Environment Institute – Landscape Futures Program

Climate Change, Community and Environment

Eyre Peninsula Spatial Datasets

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Name	Custodian	Year
Eyre Peninsula Demographic Boundaries and Datasets		
Census Collection District	ABS	2006
Statistical Local Area	ABS	2006
Statistical Subdivision	ABS	2006
Statistical Division	ABS	2006
EP Postal	ABS	2006
EP State electoral divisions	ABS	2006
EP Commonwealth Electoral Division	ABS	2006
EP Local Government Area	SA Planning/DEH	2009
AgStats 1982/83 to 1996/97 (SLA)	ABS	1997
Estimated value of Agricultural Operations (EVAO) 1996-97	ABS	2001
Soil Information		
APSIM APSOIL Soil sites	APSRU	2009
DWLBC Soils Data	DWLBC	2007
Australian Clay Content A-horizon (interpolated from site measurements)	CSIRO	2000
Australian Clay Content B-horizon (interpolated from site measurements)	CSIRO	2000
Available Water Capacity for Australian Areas of intensive agriculture of A-Horizon	CSIRO	1999
Available Water Capacity for Australian Areas of intensive agriculture of B-Horizon	CSIRO	1999
Digital Atlas of Australia Soils	CSIRO	2001
Native Vegetation Datasets		
ERIN threatened biological communities/species	Australian Government - DEWHA	2010
Native vegetation (NVIS) Present Major Vegetation Groups Stage 1 Version 3.0	Australian Government - DEWHA	2007
Native vegetation (NVIS) Pre-European 1750 Major Vegetation Groups Stage 1 version 3	Australian Government - DEWHA	2006

Name	Custodian	Year
Forest reserve Boundaries	PIRSA - Forestry SA	2008
Floristic Vegetation	NVIS-DEH	2008
Protected Areas - NPWS and Conservation reserve Boundaries	DEH	2009
Bushland Condition monitoring Assessment sites (15)	Nature Conservation Society of South Australia	2008
Roadside Vegetation (Floristic)	DEH	2008
National Parks and Reserves - no mineral exploration access	PIRSA	2008
National Parks and Reserves - mineral exploration access	PIRSA	2008
Climate Datasets		
Weather Station Sites	Bureau of Meteorology	2010
SILO weather station data (1897-2010) Patched Point Dataset (PPD)	Bureau of Meteorology	2010
Daily Rainfall- gridded	Bureau of Meteorology	1900-2008
Monthly Maximum and Minimum Temperature - gridded	Bureau of Meteorology	1911-2008
Daily Solar Exposure - gridded	Bureau of Meteorology	1990-2008
Monthly and Annual Evapotranspiration	Bureau of Meteorology	1961-1990
ANUCLIM 1.8 BIOCLIM climate datasets	CSIRO	2000
Water Datasets		
Water Bodies	DEH	2007
Water Construction Features	DEH	2007
Water Courses	DEH	2007
Water Natural Features	DEH	2007
Water Pipelines	DEH	2007
River condition	Australian Government - DEWHA	2001
Inland Water	PIRSA	2008

Name	Custodian	Year
Water Courses	PIRSA	2008
Aquatic Reserves	PIRSA	2008
State Marine Parks	DEH	2008
Sediment and nutrient supply to river links - Australian Streams		
Australian Groundwater Flow Systems	NWLRA	2000
Australian Groundwater Management Units, Unincorporated Areas and Provinces	PIRSA	2000
Australian Surface Water management Areas	AUSLIG	1999
Mining Datasets		
Mines- Major Occurrences	PIRSA	2008
Mines-Selected Mines and Resources	PIRSA	2008
Indigenous Protected Areas	DEH-ERIN UNIT	2006
Geology	PIRSA	2008
Mines and Occurrences	PIRSA	2008
Areas reserved for Mining	PIRSA	2008
Exploration Licence Applications for Minerals and or Opals	PIRSA	2008
Exploration Licence Applications for Minerals	PIRSA	2008
Expired Exploration Licences for Minerals and or Opals	PIRSA	2008
Expired Exploration Licences for Minerals	PIRSA	2008
Tenements- Mining Act 1971	PIRSA	2008
Tenement Applications - Mining Act 1072	PIRSA	2008
Other restricted Lands	PIRSA	2008
Precious Stone Fields	PIRSA	2008

Name	Custodian	Year
Digital Terrain Models		
Shuttle Radar Topography Mission 1'sec (30m), 3'sec (90m), 9'sec (250m)	DEH/PIRSA/NASA	2010
ASTER Digital terrain model	NASA	2009
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
Eyre Peninsula Land use	BRS	2001
Land Use Generalised	SA Planning	2009
IBRA regions and IBRA sub regions	DEH	2008
NRM Regions	DWLBC	2007
Land Parcels - Cadastre	DTEI	2010
Hundreds	PIRSA	2008
Australian Dryland Salinity Assessment	NLWRA	2001
South Australian Dryland Salinity Risk 2000-2050	PIRSA	2001
Australian Nested Catchments and Sub Catchments	ANU	2000
Australian National Gravity Database (800m resolution)	Geoscience Australia	2008
Radiometric Map of Australia	Geoscience Australia	2009
Imagery Datasets		
Landsat Imagery	USGS	1999-2009
MODIS Imagery	USGS	2000-2009

Name	Custodian	Year
Other Eyre Peninsula Datasets		
Airfields	PIRSA	2008
Bridges	PIRSA	2008
Built-up Areas	PIRSA	2008
EP Towns	PIRSA	2008
Rail Yards	PIRSA	2008
Railroad	PIRSA	2008
Roads	PIRSA	2008
Roads Unformed- local	DEH	2008
Town Area	DTEI	2008
Coast line	DEH	2008

EYRE PENINSULA DEMOGRAPHIC BOUNDARIES AND DATASETS

ABS boundaries. The census provides statistical information on the key characteristics of the population demographic that makes up the Eyre Peninsula. 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.

Table 1 Australian Standard Geographical Classification for the Eyre Peninsula study region

SD	SSD	SLA	Number of CD	Name
30				**Eyre**
	05			Lincoln
		1190	7	Cleve (DC)
		1750	7	Elliston (DC)
		1960	4	Franklin Harbour (DC)
		3220	5	Kimba (DC)
		3570	6	Le Hunte (DC)
		3710	12	Lower Eyre Peninsula (DC)
		6300	26	Port Lincoln (C)
		7910	7	Tumby Bay (DC)

SD	SSD	SLA	Number of CD	Name
30	**10**			**West Coast**
		1010	10	Ceduna
		7490	6	Streaky Bay
35				**Northern**
	05			Whyalla
		8540	40	Whyalla

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.

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).

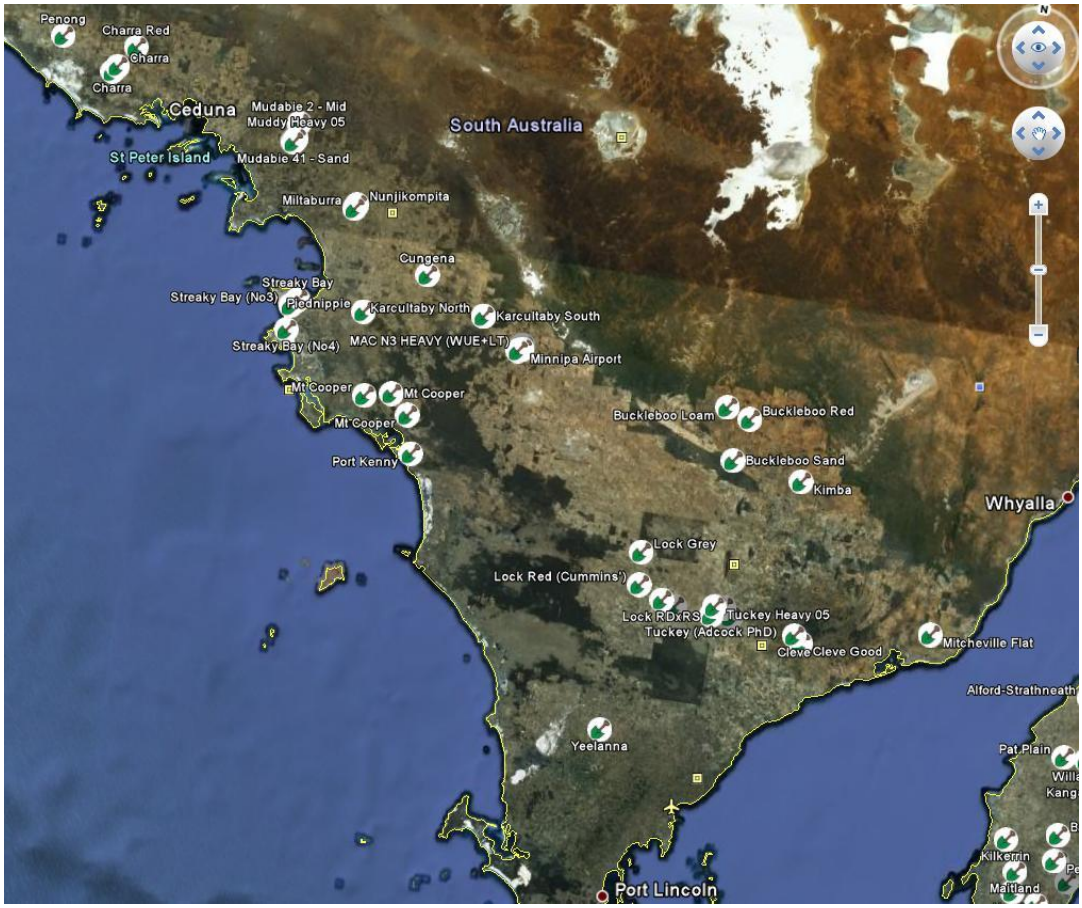
Commonwealth Electoral Divisions. Boundary files containing conversion of data from the 2006 Postal Areas (POAs) to 2007 Commonwealth Electoral Divisions (CEDs).

AgStats 1982/83 to 1996/97. This is a subset of Agricultural Census data from 1982/1983 to 1996/1997 published by the Australian Bureau of Statistics (ABS), consistent for area and attribute produced for use within the National Land and Water Resources Audit (1998). The subset of 513 data items for plant and livestock production and 246 data items for respondent numbers of these plant and animal production (a total of 759 data items) from AgStats were important items commonly available in the AgStats database over the 15 years period and each year for respondents having Estimated Value of Agricultural Operations (EVAO) above the cutoff of $22,500. The data were then concorded to Version 2.6 Statistical Local Area (SLA) boundaries (ABS, 1996) using the mask from the Land Use Map (1996/1997) developed in Bureau of Rural Sciences (BRS). The land use mask has a number of land use classes such as agricultural land, national parks, protected areas, forestry and so on. The concordance developed for the AgStats database used conversion ratios based upon the agricultural land area and obtained by overlaying the land use mask, and SLA boundary Version 2.6 (1996) against each of the previous versions of SLA boundaries.

Estimated Value of Agricultural Operations (EVAO), 1996-1997. The geography of this dataset is Australian statistical local area (SLA). The data relates to Estimated Value of Agricultural Operations (EVAO) as a median value for each SLA for each farm at a scale of 1:25,000,000. The estimated value of agricultural operations is a measure of gross farm income and this data represents all farm establishments with an EVAO greater than $5,000. The data is presented at a scale of 1:25,000,000. Data for Estimated Value of Agricultural Operations (EVAO) is provided as a custom cross tabulation by the Australian Bureau of Statistics. The data was compiled from the Australian Bureau of Statistics Agricultural Census 1996-1997 data for all farms with EVAO > $5,000. Data has been supplied as a median EVAO figure per SLA. The hectares of agricultural land use attribute is derived from the 1996/97 Land Use of Australia, 1:1 Million, Version 1a produced by the Bureau of Rural Sciences. The attribute of the SPREAD layer "Spread" was used to produce an agricultural land cover using Spread values 0 - 21 inclusive. See the 1996/97 Land Use of Australia, 1:1 Million, Version 1a metadata and user guide for further information.

SOIL INFORMATION

APSIM/Apsoil Sites. A total of 64 soil pit sites (see below) across the Eyre Peninsula are available from the APSIM/ Apsoil database. These sites have individual soil and crop species data in spreadsheet and graphical formats and provide the ability to run APSIM simulations for locally relevant soils. Site information includes soil type, Plant Available Water Capacity for different crops (predominately wheat), drained upper and crop lower limits at different soil depths (0 to greater than 1000mm).



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 Clay Content A-horizon. Clay content for Australian areas of intensive agriculture of Layer 1 (A-Horizon - Top-soil) (derived from site measurements of clay content). his dataset presents a surface of predicted %Clay content (X 1000) of layer 1 (A Horizon - top-soil) surface for the intensive agricultural areas of Australia. Data modelled from spot observations taken by soil agencies both State and CSIRO. % Clay has been estimated using both a polygon model, and a combined point/polygon model. The map derived from the combined model is considered to be more accurate, and is the preferred choice for applications that require an estimate only of % clay. Where clay, sand and silt are all required, the polygon-based maps should be used. These maps of % clay in topsoil and subsoil were produced from combined point- and polygon-based models. A point-based model of % clay was developed using soil profile data, and the map of % clay derived from polygon data was added in as an extra environmental layer. This has the advantage of retaining the spatial structure of the soil map, while allowing estimates of % clay to vary within each map unit as a function of other environmental predictors. The model was derived for log (% clay), but results are presented as %clay. The model for % clay in topsoil is generally good, although it is strongest in

Queensland, Victoria and Tasmania and less reliable in southern NSW, NT and WA. This is considered to be a more reliable estimate of % clay than that produced by the polygon based model.

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 0.001 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. Uncertainty surfaces corresponding to ASRIS point model prediction surfaces have been prepared for this soil property. The dimensionless uncertainty values fall in the range 0 to 1000 where lower values represent greater uncertainty.

Australian Clay Content B-horizon. Clay content for Australian areas of intensive agriculture of Layer 2 (B-Horizon - Sub-soil) (derived from site measurements of clay content). This dataset presents a surface of predicted %Clay content (X 1000) of layer 2 (B Horizon - sub-soil) surface for the intensive agricultural areas of Australia. Data modelled from spot observations taken by soil agencies both State and CSIRO. % Clay has been estimated using both a polygon model, and a combined point/polygon model. The map derived from the combined model is considered to be more accurate, and is the preferred choice for applications that require an estimate only of % clay. Where clay, sand and silt are all required, the polygon-based maps should be used. These maps of % clay in topsoil and subsoil were produced from combined point- and polygon-based models. A point-based model of % clay was developed using soil profile data, and the map of % clay derived from polygon data was added in as an extra environmental layer. This has the advantage of retaining the spatial structure of the soil map, while allowing estimates of % clay to vary within each map unit as a function of other environmental predictors. The model was derived for log (% clay), but results are presented as %clay. The model for % clay in subsoil is less reliable than for topsoil. This is considered to be a more reliable estimate of % clay than that produced by the polygon based model. 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 0.001 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. Uncertainty surfaces corresponding to ASRIS point model prediction surfaces have been prepared for this soil property. The dimensionless uncertainty values fall in the range 0 to 1000 where lower values represent greater uncertainty.

Available Water Capacity for Australian areas of intensive agriculture of Layer 1 (A-Horizon - Sub-soil) (derived from soil mapping). Surface of predicted Available Soil Water Holding Capacity of layer 1 (A Horizon - Sub-soil) surface for the intensive agricultural areas of Australia. Data modelled from area based observations made by soil agencies both State and CSIRO and presented as .0.01 degree grid cells. Available water capacity (AWC) is a measure of the store of water available for plants to use. AWC is presented here as the estimated total for the horizon, measured in millimetres (mm). The amount of water that is held by the soil varies according to a number of soil properties including, soil texture, organic matter content, bulk density and soil structure development. Available water capacity has been calculated as the difference in volumetric water content at 0.1 bar and 15 bar (matric potentials of -10 kPa and -1.5 mPa) for each layer. These represent respectively the field capacity (maximum water content following free drainage) and the permanent wilting point (lower limit of soil moisture available to plants). The final ASRIS polygon attributed surfaces are a mosaic of all of the data obtained from various state and federal agencies. The surfaces have been

constructed with the best available soil survey information available at the time. The surfaces also rely on a number of assumptions. One being that an area weighted mean is a good estimate of the soil attributes for that polygon or map-unit. Another assumption made is that the look-up tables provided by McKenzie et al. (2000), state and territories accurately depict the soil attribute values for each soil type. The accuracy of the maps is most dependent on the scale of the original polygon data sets and the level of soil survey that has taken place in each state. The scale of the various soil maps used in deriving this map is available by accessing the data-source grid, the scale is used as an assessment of the likely accuracy of the modelling. The Atlas of Australian Soils is considered to be the least accurate dataset and has therefore only been used where there is no state based data. Of the state datasets Western Australian sub-systems, South Australian land systems and NSW soil landscapes and reconnaissance mapping would be the most reliable based on scale. NSW soil landscapes and reconnaissance mapping use only one dominant soil type per polygon in the estimation of attributes. South Australia and Western Australia use several soil types per polygon or map-unit. The level of uncertainty associated with estimates of available water capacity are very high. McKenzie et al (2000) note that there are many physical and practical reasons why such an estimate of available water capacity is only an approximate, and sometimes erroneous, estimate of the actual plant available water capacity (see Hillel 1980). Despite these limitations, it provides a reasonable first approximation of the water storage capacity of a soil. 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 0.001 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.

Available Water Capacity for Australian areas of intensive agriculture of Layer 2 (B-Horizon - Sub-soil) (derived from soil mapping). Surface of predicted Available Soil Water Holding Capacity of layer 2 (B Horizon - Sub-soil) surface for the intensive agricultural areas of Australia. Data modelled from area based observations made by soil agencies both State and CSIRO and presented as .0.01 degree grid cells. Available water capacity (AWC) is a measure of the store of water available for plants to use. AWC is presented here as the estimated total for the horizon, measured in millimetres (mm). The amount of water that is held by the soil varies according to a number of soil properties including, soil texture, organic matter content, bulk density and soil structure development. Available water capacity has been calculated as the difference in volumetric water content at 0.1 bar and 15 bar (matric potentials of -10 kPa and -1.5 MPa) for each layer. These represent respectively the field capacity (maximum water content following free drainage) and the permanent wilting point (lower limit of soil moisture available to plants). The final ASRIS polygon attributed surfaces are a mosaic of all of the data obtained from various state and federal agencies. The surfaces have been constructed with the best available soil survey information available at the time. The surfaces also rely on a number of assumptions. One being that an area weighted mean is a good estimate of the soil attributes for that polygon or map-unit. Another assumption made is that the look-up tables provided by McKenzie et al. (2000), state and territories accurately depict the soil attribute values for each soil type. The accuracy of the maps is most dependent on the scale of the original polygon data sets and the level of soil survey that has taken place in each state. The scale of the various soil maps used in deriving this map is available by accessing the data-source grid, the scale is used as an assessment of the likely accuracy of the modelling. The Atlas of Australian Soils is considered to be the least accurate dataset and has therefore only been used where there is no state based data. Of

the state datasets Western Australian sub-systems, South Australian land systems and NSW soil landscapes and reconnaissance mapping would be the most reliable based on scale. NSW soil landscapes and reconnaissance mapping use only one dominant soil type per polygon in the estimation of attributes. South Australia and Western Australia use several soil types per polygon or map-unit. The level of uncertainty associated with estimates of available water capacity is very high. McKenzie et al (2000) note that there are many physical and practical reasons why such an estimate of available water capacity is only an approximate, and sometimes erroneous, estimate of the actual plant available water capacity (see Hillel 1980). Despite these limitations, it provides a reasonable first approximation of the water storage capacity of a soil. 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 0.001 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.

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

Environmental Resources Information Network (ERIN) threatened biological/ecological communities and species. The Environmental Resources Information Network (ERIN) is a unit within the Department of the Environment, Water, Heritage and the Arts, specializing in online data and information management, and spatial data integration and analysis. ERIN aims to improve environmental outcomes by developing and managing a comprehensive, accurate and accessible information base for environmental decisions. Information bases continue to be established to help answer questions crucial to the conservation and management of our environment.

- What is found in a particular region? (such as, a rare species, an environmental resource, or a type of management zone)
- Where is something?
- What kinds of environments exist and where are they found?
- How are these environments being managed?
- Is the environment changing and by how much?
- What will happen if...?

Number of EPBC-listed species and communities occurring in a 0.05 degree latitude/longitude grid cells containing land across Australia. Analysis is based on distributions from the Species and Communities of National Environmental Significance map database of species and communities listed under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. In general, known and likely distributions are used. The following ESRI grid layers are available: thrtnd_kl = all threatened species ce_kl = critically endangered species end_kl = endangered species vul_kl = vulnerable species plants_kl = threatened plants birds_kl = threatened birds fishes_kl = threatened fishes frogs_kl = threatened frogs inverts_kl = threatened invertebrates mammals_kl = threatened mammals reptiles_kl = threatened reptiles mig_kl = migratory species com_all = threatened communities (known, likely and may occurrences) com_ce_all = critically endangered communities (known, likely and may occurrences) com_end_all = endangered communities (known, likely and may occurrences) com_vul_all = vulnerable communities (known, likely and may occurrences) Note: - kl uses known and likely occurrence; -all uses known, likely, and may occur occurences. The Value field contains the number species occurring in the cell. Threatened includes critically endangered, endangered and vulnerable.

Australia - Present Major Vegetation Subgroups - NVIS Stage 1, Version 3.1. This raster dataset provides summary information on Australia's present native vegetation. It has 100 m x 100 m (1 Ha) cell size. State and Territory vegetation mapping agencies supplied a new version of the National Vegetation Information System (NVIS) over the first half of 2005. Summaries were derived from the best available data in the NVIS extant (present) theme as at May 2006. This product is derived from a compilation of data collected at different scales by different organisations.

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

Gaps in the NVIS database were filled by non-NVIS data, notably the small 1:5M patch in New South Wales and parts of the arid zone at 1:1M in South Australia. The data represent on-ground dates of 2001 in Queensland, 2001 to 2004 in South Australia (depending on the region) and 2004 in other

jurisdictions, except NSW. NVIS data was partially updated in NSW with 2001-04 data, with extensive areas of 1997 data remaining from the earlier version of NVIS. 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.

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

Forest Reserve Boundaries. Identifies all areas owned or managed by Forestry SA in the ten forest districts. Excludes minor forest reserves and coded to reflect land use. Data sources include field surveys, survey books, aerial photos and GPS.

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.

Bushland Condition Monitoring Sites. GPS referenced sites for bushland monitoring using 30m by 30m quadrant. Measures vegetation community type, vegetation association and habitat condition based on rating of species diversity, weed abundance and threat, structural diversity, recruitment of species, fallen logs and trees, primary canopy health, tree health, feral animals, hollow bearing trees and habitat trees. 15 Sites are present for the EP region.

Roadside Vegetation (Floristic). This dataset contains information from the Roadside Vegetation Database on the left and right side of the road. The data has been collected using Planning SA's standard roadside vegetation survey methodology.

National Parks and Reserves – No mineral Access. Location of areas reserved from certain provisions of the Mining Act, 1971 and Opal Act, 1995. Areas are reserved for several reasons, including preservation of heritage and tourism interests. Such reserves prevent mineral claims and exploration licences from being granted. They generally include entire cadastral land parcels.

National Parks and Reserves – Mineral Access. Parks and reserves not restricted from the Mining Act 1971 and Opal Act 1995.

CLIMATE DATASETS

Weather Station Sites and Point Patch Dataset. The co-ordinates of and specific meteorological stations climate dataset (Point Patch Dataset) of all weather station sites within the EP region. These datasets provides continuous daily climate data based on original Bureau of Meteorology records but use interpolated data to fill ("patch") any gaps in the observation record.

Daily Rainfall –Gridded data. Daily gridded data from 1900 to 2008. The grids describe rainfall values across the study region in the form of a two-dimensional array. The analyses (grids) are computer generated using a sophisticated analysis technique. It incorporates an optimised Barnes successive correction technique that applies a weighted averaging process to the station data. Topographical information is included by the use of rainfall ratio (actual rainfall divided by monthly average) in the analysis process. On the maps each grid-point represents an approximately square area with sides of about 5 kilometres (0.05 degrees). The size of the grids is limited by the data density across Australia. This grid-point analysis technique provides an objective average for each grid square and enables useful estimates in data-sparse areas such as central Australia. However, in data-rich areas such as southeast Australia or in regions with strong gradients, "data smoothing" will occur resulting in grid-point values that may differ slightly from the exact rainfall amount measured at the contributing stations.

Daily Solar Exposure. These solar exposure grids show the daily total global solar exposure across Australia for 1990 onwards. Global solar exposure is the total amount of solar energy falling on a horizontal surface. The daily global sector is the total solar energy for a day. Typical values for daily global exposure range from 1 to 35 MJ/m^2 (Megajoules per square metre). The Bureau of Meteorology's computer radiation model uses visible images from geostationary meteorological satellites to estimate daily global solar exposures at ground level. At each location for each satellite acquired image, the brightness's are averaged over each grid cell and used to estimate solar irradiance at the ground. Essentially, the irradiance at the ground can be calculated from the irradiance at the top of the earth's atmosphere, the amount absorbed in the atmosphere (dependant on the amount of water vapour present), the amount reflected from the surface (surface albedo) and the amount reflected from clouds (cloud albedo). These instantaneous irradiance values are integrated over the day to give daily insolation (daily radiant exposure) in mega joules per square metre. The daily exposure gridded datasets cover Australia with a resolution of 0.05 degrees in latitude and longitude. These datasets were produced by reprocessing archived raw satellite data using software that was extensively rewritten in 2006, but based on the physical model that has been used since 1990. Satellite-derived global solar exposure estimates are based on images from the Geostationary Meteorological Satellite GMS-4, GMS-5, MTSAT-1R (from Nov. 2005) and Geostationary Operational Environmental Satellite (GOES-9) satellites which are provided with permission of the Japan Meteorological Agency (JMA) and the United States National Oceanic & Atmospheric Administration (NOAA). Any use of products from this imagery requires acknowledgement of the satellites of JMA and NOAA as the original source of the satellite data, and acknowledgement of the Commonwealth of Australia (Bureau of Meteorology) which received and processed the images. Acknowledgement should be in the form: "*Solar exposure data derived from satellite imagery processed by the Bureau of Meteorology from the Geostationary Meteorological*

Satellite series operated by Japan Meteorological Agency and from GOES-9 operated by the National Oceanographic & Atmospheric Administration (NOAA) for the Japan Meteorological Agency"

Monthly Temperature Gridded data. Monthly maximum and minimum temperature maps and gridded data from 1911 to 2008. The maps show maximum and minimum temperature values across Australia in a two dimensional array. The analyses (grids) are computer generated using a sophisticated analysis technique. It incorporates an optimised Barnes successive correction technique that applies a weighted averaging process to the station data. Topographical information is included by the use of anomalies (departures from average) in the analysis process. On the maps each grid-point represents an approximately square area with sides of about 5 kilometres (0.05 degrees). The size of the grids is limited by the data density across Australia. This grid-point analysis technique provides an objective average for each grid square and enables useful estimates in data-sparse areas such as central Australia. However, in data-rich areas such as southeast Australia or in regions with strong gradients, "data smoothing" will occur resulting in grid-point values that may differ slightly from the exact temperature measured at the contributing stations.

Monthly and Annual Evapotranspiration. Mean monthly and mean annual areal actual, areal potential and point potential evapotranspiration (ET) grids. The grids show the ET values across Australia and the mean data are based on the standard 30-year period 1961-1990. Gridded data were generated using the ANU (Australian National University) 3-D Spline (surface fitting algorithm). The grid point resolution of the data is 0.1 degrees (approximately 10km). As part of the 3-D analysis process a 0.1 degree resolution digital elevation model (DEM) was used. Approximately 750 stations were used in the analysis, and all input station data underwent a high degree of quality control before analysis, and conform to WMO (World Meteorological Organisation) standards for data quality. Areal Actual ET is the ET that actually takes place, under the condition of existing water supply, from an area so large that the effects of any upwind boundary transitions are negligible and local variations are integrated to an areal average. Areal Potential ET is the ET that would take place, under the condition of unlimited water supply, from an area so large that the effects of any upwind boundary transitions are negligible and local variations are integrated to an areal average.
Point Potential ET is the ET that would take place, under the condition of unlimited water supply, from an area so small that the local ET effects do not alter local air mass properties. It is assumed that latent and sensible heat transfers within the height of measurement are through convection only. The above definitions are based on those given by Morton (1983), but we have used the term areal potential ET for Morton's wet-environment ET and the term point potential ET for Morton's potential ET.
Morton, F.I. (1983). Operational estimates of areal evapotranspiration and their significance to the science and practice of hydrology. Journal of Hydrology, 66: 1-76.

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 resampled 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 Construction Features. Data layers include features of significant size captured for standard topographic mapping purposes and represented by line or point geometry. Included features: dam wall, weir, caisson, salt evaporation pan. 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 Pipelines. Data layer includes major water pipelines either above or below ground. 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.

River Condition (basins and reaches). The Assessment of River Condition is the first attempt to report on river condition for key river basins across Australia. The integrated assessment provides a basin-wide context and a framework within which decisions and river management priorities can be considered. The assessment incorporates a range of attributes that are considered to indicate key ecological processes at the river reach and basin levels. The two indices developed are an Aquatic Biota Index using macroinvertebrates, and an Environment Index with four sub-indices: catchment disturbance; hydrological disturbance; habitat; and nutrient and suspended sediment load. A range of data types and approaches were used including direct measurements and modelling of nutrient and sediment loads. The river basins assessed include areas that contain intensive land use and selected areas of non-intensive land use such as part of the Northern Territory and the western division of the Murray-Darling Basin. Whole river basins were used so that processes such as hydrology and sediment and nutrient movement could be modelled and balanced over entire catchments. Data for basin boundaries were captured by relevant State and Territory authorities from 1:10 000 to 1:250 000 scale source material. The balance of data is from AUSLIG GEODATA 1:100 000 scale coastline data and includes State border information. Data are suitable for GIS applications. The reaches data were modelled from the AUSLIG 9 second DEM (second edition).

Inland Waters. Polygonal boundaries of inland waters within the EP region. Description of where water body is permanent/ perennial/ intermittent or fluctuating.

Water Courses. Spatial representation (Arcs) of rivers and streams within the EP region.

Aquatic Reserves. This data set is used to identify the location and spatial extent of marine and coastal environments protected under the Fisheries Act, 1982. These areas form one component of the network of Marine Protected Areas (MPA's) for South Australia. This data set was generated from the gazetted coordinates of each dedicated reserve.

State Marine Parks. Dedicated to conservation as a Marine Protected Area (MPA), these are established to protect the biological diversity of these waters whilst providing for ecologically sustainable use of their natural resources. This layer contained the state and commonwealth boundaries making up the legal marine protected areas of The Great Australian Bight.

Sediment and nutrient supply to river links - Australian Streams. This data set is the vector streams coverage generated from the 9" (approx 250 m) digital elevation model data set attributed with sediment and nutrient source, sink, load and delivery information. The data set is a product of the Water-borne Soil Erosion Project of the National Land and Water Resources Audit (NLWRA). This digital map uses geographical coordinates referred to the World Geodetic System 1984 (WGS84). The data set may be of use to researchers and policy makers in need of national or regional scale land use data. These attributes are the product of the river model component of the Water-borne

Soil Erosion Project of the National Land and Water Resources. Inputs to this model are the hill slope erosion and gully erosion estimates produced by other components of the project.

Australian Groundwater Flow Systems - National Land and Water Resources Audit, January 2000. The data shows the distribution of groundwater flow systems at a national scale. These flow systems were based on their hydrogeological characteristics using a combination of geology, geomorphology and topographical (Digital Elevation Model) information at a national scale. The groundwater flow systems identify the extent of groundwater processes contributing to salinity, together with the characteristic hydrogeological processes considered likely to result in dryland salinity given suitable climatic conditions.

Australian Groundwater Management Units, Unincorporated Areas and Provinces. Contains the boundaries and names of Groundwater Management Units, Unincorporated Areas and Groundwater Provinces. A Groundwater Management Unit (GMU) is a hydraulically connected groundwater system that is defined and recognised by State and Territory agencies. This definition allows for management of the groundwater resource at an appropriate scale at which resources issues and intensity of use can be incorporated into groundwater management practices.

A Groundwater Province is an area having a broad uniformity of hydro-geological and geological conditions identified as either predominantly sedimentary or fractured rock as defined by the Australian Water Resources Council. An Unincorporated Area is a groundwater resource defined by a groundwater province and excluding any designated groundwater management units. For the purposes of reporting the total groundwater resource, unincorporated areas have been included in the analyses that follow. For convenience, Unincorporated Areas are reported under the heading of groundwater management units. The data contains the boundaries (captured at various scales) and the name and number of each Groundwater Management Unit, Unincorporated Area and Province. For South Australia, the province boundaries were sourced from AGSO Groundwater Provinces data. The GMU information was derived from Prescribed Water Resource Areas (PWRA) and Local Government Area boundaries provided by Resource Information, Department of Environment and Heritage and based on digital cadastral database information. Other GMU boundaries were produced by digitising contours from 1:50,000 map sheets.

Australian Surface Water Management Areas. Contains the boundaries and names of Surface Water Management Areas (SWMA). Surface Water Management Areas are regions defined by State and Territory water management agencies for use in national water resources reporting. Many Surface Water Management Areas are the same as the Australia's River (AWRC) Basins (AUSLIG 1997) boundaries, however in some States and Territories some Surface Water Management Areas are a sub-set or a major part of the AWRC Basins. For South Australia, changes were made in the eastern part of the State to ensure that SWMAs followed prescribed wells area and local government area (LGA) boundaries. Prescribed well areas are areas within which there are restrictions on groundwater extraction. All wells ("bores") must be licensed and there are restrictions on volume and are legislated boundaries. Prescribed wells area and LGA boundaries were digitised from 1:50,000 topographic maps.

MINING DATASETS

Mines – Major Occurrences. To display location and characteristics of South Australia's known major mineral occurrences. Source data are documents originating from Office of Minerals and Energy Resources and its predecessors and from various mining/mineral exploration companies.

Mines – Selected Mines and Resources. To display location and characteristics of selected significant mines and mineral deposits within South Australia. Used in prospectivity assessment. Source data are documents originating from Office of Minerals and Energy Resources and its predecessors and from various mining/mineral exploration companies.

Indigenous Protected Areas. This dataset details the declared Indigenous Protected Areas (IPA) across South Australia through the implementation of the Indigenous Protected Areas Programme. The IPA Programme is part of the National Reserve System (NRS) Programme which aims to establish a network of protected areas which include a representative sample of all types of ecosystems across the country. Through this program, Indigenous landowners are being supported to manage their lands for the protection of natural and cultural features in accordance with internationally recognised standards and guidelines for the benefit of all Australians. The IPA Programme and NRS Programme are part of the Australian Government's Natural Heritage Trust. More information can be found from the following website:

http://www.deh.gov.au/indigenous/ipa

This dataset can be used to show the locations of Indigenous Protected Areas for conservation purposes. Through the IPA Programme, as new declarations are made ERIN has continued to produce spatial boundaries of all IPA's. In 2006 ERIN updated the IPA datasets to comply with the Collaborative Australian Protected Areas Database (CAPAD) as IPA's are included in CAPAD.

Geology. Surface geology of Australia 1:1,000,000 scale, South Australia. Compiled from the latest published 1:250 000-scale and some 1:100 000-scale geological maps. modified to incorporate results of recent research by PIRSA in the Olary Domain. Much of South Australia is covered by Cenozoic regolith, mainly sand plains, dunes, playas and colluvium, with lesser silcrete, calcrete and laterite.

Exploration Licence Applications for Minerals and/ or Opals. Location of all current mineral and/or opal Exploration Licence applications issued under the Mining Act, 1971. Exploration Licences provide exclusive tenure rights to explore for mineral and/or opal resources for up to a maximum of 5 years. Comment is sought on applications for Exploration Licences from numerous sources before granting. Exploration programs are subject to strict environmental and heritage conditions. Exploitation of identified resources must be made under separate mineral production leases and/or precious stones claims. Exploration Licence application boundaries were sourced from the official Mining Register licence application documents. Licence application boundaries are legally defined to follow lines of latitude and longitude. The register has existed since 1930.

Exploration Licences for Minerals. Location of all current mineral Exploration Licences issued under the Mining Act, 1971. Exploration Licences provide exclusive tenure rights to explore for mineral

resources for up to a maximum of 5 years. Comment is sought on applications for Exploration Licences from numerous sources before granting. Exploration programs are subject to strict environmental and heritage conditions. Exploitation of identified resources must be made under separate mineral production leases. Exploration Licence boundaries were sourced from the official Mining Register licence documents. Licence boundaries are legally defined to follow lines of latitude and longitude. The register has existed since 1930.

Expired Exploration Licences for Minerals and/or Opals. Location of all expired mineral Exploration Licences issued under the Mining Act, 1971. Exploration Licences provide exclusive tenure rights to explore for mineral resources for up to a maximum of 5 years. Comment is sought on applications for Exploration Licences from numerous sources before granting. Exploration programs are subject to strict environmental and heritage conditions. Exploitation of identified resources must be made under separate mineral production leases. Exploration Licence boundaries were sourced from the official Mining Register licence documents. Licence boundaries are legally defined to follow lines of latitude and longitude. The register has existed since 1930.

Expired Exploration Licences for Minerals. Location of all expired mineral Exploration Licences issued under the Mining Act, 1971. Exploration Licences provide exclusive tenure rights to explore for mineral resources for up to a maximum of 5 years. Comment is sought on applications for Exploration Licences from numerous sources before granting. Exploration programs are subject to strict environmental and heritage conditions. Exploitation of identified resources must be made under separate mineral production leases. Exploration Licence boundaries were sourced from the official Mining Register licence documents. Licence boundaries are legally defined to follow lines of latitude and longitude. The register has existed since 1930.

Tenement – Mining Act 1971. Location of all tenements issued under the Mining Act, 1971. The types of tenement are:

1. Extractive Mineral Lease (EML) - An EML entitles the lessee to carry out mining operations specified in the lease for the recovery of extractive minerals.
2. Mineral Claim (MC) - An MC provides an exclusive right for 12 months to prospect for minerals within the claim area (conditions apply).
3. Mineral Lease (ML) - An ML entitles the lessee to carry out mining operations specified in the lease for the recovery of minerals other than extractive minerals.
4. Miscellaneous Purposes Licence (MPL) - An MPL may be granted for any purpose ancillary to the conduct of mining operations, for example an operating plant, drainage or an access road.
5. Private Mine (PM) - PM tenements were declared prior to the Mining Act, 1971 and are subject to specific conditions.
6. Retention Lease (RL) - An RL entitles the lessee to retain the lease area for future mining operations where, for economic or other reasons, the lessee is justified in not proceeding immediately.

The tenement type SML (Special Mining Lease) relates to the Olympic Dam mine, which is administered under the Roxby Downs (Indenture Ratification) Act, 1982. Departmental hardcopy tenement records are the primary data source. These records are derived from information supplied

by applicants. Applicant information is often schematic and the scale of the final document is determined by the most appropriate scale maps available at the time. Applicant information and associated records used for this project date back over the last 30 years. The source date is dependent upon the date of application. The dataset contains an accuracy description for each tenement. From time to time, applications are confirmed by field staff using GPS.

Tenement Applications - Mining Act, 1971. Location of all tenement applications lodged under the Mining Act, 1971. The two types of tenement application are:

1. Mineral Claim Application (MCA) - An application for a Mineral Claim (MC), which when registered provides an exclusive right for 12 months to prospect for minerals within the claim area (conditions apply).
2. Miscellaneous Purposes Licence Application (MPLA) - An application for a Miscellaneous Purposes Licence (MPL), which may be granted for any purpose ancillary to the conduct of mining operations, for example an operating plant, drainage or an access road.

Departmental hardcopy tenement records are the primary data source. These records are derived from information supplied by applicants. Applicant information is often schematic and the scale of the final document is determined by the most appropriate scale maps available at the time. Applicant information and associated records used for this project date back over the last 30 years. The source date is dependent upon the date of application. The dataset contains an accuracy description for each tenement. From time to time, applications are confirmed by field staff using GPS.

Other Restricted Lands. Restricted Lands such as army bases and areas restricted by law.

Precious Stone Fields. Location of Precious Stones Fields proclaimed under the Mining Act, 1971. Precious Stones Fields are the only areas in South Australia where claims are able to be pegged for prospecting and mining of precious stones, particularly opals. There are restrictions to mineral exploration within these areas. Precious Stones Fields are proclaimed in the South Australian Government Gazette. Boundaries are defined by latitude and longitude and were captured by keyboard entry of the coordinates.

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).

ASTER Digital Terrain Model. The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) is an advanced multispectral imager that was launched on board NASA's Terra

spacecraft in December, 1999. The Digital Elevation model created from this sensor has an absolute error less than 7 metres, a relative error less than 10 metres and a horizontal resolution of 30 metres.

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

Agricultural Land Cover Change datasets - Land cover themes 1990. One hundred and fifty eight Landsat Thematic Mapper scenes for 1990 (1991 in the Australian Capital Territory, New South Wales and Queensland) and 1995 were used in conjunction with vegetation and a range of ancillary data sets by State agencies and BRS to establish:

* the extent of woody vegetation (native and exotic vegetation greater than or equal to two metres tall with greater than or equal to 20 percent crown cover) in Australia's more intensively used agricultural areas in 1990/91;
* the rates of clearing of this woody vegetation and tree planting 1990/91-1995, and the reasons for clearing and planting; and
* the types and biomass of vegetation cleared.

Remote sensing has provided a spatially accurate and reliable estimate of the rates of clearing 1990-1995 for the Northern Territory, South Australia, Tasmania, Victoria and Western Australia and for 1991-1995 for the Australian Capital Territory, New South Wales and Queensland. The data is available in 250m, 100m and 25m grids.

2001 Eyre Peninsula Land Use, South Australia. This dataset contains the land use classes of the Eyre Peninsula, for 2001. The land uses were obtained from fieldwork, and where polygons were inaccessible, image interpretation (Landsat 7 ETM+, 1:50000 mapping accuracy) was used. The land uses (lu_code) were collected in the Australian Land Use and Management (ALUM) classification (version 4). The digital cadastre database (scale:1:10 000-1:50 000, date: 01-01-1997) was entered with land use data that was obtained from field work and image interpretation. Features such as

lakes and rivers were obtained from SA land cover data (scale: 1:40 000, date: 01-01-1997), and overlaid onto the land uses. Vegetation polygons obtained from the SA land cover dataset and Far West Eyre Peninsula native vegetation cover (scale: 1:250 000, date: 01-01-1990) were overlaid onto land cover grids (scale: 100 000, date: 01-01-1995) and vegetation classes determined and added. Heritage Agreement Areas were next overlaid (scale: 1:40 000, date: 15-10-1999). The final dataset to be added was Collaborative Australian Protected Area Database (CAPAD) (scale: 1:50 000, date: 01-06-1999) data, to produced the final land use dataset. From field verification (16th July - 4th October 2001), for the 1001 sites randomly selected over the whole of the Eyre Peninsula, an average accuracy of 96% was obtained.

Land Use Generalised. This layer is a general parcel based land use based on the valuation information and the valuation parcel boundaries. The land use code from the valuation has been categorized into nineteen broad classes. This data set has been derived from the digital cadastre boundaries and therefore positional accuracy will vary with the accuracy of these boundaries.

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 ortho-rectified 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..

Hundreds. This layer is a cadastral division used for land parcel segregation. It is at a coarser scale than the land parcel database. One hundred can have many land parcels. It was intended that each division should contain approximately 100 square miles.

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.

Australian National Gravity Database 0.5 minute Onshore Gravity Grid July 2008. The 2008 gravity grid over Continental Australia is derived from onshore observations recorded at approximately 1.4 million gravity stations held in the Australian National Gravity Database (ANGD) by Geoscience Australia (GA). The onshore data were acquired by the Commonwealth, State and Territory Governments, the mining and exploration industry, universities and research organisations from the 1950s to the present day. Continental Australia has a basic station spacing coverage of 11 kilometres, with South Australia, Tasmania and part of New South Wales covered at a spacing of 7 kilometres. Victoria has station coverage of approximately 1.5 kilometres. Recent Federal, State and Territory Government initiatives have funded systematic infill at a grid station spacing of 2, 2.5 or 4 kilometres to provide improved coverage in areas of scientific or economic interest. Other areas of detailed coverage have been surveyed by private companies for exploration purposes. Over the continental region only open file data as held in the ANGD at May 2008 were used in the creation of the grid. The data values contained in the grid are spherical cap Bouguer gravity anomalies over Continental Australia. The onshore spherical cap Bouguer gravity anomalies were calculated using a density of 2.67 tm^{-3}. These data gridded using a variable density gridding technique provided by the INTREPID Geophysics software package. The data were gridded to a cell size of 0.5 minutes of arc = 0.00833333º (approximately 800m). Data accuracy has been measured at 5 μms^{-2}, maximum error 100 μms^{-2} onshore, with data precision at 1 μms^{-2}.

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:

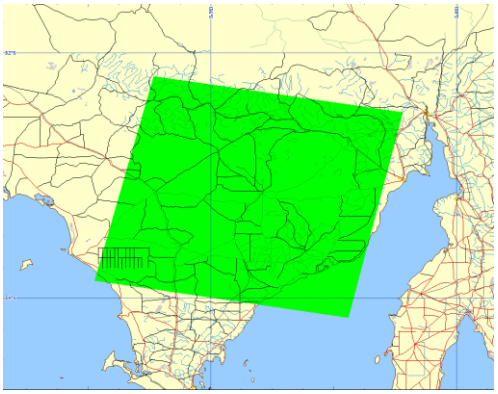
http://www.ga.gov.au/minerals/research/national/radiometric/

IMAGERY DATASETS

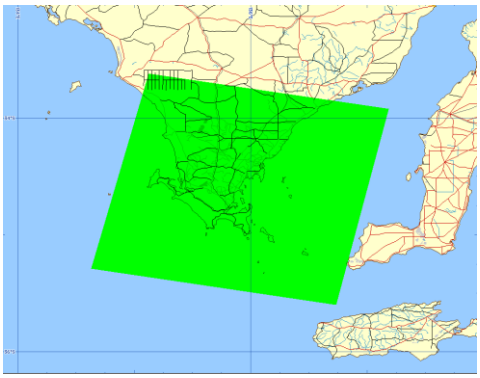
Landsat TM Imagery. The thematic mapper (TM) is an advanced, multispectral scanning, earth resources sensor designed to achieve higher image resolution, sharper spectral separation, improved geometric fidelity, and greater radiometric accuracy and resolution than that of the previous sensors. This sensor also images a swath that is 185 km (115 miles) wide, but each pixel in a TM scene represents a 30 m x 30 m ground area, except in the case of the far-infrared band 7, which uses a larger 120 m x 120 m pixel. Pass over by the sensor is every 16 days.

The TM sensor has seven bands that simultaneously record reflected or emitted radiation from the Earth's surface in the blue-green (band 1), green (band 2), red (band 3), near-infrared (band 4), mid-infrared (bands 5 and 7), and the far-infrared (band 6) portions of the electromagnetic spectrum. TM band 2 can detect green reflectance from healthy vegetation, and band 3 is designed for detecting chlorophyll absorption in vegetation. TM band 4 is ideal for near-infrared reflectance peaks in healthy green vegetation, and for detecting water-land interfaces. TM band 1 can penetrate water for bathymetric (water depth) mapping along coastal areas, and is useful for soil-vegetation differentiation, as well as distinguishing forest types. The two mid-infrared bands on TM are useful for vegetation and soil moisture studies, and discriminating between rock and mineral types. The far-infrared band on TM is designed to assist in thermal mapping, and for soil moisture and vegetation studies.

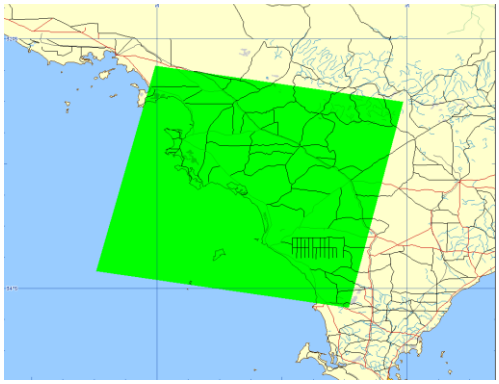
We have collected Landsat imagery for the Eyre Peninsula over the following areas (see below- green areas are Landsat coverage area) from August to October for the 1999-2009 growing seasons. The number of images collected within a year was depending on the degree cloud cover within the image.



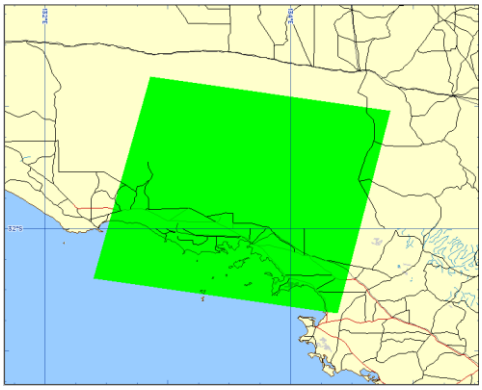
Cleve/Kimba



Port Lincoln/Tumby Bay

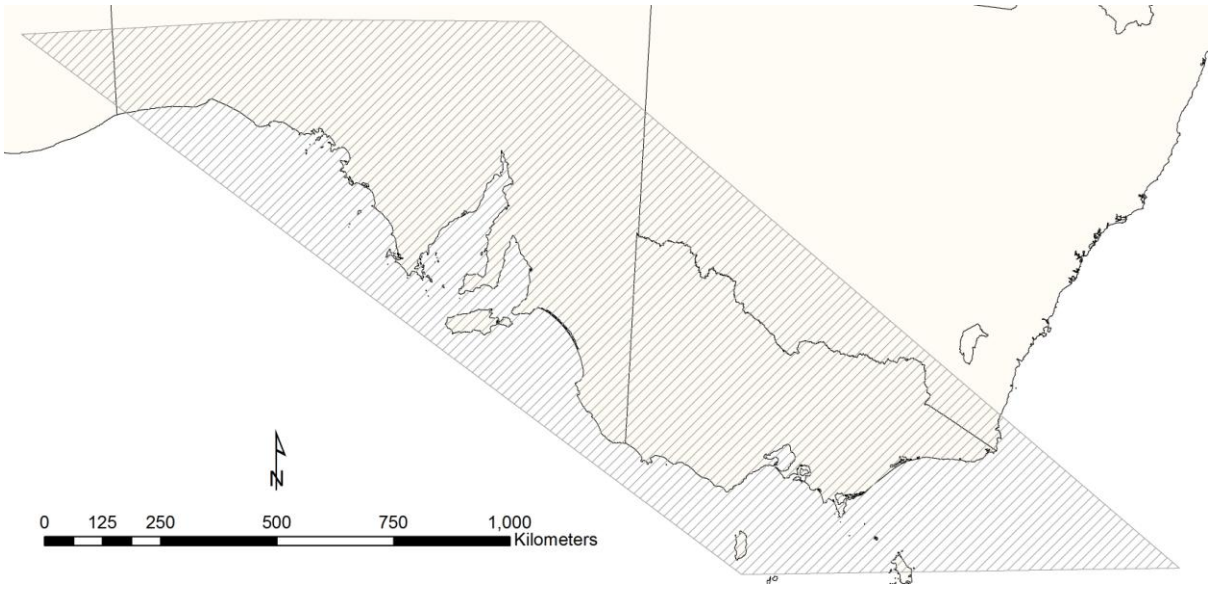


Streaky bay/Wudinna



Ceduna

MODIS Imagery. MODIS (or Moderate Resolution Imaging Spectroradiometer) is a key instrument aboard the Terra (EOS AM) and Aqua (EOS PM) satellites. Terra's orbit around the Earth is timed so that it passes from north to south across the equator in the morning, while Aqua passes south to north over the equator in the afternoon. Terra MODIS and Aqua MODIS are viewing the entire Earth's surface every 1 to 2 days, acquiring data in 36 spectral bands, or groups of wavelengths. These data will improve our understanding of global dynamics and processes occurring on the land, in the oceans, and in the lower atmosphere. MODIS is playing a vital role in the development of validated, global, interactive Earth system models able to predict global change accurately enough to assist policy makers in making sound decisions concerning the protection of our environment. This sensor also images a swath that is 2,330 km (cross track) by 10 km (along track at nadir). Spatial resolution is 250m (bands 1-2), 500m (bands 3-7) and 1000m (bands 8-36). We have collected 250 m resolution MODIS imagery in a 16 day composite form over 1,140 kilometres covering the Eyre Peninsula and SA agricultural area (see below- grey area is MODIS coverage area). This composite made up of 16 days of imagery ensures essentially cloud free datasets. Twenty four (24) images have been collected for each of the years from 2000-2009.



OTHER EYRE PENINSULA DATASETS

Airfields. Latitude and Longitude of Airfield locations in the EP region.

Bridges. Latitude and Longitude of Airfield locations in the EP region.

Towns. Latitude and longitude of EP towns**.**

Built up Areas. Boundaries of town areas within the EP region.

Rail yards. Latitude and Longitude of rail yards locations in the EP region.

Roads. Major and minor roads within the EP region. 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.

Roads – Unformed. Data layer includes surveyed road corridors which do not contain a navigable road or track. Can be used for analysis or mapping of road centrelines which form part of the cadastre but which are not constructed. Defined from the SA cadastral database.

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.