



LCDB v5.0 - Land Cover Database version 5.0, Chatham Islands

Title

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Creator

Landcare Research New Zealand Ltd

Description

The New Zealand Land Cover Database (LCDB) is a multi-temporal, thematic classification of New Zealand's land cover. It identifies 33 mainland land cover classes (35 classes once the offshore Chatham Islands are included). The classification was revised between versions 1, 2, and 3 but has been consistent thereafter, and always with backward compatibility maintained. Land cover features are described by a polygon boundary, a land cover code, and a land cover name at each nominal time step; summer 1996/97, summer 2001/02, summer 2008/09, summer 2012/13, and summer 2018/19. The data set is designed to complement in theme, scale and accuracy, New Zealand's 1:50,000 topographic database (www.linz.govt.nz/land/maps/topographic-maps/topo50...). LCDB is suitable for use in national and regional environment monitoring, forest and shrubland inventory, biodiversity assessment, trend analysis and infrastructure planning. The classification used in LCDBv5.0 is presented in the document 'LCDBClassesAtVersion5.pdf' and a table correlating LCDB classes over all versions is presented in the document 'LCDBClassCorrelations.pdf'. Both of these are among the accessory documents to this dataset in the LRIS portal (Iris.scinfo.org.nz/). LCDB version 5.0 was released in January 2020 and includes corrections to all time steps 1997/97, 2001/02, 2008/09, 2012/13 and 2018/19 for both the New Zealand mainland and Chatham Islands. A description of work undertaken for this release (including that of all earlier releases) is presented in the Lineage section. Of particular note at version 5.0 is the addition to LCDB, of attributes designed to readily identify and monitor wetlands over time and a similar capability to manage significant coastal changes. "EditAuthority" and "EditDate" are attributes, maintained since version 3.0 to indicate authorship and nominal date of polygon mapping, edit or change. Errors in the data due to misclassification (rather than land cover change) or poor delineation can be reported to Landcare Research for inclusion in the next release using the online feedback facility in Iris.scinfo.org.nz/.

Source

LCDB v1 was created afresh 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 onward consolidated and refined the mapping process by 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. Polygons of less than 1/10 hectare from version 2 were found to be largely erroneous and/or misleading and were removed before LCDB v3.0 mapping. 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 image difference detection, a variety of supporting imagery (including aerial photography), and accessory datasets (such as New Zealand's LUCAS Land Use Map (LUM)). The minimum mapping unit for the data is nominally 1 hectare (although mapping regularly goes below this threshold to resolve significant features (e.g. wetlands) and to accommodate change (which frequently bisects polygons). 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 imagery, 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 LCDB v2 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 (www.lcdb.scinfo.org.nz/). LCDB v3.3 is an improvement to LCDB v3.0 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 LUCAS 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 LUCAS 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.

LCDB v5.0 introduced a fifth time step and improved upon LCDB v4.1 through eight processes:

- Correction of error (in classification or delineation) some notified by users, some logged post-LCDB v4.1 by Landcare Research and some observed during mapping by analysts. In particular, a significant area of Stewart Island from the head of Patterson Inlet, up the Ruggedy Flat and through to Mason Bay was remapped to correct earlier mapping.
- Mapping of detected change between 2012/13 and 2018/19 including hitherto undetected ponds, wetland loss, urban expansion, and change associated with harvesting/replanting of production forests
- A review of impossible and implausible land cover transitions, correcting those found in error
- Re-mapping of built-up areas in Canterbury to revert earthquake 'red-zone' areas, mostly to 'Urban Open Space', using Environment Canterbury data
- Improving identification and tracking of wetlands by creating a wetland identifier for every time-step and expanding its use to include all wetlands (but not open water) irrespective of whether it is implied by the class name or not.
- Installing a capacity to map and manage significant coastline change by, firstly incorporating a recent higher-fidelity coast from Topo50 ("NZ Coastlines and Islands Polygons (Topo 1:50k)" dataset, downloaded from LINZ on 16 April 2019) and then selecting and screening areas of significant difference (width > 50 m and area > 1 ha) to map 22 areas of verified change since the previously downloaded (May 2012) LINZ coastline used in earlier LCDB versions. This change, any future change, and any re-worked earlier change can now be mapped and managed by 'Onshore' indicators for every time-step in LCDB.
- Incorporation of high-quality wetland mapping of dispersed locations nationally arising from an MfE-contracted review of wetland loss and, a comprehensive set of high-fidelity wetland polygons created from reference to Environment Waikato data.
- Application of MfE's irrigation layer (<https://data.mfe.govt.nz/layer/90838-irrigated-land-area-2017/>) to identify areas of low producing, depleted, and tussock grassland that should be mapped as high producing exotic

grassland. 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, slivers, gaps, overlaps and other anomalies.

Coverage

-44.4349891916 -176.893681497 -43.5625596642 -176.154251452

Identifier

<https://iris.scinfo.org.nz/layer/104442/>

Language

eng

Subject

farming

Subject

biota

Subject

environment

Subject

planningCadastre

Subject

imageryBaseMapsEarthCover

Subject

inlandWaters