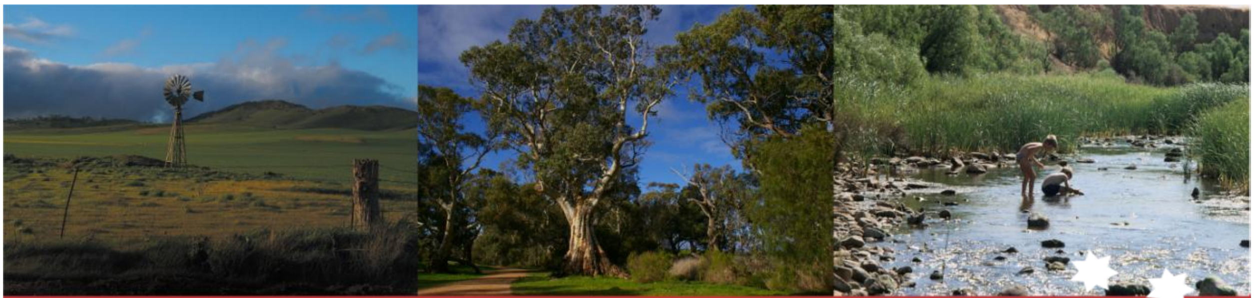
Environment Institute – Landscape Futures Program

Climate Change, Community and Environment



South Australian Murray Darling Basin
NRM Region Datasets

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Government of South Australia

CSIRO

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Name	Custodian	Year
SAMDB Demographic Boundaries and Datasets		
Census Collection District	ABS	2006
Statistical Local Area	ABS	2006
Statistical Subdivision	ABS	2006
Statistical Division	ABS	2006
SAMDB Postal	ABS	2006
SAMDB State electoral divisions	ABS	2006
SAMDB Commonwealth Electoral Division	ABS	2006
SAMDB Local Government Area	SA Planning/DEH	2009
Soil Information		
APSIM APSOIL Soil sites	APSRU	2009
DWLBC Soils Data	DWLBC	2007
Digital Atlas of Australia Soils	CSIRO	2001
Australian Soil Resource Information System (ASRIS) (Level 5, Level 4, and Level 3)	CSIRO	2010
Native Vegetation Datasets		
Biological Survey of South Australia	DEH	2010
National parks and conservation areas	NVIS-DEH	2008
South Australian remnant vegetation	DEH	2004
South Australian pre European vegetation	DEH	2000
Climate Datasets		
ANUCLIM 1.8 BIOCLIM climate datasets	CSIRO	2000

Name	Custodian	Year
Water Datasets		
Water Bodies	DEH	2007
Water Courses	DEH	2007
Water Natural Features	DEH	2007
Digital Terrain Models		
Shuttle Radar Topography Mission 1'sec (30m), 3'sec (90m), 9'sec (250m)	DEH/PIRSA/NASA	2010
Topography - Contours 50k	DEH	2007
Topography - Spot Heights 50k	DEH	2007
Land Characterisation Datasets		
Agricultural land cover change dataset - land cover themes 1990	BRS	2000
IBRA regions and IBRA sub regions	DEH	2008
NRM Regions	DWLBC	2007
Land Parcels - Cadastre	DTEI	2010
Australian Dryland Salinity Assessment	NLWRA	2001
South Australian Dryland Salinity Risk 2000-2050	PIRSA	2001
Radiometric Map of Australia	Geoscience Australia	2009
Other Datasets		
Built up Areas	PIRSA	2008
SA Towns	PIRSA	2008
Rail Yards	PIRSA	2008
Railroad	PIRSA	2008
Roads	PIRSA	2008
Town Area	DTEI	2008
Coast line	DEH	2008

SAMDB DEMOGRAPHIC BOUNDARIES AND DATASETS

ABS boundaries. The census provides statistical information on the key characteristics of the population demographic that makes up the SAMDB. The census is carried out on special geographic areas (spatial units) defined in the Australian Standard Geographical Classification (ASGC) http://www.abs.gov.au/AUSSTATS/abs@.nsf/lookup/1216.0Contents12005

The ASGC is a hierarchical classification system of geographical areas and consists of a number of interrelated structures. It provides a common framework of statistical geography and enables the production of statistics which are comparable. A hierarchy exist for Census data collection with the smallest unit being the Collector District (CD). CD's aggregate to form larger spatial units, Statistical Local Areas (SLA). SLA's can be made up of one too many CD's. These are the base units used to collect and disseminate statistics other than those collected from the Census. SLA's aggregate directly to form larger spatial units of Statistical Subdivision (SSD). SSD are a general purpose unit which encompass one or more SLA's and do not cross state boundaries. The SSD are aggregated to Statistical Divisions (SD). SD is a general purpose spatial unit and is the largest and most stable unit within each state.

ABS Postal Area Concordances. Conversion of data from the ASGC hierarchy to 2006 Postal Areas (POAs). This population weighted concordance can be used to translate statistics aggregated by SLA to POA aggregations. Postal Areas are ABS approximations of Australia Post postcodes, created by allocating whole Collection Districts (CDs) on a 'best fit' basis to postcodes.

State Electoral Divisions. Boundary files containing conversion of data from the 2006 Postal Areas (POAs) to 2006 State Electoral Divisions (SEDs).

Commonwealth Electoral Divisions. Boundary files containing conversion of data from the 2006 Postal Areas (POAs) to 2007 Commonwealth Electoral Divisions (CEDs).

Local Government Area. This dataset records the location and extent of the local government areas within South Australia and their relationship to the Cadastre. Local Government Areas are an administrative theme to the Digital Cadastral DataBase (DCDB). Local Government Areas are under the control of local governing bodies. The Local Government Authority defines the Local Government Areas. The data is collected by DEH.

SOIL INFORMATION

Department of Water, Land, Biodiversity Conservation (DWLBC) Soils Data. Spatial data on soil landscapes which covers Southern South Australia (which includes the whole of the agricultural districts) at base mapping scales of 1:50,000 or 1:100,000 depending on region. The spatial data is based on an interpretation of 1:40,000 stereo colour aerial photography and limited field inspection of landscapes and soil by soil scientists. Soil Landscape Map Unit boundaries were determined after an integration of field observations and recordings, laboratory analyses, stereoscopic examination of aerial photographs, understanding of regional landscape processes and stratigraphy, existing soil and geological mapping data, and an examination of land and soil attributes.

The aim of the data is supply map, statistics and reports displaying and describing:

- Land and soil attributes within Southern South Australia
- Land surface features affecting land use, land management and productivity
- Limitations/suitability of land and soil for a range of agricultural and other uses

Soil Landscapes - SPATIAL DATA is a spatial dataset of Soil Landscape Map Units (LANSLU). The data set is to be used in conjunction with Soil Landscapes - MAPPING DATA for the production of land and soil attribute maps and Soil Landscapes - ANALYSIS DATA for the calculation of land and soil attribute spatial data statistics. The 'Spatial Data' covers Southern South Australia (including the whole of the agricultural districts) at base mapping scales of 1:50,000 or 1:100,000 (depending on region - see below). Soil Landscape Map Unit (LANSLU) codes incorporate a Land System code (first three characters) and a Soil Landscape Unit code (remaining characters) specific to that Land System. USE: Used to supply Government, community groups, industry and the general public with up to date regional, subregional and catchment level land and soil attribute information for Southern South Australia. AIM: The aim is to produce maps, statistics and reports displaying and describing: · Land and soil attributes within Southern South Australia · Land surface features affecting land use, land management and productivity · Limitations / suitability of land and soil for a range of agricultural and other uses

Australian Soil Resource Information System (ASRIS). Three levels of data were acquired for the whole of South Australia, Level 5, Level 4 and Level 3. Each is described below. The important difference between the ASRIS datasets and the South Australian Soil Landscape Data is that in the ASRIS data soil property variables are continuous where as in the South Australian Soil Landscape Data the variables are categorical.

Level 5: ASRIS Level 5 Tracts and Land Unit Attribution is a spatial dataset of mapped soil units with the most detailed attribution of soil properties according to the ASRIS Technical Specification. The data set is compiled from individual land resource surveys completed over many years using various methods. The dataset has a spatial scale between 1:50 000 and 1:100 000. This dataset is designed for catchment management, hydrological modelling, land conservation strategies and infra-structure planning

Level 4: ASRIS Level 4 Tracts and Land Unit Attribution is a spatial dataset of mapped soil units with moderate attribution of soil properties but fitting the ASRIS Technical Specification. The dataset is applicable at a scale of 1:250,000. It includes reconnaissance scale land resource survey, or summaries of information compiled from level 5 information. This dataset is designed for catchment planning and to inform catchment scale natural resource policy.

Level 3: ASRIS Level 4 Tracts and Land Unit Attribution is a spatial dataset of mapped soil units with little attribution of soil properties. The dataset is applicable at a scale of 1:1000 000. It is a regional scale land resource survey made using landform, regolith materials, age of land surface, water balance, dominant soil suborder. This dataset is designed for to inform regional scale natural resource policy.

Digital Soil Map of Australia. The digital version of the Atlas of Australian Soils was created by NRIC (National Resource Information Centre) in 1991 from scanned tracings of the published hardcopy maps (1 - 10), Northcote et al. (1960 – 1968). The Atlas of Australian Soils (Northcote *et al*, 1960-68) was compiled by CSIRO in the 1960's to provide a consistent national description of Australia's soils. It comprises a series of ten maps and associated explanatory notes, compiled by K.H. Northcote and others. The maps were published at a scale of 1:2,000,000, but the original compilation was at scales from 1:250,000 to 1:500,000. Mapped units in the Atlas are soil landscapes, usually comprising a number of soil types. The explanatory notes include descriptions of soils landscapes and component soils. Soil classification for the Atlas is based on the Factual Key. The Factual Key (Northcote 1979) was the most widely used soil classification scheme prior to the Australian Soil Classification (Isbell 2002). It dates from 1960 and was essentially based on a set of about 500 profiles largely from south-eastern Australia. It is a hierarchical scheme with 5 levels, the most detailed of which is the principal profile form (PPF). Most of the keying attributes are physical soil characteristics, and can be determined in the field. The "mapunit" code contained within the digital dataset represents and links to the soil landscapes described in the explanatory notes. (explanatoryNotes.txt).The dominant and top 5 soils (as PPF classes) listed within the explanatory notes have been estimated from the text and are also included with this dataset (muppf5.txt). Additional work by various groups has added some value to the dataset by providing look up tables that link to some interpretations of the mapping units or dominant soil type (PPF). Some examples of this include:

1. McKenzie, N. J. and Hook, J. **(1992).** Interpretations of the Atlas of Australian Soils. Consulting Report to the Environmental Resources Information Network (ERIN). CSIRO Division of Soils Technical Report 94/1992.
2. McKenzie NJ, Jacquier DW, Ashton LJ and Cresswell HP **(2000)** Estimation of soil properties using the Atlas of Australian Soils. CSIRO Land and Water Technical Report 11/00, February 2000.
3. Ashton, L.J. and McKenzie, N.J. **(2001)** Conversion of the Atlas of Australian Soils to the Australian Soil Classification, CSIRO Land and Water (unpublished).

NATIVE VEGETATION DATASETS

Estimated Pre-1750 Major Vegetation Subgroups - NVIS Stage 1, Version 3.1. This raster dataset provides summary information on the distribution of Australia's estimated pre-1750 (pre-European, pre-clearing, natural) native vegetation. State and Territory vegetation mapping agencies supplied a new version of the National Vegetation Information System (NVIS) over the first half of 2005. It has a 100 m x 100 m (1 Ha) cell size. This product is derived from a compilation of data collected at different scales on different dates by different organisations. Gaps in the NVIS database were filled by non-NVIS data, notably large areas of New South Wales and all of South Australia. The data represent on-ground dates 2001 to 2004 in South Australia (depending on the region). Sixty-seven (67) Major Vegetation Subgroups were identified to summarise the type and distribution of Australia's native vegetation. The classification contains an emphasis on the structural and floristic composition of the dominant stratum (as with Major Vegetation Groups), but with additional types identified according to typical shrub or ground layers occurring with a dominant tree or shrub stratum. In a mapping sense, the groups reflect the dominant vegetation occurring in a map unit from a mix of several vegetation types. Subdominant vegetation groups which are also present in the map unit are not shown. For example, the dominant vegetation in an area may be mapped as dominated by eucalypt open forest with a shrubby understorey, although it contains pockets of rainforest, shrub land and grassland vegetation as subdominants. A number of other non-vegetation and non-native vegetation land cover types are also represented as Major Vegetation Subgroups. These are provided for cartographic purposes, but should not be used for analyses. For background and other NVIS products, please see the links on

http://www.environment.gov.au/erin/nvis/index.html

Native Vegetation (Floristic). This dataset represents the State Governments key extant native floristic vegetation mapping layer for SA. It provides floristic and structural information, and/or presence of native vegetation in South Australia. The data set includes floristic vegetation mapping datasets produced as part of the Biological Survey of SA program. The descriptions for the vegetation types are stored in a textual database, the South Australian Vegetation Information System Database (SAVEG). The database uses the National Vegetation Information System (NVIS) Framework. Native vegetation data was captured using several data capture techniques, scales, sensitivities and survey years. In general the native vegetation cover is mapped based on imagery and field based information for further delineation and attribution to provide floristic vegetation group information. This dataset has been translated into the NVIS vegetation attribute framework Version 6.0 enabling integration with national projects. It should not be assumed that this dataset represents all native vegetation cover present in the State due to the limitations of the mapping methodology. For more information refer to

http://www.atlas.sa.gov.au/products/veg_map_limitations.html

Protected Areas – NPWS and Conservation Reserve Boundaries. These are the boundaries of land dedicated to conservation within South Australia. These areas protect both the fauna and flora species and are a major 'biological reservoir' for the maintenance of species diversity. This data set provides an accurate location for the legal boundary of reserves dedicated under the National Parks and Wildlife Act, Wilderness Protection Act and reserves for conservation purposes the under Crown Lands Act in South Australia.

CLIMATE DATASETS

ANUCLIM 1.8 BIOCLIM climate datasets. Various Anuclim 1.8 BIOCLIM climate datasets. Datasets pertain to ASRIS study areas. The following BIOCLIM surfaces were generated for the ASRIS project using ANUCLIM version 1.8:

1. Annual mean temp
2. Mean Diurnal Change
3. Isothermality
4. Temp - Seasonality
5. Max Temp - warmest Period

6. Min Temp - Coldest period
7. Temp Annual Change
12. Annual Precipitation
13. Precipitation of Wettest Period
14. Precipitation of Driest Period
15. Precipitation Seasonality
20. Annual mean radiation
21. Highest Period Radiation
22. Lowest Period Radiation
23. Radiation Seasonality
28. Annual mean moisture Index
29. Highest Period moisture Index
30. Lowest Period moisture Index
31. Moisture Index seasonality

The digital map data is provided in geographical coordinates based on the World Geodetic System 1984 (WGS84) datum. This raster data set has a grid resolution of 0..01 degrees (approximately equivalent to 1.1 km). The data set is a product of the National Land and Water Resources Audit (NLWRA) as a base dataset. These surfaces were generated using ANUCLIM version 1.8 and an ASCII version of the AUSLIG 9 Second DEM. Surfaces have been re-sampled from 0.0025 degree cell size to 0.01 degree cell size using bilinear interpolation.

WATER DATASETS

Water Bodies. Layer contains natural and constructed water pondage features including; lakes, wetlands, reservoirs and dams. The layers can be used as a general indication of these features within the agricultural areas of South Australia. Features were originally captured by analog photogrammetric techniques based on 1:80 000 scale aerial photography and surveyed ground control for the standard 1:50 000 mapping program.

Water Natural Features. Data layers include waterholes, springs etc. Larger features represented by polygons. Can be used as a general indication of these features within the agricultural areas of South Australia. Features were originally captured by analog photogrammetric techniques based on 1:80 000 scale aerial photography and surveyed ground control for the standard 1:50 000 mapping program.

Water Courses. Spatial representation (Arcs) of rivers and streams within South Australia including drainage alignments.

DIGITAL TERRAIN MODELS

Shuttle Radar Topography Mission. The Shuttle Radar Topography Mission (SRTM) obtained elevation data on a near-global scale to generate the most complete high-resolution digital topographic database of Earth. SRTM consisted of a specially modified radar system that flew onboard the Space Shuttle Endeavour during an 11-day mission in February of 2000. SRTM is an international project spearheaded by the National Geospatial-Intelligence Agency (NGA), NASA, the Italian Space Agency (ASI) and the German Aerospace Center (DLR). For Australia, absolute height error is 6.0 metres, relative height error is 4.7 metres. Resolution outputs available, are 1 arc second (30 metre), 3 arc seconds (90 metre) and 9 arc seconds (250 metre).

Topography - Contours 50,000. Data layer includes 10 metre contours covering the agricultural areas of South Australia. Can be used for mapping and modelling the land surface within scale limitations. Features were originally captured by analog photogrammetric techniques based on 1:80 000 scale aerial photography and surveyed ground control for the standard 1:50 000 mapping program. The reproduction material was subsequently scanned, the data vectorised and processed through standard procedures to clean and code the data. The tile based data was processed, edge-matched and converted to GIS format.

Topography - Spot Heights 50k. Data layer represents elevation points which have been captured to record high or low points not indicated by standard contour lines. Can be used as a general indication of these features within the agricultural areas of South Australia. Features were originally captured by analog photogrammetric techniques based on 1:80 000 scale aerial photography and surveyed ground control for the standard 1:50 000 mapping program. The reproduction material was subsequently scanned, the data vectorised and processed through standard procedures to clean and code the data. The tile based data was processed, edge-matched and converted to GIS format.

LAND CHARACTERISATION DATASETS

Interim Biogeographic Regionalisation of Australia (IBRA) and IBRA sub regions. Interim Biogeographic Regionalisation for Australia represents a landscape based approach to classifying the land surface of Australia across a range of environmental attributes. The Regions have been developed to assess and plan for the protection of biological diversity. The regionalisation forms a hierarchy with State based Subregions being grouped to form Regions. The environmental associations of SA were digitised from the maps as published in reports in 1977 by CSIRO. The survey approach used was a modified form of integrated reconnaissance survey; refer to Environments of SA Handbook for more information. Mapping was based on landsat imagery and involved compilation of existing published research and interpretation of landsat imagery. Field work was generally limited to checking mapping rather than collection of new data. Two scales were used for mapping, 1:250 000 in the agricultural region and 1:1 000 000 in the pastoral region and sparsely populated areas. The boundaries have then been re-interpreted based on IBRA regions (version 4), satellite imagery, geological data, topographical data and vegetation mapping. The State border boundaries are based on standard map grid from AUSLIG data updated in Mar 2008. The coastline is based on DEH coastline data current to 2008 that has been derived from 1:50,000 orthorectified imagery dated between 2003-2006 and includes offshore islands. As part of version 6.2 within the rangelands the boundaries have been re-interpreted based on the pastoral land system mapping to replace the revised CSIRO data. This mapping has used landsat imagery, geology and vegetation data as part of the delineation process.

Natural Resource Management Regions. The Natural Resources Management Boundaries define the area of responsibility for each of the State's eight NRM Boards. These Boards are responsible for the planning and management of the region's Natural Resources and will undertake many of the roles formally performed by the Catchment Water Management Boards, Soil Conservation Boards, Animal and Plant Control Boards etc. This dataset was constructed by combining existing datasets such as Catchment Water Management Board and Hundred boundaries. The new boundaries were repeatedly modified and adjusted until they were topologically coincident with the South Australian Digital Cadastral Database.

Land Parcel Boundaries. The PARCEL database is a copy of the State's Digital Cadastral Data Base (DCDB) and is a graphical representation of all the legal land parcel boundaries that exist within South Australia. It comprises approximately 854,000 land parcels, together with their legal identifiers. Lots and Units shown in Strata Plans and Community Plans are not included, and can be accessed from the DCDB - STRATA _PLAN database. The PARCEL database is the fundamental reference layer for spatial information systems in South Australia. Used for land administration, mapping and spatial analysis purposes generally. It can be linked to other databases either spatially or through the parcel identifier. The cadastre was acquired during a four-year period (1984-1988) by digitising cadastral boundaries from the best available mapping. The scale of the source mapping ranged from 1:792 in the City of Adelaide to 1:100,000 in rural areas. Most data was captured from maps at scale 1:2,500 in urban areas (400,000 parcels), and 1:10,000 or 1:50,000 in rural areas and islands (350,000 parcels) with the remainder in pastoral areas being sourced from Transport SA..

Australia Dryland Salinity Assessment Spatial Data (1:2,500,000) - NLWRA 2001. The maps represent a compilation of dryland salinity risk and hazard mapping for 2000, 2020 and 2050. The map shows the broad distribution of areas considered as having either a high salinity risk or a high salinity hazard. In southern Australia where groundwater level and trend data are available, assessments that are more confident have been possible. The bulk of non-agricultural areas in Western Australia, South Australia and western New South Wales were considered to have a very low salinity risk and were not assessed. Areas of risk are based on groundwater levels and air photo interpretation. The data show actual areas where dryland salinity or water tables less than 2 meters have been measured. Every delineated area is underpinned by either air photo data or by one or more groundwater bores. The area at risk is conservative due to limitations in the air photo and bore data.

The year 2000 was derived from areas of secondary salinity mapped by the South Australian Department of Primary Industries and Resources. Secondary salinity is the salinisation of land and water resources due to land use impacts by people, and includes that due to watertable rises from dryland management systems or irrigation systems. The South Australian estimates of current extent are better estimates of affected land than exist for other states. A linear trend was applied over the 50 year period - based on the trends to the Year 2000. Year 2020 and 2050 - Predictions from the South Australian DPIR based on extrapolation of field survey and groundwater trend data from representative catchments across agricultural regions.

South Australia - Dryland Salinity Risk - 2000 to 2050. Areas of the state currently affected and at risk to dryland salinisation. The dataset includes areas currently affected by dryland salinisation, and predicted risks for years 2025 and 2050. Current dryland salinity areas were interpreted from aerial photography and existing topographic data. Some additional areas were digitised from topographic base maps. Areas thought to be at risk from dryland salinity by 2025 and 2050 are based on watertable trends, topography and professional judgement.

Australian Nested Catchments and sub Catchments. A nested set of sub-catchments and catchments for Australia. The catchments have been determined from the version 2 of the 9-second continental Digital Elevation Model (DEM) produced by CRES for AUSLIG. The revised DEM overcomes significant deficiencies in the drainage structure of the first DEM.
When amalgamated, the new catchments show close but not complete agreement with the Australia's River Basins data from AUSLIG 1997. There are discrepancies in the Western Drainage Division. There are also some minor discrepancies in some catchment boundaries.
The sub-catchments and catchments are supplied in the form of a single ARC/INFO grid, with grid spacing of 9 arc seconds, and an associated attribute table defining the sub-catchments according to four minimum area thresholds - 2.5 km2, 25 km2, 50 km2 and 500 km2. The National Land and Water Resources Audit funded the compilation of the data. The Centre for Resource and Environmental Studies at the Australian National University undertook the development of the database. The ANUDEM program produced a grid of flow direction for each of 44 tiles in the 9 second DEM corresponding to standard 1:1 million topographic map series. The tiles were joined smoothly by deriving two new grids consisting of eastern and northern components of unit flow direction vector by taking respectively the sine and cosine of flow direction (in radians). The tiles for eastern and northern components were separately merged using the ARC/INFO GRID MOSAIC. A merged flow direction grid was computed by taking inverse tangent of ratio of each merged northern component to each merged eastern component. The resulting flow direction angles were reclassified into standard ARC/INFO codes for flow direction.
Set of automatic procedures were developed to correct identified deficiencies in flow direction grid, consisting of closed loops, crossing flow paths and poor connectivity. Closed loops in flow direction grid prevent ARC/INFO GRID FLOW ACCUMULATION from completing and were removed by defining one cell in each closed loop as a sink. Neighbouring grid cells with crossing diagonal flow directions were corrected by re-directing the flow direction of cell with lowest accumulated upstream area to lowest neighbouring grid cell with lower elevation. The poor connectivity of sub-catchments was improved by identifying zones, or "tails", within sub-catchments that were defined using minimum area threshold of 2.5km2. The sub-catchment membership of such zones was redefined by altering flow direction of lowest grid cell in zone to neighbouring sub-catchment seed in direction of greatest downhill slope. If neighbouring seed uphill it was still selected if cell was lower than all upstream grid cells. The procedure for deriving the nested sub-catchments was repeated for each of specified minimum area criteria (2.5km2, 25km2, 50km2 and 500km2). GRID FLOW ACCUMULATION was applied for upslope contributing area for each grid cell. Determining sub-catchment seeds by grid cells with an increase in upslope contributing area = or > than specified threshold. Defining sub-

catchments, for each stream link with GRID WATERSHED. Assign membership to grid cells with no sub-catchment membership, (areas less than specified minimum threshold) were assigned to either basins defined by GRID BASIN for 2.5km2 sub-catchments or to final sub-catchment defined by immediately smaller area threshold. Sub-catchments defined with minimum area > 2.5km2: linked sink catchments merged with stream sub-catchments of immediately smaller area threshold to larger stream sub-catchment to which smaller sub-catchment belongs and merge small stream sub-catchments below area threshold with downstream sub-catchment until catchment outlet is reached. Iteratively combine each remaining sink catchment with area < specified threshold with lowest neighbouring sub-catchment, starting with highest catchments, until combined area is = or > specified threshold or sink catchment was combined with a stream sub-catchment. Join coastal catchments smaller than specified area threshold with neighbouring small coastal catchment until combined area reaches the threshold and if neighbouring catchment was not within a different river basin as defined in AUSLIG (1997). Basins were derived by assigning to coastal pour-point cells the basin number from River Basins of Australia (AUSLIG 1997) converted to 9 second grid by POLYGRID. To define Lake Eyre Inland Drainage basin, grid cells with an elevation value equal to lowest point (<-15m) were added as seeds. Basins were then computed by WATERSHED. Grid cells within catchments of inland sinks (and therefore not included within a defined basin) replaced by 500 km2 sub-catchment grid values. These sink catchments were merged with lowest neighbouring catchment using same procedure as nested sub-catchments. Procedure continued until all sink catchments were associated with either coastal basin or Lake Eyre drainage basin.

Radiometric Map of Australia. Dataset shows the surface distribution of potassium, uranium and thorium over 80 per cent of the continent. Almost all the gamma-rays detected near the Earth's surface result from the natural radioactive decay of these three elements, while their distribution indicates a lot about the relative age, stability, composition and processes which have helped to create the Australian landscape. The new radiometric map has been produced by combining more than 550 survey grids range from 50 m through to 800 m, but most have a cell size of about 100 m. The original survey grids were levelled and then re-sampled, using minimum curvature onto the Radiometric Map of Australia grids with a cell size of about 100 m (0.001 degrees). The original individual surveys were conducted using low flying aircraft and helicopters to measure the gamma radiation emitted from the rocks and soils below. The map reveals the distribution of bedrock and regolith materials at a national scale, but has sufficient detail to show variations at local scales. More information on its development can be found here:

http://www.ga.gov.au/minerals/research/national/radiometric/

OTHER DATASETS

Towns. Latitude and longitude of towns within and around the SAMDB**.**

Built up Areas. Boundaries of town areas within and around the SAMDB.

Roads. Major and minor roads within the South Australia. The dataset represents navigable roads, including public and private access roads and tracks. Can be used as a framework layer for spatial analysis and mapping within South Australia. The dataset has been compiled from a combination of road centreline data and topographic road data.

Coast Line. Layer includes an interpretation of the mean high water mark for the coastal zone of South Australia. Can be used as a general indication of this feature within SA.

MODELLED DATASETS

Percent protected
This dataset shows the conservation status of Interim Biogeographic Regionalisation of Australia (IBRA) sub regions with regard to formal protection. Grid values show the percentage of formally protected areas within each grid.

Wind erosion risk
The risk of wind erosion was then estimated through combining the soil wind erosion potential (consequence) and wind erosion factor (likelihood) layers. To ensure comparable data scaling between the two layers both layers were linearly transformed to values between 1 and 5. The soil erosion potential layer was rescaled from 1 (Low potential) through 5 (high potential) with the 2 intermediary classes of moderately low and moderately high given values of 2.33 and 3.67, respectively. The scenario-specific wind erosion factor layers were linearly transformed to values between 1 (low) and 5 (high). This layer represents the S0 baseline scenario:

Deep drainage
Deep drainage priorities were calculated as the marginal cost of deep drainage benefits by dividing the cost layer for each action (net economic return) by the benefits layer for each action. The resulting priority layer was rescaled to values between 1 and 5.

Wind erosion properties
Wind erosion priorities were calculated as the marginal cost of wind erosion benefits by dividing the cost layer for each action (net economic return) by the benefits layer for each action. The resulting priority layer was rescaled to values between 1 and 5.

Landscape fragmentation
The spatial distribution of the degree of landscape fragmentation (LF) was calculated for cleared agricultural areas as the percentage vegetation cover within a 5km radius using a moving window technique. The percentage values were linearly transformed to the range 1 (lowest benefit) to 5 (highest benefit) to create a biodiversity benefit score for ecological restoration for addressing landscape fragmentation.

Land use impact model
This dataset shows the risk to remnant native vegetation using the Land Use Impact Model (LUIM) LUIM was used to quantify the risk of degradation to remnant vegetation from surrounding land use management practices and associated landscape modification. Five threatening processes were considered: grazing pressure, weed invasion, nutrient deposition, rising groundwater, and wind erosion. Risk was calculated as a function of a variety of elements in the LUIM model including the nature of land use and management, conservation status of remnants, landscape ecology indices, and other factors. LUIM output provides an estimate of risk of degradation posed by each

threatening process to each remnant vegetation community patch. Grid values show the risk as a value from 1 (low risk) to 5 (high risk) for each pixel.

Species dispersal
Species dispersal, especially the seed of native flora, generally has a negative exponential relationship with distance from source. Hence, a negative exponential distance function was used to identify high benefit sites for ecological restoration. The negative exponential function has the effect of placing exponentially greater emphasis on sites closer to remnant vegetation for restoration. The Euclidean distance to the nearest remnant vegetation patch (d) was calculated for the dryland agricultural areas in the GIS. The Euclidean distance was then exponentially rescaled to scores between 1 (furthest away) and 5 (closest to remnant). The resulting layer quantifies the relative benefits of ecological restoration with regard to proximity to remnant vegetation patches.

Long term average annual profit traditional agriculture
This dataset shows the long term average annual profit at full equity for traditional agriculture in cleared agricultural areas under the baseline climate change scenario. Grid values show the average profit in dollars per hectare per year ($/ha/yr) at full equity.

Long term average annual profit conservation agriculture
This dataset shows the long term average annual profit at full equity for conservation farming in cleared agricultural areas under the baseline climate change scenario. Grid values are shown as average profit in dollars per hectare per year. ($/ha/yr)

Long term average annual profit sheep grazing private land
This dataset shows the long term average annual profit at full equity for grazing sheep in areas of privately owned, unprotected remnant native vegetation under the baseline climate change scenario. Grid values are shown as average profit in dollars per hectare per year. ($/ha/yr)

Productivity canola
This dataset shows the productivity of canola cropping under conservation farming methods for the baseline and four climate change scenarios. Data has been modelled for the purpose of comparing wheat and canola as biofuels. Biofuels cropping was modelled in this study as a continuous cropping system, with alternating years of wheat and canola, under conservation farming. Biofuels crop yields, or quantities, for the baseline were sourced from agricultural census data. Quantity values for biofuels crops under climate change scenarios were created by modifying the census-derived quantity values under the baseline scenario based on APSIM modelling. Grid values show the quantity (yield) of canola produced in tonnes per hectare per year (t/ha/yr). The region has been broken up by statistical local area (SLA).

Productivity wheat
This dataset shows the productivity of wheat cropping under conservation farming methods for the baseline and four climate change scenarios. Data has been modelled for the purpose of comparing wheat and canola as biofuels. Biofuels cropping was modelled in this study as a continuous cropping system, with alternating years of wheat and canola, under conservation farming. Biofuels crop yields, or quantities, for the baseline were sourced from agricultural census data. Quantity values for biofuels crops under climate change scenarios were created by modifying the census-derived quantity values under the baseline scenario based on APSIM modelling. Grid values show the

quantity (yield) of wheat produced in tonnes per hectare per year (t/ha/yr). The region has been broken up by statistical local area (SLA).

Economic costs of NRM actions
This data set shows the economic cost of natural resource management actions. Net economic returns were calculated in dollars per hectare per year ($/ha/yr). These dollar values were transformed into cost score layers with units between 1 (low cost) and 5 (high cost) to capture the relative changes in net economic returns between different natural resource management actions and scenarios. Grid values show the score (1-5) for each pixel.

> Layers exist for - Biofuels, biomass, deep rooted perennials, conservation farming, ecological restoration

Carbon benefits from wheat/canola cropping for biofuels
This dataset shows the total carbon benefit (tonnes CO_2^{-e} /ha/yr) from wheat/canola cropping for biofuels production under climate scenarios. Total carbon benefits from biofuels vary substantially across the Lower Murray, driven by climate change through the effects on productivity.

Carbon benefits from biomass production of energy
This data set shows the total carbon benefit (tonnes CO_2^{-e} /ha/yr) from biomass-based production of renewable energy modelled for baseline and four climate change scenarios. Carbon benefits are directly related to biomass productivity. Carbon benefits follow the same geographic pattern as biomass productivity with the wetter areas of the Mt. Lofty ranges and the southern Wimmera displaying higher potential carbon benefits through biomass production.

High benefit areas for vegetation management under climate change
This data set shows the high benefit areas for vegetation management under climate scenarios, as identified by the multi-species benefits index. This index was calculated based on the predicted amount of suitable habitat under future climate scenarios and the dispersal distance from existing known species locations. The resulting layers were then weighted by a scalar representing the change in habitat suitability between current and future climate scenarios for each species. The resulting layers were then summed over all species to create a single, multi-species benefits index that identifies areas in the landscape for vegetation management that best show the effects of climate change on biodiversity.

High benefit areas for ecological restoration under climate change
This data set shows the high benefit areas for ecological restoration under climate scenarios, as identified by the multi-species benefits index. This index was calculated based on the predicted amount of suitable habitat under future climate scenarios and the dispersal distance from existing known species locations. The resulting layers were then weighted by a scalar representing the change in habitat suitability between current and future climate scenarios for each species. The resulting layers were then summed over all species to create a single, multi-species benefits index that identifies areas in the landscape for ecological restoration that best show the effects of climate change on biodiversity.