Product data description

AS/NZS ISO 19131:2008 compliant

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Vicmap™ Vegetation

Vicmap

VICTORIA State Government | Environment, Land, Water and Planning

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Overview

Vicmap™

Vicmap™ is the foundation that underlies most spatial information in Victoria. This portfolio of spatial related authoritative data products, made up from individual datasets, is developed and managed by the Department of Environment, Land, Water & Planning. The information provides the foundation to Victoria's primary mapping and spatial information systems, and is for building business information and systems.
Vicmap is a registered trademark of the Victorian Government and is synonymous with authoritative statewide mapping since 1975.

The Vicmap portfolio includes:

Vicmap Address
Vicmap Admin
Vicmap Crown Land Tenure
Vicmap Elevation
Vicmap Features of Interest
Vicmap Hydro
Vicmap Imagery
Vicmap Lite
Vicmap Planning
Vicmap Position
Vicmap Property
Vicmap Topographic Mapping
Vicmap Transport
Vicmap Vegetation

Vicmap data is supported by a collection of Reference Tables, Vicmap Reference Tables. A reference table may list the full name, description and other attributes associated with a feature code or identifier.

Further information can be found at www.delwp.vic.gov.au/vicmap

Data product specification title

Vicmap™ Vegetation

Responsible party

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Terms and definitions

For the purpose of this document, the following terms and definitions apply.

Term	Definition
ANZLIC ID	A unique identifier enabling metadata records to be discovered and differentiated within a structured data library.
Attribute	A characteristic of a feature that may occur as a type or an instance.
Chain	A line composed of a sequence of non-intersecting line segments bounded by nodes. Chains reference the polygons to the left and right of the chain.
Custodian	An organization responsible for ensuring the accuracy, currency, distribution of their data and the terms and conditions of access and use.
Data type	Specification of a value domain with operations allowed on values in this domain Refer to AS/NZS ISO 19103
Dataset	Identifiable collection of data. Maybe as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map maybe considered a dataset. Refer to AS/NZS ISO 19115
Dataset series	Collection of datasets sharing the same product specification, also known as a product.
Domain	A well-defined set both necessary and sufficient, as everything that satisfies the definition in the set and everything that does not satisfy the definition is necessarily outside the set. Refer to ISO/TS 19103
the Department	Meaning the Department of Environment, Land, Water & Planning (DELWP).
Entity	A unit of data that can be classified and have stated relationship with other entities.
Feature	An abstraction of real-world phenomena. A feature may occur as a type or an instance. Feature type or instance shall be used when only one is meant. The feature structure of the feature based data model can be summarised as: feature instance = [spatial object + attribute object]
Metadata	Metadata is 'data about data' and provides a synopsis about the data lineage, accuracy and details about access permissions. Refer to ISO 19115 Geographic information — Metadata
Parent metadata record	Parent metadata records act as a cover note for a product that contains a dataset series for search, discovery & delivery purposes.
Persistent Feature Identifier (PFI)	The unique code provide at creation of the feature which remains until the feature is retired.
Product	Dataset or dataset series that conforms to a data product specification.
Quality	Totality of characteristics of a product that bear on its ability to satisfy stated and implied needs. Refer to: ISO 19113 Geographic information — Quality principles ISO 19114 Geographic information — Quality evaluation procedures
the State	Victoria
Unique Feature identifier (UFI)	Each feature is uniquely identified and renewed with each change.

Acronyms

For the purpose of this document, the following acronyms may apply.

Acronym	Definition
CFA	Country Fire Authority
DALA	DELWP Data Access License Agreement
DELWP	Department of Environment, Land, Water & Planning
DSV	Data Search Victoria
FIB	Forest Industry Brigade
NES	Notification for Editing Service
RMSE	Root-Mean-Square Error
SDM	Spatial DataMart
SPOT	Satellite Pour l'Observation de la Terre (French)
VGDD	Victorian Government Data Directory

Informal description of the data product

Vicmap Vegetation contains topologically structured digital datasets (tree density and plantations) depicting areas of tree or woody cover across the State of Victoria.
Vicmap Vegetation assists users in emergency, environmental management and map production. Key users are utilities, environmental managers, local government, cartographers and emergency services organisations.
Product updates are made available weekly through the Vicmap maintenance lifecycle. The data is sourced from authoritative Custodians yearly via the *DELWP Custodianship Program*.

Specification scope

Level
Dataset series.

Extent & Coverage
Tree density
Tree density data within Vicmap Vegetation covers Victoria and extends to a limited extent into New South Wales and South Australia.

Plantation
The Plantations data within Vicmap Vegetation covers the State of Victoria.

Data product identification

Title
Vicmap™ Vegetation

Alternative title
Vicmap Vegetation: Tree density
Vicmap Vegetation: Plantation

Abstract

Vicmap Vegetation consists of two feature-type datasets:

Tree Density: Consists of information showing the presence of forest/tree cover. The forest cover is divided into three distinct classes: dense, medium and scattered, showing the spatial separation of woody vegetation.

Plantations: Consists of information showing the extent of softwood and hardwood plantings. Most of this information is supplied through a cooperative data sharing agreement between DELWP, CFA and the plantation managers or owners who are registered as a Forest Industry Brigade. Small plantation estates which fall under the Forest Industry Brigade threshold will be progressively added over time.

Purpose

Tree Density: To supply information where woody vegetation exists across the state and to give an indication of the separation between patches.

Plantation: Its primary purpose is to map hardwood and softwood plantations within the landscape for bushfire and emergency mapping applications.

Topic Category
Biota.

Data content and structure

Data content

Vicmap Vegetation is a feature-based product consisting of polygons. The dataset series that comprise Vicmap Vegetation are listed in Table 1 below:

ANZLIC ID	Dataset name	Description	Feature type
ANZVI0803002618*	VICMAP_VEGETATION	Parent metadata record	N/A
ANZVI0803004754	VMVEG_PLANTATION	Restricted dataset of hard wood and softwood plantation cover	Polygon
ANZVI0803003127	VMVEG_TREE_DENSITY	Vegetation features represented by polygons, including tree density (presence/absence)	Polygon

Table 1: Vicmap Vegetation metadata & data.

**Parent metadata record for ANZVI0803004754 & ANZVI0803003127. Parent metadata records act as a cover note for a product that contains a dataset series for search, discovery & delivery purposes. Refer to the data model in Appendix A.*

Vicmap Tree Density *(VMVEG_TREE_DENSITY)* consists of polygons features representing woody vegetation which includes:

- Feature Type: Tree Density:
- Dense
- Medium
- Sparse

Vicmap Plantations *(VMVEG_PLANTATION)* consists of polygon features representing plantations, which includes:

- Feature Type: Agriculture area
- Feature Subtype: Plantation
- Plantation Type: Hardwood, Softwood & Unknown

A plantation type may be unknown if the type of plantation is unknown or the area is in fallow and the plantation type that will be planted is unknown or cannot be assumed.

Only planted or to be planted areas are mapped. Linear plantings including wind breaks and screen plantings, failed plantings, ornamental plantings, remnant vegetation and non-productive areas such as clearings, roads, water bodies, grasslands, pasture land and rocky outcrops are normally not included in this dataset.

Data model

Refer to Appendix A for the data and object models.

The majority of Vicmap product data models are published on the department's website www.delwp.vic.gov.au/vicmap.

Data dictionary

See Appendix B.

Data structure

The structure includes:

- Topologically structured (vertical topology) with other Vicmap products
- Seamless statewide data
- Conforms to national data models(i.e. ICSM)
- Additional information about features contained in attribute tables (i.e. data quality, feature type).

Rules and/or characteristics that apply to all Vicmap data:

- A Persistent Feature Identifier (PFI) is generated once for each feature at the point of creation and remains constant until a feature is retired. A PFI is unique cannot be reused within a dataset. However, you may have the same PFI number in different datasets but does not relate to the same feature entity.
- The Unique Feature Identifier (UFI) is generated for each feature at the point of creation and changes with each modification or version. This allows users to track the changes made to a feature over time.

Reference systems

Vicmap is mapped to the Geocentric Datum of Australia (GDA) and the Australian Height Datum (AHD). Data is held in geographic latitude and longitude computed in terms of the GDA at 01 January 1994 (GDA94).
The temporal reference system for Vicmap is the Gregorian calendar.

Data quality

Accuracy

The spatial accuracy of data is where possible better than 1:25,000 and retains vertical topology with other Vicmap products.
The following procedures are undertaken as normal update/maintenance routines, to ensure conformity of the data to specification:

- Customised menus for data editing which provide on the fly logical consistency attribute checking as data is edited
- Automated data QA processes to validate topological integrity, completeness and logical consistency
- Automated data loading routines, reflecting business rules for data population, to ensure data accuracy
- Independent review of data upon loading including aspatial attributes, spatial extents and successful data load
- Validation of accepted types according to approved reference tables
- Validation of entity PFI/UFI tags for uniqueness.

Approximately 5% of all maintenance advice notices processed are separately audited by Information Services Division to confirm accuracy, completeness and correctness in the capture process.

The horizontal spatial accuracy is dependent upon the theme:

- *Tree Density:* Primary input was derived from SPOT Panchromatic satellite imagery which has a pixel resolution of 10m. The spatially accuracy of this input was 1.5 RMSE.
- *Plantation:* Primary source of input is from the custodian of the original data source, with the positional accuracy unknown. The mapping of plantations is as provided by the data provider and is usually not spatially edited. Checks against high resolution aerial photography indicate the spatial accuracy is high and is within 20m.

Feature and attribute accuracy (Thematic accuracy)

Tree Density
The three density classes are derived by automated grid cell processing, thereby ensuring consistency. The attribute accuracy of the density classes is solely dependent on the accuracy of the SPOT Panchromatic/Monochratic image classifications. The tree cover classifications of the SPOT imagery have, in general, overestimated the occurrence of trees. Although spatially very accurate, the classifications need to be "cleaned" by a process of visual interpretation and manual editing. The "Feature_Reliability_Code" polygon attribute has been added as an indicator of the classification accuracy. This indicates to the user how much field verification has been undertaken on the original tree cover classification. The feature_reliability_code contains three values of verified, unverified and unknown.

- Verified means it has been independently checked and the feature exists
- Unverified no checking has taken place and
- Unknown, no record has been supplied regarding its verification.

Plantation
While auditing of Plantation attributes against the custodial source establishes a high level of confidence in the data, there is no audit of the data against the corresponding real-world features, as this is seen as the responsibility of the relevant custodians.

Logical consistency

Logical consistency is a measure of the degree to which data complies with the technical specification.

Tree Density
The test procedures are a mixture of software scripts and on-screen, visual checks. All polygons are automatically generated in a raster to vector conversion. All polygons are closed and labelled consistently. All relationships between attributes are logical.

Plantation
The test procedures are a mixture of software scripts and on-screen, visual checks.
All polygons are closed and labelled consistently. All relationships between attributes are logical.

Data capture

Vicmap relies on the agreements and MoU's signed with authoritative Custodians, through the *DELWP Custodianship Program*, for its data.

The Department may also use imagery to improve the completeness of a dataset in absence of an authoritative Custodian.

Examples of Custodians and/or those that may supplement or verified data are listed below:

- Federal, State and Local Government
- Government agencies and authorities (e.g. Parks Victoria, Melbourne Water, VicRoads)
- Registrar of Geographic Names – Department of Environment, Land, Water, and Planning
- Crown Land Management – Department of Environment, Land, Water, and Planning
- Fire Management - Department of Environment, Land, Water, and Planning
- Emergency & Essential Services, and
- Utility companies.

Tree Density
All content is derived from DELWP satellite imagery including cross border data.

Plantations
The majority of the content is sourced from large plantation owners or managers who currently have a FIB under a cooperative arrangement data sharing agreement with DELWP and the CFA. Plantations which have not been sourced from the plantation owners or /managers are obtained via the standard Vicmap edit/update procedures.

History

Tree Density
The creation of the forest density layer was a two-step process. First the mapping of woody vegetation, using satellite imagery. The second the creation of the three density types. A summary of the processing steps are provided below:

- Woody or tree cover extent detail was compiled using SPOT Panchromatic satellite imagery. An automatic classification method was used to derive the extent of vegetation followed by manual editing to remove any large errors. The manual editing was required due to the limits of the spectral discrimination the SPOT Panchromatic was able to achieve to woody vegetation from the surrounding features.

- The presence/absence of the tree cover (Woody vegetation greater than two metres in height and with a crown cover (foliar density) greater than 10 percent) was grouped into the three density classes of dense, medium and sparse. This was achieved by an automatic proximity cell based procedure. The grouping of the tree cover was used to simplify the representation of trees when converting the raster presence/absence data to a polygon/vector bases data. It is also an effective means of showing scattered woody vegetation.
- Control for the satellite imagery was created by using Vicmap Transport as ground control points. A 2D polynomial model was then used to register the imagery.
- The currency of the data is based upon the date of the satellite imagery used. The collection period is from March 1993 up to October 2001. Due to the capture method a single polygon of tree cover could have multiple dates. It is for this reason that each polygon is attributed with the begin and end date of the satellite image used. E.g. If a single image is used to derive a tree density polygon, both the upper and lower dates would be the same. If more than one image was used the earliest and latest date would be indicated.

Plantations
Due to the varying sources of information the input data has been generalised to the common standard in regard to the attribution to create the plantation type. However the spatial boundaries have not been changed from the original source. This may result in overlap of separate plantation extents.

Data maintenance

Vicmap Vegetation: Tree Density is a static dataset.
Vicmap Vegetation: Plantations can change under one of the following three terms:

- *Vicmap maintenance* - The incorporation of new data to an existing dataset via an M1, M2 or scheduled Custodial supply. No changes are made to the data or object model, therefore does not require change management processes. Additions can be seen in the weekly Vicmap update.
- *Vicmap Improvements* – Changing existing data, example the moving of a feature or adding of attributes. Typically carried out as part of a project through the provision of new Custodial data requiring change management.
- *Vicmap upgrades* – Significant changes to a dataset that may see existing data over a large area replaced and/or may require the data model changed. Change management processes are applied.

DELWP obtains updates to data from authoritative Custodians at various intervals based on the agreed Custodianship arrangements (i.e. quarterly, yearly and ad hoc). Updates are incorporated into Vicmap daily and made available weekly: noting that Vicmap data is never deleted, only retired and archived for legal purposes. Data is date stamped to reflect the last time the record was verified.
Reported errors or omissions are verified with the authoritative source before a change is made. Most notifications regarding anomalies are received via the Notification for Editing Service (NES) and once verified will be incorporated into Vicmap. Feedback from users and stakeholders, including emergency services dispatch providers, ensures that the highest standards are maintained.
Approximately 5% of all maintenance advice notices processed are separately audited by DELWP to confirm accuracy, completeness and correctness in the capture process.

Vicmap data undergoes the following standard procedures to ensure conformity of the products specification:

- Customised menus for data editing which provide on the fly logical consistency attribute checking as data is edited
- Automated data quality assurance processes to validate topological integrity, completeness and logical consistency
- Automated data loading routines, reflecting business rules for data population, to ensure data accuracy
- Independent review of data upon loading including aspatial attributes, spatial extents and successful data load
- Validation of accepted types according to approved reference tables (Appendix C), and
- Validation of entity PFI/UFI tags for uniqueness.

Data made available to Vicmap under Cross Border agreements is subject to the maintenance regime of the relevant jurisdiction and is not subject to the same maintenance regime of the Vicmap datasets. Cross border data made available in Vicmap is not updated regularly.

Vicmap maintenance and update frequency

Currently there is no ongoing program to maintain the Tree Density across the state. The majority of maintenance will be based upon the notification and consequent editing of errors.

Major updates to the Plantation data will occur annually based upon information received from the main custodian of the input data. Minor updates may occur throughout the year on an irregular basis. These updates are based upon notification of errors or to add small areas which have not been included from the major input sources.

Data product delivery

Access & licensing

Data available under the DataVic policy www.data.vic.gov.au

Vicmap Vegetation: Tree Density is freely available through the Victorian Government Data Directory (VGDD) at www.data.vic.gov.au under a Creative Commons Attribution 3.0 Australia license.

The Victorian Government Data Directory also provides details such as:

- Timetable for release
- Usage and availability restrictions
- License restrictions and conditions
- Access constraints
- Exclusion of liability
- Supply and media formats
- Projections.

Vicmap Vegetation: Plantation is only available under a DELWP's Data Access License Agreement (DALA). A DELWP DALA outlines the rights and restrictions in relation to the use of the Vicmap Vegetation Plantation dataset. In general, a DELWP DALA allows licensees to use the data for personal use or within their own business but does not permit the data to be commercialised or on-sold. To organise a DELWP DALA and order the data please send a request to data.vsdl@delwp.vic.gov.au

Cross boarder data is restricted to internal and emergency services use and therefore not available through the VGDD.

Vicmap is also available through a network of Data Service Providers listed at:
www.delwp.vic.gov.au/vicmapdsp

Selected Vicmap Products can be bought online through DELWP web located at:
www.delwp.vic.gov.au/vicmapdata

Historical versions of Vicmap data is only available under special and exceptional circumstances, such as a legal proceeding, and may incur an administration fee.

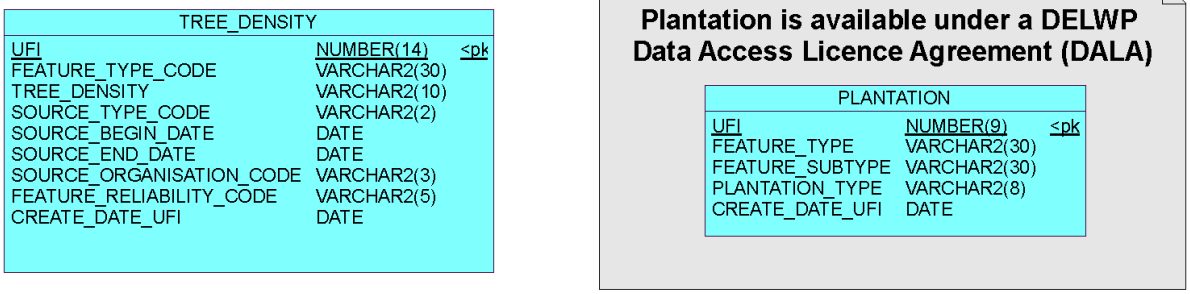
Metadata

The metadata, abstract, and preview for the datasets within Vicmap products can be viewed at DataSearch Victoria (DSV) located at www.delwp.vic.gov.au/datasearch by searching for the ANZLIC ID.

Appendix A: Data & object model

Vicmap data models can be located at [www.delwp.vic.gov.au/vicmap.](http://www.delwp.vic.gov.au/vicmap)

Vicmap Vegetation
Version 4.1
14 May, 2015



Relationships to Reference Tables (codelists) include:

TREE_DENSITY
TREE_DENSITY ---> VMREFTAB.VG_TREE_DENSITY.TREE_DENSITY
Valid values are:
+ SCATTERED
+ MEDIUM
+ DENSE
SOURCE_TYPE_CODE ---> VMREFTAB.RS_SOURCE_TYPE.SOURCE_TYPE_CODE
SOURCE_ORGANISATION_CODE ---> VMREFTAB.RS_ORGANISATION.ORGANISATION_CODE
FEATURE_RELIABILITY_CODE ---> VMREFTAB.RS_FEATURE_RELIABILITY.FEATURE_RELIABILITY_CODE

PLANTATION
PLANTATION_TYPE --> VMREFTAB.VG_PLANTATION_TYPE.

Appendix B: Data dictionary

Vicmap Vegetation: Tree Density Attribute	Definition	Field type/size	Explanation
UFI	Unique Feature Identifier	NUMBER(14)	This unique identifier facilitates reporting quality or enhancement issues. A new UFI will be generated each time the data is reloaded by the maintainer even if the polygon spatial or aspatial attributes have not changed.
FEATURE_TYPE_CODE	Feature Type	VARCHAR2(30)	Type of Feature Valid value in this table is: Forest
TREE_DENSITY	Tree Density	VARCHAR2(10)	Tree cover density See reference table: VMREFTAB.VG_TREE_DENSITY
SOURCE_TYPE_CODE	Source code	VARCHAR2(2)	Data source of the mapping of tree cover See Reference Table: VMREFTAB.RS_SOURCE_TYPE
SOURCE_BEGIN_DATE	Begin Date	DATE	The earliest date at which the data was sourced
SOURCE_END_DATE	End Data	DATE	The latest date at which the data was sourced
SOURCE_ORGANISAT-ION_CODE	Organisation Code	VARCHAR2(2)	Name of organisation that supplied the source data VMREFTAB.RS_ORGANISATION
FEATURE_RELIABILITY_CODE	Reliability Code	VARCHAR2(5)	The reliability of the mapped feature. See Reference Table: VMREFTAB.RS_FEATURE_RELIABILITY
CREATE_DATE_UFI	UFI created.	DATE	Data UFI was created.

Vicmap Vegetation: Plantations Attribute	Definition	Field type/size	Explanation
UFI	Unique Feature Identifier (UFI)	NUMBER(9)	This unique identifier facilitates reporting quality or enhancement issues.
FEATURE_TYPE	Feature Type	VARCHAR2(30)	As defined by VMREFTAB.FT_FEATURE_TYPE Valid value in this table is: Agricultural Area
FEATURE_SUBTYPE	Feature Subtype	VARCHAR2(30)	Valid value in this table is: Plantation
PLANTATION_TYPE	Plantation Type	VARCHAR2(8)	As defined by VMREFTAB.VG_PLANTATION_TYPE Valid values are: • SOFTWOOD • HARDWOOD • UNKNOWN
CREATE_DATE_UFI	Unique Feature Identifier (UFI) creation date	DATE	Data UFI was created.

Appendix C: Reference tables

Theme: Tree Density

VMREFTAB.VG_TREE_DENSITY

Density	Description
Dense	Dense Tree cover
Medium	Medium density tree cover
Scattered	Scattered tree cover

VMREFTAB.RS_SOURCE_TYPE

Source_Type_Code	Description
10	Satellite
11	Aerial Photography

VMREFTAB.RS_ORGANISATION

Source_Organisation_code	Description
10	DSE
11	DPI

VMREFTAB.RS_Feature_Reliability_Code

Feature_reliability_code	Description
Ver	Verified
Unver	Unverified
Unkwn	Unknown

Theme: Plantations

VMREFTAB.FT_FEATURE TYPE

Feature Type Code	Description
Agricultural Area	Agriculture area.

VMREFTAB.VG_PLANTATION_TYPE

Plantation Type Code	Plantation_type
SW	SOFTWOOD
HW	HARDWOOD
UNK	UNKNOWN

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