ANZLIC Page 0 Metadata

Dataset

Title: Land Use in Queensland

Custodian: Queensland Department of Natural Resources and Mines (QDNRM)

Jurisdiction: Queensland

Description

Abstract: This dataset is a digital land use map of the state of Queensland. As nearly as possible it shows land use in 1999. The dataset is a product of the Queensland Land Use Mapping Program (QLUMP) and was produced by QDNRM. It is part of a national catchment scale land use mapping project coordinated by the Commonwealth Bureau of Rural Sciences (BRS) and being undertaken by QDNRM as well as government agencies in other states and territories. The dataset is a baseline (1999) land use map for the entire state and comprises one digital map in vector format at nominal scales of 1:50,000 and 1:100,000, dependent on intensity of land use in individual catchments. The map consists of a mosaic of 79 catchment-based land use datasets. Coordinates are geographic referred to the Geocentric Datum of Australia 1994 (GDA94) on the Geodetic Reference System 1980 (GRS80) ellipsoid. The map is a polygon coverage with each polygon having attributes describing land use. Land use is classified according to the Australian Land Use and Management Classification (ALUMC) Version 5, February 2002.

Search Words: Land Use
Land Use Classification
Land Use Mapping

Geographic Extent Name
GEN_CATEGORY:
GEN_CUSTODIAL_JURISDICTION:
GEN_NAME:

Geographic Bounding Box
North Bounding Latitude: -14.16
South Bounding Latitude: -29.18
East Bounding Longitude: 153.55
West Bounding Longitude: 143.96

Data Currency

Beginning Date: 1999-01-01

Ending Date: 2005-04-15

Dataset Status

Progress: Complete

Maintenance and Update Frequency: Not Known

Access

Stored Data Format: ESRI Geodatabase

Available Format Types: DIGITAL Web browser connection within QDNRM
DIGITAL Online connection within QDNRM available through ArcGIS
DIGITAL ESRI ArcGIS formats

Access Constraints: Restricted to all levels of government and community. Dataset is available for use by government agencies, community groups and individuals under a signed license agreement. Dataset will be available to registered users via web delivery tools, for example, through an access controlled internet site like the NAP RIS Portal.

Data Quality

Lineage:

Source Data
QDNRM - Landsat TM and ETM+ imagery (1999, 2000, 2001); Statewide Landcover and Tree Study (SLATS) baseline land cover (1999); Digital Cadastral Database (DCDB) (2001); Protected Areas of Queensland (Estates v8.1) (2002); State Forest and Timber Reserve Boundaries (2002); Plantations (1997); scanned and hardcopy aerial photography (1994 to 2002); Queensland Valuation and Sales Database (QVAS) (1999); Water Entitlement Registration Database (WERD) (2003);
QDPI (Queensland Fisheries Service) – Queensland Coastal Wetland Resources (2001).

All datasets were in digital format.

Data capture
A range of existing digital datasets containing land use information was collated from QDNRM, QDPI, EPA and other agencies spatial data inventory and prepared for use in a GIS using ARCInfo, ArcGIS and ERDAS Imagine software. Additional information and data from regional QDNRM and QDPI officers, other government departments and agencies, regional NRM and catchment groups, land owners and managers as well as field observations and checking was incorporated at various stages of the data processing sequence.

Processing steps
Datasets containing baseline land cover (supplied by SLATS), Protected Areas, State Forest and Timber Reserves, plantations, coastal wetlands, reserves (from DCDB) and logged forests were integrated in a spatial model to produce a preliminary land use raster image. The model incorporates a decision matrix

which assigns each pixel a specific land use class according to a set of pre-determined rules.

Individual catchments were clipped from the model output dataset and enhanced with additional land use information interpreted primarily from Landsat TM and ETM+ imagery as well as scanned and hardcopy aerial photography (where available). The DCDB and other datasets containing land use information were used to help identify property and land use type boundaries. Polygons were assigned to land use classes according to ALUMC. This process produced a draft land use raster image.

Verification of the draft land use dataset, particularly those with significant areas of intensive land uses, was undertaken by comparing mapped land use classes with observed land use classes in the field. However, this was not possible for all catchments. A laptop computer running ArcView GIS and Geographic Tracker loaded with the draft land use and Landsat TM images, DCDB, roads, towns, drainage and other relevant datasets connected to a GPS receiver provided accurate real-time navigation and mapping capability to facilitate checking and editing of the dataset. Additional edits and information acquired during the fieldwork program were incorporated post field trip and a final raster land use image prepared.

The final raster image was converted to a vector coverage and GIS editing (smoothing and elimination of small polygons) performed. The final dataset was checked to ensure compliance with BRS data quality specifications and where appropriate, validation was undertaken to assess thematic (attribute) accuracy. As with verification, validation was not undertaken for all catchments. Completed land use datasets for individual catchments were edge matched and joined to form a series of mosaics for the coastal, northern coastal, Queensland Murray-Darling Basin, western, Cape, Gulf and remainder of state regions. The mosaics were edge matched and joined in ArcGIS to form the state-wide dataset.

It is important to recognise that QLUMP has been undertaken on a catchment basis. The state-wide dataset was produced by progressively mosaicing 79 catchment-based land use datasets. Metadata containing specific information for individual catchments, including verification and validation data, is available for each dataset.

Positional Accuracy:

Land use polygons were captured using source datasets with a range of scales as well as on-screen hand digitising from Landsat TM and ETM+ imagery as well as aerial photography. The positional accuracy of source datasets was variable, ranging from approximately 25 metres for features derived from 1:50,000 scale datasets, to 50 metres for features derived from 1:100,000 scale datasets. Whilst aerial photography is more accurate than Landsat imagery in locating and mapping features, positional accuracy of land use datasets derived from these is limited to that of the imagery.

Hand digitising was undertaken to an error of approximately 0.25 to 0.4 mm (50 to 75 metres at nominal map scale). SLATS processed Landsat TM imagery has a maximum RMSE of 0.7 pixels (17.5 metres) and positional accuracy of two pixels (50 metres) or better. Where there were inconsistencies between polygon boundaries defined by source datasets (vector coverages) and imagery, they were adjusted to conform to the imagery as this was considered to have higher positional accuracy.

Polygons mapped in the field have a positional accuracy of 50 metres or better, limited primarily by the EPE of the GPS receiver (generally less than 10 metres) and accuracy with which their boundaries can be defined either on the ground (generally less than 10 metres) or on the imagery (generally less than 50 metres).

Attribute Accuracy:

Delineation of land use polygons was based on visual interpretation of multi-temporal Landsat imagery and aerial photography as well as ancillary data sets containing land use information, field observations and personal communication with regional QDNRM and QDPI staff, other government agencies, NRM groups, land owners and managers. Assignment of land use classes was based on ALUMC. Several classes were highlighted as being particularly susceptible to confusion and misclassification and issues arose which increased uncertainty in others.

Livestock grazing occurs on a range of pasture types including native and exotic as well as mixtures of both types. Identifying and separating these using imagery, aerial photography and field observation is difficult and unreliable. All grazing was therefore assigned to Grazing natural vegetation (2.1.0) irrespective of whether it was on native, introduced or modified pastures. Areas of pasture which appeared to be harvested for fodder or grazed off were mapped as Cropping (3.3.0). This may contribute to an over-estimation of cropping. Other areas mapped as grazing include road reserves, cleared and uncleared land adjacent to rivers and streams as well as land immediately adjacent to or between cropped paddocks. Other minimal use (1.3.0) and remnant native vegetation (1.3.3) may also be confused with this class. The appearance of these can be highly variable and classification may therefore not be consistent.

Rural residential (5.4.2) areas are a source of possible error. Properties on the fringes of suburban settlements, hobby farms and subdivisions in isolated localities with comparatively small lot sizes were mapped to this class. The use of QVAS (valuation information) was useful, based on whether or not the land owner was classified as a primary producer. This class may be misclassified with grazing (2.1.0) and remnant native cover (1.3.0), especially on larger properties.

The distinction between grazing (2.1) and production forestry (2.2) was not always evident and misclassification (underestimate of production forestry as primary land use) is likely. Similarly, the distinction between dryland and irrigated cropping and horticulture was not always clear. Irrigated modified pastures (4.2.0) was mapped opportunistically and there may be confusion with Remnant native cover (1.3.3) (no grazing), Irrigated cropping (4.3.0) and Dairy (5.2.1). Property boundaries were generally used to define the class Dairy (5.2.1) which may also include associated fodder crops. Most horticulture was mapped from QVAS, imagery and local knowledge and aerial photographs. Proximity to water sources was also used to confirm or infer irrigated cropping and horticulture.

Many water features (6.1.0, 6.2.0), whilst exceeding the minimum mappable area requirements, do not meet the criteria for linear or uniform features. The ephemeral nature of many of these can lead to confusion insofar as they may be present in imagery of one date and either absent or of differing extent in imagery of subsequent or previous dates. Rivers are mapped as River (6.3.0) up to the river mouth (end of catchment) and may (incorrectly) include small bays.

Wherever possible and practical, validation of individual catchment datasets was undertaken using a modified version of the methods described in *Land Use Mapping at Catchment Scale – Principles, Procedures and Definitions*, Edition 2, February 2002 (BRS). Refer to individual metadata for catchments for further information regarding validation.

Logical Consistency:
ARCInfo was used to perform topological consistency checks to detect errors in the spatial data structure of the final dataset. These confirmed that all polygons are closed, possess only one label and are topologically related; nodes are formed at the intersection of lines and there is no overshoot, undershoot, unintentionally crossed or duplicated lines. Individual catchment datasets were visually checked against the final raster image by overlaying and examining for consistency of alignment and presence of any extraneous polygons.

Completeness:

Completeness of coverage
All spatial and attribute data are complete for the entire dataset.

Completeness of classification
Land use features were captured from a wide range of source data. Mapping from satellite imagery was generally undertaken to the smallest discrete unit able to be visually interpreted using the visual cues of colour, texture and pattern (approximately 0.25 hectare). Features mapped in the field were generally larger than one hectare unless they were considered to be of mappable significance (for example, high impact intensive land uses). Land use information from ancillary datasets was captured at the scale of the source data. The resulting land use dataset therefore contains features at a range of scales and resolutions. To promote consistency in the way land use features are handled and represented, project guidelines specify minimum data resolution standards appropriate to various mapping scales. At a scale of 1:50,000 (1:100,000) the surface area of the smallest mapped feature is one (4) hectare and minimum width for linear features is 50 (100) metres. To achieve these standards the dataset was subjected to GIS editing in ARCInfo to smooth rasterised polygon boundaries (using GENERALIZE) and eliminate polygons smaller than the minimum mappable unit (using ELIMINATE).

Land use classes were assigned according to the Australian Land Use and Management Classification Version 5, February 2002 (Bureau of Rural Sciences, 2002).

Completeness of verification and validation
Verification and validation is incomplete. Wherever possible and practical, individual catchments were verified and validated.

Contact Information

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Metadata Date

Metadata Date: 2003-05-26

Additional Metadata

Refer to the contact position for additional information regarding source data. Further information relating to land use mapping can be found at http://www.nrm.qld.gov.au/science/lump/ and http://www.brs.gov.au/landuse/.