



Manaaki Whenua
Landcare Research

LCDB v4.1 - Land Cover Database version 4.1, Mainland New Zealand

Metadata

File Identifier

| 1d4c620d-c775-ae75-c6fe-2c7b860ec6ca

Language

Language Code

| eng

Character Set

Character Set Code

| utf8

Hierarchy Level

Scope Code

| dataset

Hierarchy Level Name

| dataset

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Date Stamp

Date

2015-07-15

Metadata Standard Name

ISO 19139 Geographic Information - Metadata - Implementation Specification

Metadata Standard Version

2007

Spatial Representation Info

Vector Spatial Representation

Topology Level Code

geometryOnly

Geometric Object Type Code

composite

Integer

488610

Reference System Info

Reference System

Reference System Identifier

Identifier

Code

EPSG:2193

Code Space

EPSG

Version

8.6.2

Identification Info

Data Identification

Citation

Citation

Title

LCDB41_Upload

Alternate Title

LCDB v4.1, LCDB4.1

Date

Date

Edition

Version 4.1

Edition Date

Date

2015-06-30

Cited Responsible Party

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Presentation Form

Presentation Form Code

mapDigital

Collective Title

New Zealand Land Cover Database version 4.1 (LCDB4.1)

Abstract

The New Zealand Land Cover Database (LCDB) is a multi-temporal, thematic classification of New Zealand's land cover. It contains 33 mainland classes (35 including the offshore Chatham Islands). The classification has evolved from version to version but backward compatibility has been maintained. Geographic features are described by a polygon boundary, a land cover code, and a land cover name at each of four nominal time steps; summer 1996/97, summer 2001/02, summer 2008/09, and summer 2012/13. The data set is designed to complement in theme, scale and accuracy, Land Information New Zealand's 1:50,000 topographic database. LCDB is suitable for use in national and regional state-of-environment monitoring, forest and shrubland inventory, biodiversity assessment, trend analysis and infrastructure planning. The classification used in LCDB v4.1 is presented in the document 'LCDBClassesAtVersion4.1.pdf' and a table correlating LCDB classes over all four LCDB versions is presented in the document 'LCDBClassCorrelations.pdf'. Both of these documents are available as an attachment to this dataset in the LRIS portal (<https://iris.scinfo.org.nz/>) and on the LCDB project site (www.lcdb.scinfo.org.nz). LCDB v4.1 was released in July 2015 and includes corrections to all time steps 1996/97, 2001/02, 2008/09 and 2012/13. A description of work undertaken for this release (including that in all earlier releases) is presented in the Lineage section. Of particular note at 4.1 is the re-mapping of Chatham Islands - first mapped at version 2, but then not continued through versions 3.0, 3.3, and 4.0 because of resource constraints. "EditAuthority" and "EditDate" are attributes, maintained since version 3.0 to indicate authorship and nominal date of polygon mapping, edit or change. The data is referenced to the New Zealand Transverse Mercator 2000 projection (NZTM2000) which uses the NZ Geodetic Datum 2000 (NZGD2000). Errors in the data due to misclassification (not changes since mapping) or poor delineation can be reported to Landcare Research for inclusion in the next release using the online feedback mechanisms in <https://iris.scinfo.org.nz/>.

Purpose

The New Zealand Land Cover Database (LCDB) is a multi-temporal, thematic classification of New Zealand's land cover. It contains 33 mainland classes (35 including the offshore Chatham Islands). The classification has evolved from version to version but backward compatibility has been maintained. Geographic features are described by a polygon boundary, a land cover code, and a land cover name at each of four nominal time steps; summer 1996/97, summer 2001/02, summer 2008/09, and summer 2012/13. The data set is designed to complement in theme, scale and accuracy, Land Information New Zealand's 1:50,000 topographic database. LCDB is suitable for use in national and regional state-of-environment monitoring, forest and shrubland inventory, biodiversity assessment, trend analysis and infrastructure planning.

Credit

Funding is from the Ministry of Business Innovation and Employment under contract CO9X1101, with both supplementary funding and imagery contributed by the Ministry for the Environment. The Department of Conservation, Ministry for the

Environment, Land Information New Zealand, regional councils, territorial authorities and other users have made significant in-kind contributions by providing related datasets, checking the draft mapping in their areas of interest and commenting on public releases.

Status

Progress Code

onGoing

Point Of Contact

Responsible Party

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Resource Maintenance

Maintenance Information

Maintenance And Update Frequency

Maintenance Frequency Code

irregular

Maintenance Note

Funding for the compilation of LCDB versions 3 and 4 was from the Ministry for

Science and Innovation under contract CO9X1101 whose term began in July 2011 and concluded on 30 June 2015. LCDB will continue in the custody of Landcare Research but maintenance and future updates are contingent upon new funding becoming available.

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Descriptive Keywords

Keywords

Keyword

New Zealand

Type

Keyword Type Code

place

Descriptive Keywords

Keywords

Keyword

Herbaceous Saline Vegetation

Keyword

Gravel and Rock

Keyword

Exotic Forest

Keyword

Permanent Snow and Ice

Keyword

Estuarine Open Water

Keyword

Fernland

Keyword

Depleted Grassland

Keyword

Tall Tussock Grassland

Keyword

High Producing Exotic Grassland

Keyword

Alpine Grass/Herbfield

Keyword

Built-up Area (settlement)

Keyword

Transport Infrastructure

Keyword

Sub Alpine Shrubland

Keyword

Sand and Gravel

Keyword

Broadleaved Indigenous Hardwoods

Keyword

| Herbaceous Freshwater Vegetation

Keyword

| Deciduous Hardwoods

Keyword

| Mangrove

Keyword

| Short-rotation Cropland

Keyword

| Forest - Harvested

Keyword

| Gorse and/or Broom

Keyword

| Surface Mines and Dumps

Keyword

| Lake or Pond

Keyword

| River

Keyword

| Matagouri or Grey Scrub

Keyword

| Low Producing Grassland

Keyword

| Orchard Vineyard & Other Perennial Crops

Keyword

| Mixed Exotic Shrubland

Keyword

| Landslide

Keyword

| Urban Parkland/Open Space

Keyword

| Indigenous Forest

Keyword

| Flaxland

Keyword

Manuka and/or Kanuka

Keyword

Dune Shrubland

Keyword

Peat Shrubland

Type

Keyword Type Code

stratum

Descriptive Keywords

Keywords

Keyword

1996, 2001, 2008, 2012, 1996/97, 2001/02, 2008/09, 2012/13

Type

Keyword Type Code

temporal

Descriptive Keywords

Keywords

Keyword

Vegetation, Wetland, Agriculture, Forest, Environment, Land Cover, Land Use

Type

Keyword Type Code

theme

Descriptive Keywords

Keywords

Keyword

Downloadable Data

Resource Constraints

Legal Constraints

Access Constraints

Restriction Code

intellectualPropertyRights

Use Constraints

Restriction Code

license

Other Constraints

The New Zealand Land Cover Database is managed by Landcare Research New Zealand Ltd on behalf of the New Zealand Government and is published for general use under a Creative Commons by Attribution 3.0 New Zealand licence (<https://creativecommons.org/licenses/by/3.0/nz/>)

Spatial Representation Type Code

vector

Representative Fraction

Denominator

Integer

25000

Representative Fraction

Denominator

Integer

5000000

Language

Language Code

eng

Character Set

Character Set Code

utf8

Topic Category Code

inlandWaters

Topic Category Code

environment

Topic Category Code

farming

Topic Category Code

biota

Topic Category Code

imageryBaseMapsEarthCover

Topic Category Code

planningCadastre

Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.3.1.4959

Extent

EX_Extent

Description

The data set has completeness of coverage for the New Zealand mainland and near-shore Islands and Chatham Islands for all time periods. The data set has completeness of classification. Classification schema has a nominal 1 ha Minimum Mapping Unit (MMU), The classification used in LCDB v4 is presented in the document 'LCDBClassesAtVersion4.1.pdf' available as an attachment to this dataset in the LRIS portal (www.lcdb.scinfo.org.nz/) and on the LCDB project site (www.lcdb.scinfo.org.nz). The data set has completeness of verification. Land cover classes at LCDB v2 utilised ground data to inform supervised and manual image classification and the draft classification underwent field verification (refer LCDB2 readme directory for description of field checking procedure). LCDB v3.0, v3.3, v4.0 and v4.1 utilised satellite imagery and aerial photography primarily, with field verification and error notification contributed for limited areas by stakeholders.

Geographic Element

EX _ Geographic Bounding Box

Extent Type Code

Boolean

false

166.262038179.501385-47.421639-34.008229

Geographic Element

EX _ Geographic Description

Extent Type Code

Boolean

true

Identifier

Code

NZ

Extent

EX _ Extent

Geographic Element

EX _ Geographic Bounding Box

Extent Type Code

Boolean

true

166.262038179.501385-47.421639-34.008229

The nominal minimum mapping unit for the data is 1 hectare and the imagery has been classified into 33 thematic classes on the New Zealand mainland with a further two classes created for mapping the Chatham Islands. The coastline used in LCDB versions 3 and 4 is that of the 1:50,000 NZTopo database from the Land Information New Zealand (LINZ), NZ Coastline and NZ Islands layers. These are licensed by LINZ as Creative Commons Attribution 3.0 New Zealand, and were sourced from the LINZ Data Service (<http://www.linz.govt.nz/data/linz-data-service>). An "Onshore" attribute is used to indicate where classes are mapped inside the Topo50 coastline (Onshore = 'yes') or outside the Topo50 coastline (Onshore = 'no') (the latter primarily involving; mangroves, herbaceous saline vegetation, and estuarine open water). An accuracy assessment on LCDB v4.0 mapping was undertaken in 2014 with results available as attachments to this dataset in the LRIS portal (<https://lris.scinfo.org.nz/>) and on the LCDB project site (www.lcdb.scinfo.org.nz). The data set has been captured and is stored in ESRI File GeoDatabase format (<http://www.digitalpreservation.gov/formats/fdd/fdd000294.shtml>). The data has been built for polygon topology and has been checked for duplication and anomalies within the data.

Distribution Info

Distribution

Distribution Format

Format

Name

Shapefile

Version

ArcGIS10.2

Specification

<http://www.digitalpreservation.gov/formats/fdd/fdd000294.shtml>

Transfer Options

Digital Transfer Options

Units Of Distribution

New Zealand, North Island, South Island, Chatham Islands, clip area

Transfer Size

Real

871.411

On Line

Online Resource

Linkage

URL

<https://iris.scinfo.org.nz/layer/48423-lcdb-v41-land-cover-database-version-41-mainland-new-zealand/>

Data Quality Info

DQ _ Data Quality

Scope

DQ _ Scope

Level

Scope Code

dataset

Level Description

Scope Description

Dataset

The LCDB is compiled using a combination of manual on-screen digitising and image classification informed by automated change detection based on spectral difference between images at successive dates. Mapping confidence has improved from version to version as imagery has improved, accessory datasets have assisted decision-making and errors have been corrected. An analysis undertaken at LCDB version 3.0 indicated overall map accuracy was better than 95% (<http://www.lcdb.scinfo.org.nz/about-lcdb/accuracy-assessment>).

Lineage

LI _ Lineage

Statement

LCDB v1 was created 'de novo' from classified SPOT satellite imagery with polygons either captured directly from the classified imagery or manually

digitised. The modest classification of 16 LCDB v1 classes were considerably expanded to 43 classes for LCDB v2 and polygon boundaries were significantly re-drawn by manual digitising over LandSat 7 and ETM+ satellite imagery. Mapping of the second (2001/02) time step was informed by a 'difference layer' created by comparison between 1996/97 and 2001/02 imagery and an extensive field checking phase sought to verify the mapping. LCDBs v3 and v4 consolidated and refined the mapping process by firstly rationalising the classification to 33 mainland classes (35 with Chatham Islands included), smoothing polygon boundaries to remove latent artifacts of the early raster mapping, and aligning the mapping with the standard topographic coastline. Improved imagery and image classification techniques, combined with resource limitations, prompted a decision to not undertake widespread field checking, but ancilliary data and stakeholder reviews were built into the mapping workflow. Change mapping remained a manual, on-screen, process but was assisted by improved imagery difference detection, a variety of supporting imagery (including aerial photography), and accessory datasets (such as New Zealand's Kyoto Land Use mapping). The minimum mapping unit for the data is nominally 1 hectare. Polygons from earlier versions less than 1/10 hectare were removed. LCDB v3.0 undertook a 'rubber-sheet' correction of a mis-aligned area of mapping in South Westland / northern Otago, and mapped a new time step corresponding to summer 2008/09 using SPOT 5 satellite imagery acquired between November 2006 and October 2008. Some cloud affected areas were in filled using Landsat or imagery from earlier dates. Satellite imagery was pan sharpened to 10m spatial resolution with terrain normalisation. Orthorectification was to the New Zealand Map Grid using photogrammetric software. Ground control points, used to position the imagery in the rectification process, were measured from aerial photography. Elevation models, used to correct distortion due to height, have 15m pixels and were generated from 20m contour data. Orthorectification met the target of 95% of the imagery being accurate within 5 metres r.m.s. error. Map updates were guided by an analysis of the new data identifying patches with spectral signatures inconsistent with the LCDB2 class. Operators then used visual interpretation and manual digitising techniques to re-map in the vicinity of identified inconsistencies. In addition to the new SPOT data, imagery from other dates before and after was viewed simultaneously to help make decisions on the correct class and what is likely happening on the ground. Higher resolution SPOT Maps data from 2008/09 was included in this image set. Harvested forest polygons at 2001 were reviewed and their new 2008 state entered and new forest harvesting at 2008 incorporated. Ancillary data such as digital topodata, aerial photography and published topomaps were used to assist in the interpretation of the imagery. Regional councils and the Department of Conservation reviewed the draft mapping and provided corrections for errors found in their areas of interest. An accuracy assessment on LCDB3.0 mapping was undertaken early in 2012 and results made available on the LRIS portal (<https://lris.scinfo.org.nz/>) and on the LCDB project site (www.lcdb.scinfo.org.nz). LCDB v3.3 is an improvement to LCDB3.0 as a result of five processes:

- A review of improbable land cover transitions, correcting those found in error
- A review of >20ha mapped land cover

transitions between 2001/02 and 2008/09, correcting those found in error (some of these records were exposed as original error rather than recent-date change) • Croplands and Settlements were reviewed and improved using recently updated Kyoto Land Use Mapping (refer <http://www.mfe.govt.nz/land/data-organisations/land-use-map#map>). • A review of South Island tussock and low producing grasslands to delineate those which have undergone recent improvement (commonly, but not always, associated with dairy conversion) • Correction of error (in classification or delineation) noticed in the vicinity of edits undertaken above and those notified by users LCDB v4.0 introduced a fourth time step, land cover corresponding nominally to summer 2012/13 using SPOT 5 satellite imagery acquired between October 2011 and February 2013. In addition to 2008-2012 change mapping, further improvements were made through five other processes: • Incorporation of high-quality wetland mapping of five Regions (Bay of Plenty, Taranaki, Manawatu-Wanganui, Wellington and Otago), and one District (Far North) • Mapping of detected change between 2008/09 and 2012/13 including that associated with harvesting/replanting of production forests • Correction of error (in classification or delineation) noticed in the vicinity of edits undertaken above and those notified by users • Incorporation of new urban development not detected by the change analysis above but recorded in the LINZ core record system (cadastral) database LCDB v4.1 is an improvement to LCDB v4.0 as a result of three processes: • Significant contradictions in woody land covers between LCDB v4.0 and 2012 Kyoto Land Use Mapping were investigated and, where necessary, corrections made - these mainly represented indigenous/exotic and forest/scrub confusions. • Unmapped woody vegetation patches in grassland polygons were detected by spectral methods verified with radar (ALOS PALSAR) analysis, and incorporated in a semi-automated process. • Error-correction arising from user feedback and limited 'green field mapping' improvements were made during and following the foregoing processes. The data set has been captured and is stored in digital ArcGIS file Geodatabase and ESRI Shapefile format with an internal database structure storing the attribute data. The data has been built for polygon topology and has been checked for duplication and anomalies within the data.

Metadata Constraints

Legal Constraints

Use Limitation

Attribution 3.0 New Zealand

Use Limitation

<http://creativecommons.org/licenses/by/3.0/nz/>

Use Constraints

Restriction Code

license

Metadata Maintenance

Maintenance Information

Maintenance And Update Frequency

Maintenance Frequency Code

asNeeded

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