PAGE 0 METADATA FOR THE 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 AND 2001/02 LAND USE OF AUSTRALIA, VERSION 3

Data Set
Title
1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 Land Use of Australia, Version 3

Custodian
Bureau of Rural Sciences (BRS)

Jurisdiction
Australia

Description
Abstract
The 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 Land Use of Australia, Version 3, is a series of land use maps of Australia for the years 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02. The non-agricultural land uses are based on existing digital maps covering four themes: protected areas, topographic features, tenure and forest. Time series data at relatively high temporal resolution were available for the protected areas and forest themes. The agricultural land uses are based on the Australian Bureau of Statistics' agricultural censuses and surveys for the years mapped. The spatial distribution of agricultural land uses is interpretive and has been determined using Advanced Very High Resolution Radiometer (AVHRR) satellite imagery with ground control data. The maps are supplied as a set of ARC/INFO (Trademark) grids with geographical coordinates referred to GDA94 and 0.01 degree cell size. For each of the years mapped there is a set of probability maps, one for each agricultural land use and a single summary map showing the non-agricultural land uses and a likely arrangement of the agricultural land uses. The arrangement of agricultural land uses in the summary map was determined from the probability maps using some simple rules to make an approximation to a maximum likelihood land use map. As supplied, the probability maps are floating point grids with cell value between 0 and 1 and no value attribute table while the summary map is an integer grid with a value attribute table with attributes defining the agricultural commodity group, irrigation status and land use according to the Australian Land Use and Management Classification (ALUMC), Version 5 (http://www.daff.gov.au). Prospective users of the data should note the caveats and additional metadata, which are included in the document entitled 'User Guide and Caveats: 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 Land Use of Australia, Version 3' (BRS, 2006c). The caveats are also available as a separate document entitled 'Caveats: 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 Land Use of Australia, Version3' (BRS, 2006a).

Search Words
AGRICULTURE
AGRICULTURE Crops
AGRICULTURE Horticulture
AGRICULTURE Irrigation

BOUNDARIES
BOUNDARIES Administrative
BOUNDARIES Biophysical
BOUNDARIES Cultural
FLORA
FLORA Exotic
FLORA Native
FORESTS
FORESTS Agroforestry
FORESTS Natural
FORESTS Plantation
HUMAN ENVIRONMENT
LAND
LAND Conservation
LAND Conservation Reserve
LAND Cover
LAND Ownership
LAND Use
VEGETATION
VEGETATION Structural
WATER
WATER Lakes
WATER Surface
WATER Wetlands

North Bounding Latitude
-9.995

South Bounding Latitude
-44.005

East Bounding Longitude
154.005

West Bounding Longitude
112.505

Data Currency
Beginning Date
1992-04-01

Ending Date
2002-03-31

Data Set Status
Progress
Complete

Maintenance and Update Frequency
As required

Access
Stored Data Format
DIGITAL ARC/INFO 9.1 under SunOS

Available Format Type
DIGITAL - ARC/INFO raster

Access Constraint
Access is unrestricted. Users of the data set are asked to acknowledge, in any visual or published material, that it was derived and compiled by BRS and to make known to BRS any errors, omissions or suggestions for improvement.

Data quality
Lineage

I. For each year mapped, four thematic layers were constructed in raster form with 0.01 degree pixel size and overlain to determine the non-agricultural land uses and the distribution of agricultural land. The layers were a topographic features layer, a protected areas layer, a tenure layer and a forest type layer. They were based on a 1999 update of TOPO-250K (Series 1) and a 2005 update of TOPO-250K (Series 2), 1:250,000 scale vector topographic data sets published by Geoscience Australia (GA); the Collaborative Australian Protected Areas Database data sets for 1997, 2000 and 2002, 1:250,000 scale vector protected areas data sets published by the Department of Environment and Heritage (DEH); Australian Tenure, a 250m raster tenure data set compiled by BRS in 1997; agricultural land use status information for aboriginal freehold and leasehold land from state and territory agencies; the Kyoto Forest data sets for 1992, 1995, 1998, 2000 and 2002 - 25m raster data sets compiled by DEH; crown cover data from Vegetation: Present (1988) and Vegetation: Pre-European Settlement (1788) published by GA; land use data from the collaborative 'Land Use Mapping at Catchment Scale' project managed by BRS (BRS, 2002) and from the collaborative 'Land Use Data Integration Case Study - Lower Murray NAP Region' project managed by BRS and from the Agricultural Land Cover Change: 1995 Land Cover data set compiled by BRS; and plantation forest data from BRS's Plantations 2001 data set.

II. The spatial distribution of specific agricultural land uses for each of the six years was determined using SPREAD II, developed by Simon Barry of BRS. SPREAD II, like the SPREAD algorithm of Walker and Mallawaarachchi (1998), uses time series NDVI data with control sites (ground control data comprising records of the agricultural land uses that existed at specific points in specific years) to spatially disaggregate agricultural census or survey data. The SPREAD II methodology is statistically based, using a Bayesian technique - a Markov Chain Monte Carlo (MCMC) algorithm. It has been implemented in R. NDVI images were obtained from AVHRR data processed to correct for cloud cover by DEH. Control site data were collected by State and Territory agencies for the Audit (project BRR5) and relate to the years 1996, 1997 and 1998. The irrigation status of most control sites is known and the method was used to determine the distribution, not only of commodity groups, but also of their irrigation status. Agricultural census and survey data reported on Statistical Local Areas (SLAs) were obtained from the Australian Bureau of Statistics.

Modifications made to the agricultural census and survey data are the same as carried out during the construction of the 1996/97 Land Use of Australia, Version 2 (Stewart et al, 2001). The irrigation boundaries data set published by the Audit, the Australian Irrigation Areas, Version 1a, with some additional polygons incorporated for irrigation districts in Victoria, served as an irrigation constraint to refine the prior probabilities used in the MCMC algorithm. A horticulture mask constructed using some of the data sets listed in section I served as a horticulture constraint to refine the prior probabilities used in the MCMC algorithm. For each of the six years, SPREAD II generated outputs comprising the 42 probability maps described in the abstract and a summary agricultural land use map (the agricultural component of the summary map described in the abstract).

III. Land uses were assigned to pixels in the summary grids with the aid of a macro, which assigns land use categories from the Australian Land Use Management Classification Version 5 (search the website http://www.daff.gov.au/ for the term 'ALUMC') according to the attributes of the four layers overlaid in step I and of the summary agricultural land use map made in step II.

Positional Accuracy

The data type and stated positional accuracy of the major existing data sets used to determine the non-agricultural land uses and the distribution of agricultural land (as discussed in the lineage section) are as follows:

- CAPAD data sets - vector data, spatial errors are in the range 1m to 500m
- TOPO-250K - vector data, error less than 160m for at least 90% of well-defined points
- Australian Tenure - 250m raster data, spatial errors, in the main, do not exceed 125m
- Kyoto Forest data sets - 25m raster data, positional accuracy unknown but average errors assumed to be comparable in size to pixel size

The input NDVI imagery and the output probability and summary grids have 0.01 degree pixel size. Therefore, spatial errors, in the main, should not exceed 1 - 2 km.

Attribute Accuracy

Non-agricultural land uses were assigned, initially, on the basis of existing data sets showing topographic features, protected areas, tenure and forest type. Specific agricultural land uses were then assigned by automated interpretation of NDVI images. Accuracy of assignments based on existing data sets depends mainly on the attribute accuracy of the underlying data sets but also on the validity of the rules used for land use assignment. The attribute accuracy of the underlying data sets has not been tested except for the topographic features data set (TOPO-250K) for which the range of allowable attribute errors is from 0.5% to 5% at a 99% confidence level. However, the attribute accuracy of the other three underlying data sets is expected to be high, with consequent high accuracy in non-agricultural land use assignments. The accuracy of the specific agricultural land use allocations based on automated interpretation of NDVI images is variable. The probability grids give an indication of the accuracy of the agricultural land use allocations.

Logical Consistency
The attribute combination corresponding to each land use assignment in the summary grid was tested by inspection to verify that these automated assignments were as intended and were logically consistent.

Completeness
Coverage and classification are complete. Verification of spatial and attribute data are in progress.

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Additional Metadata
Bureau of Rural Sciences, 2002, 'Land use mapping at catchment scale: principles, procedures and definitions', Edition 2, Bureau of Rural Sciences, Canberra.

Bureau of Rural Sciences, 2006, 'Guidelines for land use mapping in Australia: principles, procedures and definitions', Edition 3, Bureau of Rural Sciences, Canberra.

Bureau of Rural Sciences, 2006a, 'Caveats: 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 land use of Australia, version 3', Bureau of Rural Sciences, Canberra.

Bureau of Rural Sciences, 2006b, 'Final report: 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 land use of Australia, version 3', Bureau of Rural Sciences, Canberra.

Bureau of Rural Sciences, 2006c, 'User guide and caveats: 1992/93, 1993/94, 1996/97, 1998/99, 2000/01 and 2001/02 land use of Australia, version 3', Bureau of Rural Sciences, Canberra.

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