSTRACT:
Land salinisation and degradation of surface water quality in the Australia is a serious environmental problem in Australia, particularly in the Murray-Darling Basin. Most salinity problems are groundwater related and it is only by understanding regional groundwater processes that effective management plans can be formulated to combat processes (Evans & Kellett, 1989). The Murray-Darling Basin Ministerial Council initiated the compilation of Hydrogeological mapping for the Murray Darling Basin in 1987. The first part of the mapping program was to compile a shallow groundwater salinity map of the Murray Geological Basin at 1: 1 million scale. The Shallow Groundwater Salinity Map contains information on the salinity of the shallow groundwater, depth to the watertable and areas affected by salt.

SEARCH WORDS: WATER Groundwater
WATER Salinity

GEOGRAPHIC EXTENT NAME: Murray Geological Basin

BEGINNING DATE: 1987

ENDING DATE: 1988

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO
NON DIGITAL – 1: 1,000,000 Map

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

Hydrogeology compiled in 1987 by:

W.R Evans, J.R. Kellett, BMR; R.M. Williams, G. Gates, S. Lawson, A. van der Lelij, NSW; S.R Barnett, DME SA; R.C Lakey, C.R. Lawrence DITR, D. Ife, R. Thorne RWC, P.G. Macumber, DWR Vic,

using data (particularly borehole measurements) provided by the Department of Water Resources NSW, the Department of Mines and Energy, SA, and the Department of Industry, Technology and Resources and the Rural Water Commission, both of Victoria.

The 1:1000000 scale International Map of the World topographic series was used as the base. Geology was compiled from Brown, C.M. & Stephenson, A.E., 1985 – Murray Basin 1:1000000 scale geological map published by the Bureau of Mineral Resources, Australia.

The salt affected land coverage was a regional interpretation by P.G. Macumber (DWR) and Rob Thorne (RWC) for the Victorian part of the Basin.

Data was translated from the original IGDS cartographic files into ARC/INFO, and transformed, edited and projected into real world coordinates. Coverage topology was built and attributes added.

POSITIONAL ACCURACY:
The datasets have been compiled at 1: 1,000,000 scale using AUSLIG International Map of the World Topographic Series as a base.

ATTRIBUTE ACCURACY:
Reliability map is available

LOGICAL CONSISTENCY:
The data has polygon topology with no dangle or label errors

COMPLETENESS:
Data covers the Murray Geological Basin.

METADATA DATE: July 1999

ADDITIONAL METADATA:

Data Dictionary:

Layer Name: GWSAL
Description: Salinity of the Shallow Groundwater Aquifer: The shallow groundwater salinity coverage uses the attribute CODE to express salinity. The CODE uses a standard Salinity Table and classes salinity into seven classes. CODE values of 0 are areas where there is no salinity data.

Description of polygon attributes for GWSAL:

Item Name	Description	Arc/INFO item definition
CODE	Code for salinity class	4,5,B

Description of item CODE:

Code value	Salinity in mg/L	Electrical Conductivity units
1	0 – 500	0 – 700
2	500 – 1500	700 – 2100
3	1500 – 3000	2100 – 4400
4	3000 – 7000	4400 – 10 000
5	7000 – 14 000	10 000 – 20 000
6	14 000 – 35 000	20 000 – 50 000
7	>35 000	> 50 000
0	NO DATA	NO DATA

Layer Name: GWDEPTH
Description: Depth to Watertable: The depth to watertable coverage has grouped groundwater depths into three categories according to the depth of the watertable in metres from the ground surface. The coverage stores the information in the attribute CODE (see table below). CODE values of 0 are areas where there is no watertable depth data.

Description of polygon attributes for GWDEPTH:

Item Name	Description	Arc/INFO item definition
CODE	Code for depth to watertable class	4,5,B

Description of item CODE:

Code	Depth from ground surface to watertable
1	Less than 2 metres
2	2 – 5 metres
3	Greater than 5 metres
0	NO DATA

Layer Name: SALTAFF
Description: The areas affected by salt coverage includes polygons of areas affected by salt. The coverage uses the attribute CODE to specify salt affected areas where CODE value =1 are the areas affected by salt.

Description of polygon attributes for SALTAFF:

Item Name	Description	Arc/INFO item definition
CODE	Code for salt affected land class	4,5,B

Description of item CODE:

Code	Description
1	Salt-affected
0	Not salt-affected at time of survey, or NO DATA

Layer Name: BOUND
Description: The data represents the boundary for the Murray Geological basin and has both arc and polygon topology with standard ARC/INFO item definitions.

References:

Brown C M & Stephenson A E, 1991: *Geology of the Murray Basin, Southeastern Australia*. Bulletin 235, Bureau of Mineral Resources, Canberra.

Evans W R (compiler), 1988: *Preliminary Shallow Groundwater and Salinity Map of the Murray Basin (1: 1,000,000),* Bureau of Mineral Resources, Canberra

Evans, W R & Kellett, J, 1989: *The Hydrogeology of the Murray Basin, Southeastern Australia,* BMR Journal of Australian Geology and Geophysics, Vol 11 No 2/3 p147-166, Canberra.

Hydrogeology of the Murray Geological Basin 1: 250,000 Scale

TITLE: Hydrogeology of the Murray Basin (1: 250,000)

CUSTODIAN: Murray-Darling Basin Commission (MDBC) and Bureau of Resource Sciences (BRS)[1]

[1] *Note the Australian Geological Survey Organisation (AGSO) was the former custodian of the data, but owing to an organisation restructure is now Bureau of Resource Sciences (BRS)*

JURISDICTION: Australia

ABSTRACT:
The Murray Basin Hydrogeology project was a six-year project undertaken by Groundwater Group in the Australian Geological Survey Organisations (now in the Bureau of Resource Sciences) with the support of State government agencies that had the objectives of:

1. Showing the influence of groundwater on land salinisation and surface water salinity;
2. Delineating useable groundwater resources;
3. Highlighting present and potential salinity hazard; and
4. Enhancing community awareness and understanding of groundwater systems and processes.

The project produced 26 map sheets at 1:250,000 scale (see also Hydrogeology of the Murray Basin – 1: 1,000,000), outlining the hydrogeology of the Murray Geological Basin. Each mapsheet contains a wealth of information on the groundwater system, including tops of major aquifers, groundwater salinities, aquifer yields and depth to watertable. An ARC/INFO-based database has been derived from this map series. The construction of the GIS database is an extension of the original objectives that utilises new technologies. By converting into a GIS format, the mapping now has both topology and attributes for querying and analysis and also has the ability to be readily combined with other spatial data for the area. A major outcome of the GIS database will be the inclusion of hydrogeological information (as distinct from data) into natural resource management decisions made within the Basin. Groundwater maps and models are characterised by underlying robust conceptual models and a level of interpretation applied to raw data residing within the State operating agencies. The GIS database provides easily obtainable information for these products.

The report entitled "*GIS Database of Murray Basin Hydrogeology*" by Brodie et al. (see References) outlines the GIS database in detail.

SEARCH WORDS: WATER Groundwater
WATER Salinity

GEOGRAPHIC EXTENT NAME:

The Murray Basin Hydrogeological Map Series covers the entire Murray Geological Basin where the appended set of 1:250,000 scale maps were:

Adelaide-Barker (SI 54-9, 54-13)
Burra-Chowilla-Olary (SI 54-5, SI 54-6, SI 54-2)
Renmark (SI 54-10)
Pinnaroo (SI 54-14)
Narracoorte (SI 54-2)
Hamilton (SI 54-7)
Horsham (SI 54-3)
Ouyen (SI 54-15)
Mildura (SI 54-11)
Ana Branch (SI 54-7)
Menindee (SI 54-3)
Manara (SI 54-4)
Pooncarrie (SI 54-8)
Balranald (SI 54-12)
Swan Hill (SI 54-16)
St Arnaud (SI 54-4)
Ballarat (SI 54-8)
Bendigo (SI 55-1)
Deniliquin (SI 55-13)
Hay (SI 55-9)
Booligal (SI 55-5)
Ivanhoe (SI 55-1)
Cargelligo (SI 55-6)
Narrandera (SI 55-10)
Jerilderie (SI 55-14)
Wangaratta (SI 55-2)

BEGINNING DATE: July 1994

ENDING DATE: June 1995

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not planned

STORED DATA FORMAT: DIGITAL ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL - ARC/INFO
NONDIGITAL - 1:250,000 maps

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
The GIS database was constructed using the software ARC/INFO. Digital files associated with map publication were processed and combined into seamless basin-wide ARC/INFO coverages for each hydrogeological theme. The surface geological map (Brown & Stephenson, 1991) was compiled mainly from photographic reductions of 1: 250 000 scale geological maps published by the geological surveys. The areas that published mapping, mainly in NSW, were mapped at reconnaissance level. This involved interpretation of black and white aerial photographs supplemented by minor traverses.
The primary digital data from the map production process are Intergraph design files (*.DGN). The construction of the ARC/INFO GIS from these files involved a number of steps:

1. Initial translation;
2. Registration of tics;
3. Correction of digitising errors;
4. Construction of topology;
5. Addition of attributes;
6. Transformation; and
7. Appending.

POSITIONAL ACCURACY:
The datasets have been compiled at 1:250,000 scale using the AUSLIG International Map of the World Topographic Series as a base.

ATTRIBUTE ACCURACY:
It is important to note that the hydrogeological mapping is interpretive. The quantity and quality of borehole information is different for each map sheet. The positional accuracy of contours and boundaries tends to relate to the density of boreholes and can vary from around 100m to over a kilometre. The year 1988 was chosen as the time datum for the hydrogeological mapping. In a number of areas, this time constraint was not strictly followed due to the paucity of data. The mapping is not suitable for large-scale studies (e.g. at farm level), however, the mapping does provide a regional hydrogeological framework.

LOGICAL CONSISTENCY: Full

COMPLETENESS: Full

METADATA DATE: July 1998

ADDITIONAL METADATA:

Data Dictionary:

Data available:

Layer Name	Description
RELIAB_P	Reliability Map
BND_N	Murray Hydrological Basin boundary
SEIS_A	Seismic Traverses Lines
XLINE_A	Cross section positions
SHALDEP_L	Depth to standing water (basin wide)
Standing Water Level (Above AHD)	
SHALSWL_L	Shallowest aquifer
TER1SWL_L	Lower Renmark group aquifer
TER2SWL_L	Middle Renmark Group aquifer
TER3SWL_L	Upper Renmark Group aquifer
TMLSWL_L	Murray Group Limestone
TPASWL_L	Pliocene Sands/Calivil Formation
Salinity	
SHALS_N	Shallowest aquifer
TER1S_N	Lower Renmark aquifer
TER3S_N	Upper Renmark aquifer
TMLS_N	Murray Group Limestone
TPAS_N	Pliocene Sands/Calivil Formation
Yield	
SHALY_N	Shallowest aquifer
TER1Y_N	Lower Renmark aquifer
TER3Y_N	Upper Renmark aquifer
TMLY_N	Murray Group Limestone
TPAY_N	Pliocene Sands/Calivil Formation
Upper Surface Topographic Contours (Above AHD)	
TER1TOP_L	Lower Renmark Group aquifer
TER3TOP_L	Upper Renmark Group aquifer
TMLTOP_L	Murray Group Limestone
TPATOP_L	Pliocene Sands/Calivil Formation
PCZTOP_L	Pre-Tertiary basement
Groundwater Flowlines	
SHALFLOW_A	Shallowest aquifer
TER1FLOW_A	Lower Renmark aquifer
TER2FLOW_A	Upper Renmark aquifer
TER3FLOW_A	Murray Group Limestone
TPAFLOW_A	Pliocene Sands/Calivil Formation
SWLDIFF_L	Equivalent freshwater head difference between shallowest and deepest aquifers

Naming convention:

The suffix (after the '_') denotes which ARC/INFO GIS feature(s) are present with attributes, based on the following model:

- _s spot (point) attributes
- _a arc attributes
- _l link (both point and arc) attributes
- _p polygon attributes
- _n net (both arc and polygon) attributes

Layer Name: BND_N
Description: Murray Basin Boundary

Description of polygon attributes for BND_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of polygon feature	1,1,C
FEATURE	Description of type of polygon feature	32,32,C
BASIN	If within the Murray Basin	1,1,C

Description of items TYPE and FEATURE:

Type value	Feature description
A	Aquifer boundary
B	Fault or barrier
C	Contours
D	Data density/depth boundary
F	Flow line
G	Geological extent
H	Hardline
K	1:100k or 1:250k map sheet boundary
M	Murray Basin boundary
N	No flow boundary (groundwater divide)
O	Ocean/coastline
R	Maximum regressive extent
S	Soft line
T	Maximum transgressive extent
U	Unconfined/confined boundary
W	Well/bore data
X	Extra feature to define TIN

Description of arc attributes for BND_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,1
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C

Description of items RELIAB and RELIABILITY:

Reliab value	Reliability description
A	Approximate
C	Concealed
D	Derived from digital elevation model
E	Possibly in error
F	Estimated from field observations
G	GPS
H	Maximum value
I	Inferred
L	Minimum value
M	Estimated from published map
R	Redundant
S	Accurate, surveyed
T	Transitional

Layer Name: RELIAB_P
Description: Reliability of hydrogeological compilations

Description of polygon attributes for RELIAB_P:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
RELIAB	Code for reliability of polygon feature	1,1,C
RELIABILITY	Reliability of other mapping within polygon	100,100,C

Description of items RELIAB and RELIABILITY:

Reliab value	Reliability description
A	Detailed knowledge based on concentrated drilling with good historical record. Field census of bores has been undertaken.
B	Limited knowledge based on dispersed drilling and moderate length historical record
C	Poor knowledge from sparse information and little historical record
D	No data available

Layer Name: <UNIT>SWL_L
Description: Aquifer standing water levels, where <UNIT> is the unit symbol, eg. ter1, tpc, tqs, etc.

Description of point attributes for <UNIT>SWL_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of point feature	1,1,C
FEATURE	Description of type of point feature	32,32,C
RELIAB	Code for reliability of point feature	1,1,C
RELIABILITY	Reliability of point feature	100,100,C
SWL	Standing water level (m AHD)	8,12,F,1

Description of items RELIAB and RELIABILITY:

Reliab value	Reliability description
A	Approximate
C	Concealed
D	Derived from digital elevation model
E	Possibly in error
F	Estimated from field observations
G	GPS
H	Maximum value
I	Inferred
L	Minimum value
M	Estimated from published map
R	Redundant
S	Accurate, surveyed
T	Transitional

Description of arc attributes for <UNIT>SWL_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
SWL	Standing water level (m AHD)	8,12,F,1

Layer Name: <UNIT>S_N
Description: Aquifer salinity, where <UNIT> is the unit symbol, eg. ter1, tpc, tqs, etc.

Description of polygon attributes for <UNIT>S_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
SALTID	Code for aquifer salinity	1,1,I
SALINITY	Description of aquifer salinity range	32,32,C

Description of arc attributes for <UNIT>S_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
MIN_SALT	Minimum groundwater salinity (mg/L)	8,8,N
MAX_SALT	Maximum groundwater salinity (mg/L)	8,8,N

Layer Name: <UNIT>Y_N
Description: Aquifer yield, where <UNIT> is the unit symbol, eg. ter1, tpc, tqs, etc.

Description of polygon attributes for <UNIT>Y_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
YIELDID	Code for aquifer yield	1,1,I
YIELD	Description of aquifer yield range	32,32,C

Description of arc attributes for <UNIT>S_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
MIN_YIELD	Minimum aquifer yield	8,8,I
MAX_YIELD	Maximum aquifer yield	8,8,I

Layer Name: <UNIT>TOP_L
Description: Structural contours of top of aquifer, where <UNIT> is the unit symbol, eg. ter1, tpc, tqs, etc.

Description of polygon attributes for <UNIT>TOP_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of point feature	1,1,C
FEATURE	Description of type of point feature	32,32,C
RELIAB	Code for reliability of point feature	1,1,C
RELIABILITY	Reliability of point feature	100,100,C
ELEV_TOP	Top of unit (m AHD) as observed in bore hole	6,6,I

Description of arc attributes for <UNIT>TOP_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
ELEV_TOP	Top of unit (m AHD) as observed in bore hole	6,6,I

Layer Name: SHALUN_N
Description: Host unit for shallowest aquifer

Description of polygon attributes for SHALUN_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
MAP_SYMB	Code for unit hosting shallowest aquifer	20,20,C
UNITNAME	Name of unit hosting shallowest aquifer	64,64,C

Description of items MAP_SYMB and UNITNAME:

Map_symb value	Unit Name
Q	Undifferentiated Quaternary
Qa	Coonambidgal Formation
Qfr	Pooraka Formation and other colluvial and residual deposits
Qpl	Coomandook Formation
TQs	Shepparton Formation
TQs3	Upper Shepparton Formation
TQv	Newer Volcanics
Tpa	Pliocene Sands
Tpc	Calivil Formation
Tps	Loxton-Parilla Sands
Ter	Renmark Group
Ter3	Upper Renmark Group
Tmg	Geera Clay
Tml	Murray Group Limestone
CZ	Undifferentiated Cainozoic
pCZ	Pre Cainozoic
Kl	Lower Cretaceous Sediments
DCls	Devonian to Lower Carboniferous sediments

Description of arc attributes for SHALUN_N:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C

Layer Name: SHALDEP_L
Description: Depth to watertable (Basin wide)

Description of point attributes for SHALDEP_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of point feature	1,1,C
FEATURE	Description of type of point feature	32,32,C
RELIAB	Code for reliability of point feature	1,1,C
RELIABILITY	Reliability of point feature	100,100,C
DEPTH	Depth to watertable in metres	8,8,N,1

Description of arc attributes for SHALDEP_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
DEPTH	Depth to watertable in metres	8,8,N,1

Layer Name: <UNIT>FLOW_A
Description: Groundwater flow lines, where <UNIT> is the unit symbol, eg. ter1, tpc, tqs, etc.

Description of arc attributes for <UNIT>FLOW_A:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C

Layer Name: SWLDIFF_L
Description: Equivalent freshwater head difference between shallowest and deepest aquifers

Description of point attributes for SWLDIFF_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of point feature	1,1,C
FEATURE	Description of type of point feature	32,32,C
RELIAB	Code for reliability of point feature	1,1,C
RELIABILITY	Reliability of point feature	100,100,C
DIFF	Equivalent freshwater head difference in metres	8,8,N,1

Description of arc attributes for SWLDIFF_L:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
TYPE	Code for type of linear feature	1,1,C
FEATURE	Description of type of linear feature	32,32,C
RELIAB	Code for reliability of linear feature	1,1,C
RELIABILITY	Reliability of linear feature	100,100,C
DIFF	Equivalent freshwater head difference in metres	8,8,N,1

Layer Name: SEIS_A
Description: Position of seismic lines

Description of arc attributes for SEIS_A:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I

Layer Name: XLINE_A
Description: Position of cross sections

Description of polygon attributes for XLINE_A:

Item Name	Description	Arc/INFO item definition
UFI	Unique feature identifier	6,6,I
XSECT	Name of cross section	8,8,C

References:
Brodie R, Overton W and Manson V, 1995: *GIS Database of Murray Basin Hydrogeology*, Australian Geological Survey Organisation, Canberra.

Landsat TM Base Mapping

TITLE: Landsat TM Base Mapping for the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
Accurate, consistent and timely information about the Murray-Darling Basin depends on an accurate, consistent and up-to-date mapping base. This dataset was produced in 1996 by ESRI (Eastern Australia) Pty Ltd as part of the *Murray-Darling Basin Mapping* Project. The mapping base selected was Landsat Thematic Mapper (TM), EOSAT/ACRES satellite imagery (or scenes) captured at a resolution of 25 metres (see Appendix 1).

The mapping base consists of seventy (70) full digital Landsat TM satellite scenes that have been rectified and have dates from 1994 to 1995. This imagery was gathered together by the MDBC through two Joint Agency Data Agreements (JADAs) to cover the whole of the Murray-Darling Basin. Fifty-two (52) of the scenes correspond to a JADA covering NSW, Victoria and SA and the remaining eighteen (18) scenes are correspond to a JADA covering Queensland.

To make the information available to the general user community the MDBC has reduced the number of bands from 6 to 3 (band 4, 3 and 2) and processed these bands using the IMAGINE RGB cluster algorithm agreed by the originators of the data, EOSAT/ACRES. The resulting mapping base has the same spatial accuracy as the original imagery, but is somewhat spectrally degraded. The enormous size of the datasets, which cover the basin at high spatial resolution (25 metre pixels), mean the data will be released in CD-ROM format.

Two other products have also been created from the Landsat TM imagery: a Landsat TM mosaic for the Basin with a resolution of 100 metres; and a Landsat TM mosaic for the Basin with a resolution of 500 metres. These products are the result of resampling the original "raw" Landsat TM imagery (not RGB cluster processed) and then the application of the appropriate histogram stretches.

SEARCH WORDS: PHOTOGRAPHY AND IMAGERY Satellite

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: 1994

ENDING DATE: 1995

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – GeoTIFF raster

AVAILABLE FORMAT TYPES: DIGITAL – GeoTIFF raster

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
Landsat TM imagery is acquired via a satellite (Landsat 5) that orbits the earth at an altitude of 705 kilometres. The satellite is a "passive" system that consists of an array of small sensors or detectors, which record (as digital numbers) the amount of electro-magnetic radiation reflected and/or emitted from the earth's surface.

Data Processing
To satisfy the copyright rule of EOSAT (owners of Landsat TM data) and to ensure that no royalties are payable to ACRES or EOSAT, the process known as RGB (Red, Green and Blue) clustering on the IMAGINE image processing system was accepted as the algorithm for application. RGB clustering generates a single band of data although a colour image is the end result. (The colour being dependent upon the TM bands selected.) The three bands used for the clustering process were 4 (near infrared), 3 (visible blue) and 2 (visible green) as Red, Green, and Blue respectively.

A description of RGB clustering taken from the ERDAS IMAGINE *Field Guide*:
'RGB clustering is a simple classification and data compression technique for three bands of data. It is a fast and simple algorithm that quickly compresses a 3-band image into a single band pseudocolor image, without necessarily classifying any particular features. The algorithm plots all pixels in 3-dimensional feature space and then partitions this space into clusters on a grid. In the more simplistic version of this function, each of these clusters becomes a class in the output thematic raster layer.'

POSITIONAL ACCURACY:
The specified positional accuracy of the structural vegetation data set is consistent with 1:100,000 scale topographic mapping standards, ie. 90% or more of mapped spatial features (eg. raster boundaries) will be no more than 50 metres from their actual ground location, ie. within 0.5 millimetres on the map at 1:100,000 scale.
Data used in the Murray-Darling Basin Landsat TM Base Mapping project is described by ACRES as 'Level 10' data. This means that the data has been radiometrically and geometrically corrected with two dimensional resampling, georeferenced with ground control points and digital terrain model. The georeferencing of Landsat TM scenes is to a RMS error less of than 45 metres (1.5 pixels).

ATTRIBUTE ACCURACY: N/A

LOGICAL CONSISTENCY: N/A

COMPLETENESS: Complete coverage of the Murray-Darling Basin.

METADATA DATE: Feb 1999

ADDITIONAL METADATA:

Spatial Extent Notes:
The Landsat TM mapping covers the whole of the Murray-Darling Basin. Each 1:100,000 map sheet tile in the data set has a rectangular AMG buffer around its edge, with a two kilometre minimum extent. This is necessary because of orientation differences between the raster AMG grid and the bounding border in geographical coordinates of the standard map sheet. Adjacent tiles are fully edgematched to allow unioning of overlapping regions in a seamless fashion.

Relief

TITLE: Relief of the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC), CSIRO Land and Water and Bureau of Resource Sciences (BRS) [1]

[1] *Note: the Australian Geological Survey Organisation (AGSO) was a former custodian of the data, but owing to an organisational restructure, the custodian is now Bureau of Resource Sciences (BRS).*

JURISDICTION: Australia

ABSTRACT:
A relief map of the Murray-Darling Basin (MDB) was compiled as part of the MDB Soil Information Strategy (an MDBC project). The relief map was derived using the AUSLIG 9-Second DEM that has a resolution of 250 metres. Relief was defined for each grid cell (point or pixel) as the elevation range between the nearest ridge above the point and the nearest stream below the point. The relief surface combined with state soil databases and AGSO lithology was used to create the soils-landform map for the Murray Darling Basin. The relief data was derived into 5 classes. A paper entitled "New Geotechnical Maps for the Murray-Darling Basin" by E Bui et al (see References) describes the product in more detail.

SEARCH WORDS: LAND Topography

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: Jan 1995

ENDING DATE: Nov 1998

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
Relief data were derived from the GEODATA 9-Second DEM of Australia (250m pixel; 1996), as the elevation difference between the nearest ridge up-slope and nearest major stream down-slope of each cell. All real sinks in the DEM were identified by using the AUSLIG TOPO-250K Lake coverage as an overlay and filling all other sinks. Major streams were skeletonised to ensure streams were a maximum of one pixel wide. Given the low resolution of the DEM, major ridges were approximated thus: flow accumulation was derived and local ridges were identified as those pixels with accumulation < 2 pixel. The resulting image was skeletonised and any features smaller than 8 pixels (2km) were eliminated. The nearest downhill stream and uphill ridge pixel from any given point were identified using successive uphill and downhill dilations, respectively. Relief at each point was calculated as the difference in elevation between the nearest ridge uphill and nearest major stream downhill from the point. The classified image was mode-filtered using an adaptive window of range 9-11 pixels using the local variograms of the DEM to compute each window.

POSITIONAL ACCURACY:
The relief surface is calculated from the GEODATA 9- Second DEM and is reliant on its accuracy. The positional accuracy metadata for the GEODATA 9- Second DEM is "Not documented."

ATTRIBUTE ACCURACY:
The relief surface for the Murray-Darling Basin derived from the GEODATA 9- Second DEM that has a resolution of 250 metres. However, due to the elimination of features smaller than 2km and the mode filtering used, the resolution of the data is at least 2km.

LOGICAL CONSISTENCY:
The Relief coverage was created by the conversion of raster to vector (polygon) format within the ARC/INFO GIS package. A visual check of the map was performed to detect flaws in the resulting linework and the attributes described in the plotted key. The derived relief surface was classified into five classes according to McDonald et al. (1990): less than 9m, 9-30m, 30-90m, 90-300m, and greater than 300m.

COMPLETENESS:
The data covers the entire Murray Darling Basin. The uniformity of the data corresponds to that of the GEODATA 9-Second DEM.

METADATA DATE: Jan 1999

ADDITIONAL METADATA:

Data Dictionary:

Description of polygon attributes for RELIEF:

Item Name	Description	ARC/INFO item definition
RELDESC	Relief class code description	72,72,C
RELIEF	Relief class code	4,4,B

Description of items RELIEF and RELDESC:

Relief Class	Relief Description
1	Less than 9m
2	9m-30m
3	30m-90m
4	90m-300m
5	Greater than 300m

References:

Bui, E. N., Moran, C. J. and Simon, D. A. P.(1998) *New Geotechnical Maps for the Murray-Darling Basin*, CSIRO Land and Water Technical Report 42/98, December 1998.

Kingham R. (1998) *Lithology of the Murray-Darling Basin*, AGSO Technical Report 1998/21, Australian Geological Survey Organisation, Canberra.

Soil-Landforms

TITLE: Soil-Landforms and Relief of the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC), CSIRO Land and Water and Bureau of Rural Sciences (BRS)[1]

[1] *Note the Australian Geological Survey Organisation (AGSO) was a former custodian of the data, but owing to an organisational restructure, the custodian is now Bureau of Rural Sciences (BRS).*

JURISDICTION: Australia

ABSTRACT:
Soil-Landforms of the Murray-Darling Basin was compiled as part of the Murray-Darling Basin Soil Information Strategy (MDBSIS) and is designed to provide information on soils for natural resource management and planning at the Catchment Management Committee level or over broader regions. The GIS contains information on each soil-landform class including lithofacies description, relief category and proportions of dominant Principal Profile Forms; reliability and data quality statistics. The soil-landforms data is derived from an integration of state soil databases, lithology and relief information. A rule-based method was used to fill in areas lacking adequate soil information. A hard copy map for the soil landforms is available and contains the same as the digital data excluding reliability and data quality statistics. The soil-landform map, including look-up tables and a relief map are available in digital form. Relief data are embedded in the soil landforms GIS in appropriate attributes and look-up table.

SEARCH WORDS: SOIL
SOIL Mapping
GEOSCIENCES Geology
GEOSCIENCES Geomorphology

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: Jan 1959

ENDING DATE: Nov 1998

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY:
As required. Successive versions of the map may be released, as improved data become available for inclusion.

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
Source data for this map can be divided into three main categories: soil, lithofacies and relief data. Soil data were derived from soil (1:100,000 and 1:250,000; 1959-94), soil landscape (1:100,000 and 1:250,000; 1990-97) and land system (1:250,000 and 1:500,000; 1974-91) maps. A number of the maps were not available in a digital form and were digitised for this project. Soil data were statistically extrapolated (1998) in areas of the Murray-Darling Basin where existing records were either non-existent or of insufficient quality. Lithofacies data were derived from the digital AGSO map, Geology of the Murray-Darling Basin (1:1,000,000; 1998), and a digitised Geomorphic Map of the Riverine Plain (1:500,000; 1973) combined with statistical lithofacies extrapolations (1998) to increase the spatial detail in the Darling alluvial plain.

Relief data were derived (1998) from the GEODATA 9-Second DEM of Australia (250m pixel, 1996) as the elevation difference between the nearest ridge up-slope and nearest major stream down-slope of each cell. The soil-landforms were created (1998) by intersecting classes of lithofacies with relief and attributing soil and quality data.

POSITIONAL ACCURACY:
The Soil-Landforms map is largely a composite product and the positional accuracy depends on the source of the lithofacies and DEM data. Based on the scales of the lithofacies source data, input horizontal positional accuracy would range from 25m to 250m. However, as all polygonal input data were rasterised to a 250m cell size for processing, the horizontal positional accuracy of the final product would be 250m.

The positional accuracy metadata for the GEODATA 9-Second DEM is "Not documented." This is the source of the vertical positional data for the Soil-Landforms map.

ATTRIBUTE ACCURACY:
The accuracy of soil type information is defined through a reliability statement. In previously mapped areas the reliability is determined from the scale of mapping and the nature of the mapping, ie., whether soil type allocation to polygons was the principal aim of the mapping exercise or not. Reliability in areas where soil type was statistically mapped is derived from the uncertainty coefficients and model fitting accuracy associated with the mapping and the assumption that the maximum reliability would equate to 1:250 000 scale soil association mapping. The soil type reliability ratings are provided as a separate ARC/INFO coverage named RELIABIL (available with the Soil-Landforms map). Map quality statistics attributed to the soil-landform polygons were derived as mean values within each polygon. They contain no internal statement of accuracy.

LOGICAL CONSISTENCY:
The Soil-Landforms coverage was created by the conversion of grid to polygon data within the GIS package (ARC/INFO). A visual check of the map was performed to detect flaws in the resulting linework and the attributes described in the plotted key. Topological consistency checking ensured a logical polygon structure and the allocation of one label per polygon.

COMPLETENESS:
Due to the nominal 1:250,000 scale of this map and its corresponding conventional minimum legible area of 2.5 square km, polygons smaller than this area were not represented. To assist interpretation of the plotted map, soil-landform class numbers have been shown on many polygons. Space limitations meant that class numbers were only plotted on polygons larger than 100 square km. For complete coverage of the Murray-Darling Basin, soil data required extrapolation across 34% and lithofacies data across 15% of the basin area where existing information was insufficient. Extrapolation model reliability was assessed and documented in polygon attributes but field verification of these predictions was not possible within the budget, scope and timeframe of the project. The data presented for the remainder of the Murray-Darling Basin were derived from published surveys.

METADATA DATE: Jan 1999

ADDITIONAL METADATA:

Data Dictionary:

The Soil Landforms dataset is represented by an ARC/INFO coverage named MDB_SLF that has polygon attributes. A layer named RELIABIL gives reliability information for the coverage MDB_SLF.

The 3 most probable dominant soil types or Principal Profile Forms (PPF) encountered are recorded using a Factual Key (Northcote, 1979). There are separate items for the three probable dominant soil types and their estimated percentage eg. PPF1, PPF2, PPF3 and PERCENT1, PERCENT2, PERCENT3. There are 394 Soil-Landform class values. The value groups unique lithological classes and relief features.

Description of polygon attributes of MDB_SLF:

Item Name	**Description**	**ARC/INFO item definition**
PPF1	PPF code for most dominant soil type	8,8,I
PERCENT1	Percentage of area occupied by most dominant soil type	3,3,I
PPF2	PPF code for second most dominant soil type	8,8,C
PERCENT2	Percentage of area occupied by second most dominant soil type	3,3,I
PPF3	PPF code for third most dominant soil type	8,8,C
PERCENT3	Percentage of area occupied by third most dominant soil type	3,3,I
AREA_KM2	Area of polygon (km^2)	4,12,F
PURITY	PPF data quality statistics – Purity	4,6,F
DIVERSITY	PPF data quality statistics – Diversity	4,6,F
VARIATION	PPF data quality statistics – Variation	4,6,F
INFORMATION	PPF data quality statistics – Information	4,6,F
RICHNESS	PPF data quality statistics – Richness	4,6,F
CLASS	Soil landform Class number	4,4,B

Description of attributes for lookup table MDB_SLF.LUT (item CLASS provides link between tables:

Item Name	Description	ARC/INFO item definition
CLASS	Soil-landform class	4,6,B
LITHOFAC	Lithofacies code	4,4,B
LITHDESC	Lithofacies description	72,72,C
RELIEF	Relief class code	4,4,B
RELDESC	Relief class description	16,17,C
PPF1	PPF code for most dominant soil type	8,8,C
PERCENT1	Percentage of area occupied by most dominant soil type	3,3,I
PPF2	PPF code for second most dominant soil type	8,8,C
PERCENT2	Percentage of area occupied by second most dominant soil type	3,3,I
PPF3	PPF code for third most dominant soil type	8,8,C
PERCENT3	Percentage of area occupied by third most dominant soil type	3,3,I

Description of items LITHOFAC and LITHDESC:

Lithofac value	Lithdesc value
1	Cza, Alluvium, undifferentiated
2	Czl, Mud, silty clay
3	Czs, Sand, gravel, sandstone
4	Czv, Basalt, trachyte, volcanic sediments
5	Js, Sandstone, mixed sediments
6	Ks, Sandstone, lutite
7	Os, Sandstone, mixed sediments, siltstone
8	SDg, Granite, granitoids
9	SDgi, Granodiorite
10	Um, Ultramafic
11	Ci, Granite, aplite
12	Cs, Sandstone, mixed sediments
13	Czd, Silcrete, gravel
14	Czr, Colluvium, sand
15	Ducl, Sandstone, conglomerate, mixed sediments
16	Dvr, Rhyolite, volcanics
17	Jm, Sandstone, shale, mixed sediments
18	Jv, Basalt, unsaturated volcanics
19	Km, Sandstone, mudstone, siltstone
20	Ov, Basalt, andesite
21	Pg, Granite
22	Pm, Mixed sediments, shale, conglomerate
23	Ps, Conglomerate, sandstone
24	Pv, Rhyolite, ignimbrite

Description of items LITHOFAC and LITHDESC continued:

Lithofac value	Lithdesc value
25	Rg, Granite, syenite, adamellite
26	Rm, Siltstone, sandstone, mixed sediments
27	Rs, Sandstone, conglomerate, mixed sediments
28	SDb, Mafic lava, gabbro, andesite
29	SDcl, Sandstone, mixed sediments, conglomerate
30	SDgs, Granite, granodiorite
31	SDls, Limestone
32	SDs, Shale, siltstone
33	Water body
34	Cuv, Volcanic sediments, andesite
35	Czbs, Sand
36	Czle, Lagoonal deposits, mud
37	Dus, Siltstone, shale
38	Es, Sandstone, mixed sediments
39	Ev, Basalt, mafic to ultramafic rocks
41	PRs, Mixed sediments, gneiss, amphibilite
42	PRv, Rhyolite, volcanics
45	Svr, Tuff, Dacite
107	Cza, Silty clay, floodplain, Marra Creek Formation
108	Cza, Clay, backplain, Marra Creek Formation
109	Cza, Silt, clay, sand, backplain, Carrabear Formation
110	Cza, Silty clay, backplain, Bugwah Formation
111	Cza, Silty clay, floodbasin, Marra Creek Formation
112	Cza, Sand, channel
113	Cza, Silt and clay, backplain, Marra Creek Formation
114	Cza, Silty clay, crevasse splay, Bugwah Formation
115	Cza, Silty clay, floodbasin, Marra Creek Formation
116	Cza, Conglomerate, meander plain, Trangie Formation
117	Cza, Silt, meander plain, Bugwah Formation
118	Cza, Silt and clay, meander plain, Marra Creek Formation
119	Cza, Silt and sand, meander plain, Carrabear Formation
120	Cza, Silt, riverine swamp
121	Cza, Silt, clay, sand, scalded meander plain, Bugwah Formation
122	Cza, Loamy colluvium
123	Cza, Mixed alluvium, Eastern tributaries
124	Cza, Sand, channel, Eastern tributaries
126	Cza, Meander belt, Eastern tributaries
127	Cza, Floodplain, Eastern tributaries
128	Cza, Alluvial terrace, Eastern tributaries
129	Cza, Sump basins, salinas, Eastern tributaries
132	Cza, Fine colluvium, Eastern tributaries
135	Cza, Sand

Description of items LITHOFAC and LITHDESC continued:

Lithofac value	Lithdesc value
202	Cza, Alluvial-colluvial slope aprons
203	Cza, Confined traces with patterns other than meander scrolls
204	Cza, Channelled plain
205	Cza, Confined traces with meander scroll patterns
206	Cza, Source-bordering dunes
207	Cza, Depression plain
208	Cza, Dunefield with linear dunes
209	Cza, Plains of indistinct character with surficial aeolian sand or clay
210	Cza, Dunefield with irregular or sub-parabolic dunes
212	Cza, Palaeozoic granites
213	Cza, Palaeozoic sediments
214	IW, Intermittent lakes
215	Cza, Lunettes and lunette remnants
216	Cza, Plains with little or no modification by channels, scalds or drains
217	Cza, Plains with channels
218	Cza, Plains with depressions
219	Cza, Plains with drains
220	Cza, Plains with scalds
221	Cza, Plains of indistinct character on tertiary marine sediments
222	Cza, Scalded plains
223	Cza, Swamps
224	Cza, Tertiary sands, gravels
226	Cza, Unconfined traces - no deposition evident

Description of items RELIEF and RELDESC:

Relief value	Relief Description
1	Less than 9m
2	9m-30m
3	30m-90m
4	90m-300m
5	Greater than 300m

Description of polygon attributes for RELIABIL:

Item Name	Description	ARC/INFO item definition
CLASS	Reliability of soil information presented in the soil landform coverage	4,8,B

Description of values for item CLASS contained in the lookup table RELIABIL.LUT:

Class value	Class	Description
1	1:100 000	Reliability Class A (Most Reliable)
2	1: 250 000 (Soil Landscapes NSW)	Reliability Class B
3	1: 250 000 (Manilla/Narrabri) 1: 250 000 (Land Systems of Western NSW) 1: 500 000 (Land Systems of Western Arid QLD)	Reliability Class C
4	1: 500 000 (Balonne-Maranoa)	Reliability Class D
5	1: 250 000 (Land Systems of Victoria) 1: 50 000 (Environments of SA)	Reliability Class E
6		Reliability Class F (Least Reliable)

References:

Bui, E. N., Moran, C. J. and Simon, D. A. P.(1998) *New Geotechnical Maps for the Murray-Darling Basin*, CSIRO Land and Water Technical Report 42/98, December 1998.

Kingham, R. (1998) *Lithology of the Murray-Darling Basin*, AGSO Technical Report 1998/21, Australian Geological Survey Organisation, Canberra.

Northcote, K. H. (1979). *A Factual Key for the Recognition of Australian Soils*. 4th Edn., Rellim technical Publishers, Glenside S.A.

Structural Adjustment and the Implementation of CMPs

TITLE: Structural Adjustment and the Implementation of Catchment Management Plans (CMPs)

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
The Dryland Issues Working Group of the MDBC commissioned a scoping research project to explore the current process of adjustment Murray-Darling Basin and to assess the effectiveness of adjustment and catchment policies and programs in this area. This project was to be based upon existing available data and would identify and catalogue the "knowledge gaps" currently constituting a barrier to informed policy development in this area. A report entitled *Structural Adjustment and the Implementation of Catchment Management Plans* by Neil Barr and Scott Ridges of the Victorian Department of Natural Resources and Environment (DNRE), is one of the outcomes of this project. The data generated by the analysis of various Australian Bureau of Statistics (ABS) and Australian Bureau of Agricultural and Resource Economics (ABARE) data is available as a series of ARC/INFO GRIDs that represent the figures contained in the report. All data is represented by Statistical Local Area (SLA).

The study area was initially undertaken in the wheat-sheep zone of the eastern Murray-Darling Basin. As the study progressed, a decision was made to extend the analysis to most of the Murray-Darling Basin where this was possible within the existing budget. Some of the South Australian and Queensland areas of the basin are not fully covered by the data.

SEARCH WORDS: HUMAN ENVIRONMENT Statistics

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: 1986

ENDING DATE: 1996

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO (GRID)

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO (GRID)

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
Neil Barr and Scott Ridges of DNRE constructed a database using two major data entities – the farm establishment used in the ABS farm census and the self-description of farmer used in the ABS population and housing census. This database was linked to an ArcView polygon Shape file containing ABS SLA boundaries to enable spatial representation of the results of the study.

Major Data Sources:

1. ABS Farm Census

Data from the ABS farm census is normally available only in aggregated form at State or local government area levels. Data was purchased disaggregated at parish levels and Statistical Local Area level. Statistical Local Areas boundaries changed in most years from 1991 to 1995. This presented some problems in comparing data between successive censuses. Parish boundaries remained constant, and were chosen as the preferred method for mapping temporal changes. As parishes are significantly smaller than local government areas, they are also to be re-aggregated in close resemblance to major catchment and soil type classifications.

2. ABS Population and Housing Census

The Population and Housing Census is conducted at five yearly intervals. The most recent three censuses occurred in 1986, 1991 and 1996. Data was ordered for these three censuses. The data sets described characteristics of individuals who described themselves as farmers and characteristics of those families whose membership included a self-described farmer. Data was aggregated to 1996 Statistical Local Area boundaries for each of the three censuses.

3. ABARE Data

The Australian Bureau of Agricultural and Resource Economics undertakes an annual farm survey. This survey provides a comprehensive description of the financial performance of Australian farms. This financial data is available disaggregated into regions. However, because of the relatively small sample size, the regions are significantly larger than the average SLA. Three regions cover the whole of the Victorian Murray basin.

In order to build their annual sample, ABARE has had access to the ABS frame of farm establishments. Using the full ABS frame ABARE has tracked changes in farm establishment and creation in SLAs over the period 1986-95 (Lindsay et al., 1997). The study team was given limited access to summary data from this project for the years 1986 and 1995 aggregated to SLA boundaries.

Data origins:

GRID name and description	Data source/s	Analysis notes
SOCIOF2 Ratio of farm families to farm establishments for 1996	ABS Farm census ABS Population and Housing census	
SOCIOF5 Number of farm establishments for 1995 SOCIOF6 Number of farm families for 1996	ABS Farm census ABS Population and Housing census	
SOCIOF7 Median estimated value of agricultural operations for 1996	ABARE – summary data for 1986 and 1995 aggregated to SLA boundaries	Medians were estimated using the assumption of uniform distribution within each income category, introducing a potential source of inaccuracy to the data. Figures obtained from ABS on actual farm sizes were provided in aggregate form based on 1995 SLA boundaries. There was significant difference between these boundaries and those used in Victoria in 1996. An estimated pro-rata concordance function based upon farmer numbers was used to estimate data for 1996 Victorian SLAs.
SOCIOF8 Average median farm family income in $1996 for 1986 to 1996 SOCIOF9 Median farm family income in $1996 for 1986 SOCIOF10 Median farm family income in $1996 for 1991 SOCIOF11 Median farm family income in 1996	ABS Population and Housing censuses for 1986, 1991 and 1996	ABS provides income data aggregated at SLA level and aggregated to predetermined income categories. Median incomes were estimated by assuming a uniform distribution across the income category within which the median fell. Median incomes for the 1986 and 1991 censuses were inflated to 1996-dollar terms using the ABS estimate of the consumer price index for each inter-censal period. The three median income estimates for 1986,1991 and 1996 were then averaged to obtain a smoothed estimate of median farm family income over the period 1986-96.

Data origins continued:

GRID name and description	Data source/s	Analysis notes
SOCIOF12 Mean percentage of farm families achieving FAST sustainability benchmark for 1986 to 1996 SOCIOF13 Mean percentage of farm families failing to exceed FAST unsustainability benchmark for 1986 to 1996	ABS Population and Housing censuses for 1986, 1991 and 1996	Income categories used by the ABS were adjusted for inflation for the period 1986 to 1996. Assumptions of uniform income distribution were then made to estimate the number of families reaching the sustainability benchmarks for each of the three census years. These three estimates were then averaged to obtain a smoothed indicator of performance against FAST financial sustainability benchmarks.
SOCIOF15 Mean annual rate of new entry to farming for 1991 to 1996 SOCIOF16 Rate of decline in entry rate to farming for people aged under 35 years for 1986 to 1996 SOCIOF17 Mean annual entry of persons aged over 55 years to agriculture for 1986 to 1996	ABS Population and Housing census	New entrants were calculated as those who described themselves as farmers in the census and also declared that they had changed address since the last census.
SOCIOF19 Estimated annual rate of exit from farming for 1991 to 1996	ABS Population and Housing census	A proxy measure of exit rates was calculated based upon the change in number of persons calling themselves farmers between successive censuses and the number of new entrants to farming identified as described in the above section.

Data origins continued:

GRID name and description	Data source/s	Analysis notes
SOCIOF20 Mean annual percentage decline in farm establishment numbers for 1986 to 1995	ABARE	Figures obtained from ABS on actual farm sizes were provided in aggregate form based on 1995 SLA boundaries. There was significant difference between these boundaries and those used in Victoria in 1996. An estimated pro-rata concordance function based upon farmer numbers was used to estimate data for 1996 Victorian SLAs.
SOCIOF23 Mean annual percentage decline in farmer numbers for 1986 to 1996	ABS Population and Housing census	This data explores the decline in the number of farmers. This is not the same as the number of farm establishments, or the number of farm families, which is closer to the concept of farm establishment.
SOCIOF24 Relative adjustment patterns based upon ABS Population and Housing Census data for 1986 to 1991	ABS Population and Housing census	
SOCIOF26 Relative adjustment patterns based upon ABS Population and Housing Census data for 1986 to 1991 SOCIOF27 Relative adjustment patterns based upon ABS Population and Housing Census data for 1991 to 1996	ABS Population and Housing census	
SOCIOF28 Median age of farmers for 1986 SOCIOF29 Median age of farmers for 1996 SOCIOF30 Increase in median age of farmers for 1986 to 1996	ABS Population and Housing censuses for 1986, 1991 and 1996	Median ages were calculated for those persons who described themselves as farmers using the assumption of a uniform age distribution within age cohorts.

The data obtained from DNRE were initially in decimal latitude/longitude coordinates that were then reprojected to a MDBC Standard Lambert Conformal Conic projection. To adhere to copyright conditions applied by the ABS, the data were converted into a series of GRIDs – one GRID for each attribute – so that accurate SLA boundaries could not be extracted. The cell size is 1 km by 1 km.

POSITIONAL ACCURACY: 1:1 million

ATTRIBUTE ACCURACY:

GRID name and description	Caveat notes
SOCIOF2 Ratio of farm families to farm establishments for 1996	This ratio is unreliable in SLAs with a small number of farms or farm establishments. In the case where the number of farm establishments is small, the calculated ratio may be extremely high. An example is the SLA of "Greater Dandenong Balance" which had 19 establishments and 67 farm families, giving a ratio of 300%. Predominantly urban SLAs may have even higher ratios. These figures should be used cautiously.
SOCIOF5 Number of farm establishments for 1995 SOCIOF6 Number of farm families for 1996	Currently the farm establishment is defined as a farm business or discreet section of a farm business, which has been estimated by the ABS to produce a gross value of production greater than the pre-determined cut-off figure. Farms with production lower than this figure are excluded from Farm Census data.
SOCIOF7 Median estimated value of agricultural operations for 1996	The estimations of 1996 Victorian SLA boundaries introduces some unavoidable error. Assumptions of uniform distribution within EVAO categories are made to enable estimates of median EVAO. This will introduce error into median estimates.
SOCIOF8 Average median farm family income in $1996 for 1986 to 1996 SOCIOF9 Median farm family income in $1996 for 1986 SOCIOF10 Median farm family income in $1996 for 1991 SOCIOF11 Median farm family income in 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer. Error is introduced into the estimate of median family income by the assumption of uniform distribution within ABS income categories. There is considerable volatility in the data.

GRID name and description	Caveat notes
SOCIOF12 Mean percentage of farm families achieving FAST sustainability benchmark for 1986 to 1996 SOCIOF13 Mean percentage of farm families failing to exceed FAST unsustainability benchmark for 1986 to 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer. Assumptions of uniform income distribution were made to estimate the number of families reaching the sustainability benchmarks for each of the three census years. The sustainability benchmarks take no account of family life cycle, as do more widespread benchmarks such as the Henderson poverty line. Using the Henderson benchmark would have required greater resources than were available to this scoping project.
SOCIOF15 Mean annual rate of new entry to farming for 1991 to 1996 SOCIOF16 Rate of decline in entry rate to farming for people aged under 35 years for 1986 to 1996 SOCIOF17 Mean annual entry of persons aged over 55 years to agriculture for 1986 to 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer. The definition of new entrant does not necessarily mean the entrants are new to farming as an occupation. They are new to farming in their current location. The estimate of farm entry calculated from these questions does not include new entrants to farming who are not resident within the SLA where the farm is located. In other words, absentee entrants to farming are excluded. It also excludes farm owners who have stopped working in off farm employment and increased reliance on farm income.
SOCIOF19 Estimated annual rate of exit from farming for 1991 to 1996	There is no data for the youngest or oldest age groups as the model is unable to calculate a proxy exit measure for these age groups. The inclusion of a randomisation factor by the ABS in table cells with small counts to protect confidentiality leads to occasional erratic estimates of exit rates for SLAs with small numbers of farmers. Estimates of exit rates from this measure must be treated with caution and used for relative comparisons rather than as actual measures.
SOCIOF20 Mean annual percentage decline in farm establishment numbers for 1986 to 1995	The estimation of Victorian SLA boundaries introduces some unavoidable error. The data is subject to anomalies introduced by measurement based on minimum EVAO criteria. Assumptions of uniform distribution within EVAO categories are made to enable estimates of median EVAO. This will introduce error into median estimates.
SOCIOF23 Mean annual percentage decline in farmer numbers for 1986 to 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer.

GRID name and description	Caveat notes
SOCIOF24 Relative adjustment patterns based upon ABS Population and Housing Census data for 1986 to 1991	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer.
SOCIOF26 Relative adjustment patterns based upon ABS Population and Housing Census data for 1986 to 1991 SOCIOF27 Relative adjustment patterns based upon ABS Population and Housing Census data for 1991 to 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer. The measures must only be used as indications of the relative rates of adjustment in each SLA.
SOCIOF28 Median age of farmers for 1986 SOCIOF29 Median age of farmers for 1996 SOCIOF30 Increase in median age of farmers for 1986 to 1996	The self-definition of the farmer used in the ABS Population and Housing Census allows some ambiguity over the inclusion of a person within the definition of farmer. ABS age data was only available by 5-year age cohorts. A potential error in median age estimates is created by the assumption of uniform age distribution within age cohorts.

LOGICAL CONSISTENCY:
Not documented.

COMPLETENESS:
Some of the South Australian and Queensland areas of the basin are not fully covered (in a spatial sense) by the data.

METADATA DATE: April 1999

ADDITIONAL METADATA:

Data Dictionary:
The socioeconomic data is represented in ARC/INFO GRID format and have floating point values (with the exception of SOCIOF26 and SOCIOF27). The GRID cell size is 1 km by 1 km. They are named by SOCIOF<figure number>, for example SOCIOF2 would correspond to data represented by Figure 2 in the Barr & Ridges report.

Data themes available (by SLA only):

GRID name	Description
SOCIOF2	Ratio of farm families to farm establishments for 1996
SOCIOF5	Number of farm establishments for 1995
SOCIOF6	Number of farm families for 1996
SOCIOF7	Median estimated value of agricultural operations for 1996
SOCIOF8	Average median farm family income in $1996 for 1986 to 1996
SOCIOF9	Median farm family income in $1996 for 1986
SOCIOF10	Median farm family income in $1996 for 1991
SOCIOF11	Median farm family income in 1996
SOCIOF12	Mean percentage of farm families achieving FAST sustainability benchmark for 1986 to 1996
SOCIOF13	Mean percentage of farm families failing to exceed FAST unsustainability benchmark for 1986 to 1996
SOCIOF15	Mean annual rate of new entry to farming for 1991 to 1996
SOCIOF16	Rate of decline in entry rate to farming for people aged under 35 years for 1986 to 1996
SOCIOF17	Mean annual entry of persons aged over 55 years to agriculture for 1986 to 1996
SOCIOF19	Estimated annual rate of exit from farming for 1991 to 1996
SOCIOF20	Mean annual percentage decline in farm establishment numbers for 1986 to 1995
SOCIOF23	Mean annual percentage decline in farmer numbers for 1986 to 1996
SOCIOF24	Mean annual percentage decline in number of farm families for 1986 to 1996
SOCIOF26	Relative adjustment patterns based upon ABS Population and Housing Census data for 1986 to 1991
SOCIOF27	Relative adjustment patterns based upon ABS Population and Housing Census data for 1991 to 1996
SOCIOF28	Median age of farmers for 1986
SOCIOF29	Median age of farmers for 1996
SOCIOF30	Increase in median age of farmers for 1986 to 1996

1.1.

Description of values for SOCIOF26 and SOCIO27:

VALUE	Description
1	Tightly held
2	Fragmenting
3	Churning
4	Consolidating
5	Average

References:

Barr, N. and Ridges, S. 1998: *Structural Adjustment and the Implementation of Catchment Management Plans – A summary of a report prepared for the MDBC project D7028*, Murray-Darling Basin Commission, Canberra (in prep.).

Structural Vegetation and Landcover Mapping for the MDB

TITLE: Structural Vegetation and Landcover Mapping for the Murray-Darling Basin

CUSTODIAN: Murray-Darling Basin Commission (MDBC) (see Additional Metadata for a list of agencies that have joint custodianship)

JURISDICTION: Australia

ABSTRACT:
The structural (or woody) vegetation and landcover mapping was developed as part of a larger MDBC project named BasinCare (project code of M305) and is based upon an interpretation of 1989-1991 Landsat TM imagery (bands 2,3,4 & 5) using a consistent specification. The specification is described in a report entitled *Structural Vegetation Data: a specifications manual for the Murray-Darling Basin Project M305* by Kim Ritman (see References).

The project was undertaken by a number of State and Commonwealth agencies on behalf of the MDBC. The data produced by the project only contains information about woody vegetation. Woody vegetation is defined as vegetation at least two metres tall and with a crown cover projection (density) of 20 percent or more. An important feature of this BasinCare project is an accuracy assessment (see References) that specifies the limitation of the data (and therefore its uses), such as the area of the smallest patch of woody vegetation that can be taken to be accurate, say to the 95 percent level of confidence. The digital map's nominal output scale of 1:100 000 is significantly better than the previously best available Basin-wide vegetation data which was mapped at a scale of 1:5 million by Dr John Carnahan and coworkers. The data contains woody vegetation attributes including density, genus and growth form for overstorey and understorey vegetation.

SEARCH WORDS: VEGETATION Structural
LAND Cover

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: 1989

ENDING DATE: 1991

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

1. Woody item derived from digital classification of satellite images supplemented by aerial photography interpretation and fieldwork. Woody vegetation defined as density > 20% crown cover and height of > 2 metres. Unsupervised classification followed by manual class assignment.
2. Landcover, Density and Vegetation Group (genus and growth form) items derived from manual interpretation of hardcopy 1:100 000 Landsat prints of bands 3,4 & 5 followed by digitisation and attribution.
3. Data sets in 1 and 2 above combined according to rule base described in the BasinCare Task 1 Specification Manual.

Note: Although a single specification for vegetation mapping was used, different State agencies used different methods to process the satellite imagery. Further details can be found in the *Specification Manual* (see References).

POSITIONAL ACCURACY:

The specified positional accuracy of the structural vegetation data set is consistent with 1:100,000 scale topographic mapping standards, ie. 90% or more of mapped spatial features (eg. raster boundaries) will be no more than 50 metres from their actual ground location, ie. within 0.5 millimetres on a map at 1:100,000 scale.

The geo-referencing of Landsat TM scenes is to a RMS error less than 45 metres (1.5 pixels).

More information can be obtained from the *Accuracy Assessment* (see References).

ATTRIBUTE ACCURACY:

In general the attribute accuracy of discretely classed features relies on the consistent interpretation of the boundaries. The attributes of woody vegetation constitute continuums and mixtures. The assignment of discrete boundaries to continuums and mixtures is subject to interpretation. Regular cross checking and review of interpretations was undertaken to maximise the consistency of mapping.

The attribution and edgematching to adjacent map sheets of the woody vegetation data set was progressively verified and correlated with field data and aerial photograph inspection during the classification stage. This task was undertaken by qualified interpretation staff.

Those components of the data collection that involve the additional process of line digitising and tagging are subject to a two stage verification of attribution. The first stage is a direct verification of the digital linework and tags against the original hardcopy interpretations by digitising staff. The second stage is the production of check plots that are returned to interpreters for validation.

Attribute accuracy varies, among other influences, according to the quality of vegetation survey information available for any given area that is quite variable across the Murray-Darling Basin.

More information can be obtained from the *Accuracy Assessment* (see References).

LOGICAL CONSISTENCY:
A final verification and assessment of attribute logical consistency was made across all data as part of the logical consistency tests conducted by an independent group.

COMPLETENESS:
Information regarding completeness can be obtained from the *Specifications Manual* (see References) under section 2.9.4 (page 38).

METADATA DATE: May 1999

ADDITIONAL METADATA:

Data Dictionary:
The woody vegetation mapping is stored as a series of 25-metre resolution ARC/INFO GRIDs, each covering one 1:100 000 topographic map sheet. There are a number of non-standard items in the GRID attribute table and these are outlined below.

Description of GRID attributes:

Item Name	Description	ARC/INFO item definition
WOODY	Woody vegetation is defined as persistent vegetation, extant on the imagery, with a nominal lower boundary of two-metre height in the upper stratum and density of 20% crown cover. There are instances where woody vegetation is classified within large settlement areas, rural land cover types, and coincident with plantations and orchards. With the exception of plantations and orchards, woody vegetation is a subset of the landcover type No. 7, native or exotic vegetation. There are areas of Landcover type 7 native or exotic vegetation that are not woody (eg. Chenopod shrublands), however most areas mapped as native or exotic vegetation are woody. Patches identified as woody, and are of areas less than 50 Ha, are not required to be attributed with genus, growth form and density. It is intended that woody/non-woody data can stand alone as a separate layer.	1,2,I

Item Name	Description	ARC/INFO item definition
LANDCOVER	Landcover is the highest level on the hierarchy of attributes. Only broad landcover classes are identified. These landcover types are only features that can be reliably identified on Landsat images. For example all irrigated areas cannot be reliably identified from single date imagery. It is intended that this level of classification becomes an initial template for land use mapping exercises.	1,2,I
DENSITY	The crown cover class (McDonald et al, 1990) for the dominant vegetation. Note that isolated and very sparse are not mandatory to map.	1,2,I
A_GENUS1	Primary genus of the overstorey of Vegetation Group A, identified for native vegetation and plantation landcover types. Where more than one genera is evident in the overstorey GENUS2 and for three, GENUS3 are used in order of dominance. If there are several co-dominant genus or no dominant order can be assigned, a numeric flag will be located in '*_MIX'. Full generic name is recorded.	15,15,C
A_GENUS2	The second genus of the overstorey of Vegetation Group A, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded if exists.	15,15,C
A_GENUS3	The third genus of the overstorey of Vegetation Group A, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded if exists.	15,15,C
A_MIX	This item is a numeric flag used to identify the dominance ranking of the genus if more than one is listed for Vegetation Group A. The default is dominance in order of appearance. There is a numeric flag included if the dominance order is unknown.	1,2,I
A_GFO	The growth form of the predominant overstorey for Vegetation Group A.	1,2,C
A_GENUSU	The genus or group name in full of the understorey of Vegetation Group A. The understorey is only recorded if the overstorey vegetation density is less than 20% CC. Full generic or group name is recorded (eg. a group is *chenopod*; a genus is *Acacia*).	15,15,C
A_GFU	The understorey growth form of Vegetation Group A.	1,2,C

Item Name	Description	ARC/INFO item definition
B_GENUS1	Primary genus of the overstorey of Vegetation Group B, identified for native vegetation and plantation landcover types. Where more than one genus is evident in the overstorey GENUS2 and for three, GENUS3 are used in order of dominance. If there are several co-dominant genus or no dominant order can be assigned, a numeric flag will be located in '*_MIX'. Full generic name is recorded.	15,15,C
B_GENUS2	The second genus of the overstorey of Vegetation Group B, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded.	15,15,C
B_GENUS3	The third genus of the overstorey of Vegetation Group B, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded.	15,15,C
B_MIX	This item is a numeric flag used to identify the dominance ranking of the genus if more than one is listed for Vegetation Group B. The default is dominance in order of appearance. There is a numeric flag included if the dominance order is co-dominant or unknown.	1,2,I
B_GFO	The growth form of the predominant overstorey vegetation for Vegetation Group B.	1,2,C
B_GENUSU	The genus or group name in full of the understorey of Vegetation Group B. The understorey is only recorded if the overstorey vegetation density is less than 20% CC. Coding same as Vegetation Group A.	15,15,C
B_GFU	The understorey growth form of Vegetation Group B.	1,2,C
C_GENUS1	Primary genus of the overstorey of Vegetation Group C, identified for native vegetation and plantation landcover types. Where more than one genus is evident in the overstorey GENUS2 and for three, GENUS3 are used in order of dominance. If there are several co-dominant genus or no dominant order can be assigned, a numeric flag will be located in '*_MIX'. Full generic name is recorded.	15,15,C
C_GENUS2	The second genus of the overstorey of Vegetation Group C, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded.	15,15,C

Item Name	Description	ARC/INFO item definition
C_GENUS3	The third genus of the overstorey of Vegetation Group C, identified for native vegetation and plantation landcover types. See '*_GENUS1' for definition of dominance. Full generic name is recorded.	15,15,C
C_MIX	This item is a numeric flag used to identify the dominance ranking of the genus if more than one is listed for Vegetation Group C. The default is dominance in order of appearance. There is a numeric flag included if the dominance order is co-dominant or unknown.	1,2,I
C_GFO	The growth form of the predominant overstorey vegetation for Vegetation Group C.	1,2,C
C_GFU	The understorey growth form of Vegetation Group C.	1,2,C

Definition of Vegetation Groups:

(1) Vegetation Group A
The attributes, vegetation genus and growth form are combined into a common theme called Vegetation Group. A group can contain a mix of dominant genera. Multiple vegetation groups are required where mapping cannot single out pure groups and therefore represents an aggregate or mosaic. In most cases there will only be one Vegetation Group per map unit. In cases where map units cover a mosaic of Vegetation Groups the additional Groups B and C are used as required.

(2) Vegetation Group B
In cases where map units cover a mosaic of Vegetation Groups, the additional Groups B and C are used as required. For example the Groups A and B are used where a mosaic of two essentially pure Groups each of patch size less than 50Ha are located in a mapped unit.

(3) Vegetation Group C
In cases where map units cover a mosaic of Vegetation Groups, the Groups A, B and C are used as required. For example the Groups A, B and C are used where a mosaic of three essentially pure Groups each of patch size less than 50Ha are located in a mapped unit.

Description of item WOODY:

WOODY value	Description
0	Absent, [Default]
1	Present
2	Unclassified / cloud

Description of item LANDCOVER:

LANDCOVER value	Description
0	not classified, out of TM image
1	other, including crops and annual/perennial pasture
2	settlement
3	bare ground
4	water
5	plantation
6	orchard
7	native or exotic vegetation

Description of item DENSITY:

DENSITY value	Description
0	not applicable / not mapped
1	0 - 0.2 % CC, isolated
2	0.2 - 20 % CC, very sparse [open woodland]
3	20 - 50 % CC, sparse [woodland]
4	50 - 80 % CC, mid-dense [open forest]
5	80 - 100+% CC, dense [closed forest]

Description of items A_MIX, B_MIX and C_MIX:

A_MIX value	Description
0	dominance in order of number [default]
1	co-dominance
2	unknown dominance

Description of items A_GFO, B_GFO and C_GFO:

A_GFO value	Description
T	tree
M	mallee
S	shrub
H	herb or grass
0	not applicable / not mapped

Description of items A_GFU, B_GFU and C_GFU:

A_GFU value	Description
T	tree
M	mallee
S	shrub
H	herb or grass
0	not applicable / not mapped

Agencies who have joint custodianship with the MDBC (note: some agency names and contact details are likely to have changed):

State	Primary Custodian	Secondary Custodian	Contact	Phone/fax
SA	Dept. of Environment & Natural Resources DENR	Office of Housing & Urban Development	Technical Specialist Image Data Services 282 Richmond Rd Netley SA 5037	08-8226 4903P 08-8226 4906F
Victoria	Dept. of Conservation & Natural Resources DCNR	~	Program coordinator NRS Branch 1/601 Bourke St Melbourne VIC 3000	03-9628 9336P 03-9628 9377F
ACT	Dept. of Urban Services DUS	~	GIS Manager PO Box 1119 TUGGERANO NG ACT 2901	02 6207 2323P 02 6207 2229F
NSW – Woody Data	Dept. of Land & Water Conservation DWLC	~	Data Manager LIC PO Box 143 Bathurst NSW 2795	02 63328 200P 02 63318 095F
NSW – Vegetation Group & Density Data	National Parks & Wildlife Service NPWS	Dept. of Land & Water Conservation	Data Manager LIC PO Box 143 Bathurst NSW 2795	02 63328 200P 02 63318 095F
Queensland East	Dept. of Primary Industry DPI Qld	~	GIS Manager Forestry Section GPO Box 944 BRISBANE QLD 4001	07-3234 0124P 07-3234 0326F
Queensland West	Dept. of Environment & Heritage DEH	Dept. of Lands DOL	Manager Qld Herbarium Meiers Rd INDOOROOPILLY QLD 4068	07-3877 9325P

References:

Ritman, K T, 1995: *Structural Vegetation Data: a specifications manual for the Murray-Darling Basin Project M305*, NSW Department of Land and Water Conservation, Land Information Centre, Bathurst.

Volframs, A and Wilkins, K, 1998: *M305 Project: Accuracy Assessment of the Woody/Non-woody datasets*, Surveyor General's Department of NSW, Bathurst, April 1998.

Wetlands GIS of the Murray-Darling Basin

TITLE: Wetlands GIS of the Murray-Darling Basin Series 2.0

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
This project mapped the maximum extent of wetlands within the Murray-Darling Basin over a ten-year period (1983-1993). The method used was based on the presence of water. Wetlands greater than five hectares were identified using a combination of unsupervised classification of Landsat MSS imagery and additional wetland information to create information classes of broad wetland groups (floodplain wetlands, freshwater lakes, saline lakes, and reservoirs). The mapped data will be used to assess the wetland resource in each catchment within the Murray-Darling Basin. This data layer is the result of an external review of the Murray-Darling Basin Wetlands Verification Series 1.0 by relevant state agencies in New South Wales, Victoria, Queensland, South Australia and the ACT.

SEARCH WORDS: WATER Wetlands mapping

GEOGRAPHIC EXTENT NAME: Murray-Darling Basin

BEGINNING DATE: 1987

ENDING DATE: 1993

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:
Wetlands were identified using unsupervised classification of Landsat MSS imagery on the basis of the presence of water. The thematic grid was vectorised using ARC/INFO. Wetland areas were then grouped using additional information including aerial survey of wetland data, 1:250,000 hard copy map sheets, AUSLIG TOPO250K waterbody theme and existing wetland maps. This produced Verification Series 1.0. Wetland maps of this series were externally reviewed by appropriate State agencies. Amendments based on reviewer's recommendations were incorporated into Series 2.0.

POSITIONAL ACCURACY:
Each Landsat MSS image was geometrically rectified and geocoded to UTM coordinates (AGD66 datum and Australian National spheroid) using 1:250,000 scale topographic maps. A Root Mean Square Error of less than one pixel was achieved for each image.

ATTRIBUTE ACCURACY:
Wetlands were grouped into four broad classes: floodplain wetlands, freshwater lakes, saline lakes and reservoirs on the basis of spectral signature, geomorphological characteristics and other data (generally 1:250,000 scale).

LOGICAL CONSISTENCY:
The GIS package ARC/INFO was used to do topological consistency checks to detect flaws in the spatial data structure and to identify them as errors. This check ensures that all classified polygons are closed, nodes are formed at the intersection of lines, and that there is only one unique label within each. Multiple and dangling lines were also edited. All polygons were visually checked by draping over Landsat MSS imagery using ERDAS Imagine to ensure that polygons were correctly coded.

COMPLETENESS:
This mapping identifies wetlands greater than 5 hectares. Unsupervised classification reliant on imagery being acquired at wet period (some areas may have been missed because of dry imagery and/or cloud cover). Ten percent of the coverage verified against aerial survey of wetland areas. This cover is the result of feedback from an external review of wetland maps of the Verification Series 1.0.

METADATA DATE: August 1999

ADDITIONAL METADATA:

Projection: Standard MDBC Lambert Conformal Conic projection as defined below:
Projection: Lambert Conformal conic
Units: Metres
Spheroid: Australian
Parameters: 6378160 6356775 (semi-major axis & semi-minor axis)
First standard of parallel: -34 30 00
Second standard of parallel: -28 30 00
Central meridian: 146 00 00
Latitude of origin: -31 30 00

Data Dictionary:
The wetlands are represented in an ARC/INFO polygon coverage called MDBWETLD. The wetlands are described using five attributes as described below.

Description of polygon attributes:

Item Name	Description	Arc/INFO item definition
DATE	Date of Landsat MSS image acquisition	10,10,C
SYMBOL	Shadeset symbol for each group of wetland	3,4,I
GROUP	The type of wetland	20,20,C
GROUPCODE	Code used to identify the group of wetland	4,4,I
NAME	The wetland name identified from the AUSLIG TOPO250K waterbody theme (AUSLIG 1994)	35,35,C

Description of item GROUP and GROUPCODE:

Groupcode value	Group value	Description
0		
4	Saline Lake	Naturally occurring drainage basins of saline open water. A unique spectral signature from Landsat MSS imagery identified most saline lakes. Wetlands annotated as 'salt' or 'salt lake' on hard copy 1: 250 000 maps and ancillary information from existing wetland maps was used as verification or as an attribute source. Examples included Lake Wyara and Lake Tyrell.
5	Freshwater Lake	Naturally occurring drainage basins of open water where aquatic vegetation on the surface did not dominate the spectral reflectance. It includes permanent to semi-permanent drainage basins that were named (AUSLIG 1994). Examples included Lake George, Lake Alexandrina, Menindee Lake and Lake Numalla.
6	Reservoir	A human-made waterbody of open water where water is stored and/ or regulates flows of water. It included catchment reservoirs, farm dams, off-river storages, levees, reservoirs associated with mines and quarries, evaporation basins and sewage ponds. These data were collated from AUSLIG (1994) 250K waterbody layer and 1:250 000 topographic maps. Examples included Hume Dam and Tullakool Evaporation Basins.
18	Floodplain Wetlands	These were areas of land adjacent to rivers but also included the river channel and waterholes that were not freshwater or saline lakes. They included wetland vegetation communities such as river red gum (*Eucalyptus camaldulensis*), black box (*Eucalyptus largiflorens*), and lignum (*Muehlenbeckia florulenta*). Examples include the Macquarie Marshes, Barmah-Millewa Forest and the Lowbidgee Floodplain. Ephemeral lakes and claypans dominated by herbaceous vegetation (reeds *Typha* spp; *Phragmites* spp. nitre goosefoot (*Chenopodium nitrariaceum*) and canegrass (*Eragrotis australasica*)) were also included as floodplain wetlands. Examples of these include the Great Cumbungi Swamp and Yantabulla Swamp.
-999	Non-wetland	

References:

Kingsford, R T, Thomas, R F and Knowles, E, 1999: Wetlands GIS of the Murray-Darling Basin, NSW National Parks and Wildlife Service.

Terms and Conditions for Use of Murray-Darling Basin Mapping

Definition

Murray-Darling Basin Mapping includes all Murray-Darling Basin Commission (MDBC) copyrighted mapping and survey information, in both digital and hardcopy formats, of the Murray-Darling Basin.

Specifically, Murray-Darling Basin Mapping includes:

- Landsat TM and AVHRR imagery
- Vegetation mapping
- Soils and lithology mapping
- Wetlands GIS
- Hydrogeology
- Disposal basins
- Socio-economic data
- Climate data
- Irrigation area information

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Failure to comply with the above terms and conditions is a breach of copyright.

Section 2: River Murray Mapping

Background

Statutory planning is necessary to control haphazard development on the River Murray floodplain, and thereby avoid cumulative downstream and cross-border impacts. For example, the siting of a toxic waste dump or large-scale feedlot on land liable to flooding could have serious water quality implications in the event of a flood. With the Murray stretching across three States and numerous local councils, the Murray-Darling Basin Commission (MDBC) agreed that a consistent and coordinated approach to environmental planning would help minimise the potential impacts of development on the sensitive riverine environment of the Murray.

On 31 March 1994, Murray Regional Environmental Plan No. 2 for Riverine Land (Murray REP No. 2) was gazetted in New South Wales with the support of the MDBC. Murray REP No. 2 provides the framework for statutory planning, for example Local Environmental Plans along the Murray floodplain in New South Wales. The principles of Murray REP No. 2 (but not the plan itself) have also been agreed on the Victorian side of the Murray floodplain.

Introduction

The successful implementation of environmental plans such as Murray REP No. 2 relies on accurate, reliable and consistent mapping. For example, to make informed decisions about development applications and to delineate where exactly the various provisions of the plan apply. A River Murray Mapping Task Force with membership from South Australia, Victoria and New South Wales was constituted to oversee the development of appropriate mapping to support environmental planning for the Murray and Darling floodplain systems. Currently, natural resource data for the River Murray is being collected by the Murray-Darling Basin Commission to support environmental planning and management. Data sets produced as a result include an orthophoto base, surveys of wetlands and riparian vegetation, geomorphology and major historical flood events. It is the MDBC's intent to keep this data up-to-date and to include better information, as it becomes available.

This section describes the data sets that fall into the MDBC project *River Murray Mapping*.

Projection Information

All *River Murray Mapping* products are available in the following projection:

Projection name: Universal Transverse Mercator (scale factor 0.9996)
Units: Metres
Datum: WGS84/GDA94
Spheroid: WGS84/GDA94
Zones: 54 or 55

River Murray Digital Terrain Model, 1996

TITLE: Digital Terrain Model for the River Murray, 1996

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
A Digital Terrain Model (DTM) has been constructed by the South Australian Department of Environment, Heritage and Aboriginal Affairs (DEHAA) on behalf of the MDBC, as part of Second Edition River Murray Mapping to allow the removal of terrain-induced distortion from raw aerial photo images along the River Murray. The DTM is a regular grid mesh of heights (with a resolution of 100 metres) based on the GDA94 coordinate system. The Model covers the same extent as the Second Edition River Murray Mapping Orthophoto series. Heights at each 100-metre interval have been mathematically modelled from a variety of different input sources. The data exists in ASCII format and as Design Files (.DGN) and each DTM mesh point can be interrogated for height.

SEARCH WORDS: LAND Topography

GEOGRAPHIC EXTENT NAME: River Murray flood plain by River Murray Regions. There are ten regions:

1. Lake Alexandrina
2. Lower Murray
3. Riverland
4. Lake Victoria
5. Sunraysia
6. Swan Hill
7. Wakool
8. Barmah-Millewa
9. Albury-Yarrawonga
10. Upper Murray

BEGINNING DATE: 1996

ENDING DATE: 1998

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Possibility of an update in the next Census year (2001) subject to approval.

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

The digital terrain data used for the production of the final 100-metre grid was a combination of:

- SA Lands 5 metre contours in regions 1 to 3 (supplemented by some fringe areas of DEM's from old 1:50,000 mapping block photography);
- Much of the height data for regions 4 – 9 was photogrammetrically acquired using either a 100 metre or a 250 metre grid of spot height supplemented by some breaklines;
- As mentioned above for regions 4 – 9, the 100 metre DTG of region 10 was essentially derived from Vic/NSW topographic data.

All the above data was terrain modelled using Bentley MGE Terrain Modeller and a TIN process before the final regular 100 metre grid was derived.

POSITIONAL ACCURACY:
The data was constructed to 1:25,000 mapping specifications ie. 90% of the features are within ± 12.5 metres on the ground.

ATTRIBUTE ACCURACY:
The final absolute DTM height accuracy for regions 1 - 9 is estimated to be ± 5 metres (better in SA), but in the mountainous Upper Murray (region 10) there could be some height errors greater than 5 metres in the steep and forested terrain. Relative height accuracy is approximately ± 2 metres.

LOGICAL CONSISTENCY: Full

COMPLETENESS: Full

METADATA DATE: June 1999

ADDITIONAL METADATA:

Data Dictionary:

The data exists in ASCII format as a series of points described by x, y and z values; and as line-strings in ISFF Design Files (.DGN).
1.2.

River Murray Flood Mapping

TITLE: River Murray Flood Mapping

CUSTODIAN: Planning SA (South Australian data)
Murray-Darling Basin Commission (SA border to Lake Hume)

JURISDICTION: Australia

ABSTRACT:
River Murray Flood Mapping represents the extent of flooding based on historical records and some associated information (eg. flood depth contours and levels) captured by two different projects for (1) the River Murray from the mouth to the South Australian border, and (2) the River Murray from the South Australian border to Lake Hume. The flood information for the South Australian section of the River Murray was obtained from the South Australian Government by the Murray-Darling Basin Commission (MDBC), and represents the extent of the 1956 flood. The information for the River Murray upstream of the South Australian border was produced for the MDBC to support environmental planning along the River Murray, such as NSW Murray Regional Environmental Plan No 2 (note that the flood information was collected in a uniform and consistent fashion for both the NSW and Victorian sides of the floodplain). Accuracy and reliability of mapping was subject to the quality of data available at the time the mapping was undertaken.

The Victorian Department of Natural Resources and Environment (DNRE), who undertook the flood information mapping upstream of South Australia on behalf of MDBC as part of a Natural Resource Management Strategy (NRMS) project, is currently producing detailed metadata to support the mapping, for example specifying the sources of data for each flood information segment. *Please note that the flood mapping data is preliminary until complete metadata has been constructed*.

SEARCH WORDS: WATER Hydrology
WATER Surface
HAZARDS Flood

GEOGRAPHIC EXTENT NAME: The Flood Mapping covers the entire River Murray floodplain from the mouth to below Hume Dam. This area currently excludes the Edward-Wakool river system (due to be completed late in 1999 by a separate study).

BEGINNING DATE: 1989

ENDING DATE: 1999

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC Copyright conditions and SA Government licence constraints (see Terms & Conditions)

LINEAGE:

1. River Murray mouth to South Australian border:
The data for this part of the River Murray represents the extent of land flooded during the 1956 flood event. The coverage was captured from 1:10,000 mylars as a dataset by the Geographic Analysis and Research Unit (part of SA Dept of Transport, Urban Planning and the Arts – Planning SA) and the Resources Information Group (part of SA Dept of Environment, Heritage and Aboriginal Affairs).

2. River Murray from the South Australian border to Lake Hume:

2.1. Available Aerial Photography
This is a major source of information in establishing the extent of flooding for particular events.

2.2. Landsat & Spot Imagery
This information is used where aerial photography is not available. These images were used in conjunction with the theoretical analytical programs HEC 2 and MIKE 11, and any other information available.
The Victorian Department of Natural Resources and Environment (DNRE) has many gauging sites along the river and flow data for various historical flood events. Statistical analysis of this data enables the determination of different return period flows.
The theoretical 1% flow is then used with the analytical models - HEC 2 and MIKE 11 - to establish a difference in flow level between the known events and the theoretical 1% level.
Differentials between known flood events and theoretical one percent flow, established at existing gauging stations, can be used to create one-percent longitudinal profiles.
In the absence of the above information, geomorphological, soil and vegetation maps are used to define flood extents. These sources are respectively less reliable than any of the above methods.

2.3. Criteria for Mapping
2.3.1. Levee Banks
a) Private Ownership
Licensed (NSW) and unlicensed levees (Vic and NSW) that have been constructed by individuals are deemed not to exist for the purposes of flood mapping. The reasons these banks are ignored are that they have been constructed to various standards of height, construction quality and different protection levels, and maintenance is almost nonexistent.

Even if some banks have been constructed to a reliable standard, the fact that many others in the area are not could result in failures and subsequent flooding, ie. the unreliability of most banks condemns the better banks to the same lower classification..

b) Public Ownership

Main public levees, ie. levees managed by Shires, Government Departments or Water Management Authorities, are deemed to have interaction with floods because these authorities are responsible for these levees and the consequences of any failure. Also public authorities nearly always adhere to strict design, construction and maintenance standards.

2.3.2. Roads and Railways

These are considered to be barriers, because they are generally built to appropriate engineering standards and have generally stood the test of time in retaining floodwaters.

2.3.3. Channels

a) Main trunk channels

Main trunk channels that are maintained by a Public Authority are considered to be barriers depending on their height. This is because they have been constructed to an appropriate standard.

b) Private channels

Private channels are not considered to be barriers because of their often irregular height. They are usually smaller than channels controlled by public authorities, their banks are not as high and they would normally be expected to be overtopped by a major flood event. Their standard of construction is not known and maintenance standard varies significantly with the different owners.

2.3.4. Private Farm Drains & Authority Farm Drains

These drains are constructed at low points and with gaps in spoil banks. Generally, the spoil banks are well below the major flood event's extent of flooding.

2.3.5. Flood Protected Areas - Special Notes

Notwithstanding any of the above considerations, special notations are used to indicate areas that are protected from flooding by artificial means. For example,

"This area is protected from flooding but may flood in the event of the Channel/Main Road/Levee is overtopped or breached."

The flood mapping used *First Edition River Murray Mapping* orthophotos for base mapping. The data was reprojected from UTM AGD66 datum and Australian National spheroid to UTM WGS84 datum and spheroid for compatibility with *Second Edition River Murray Mapping*.

POSITIONAL ACCURACY:

(1) For the mapping from the River Murray mouth to the South Australian border:

As far as can be ascertained, the information is correct to the scale of capture (1:10,000 scale).

(2) For the mapping from the South Australian border to Lake Hume:
The base mapping used (*First Edition River Murray Mapping* orthophotos) has been designed to comply with standard accuracy associated with 1:25,000 topographic mapping, ie. 90% of features identifiable on the orthophoto located within 12.5 metres (ie. 0.5 mm at 1:25,000 scale) of true ground position. However, the flood mapping, being a derived information product, is likely to be somewhat less accurate than this.

ATTRIBUTE ACCURACY:
(1) For the mapping from the River Murray mouth to the South Australian border, the attribute accuracy is to within design standards.

(2) For the mapping from the South Australian border to Lake Hume:
Historical floods, for example in 1917, 1974 and 1956 were mapped based on the best available information, ***for the purposes of environmental planning***. Please note the data and mapping may not prove ideal for purposes other than for which they were designed.

LOGICAL CONSISTENCY: The major flood event coverages have full polygon topology and no label or node errors, with the other coverages having line and annotation attributes.

COMPLETENESS: For each of the two regions, the flood information is seamless and is complete for the River Murray from the mouth to Lake Hume.

METADATA DATE: April 1998

ADDITIONAL METADATA:

Data Dictionary

The flood information for upstream of South Australia has been converted from DGN format to ARC/INFO and was then separated into two layers. The first (EXT) describes the major flood event (a compilation of historical flood information from 1917 and other flood events). This layer has full polygon topology that allows the event to be shaded for 'flooded and 'not flooded'. The second (ALL) describes flood mapping information for all years covered by the study and has line and annotation attributes. This layer does not have polygon topology. The South Australian data exists as a flood extent (EXT) layer only and does not contain the more comprehensive information of the ALL layer.

Description of poly attributes for coverage name EXT:

Item name	Description	ARC/INFO item definition
DESC	Whether the area described by the polygon will be flooded or not in a major flood event	30,30,C

Description of item DESC:

Desc value	Description
Flooded	The area represented by the polygon will be flooded by a major flood event.
Not Flooded	The area represented by the polygon will not be flooded by a major flood event.

Description of arc attributes for coverage name ALL:

Item name	Description	ARC/INFO item definition
IGDS-LEVEL	An item from the original MicroStation DGN format file defining each feature/theme	2,2,I
DESC	A description of the feature/theme, linked to item IGDS-LEVEL	50,50,C

Description of items IGDS-LEVEL and DESC:

Igds-level value	Desc value
1	Flood extent – 1917 and other
2	Flood extent – 1917 and other – not finalised
4	1974 flood extent
7	Unknown flood extent data
10	Edge of map sheet
16	Lakes/Dams, minor rivers
17	Extent of mapping
18	Major rivers
19	Murray River distances
22	Channel line
28	South Australian Border
30	1975 flood line from 1975 Landsat data
31	1975/1993 flood contour and level
32	Major flood event contour
34	Flood contour (year uncertain)
40	1917 flood level
41	1975 flood level
42	1981 flood level
43	Tabulations
44	1956 flood level
45	Other flood level data
48	Levee from engineering survey
49	Levee elevations
51	Levee (digitised levee)
61	Linework for flood fill
62	Sheet edge for flood fill

Geomorphic mapping of the River Murray floodplain

TITLE: Geomorphic mapping of the River Murray floodplain, Lake Hume to the South Australia Border.

CUSTODIAN: Murray-Darling Basin Commission

JURISDICTION: Australia

ABSTRACT:
Geomorphic mapping of the River Murray floodplain from Lake Hume to the South Australia border contains data from five sources:

1. Thorne, R.A., Hoxley, G.P., & Chaplin, H. (1988) Geomorphic Map from Nyah to the South Australia border. Rural Water Commission. Unpublished map.
2. HydroTechnology (1994) Geomorphic Mapping - Barham to Wakool Junction. Unpublished report prepared for Murray-Darling Basin Commission.
3. Cox, F. & Friedman, L. (1983) River Murray Geomorphology. Echuca - State Border. State Rivers & Water Supply Commission. Unpublished report.
4. Currey, D.T. (1977) Geomorphology of the Barmah-Millewa Forests Environment. *in* Storrier, R.R. & Kelly, I.D. (eds.) "The Hydrogeology of the Riverine Plain of South East Australia", pp 9-19. Australian Society of Soil Science. Proceedings of a symposium held at Griffith NSW, 28-29 July 1977.
5. Currey, D.T. (1976) The Geomorphology of the River Murray. State Rivers & Water Supply Commission. Unpublished report.

SEARCH WORDS: GEOSCIENCES Geomorphology mapping

GEOGRAPHIC EXTENT NAME: River Murray floodplain from Lake Hume to the South Australia border.

BEGINNING DATE: 1975

ENDING DATE: 1998

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Not Planned

STORED DATA FORMAT: DIGITAL ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO
NON DIGITAL – Reports (see References)

ACCESS CONSTRAINT: MDBC copyright conditions apply (see Terms & Conditions)

LINEAGE:

Geomorphological mapping was carried out at the following scales:

Source map coverage	Reference	Scale
Nyah to SA Border	Thorne et al. (1988)	1:100,000
Barham to Wakool Junction	HydroTechnology (1994)	1:100,000
Echuca to SA Border	Cox & Friedman (1983)	1:100,000
Tocumwal to Echuca	Currey (1976 &1977)	1:100,000
Hume to Tocumwal	Currey (1976)	1:100,000
Downstream of Wodonga (for 12km)	Currey (1976)	1:14,286
Lake Hume to Albury	Currey (1976)	1:20,000

In the areas derived from Currey (1976) and Cox & Friedman (1983) the positions of the main watercourses have been taken from AUSLIG 1:100,000 topographical data, except in the area covered by the Jerilderie 1:250,000 map sheet (I55-14) in which case 1:250,000 AUSLIG data have been used. The locations of lakes shown on the geomorphic source maps have been identified using the AUSLIG data.

The AUSLIG 1:100,000 data have also been used to define the location of the River Murray in the area covered by Thorne et al. (1988).

The AUSLIG data have been used under an extended licence agreement between Sinclair Knight Merz and AUSLIG which allows the use of such data for work undertaken by Sinclair Knight Merz specifically for the Murray-Darling Basin Commission. Release of digital topographic data obtained from the Australian Land Information Group (AUSLIG) used in the production of the geomorphic maps is in compliance with the extended license agreement.

The source data were digitised into MicroStation and then converted to ArcInfo format. A consistent landform code was developed to allow cross-referencing between data collected by different authors.

Data were transferred to the *First Edition River Murray Mapping* orthophoto base and later reprojected to UTM WGS84 datum and spheroid to be compatible with *Second Edition River Murray Mapping*.

POSITIONAL ACCURACY:
Mostly +/- 100 metres but may in places be +/- 500 metres for areas without clearly defined boundaries.

ATTRIBUTE ACCURACY:
Attribute data have been taken directly from the original mapping and codes applied to unify the different terminology.

LOGICAL CONSISTENCY:
Polygon and line topologies have been built. There are no dangle or label errors.

COMPLETENESS:
Where data sets overlap between Barham/Koondrook and the South Australia border, the HydroTechnology (1992) data set takes precedence over that of Thorne et al. (1988) and Cox and Friedman (1983). The Thorne et al. (1988) data set has been used in preference to that of Cox and Friedman (1983) in the area from Nyah to the South Australia border. Between Lake Hume and Albury, the "Downstream of Wodonga" and "Lake Hume to Albury" map data takes precedence over the "Hume to Tocumwal" map data (all appearing in Currey, 1976).

METADATA DATE: May 1998

ADDITIONAL METADATA:

Data is compliant with the Second Edition of *Australian Soil and Land Survey Field Handbook* – 1990, by R C McDonald et al., Inkata Press.

Data Dictionary:
The data exists as an ARC/INFO coverage that has full polygon topology as well as arc attributes. The polygon and arc attributes have the same descriptions.

Description of polygon and arc attributes:

Item name	Description	ARC/INFO item definition
AUTHOR	Source map author	16,16,C
SOURCE_DATE	Source map date	4,4,I
SOURCE_SCALE	Source map scale	10,10,C
SOURCE_COV	Source map coverage	40,40,C
GIS_COV	Coverage name in GIS	40,40,C
REFERENCE	Reference	24,24,C
AUTHORS_UNIT	Author's geomorphic unit description	40,40,C
MORPH_TYPE	Morphological type	24,24,C
LANDFORM_PATTERN	Landform pattern	24,24,C
GROSS_LANDFORM	Gross landform element	24,24,C
LANDFORM_ELEMENT	Landform element	32,32,C
ELEMENT_CODE	Landform element code	8,8,C

Description of items:

MORPH_ TYPE values	LANDFORM PATTERN values	GROSS_ LANDFORM values	LANDFORM_ELEMENT (LE) values	LE Code values
Flat	Plain	Plain	Plain	P
Flat	Plain	Plain	Plain with aeolian cover	Pa
Flat	Plain	Plain	Plain with aeolian cover & dunes	Pad
Flat	Plain	Plain	Plain with depressions	Pdp
Flat	Plain	Plain	Plain with channels	Pc
Flat	Plain	Plain	Plain with dunes	Pd
Flat	Plain	Plain	Plain with linear dunes	Pdl
Flat	Plain	Plain	Plain with scalds	Ps
Flat	Plain	Plain	Plain with scalds & channels	Psc
Flat	Plain	Plain	Plain with scalds and aeolian cover	Psa
Flat	Plain	Alluvial plain	Backplain	APbk
Flat	Plain	Alluvial plain	Floodout	APf
Flat	Plain	Alluvial plain	Floodout with swamps	APfsw
Flat	Plain	Alluvial plain	Levee	APlv
Flat	Alluvial plain	Alluvial plain	Alluvial plain	AP
Flat	Alluvial plain	Alluvial plain	Alluvial plain with channels	APc
Flat	Alluvial plain	Alluvial plain	Terraced land (alluvial)	APT
Flat	Alluvial plain	Terrace (alluvial)	Terrace (alluvial) - undefined	T
Flat	Alluvial plain	Terrace (alluvial)	Terrace (alluvial)	TO
Flat	Alluvial plain	Terrace (alluvial)	Terrace (alluvial)	T1T1
Flat	Alluvial plain	Terrace (alluvial)	Terrace (alluvial)	T2T2
Flat	Alluvial plain	Terrace (alluvial)	Terrace (alluvial)	T3
Flat	Delta	Delta	Delta	FD
Depression	Plain	Depression	Depression	DP
Depression	Plain	Depression	Depression with scalds	DPs
Depression	Plain	Depression	Scald	DPscd
Depression	Plain	Channel	Channel	C
Depression	Plain	Channel	Channel remnant	Cr
Depression	Plain	Channel	Abandoned channel	Cab
Depression	Plain	Channel	Prior stream	Cpst
Depression	Plain	Channel	Ancestral river	Canc
Depression	Plain	Channel	Floodway	Cfw
Depression	Plain	Channel	Stream	Cst
Depression	Plain	Channel	River	Criv

MORPH_ TYPE values	LANDFORM PATTERN values	GROSS_ LANDFORM values	LANDFORM_ELEMENT (LE) values	LE Code values
Depression	Plain	Lake	Lake	L
Depression	Plain	Lake	Lake bed	Lb
Depression	Plain	Lake	Lake bed with aeolian cover	Lba
Depression	Plain	Lake	Scalded lake bed	Lbs
Depression	Plain	Lake	Billabong	Lbq
Depression	Plain	Swamp	Swamp	SW
Depression	Plain	Swamp	Backswamp	SVvbk
Hillock or Ridge	Plain	Dune	Dune	D
Hillock or Ridge	Plain	Dune	Low dune	Dlo
Hillock or Ridge	Dunefield	Dunefield	Dunefield	DF
Hillock or Ridge	Dunefield	Dunefield	Linear dunefield	DFI
Hillock or Ridge	Plain	Lunette	Lunette	LU
Hillock or Ridge	Plain	Lunette	Lunette remnant	LUr
Hillock or Ridge	Plain	Lunette	Lunette or Dune	LUD
Lower Slope	Alluvial fan	Alluvial fan	Alluvial fan	AF
Slope	Rises	Scarp	Fault scarp	SCflt
Substrate	Substrate	Substrate	Hillwash (colluvium)	SScol
Substrate	Substrate	Substrate	Pliocene Sand	SSplio
Substrate	Substrate	Substrate	Bedrock	SS

References:

Sinclair Knight Merz,1998: *Geomorphic mapping of the River Murray floodplain*. Final Report for Goulburn-Murray Water on behalf of Murray-Darling Basin Commission, May 1998, unpublished report.

Other References used by the project:

Thorne, R A, Hoxley, G P, & Chaplin, H, 1988: *Geomorphic Map from Nyah to the South Australia border*, Rural Water Commission, Unpublished map.

HydroTechnology 1994: *Geomorphic Mapping - Barham to Wakool Junction*, Unpublished report prepared for Murray-Darling Basin Commission.

Cox, F & Friedman, L, 1983: *River Murray Geomorphology*, Echuca - State Border. State Rivers & Water Supply Commission. Unpublished report.

Currey, D T, 1977: *Geomorphology of the Barmah-Millewa Forests Environment*, In Storrier, R R & Kelly, I D (eds.) "The Hydrogeology of the Riverine Plain of South East Australia", pp 9-19. Australian Society of Soil Science. Proceedings of a symposium held at Griffith NSW, 28-29 July 1977.

Currey, D T, 1976: The Geomorphology of the River Murray. State Rivers & Water Supply Commission. Unpublished report.

Second Edition River Murray Mapping Orthophotography

TITLE: Second Edition River Murray Mapping Orthophotography

CUSTODIAN: Murray-Darling Basin Commission

JURISDICTION: Australia

ABSTRACT:
In 1995, the South Australian Department of Environment, Heritage and Aboriginal Affairs (DEHAA) was contracted to capture the River Murray floodplain in a series of colour infrared orthophotographs. These were taken between the months of March and May of 1996 during "average" river flow conditions and compliment the black and white orthophotography of the *First Edition River Murray Mapping* (taken in 1991). This project is the result of the Murray-Darling Basin Commission's responsibility to conserve and regulate the River Murray and a requirement to develop a comprehensive spatial database for land use planning and environmental management. The orthophotography provides an accurate and informative mapping base for natural resource applications on the River Murray floodplain.

Colour infrared aerial photography was chosen for the new mapping because it provides an accurate means for delineating vegetation (including irrigated crops), wetlands and water bodies. The orthophoto tiles are north south oriented and aligned to standard 1:100,000 scale national topographic map sheets.

SEARCH WORDS: PHOTOGRAPHY AND IMAGERY Aerial

GEOGRAPHIC EXTENT NAME: River Murray floodplain (including the Edward-Wakool system)

BEGINNING DATE: March 1996

ENDING DATE: May 1996

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY:
Possibly updated in 2001 (next census year) – subject to approval.

STORED DATA FORMAT:
Band interleaved by line (BIL) with ARC/INFO, ERMapper and TerraScan headers.

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO, ERMapper, TerraScan
NON DIGITAL – Contact Prints and photographic enlargements

ACCESS CONSTRAINT: MDBC Copyright conditions (see Terms and Conditions)

LINEAGE:
Colour infrared aerial photography was taken between March and May 1996. These aerial photographs were then:

- scanned at 1.25 metre resolution using a high quality optical scanner;
- the aerial photos were corrected for distortions caused mainly by the camera lens, the tilt of the aircraft and the effects of topography at the moment of exposure;
- resampled to 2.5 and 5 metre resolution; and
- colour-balanced to better match adjacent orthophotos, but without losing any significant spectral information.

Development of Orthophoto Control:
Existing control was used where available and of suitable quality, otherwise new ground control survey was undertaken.

Regions 1 – 3: South Australian Department of Lands 1:10,000 mapping photography was used to derive suitable orthophoto control.
Regions 4 – 7: Victorian 1:25,000 mapping photography was used to derive suitable orthophoto control plus GPS field control in some areas.
Region 8: A large part of this region (Tocumwal block) was aerial triangulated using colour infrared orthophotos from the 2nd Edition River Murray Mapping Orthophotograhy series.
Region 9: The control in this region was again variable with the majority being close to ± 5 metres in planimetry (some closer to 10 metres) and ± 2 to 3 metres in height.
Region 10: In this region of the Upper Murray we had difficulties in identifying and deriving suitable control because of the steep and forested terrain. The majority of the digital terrain data used in the orthophoto process was from Victorian and NSW data.

POSITIONAL ACCURACY:

Orthophoto Control Quality
The control for orthophotos was aimed at 1:25,000 mapping specifications ie. 90% of well defined detail within ± 12.5 metres in planimetry. To achieve this DEHAA used a combination of SA Lands control (1:10,000 plus some 1:50,000 mapping), Victorian/NSW control (1:25,000 and some 1:50,000 mapping) and new ground survey (GPS). In many cases older mapping photography was used to derive orthophoto control. The following summarises (by region) the accuracy of the control used:

Regions 1 – 3: Some fringe photography had to be controlled with 1:50,000 mapping photography. Estimated accuracy in planimetry of ± 1 to 2 metres, and estimated accuracy in height of ±1 to 2metres.
Regions 4 – 7: An estimated accuracy in planimetry of ± 5 metres, and estimated accuracy in height of ± 2 to 3 metres. The GPS control was to ± 0.5 metre in plan & height but natural features were used not targets.
Region 8: An estimated planimetric accuracy of ± 2 to 3 metres, and an estimated accuracy in height of ± 1 to 2 metres.
Region 9: The control in this region was again variable with the majority being close to ± 5 metres in planimetry (some closer to 10 metres) and ± 2 to 3 metres in height.

Region 10: DEHAA have no real means of truly estimating the accuracy, but could be estimated at ± 5metres in height (some points more like 10 metres). In planimetry, some control points were close to ± 10 metres or greater. The majority of the digital terrain data used in the orthophoto process was from Victorian and NSW data.

ATTRIBUTE ACCURACY: Not applicable

LOGICAL CONSISTENCY: The orthophotos have been checked for spatial correctness by the MDBC.

COMPLETENESS: Orthophoto coverage is complete for the River Murray floodplain (see attached index).

ADDITIONAL METADATA:

Orthophoto Index: The orthophotos are grouped into ten River Murray Regions:

UTM Zone 54 regions

1. Lake Alexandrina
2. Lower Murray
3. Riverland
4. Lake Victoria
5. Sunraysia
6. Swan Hill

UTM Zone 55 regions

7. Wakool
8. Barmah-Millewa
9. Albury-Yarrawonga
10. Upper Murray

Dates of capture:

22/03/96

6626A3
6626A4
6626A5
6626B5
6627E4
6627E5
6627F3
6627F4
6627F5
6726A4
6726A1
6726A2
6726A3
6726A5
6726B1
6726B2
6726B3
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6726C3
6726C4
6726D3
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6727B3
6727B4
6727C4
6727C5
6727D1
6727D2
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6727D5
6727E1
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6728E5
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6728F4

24/03/96

7626A2
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7726D2
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7726E5
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8026E4

25/03/96

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8525B1

25/03/96

8225C5
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28/03/96

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8026C1

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28/03/96

7627F1
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4/04/96

6828A2
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4/04/96

7129D4
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7229B5
7229D1
7229D2
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7229D5
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7330F1

Dates of capture (continued):

24/04/96	1/05/96	15/05/96	16/05/96		16/05/96		17/05/96
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	6829C5	8425C5	7627D1		7328D5	7627B5	7329F4
	6929C3	8525C1	7627D5		7428A4	7628F1	7329F5
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	6929C1	8525D1	7627D3		7428A2	7727A1	
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	7229C3		7727D1		7428D3		
	7229C4		7727D2		7428D4		
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			7727E2		7527B5		
			7727E3		7528B1		
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			7727E5		7528B4		
			7825C3		7528B5		
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			7825C5		7528C2		
			7826F1		7528C3		
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			7826F3		7528C5		
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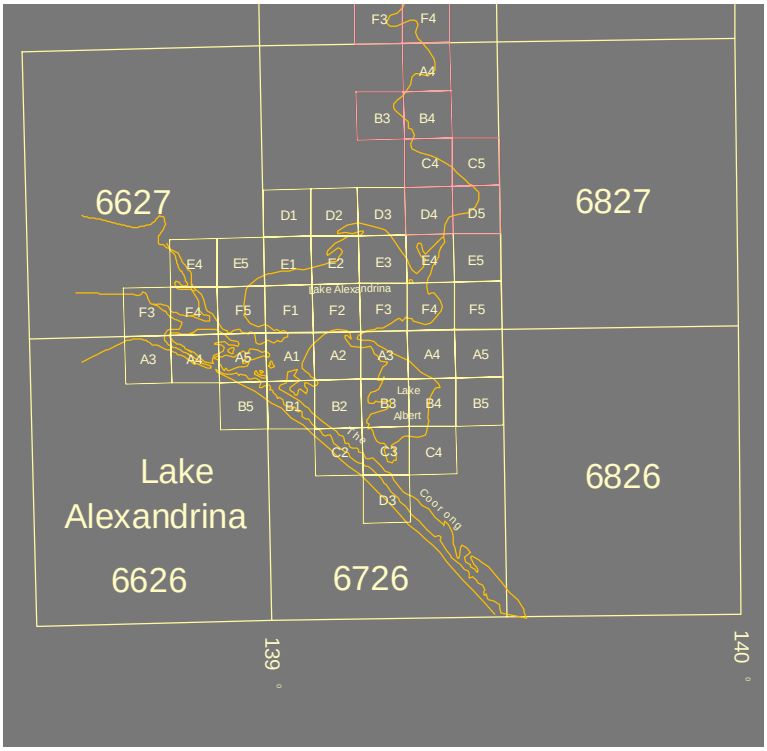
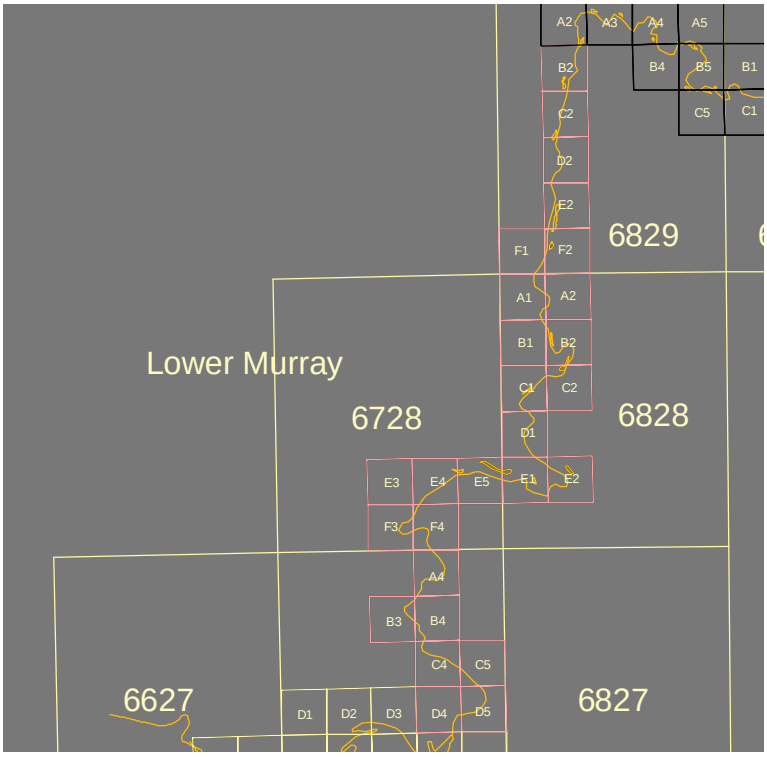
			7827C1		7528D4		
			7827D1		7528D5		
			7827D2		7528E3		
			7827E1		7528E4		
			7827E2		7528E5		
			7827E3		7528F3		
			7827E4		7528F4		
			7925C1		7528F5		
					7627A1		

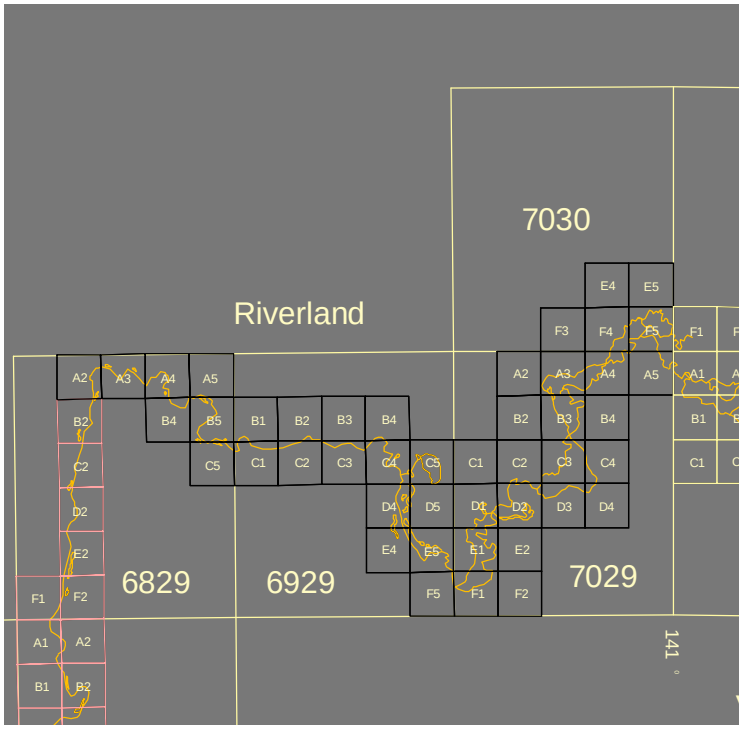
Region 1 – Lake Alexandrina



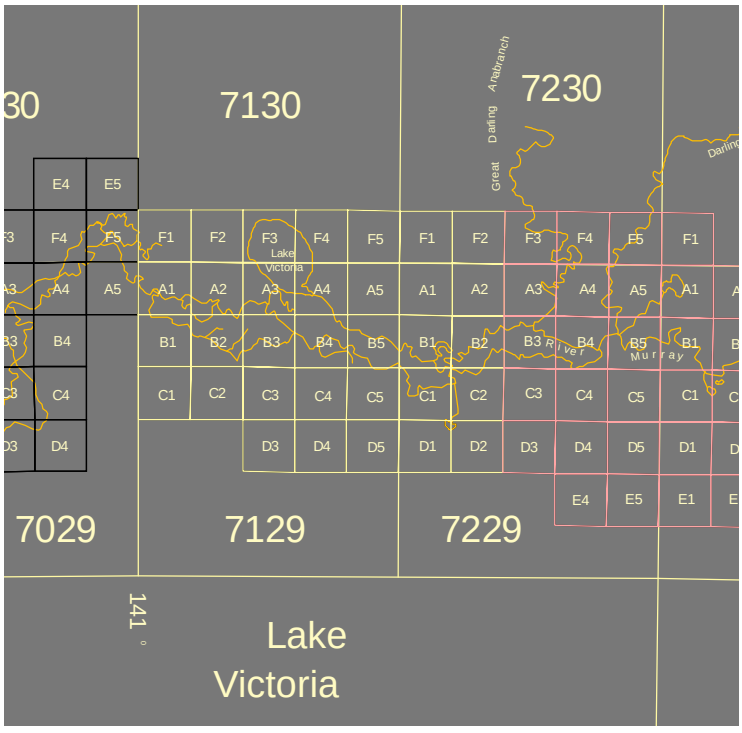
Region 2 – Lower Murray



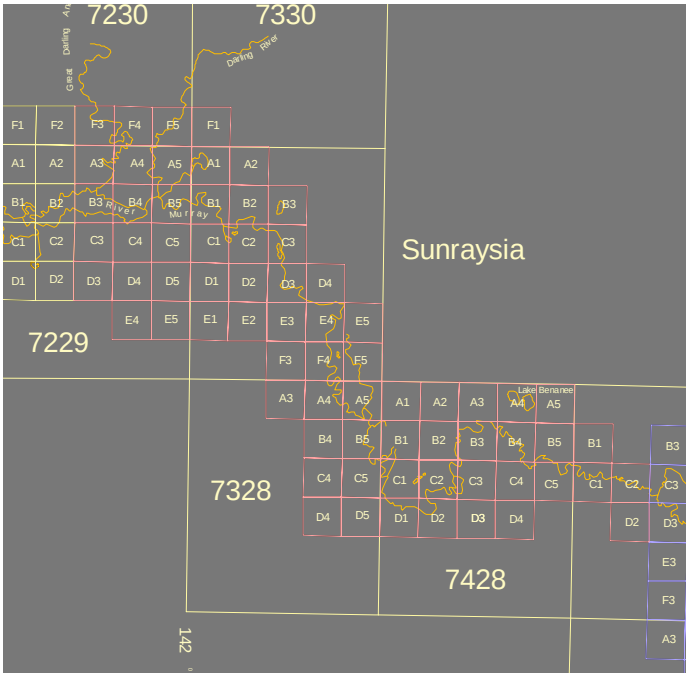
Region 3 – Riverland



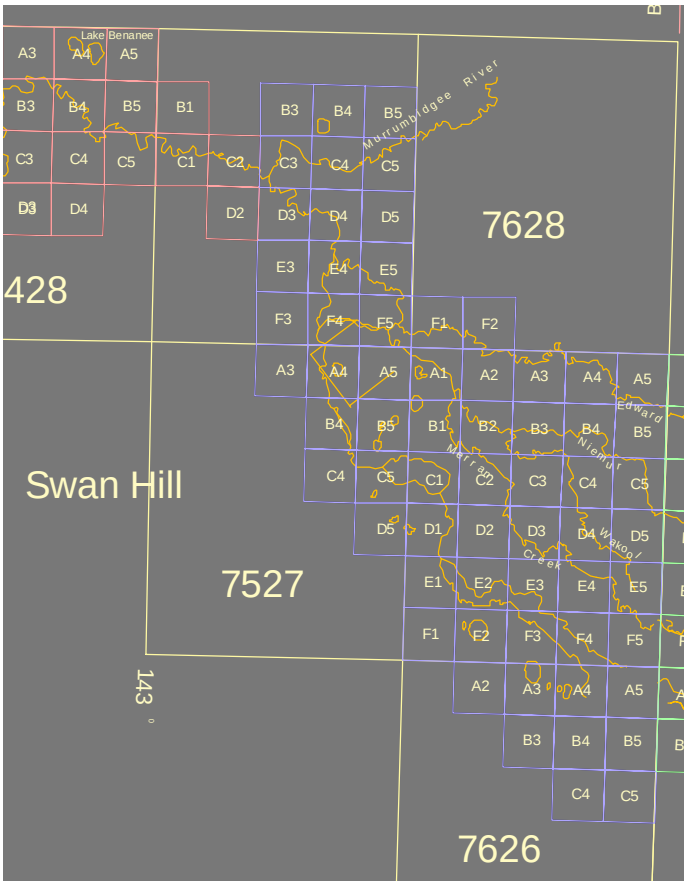
Region 4 – Lake Victoria



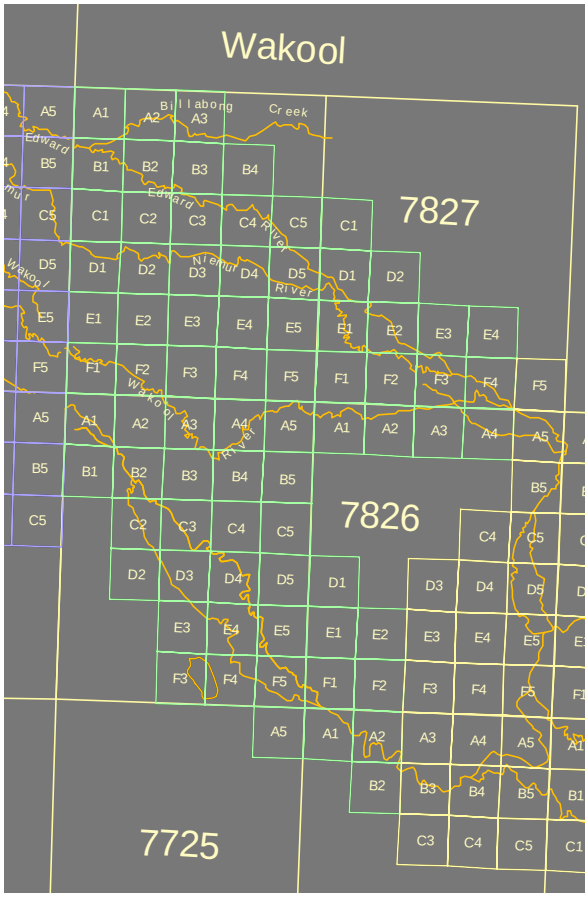
Region 5 – Sunraysia



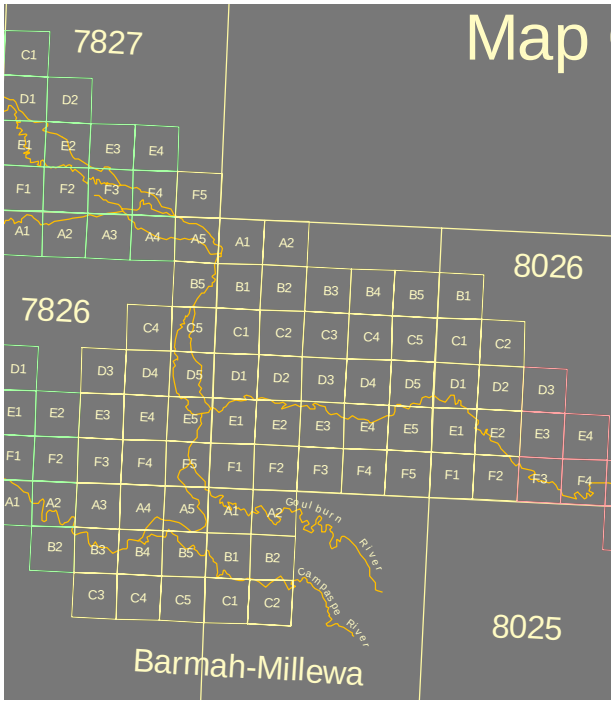
Region 6 – Swan Hill



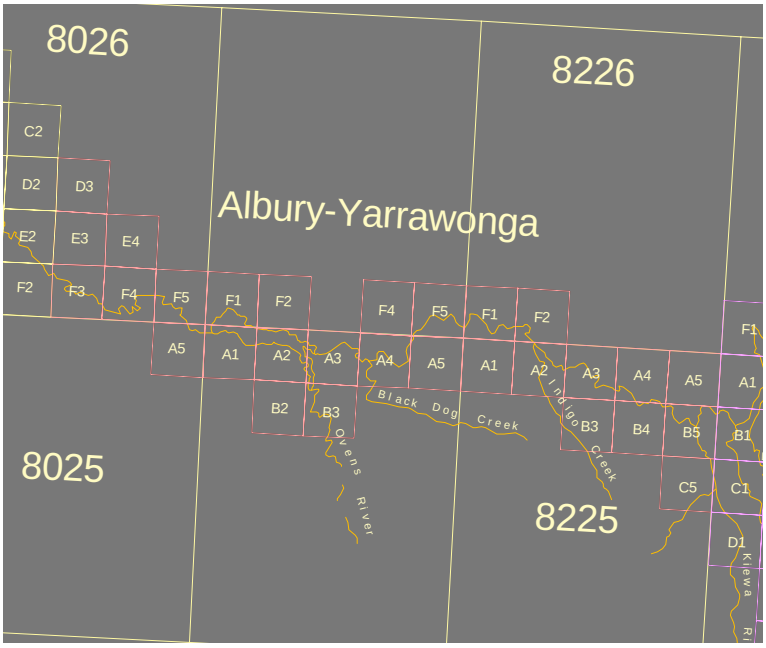
Region 7 – Wakool



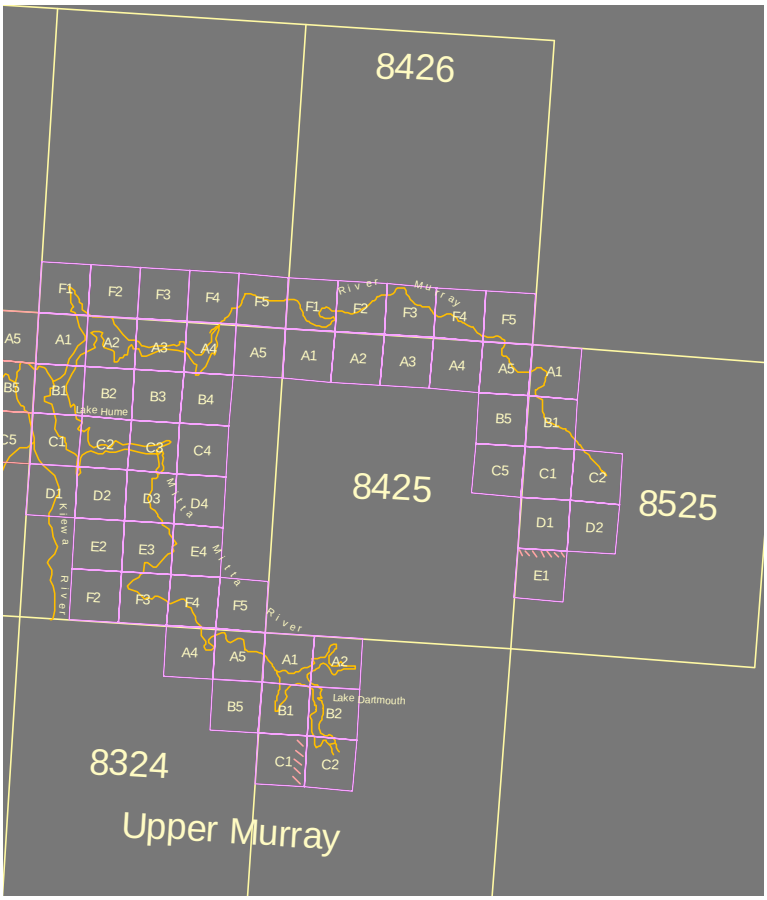
Region 8 – Barmah-Millewa



Region 9 – Albury-Yarrawonga



Region 10 – Upper Murray



References:

Nanninga, P.M., 1997: *River Murray Mapping*, Riverine Environment Forum, Murray-Darling Basin Commission, Canberra.

Edwards, K., 1997: *A Natural Look at Geographic Information along the River Murray Floodplain*, ANZAAS 97, 28 Sep-2 Oct, Adelaide.

Riparian Vegetation Survey of the River Murray

TITLE: Riparian Vegetation Survey of the River Murray

CUSTODIAN: Murray-Darling Basin Commission

JURISDICTION: Australia

ABSTRACT:
In 1986, the River Murray Riparian Vegetation Survey was initiated by the Murray-Darling Basin Commission to assess the present status of the vegetation along the River Murray, to identify causes of degradation, and to develop solutions for its rehabilitation and long term stability. The Study area was the floodplain of the River Murray and its anabranches, including the Edward-Wakool system, from below Hume Dam to the upper end of Lake Alexandrina, a total of nearly 9,000 square kilometres (900,000 hectares). The survey was conducted by Margules & Partners Pty Ltd, P and J Smith Ecological Consultants, and the then Victorian Department of Conservation, Forests and Lands (DCFL). The results were then compiled by DCFL, a report published (see References) and a GIS was constructed.

Please note that the vegetation mapping uses a mixed floristic/structural classification.

SEARCH WORDS: LAND Cover
VEGETATION Mapping

GEOGRAPHIC EXTENT NAME: The floodplain of the River Murray and its anabranches, including the Edward-Wakool system, from below Hume Dam to the upper end of Lake Alexandrina.

BEGINNING DATE: 1986

ENDING DATE: 1991

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Update in progress using colour infrared orthophotography from *Second Edition River Murray Mapping*.

STORED DATA FORMAT: DIGITAL ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC Copyright conditions (see Terms and Conditions)

LINEAGE:

1. Collection Method – Survey

1.1. Bibliography

A comprehensive bibliography was compiled on the floodplain vegetation, its environment and the impact of human activity. The literature was reviewed and summarised.

1.2. Field survey

A field survey was carried out, visiting 112 sites throughout the study area and collecting vegetation data from 335 plots. Brief studies were made of the effects of river regulation and salinisation at specific sites.

2. Collection Method – Digitising

After mapping from a variety of sources was completed by the consultant, Adam Choma of the then Victorian Department of Conservation, Forests and Lands (DCFL), compiled the riparian vegetation mapping and completed the digitising in 1990. Adam's description of how the data was digitised follows:

- 1:100 000 AUSLIG topographic maps were used as the base for all work.
- Film transparencies from AUSLIG were used in most cases but occasionally paper maps were used.
- Maximum acceptable RMS error was 0.002 on all digitising (this value is scale independent).
- Old Forestry Commission maps (one of the data sources) were often inaccurate at the presentation scale of 1:15840 and needed to be edited into shape.
- The other major source of information was NSW Department of Lands black and white aerial photography at the scale of 1:45 000. This was ground checked.
- Topographic base maps from AUSLIG were found to be very poor with, for example, poor edge-matching, roads discontinuous across map sheets and roads changing type (eg. sealed to dirt) across map sheet boundaries.
- All riparian vegetation maps were checked twice to ensure any error was in acceptable limits.

The data was then reprojected by the MDBC from UTM AGD66 datum and Australian National spheroid to UTM WGS84 datum and spheroid.

POSITIONAL ACCURACY:

Probably there is less than 1mm average error at the 1:100 000 scale. Riparian vegetation data was plotted at 1:50 000 and overlaid on wetlands maps from a separate study (*Wetlands of the River Murray*) completed by Bob Pressey in 1986 (on clear film). The correlation was found to be surprisingly good, probably within the limits of accuracy for a 1:50 000-scale map. Presentation scale for the riparian vegetation data should be 1:100 000 in view of the limits of the source material and topographic base. Reliability of data declines with decreasing scale from the presentation scale, ie. scale less than 1:100 000. Old Forestry Commission maps (one of the data sources) were often inaccurate at the presentation scale of 1:15840. Other maps, for example in South Australia and near Mildura, have less than average quality but were still considered acceptable.

Please note that the Murray-Darling Basin Commission is currently updating this data to a new improved orthophoto base, accurate to 1:25,000 scale. This dataset will include all the attributes of the Margules & Partners dataset, but the vegetation boundaries will be significantly more accurate.

ATTRIBUTE ACCURACY:
Old Forestry Commission maps (one of the data sources) were often inaccurate at the presentation scale of 1:15840. Good correspondence with the 1:50 000 Pressey data is probably because the same source material was used for both 1:50 000 and 1:100 000 scale topographic mapping.

LOGICAL CONSISTENCY:
The dataset has full polygon topology. There are no dangles or label errors.

COMPLETENESS:
Riparian vegetation mapping is complete for the flood plain of the River Murray and its anabranches, including the Edward-Wakool system, from below Hume Dam to the upper end of Lake Alexandrina.

METADATA DATE: April 1998

ADDITIONAL METADATA:

Spatial Extents Notes:
The Riparian Vegetation is available as a dataset representing the ten River Murray Regions (see 2nd Edition River Murray Mapping index), the entire River Murray, or organised by standard 1:100,000 topographic map sheets. The topographic map sheets covered are:

1:100,000 Sheets in Zone 54	1:100,000 Sheets in Zone 55
Balranald	Albury
Chowilla	Berrigan
Cohuna	Buraja
Kerang	Dookie
Lake Victoria	Echuca
Lindsay	Mannum
Mildura	Mathoura
Mobilong	Shepparton
Moorook	Tallangatta
Morgan	Tuppal
Moulamein	Walbundrie
Nowingi	Wanganella
Nyah	Wangaratta
Renmark	
Robinvale	
Swan Hill	
Swan Reach	
Weimby	
Wentworth	

Data Dictionary:

Description of polygon attributes:

Item name	Description	Arc/INFO item definition
TYPE	Vegetation types	4,4,B
COND	Condition of vegetation	4,4,B

Description of item TYPE:

TYPE value	Structural Description	Floristic and other details
Trees		
51	Red Gum Forest	*Eucalyptus camaldulensis*
		Eucalyptus blakelyi
97	Red Gum Woodland	*Eucalyptus camaldulensis*
81	Red Gum/Box Forest & Woodland	*Eucalyptus camaldulensis*
		Eucalyptus largflorens
		Eucalyptus blakelyi
		Eucalyptus melliodora
		Eucalyptus microcarpa
38	Mixed Woodland	*Eucalyptus melliodora*
		Eucalyptus largiflorens
		Eucalyptus microcarpa
		Eucalyptus albens
111	Black Box Woodland	*Eucalyptus largiflorens*
119	Black Box (Mallee Form)	*Eucalyptus largiflorens*
3	Cypress Pine/Casuarina Woodland	*Callitris preissii*
		Casuarina cristata
		Callitris glaucophylla
		Allocas. leuhmannii
115	River Cooba	*Acacia stenophylla*
113	Mallee Fringe Woodland	*Casuarina cristata*
		Heterodend. Oleifolium
		Myoporum platycarpum
		Eucalyptus spp
		Dodonaea spp
117	Mallee	*Eucalyptus* spp
112	mixed sp. Woodland	
Shrubs, Grasses, Herbs		
110	Lignum	*Muehlenbeckia cunninghamii*
114	Saline shrub land	*Halosarcia* spp
		Maireana pyramidata
		Atriplex vesicaria
		Cheno. nitrariaceum
		Atriplex nummularia
99	Open Areas	grassland, sedges, salinas
120	Samphire	*Arthrocnemum halocnemoides*

TYPE value	Structural Description	Floristic and other details
121	Depression	
122	Floodplain	
101	Levee	
65	Casuarina	
Non-native Vegetation		
82	Exotic Trees and Shrubs	pines, poplars, willows, pepper-trees, amenity plantings
100	Cultivated Pasture and Cropping	irrigated and non-irrigated
55	Orchards and Vineyards	irrigated
57,73	Other Exotics	
Non-vegetated Areas		
53	Urban	including semi-urban, golf courses, etc
25	Quarries and Sand-pits	includes naturally occurring lunettes
116	Sand Dunes	
52	Water bodies	permanent and semi-permanent

Summary of TYPE attribute (in numerical order):

TYPE value	Description	TYPE value	Description
3	Cypress Pine/Casuarina Woodland	100	Cultivated Pasture and Cropping
25	Quarries and Sand-pits	101	Levee
38	Mixed Woodland	110	Lignum
51	Red Gum Forest	111	Black Box Woodland
52	Water bodies	112	mixed sp. Woodland
53	Urban	113	Mallee Fringe Woodland
55	Orchards and Vineyards	114	Saline shrub land
57	Other Exotics	115	River Cooba
65	Casuarina	116	Sand Dunes
73	Other Exotics	117	Mallee
81	Red Gum/Box Forest & Woodland	119	Black Box (Mallee Form)
82	Exotic Trees and Shrubs	120	Samphire
97	Red Gum Woodland	121	Depression
99	Open Areas	122	Floodplain

Description of item COND:

COND value	Symbol	Condition Description
1	S	Saline Groundwater
2	W	Drowning
9	T	Drowned
3	D	Water Stress
4	G	Overgrazing
5	F	Fire
6	C	Clearing/Logging
7	R	Recreation
8	U	Unexplained
0		No data available

References:

Margules & Partners Pty Ltd, P and J Smith Ecological Consultants, Department of Conservation Forests and Lands Victoria, 1990: *Riparian Vegetation of The River Murray: A Summary*, Murray-Darling Basin Commission, Canberra.

River Murray (Below Lake Hume) Wetlands

TITLE: River Murray (Below Lake Hume) Wetlands GIS

CUSTODIAN: Murray-Darling Basin Commission (MDBC)

JURISDICTION: Australia

ABSTRACT:
A wetlands survey of the River Murray floodplain was undertaken by Bob Pressey (NSW National Parks and Wildlife Service) on behalf of the River Murray Commission (now the MDBC). A report entitled "*Wetlands of the River Murray*" was published in April 1986 by the MDBC. This study produced a database and a series of 1:50 000 scale maps with the point locations of approximately 7000 wetlands. The criteria for mapping the wetlands are described in the report. In 1996, the MDBC awarded a contract to the Australian Geological Survey Organisation (AGSO) to re-map wetlands based on Pressey's work and newly available River Murray Mapping orthophotos. The result of this project was the production of polygon coverages describing the original wetlands as well as some 3000 additional wetlands. The original Pressey database in entirely incorporated within the new Wetlands GIS.

SEARCH WORDS: WATER Wetlands

GEOGRAPHIC EXTENT NAME:
Covers the floodplain of the River Murray from east of Lake Hume to Lake Alexandrina, including the floodplains of the Edward, Wakool, Niemur and Mitta Mitta Rivers.

BEGINNING DATE: 1984

ENDING DATE: 1986

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: Update planned for 2001

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: MDBC Copyright conditions (see Terms and Conditions)

LINEAGE:
Original point location wetlands mapping was undertaken by Bob Pressey in 1986.

AGSO digitised and edited hydrographic boundaries (wetlands and watercourses) interpreted using 1:25 000 scale digital black and white orthophotos from *First Edition River Murray Mapping* Orthophotography series. Where a wetland or watercourse appeared as a single line on an interpretation sheet, for example – a narrow creek or runner, it was digitised as a polygon exactly 10 metres wide. Wetland names were taken from the Pressey wetland mapping (1986) and from AUSLIG topographic maps. (Note: not all of the wetlands mapped have names and not all wetlands are represented in the GIS.) The ARC/INFO data has been reprojected from its original AMG (AGD66) coordinate system to the WGS84 datum and spheroid which closely match (within 1.0 metre) the coordinate system used for the *Second Edition River Murray Mapping orthophotos* (GDA94).

POSITIONAL ACCURACY:
All digitising was performed within the generally accepted 1:25 000 scale accuracy standards, ie. 90 percent or more of features lie within 0.5 millimetres of true ground location (ie. 12.5 metres absolute accuracy at 1:25 000 scale). Note however that wetland boundaries are sometimes indistinct and subject to interpretational error that is difficult to quantify.

ATTRIBUTE ACCURACY:
Digital Pressey wetlands information, locations and Pressey wetland numbers were checked against hardcopy maps produced by Pressey. Additional wetland names were taken from AUSLIG topographic map sheets (at 1:25 000, 1:50 000 and 1:100 000 scales).

LOGICAL CONSISTENCY:
The data has polygon topology.

COMPLETENESS:
Wetlands are complete for the River Murray from east of Lake Hume to Lake Alexandrina, including the floodplains of the Edward, Wakool, Niemur and Mitta Mitta Rivers.
However, please note that there are wetlands, for example in the Edward-Wakool system, that have not been recorded in this version of the GIS. It is hoped a later version, utilising the *Second Edition River Murray Mapping* orthophotos, will pick up these missing wetlands.

METADATA DATE: April 1998

ADDITIONAL METADATA:

Data Dictionary:

The River Murray Wetlands mapping exists as ARC/INFO polygon coverages based on the *First Edition River Murray Mapping* Orthophoto Image Map series.

Description of polygon attributes:

Item Name	Description	Arc/INFO item definition
ID_SA	South Australian ID number	9,9,C
WET_NUM	Wetland number	7,7,C
WET_NAME	Wetland name	51,51,C
ZONE	AMG zone number	4,5,B
STATE	State (political)	4,4,C
WET_AREA	Estimated area in hectares	4,12,F,3
GEOMORPH	Geomorphic category	4,5,B
HYDROL	Hydrological category	4,5,B
MAPSHEET	Sheet number on which wetland is mapped	21,21,C
ANA_ASSOC	Anabranch association	4,4,C
THOMPSON	Cross reference to South Australian Thompson (1985) wetland survey	10,10,C

Each of the categories above are described in detail a report written by Bob Pressey (see References section).

Coding for Pressey Wetlands:
Each wetland was assigned a unique number based on section numbers. These sections are geographic extents along the Murray with unique geomorphic and hydrologic character. For example, a Pressey wetland number of "03/0123" means wetland number "123" within Murray section "3" (the anabranch area). A separate database was produced containing descriptive attributes for each wetland.

Description of item GEOMORPH:
Each wetland on the floodplains of the Murray, Edward and associated anabranches was placed in one of 17 broad, intergrading geomorphic categories. Twelve of these are the results of natural processes and five result wholly or partly from changes introduced by humans. Two separate, but very similar, classifications were applied to the wetlands of the lower lakes and the Coorong.

GEOMORPH values	Description
Natural categories	
1	Lentic (non-flowing tributaries)
2	High-level anabranches
3	Lentic channel forms
4	Active channels
5	Scroll swales
6	Channel-margin swales
7	Slackwater areas
8	Depositional basins - discrete
9	Depositional basins - interconnected
10	Murray gorge basins
11	Deflation basins
12	Miscellaneous floodplain depressions
Man-made categories	
13	Quarries and borrow pits
14	Artificial channels
15	Riverine impoundments
16	Impounded wetlands
17	Inundated shallow depressions
Lower lakes classification	
1	Lake Alexandrina
2	Lake Albert
3	Littoral wetlands
4	Back-basins
5	Lentic tributaries
Coorong classification	
1	Coorong – North Lagoon
2	Coorong – South Lagoon
3	Littoral wetlands
4	Back-basins
5	Lentic tributaries

Description of item HYDROL:

Hydrol value	Description
1	Wetland connected to the river at minimum regulated flow or at pool level or potentially at these levels but separated by a regulator or, in a few cases, by a block on the inlet channel.
2	Wetland actually or potentially connected to the river above minimum regulated flow but at, or below, maximum regulated flow (includes wetlands to which regulated flows can be delivered via irrigation supply channels or by pumping).
3	Wetlands above maximum regulated flow, filled only by surplus flows.
4	Wetlands above maximum regulated flow and which receive (often saline) water from adjacent irrigated areas via drainage, runoff or seepage or, in a few cases, effluent water from various sources. Those which receive excess irrigation water or effluent and which are filled or potentially filled by regulated flows were placed in categories 1 or 2, which were considered to override category 4 in importance for hydrology. Nearly all category 4 wetlands receive surplus flows in addition to irrigation and effluent water.

References:

R L Pressey, 1986: *Wetlands of the River Murray Below Lake Hume*, River Murray Commission Environmental Report 86/1, River Murray Commission, Canberra.

River Murray Wetlands, South Australia

TITLE: Biological Wetlands of the River Murray for South Australia based on the South Australian Wetlands Atlas

CUSTODIAN: Joint Custodianship between two South Australian Government agencies:
Department for Environment, Heritage and Aboriginal Affairs (Biodiversity and Heritage), and Department of Transport, Urban Planning and the Arts (Planning SA)

JURISDICTION: South Australia

ABSTRACT:
This data set describes the location and conservation status of biological wetlands of the South Australian section of the River Murray. The mapping is based on original wetlands coverage of the River Murray that was mapped in 1992 (the SA Wetlands Atlas).

SEARCH WORDS: WATER Wetlands

GEOGRAPHIC EXTENT NAME: South Australian section of the River Murray

BEGINNING DATE: Jan 1992

ENDING DATE: Jan 1996

PROGRESS: Complete

MAINTENANCE AND UPDATE FREQUENCY: As required

STORED DATA FORMAT: DIGITAL – ARC/INFO

AVAILABLE FORMAT TYPES: DIGITAL – ARC/INFO

ACCESS CONSTRAINT: Planning SA licence constraints and MDBC Terms and Conditions.

LINEAGE:
The wetlands mapping is based on original wetlands coverage of the River Murray that was mapped in 1992 (the Wetlands Atlas). The original data was captured at 1:10,000 using digital topographic data (obtained from 1:10,000 orthophoto mapping). The original GIS layer has some wetlands area additions based on ground truthing and all wetlands not currently considered to be biological wetlands were removed from the updated GIS coverage. Once digitising was complete, all wetland polygons were individually labelled with a unique number. This coverage was prepared to document the location, name and conservation status of biological wetlands of the South Australian section of the River Murray. The information recorded by Thompson (1986) was not directly attached to the digital data but retained as a series of separate tables for different species themes.

The Murray-Darling Basin Commission has projected the data from AGD66 datum and Australian National spheroid to WGS84 datum and spheroid so that it can be overlayed on to *Second Edition River Murray Mapping* orthophotos.

Thompson Survey
The Thompson survey classified each wetland into one of three broad hydrological categories, and then into seven other descriptive categories. These included water flow, slope of bank, submerged macrophytes, dense growths of reeds and/or sedges, permanence, regenerating redgums and fringing reeds. A conservation rating ranging from high to low was assigned to each wetland that took into consideration their biological condition, their importance as feeding and/or breeding grounds for water birds, uniqueness, and their potential for improvement given proper management. A number, known as the Thompson Wetland Number, was also given to each wetland. The number system used by Thompson prefixed the wetland number by either an 'M' or 'L', where 'M' refers to the Murray and 'L' refers to the lower lakes.

POSITIONAL ACCURACY:
The position of wetlands is considered very good and is based on the capture scale of 1:10,000.

ATTRIBUTE ACCURACY:
Correct under definitions considered for the identifying of biological wetlands.

LOGICAL CONSISTENCY:
The coverage has full polygon topology without label or node errors.

COMPLETENESS:
Data set is considered complete for the South Australia portion of the River Murray. Interpretations on wetland definitions may result in the omission of some areas not considered to be part of a biological wetland.

METADATA DATE: May 1999

ADDITIONAL METADATA:

Data Dictionary:
The Wetlands of South Australia exists as an ARC/INFO coverage that has full polygon topology.

Please note: Polygons having a conservation value (CONS_VALUENR) of zero (0) and no AS2482 code are artefacts and should be removed from any selected set before using this data spatially. They arise where creeklines in the floodplain join to each other to make a closed figure.

Description of polygon attributes:

Item Name	Description	Arc/INFO item definition
AS2482	Number corresponding to the Australian Standards document 2482, describing type of data.	5,5,I
AUS_WETLANDNR	Each wetland is uniquely numbered in sequence using an Australian-wide number. The numeric part of the code increases in value from the coast to the SA State border.	5,5,C
THOM_WETLANDNR	Thompson Wetland Number as given by Thompson used to identify wetlands and wetland complexes. Several polygons may be attributed with the same number.	4,4,C
THOM_CHANGE	Thompson's conservation ratings for wetlands were re-evaluated for the Wetlands Atlas. Indicates whether or not this value has changed since Thompson's assessment.	1,1,C
WETLAND_NAME	A name for each wetland that is used in the Wetlands Atlas that reflects local usage.	120,120,C

Item Name	Description	Arc/INFO item definition
COMPLEX_NAME	A name given to wetlands that are grouped together into functional units sharing similar hydrogeological properties or by virtue of being interconnected.	80,80,C
CONS_VALUENR	This number holds the conservation value of wetlands.	1,1,I
MDBC_DISTNR	Standard Murray-Darling Basin Commission regional identification.	3,3,I

Description of item AS2482:

AS2482 value	Description
0	The area represented by the polygon is not a wetland.
44000	The area represented by the polygon is a wetland.

Description of item THOM_CHANGE:

THOM_CHANGE value	Description
Y	The conservation value has changed since Thompson's assessment in 1986.
N	The conservation value has not changed since Thompson's assessment in 1986

Description of item CONS_VALUENR:

CONS_VALUENR value	Description
0	Not a wetland
1	High conservation value
2	High-Medium conservation value
3	Medium conservation value
4	Medium-low conservation value
5	Low conservation value
6	Not rated

References:

South Australian River Murray Wetlands Management Committee, 1996: *Wetlands Atlas of the South Australian Murray Valley*, South Australian Department of Environment and Natural Resources.

Carruthers S. and Nicolson K., 1992: *River Murray Wetland Database: a Framework based on Thompson and Pressy Wetland Surveys*, Department of Environment and Planning Internal Report.

Thompson M.B., 1986: *River Murray Wetlands: Their Characteristics, Significance and Management*, University of Adelaide, for the Department of Environment and Planning and the Nature Conservation Society of South Australia, Adelaide

Terms and Conditions for the Use of River Murray Mapping

Definition

River Murray Mapping includes all Murray-Darling Basin Commission copyrighted mapping and survey information, in both digital and hardcopy formats, of the River Murray and its associated riverine regions (e.g. the floodplains of the Darling River, Mitta Mitta River and Murray anabranches).

Specifically, River Murray Mapping includes:

- aerial photography (eg. negatives, contact prints, enlargements & copies)
- orthophotography
- ground and photo control information
- wetlands, flood boundaries, flood depth contours, levee survey information
- riparian vegetation and habitats
- terrain (eg. contours, point heights, DTM's), and
- geomorphology.

This information is copyright to the Murray-Darling Basin Commission.

Terms and Conditions

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Failure to comply with the above terms and conditions is a breach of copyright.

Appendix 1: Contact Details for MDBC spatial data

Contact Organisation:	Murray-Darling Basin Commission
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Appendix 2: Summary of ANZLIC Core Metadata Elements (Version 1.0)

Category	Element	Description
Dataset	Title	The ordinary name of the dataset
	Custodian	The organisation responsible for the dataset
	Jurisdiction	The State or country of the Custodian
Description	Abstract	A short description of the contents of the dataset
	Search Word(S)	Word likely to be used by a non-expert to look for the data set
	Geographic Extent Name(s) OR	A picklist of pre-defined geographic extents such as map sheets, local government areas, catchments, that reasonably indicate the spatial coverage of the dataset
	Geographic Extent Polygon(S)	An alternate way of describing geographic extent if no pre-determined area is satisfactory
Data Currency	Beginning Date	Earliest date of information in the dataset
	Ending Date	Last date of information in the data set
Dataset Status	Progress	The status of process of creation of the dataset
	Maintenance and Update Frequency	Frequency of changes or additions made to the dataset
Access	Stored Data Format	The format or formats in which the dataset is stored by the Custodian
	Available Format	The format or formats in which the dataset is available, showing at least, whether the dataset is available in digital or non-digital form
	Access Constraint	Any restrictions or legal prerequisites applying to the use of the dataset, eg. licence
Data Quality	Lineage	A brief history of the source and processing steps used to produce the dataset
	Positional Accuracy	A brief assessment of the closeness of the location of spatial objects in the dataset in relation to their true position on the Earth
	Attribute Accuracy	A brief assessment of the reliability assigned to features in the dataset in relation to their real world values
	Logical Consistency	A brief assessment of the logical relationships between items in the dataset
	Completeness	A brief assessment of the completeness of coverage, classification and verification
Contact Information	Contact Organisation	Ordinary name of the organisation from which the dataset may be obtained
	Contact Position	The relevant position in the Contact Organisation
	Mail Address 1	Postal Address of the Contact Position
	Mail Address 2	Optional extension of Mail Address 1
	Suburb	Suburb of the Mail Address
	State	State of the Mail Address
	Country	Country of the Mail Address
	Postcode	Postcode of the Mail Address
	Telephone	Telephone of the Contact Position
	Facsimile	Facsimile of the Contact Position
	Email Address	Electronic mail address of the Contact Position
Metadata Date	Metadata Date	Date that the metadata record for the dataset was created
Additional Metadata	Additional Metadata	Reference to other directories or systems containing further information about the dataset