National Vegetation Information System

Australian Vegetation Attribute Manual

Version 6.0

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Executive Steering Committee for Australian Vegetation Information

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Helping Communities Helping Australia

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Please see Appendix E for list of acknowledgements for all versions.

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Overview

Section One introduces the document and provides background to the National Vegetation Information System. The section also describes the scope of this Manual and introduces the NVIS Framework, part of which is presently being implemented and described in this Manual. Some important recent developments are also described.

Section Two describes the key concepts and procedures that are required to implement the NVIS Framework. It explains the requirements for and the relationships between vegetation structural and floristic attributes and the application of the NVIS Information Hierarchy. The hierarchy provides one way to aggregate and summarise the detailed data recorded in the lower tables of the database. This section also outlines the importance of understanding the need for documentation of the accuracy and reliability of the data and information entered into the database. Not all data entered into the database are of equal importance. To denote this, the attributes are categorised into those that are mandatory, essential, recommended, optional, etc. Some of the key NVIS-wide tables are too large to put in this section and are therefore placed in Section 3 (e.g. Growth Form) or the Appendices (e.g. Glossary).

Section Three presents a detailed explanation of each attribute, including its purpose, a description and an example of how the attribute should be interpreted. Some attributes have pre-defined pick lists (i.e. lookup tables) of allowable values or codes, whilst others are designed for numeric or free text content. The primary purpose of this section is to enable the analyst in determining how to translate and compile each attribute in the NVIS Framework. The section relies heavily on the concepts and tables in Section 2.

Section Four describes the progress towards the implementation of rules to improve the consistency and integrity of the NVIS database. These include rules to generate the simpler levels of the NVIS Information Hierarchy from data entered at a more-detailed level.

The Appendices have additional documents supporting the application of the NVIS Attributes.

SECTION ONE: Introduction

Background

The National Vegetation Information System (NVIS) was developed to underpin the National Land and Water Resources Audit (NLWRA) assessment of vegetation in Australia (NLWRA, 2001). The development and maintenance of NVIS is a collaborative program between Australia's Commonwealth, States and Territory governments. The NVIS framework is managed by the Executive Steering Committee for Australian Vegetation Information (ESCAVI), which comprises senior representatives from each of the above jurisdictions. The National Forest Inventory has an observer on ESCAVI.

There is a separate but complementary national forests database, the National Forest Inventory, which is primarily a data resource for reporting on productivity and sustainability matters in forests. The NFI is broadly consistent with the NVIS, although some of the data and classification attributes on which it is based differ to those used for NVIS. Coordination mechanisms have been established at the technical and governance levels between NVIS and the NFI to work towards greater consistency between these two information systems.

The guiding principles of the NVIS partnership and framework (NLWRA, 2001) are:

- Resolving data and information differences across administrative and program boundaries to provide comparable and consistent data Australia wide;
- Collaborative work of mutual benefit;
- Recognising regional level environmental differences;
- Flexible and extendable;
- Fully documented quality and application of the component data sets;
- Delivering Information to meet current needs, foreshadowing and anticipating long-term needs;
- Improving the knowledge and information base of Australia's vegetation (pre-European and present) and addressing data gaps;
- Ensuring use is commensurate with data;
- Providing information and assessments to support vegetation and other natural resource decision making;
- Improving data access and dissemination;
- Recognising the jurisdictional role in meeting specific vegetation information requirements, management responsibilities and obligations.

The main products of the NVIS partnership and framework, to date, have included:

- A vegetation attribute framework for NVIS that includes nationally consistent data attributes and standards (NLWRA, 2000a – an earlier version of this document);
- A database of existing mapped present and pre-clearing (pre-European) vegetation data where available (Thackway et al, 2001). Data compiled into the NVIS (2000) dataset included both native (grasslands, rangelands, shrubs, mangroves, riverine, woodland and forests) and some exotics (pastures and weeds), as well as vegetation structure (height and cover), and floristic composition;

- Descriptions of the above source datasets as per ANZLIC metadata standards (Page 0) and agreed Page 1 attributes;
- A report identifying existing digital vegetation data nationally; gaps in digital vegetation data nationally; recommendations of priority for filling vegetation gaps nationally; and a list of programs/activities underway to fill vegetation data gaps;
- Final products to underpin the native vegetation assessment (NLWRA, 2001) and for making widely available through the Audit distribution channels, viz:
    - The Australian Natural Resources Atlas (http://audit.ea.gov.au/ANRA/atlas_home.cfm); and
    - The Natural Resources data Library (http://adl.brs.gov.au/ADLsearch/).

The NVIS Framework

The NVIS Framework has been developed as a collaborative process between the Commonwealth, States and Territories. The Australian Vegetation Attributes are a key component of the Framework. Version 5.0 (NLWRA, 2000a) was used to compile the NVIS (2000) dataset from Australia's States and Territories (Thackway, et al, 2001).

The Australian Vegetation Attributes are envisaged to be one of several sets of attributes to be developed as part of the NVIS Framework (Fig. 1). This Manual covers the main attributes to describe vegetation types (Boxes 4 and 5) and to document and manage the input datasets from the States and Territories (Box 2). Metadata attributes (Box 10) are both an input and an output of the NVIS Framework. The reader is referred to ANZLIC (1996) as a minimum standard for documentation of spatial data.

Metadata attributes are also listed and defined in a wider, practical context in the Audit's Information Management Manual (NLWRA, 1999), which specifies data management and compilation standards (Box 1). The Audit's Manual covers data quality, availability of framework data sets, data licensing and the required standards for text, tabular, database and spatial products.

This Manual also covers taxonomic attributes to support NVIS (Box 7) and checking rules (Box 6) to ensure the consistency and quality of the vegetation descriptions and detailed vegetation data; however, a comprehensive treatment of attribute compilation rules is beyond the scope of this Manual. A project is currently under development to review site attributes in the vegetation chapter (Walker & Hopkins, 1990) of the "yellow book" (Box 8). Vegetation condition attributes (Box 9) may be developed in the future, if requested by ESCAVI.

Derived products (Box 11) are not part of the main NVIS database, but should comply with standards outlined in Box 1. In response to the requirements of users, NVIS data are typically combined with external knowledge and/or datasets to analyse vegetation information. Major Vegetation Groups and the analyses of fragmentation are examples of derived products in the Australian Native Vegetation Assessment 2001 (NLWRA, 2001).

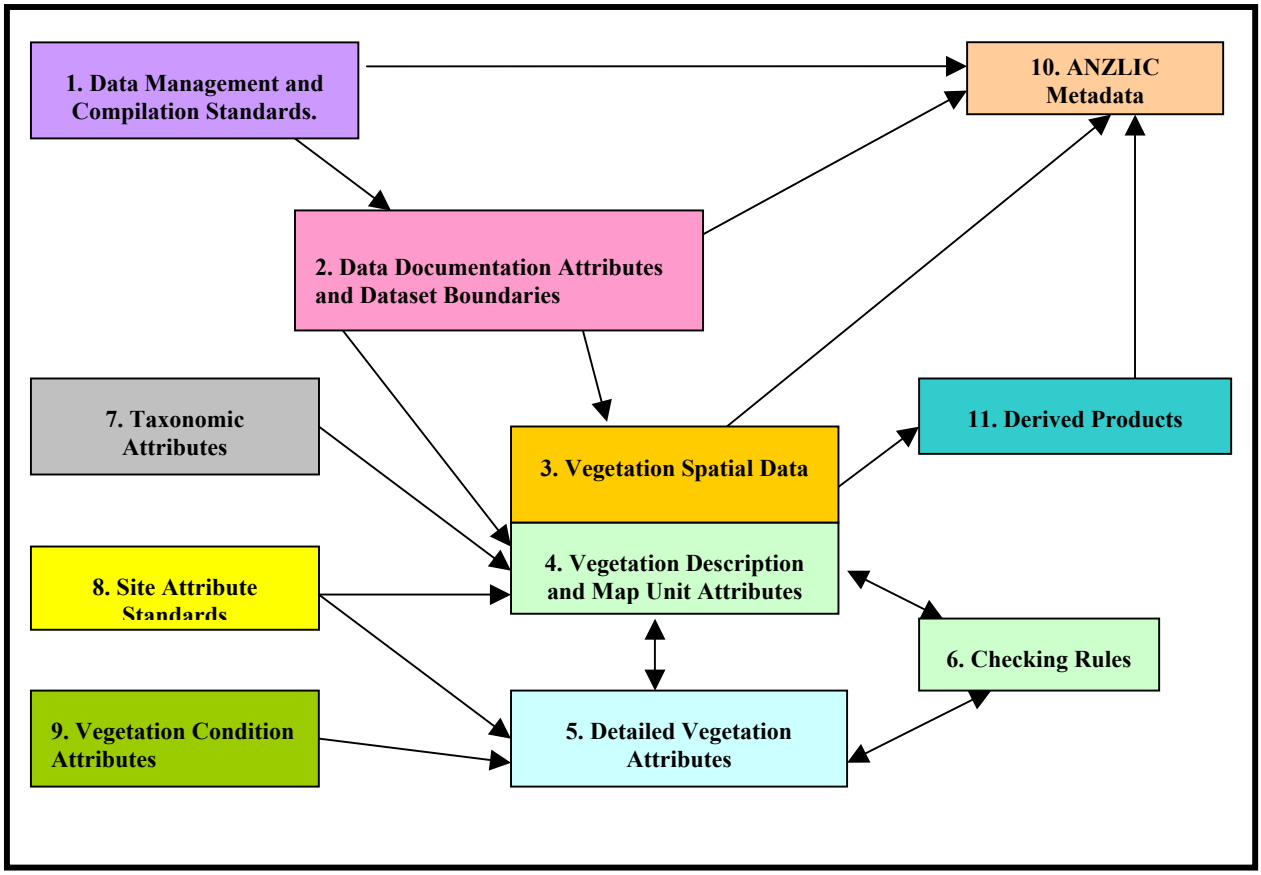


Figure 1: National Vegetation Information System Framework. Boxes 2 to 7 are the subject of this manual; their colours are consistent with Figure 4 and Appendix C. The arrows are indicative of the main links between components. In general, the input standards are on the left of the diagram, the main components of NVIS are in the centre and output products are on the right of the diagram

Scope of this Manual

In general, the Australian Vegetation Attributes Manual is a guide to the capture, interpretation and management of existing and new vegetation information into a Relational Database Management System. Its primary purpose is to link the vegetation descriptions to map units (map legend information) in a Geographic Information System (GIS). The Manual provides nationally agreed guidelines for translating and compiling mapped vegetation datasets into the NVIS database through describing the NVIS attribute framework and links to the NVIS database.

This document is not intended to be a guide for the collection of vegetation data in the field. Whilst the attributes are heavily based on those designed for site surveys of vegetation, the reader is referred to Walker and Hopkins (1990) for guidance on specific attributes to collect at sites in the field. Gunn et al (1988) and Margules & Austin (1991) give useful methodological guidelines for vegetation survey and mapping. This Manual is about how to translate, compile and manage the complex results of such surveys as an adjunct to GIS queries and displays.

The analysis of vegetation information is beyond the scope of this publication. However, the information products listed in the Background, above, give the reader an idea of the actual and potential benefits of the NVIS Framework.

The NVIS Database

The NVIS Database V2.0 (NLWRA, 2000b & c) was developed to operationalise Version 5.0 of this Manual and to assist the data custodians to translate and compile existing State and Territory vegetation data sets into the NVIS Framework. The structure of this Manual (i.e. version 6.0) reflects the current structure of the NVIS database (Fig. 4 and Appendix C).

An XML transfer protocol, based on the Australian Vegetation Attributes Manual Version 6.0, is being developed to assist with checking, compiling and transferring datasets from the respective State and Territory databases, that are implementing the NVIS framework (see Section 4).

Recent Developments

The Audit (NLWRA) was instrumental in ensuring that the progress with the vegetation theme was continued. In April 2001, a Memorandum of Understanding was signed between Environment Australia (EA) and Agriculture, Fisheries and Forestry Australia (AFFA) for the ongoing development of NVIS. This included the maintenance of the Stage One NVIS database by EA and the funding of Stage Two activities by the Bureau of Rural Sciences.

Since the NVIS (2000) dataset was compiled, several national workshops have been held to further plan and develop the NVIS framework, to restructure and improve the quality of the Stage One database and to implement the distributed maintenance of NVIS data. In particular, this Manual reflects the agreed restructuring to improve efficiency and consistency of the NVIS database. Version 6.0 of the Australian Vegetation Attribute Manual represents the consolidation of changes and refinements made since June 2000 by the NVIS collaborators. These included vegetation stakeholder feedback workshops in each State and Territory in 2001, national NVIS workshops in March 2002, November 2002 and mini-workshops in December 2001 and July 2002. The participants involved in developing the vegetation attributes are provided in Appendix E.

This Manual describes the NVIS vegetation attributes, from the highest level of Dataset Information through to the species and growth forms recorded in each (sub-)stratum* at NVIS level VI (Sub-Association level). Standard concepts and procedures are outlined in Section 2. Vegetation attributes are defined and described in Section 3.

The development of the vegetation attributes for the NVIS is a dynamic process that is responsive to improvements resulting from testing and trialling their application. Therefore it anticipated that this Manual would be further updated to document future refinements. See Appendix F for a history of the NVIS Versions V1.0 – V6.0 and Appendix G for a summary of changes to NVIS attributes from V5.0 – V6.0.

* = The notation (sub-)stratum should be read as sub-stratum and/or stratum, which are the names of the standard layers at Levels VI and V, respectively.

SECTION TWO: The NVIS Framework – Concepts and Standard Procedures

The NVIS Framework provides a comprehensive means of describing and representing vegetation types, based on establishing relationships between structural and floristic information in a Relational Database Management System. Figure 2 shows two example vegetation profile diagrams showing sub-strata. One (or more) site descriptions may be interpreted to become a unique vegetation description at NVIS Level VI. Figure 3 shows a summary of cover classes in each stratum.

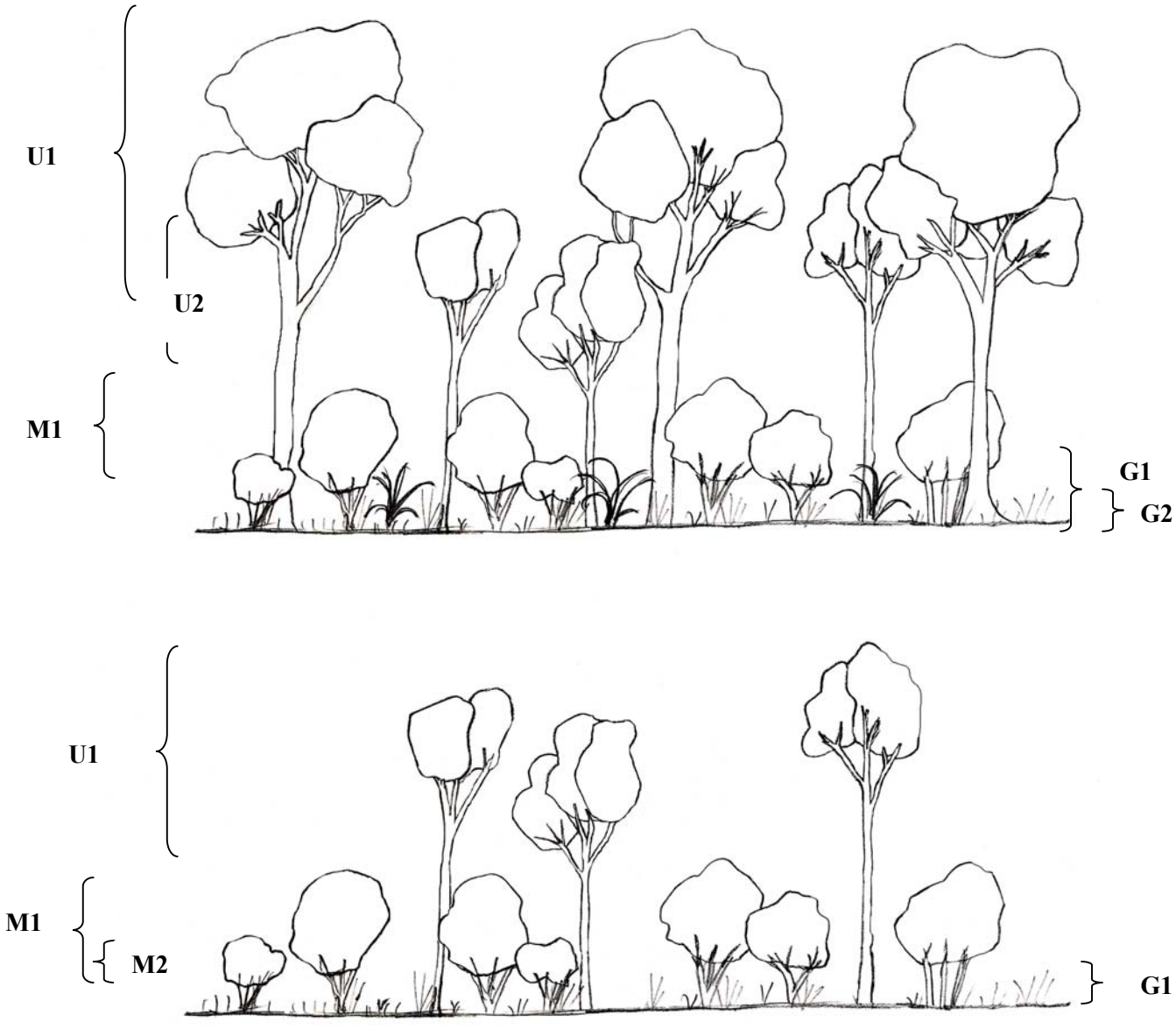


Figure 2: Vegetation profiles for two different vegetation types, showing the flexibility in assignment of sub-strata (U1, U2, etc.- see Table 2). These become key inputs for NVIS Descriptions at Level VI. For interpreting the vegetation at NVIS Level V, only the strata U, M and G are recognised.

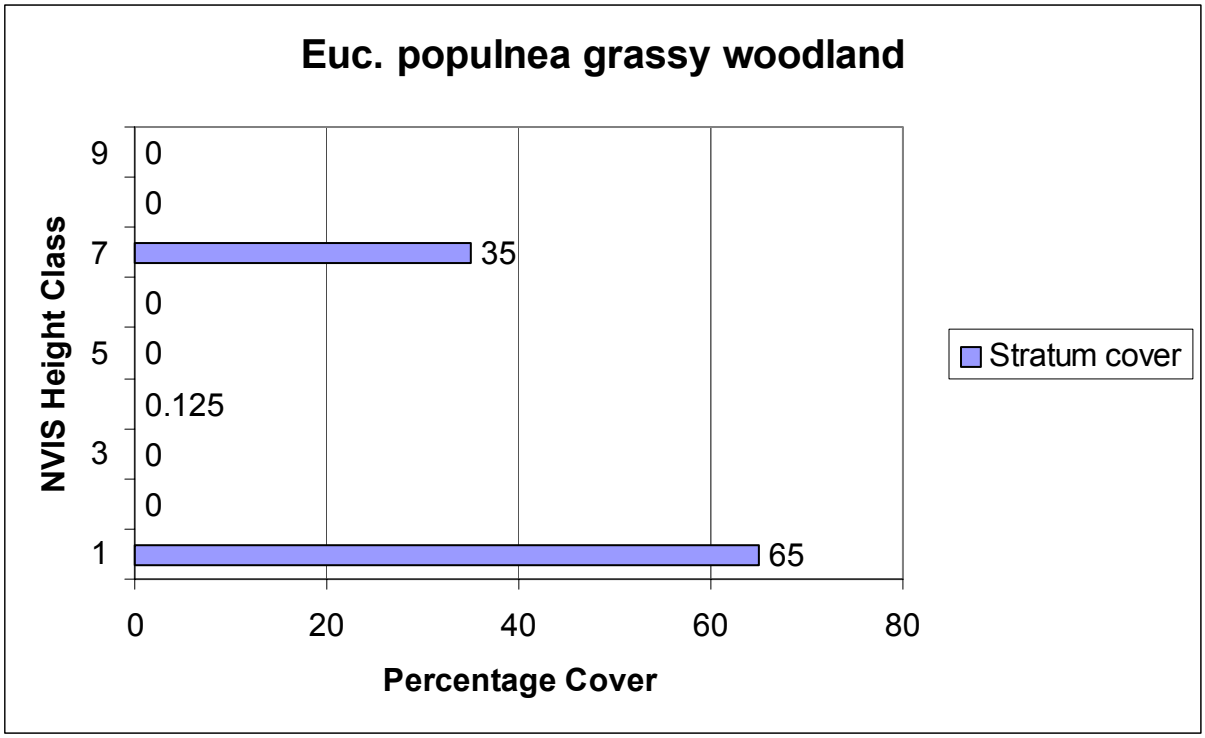


Figure 3: Graphical summary of cover values for an example NVIS Description at Level V. Stratum U (height class 7) has a cover code mid-point of 35%; stratum M (height class 4) has a cover code mid point of 0.125% and Stratum G (height class 1) has a cover code mid-point of 65%. (The NVIS Level V description of this community is: U+ ^Eucalyptus populnea/^tree/7/i;M ^Eremophila mitchellii,Geijera parviflora/^shrub/4/bi;G ^Aristida ramosa,Dichanthium sericeum,Themeda triandra/^tussock grass,forb/1/c*).*

Provided all attributes are consistently compiled at a "complex" level, summary data products can be derived using rule sets plus expert input. Current progress with the development of rule sets is documented in Section 4 of this Manual.

The following sub-sections describe the attributes and their relationships and how they are managed within the NVIS Framework. Details of each attribute are presented in Section 3. Appendix A is a glossary of key terms and definitions, which underpin the NVIS Framework.

One approach to summarising vegetation descriptions is to create a hierarchy of information. The following text describes the NVIS Information Hierarchy. Additional levels and/or hierarchies can be incorporated to meet specialist needs, such as forestry, by modifying the attributes included at each level and by modifying the rule sets used to generate successively coarser levels.

The NVIS Information Hierarchy

The NVIS Information Hierarchy is based on six levels as shown in Table 1. The purposes of the Information Hierarchy are:

- To define and therefore standardise the structural and floristic information needed within the different levels of the Information Hierarchy;

- To provide a framework for quality control and assurance of vegetation description information; and
- To provide a framework for generating outputs (eg. map products) at the various levels.

Table 1: The NVIS Information Hierarchy. The Levels below the dark line are the "complex" levels recommended for data compilation.

Hierarchical Level	Description	NVIS structural/floristic components required
I	**Class***	Dominant growth form for the ecologically or structurally dominant stratum
II	**Structural Formation***	Dominant growth form, cover and height for the ecologically or structurally dominant stratum.
III	**Broad Floristic Formation****	Dominant growth form, cover, height and dominant land cover genus for the upper most or the ecologically or structurally dominant stratum.
IV	**Sub-Formation****	Dominant growth form, cover, height and dominant genus for each of the three traditional strata. (i.e. Upper, Mid and Ground)
V	**Association****	Dominant growth form, height, cover and species (3 species) for the three traditional strata. (i.e. Upper, Mid and Ground)
VI	**Sub-Association****	Dominant growth form, height, cover and species (5 species) for all layers/sub-strata.

* Walker & Hopkins 1990
** NVIS (defined for the NVIS Information Hierarchy)

The threshold for input of vegetation description data into NVIS is Level V (the *Association*). At this level, the 3 traditional strata (Walker & Hopkins, 1990), as represented in Figures 2 and 3, are recognised where appropriate. (Not all plant communities have 3 strata.) For each stratum, the characteristic height and cover are recorded; also, up to 3 growth forms and up to 3 species can be used to describe the vegetation type at Level V.

The preferred level for input is Level VI (the Sub-Association). At this level, up to 8 sub-strata or layers are recognised (Table 2), with characteristic height and cover recorded for each sub-stratum; also, up to 5 growth forms and up to 5 species can be used to describe the vegetation type at Level VI.

While the NVIS Information Hierarchy can be used to translate and compile datasets that were collected at coarser levels than level V, this approach is not recommended. This is because the accurate and reliable use of rule sets that underpin the NVIS Information Hierarchy, require mandatory and essential attribute data (see Table 7) at Level V or VI, before these data can be aggregated to a higher level. Datasets not meeting the NVIS threshold will thus be of limited usefulness in the development of products. A detailed example of the information contained at each level of the NVIS hierarchy is given in Table 6.

The NVIS Information Hierarchy is based firstly on structural information and secondly on dominant genus and growth form collected at the sub-stratum level describing Level VI (*Sub-Association* level). This is illustrated in the examples shown for Levels V and VI (*Association* and *Sub-Association*) in Table 6.

Some benefits of the NVIS Information Hierarchy are as follows.

- The input of vegetation description data at the "complex" levels (Levels V or VI) enables the automatic generation of simpler levels, thus maintaining consistency in the database as well as reducing workloads;
- The Level V (*Association*) retains sufficient data to allow useful comparison with the Level VI (*Sub-Association*). This will be important where a jurisdiction can only enter data at level V.
- Growth form information is retained in the middle levels of the hierarchy. One of the reasons for including growth form data is that it is often easier to recognise in the field.
- Standardised descriptions provide the basis for comparing vegetation types between datasets with disparate mapping methods and hence identifying equivalent vegetation types.

Structural Information

(Sub-)Strata, Stratum Dominance and Growth Forms

The stratum codes in Table 2 show the relationship between the NVIS (sub-)stratum codes, traditional names (Walker & Hopkins, 1990) and the growth forms within each (sub-)stratum. The definitions for growth forms are in GROWTH_FORM_CODE in the Growth Form table (see Section 3). The maximum number of sub-strata within level VI (*Sub-Association*) is eight. The stratum code can be selected from the list in Table 2. When describing the stratum at level IV (the *Sub-Formation*) and level V, the data codes U, M and G are obtained from U1, M1 and G1 respectively.

The dominant (sub-)stratum is estimated by the interpreter across the vegetation type as the (sub-)stratum with the most biomass, relative to other (sub-)strata. This used to provide a summary of the vegetation description at the simpler levels (Levels I to III) in the NVIS Information Hierarchy (Table 1). For data entered at level VI, the sub-stratum that is dominant over all other sub-strata in the vegetation type is indicated with a plus "+" symbol. For data entered at level V, the stratum that is dominant over all other strata in the vegetation type is indicated with a plus "+" symbol. For data entered at level V or VI, the "+" notation is carried through to level IV. The record in the detailed vegetation data corresponding to the dominant (sub-)stratum has the Boolean attribute DOMINANT_STRATUM_FLAG set to "Y" (for Yes) or "T" (for True).

For further details, see the examples in Table 6, the Vegetation Description attributes: L6_SUB-ASSOCIATION, L5_ASSOCIATION and L4_SUB-FORMATION and the Stratum attribute: DOMINANT_STRATUM_FLAG in Section 3.

Table 2. NVIS (sub-)stratum codes and descriptions. Height classes and growth forms in brackets are currently allowed by the rules (see Section 4), but are not recommended.

NVIS Stratum Code	NVIS Sub-stratum Code	Description	Traditional Stratum Name	Growth Forms*	Height Classes*	Not allowed*
U	U1	Tallest tree sub-stratum. For forests and woodlands this will generally be the dominant stratum. For a continuum (eg. no distinct or discernible layering in the vegetation) the tallest stratum becomes the defining sub-stratum.	Upper, tree Overstorey/Canopy (If only one tree layer occurs it is coded U1)	Trees, tree mallees, palms, vines (mallee shrubs) Also: epiphytes, lichens	8,7,6 (5)	Grasses & shrubs, low mallee shrubs
	U2	Sub-canopy layer, second tree layer				
	U3	Sub-canopy layer, third tree layer				
M	M1	Tallest shrub layer.	Mid, shrub (if only one mid layer occurs it is coded M1)	Shrubs, low trees, mallee shrubs, vines, (low shrubs, tall grasses, tall forbs, tall sedges) grass-trees, tree-ferns, cycads, palms. Also: epiphytes, lichens	(6) 5,4,3	Mid and low grasses, sedges, rushes & forbs. Mid & tall trees/ palms.
	M2	Next shrub layer.				
	M3	Third shrub layer				
G	G1	Tallest ground species	Lower, ground (if only one ground layer occurs it is coded G1)	Grasses, forbs, sedges, rushes, vines, lichens, epiphytes, low shrubs, ferns, bryophytes, cycads, grass-trees, aquatics, seagrasses.	(4,3) 2,1	Trees, tree-mallees, palms.
	G2	Ground				

* See Table 3 and Section 4 for further details.

Growth Forms and Heights

The NVIS framework compiles a maximum of number of 8 height classes that are linked to growth forms. Growth form codes used in the NVIS are described in the GROWTH_FORM: GROWTH_FORM_CODE attribute. Height classes are used to describe the sub-strata of vegetation found at the vegetation *Sub-Association* level. The height refers to the 'top height' of the stratum. Height classes used in the NVIS are described in the HEIGHT_CLASS attribute in the Stratum table.

The height classes are assigned to 5 sets of growth forms, as per the columns in Table 3. Woody plants are divided into three classes on the basis of whether they are single-stemmed (trees etc.) or multi-stemmed (shrubs, mallees). The lower-storey growth forms are divided into terrestrial higher plant forms: grasses, grass-like growth forms and forbs and lower-plant and/or aquatic forms. Vines and palms are assigned to particular growth form categories for the assignment of height classes, according to further properties specific to each vegetation description.

Table 3: Height classes defined for the NVIS. The word in the body of the table is used to "qualify" the structural formation.

Height		***Growth Form***				
Height Class	**Height Range (m)**	tree, vine (M & U), palm (single-stemmed)	shrub, heath shrub, chenopod shrub, ferns, samphire shrub, cycad, tree-fern, grass-tree, palm (multi-stemmed)	tree mallee, mallee shrub	tussock grass, hummock grass, other grass, sedge, rush, forbs, vine (G)	bryophyte, lichen, seagrass, aquatic
8	**>30**	tall	NA	NA	NA	NA
7	**10-30**	mid	NA	tall	NA	NA
6	**<10**	low	NA	mid	NA	NA
5	**<3**	NA	NA	low	NA	NA
4	**>2**	NA	tall	NA	tall	NA
3	**1-2**	NA	mid	NA	tall	NA
2	**0.5-1**	NA	low	NA	mid	tall
1	**<0.5**	NA	low	NA	low	low

Source: (Based on Walker & Hopkins 1990).

Where vegetation forms structurally complex vertical layers up to 8 classes can be used (see Table 2) e.g. vegetation in a riparian zone may comprise several upper tree layers, several mid layers of trees and shrubs and a number of ground layers. Where the vegetation is relatively simple e.g. savannah grassland, there are often only two strata comprising trees (e.g. height class 7) and grasses (e.g. height class 4).

Stratum Cover and Dominance

The remaining structural attributes needed to describe vegetation structure are cover and an indication of (sub-)stratum dominance. Cover is estimated for each (sub-)stratum and recorded in the Stratum Table. Further details of the cover of each growth form and species can be recorded in separate tables – see later sections.

Cover is an essential attribute (Table 7) in the description of a vegetation type. Cover can be assigned to the stratum (e.g. Fig. 3) and/or sub-stratum as part of the vegetation structure at a summary level in the Stratum table.

A multitude of methods have been used for describing vegetation cover. When providing detailed cover measures in the Stratum table, it is important to fill in the COVER_TYPE attribute in that table. The minimum requirement is for an interpretation of COVER CODE attribute for each (sub-) stratum in the Stratum table. This enables comparison between vegetation descriptions originating from different methods.

Dominance of the (sub-)stratum provides a useful summary of the vegetation description at the simpler levels (Levels I to III) in the NVIS Information Hierarchy (Table 1). The dominance of a (sub-)stratum is indicated by its relative biomass across a vegetation type. The data provider usually estimates the biomass of each (sub-)stratum as a multiple of the cover, height and area covered by the (sub-)stratum within the full extent of the vegetation type.

For data entered at level VI, the sub-stratum that is dominant over all other sub-strata in the vegetation type is indicated with a plus "+" symbol. For data entered at level V, the stratum that is dominant over all other strata in the vegetation type is indicated with a plus

"+" symbol. For data entered at level V or VI, the "+" notation is carried through to level IV. For further details, see the attributes L6_SUB_ASSOCIATION, L5_ASSOCIATION and L4_SUB_FORMATION in Section 3.

Component Data for Growth Forms

Detailed source component data about an unlimited number of growth forms can be entered into the Growth_Form table. However, the NVIS Information Hierarchy uses only the top 3 growth forms per stratum at Level V and the top 5 growth forms per sub-stratum at Level VI (See the subsection on the NVIS Information Hierarchy, Table 2 and attribute descriptions in the Veg_Description table in Section 3).

The dominance of a growth form is indicated by its relative biomass in each (sub-)stratum of a vegetation type. The data provider usually estimates the growth form's biomass as a multiple of cover, height and area covered by the growth form within the full extent of the vegetation type. Growth forms must be listed in order of decreasing dominance, using the attribute GROWTH_FORM_RANK in the Growth Form table. Where available, additional data on the type of dominance (or whether it is an "indicator") of the growth form in a (sub-)stratum can be recorded in the GR_FORM_DOMINANCE_QUALIFIER attribute.

Detailed cover values can be provided for each growth form for each (sub-) stratum in the Growth_Form table. It is important to fill in the COVER_TYPE attribute in the same table.

In some cases, where cover and/or height of a growth form has not been recorded in the field survey, frequency is sometimes used to estimate dominance. This is useful attribute in its own right (GROWTH_FORM_FREQUENCY), but its use in isolation to estimate dominance is not recommended.

Where data providers to NVIS want to record the growth form as sometimes present in the vegetation description, the attribute GROWTH_FORM_ALWAYS_THERE in the Growth Form table can be set to "N". This facility and data would provide the raw data for an automated program to generate a "+/-" symbol in front of the growth form in a vegetation description, if this is required in the future.

Putting the Structural Formation Together

The vegetation structural formations are a standardised terminology used to integrate growth form, height and cover within each stratum. The NVIS structural terminology was adapted from Specht (1970), Specht *et al* (1974), and Walker and Hopkins (1990).

The allocation of a height class to a growth form in a sub-stratum by the data custodian gives rise to a particular height qualifier, from the body of Table 3. The height qualifier and growth form are then added to cover information to define the structural formation (Table 4). The structural formation is used in generating levels I to IV of the NVIS Information Hierarchy and is thus a relatively user-friendly summary of the dominant growth form, cover and height of a vegetation description.

For example, under the NVIS Structural Formation Terminology, vegetation that comprises shrubs of less than 2m in height and with a foliage cover 10-30% is classed as 'open shrubland'.

Table 4: NVIS Structural Formation Terminology

	Cover Characteristics							
	Foliage cover *	70-100	30-70	10-30	<10	≈0	0-5	unknown
	Crown cover **	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown
	% Cover ***	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown
	Cover code	d	c	i	r	bi	bc	unknown
Growth Form	**Height Ranges (m)**	**Structural Formation Classes**						
tree, palm	<10,10-30, >30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	trees
tree mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	mallee trees
shrub, cycad, grass-tree, tree-fern	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrubs
mallee shrub	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrubs
heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrubs
chenopod shrub	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrubs
samphire shrub	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrubs
hummock grass	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grasses
tussock grass	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grasses
other grass	<0.5,>0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grasses
sedge	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedges
rush	<0.5,>0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rushes
forb	<0.5,>0.5	closed forbland	forbland	open forbland	sparse forbland	isolated forbs	isolated clumps of forbs	forbs
fern	<1,1-2,>2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	ferns
bryophyte	<0.5	closed bryophyteland	bryophyteland	open bryophyteland	sparse bryophyteland	isolated bryophytes	isolated clumps of bryophytes	bryophytes
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichens
vine	<10,10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vines
aquatic	0-0.5,<1	closed aquatic bed	aquatic bed	open aquatic bed	sparse aquatics	isolated aquatics	isolated clumps of aquatics	aquatics
seagrass	0-0.5,<1	closed seagrass bed	seagrassbed	open seagrassbed	sparse seagrassbed	isolated seagrasses	isolated clumps of seagrasses	seagrasses

Notes

This table is based on native vegetation, but can be used in a similar fashion for non-native vegetation and for describing revegetation.

* Foliage Cover is defined for each stratum as 'the proportion of the ground, which would be shaded if sunshine came from directly overhead'. It includes branches and leaves and is similar to the Crown type of Walker & Hopkins (1990) but is applied to a stratum or plot rather than an individual crown. It is generally not directly measured in the field for the upper stratum, although it can be measured by various line interception methods for ground layer vegetation. For the attribute COVER CODE in the Stratum table, the ground cover category refers to ground foliage cover not percentage cover.

** Crown Cover (canopy cover) as per Walker & Hopkins (1990). Although relationships between the two are dependent on season, species, species age etc (Walker & Hopkins (1990), the crown cover category classes have been adopted as the defining measure.

*** The percentage cover is defined as the percentage of a strictly defined plot area, covered by vegetation. This can be an estimate and is a less precise measure than using, for example, a point intercept transect methods on ground layer, or overstorey vegetative cover. That is for precisely measured values (e.g. crown densitometer or point intercept transects) the value measured would be 'foliage' cover. Where less precise or qualitative measures are used these will most probably be recorded as 'percentage' cover.

The last column of Table 4 is designed to cater for situations, in existing data, where the cover value for the growth form is unknown.

Floristic Information

Species Nomenclature

Each species should be described using full scientific name in the attribute TAXON_DATA_DESCRIPTION in the Taxon_Data table. This field has been retained in this form for operational reasons (rather than split into components, as in the Taxon_Lists table). The onus is on the data supplier to provide consistent spelling and punctuation (e.g. for the infraspecies rank) for the same taxonomic entity. The nomenclature for undescribed species should carry sufficient information to uniquely identify a source collection and location, e.g. Caladenia "Bordertown" (R.S.Rogers 788), rather than “species A” etc. Alternatively, or additionally, the data supplier can provide a TAXON_DATA_SOURCE_CODE, which may be useful in assigning the current taxonomic name to the Taxon_Data record.

Component Data for Species

In a similar way to growth forms, above, detailed source component data about an unlimited number of taxa (species) can be entered into the Taxon_Data table. However, the NVIS Information Hierarchy uses only the top 3 taxa per stratum at Level V and the top 5 taxa per sub-stratum at Level VI. (See the subsection on the NVIS Information Hierarchy and attribute descriptions in the Veg_Description table in Section 3).

It is recommended that the order of the species be to be listed from the most dominant to least dominant using the attribute TAXON_DATA_RANK in the Taxon_Data table. The dominance of a taxon (species) is indicated by its relative biomass in each (sub-)stratum of a vegetation type. The data provider usually estimates the species’ biomass as a multiple of cover, height and area covered by the species within the full extent of the vegetation type. Where available, additional data on the type of dominance of the species (or whether the species is an “indicator”) in a (sub-)stratum can be recorded in the TAXON_DATA_DOMINANCE_QUALIFIER attribute.

In some cases, where cover and/or height of a species has not been recorded in the field survey, frequency is sometimes used to estimate dominance. However, its use in isolation to estimate dominance is not recommended. The frequency of a species is often reported for a vegetation type and can be recorded in the NVIS database as an independent variable TAXON_DATA_FREQUENCY. It is easily generated from site survey databases as a ratio or percentage of sites containing the species compared with all survey sites.

Detailed cover values can be provided for each species for each (sub-) stratum in the Taxon_Data table. It is important to fill in the COVER_TYPE attribute in the same table.

Where data providers to NVIS want to record the species as sometimes present in the vegetation description, the attribute TAXON_DATA_ALWAYS_THERE in the Taxon_Data should be set to “N”. This will provide the raw data for an automated program to generate a “+/-“ symbol in front of the species in the vegetation description.

Section 3 provides further details on how species information should be interpreted and entered into the Vegetation_Description and Taxon_Data tables.

Completing the NVIS Vegetation Description

Rules for Checking Data and Generating Simpler Levels

At a national workshop in November 2002, the NVIS collaborators agreed to the implementation of proposed rules to address the structural and content issues impacting on the quality and consistency of the NVIS dataset. These include, *inter alia*, rules to:

1. Check the quality and consistency of data between the detailed data tables (Stratum, Growth_Form and Taxon_Data) and the Veg_Description table; and
2. Automatically generate the simpler levels in the NVIS Information Hierarchy.

The NVIS collaborators have agreed that conversion from Level VI to V is best undertaken through an expert input, since it is currently too complex to automate the process considering the large variety of methods and data collected. See Section 4 for a description of current progress with the rules.

Putting the Vegetation Description Together

The source component information on growth forms and species can be combined with the structural formation terminology to produce an integrated NVIS Vegetation Description at the complex NVIS level (V and/or VI). The NVIS collaborators have agreed to the use of rules to automate the generation of simpler levels (Levels I to IV) in the NVIS Information Hierarchy.

The rules for generating simpler levels in the NVIS Information Hierarchy require some additional attributes, compared with Version 5.0 of the Attributes (NLWRA, 2000a), to ensure consistent and understandable vegetation descriptions.

One such attribute (the "+" symbol in the Level V and/or VI fields in the Vegetation_Description table and the corresponding value of the DOMINANT_STRATUM_FLAG in the Stratum table) has already been described in the subsection on Stratum Cover and Dominance, above.

When the dominant species and dominant growth form for a (sub-)stratum were used to generate Level IV descriptions by automated rules, anomalies sometimes arose in that the two would not match, - for example, "Eucalyptus fernlands". The anomaly was because Level IV (and III) descriptions are characterised by genus (and not species) and the difficulties in assigning dominance in some vegetation types.

A notation system that is semi-independent from species- and growth form dominance has been devised to ensure consistency in the generation of simpler NVIS levels. The data provider must assign an up-arrow or hat "^" to the genus or growth form believed to best describe and characterise the vegetation type at Levels I to IV (Table 1) in the Veg_Description table. This is usually, but not always, a dominant or co-dominant species or growth form. Then, the matching growth form or genus (i.e. whatever wasn't chosen first) should be tagged with an up-arrow or hat "^". This is Case 1 in Table 5.

A table of possible (i.e. matching) growth forms for each genus has been developed by the NVIS collaborators to enable consistency checking by automated rules. Currently, Rules 29 and 30 in Section 4 implement Case 1.

Table 5: Using the up-arrow or "hat" notation.

Case	Scenario	Genus per stratum (Level V)		Growth Form (GF) per stratum (Level V)	Result	Notes
		1st hat	2nd hat			
1	1 dominant /characteristic genus in the stratum	^	-	^	Genus 1 & GF promoted to Level IV (& possibly L III).	• GF must match Genus 1. • At Level VI, the hats must be in one substratum only. (Rules 12, 13 & 14)
2	2 co-dominant /equally characteristic genera in the stratum	^	^	^	Genus 1 & 2 & GF promoted to Level IV (& possibly L III).	• GF must match genus 1 or 2. • Genus 1 & Genus 2 can be in different sub-strata in Level VI.
3	3 or more co-dominant / equally characteristic genera in the stratum	^^	-	^	Genus 1, "mixed" & GF promoted to Level IV (& possibly L III).	• GF must match Genus 1. • Selection of Genus 1 is arbitrary. • At Level VI, the hats must be in one substratum only. (Rules 12, 13 & 14)

* = Where more than one genus with a hat, the relative order is taken from the relative dominance in TAXON_DATA_RANK.

Notes

- If the stratum is indicated (with a plus '+' symbol) as the dominant in the vegetation type, the genus (or genera) and growth form will also be promoted to Level III.
- Cases 2 & 3 have not yet been implemented in the NVIS database.
- Case 2 has the potential for a genus with unmatched growth form. Thus Rules 12, 13, 14 and 30 will need to be modified.

NVIS collaborators have agreed that in some cases, one genus is inadequate to describe the floristics of some strata at Level IV. Where two genera are necessary to describe a stratum, a second up-arrows or hat "^" can be added to another genus in the stratum. (At Level VI, the genus can be in a different sub-stratum.) The genera will be written out in the Level IV description (and III, if the stratum is dominant: i.e. is marked with a '+' at Levels VI to IV) in the dominance order specified in TAXON_DATA_RANK. This is case 2 in Table 5.

Where more than two genera are characteristic of the stratum, the word "mixed" can be generated at Level IV by the use of a double up-arrow or double hat "^^" on one genus in the Level V or VI description. (If a double hat is used on one genus in a stratum, one genus is written in Level IV with the word "mixed" afterwards.) Only one growth form hat

per stratum is permitted and this must match one of the two genera marked with the double hat.

The double hat facility has not been provided for the growth form table, because many growth forms can usually be found in each stratum, if one looks hard enough. In other words, each stratum is "mixed", by default, with respect to growth forms.

This information is also stored in TAXON_DATA_SUMMARY_FLAG in the Taxon_Data table and/or GROWTH_FORM_SUMMARY_FLAG in the Growth_Form table – see Section 3 for details.

Detailed Examples of the NVIS Information Hierarchy

A completed NVIS vegetation description is given in Table 6. Table 6 also summarises the use of each component of the NVIS Information Hierarchy (Table 1) – species, growth form, cover and height. The examples in Table 6 illustrate, for the same vegetation type, the resultant standardised description of the type at various levels in the NVIS Information Hierarchy.

Appendix J gives an example of a complete vegetation description and shows the relevant content of each attribute in the NVIS Database. Please note, in particular, the contents of attributes in the Veg_Description table.

*Table 6: Example usage of the NVIS Information Hierarchy (***Note: For definitions of U, M, G, U1, U2, U3, M1, M2, M3, G1, and G2 refer to Table 1.)

Level	Description	Species	Growth form	Cover	Height
I	**CLASS**	-	1 dominant growth form for the dominant stratum	-	-
	Example	*Tree*			
II	**STRUCTURAL FORMATION**	-	1 dominant growth form for the dominant stratum	1 cover class for the dominant stratum	1 height class for the dominant stratum
	Example	*Open woodland*			
III	**BROAD FLORISTIC FORMATION**	1 dominant genus name for the dominant stratum	1 dominant growth form for dominant stratum	1 cover class for dominant stratum	1 height class for dominant stratum
	Example	*Eucalyptus open woodland*			
IV	**SUB-FORMATION**	1 dominant genus name for each stratum ((max 3 strata; i.e. for U, M, G where substantially present)	1 dominant growth form for each stratum (max 3 strata)	1 cover class for each stratum (max 3 strata)	1 height class for each stratum (max 3 strata)
	Example	*+Eucalyptus open woodland\Acacia tall sparse shrubland\Aristida open tussock grassland*			
V	**ASSOCIATION**	Up to 3 dominant species for each stratum (max 3 strata; i.e. for U, M, G where present)	Up to 3 dominant growth forms for each stratum (max 3 strata; i.e. for U, M, G where present)	1 cover class code for each stratum (max 3 strata; i.e. for U, M, G where present)	1 height class code for each stratum (max 3 strata; i.e. for U, M, G where present)
	Example	*U+ ^Eucalyptus coolabah,Casuarina cristata,Flindersia maculosa\^tree\7\r;M ^Acacia salicina,Alectryon oleifolius,Acacia stenophylla\^shrub\4\r;G ^Aristida ramosa,Astrebla squarrosa,Bothriochloa decipiens\^tussock grass,forb,sedge\2\i*			
VI	**SUB-ASSOCIATION**	Up to 5 dominant species for each sub-stratum (i.e. for U1, U2, U3, M1, M2, M3, G1, G2 where present) • Indicate characteristic genus in each sub-stratum with an up arrow or hat "^". Must match characteristic growth form.	Up to 5 dominant growth forms for each sub-stratum. • Indicate characteristic growth form with an up arrow or hat "^". Must match characteristic genus.	1 cover class code for each sub-stratum	1 height class code for each sub-stratum
	Example	*U1+ ^Eucalyptus coolabah,Casuarina cristata,Flindersia maculosa\Eucalyptus\^tree\7\r;M1 ^Acacia salicina,Alectryon oleifolius ,Acacia stenophylla,Acacia victoriae subsp. victoriae,Eremophila bignoniiflora\Acacia\^shrub\4\bi;M2 Eremophila longifolia,Muehlenbeckia florulenta\Eremophila\shrub\3\r;G1 ^Aristida ramosa,Astrebla squarrosa,Bothriochloa decipiens,Dichanthium sericeum,Enteropogon acicularis\Aristida\^tussock grass,forb,sedge\2\i*			

Attribute Requirements

Each NVIS attribute presented in Section 3 has a standardised descriptor code in the row titled 'Requirement'. Table 7 defines the use of these descriptors and codes in the NVIS Framework. When interpreting existing data into the NVIS database, the data custodian is requested to record at least the Mandatory, QAQC (Quality Control & Quality Assurance) and Essential categories of attributes, so that the data can be easily incorporated in the NVIS Framework. When planning new vegetation surveys, the data custodian is encouraged to collect information which is identified as Recommended, as well as Mandatory, QAQC and Essential, so that the NVIS Framework can be refined and extended to better meet user needs. The Framework currently provides for flexibility and utility across a range of users and applications.

Table 7: NVIS attribute requirements

Requirement Descriptor	Description	Required For:	Code used in Section 3 of NVIS Attributes
Mandatory (formerly Mc)	Administrative/ reference data.	Identification, location and management of the main components of the vegetation database and information transfer.	Mandatory
QAQC (formerly Mb and Mc)	These Quality Control & Quality Assurance attributes are needed to provide information on the origins, methods and quality of the data.	Quality Assurance and Quality Control of the Data. Assessment of the limitations of the data by potential users.	QAQC
Essential (formerly Ma)	Essential	Defining and population of a useful Vegetation Description at all levels in the NVIS Information Hierarchy.	Essential
Recommended	If used, the attribute will contribute to a more complete dataset.	Improved efficiency of databasing and/or field to meet additional user requirements and/or quantitative evidence to underpin interpreted field(s).	Recommended
Automated	Derived from other attributes by an automatic (rule-based) process.	A complete NVIS hierarchy; useful summary data.	Automated
Optional	Included to provide more flexibility and clarification for additional information where required. If used, the attribute will contribute to a more complete dataset.	Experimentation with additional fields.	Optional

Each requirement descriptor is further elaborated, below:

1. Mandatory

This is basic reference information to enable storage, management and transfer of NVIS data records. The absence of content in these fields renders the relevant records unusable.

Some of this reference information, for example the NVIS_ID – see the Veg_Description and Map_Unit tables in Section 3, is generated by the Commonwealth, upon receipt of new data from data custodians. The custodian is required to retain this number for subsequent edits and updates to the vegetation description.

2. QAQC

These Quality Assurance and Quality Control attributes are necessary to provide information on the origins, methods and quality of the data. The absence of content in these fields would render the relevant datasets and records of questionable utility. Users of the data would be uncertain of the origins and tolerances of the data and whether it was suitable for their analyses.

For example, the IMAGERY_SOURCE gives a description of the base images used to make the vegetation map. The custodian needs to distinguish between aerial photographs and satellite imagery, since each source has inherent strengths and weaknesses.

3. Essential

These attributes need to be filled out to define and populate a useful Vegetation Description at all levels in the NVIS Information Hierarchy. For example, the COVER_CODE in the Stratum table is essential to creating a valid vegetation description in the Veg_Description table.

Data sets compiled into the NVIS, that do not include the required descriptions or codes for all essential attributes will be meaningless or of very limited utility. Where the attribute is essential, the data custodian is required to complete missing information as listed in Table 8. Some incomplete records will be incorporated, but will have limited functionality with respect to the Information Hierarchy.

4. Recommended

Through experience with using the NVIS (2000) dataset, supply of content in these fields enhances the utility of the record. It provides a requirement class between the mandatory/essential/QAQC and optional for the NVIS collaborators to progressively improve the national collection and databasing of vegetation information. For example, the COVER_MEAN_VALUE in the Growth_Form table is not essential for an NVIS vegetation description, but provides evidence to support the assignment of dominance amongst the growth forms (attributes: GROWTH_FORM_DOMINANCE_QUALIFIER and GROWTH_FORM_RANK).

5. Automated

These attributes are derived by an automatic, rule-based program and thus do not need to be filled out by the data custodian. For example, the attributes to store Levels I to IV components of the vegetation description in the Veg_Description table.

6. Optional

Attributes defined as optional have been included to provide the data custodian a means to experiment with additional attributes that may be of use in the NVIS framework. Attributes defined as optional are not critical to the data set, although every effort should still be made to include them in the NVIS. The NVIS collaborators review these fields from time to time.

Missing Information

Where information is missing, not applicable or unknown, the codes in Table 8 should be used.

Table 8: Codes used to describe unknown or missing information

Type of Missing Value	Numeric Fields	Text Fields
Blank fields. Fields that do not apply to the data set.	-9999	not applicable
Unknown values, no data available, lost or missing values (missing values may include values that could not be incorporated into the NVIS due to lack of time, incompatible data formats, etc.)	-9999	unknown

NVIS Vegetation Attribute Structure

The NVIS database comprises data arranged in four different subsystems, 3 of which are shown in Figure 4, viz:

- A specially formatted table to attach vegetation descriptions to each map unit in a Geographic Information System (Further details of the spatial component of NVIS will be documented separately.);
- Database fields in the Vegetation Description table to provide a standardised, user-friendly summary of the Vegetation Description, including the various levels of the NVIS Information Hierarchy; and
- Relational database tables, which include detailed data on structural, growth form and floristic characteristics of a vegetation type; and
- Dataset information (documentation and management) attributes (not shown in Figure 4).

Please note the fields SOURCE_CODE and SOURCE_DESCRIPTION in the Map_Unit table, in the Obsolete Attributes (Appendix I). These have been retained for use in the NVIS Database, until all data custodians resolve all mosaics into their component vegetation descriptions. For newly supplied data, the attributes are only needed in the Veg_description table, provided that the guidelines in this document (especially in Section 3) are adhered to.

Further details of the arrangement of attributes in the NVIS Database are given in an Entity: Relationship diagram (Appendix C). Data custodians can use Appendix C as a guide for building an NVIS-compliant database, but would typically add more attributes (and perhaps tables) to store additional data.

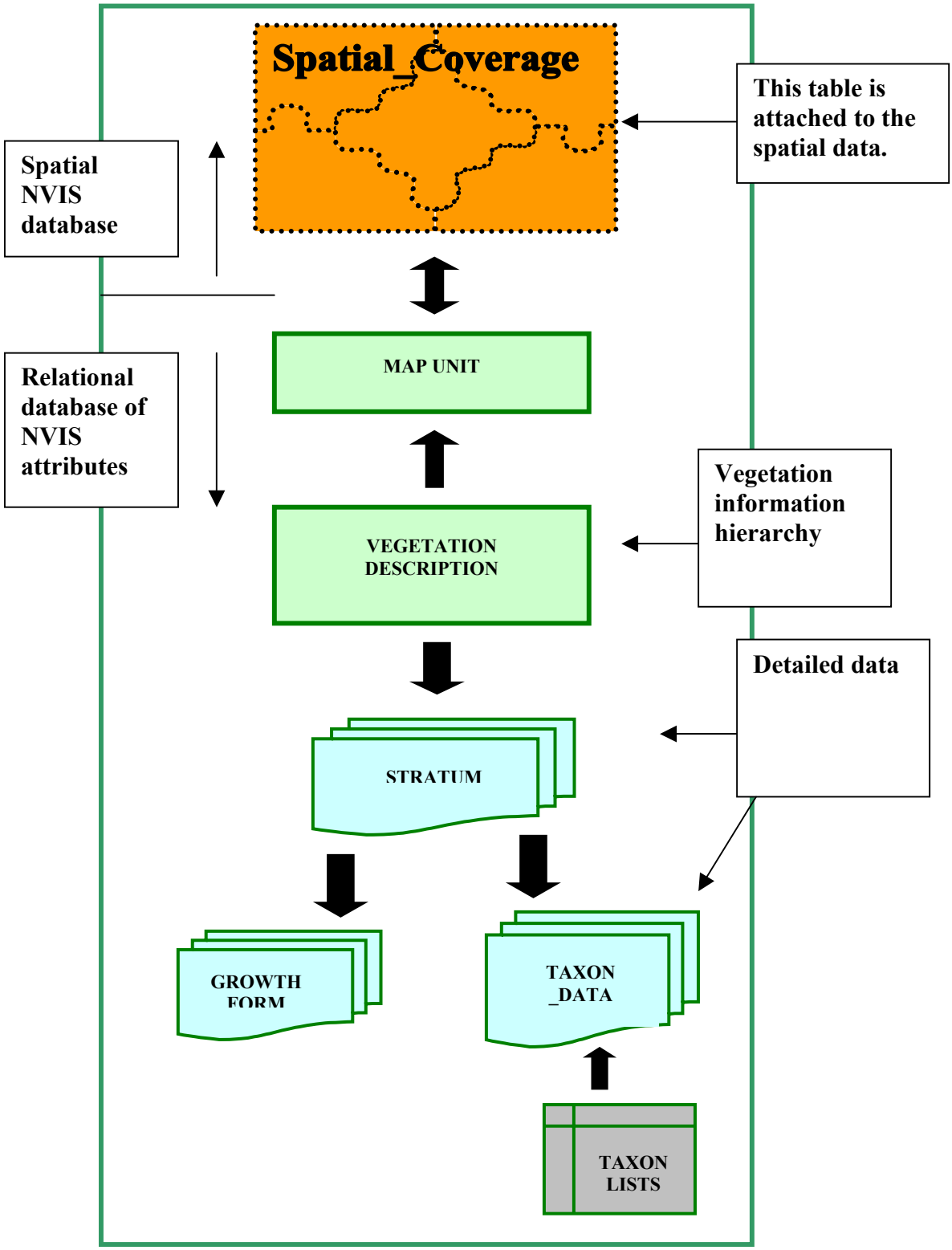


Figure 4: The NVIS Vegetation Attribute Structure V6.0. For simplicity, the tables and attributes for dataset information are not shown. See Appendix C for a more complete diagram of the NVIS database.

Data Set Documentation and Information Reliability

Each dataset provided as input to NVIS needs to have appropriate metadata supplied. This should be in the form of completed attributes in the Dataset Information part of the NVIS database (Data_Set, Reference and Mapping_Source tables). The Data_Set table, in particular, has attributes to describe the scope of each input dataset, validation techniques used and data accuracy. The data provider must interpret any existing metadata, publications and/or unpublished material associated with the dataset to fill in these attributes. Emphasis in documenting metadata has been placed on more detailed reporting on accuracy assessment, as these measures provide users with valuable information on the mapped product that is included in NVIS. See Section 3 for details of each attribute.

The Map_Source and Mapping Method tables of Version 5.0 have been combined into the Mapping_Source table in Version 6.0 to streamline the documentation of primary sources.

The Dataset Information attributes were used by the Audit to assess the accuracy, reliability and currency of datasets included in the NVIS (2000) Dataset (NLWRA, 2001: 141-159). A very useful corollary of compiling this metadata is that "gaps" in spatial and thematic coverage of Australia are easier to identify and communicate to decision-makers.

SECTION THREE: List of NVIS Attributes

Notes on Section 3

- Section 3 is generated from an XML text master file by formatting scripts.
- The descriptive fields can be added or removed for display purposes.
- The attributes describe those fields necessary to describe vegetation and do NOT describe the primary and secondary key fields needed to implement a working database.
- The terminology (sub-)stratum should be interpreted as follows: sub-stratum (for level VI data) and/or stratum (for level V data).

Data Set Level Attributes

Reference Information

- **DS01----- DATA SET NAME**
- **DS02----- DATA SET NUMBER**
- **DS03----- VEGETATION THEME CODE**
- **DS04----- VEGETATION THEME CONSTRAINTS**
- **DS05----- ANZLIC METADATA IDENTIFIER**
- **DS06----- ANZLIC METADATA NAME**
- **DS07----- ANZLIC METADATA URL**

Vegetation Attribute Methods and Accuracy

- **DS08----- STRUCTURAL CLASSIFICATION SYSTEM**
- **DS09----- FLORISTIC GROUP TYPE**
- **DS10----- CLASSIFICATION METHOD**
- **DS11----- SAMPLING TYPE**

- DS12----- BOTANICAL EXPERTISE

Spatial Methods, Positional Accuracy and Usable Scales

- DS13----- POSITIONAL ACCURACY
- DS14----- POSITIONAL ACCURACY DETERMINATION
- DS15----- POSITIONAL ACCURACY MEASURE
- DS16----- MAP PUBLICATION SCALE
- DS17----- FINEST SCALE
- DS18----- BROADEST SCALE

Summary of Survey and Mapping Methods and Accuracy

- DS19----- SURVEY AND MAP RELIABILITY
- DS20----- START DATE_ATTRIBUTE
- DS21----- END DATE ATTRIBUTE
- DS22----- START DATE_SPATIAL
- DS23----- END DATE SPATIAL

Map Origins (Methods and Sources)

- MS01----- MAPPING SOURCE NUMBER
- MS02----- MAPPING METHOD
- MS03----- MAPPING EXPERTISE
- MS04----- IMAGERY SOURCE

- MS05----- IMAGERY SCALE
- MS06----- IMAGERY RESOLUTION
- MS07----- MAP SOURCE EXTENT
- MS08----- DELINEATION MEDIUM
- MS09----- START_DATE_SOURCE
- MS10----- END DATE SOURCE
- MS11----- MAP BASE

References

- RF01----- CITATION
- RF02----- FORMAT
- RF03----- STORAGE LOCATION

Map Unit Level Attributes

Reference Information

- MU01----- MAP UNIT IDENTIFIER

Descriptive Information

- MU02----- SPATIAL MIX
- MU03----- MOSAIC TYPE
- MU04----- NUMBER OF VEGETATION DESCRIPTIONS

- MU05----- VEG DESCRIPTION POSITION
- MU06----- VEG DESCRIPTION PROPORTION

Vegetation Description Level Attributes

Reference Information

- VG01----- VEGETATION IDENTIFICATION
- VG02----- NVIS IDENTIFICATION
- VG03----- SOURCE CODE

Descriptive Information

- VG04----- LEVEL OF DETAIL
- VG05----- NUMBER OF STRATA
- VG06----- LEVEL 1 (CLASS)
- VG07----- LEVEL 2 (STRUCTURAL FORMATION)
- VG08----- LEVEL 3 (BROAD FLORISTIC FORMATION)
- VG09----- LEVEL 4 (SUB-FORMATION)
- VG10----- LEVEL 5 (ASSOCIATION)
- VG11----- LEVEL 6 (SUB-ASSOCIATION)
- VG12----- SOURCE DESCRIPTION
- VG13----- ENVIRONMENTAL DESCRIPTION

Detailed Vegetation Attributes

Structural Information

- **ST01----- STRATUM CODE**
- **ST02----- SUB-STRATUM RANK**
- **ST03----- NUMBER OF GROWTH FORMS**
- **ST04----- NUMBER OF TAXA**
- **ST05----- COVER TYPE**
- **ST06----- COVER TYPE DERIVATION METHOD**
- **ST07----- COVER MINIMUM VALUE**
- **ST08----- COVER MAXIMUM VALUE**
- **ST09----- COVER MEDIAN VALUE**
- **ST10----- COVER MEAN VALUE**
- **ST11----- COVER CODE**
- **ST12----- HEIGHT TYPE**
- **ST13----- HEIGHT TYPE DERIVATION METHOD**
- **ST14----- HEIGHT MINIMUM VALUE**
- **ST15----- HEIGHT MAXIMUM VALUE**
- **ST16----- HEIGHT MEAN VALUE**
- **ST17----- HEIGHT MEDIAN VALUE**

- ST18----- HEIGHT CLASS
- ST19----- DOMINANT STRATUM FLAG

Taxon Data

- TD01----- TAXON DATA RANK
- TD02----- TAXON DATA DESCRIPTION
- TD03----- TAXON DATA SOURCE CODE
- TD04----- COVER TYPE
- TD05----- COVER TYPE DERIVATION METHOD
- TD06----- COVER MINIMUM VALUE
- TD07----- COVER MAXIMUM VALUE
- TD08----- COVER MEDIAN VALUE
- TD09----- COVER MEAN VALUE
- TD10----- TAXON DATA DOMINANCE QUALIFIER
- TD11----- TAXON DATA FREQUENCY
- TD12----- TAXON DATA ALWAYS THERE
- TD13----- TAXON DATA SUMMARY FLAG

Growth Form Information

- GF01----- GROWTH FORM RANK
- GF02----- GROWTH FORM CODE

- GF03----- COVER TYPE
- GF04----- COVER TYPE DERIVATION METHOD
- GF05----- COVER MINIMUM VALUE
- GF06----- COVER MAXIMUM VALUE
- GF07----- COVER MEDIAN VALUE
- GF08----- COVER MEAN VALUE
- GF09----- GROWTH FORM DOMINANCE QUALIFIER
- GF10----- GROWTH FORM FREQUENCY
- GF12----- GROWTH FORM ALWAYS THERE
- GF13----- GROWTH FORM SUMMARY FLAG

Supplementary Taxon Information

Taxon List Origin Information

- TO01----- TAXON LIST ORIGIN CUSTODIAN
- TO02----- TAXON LIST ORIGIN STATE
- TO03----- TAXON LIST ORIGIN DETAILS

Taxon Source Information

- TL01----- TAXON LISTS SOURCE CODE
- TL02----- TAXON LISTS FAMILY

- TL03----- TAXON LISTS GENUS
- TL04----- TAXON LISTS SPECIES
- TL05----- TAXON LISTS AUTHOR
- TL06----- TAXON LISTS INFRASPECIES RANK
- TL07----- TAXON LISTS INFRASPECIES
- TL08----- TAXON LISTS INFRASPECIES AUTHOR
- TL09----- TAXON LISTS COMMON NAME
- TL10----- TAXON LISTS REFERENCE

Descriptions of NVIS Attributes

Data Set Level Attributes

Reference Information

Attribute: DS01 - DATA SET NAME	
Heading	**Details**
Purpose:	**To identify each dataset in a user-friendly way.**
Requirement:	**Mandatory**
Database Field Name:	**DATA_SET_NAME**
Description:	**This is the name given to the spatial data set by the custodial organisation. The information should be in plain language (that is, preferably not solely in acronym form).**
Value:	**Character(2000)**
Example:	**Gippsland Ecological Vegetation Classes - Extant**
Comments:	**Sometimes duplicates ANZLIC_METADATA_NAME, but is necessary to cater for situation where the dataset supplied to NVIS is a subset or a superset of the dataset described on the Australian Spatial Data Directory.**

Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS02 - DATA SET NUMBER	
Heading	**Details**
Purpose:	**To identify each dataset in a concise and systematic way.**
Requirement:	**Commonwealth**
Database Field Name:	**DATA_SET_NUMBER**
Description:	**This is a number given to the data set by the Commonwealth in compiling the NVIS (2000) dataset. The number must be retained by the data custodian for any subsequent transfers or updates to the vegetation description.**
Value:	**Number(10). Format: SDD, where S = State Code (from lookup table); DD is the dataset number, which is assigned by the administrator.**
Example:	**413**
Comments:	**This first digit is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to. This field will probably be of little direct interest to the States and Territories.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: DATA SET NUMBER

Code	Explanation
1	Australian Capital Territory
2	New South Wales
3	Northern Territory
4	Queensland
5	South Australia
6	Tasmania
7	Victoria
8	Western Australia

Attribute: DS03 - VEGETATION THEME CODE	
Heading	**Details**
Purpose:	**To identify whether the dataset represents pre-1750**

	and/or extant (present) vegetation.
Requirement:	Mandatory
Database Field Name:	VEGETATION_THEME_CODE (was: DATASET_COVERAGE_TYPE)
Description:	This is a short code assigned to the data set according to whether the dataset represents pre-1750 and/or extant (present) vegetation.
Value:	Character(20). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.
Example:	E
Comments:	This attribute was developed and applied by BRS (as B/E/P) in the compilation phase of NVIS (2000). It is a useful and important attribute for managing NVIS spatial coverages. This field and the next (VEGETATION_THEME_CONSTRAINTS) replace the former attribute VEGETATION_THEME COVERAGE, which combined two streams of information about the dataset.
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: VEGETATION THEME CODE

Code	Explanation
B	The dataset comprises both extant and pre-clearing
E	Extant (i.e. present, remnant) vegetation
P	Pre-clearing (i.e. pre-1750 or "natural") vegetation

Attribute: DS04 - VEGETATION THEME CONSTRAINTS	
Heading	Details
Purpose:	To describe any major limitations applying to the vegetation theme for the dataset.
Requirement:	Recommended
Database Field Name:	VEGETATION_THEME_CONSTRAINTS
Description:	A free text description of any spatial or attribute limitations to the vegetation theme (pre-clearing or extant) that applies to the dataset.
Value:	Character(2000).
Example:	woody vegetation only; endangered communities only; only recorded vegetation types conforming to the vegetation regulation act - see reference 456; mapped woody remnant vegetation within the wheatbelt study

	area, but did not attribute the cleared and semi-native vegetation types.
Comments:	**In terms of spatial constraints, please specify the extent of coverage by the attributes and any exclusions. See also VEGETATION THEME CODE,**
Status:	**Proposed field, not yet implemented in the NVIS Oracle database. Requires agreement and provision of content from NVIS stakeholders.**

Attribute: DS05 - ANZLIC METADATA IDENTIFIER	
Heading	**Details**
Purpose:	**To provide a unique, machine-generated, human-readable link to the completed metadata and further information about the data set on the Australian Spatial Data Directory.**
Requirement:	**Recommended**
Database Field Name:	**ANZLIC_METADATA_IDENTIFIER**
Description:	**Each metadata statement prepared by the custodian must have a unique, system-generated ANZLIC identifier. A data set should be internally consistent, for example the methods used for mapping and the taxon list used to name species records must be consistent. A data set derived with inconsistent methodologies should be recorded as a distinct data set where possible.**
Value:	**Character(50)**
Example:	**ANZCW0501000222**
Comments:	**All data sets must have an ANZLIC compliant metadata entry before being accepted into the NVIS. The ANZLIC identifier is supplied by the ANZLIC contact in each jurisdiction. The Australian Spatial Data directory can be searched at URL: http://www.auslig.gov.au/asdd/ and has useful extra details including the data set: title, custodian, contact information, quality information and a list of attributes.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS06 - ANZLIC METADATA NAME	
Heading	**Details**
Purpose:	**To provide name of dataset in ASDD**
Requirement:	**Optional**
Database Field Name:	**ANZLIC_METADATA_NAME**
Description:	**This is the name given to the data set by the custodial organisation. The information should be in plain language**

	(that is, preferably not solely in acronym form). Should preferably be the same as DS1, but typically, this isn't the case.
Value:	Character(2000)
Example:	Gippsland Ecological Vegetation Classes - Extant
Comments:	
Status:	Implemented in the NVIS Oracle database.

Attribute: DS07 - ANZLIC METADATA URL	
Heading	Details
Purpose:	To provide a direct, on-line link to the metadata statement.
Requirement:	Optional
Database Field Name:	ANZLIC_METADATA_URL
Description:	The internet address of the metadata statement, (preferably as found on the Australian Spatial Data Directory (ASDD).
Value:	Character(2000)
Example:	http://www.auslig.gov.au/servlet/asdd_basic/retrieve?pn=17&el=F&db=current&rp=2&mr=1&ac=current&cid=177
Comments:	The contents of this field will require maintenance from time to time.
Status:	Implemented in the NVIS Oracle database.

Vegetation Attribute Methods and Accuracy

Attribute: DS08 - STRUCTURAL CLASSIFICATION SYSTEM	
Heading	Details
Purpose:	To specify the classification system originally used in the field survey and mapping method.
Requirement:	QAQC
Database Field Name:	STRUCTURAL_CLASSFN_SYSTEM
Description:	The classification system and reference used for describing the vegetation structural formations in a data set. ¶ This is important where information entered has come in class ranges rather than discretely measured values (applicable to older mapping and land system/unit mapping).
Value:	Character(50). This is a value set from an expandable look up table. Initial values are set by the administrator, new values can be added by the data loader.

Example:	**Walker1990**
Comments:	**Where a data set has been pre-classified and the classification system is not listed in the lookup table, the user will be able to ask the administrator to add an entry to the lookup table.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: STRUCTURAL CLASSIFICATION SYSTEM

Code	Explanation
Specht1995	**Specht, R. L., E. E. Hegarty, M. B. Whelan and A, Specht. 1995. Conservation atlas of plant communities in Australia. Southern Cross University. Centre for Coastal Management, Lismore**
Specht1974	**Specht, R.L., E.M. Roe, and V.H. Boughton, 1974. Conservation of major plant communities in Australia and Papua New Guinea. Aust.J.Bot.Suppl.No.7.**
Walker1990	**Walker J. and M.S. Hopkins 1990. Vegetation. In: McDonald, R.C., R.F., Isbell, J.G., Speight, J. Walker, and M.S. Hopkins. 1990. Australian soil and land survey. Field handbook. 2nd edn. Melbourne: Inkata Press**
Beadle1981	**Beadle, N. C. W. 1981. The vegetation of Australia. Cambridge University Press, London**
Carnahan1976	**Carnahan, J.A. 1976. Natural Vegetation. Atlas of Australian Resources. Second Series. Department of Natural Resources, Canberra**
Beard1976	**Beard, JS (1976) Vegetation map of Western Australia: map and explanatory memoir. Applecross WA, Vegemap Publications, 1976 : 27 vols, illus, maps.**
not applicable	**not applicable**
unknown	**unknown**
SA Structural Formation Table	**Classification based on adaptation of Muir 1977 and Specht 1972**
Modified Carnahan/Specht	**developed for Atlas of Australian Vegetation**

Attribute: DS09 - FLORISTIC GROUP TYPE	
Heading	**Details**
Purpose:	**To describe how each vegetation type has been defined in terms of species composition.**

Requirement:	**Recommended**
Database Field Name:	**FLORISTIC_GROUP_TYPE**
Description:	**This field describes the method by which species are selected to define each floristic group in the dataset (i.e. the choice of up to 5 species in the level 6 description). This field should identify whether the vegetation descriptions contain: (i) species that contribute the most biomass (or cover/abundance), (ii) indicator species or (iii) a mixture of both types of species.**
Value:	**Character(20). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**indicator_biomass**
Comments:	**Indicator species are those species that are characteristic or unique to a particular vegetation type but may not be the most abundant or dominant species.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: FLORISTIC GROUP TYPE

Code	Explanation
indicator_biomass	The species listed for the floristic group are both the indicator/diagnostic species and also those species with the greatest biomass (eg Allosyncarpia ternata forests
indicator	The species listed for the floristic group are indicator or diagnostic species, (i.e. not necessarily those species with the greatest biomass.
biomass	The species listed for the floristic group contribute the greatest biomass or cover abundance to the floristic group
not applicable	not applicable
unknown	unknown

Attribute: DS10 - CLASSIFICATION METHOD	
Heading	**Details**
Purpose:	**To describe the analysis methods used to create the vegetation types.**
Requirement:	**QAQC**
Database Field Name:	**CLASSIFICATION_METHOD (was: CLASSIFICATION_SUPPORT)**
Description:	**This attribute is used to describe the methods used to derive the vegetation types. It includes the package used**

	e.g. PATN, the particular module used e.g. UPGMA, and the parameters selected and the rationale for their selection.
Value:	**Character(4000)**
Example:	**Classification: The quadrats were classified into types on the basis of floristic/structural data (canopy cover of every species in each quadrat measured on a scale of 1 to 6 - modified Braun Blanquet scale). Both agglomerative and divisive hierarchical methods were used to classify the quadrats into major types to allow a comparison of the results of the two methods.¶ The agglomerative method used was Unpaired Analysis (UPGMA) using a Canberra metric (Kovach, 1993). The divisive method was a two way Indicator Species Analysis (TWINSPAN) (Hill, 1979) with 6 cut levels corresponding to the cover scores.¶ Minor types were distinguished within each major type using a combination of TWINSPAN analysis of each major group and the UPGMA analysis of the whole database. ¶Ordination: The floristic/cover data were also ordinated to investigate the relationships between the different vegetation types. The method used was Principle components Analysis of untransformed data with the species, but not the sites, standardised. All the species and samples were given equal weighting. The species data for the Banksia ericifolia Heath (H1) community was ordinated using Detrended Correspondence Analysis (DCA) to investigate for patterns and to correlate any patterns with time since last fire and fire frequency.**
Comments:	**The text could often be cut and pasted from an existing project report. Any modifications to the original classification must be reported.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS11 - SAMPLING TYPE	
Heading	**Details**
Purpose:	**To describe the type of site plots used to derive and/or field check the map, survey or project. Used to determine the reliability of the resultant map.**
Requirement:	**QAQC**
Database Field Name:	**SAMPLING_TYPE**
Description:	
Value:	**Character(50). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**full vegetation sites**

Comments:	**Further details on the sampling should be provided in the attribute MAPPING_METHOD for each method used in the creation of the dataset.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: SAMPLING TYPE

Code	Explanation
full vegetation and field check sites	A 'full vegetation and field check site' vegetation survey is one, which includes most of the following elements and hence represents the highest class for data quality that can be entered into the NVIS Database. 1. Planning and field survey ¶ Where the site-based quadrats are located using a stratification system that includes reference to environmental attributes and aerial photos and/or satellite imagery that are available on a regional scale (i.e. at least 1:100,000). ¶ A sufficient density of site based quadrats to detect the majority of the vegetation types present within the region at a particular scale e.g. one site per unique map unit defined on aerial photos and/or satellite imagery. ¶ Recording general biophysical and environmental attributes of a landscape unit in which the site is located. ¶ Recording the full list of higher plants and various attributes of the species e.g. growth forms ¶ Recording the vegetation in strata ¶ Recording the structural attributes of the vegetation community e.g. height, cover, strata and growth forms ¶ Recording a geo-reference for the site-based quadrats so that they are relocatable and capable of being used in a GIS ¶ Recording of metadata for each site e.g. date, observer, etc ¶ Entering of the data from site-based quadrats into a relational database and checking of the data. 2. Classifying, interpreting and describing the quadrats the vegetation into definitive vegetation types ¶ This involves describing the vegetation types in terms of structural, floristic and environmental characteristics using multivariate analyses or classifying the vegetation types according to a pre-existing list of definitive vegetation types that has been developed to represent all vegetation types known to occur within a region or jurisdiction. 3. Mapping the definitive vegetation types across the landscape based on observed patterns between the original stratification system and aerial photos and/or satellite imagery.
full vegetation sites	Plot area delimited. Full species lists (at time of survey) for each stratum including height and cover. These are generally used to ground truth mapping.
characterisation sites	Plot area delimited. List of the dominant or conspicuous species only (at time of survey), for the over-storey and ground layer including average height of the over-storey and ground-storey cover
field check sites	No plot area. With or without a GPS location.

	Dominant species in the predominant strata measured or checked. Rapid assessment sites. Possibly some structural information. Fly by sites.
basal area sites	No plot area. Aim to capture the woody species (trees and shrubs) above 1.3m by using the Bitterlich gauge. Basal area by species provides a measure of dominance of overstorey species.
no sites	No field verification
not applicable	not applicable
unknown	unknown

Attribute: DS12 - BOTANICAL EXPERTISE	
Heading	**Details**
Purpose:	To describe, as a whole for the dataset, how reliably plants were identified.
Requirement:	Recommended
Database Field Name:	BOTANICAL_EXPERTISE
Description:	A description of how well the flora was assessed.
Value:	Character(2000)
Example:	High confidence in skill and reliability of the observers/interpreters. Project manager has practical experience of 15 years and team has an average of 5 years field experience. Voucher specimens were collected.
Comments:	This information is not intended to describe individual sub-associations or map units.
Status:	Implemented in the NVIS Oracle database.

Spatial Methods, Positional Accuracy and Usable Scales

Attribute: DS13 - POSITIONAL ACCURACY	
Heading	**Details**
Purpose:	To specify the locational accuracy of the dataset.
Requirement:	QAQC
Database Field Name:	POSITIONAL_ACCURACY
Description:	The accuracy of mapped line or cell features in relation to their real world locations (eg. nearness to the real world geo-referenced location) across the data set.

Value:	**Number(5,1)**
Example:	**10 [accurate to +/- 10]**
Comments:	**The units of measure for this attribute must be in metres.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS14 - POSITIONAL ACCURACY DETERMINATION	
Heading	**Details**
Purpose:	**To identify the method used for assessing POSITIONAL ACCURACY**
Requirement:	**QAQC**
Database Field Name:	**POSITIONAL_ACCURACY_DETERM**
Description:	**A code indicating the positional source or determination of points, polygons or cells across the data set. The information provided should relate to the type of data set i.e. point, polygon or raster (##where? field not set up to provide this info).**
Value:	**Character(20). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**satellite**
Comments:	**Lookup Table sourced and simplified from draft Martin and Sinclair (1999). Where the entry is recorded as unknown or not applicable, the POSITIONAL ACCURACY attribute in the metadata should provide more information. Further details on positional controls etc should be provided in the attribute MAPPING_METHOD.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: POSITIONAL ACCURACY DETERMINATION

Code	Explanation
GPS	**GPS - type unspecified**
DGPS	**Differential /RTCM corrected GPS**
mapped	**Mapped topographic features**
satellite	**rectified satellite image**
rectphoto	**rectified aerial photograph**
orthoquad	**orthophoto quad**
estimate	**estimate from known position**

not applicable	not applicable
unknown	unknown

Attribute: DS15 - POSITIONAL ACCURACY MEASURE	
Heading	**Details**
Purpose:	To specify the type of measure and/or calculation used to determine DATASET POSITIONAL ACCURACY.
Requirement:	Recommended
Database Field Name:	POSITIONAL_ACCURACY_MEASURE
Description:	
Value:	Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and can not be added to.
Example:	RMSE
Comments:	
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: POSITIONAL ACCURACY MEASURE

Code	Explanation
RMSE	Root Mean Square of Error determined at time of transformation or registration.
CMAS	Circular map accuracy standard
percentage measure	Percentage value measured after the mapping is completed using an independent field sampling procedure
percentage estimate	Percentage value estimated from anecdotal information and/or experts
probability	Probability estimate
not applicable	not applicable
unknown	unknown

Attribute: DS16 - MAP PUBLICATION SCALE	
Heading	**Details**
Purpose:	To specify the scale at which the vegetation map/dataset was published.

Requirement:	**Mandatory**
Database Field Name:	**MAP_PUBLICATION_SCALE (was: MAPPING_SCALE)**
Description:	**The denominator of the ratio of a distance on a map to its corresponding distance on the ground.**
Value:	**Number(10)**
Example:	**50000; e.g. Kangaroo Island SA.**
Comments:	**For unpublished maps or coverages, please specify a nominal scale that would be suited to routine use.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS17 - FINEST SCALE	
Heading	**Details**
Purpose:	**To specify the finest scale at which the mapping would be most accurate for display without modifying the map/spatial units.**
Requirement:	**Recommended**
Database Field Name:	**FINEST_SCALE (was: FINE_SCALE)**
Description:	**This field is based on the stated scale/resolution of the data set, as recorded in the metadata. The field is expressed as the denominator only.¶ This attributes addresses the fact that It is quite a common occurrence that either out of ignorance or opportunism, maps are often used at a scale far finer than the intention of, and original purpose of, the mapping.¶ The term fine scale equates to large scale.**
Value:	**Number(10); To be used in conjunction with DS 19. BROADEST SCALE**
Example:	**40000 - A 1:50000 scale map could be used at 1:40000 scale without too much inaccuracy. However it could not be used at 1:20000. E.g. Kangaroo Island SA.**
Comments:	**The data custodian will determine the value. These scale limit restrictions could be applied in a GIS or internet mapping facility to restrict zooming capacity.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS18 - BROADEST SCALE	
Heading	**Details**
Purpose:	**To specify the broadest scale at which the mapping would be most accurate for display without modifying the map/spatial units.**
Requirement:	**Recommended**
Database	**BROADEST_SCALE (was: BROAD_SCALE)**

Field Name:	
Description:	**This is based on the stated scale/resolution of the data set, as recorded in the metadata. The field is expressed as the denominator only.¶ This attributes addresses the fact that it is quite a common occurrence that maps are sometimes used at a scale or resolution far broader than the intention of, and original purpose of, the mapping. Maps used at a broader scale than the publication scale may need spatial and/or attribute generalisation to be applied before viewing. I.e. simpler levels in the hierarchy would provide simpler analyses, faster viewing and coverages of comparable complexity to other themes at the broad scale.¶ The term broad scale equates with small scale.**
Value:	**Number(10); To be used in Conjunction with DS 18. FINEST SCALE.**
Example:	**200000 - A 1:50000 scale map could be used at 1:1200000 scale without too many problems; e.g. Kangaroo Island SA.**
Comments:	**The data custodian will determine the value. These scale limit restrictions could be applied in a GIS or internet mapping facility to restrict zooming capacity.**
Status:	**Implemented in the NVIS Oracle database.**

Summary of Survey and Mapping Methods and Accuracy

Attribute: DS19 - SURVEY AND MAP RELIABILITY	
Heading	**Details**
Purpose:	**To describe the overall reliability in the survey and mapping methods (spatial/positional and attributes/ecological) used to derive the data set.**
Requirement:	**Mandatory**
Database Field Name:	**SURVEY_AND_MAP_RELIABILITY(was: RELIABILITY)**
Description:	**This attribute should be completed even if little information is available and should be based on an expert assessment of all methods used and their limitations.¶ This attribute could also contain a reference to a document for further information.**
Value:	**Character(2000)**
Example:	**The reliability of this data set is very good. The delineation of map units was based on rectified colour aerial photography at 1:20000 scale using experienced interpreters. Data collected was calibrated in the field with a final accuracy of 85% in the delineation of**

	vegetation mapping units. Further information can be found in Marther (1987) Vegetation mapping of Eastern River, Northern Territory.
Comments:	**The contents of this attribute should synthesise and summarise the values of other attributes from the DataSet, Mapping Methods and Map Source tables. Where there were more than one mapping method used in the dataset, the reliability of each method should be described in MAPPING_EXPERTISE.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS20 - START DATE_ATTRIBUTE	
Heading	**Details**
Purpose:	**To document the date of the earliest field collection of vegetation-related attributes used in the survey underpinning the maps.**
Requirement:	**Mandatory**
Database Field Name:	**START DATE_ATTRIBUTE**
Description:	**Day, Month, Year of earliest attributes used in the survey.**
Value:	**Date. This is a year 2000 consistent date and time value set as dd/mm/yyyy.**
Example:	**09/04/1978**
Comments:	**This field is later attached to the NVIS GIS coverage and is fundamental to assessing the currency of the attribute data in each polygon.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS21 - END DATE ATTRIBUTE	
Heading	**Details**
Purpose:	**To document the date of the latest field collection of vegetation-related attributes used in the survey underpinning the maps.**
Requirement:	**Mandatory**
Database Field Name:	**END_DATE_ATTRIBUTE**
Description:	**Day, Month, Year of latest attributes used in the survey.**
Value:	**Date. This is a year 2000 consistent date and time value set as hh:mm:ss dd/mm/yyyy with hours set in 24hr time.**
Example:	**06/06/1996**
Comments:	**This field is later attached to the NVIS GIS coverage and is fundamental to assessing the currency of the attribute data in each polygon.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS22 - START DATE_SPATIAL	
Heading	**Details**
Purpose:	**To document the date of the earliest image used in the mapping.**
Requirement:	**Mandatory**
Database Field Name:	**START_DATE_SPATIAL (was: START_DATE)**
Description:	**Day, Month, Year of earliest image used in the mapping. The value for a dataset would normally come from earliest START_DATE_SOURCE in the Map_Source table.**
Value:	**Date. This is a year 2000 consistent date and time value set as dd/mm/yyyy.**
Example:	**09/04/1978**
Comments:	**Any automated procedure used to generate the value of this field for a dataset should be checked by an expert to ensure that it correctly summarises the whole dataset. The contents of this attribute carry through to the spatial coverage and are fundamental to assessing the currency of the spatial data.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: DS23 - END DATE SPATIAL	
Heading	**Details**
Purpose:	**To document the date of the most recent image used in the mapping.**
Requirement:	**Mandatory**
Database Field Name:	**END_DATE_SPATIAL (was: END_DATE)**
Description:	**Day, Month, Year of latest image used in the mapping.**
Value:	**Date. This is a year 2000 consistent date and time value set as hh:mm:ss dd/mm/yyyy. The value would normally come from latest END_DATE_SOURCE in the Map_Source table.**
Example:	**06/06/1996**
Comments:	**Any automated procedure used to generate the value of this field for a dataset should be checked by an expert to ensure that it correctly summarises the whole dataset. The contents of this attribute carry thru to the spatial coverage and are fundamental to assessing the currency of the spatial data.**
Status:	**Implemented in the NVIS Oracle database.**

Map Origins (Methods and Sources)

Attribute: MS01 - MAPPING SOURCE NUMBER	
Heading	**Details**
Purpose:	**To identify each unique combination of map source and mapping method used in each dataset.**
Requirement:	**Optional**
Database Field Name:	**MAPPING_SOURCE_NUMBER**
Description:	**A number assigned to each defined map origin details used in the construction of a dataset. The number is assigned sequentially, beginning with 1, within each dataset. Typical numbers are 1, 2 or 3.**
Value:	**Number(10)**
Example:	**2**
Comments:	**New field made necessary by the joining of unique combinations of the former MAPPING_METHOD and MAP_SOURCE tables.**
Status:	**New field; not yet implemented in the NVIS Oracle database. Will need to reconcile data in the version 5.0 MAP_SOURCE and MAPPING_METHODS tables.**

Attribute: MS02 - MAPPING METHOD	
Heading	**Details**
Purpose:	**To describe the interpretive tools used for delineating the map units within the data set.**
Requirement:	**QAQC**
Database Field Name:	**MAPPING_METHOD**
Description:	**Detailed description of mapping methods. A data set must have one or more entries for this attribute. In particular, the attribute provides further background for the assessment of POSITIONAL_ACCURACY and SAMPLING_TYPE.**
Value:	**Character(2000); multiple entries allowed.**
Example:	**Aerial photo interpretation; manual satellite image interpretation; combination of quantitative modelling and aerial photo interpretation**
Comments:	**The current list of attributes used to describe the MAPPING METHOD is primarily based on the use of some form of imagery. Where other methods have been used such as modelled surfaces, a full description should be provided. Additional attributes to describe other**

	mapping methods may be subsequently defined.
Status:	Implemented in the NVIS Oracle database.

Attribute: MS03 - MAPPING EXPERTISE	
Heading	**Details**
Purpose:	To describe the overall level of skill and expertise of the map interpreters during the project or survey for a particular MAPPING METHOD.
Requirement:	Recommended
Database Field Name:	MAPPING_EXPERTISE
Description:	Custodians should specify the expertise in mapping or botanical survey or a combination of both used in the compilation of the dataset.
Value:	Character(2000)
Example:	High confidence in the skill and expertise of the interpreter(s)
Comments:	This field should be completed by the project leader or from information documented about the project. It is a summary of the quality of both spatial and attribute aspects of the application of the particular MAPPING_METHOD. Where there is only one mapping method for the dataset, this attribute can be used for further details of the method, with the attribute SURVEY_AND_MAP_RELIABILITY used to describe the overall quality assessment for the dataset.
Status:	Implemented in the NVIS Oracle database.

Attribute: MS04 - IMAGERY SOURCE	
Heading	**Details**
Purpose:	To briefly describe the type of image used to derive/classify the mapping units.
Requirement:	QAQC
Database Field Name:	IMAGERY_SOURCE (was: INTERPRETIVE_BASE)
Description:	These descriptions are commonly used terms. A MAPPING METHOD must have one or more entries for this attribute. Each type of image must have a separate entry.
Value:	Character(2000)
Example:	For a dataset mapped using API using 2 image types would have 2 records in the MAP_SOURCE table, viz::¶ 1. true colour photography' and 2. 'black and white photography'.
Comments:	

Status:	Implemented in the NVIS Oracle database.

Look-up Table for: IMAGERY SOURCE

Code	Explanation
black and white aerial photography	black and white aerial photography
colour aerial photography	Colour aerial photography
colour infrared aerial photography	Colour infrared aerial photography
satellite imagery: LANDSAT TM	Satellite imagery: LANDSAT Thematic Mapper
satellite imagery: LANDSAT MSS	satellite imagery: LANDSAT Multi-Spectral Scanner
satellite imagery: non-LANDSAT	satellite imagery: neither LANDSAT MSS nor TM. Please specify details in MAPPING_METHOD field.
maps	existing and/or historic maps
unknown	unknown

Attribute: MS05 - IMAGERY SCALE	
Heading	**Details**
Purpose:	To document the scale of each IMAGERY_SOURCE.
Requirement:	QAQC
Database Field Name:	IMAGERY_SCALE (was: SCALE_OR_RESOLUTION)
Description:	The denominator of the scale of each image listed in IMAGERY_SOURCE.
Value:	Number(10)
Example:	25000
Comments:	Scale is usually applied to aerial photography.

Status:	**Implemented in the NVIS Oracle database; need to implement field changes.**

Attribute: MS06 - IMAGERY RESOLUTION	
Heading	**Details**
Purpose:	**To document the resolution of each IMAGERY_SOURCE.**
Requirement:	**Recommended**
Database Field Name:	**IMAGERY_RESOLUTION (was: SCALE_OR_RESOLUTION)**
Description:	**The resolution (cell or pixel size) of each image listed in IMAGERY_SOURCE.**
Value:	**Number(10)**
Example:	**25**
Comments:	**The units are in metres. Resolution is usually applied to airborne or satellite scanned imagery.**
Status:	**Implemented in the NVIS Oracle database; need to implement field changes.**

Attribute: MS07 - MAPPING SOURCE EXTENT	
Heading	**Details**
Purpose:	**To describe the extent of the map source and/or mapping method within the dataset.**
Requirement:	**Optional**
Database Field Name:	**MAPPING_SOURCE_EXTENT**
Description:	**A description of the area of coverage of the map source and/or mapping method within the dataset.**
Value:	**Character(4000)**
Example:	**The interpretation of colour aerial photos was confined to public land in the coastal portion of the dataset.**
Comments:	**There are many cases where a mapping method and/or map source covers only part of the area of a dataset. This is a simple text field to describe such subsets of the dataset. In future, there may be a case for x,y strings to more-precisely define the internal (methodological and source) boundaries within a dataset.**
Status:	**New field. Yet to be implemented in the NVIS Oracle database.**

Attribute: MS08 - DELINEATION MEDIUM	
Heading	**Details**
Purpose:	**To describe the medium on which the map units were delineated.**

Requirement:	**Recommended**
Database Field Name:	**DELINEATION_MEDIUM (was: MEDIUM)**
Description:	**A description of the medium on which the image was captured, processed and interpreted or, if a combination of these, the medium on which map unit boundaries were delineated.**
Value:	**Character(2000)**
Example:	**Options might include: hardcopy paper; hardcopy mylar film; digital**
Comments:	**The use of particular mapping media may have implications for POSITIONAL _ACCURACY.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: DELINEATION MEDIUM

Code	Explanation
digital	digital
hardcopy mylar film	hardcopy mylar film
hardcopy paper	hardcopy paper
hardcopy photographs	hardcopy photographs
unknown	unknown

Attribute: MS09 - START_DATE_SOURCE	
Heading	**Details**
Purpose:	**To document the date of the earliest image source used in the particular mapping.**
Requirement:	**Recommended**
Database Field Name:	**START DATE_SOURCE (was: START_DATE)**
Description:	**Day, Month, Year of earliest image used in the particular mapping method.**
Value:	**Date. This is a year 2000 consistent date and time value set as dd/mm/yyyy.**
Example:	**09/04/1978**
Comments:	**The earliest mapping source across all mapping methods for a dataset would normally be used in the attribute START_DATE_SPATIAL to summarise the whole**

	dataset.
Status:	Implemented in the NVIS Oracle database.

Attribute: MS10 - END DATE SOURCE	
Heading	**Details**
Purpose:	To document the date of the most recent (i.e. the latest) image used in the mapping.
Requirement:	Recommended
Database Field Name:	END_DATE_SOURCE (was: END_DATE)
Description:	Day, Month, Year of latest image used in the mapping.
Value:	Date. This is a year 2000 consistent date and time value set as hh:mm:ss dd/mm/yyyy with hours set in 24hr time.
Example:	06/06/1996
Comments:	The latest mapping source across all mapping methods for a dataset would normally be used in the attribute END_DATE_SPATIAL to summarise the whole dataset.
Status:	Implemented in the NVIS Oracle database.

Attribute: MS11 - MAP BASE	
Heading	**Details**
Purpose:	To describe the source of the map base used for registering the final line-work in the data set.
Requirement:	Recommended
Database Field Name:	MAP_BASE
Description:	An attribute describing the final map base used to collate the line work and provide ground control. This field is at a "higher" level than DELINEATION_MEDIUM and is normally later in the mapping process. Multiple sources can be listed.
Value:	Character(2000); Semi-colon delimited
Example:	AUSLIG (1990) 1:100,000 series; GPS Ground Control Points
Comments:	Information should include the owner/custodian of the source, the year the information was collected, the scale or resolution of the mapping base, data set title or description in this order.
Status:	Implemented in the NVIS Oracle database.

References

Attribute: RF01 - CITATION	
Heading	**Details**
Purpose:	**To cite the reference.**
Requirement:	**QAQC**
Database Field Name:	**CITATION**
Description:	**A full reference to a publication, including reports, technical manuals, journal articles that describe the data set and/or the methods used in its compilation.**
Value:	**Character(2000); The entry must include all authors names, date, title, publication name and publisher.**
Example:	**1. AUSLIG. 1990, Vegetation - Atlas of Australian Resources, Third Series, vol. 6, Australian Surveying and Land Information Group, Canberra.¶ 2. Barlow, B.A. & Hyland, B.P.M. 1988, 'The Origin of the Flora of Australia's Wet Tropics', Proc.Ecol.Soc.Aust, vol. 15, pp. 1-17.**
Comments:	**A very useful attribute when consistently and comprehensively filled out.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: RF02 - FORMAT	
Heading	**Details**
Purpose:	**To describe the format(s) in which the reference is available.**
Requirement:	**Optional**
Database Field Name:	**FORMAT**
Description:	
Value:	**Character(2000); Semi-colon delimited**
Example:	**Hardcopy and digital; Hardcopy; Digital; URL**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: RF03 - STORAGE LOCATION	
Heading	**Details**
Purpose:	**To specify where the reference can be found.**
Requirement:	**Optional**
Database Field Name:	**STORAGE_LOCATION**
Description:	**The storage location(s) indicating where the reference can be found, including its URL where available.**
Value:	**Character(2000); Semi-colon delimited**

Example:	**1. Queensland Herbarium Library¶ 2. National Library¶ 3. http://www.environment.gov.au/states/cyp_on_l/reports/lup/cons_con.html**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Map Unit Level Attributes

Reference Information

Attribute: MU01 - MAP UNIT IDENTIFIER	
Heading	**Details**
Purpose:	**The purpose of this attribute is to identify the vegetation description data relating to each spatial unit, so that it can be linked to the spatial coverage.**
Requirement:	**Mandatory**
Database Field Name:	**MAPUNT_IDENTIFIER**
Description:	**A unique map (spatial) unit identifier, which links map units to the data set identifier (DATA_SET_NUMBER) and the vegetation descriptions within them. Up to 6 vegetation descriptions are allowed per map unit. (Map units with more than one vegetation type within them are called mosaics).**
Value:	**Number(10); in the format SDDNNNNN, where S=State code, DD=dataset number within the state and NNNNN = the mapunit ID supplied by the States and Territories. S and NN are assigned by the administrator.**
Example:	**76017501**
Comments:	**The MAP_UNIT table is essentially the table used to resolve the many to many relationship between the SPATIAL_ATRIBUTE_FORMAT and VEG_DESCRIPTION tables. The map unit can be thought of as an item in the legend of a vegetation map.**
Status:	**Implemented in the NVIS Oracle database.**

Descriptive Information

Attribute: MU02 - SPATIAL MIX	
Heading	**Details**
Purpose:	**To specify the spatial mix of a map unit.**

Requirement:	**Mandatory**
Database Field Name:	**SPATIAL_MIX**
Description:	**This attribute provides general information on both the spatial extent and makeup of the discrete sub-associations or floristic groups within the one map-unit. Map units may be homogeneous (pure) or mixed (mosaics). ¶ Spatially mixed map units are defined as those that have a number of discrete vegetation types within a map unit boundary.**
Value:	**Character(50); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**Examples of spatially mixed map units (mosaics):¶ 1. Structurally similar but floristically different vegetation types within one map unit. For example some alpine eucalyptus forests of similar structure but different species mixes may not readily be separable by either API or image classification (without resort to secondary information such as elevation or aspect).¶ 2. Structurally and floristically different vegetation types within one map unit that are not uniquely tied together ecologically (eg. are part of the patterning of the landscape). Most mapped units (depending on scale, interpretation materials, operator efficiency etc.) will be variations on this theme. Vegetation types smaller than the minimum-mapping unit will also occur here.¶ 3. Structurally and floristically different vegetation types within one map unit that are uniquely tied together ecologically. These Community Complexes are defined as vegetation types that occur with other vegetation types that are uniquely tied together ecologically, but are quite different structurally and floristically, but are mapped within map unit (eg. dune and swale complexes).**
Comments:	
Status:	**Implemented in the NVIS Oracle database. Action required by NVIS collaborators to resolve mosaics.**

Look-up Table for: SPATIAL MIX

Code	Explanation
pure	**The map unit has only one sub-association or discrete floristic group, and this can be adequately described.**
dominant mosaic	**The map unit has 2 or 3 main sub-associations or floristic groups, one of which occupies or is estimated to occupy greater than 70% of the spatial area of the polygon.**
mosaic	**The map unit definitely has 2 or 3 main sub-associations, which can be described in detail, the spatial extent of each**

	within the polygon is known, and one of the sub-associations is clearly spatially dominant.
equal mosaic	The map unit has two or three main sub-associations, which can be described in detail, and the spatial extent of each within the map unit, is more or less equal.
incomplete	The map unit definitely has more than one sub-association, although only one can be adequately described.
mosaic unknown	The map unit definitely has two or three main sub-associations, which can be described in detail, although the spatial extent of each is unknown.
unknown	unknown

Attribute: MU03 - MOSAIC TYPE	
Heading	**Details**
Purpose:	To specify the data model or format used in describing a mosaic spatial unit. This assists with the matching of source codes to NVIS descriptions.
Requirement:	Commonwealth
Database Field Name:	MOSAIC_TYPE
Description:	Mosaics are defined as heterogenous spatial units, containing more than one vegetation association within the unit of mapping. The field can have one of three values, as per the lookup table, below. 'Unknown' is not a valid option.
Value:	Character(1)
Example:	M
Comments:	This is a new data management field which arose as part of the restructure (2001-02) process.
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: MOSAIC TYPE

Code	Explanation
S	SPLIT - The components of the mosaic are clearly identified within the map unit by the source codes of its constituent elements.
C	COMPOUND - The source code for the mosaic as a whole is identical to the codes for all of its constituent associations (as specified within NVIS).
M	MIXED - The source code for the mosaic as a whole is not identical to the codes, for some or all of its constituent associations (in NVIS). I.e. this is a mixture of the two above options.

Attribute: MU04 - NUMBER OF VEGETATION DESCRIPTIONS	
Heading	**Details**
Purpose:	**To count the number of discrete vegetation descriptions occurring within the map unit.**
Requirement:	**Essential**
Database Field Name:	**NUMBER_OF_VEG_DESCRIPTIONS**
Description:	**This attribute provides a quick summary of the number of discrete vegetation descriptions occurring within the one map unit. It is a simple sum of the number of discrete vegetation descriptions occurring within the map unit.¶ Map Unit has one discrete sub-association = 1¶ Map Unit has two discrete sub-association = 2**
Value:	**Number(10)**
Example:	**3**
Comments:	**This field checks the integrity of the relevant records in the VEGETATION_DESCRIPTION table through relevant rules (see Section 4).**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: MU05 - VEG DESCRIPTION POSITION	
Heading	**Details**
Purpose:	**To document the relative areas or proportions of each vegetation description within the map unit.**
Requirement:	**Essential**
Database Field Name:	**VEG_DESC_POSITION**
Description:	**Each discrete vegetation description (ideally sub-associations) within the map unit is assigned a unique number. The vegetation description with the greatest area must be assigned a value of '1'.¶ The number assigned to the remaining sub-associations (if they exist in the unit) should be allocated according to decreasing spatial area. Where there is no clear pattern of spatial dominance for subsequent sub-associations, the numbering can be arbitrary.**
Value:	**Number(10)**
Example:	**3**
Comments:	**This is a new field which arose as part of the restructure (2001-02) process. It is similar in intended function to the obsolete field VEGETATION DESCRIPTION NUMBER in the VEG_DESCRIPTION table.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: MU06 - VEG DESCRIPTION PROPORTION

Heading	Details
Purpose:	To document the estimated percentage area of each vegetation description within the map unit.
Requirement:	Optional
Database Field Name:	VEG_DESC_PROPORTION
Description:	Percentage of each vegetation description.
Value:	Number(10)
Example:	40
Comments:	This is a new field which arose as part of the restructure (2001-02) process.
Status:	Implemented in the NVIS Oracle database.

Vegetation Description Level Attributes

Reference Information

Attribute: VG01 - VEGETATION IDENTIFICATION	
Heading	**Details**
Purpose:	To definitively identify each unique vegetation description at the jurisdictional level.
Requirement:	Mandatory
Database Field Name:	VEG_ID
Description:	This is a unique number assigned by each jurisdiction to each unique vegetation description. It is suggested that the numbers are assigned sequentially within a State or Territory. Ideally each VEG_ID can be matched to a single NVIS_ID on a 1:1 basis.
Value:	Number(10)
Example:	3078
Comments:	Once assigned, the number cannot be changed.
Status:	New field: not yet implemented in the NVIS Oracle database.

Attribute: VG02 - NVIS IDENTIFICATION	
Heading	**Details**
Purpose:	To definitively identify each unique vegetation description at the national level.
Requirement:	Commonwealth

Database Field Name:	**NVIS_ID**
Description:	**This is a number assigned by the Commonwealth to each unique vegetation description supplied by the States and Territories. The numbers are assigned sequentially on initial receipt of the data. Ideally each SOURCE_CODE (and/or VEG_ID) can be matched to a single NVIS_ID on a 1:1 basis.**
Value:	**Number(10)**
Example:	**3078**
Comments:	**Once assigned, the number cannot be changed. Maintenance of this field is highly desirable and would be essential in a fully distributed system.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: VG03 - SOURCE CODE	
Heading	**Details**
Purpose:	**To enable labelling of each mapping unit with the original mapping code used by the data supplier (usually a State or Territory).**
Requirement:	**Mandatory**
Database Field Name:	**SOURCE_CODE**
Description:	**The original mapping code used by the data custodian for labelling and displaying the map unit. The original code used by the data supplier for uniquely describing or identifying the vegetation description.¶ If there is a hierarchy in the coding, the lowest level (i.e. the most detailed or descriptive level) should be provided.**
Value:	**Character(50).**
Example:	**1023 [F3]; 130 [411]; 2005300; 28c_MV; A1; AH0035; KI023A; Land unit 6b1; a8,10Sr k2Ci [803]**
Comments:	**These codes will generally not be comparable between data sets or jurisdictions. This attribute allows the NVIS coding to be matched to the original coding for the sub-association. This field is critical to communicating with collaborators and identifying additional (e.g. printed) information on the vegetation description.**
Status:	**Implemented in the NVIS Oracle database.**

Descriptive Information

Attribute: VG04 - LEVEL OF DETAIL

Heading	Details
Purpose:	To describe the level of detail in the NVIS Information Hierarchy at which the vegetation description has been supplied by the data custodian.
Requirement:	QAQC
Database Field Name:	LEVEL_OF_DETAIL (was: ENTRY_LEVEL)
Description:	This is used to readily identify the most complex level of data description supplied for each vegetation type.¶ The vegetation description entry level (association or sub-association) determines the expected detail of stratum information supplied for the vegetation description.
Value:	Character(50). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.
Example:	sub-association
Comments:	For future data supply, the minimum expected level of entry would be Association/Level 5.
Status:	Implemented in the NVIS Oracle database. Issue of legacy content.

Look-up Table for: LEVEL OF DETAIL

Code	Explanation
level5_association	For each stratum (maximum of 3 strata): floristic information (up to 3 dominant and/or diagnostic species) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2). The ecologically predominant stratum is indicated (with a plus symbol: "+"); level 5
level6_sub-association	For each layer/sub-stratum (maximum of 8 sub-strata): floristic information (up to 5 dominant and/or diagnostic species) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2). The ecologically predominant stratum is indicated (with a plus symbol: "+"); level 6

Attribute: VG05 - NUMBER OF STRATA	
Heading	Details
Purpose:	To identify the number of (sub-)strata described within a vegetation description.
Requirement:	QAQC
Database Field Name:	NUMBER_OF_STRATA
Description:	This attribute provides a quick summary of the number of discrete sub-strata occurring within the one vegetation

	description. A maximum number of eight sub-strata per sub-association can be reported. The value is provided by the data supplier.
Value:	**Number(10); Valid range 1-8; There is no particular importance placed on the order of the sub-strata, although previous versions of NVIS specified listing the sub-strata in order of decreasing dominance. Whatever order is chosen should be documented in the Data_Set table.**
Example:	**3**
Comments:	**This field checks the integrity of the relevant records in the Stratum table through relevant rules (see Section 4).**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: VG06 - LEVEL 1 (CLASS)	
Heading	**Details**
Purpose:	**To describe level 1 (i.e. the class defining the vegetation type) within the NVIS Information Hierarchy (refer to Table 1).**
Requirement:	**Automated**
Database Field Name:	**L1_CLASS**
Description:	**The description of class should include the growth form for the ecologically dominant stratum of the vegetation type/description (refer to Tables 2 and 3).**
Value:	**Character(50).**
Example:	**Tree**
Comments:	**This attribute should be derived from level 5 or 6 using a rule set.**
Status:	**Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.**

Attribute: VG07 - LEVEL 2 (STRUCTURAL FORMATION)	
Heading	**Details**
Purpose:	**To describe level 2 (i.e. the structural formation defining the vegetation type) within the NVIS Information Hierarchy (refer to Table 1).**
Requirement:	**Automated**
Database Field Name:	**L2_STRUCTURAL_FORMATION**
Description:	**The description of structural formation should include dominant growth form, height and cover (using the terminology of Tables 2, 3 and 4) for the ecologically dominant stratum of the vegetation type/description.**

Value:	**Character(2000).**
Example:	**Tall open forest**
Comments:	**This attribute should be derived from level 5 or 6 using a rule set.**
Status:	**Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.**

Attribute: VG08 - LEVEL 3 (BROAD FLORISTIC FORMATION)	
Heading	**Details**
Purpose:	**To describe level 3 (i.e. the broad floristic formation defining the vegetation type) within the NVIS Information Hierarchy.**
Requirement:	**Automated**
Database Field Name:	**L3_BROAD_FLORISTIC_FORMATION**
Description:	**This attribute describes the vegetation type/description with floristic information at the level of genus, plus the structural formation of the dominant stratum reported at the sub-formation level (Level 4) of the NVIS Information Hierarchy (see Table 1). Refer to tables 2, 3 and 4.**
Value:	**Character(2000).**
Example:	**Eucalyptus tall open forest.**
Comments:	**This attribute should be derived from level 5 or 6 using a rule set.**
Status:	**Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.**

Attribute: VG09 - LEVEL 4 (SUB-FORMATION)	
Heading	**Details**
Purpose:	**To describe level 4 (i.e. the sub-formation defining the vegetation type) within the NVIS Information Hierarchy.**
Requirement:	**Automated**
Database Field Name:	**L4_SUB_FORMATION**
Description:	**For each stratum, the sub-formation description of the vegetation type should include floristic information (genus) plus the structural formation (dominant growth form, cover, height are implied). A maximum of three strata is allowed and the dominant stratum is indicated by a plus symbol "+". Refer to tables 1, 2, 3 and 4.**
Value:	**Character(2000).**
Example:	**Eucalyptus tall open forest\Banksia open shrubland\Themeda open tussock grassland**
Comments:	**This attribute should be derived from level 5 or 6 using a**

	rule set. As at the time of writing, June 2003, the user must input "(mixed)" at this level, if there is no clear dominant genus in a stratum.
Status:	Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.

Attribute: VG10 - LEVEL 5 (ASSOCIATION)	
Heading	**Details**
Purpose:	This attribute describes level 5 (i.e. an association level description of the vegetation type) within the NVIS Information Hierarchy (refer to Table 1).
Requirement:	Essential
Database Field Name:	L5_ASSOCIATION
Description:	For each stratum, the association description of the vegetation type should include floristic information for the dominant and/or diagnostic species (maximum of 3 species per stratum) plus the structural formation (dominant growth form, cover, height are implied). A maximum of three strata (upper, mid and ground) are allowed and the dominant stratum is indicated by a plus symbol "+". Refer to tables 1, 2, 3 and 4. For documentation of the dominance and the hats ^, please see Section 2.
Value:	Character(2000).
Example:	Refer to the Example for Association in Table 6.
Comments:	This attribute should be entered directly at this level if the source vegetation data will only support an association-level and not a sub-association-level description. Alternatively, the data can be derived from level 6 using a rule set and/or the use of expert knowledge. As at the time of writing, Feb 2003, the user must interpret this level from level 6 data.
Status:	Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.

Attribute: VG11 - LEVEL 6 (SUB-ASSOCIATION)	
Heading	**Details**
Purpose:	This attribute describes the sub-association level description of the vegetation description as defined within the NVIS Information Hierarchy (refer to Table 1).
Requirement:	Essential
Database Field Name:	L6_SUB_ASSOCIATION
Description:	For each layer/sub-stratum, the sub-association description of the vegetation type should include floristic

	information for the dominant and/or diagnostic species (maximum of 5 species per sub-stratum) plus the structural formation (dominant growth form, cover, height are implied). A maximum of eight sub-strata (as per Table 2) are allowed and the dominant sub-stratum is indicated by a plus symbol "+". Refer to tables 1, 2, 3 and 4. For documentation of dominance and the hats ^, please see Section 2.
Value:	**Character(2000).**
Example:	**Refer to the example for Sub-Association in Table 6.**
Comments:	**This attribute should be entered directly at this level if the source vegetation data will support a sub-association-level description.**
Status:	**Implemented in the NVIS Oracle database. Need to change field name in the NVIS database.**

Attribute: VG12 - SOURCE DESCRIPTION	
Heading	**Details**
Purpose:	**To describe the mapping unit as used by the data supplier.**
Requirement:	**Essential**
Database Field Name:	**SOURCE_DESCRIPTION**
Description:	**A written description of the original vegetation description used by the data custodian. The written description will be the same as that name held in the original data set, sourced from the custodian of the data.**
Value:	**Character(2000).**
Example:	**Montane grassy woodland¶ Coastal vine-rich forest**
Comments:	**These descriptions will generally not be comparable between data sets or jurisdictions.¶ This attribute allows the NVIS sub-association description to be matched to the original description for the sub-association.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: VG13 - ENVIRONMENTAL DESCRIPTION	
Heading	**Details**
Purpose:	**To describe the environmental characteristics that consistently occur within the vegetation type.**
Requirement:	**Recommended**
Database Field Name:	**ENVIRONMENTAL_DESCRIPTION**
Description:	**A description of environmental parameters that consistently occur within the vegetation description and thereby help to define it.¶ Descriptions should be**

	categorical and concentrate on the main physical drivers that influence the type and extent of vegetation. Attributes should include where available geographical location (e.g. Hunter Valley or an IBRA region), soil type/s (e.g. soil depth, texture, structure), geology (e.g. basalt), landform patterns/units (e.g. upper slopes and ridge lines), terrain (elevation range, slope, solar radiation and aspect), climatic types (e.g. long hot dry summer, mild wet winter). Where possible use key words and look up tables linked to published source material.
Value:	**Character(2000).**
Example:	**This type of vegetation occurs on old sand dunes. The distribution appears to correlate with sheltered moist areas on the landward side of the Rainforests on the deep sands along the east coast of the Range. The recorded fire history varies but cool ground fires are likely to be common and patchy.**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Detailed Vegetation Attributes

Structural Information

Attribute: ST01 - STRATUM CODE	
Heading	**Details**
Purpose:	**To briefly describe the sub-stratum.**
Requirement:	**Essential**
Database Field Name:	**STRATUM_CODE**
Description:	**The stratum code defines each sub-stratum with a letter that corresponds with the stratum, and a number that describes the position within the stratum of a particular sub-stratum, in order of decreasing relative height, e.g. U1 > U2 > U3. I.e. U1 is always the tallest tree layer. The stratum code does not imply dominance.**
Value:	**Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**U1**
Comments:	**Note that E, for emergent, is no longer a valid value. In the validation of the NVIS (2000) dataset in the Commonwealth, most E sub-strata have been converted to U1 sub-stratum, as appropriate. Several E sub-strata**

	have been converted to M sub-strata.
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: STRATUM CODE

Code	Explanation
U1	Upper - Tallest sub-stratum. For forests and woodlands this will often, but not always, be the dominant sub-stratum. For a continuum, the tallest stratum becomes the defining stratum.
U	Upper - Tree layer; for data supplied at NVIS Level 5.
U2	Upper - Sub canopy layer, second tree layer
U3	Upper - Sub canopy layer, third tree layer
M1	Mid - Tall shrub layer
M	Mid - Mid (shrub) layer; for data supplied at NVIS Level 5.
M2	Mid - Mid shrub layer
M3	Mid - Low shrub layer.
G1	Lower - Tall ground layer.
G	Ground - Ground layer; for data supplied at NVIS Level 5.
G2	Lower - Low ground layer

Attribute: ST02 - SUB-STRATUM RANK	
Heading	**Details**
Purpose:	To assign a number to each sub-stratum in a stratum in order of decreasing dominance.
Requirement:	Recommended
Database Field Name:	SUB_STRATUM_RANK (was: STR_NUMBER)
Description:	A number assigned to each sub-stratum within a stratum in order of decreasing dominance. Rather than number sub-strata in order of decreasing dominance across the whole vegetation profile, comparing similar entities will be easier for the assignment of dominance to sub-strata within each stratum. Dominance would be based on an estimate of biomass (cover x height) for each sub-stratum.
Value:	Number(10); Valid range for NVIS: 1-3.
Example:	2
Comments:	Applies to data supplied at NVIS Level 6 only. This attribute does not necessarily work on decreasing height

	of the sub-stratum, as does STRATUM_CODE. This attribute is subject to further review with respect to improving the transparency of generating Level V descriptions from Level VI.
Status:	**Similar (v. 5.0) field implemented in the NVIS Oracle database.**

Attribute: ST03 - NUMBER OF GROWTH FORMS	
Heading	**Details**
Purpose:	**To document the number of growth forms recorded for the (sub-)stratum.**
Requirement:	**QAQC**
Database Field Name:	**NUMBER_OF_GROWTH_FORMS**
Description:	**This attribute provides a quick summary of the number of discrete growth forms occurring within one sub-stratum within the vegetation description. It is provided by the data supplier. A maximum number of five growth forms per sub-stratum can be reported.**
Value:	**Number(10)**
Example:	**3**
Comments:	**This field checks the integrity of the relevant records in the Growth Form table through relevant rules (see Section 4).**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST04 - NUMBER OF TAXA	
Heading	**Details**
Purpose:	**To document the number of taxa recorded for the (sub-)stratum.**
Requirement:	**QAQC**
Database Field Name:	**NUMBER_OF_TAXA**
Description:	**This attribute provides a quick summary of the number of discrete taxa occurring within the one sub-stratum in the vegetation description. It is provided by the data supplier. A maximum number of five taxa per sub-stratum can be reported.**
Value:	**Number (10)**
Example:	**3**
Comments:	**This field checks the integrity of the relevant records in the Taxon table through relevant rules (see Section 4).**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST05 - COVER TYPE	
Heading	**Details**
Purpose:	**To briefly specify the type of measure used in the COVER VALUE in the Stratum table.**
Requirement:	**Essential**
Database Field Name:	**COVER TYPE**
Description:	**This attribute must be completed if any of the COVER VALUE fields (MINIMUM, MAXIMUM, MEDIAN and/or MEAN) are recorded in the STRATUM table.¶ The codes are prefixed by:¶ N - Numeric Real Value¶ C - Numeric Classed Value (the values provided are the upper and lower ranges of a cover class category)¶ Q - Qualitative Value**
Value:	**Character(20). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**1N**
Comments:	**The numbers for the "C" options have been simplified, so that the number refers to the type of cover measure. (The letter refers to how it is reported.) Options 10Q (frequency) and 11Q (Dominance), from version 5.0 of the Aust. Veg. Attributes, have been removed, since these values would not be valid options in the STRATUM table. Also, FREQUENCY and DOMINANCE are separate fields in the GROWTH_FORM and TAXON tables.**
Status:	**Implemented in the NVIS Oracle database. The options 5C to 9C will need to be changed to 1C to 5C, respectively. Also, decisions made about 10Q and 11Q, where these exist.**

Look-up Table for: COVER TYPE

Code	Explanation
1N	**Crown or Canopy Cover:§ Crown Cover is defined as the percentage of the sample site within the vertical projection of the periphery of the crowns. In this case crowns are treated as opaque (Walker and Hopkins 1990). § Crown cover is estimated using the mean gap between crowns divided by mean crown width (the crown separation ratio) (Walker and Hopkins 1990).§ The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median.**
2N	**Foliage Cover:§ Foliage cover is defined as the percentage of the sample site occupied by the vertical projection of foliage and branches (if woody) (Walker and Hopkins 1990). § For ground vegetation, it is measured using line intercept methods. It will, to some degree take into account the**

	thickness of a clump of grass.§ % crown cover x crown type (Walker and Hopkins 1990) § The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median.
3N	**Percentage Cover:§ The percentage of a strictly defined plot area, covered by vegetation, generally applicable for the ground vegetation that has been estimated rather than measured using line intercept methods. It does not necessarily take into account thickness of a clump of grass.§ The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median.**
4N	**Projective Foliage Cover:§ The percentage of the sample site occupied by the vertical projection of foliage only (Walker and Hopkins 1990). § The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median.**
1C	**Crown or Canopy Cover: As for 1N above but for data derived from or containing class intervals. § Crown Cover is defined as the percentage of the sample site within the vertical projection of the periphery of the crowns. In this case crowns are treated as opaque. § The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median. (Formerly 5C).**
2C	**Foliage Cover: As for 2N above but for data derived from or containing class intervals. § Foliage cover is defined as the percentage of the sample site occupied by the vertical projection of foliage and branches (Walker and Hopkins 1990). § For ground vegetation, it is measured using line intercept methods. It will, to some degree take into account the thickness of a clump of grass.§ The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median. (Formerly 6C)**
3C	**Percentage Cover: As for 3N above but for data derived from or containing class intervals. § The percentage of a strictly defined plot area, covered by vegetation, generally applicable for the ground vegetation that has been estimated rather than measured using line intercept methods. It does not necessarily take into account thickness of a clump of grass.§ The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data. Values may include the minimum, maximum, mean and median. (Formerly 7C)**
4C	**Projective Foliage Cover: As for 2N above but for data**

	derived from or containing class intervals. § The percentage of the sample site occupied by the vertical projection of foliage only (not branches) (Walker and Hopkins 1990). § The cover values provided for the NVIS are the summed and averaged values for each sub-association, generally determined from the synthesis of site data.§ Values may include the minimum, maximum, mean and median. (Formerly 8C)
5C	Cover Abundance Rating: § Abundance class system eg. Braun-Blanquet.§ Percentage values may include the minimum and maximum. (Formerly 9C)
not applicable	not applicable
unknown	unknown

Attribute: ST06 - COVER TYPE DERIVATION METHOD	
Heading	**Details**
Purpose:	To provide further details on the type of measure used in the COVER VALUE in the Stratum table.
Requirement:	Optional
Database Field Name:	COVER_TYPE_DERIV_METHOD
Description:	A more detailed description of the COVER TYPE recorded, including the derivation method.¶ Where a cover abundance rating is recorded, specify the system applied and a reference where available.
Value:	Character(2000).
Example:	Braun-Blanquet
Comments:	
Status:	Implemented in the NVIS Oracle database. Recommend upgrade to contents of this field.

Attribute: ST07 - COVER MINIMUM VALUE	
Heading	**Details**
Purpose:	To record the minimum value of cover for the (sub-)stratum.
Requirement:	Optional
Database Field Name:	COVER_MINIMUM_VALUE
Description:	A percentage value related to the COVER TYPE, expressed as the minimum value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the lowest value

	of the range. This value is provided by the data supplier when only classified cover data is available for the vegetation description.
Value:	Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999
Example:	10
Comments:	
Status:	Implemented in the NVIS Oracle database.

Attribute: ST08 - COVER MAXIMUM VALUE	
Heading	Details
Purpose:	To record the maximum value of cover for the (sub-)stratum.
Requirement:	Optional
Database Field Name:	COVER_MAXIMUM_VALUE
Description:	A percentage value related to the COVER TYPE, expressed as the maximum value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the highest value of the range. This value is provided by the data supplier when only classified cover data is available for the vegetation description.
Value:	Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999
Example:	70
Comments:	
Status:	Implemented in the NVIS Oracle database.

Attribute: ST09 - COVER MEDIAN VALUE	
Heading	Details
Purpose:	To record the median value of cover for the (sub-)stratum.
Requirement:	Optional
Database Field Name:	COVER_MEDIAN_VALUE
Description:	A percentage value related to the COVER TYPE, expressed as the median value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.
Value:	Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999

Example:	**60**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST10 - COVER MEAN VALUE	
Heading	**Details**
Purpose:	**To record the mean value of cover for the (sub-)stratum.**
Requirement:	**Essential**
Database Field Name:	**COVER_MEAN_VALUE**
Description:	**A percentage value related to the SUB-ASSOCIATION STRATUM COVER TYPE, expressed as the mean value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**60**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST11 - COVER CODE	
Heading	**Details**
Purpose:	**To categorise the cover measurement for the stratum or sub-stratum.**
Requirement:	**Essential**
Database Field Name:	**COVER_CODE**
Description:	**A code which is interpreted by the data custodian from primary measure(s) of cover for the (sub-)stratum. It summarises the cover measure in a form which is comparable across different methods of measurement.**
Value:	**Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**d**
Comments:	**The methods used to translate the associated TYPE and VALUE into the appropriate COVER CODE must be documented.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: COVER CODE

Code	Explanation
d	Foliage cover 70-100% - Crown cover 80-100%
d	Ground cover 70-100%
c	Foliage cover 30-70% - Crown cover 50-80%
c	Ground cover 30-70%
i	Foliage cover 10-30% - Crown cover 20-50%
i	Ground cover 10-30%
r	Foliage cover less than 10% - Crown cover 0.25-20%
r	Ground cover less than 10%
bi	Foliage cover ~0% (scattered) - Crown cover 0-0.25%
bi	Ground cover ~0% (scattered)
bc	Foliage cover ~0% (clumped) - Crown cover 0-0.25%
bc	Ground cover ~0% (clumped)
unknown	unknown

Attribute: ST12 - HEIGHT TYPE	
Heading	**Details**
Purpose:	To describe the method used to provide the HEIGHT VALUE.
Requirement:	QAQC
Database Field Name:	HEIGHT_TYPE
Description:	The measurement point for the heights of each (sub-)stratum. This can vary depending on observer and will probably always be somewhat imprecise, as there is no unequivocal method for defining the height measurement point of particular sub canopy layers or stratum. The delineation of these layers or strata is generally subjective, relying on the recorders perception of heights and can be complicated by the vegetation itself.
Value:	Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to. In the lookup code, the first letter is as per COVER_TYPE in the STRATUM table, viz: N = Numeric Real Value; C = Numeric Classified Value

Example:	**NT**
Comments:	**This attribute is an attempt to standardise the precision and the source of the height measurement.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: HEIGHT TYPE

Code	Height Type	Stratum	Growth Form	Explanation
NV	Layer Height (general vegetation mapping)	Any	Forest, woodlands, shrublands, grasslands	Layer height of the top stratum (top of the canopy or the top of the bulk of the vegetative material making up the stratum) that may be present, other than the tallest layer (i.e. midstorey canopy). The min and max values of this will not give any indication of canopy depth.
NA	Average Height (general vegetation mapping)	Any	Forest, woodlands, shrublands, grasslands	Average height of the stratum where the bulk of the vegetative material falls within a particular stratum. This may not strictly result from the measurement of a number individuals, or representative individuals, which fall within the range of the recognised stratum. The mean value becomes essentially a measure of the midpoint of the canopy depth. The min and max values define the depth

				of the canopy or layer.
NT	Top Height	U1, U2	Forests	General height of the top of the tallest canopy layer, not necessarily the dominant canopy layer. The min and max values will not give any indication of canopy depth. This height category may indicate U1 as "emergent" layer and U2 as the dominant layer.
CV	Layer Height	As above	As above	As above
CP	Top Height	As above	As above	As above
CT	Dominant Height	As above	As above	As above
CA	Average Height	As above	As above	As above
not applicable	-	-	-	not applicable
unknown	-	-	-	unknown

Attribute: ST13 - HEIGHT TYPE DERIVATION METHOD	
Heading	**Details**
Purpose:	To provide further descriptive information on the HEIGHT TYPE recorded, including the derivation method.
Requirement:	Optional
Database Field Name:	HEIGHT_TYPE_DERIV_METHOD
Description:	A more detailed description of the HEIGHT_TYPE recorded, including the derivation method.
Value:	Character(2000).
Example:	Average height measured by a clinometer in the field.
Comments:	The unit of this field is metres or fractions, thereof.

Status:	Implemented in the NVIS Oracle database.

Attribute: ST14 - HEIGHT MINIMUM VALUE	
Heading	**Details**
Purpose:	To record the minimum value of height for the (sub-)stratum.
Requirement:	Optional
Database Field Name:	HEIGHT_MINIMUM_VALUE
Description:	A height value for the HEIGHT TYPE, expressed as the minimum value for the (sub-)stratum. This value is provided by the data supplier when only classified height data is available for the vegetation description.
Value:	Number(5,1)
Example:	10.0
Comments:	The unit of this field is metres or fractions, thereof.
Status:	Implemented in the NVIS Oracle database.

Attribute: ST15 - HEIGHT MAXIMUM VALUE	
Heading	**Details**
Purpose:	To record the maximum value of height for the (sub-)stratum.
Requirement:	Optional
Database Field Name:	HEIGHT_MAXIMUM_VALUE
Description:	A height value for the HEIGHT TYPE, expressed as the maximum value for the (sub-)stratum. This value is provided by the data supplier when only classified height data is available for the vegetation description.
Value:	Number(5,1)
Example:	40.0
Comments:	The unit of this field is metres or fractions, thereof.
Status:	Implemented in the NVIS Oracle database.

Attribute: ST16 - HEIGHT MEAN VALUE	
Heading	**Details**
Purpose:	To record the mean height for the (sub-)stratum
Requirement:	Essential
Database Field Name:	HEIGHT_MEAN_VALUE
Description:	A height value for the HEIGHT TYPE, expressed as the mean value for the (sub-)stratum.

Value:	**Number(5,1)**
Example:	**25.6**
Comments:	**The unit of this field is metres or fractions, thereof.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST17 - HEIGHT MEDIAN VALUE	
Heading	**Details**
Purpose:	**To record the mean height for the (sub-)stratum.**
Requirement:	**Optional**
Database Field Name:	**HEIGHT_MEDIAN_VALUE (was: MEDIAN VALUE)**
Description:	**A height value for the HEIGHT TYPE, expressed as the median value for the (sub-)stratum.**
Value:	**Number(5,1)**
Example:	**30.0**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: ST18 - HEIGHT CLASS	
Heading	**Details**
Purpose:	**To categorise the height for each sub-stratum.**
Requirement:	**Essential**
Database Field Name:	**HEIGHT_CLASS**
Description:	**The height class is interpreted by the data custodian from the sub-stratum height value(s) and growth form(s) for the sub-stratum. It summarises the height measure in a form which is comparable across different methods of measurement. It contributes to the definition of the structural formation of the sub-stratum.**
Value:	**Number(10); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**8**
Comments:	**Note that previously, this field was a character data type. The classes were proposed to avoid confusion with the Walker & Hopkins (1990) height classes, and to enable simplified coding for map legends.¶ The class intervals were derived from an appraisal of Australian vegetation mapping height classes used by the various jurisdictions. The existing Walker & Hopkins (1990) height classes, although applicable for the taller classes, did not correspond well in the lower classes. An epiphyte takes on the height class code of the (sub-)stratum in which it**

	occurs.
Status:	Implemented in the NVIS Oracle database. Check implications of change from Character to Numeric field.

Look-up Table for: HEIGHT CLASS

Code	Explanation
8	Height Range greater than 30 m - Trees, Vines (in M and U), Palms (single-stemmed), Epiphytes
7	Height Range 10 - 30 m - Trees, Vines (in M and U), Palms (single-stemmed), Mallee, Mallee shrub, Epiphytes
6	Height Range less than 10 m - Trees, Vines (in M and U), Palms (single-stemmed), Epiphyte; Height Range 3 - 10 m - Mallee, Mallee shrub, Epiphytes
5	Height Range less than 3 m - Mallee, Mallee shrub, Epiphytes
4	Height Range above 2 m - Cycads, Grass-trees, Tree-ferns, Shrubs, Heath shrub, Chenopod shrub, Ferns, Samphire, Palms (multi-stemmed), Tussock and Hummock grasses, Sedges, Rushes, Forbs, Epiphytes (in G), Vines (in G)
3	Height Range 1 - 2 m - Cycads, Grass-trees, Tree-ferns, Shrubs, Heath shrub, Chenopod shrub, Ferns, Samphire, Palms (multi-stemmed), Tussock and Hummock grasses, Sedges, Rushes, Forbs, Epiphytes (in G), Vines (in G)
2	Height Range 0.5 - 1 m - Cycads, Grass-trees, Tree-ferns, Shrubs, Heath shrub, Chenopod shrub, Ferns, Samphire, Palms (multi-stemmed), Tussock and Hummock grasses, Sedges, Rushes, Forbs, Lichen, Bryophyte, Seagrasses, Epiphytes (in G), Vines (in G)
1	Height Range less than 0.5 m - Cycads, Grass-trees, Tree-ferns, Shrubs, Heath shrub, Chenopod shrub, Ferns, Samphire, Palms (multi-stemmed), tussock and Hummock grasses, Sedges, Rushes, Forbs, Lichen, Bryophyte, Seagrasses, Epiphytes (in G)
unknown	unknown

Attribute: ST19 - DOMINANT STRATUM FLAG	
Heading	**Details**
Purpose:	To give a simple indication as to whether the stratum is dominant, relative to all other strata, within the vegetation community being described.
Requirement:	Essential
Database Field Name:	DOMINANT_STRATUM_FLAG (was: IS_DOMINANT)
Description:	This is a Boolean field added to the dominant sub-stratum

	in level 6 or stratum in level 5. It is carried through at the stratum level in upper levels of the NVIS Hierarchy.
Value:	Character(1); Valid entries: "Y" (Yes) or "N" (No); "T" (True) or "F" (False).
Example:	Y
Comments:	See glossary for further discussion of dominance. Where the value of this field is T or Y, the corresponding (sub-)stratum is marked with a "+" in the appropriate fields describing levels 6 to 4 in the NVIS Information Hierarchy. As part of the restructure and review of NVIS (2000), rules were developed to check the content and automatically generate levels 1 to 4 (and 5) thru XML applications.
Status:	New field. Implemented in the NVIS Oracle database.

Taxon Data

Attribute: TD01 - TAXON DATA RANK	
Heading	**Details**
Purpose:	To number to each taxon (species) in order of decreasing importance within each sub-stratum.
Requirement:	Essential
Database Field Name:	TAXON_DATA_RANK
Description:	The most important taxon in describing the (sub-)stratum must be assigned a value of '1'.¶ The number assigned to the remaining taxa should allocated according to decreasing importance.¶ A maximum of 5 taxa are required for NVIS at each sub-stratum, but more for each sub-stratum, but more can be supplied , if needed.
Value:	Number(10); Valid range for NVIS: 1-5, with no ties. Numbers greater than 5 are optional.
Example:	3
Comments:	Importance is usually the dominance of the taxon in the (sub-)stratum, as estimated by biomass. However, once the co-dominant and sub-dominant taxa have been listed, indicator taxa (but not otherwise dominant) can be used to characterise the vegetation description.
Status:	Implemented in the NVIS Oracle database.

Attribute: TD02 - TAXON DATA DESCRIPTION	
Heading	**Details**
Purpose:	To describe the taxon against which ecological data is

	entered in the TAXON_DATA table.
Requirement:	Essential
Database Field Name:	TAXON_DATA_DESCRIPTION
Description:	This field contains the full taxonomic names of the taxon.
Value:	Character (2000). Genus+species+infraspecies rank+infraspecies in the format: [A-Z][a-z]+ [a-z-]+.?((subsp.|var.|sp. aff.|cv.|f.|s. lat.|s. str.|x|nothossp.) [a-z]+)?, where A-Z means the genus name is capitalised and remaining fields are lower-case. Species and infraspecies names are all lower-case.
Example:	Eucalyptus obliqua
Comments:	
Status:	Implemented in the NVIS Oracle database and XML transfer system.

Attribute: TD03 - TAXON DATA SOURCE CODE	
Heading	**Details**
Purpose:	To supply a code for the taxon against which ecological data is entered in the TAXON_DATA table.
Requirement:	Recommended
Database Field Name:	TAXON_DATA_SOURCE_CODE
Description:	The data supplier's unique source code for the taxon. This attribute is based on the authority's coding system.
Value:	Character(50).
Example:	'eucatetr' represents Eucalyptus tetrodonta in a particular dataset or jurisdiction.
Comments:	These codes will not be comparable between data sets or jurisdictions and are only used to provide a link to the TAXON SOURCE and TAXON SOURCE IDENTIFIER.
Status:	New field in this table. Implemented in the NVIS Oracle database and the XML transfer system.

Attribute: TD04 - COVER TYPE	
Heading	**Details**
Purpose:	To briefly specify the type of measure used in the COVER VALUE in the Taxon table.
Requirement:	QAQC
Database Field Name:	COVER_TYPE
Description:	The type of measure used for defining the COVER VALUE fields (MINIMUM, MAXIMUM, MEDIAN

	and/or MEAN). This attribute must be completed if the COVER VALUE is recorded in the TAXON table.¶ The codes are prefixed by:¶ N - Numeric Real Value¶ C - Numeric Classed Value (the values provided are the upper and lower ranges of a cover class category)¶ Q - Qualitative Value
Value:	**Character(20). This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**10Q**
Comments:	****N.B. See ST05 COVER TYPE for the lookup table.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD05 - COVER TYPE DERIVATION METHOD	
Heading	**Details**
Purpose:	**To provide further details on the type of measure used in the COVER VALUE in the Taxon table.**
Requirement:	**Optional**
Database Field Name:	**COVER_TYPE_DERIV_METHOD**
Description:	**A more detailed description of the COVER TYPE recorded in the fields (MINIMUM, MAXIMUM, MEDIAN and/or MEAN), including the derivation method, as per COVER TYPE DERIVATION METHOD in the Stratum table.¶ Where a cover abundance rating is recorded, specify the system applied and a reference where available.**
Value:	**Character(2000).**
Example:	**Braun-Blanquet**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD06 - COVER MINIMUM VALUE	
Heading	**Details**
Purpose:	**To record the minimum value of cover for the taxon in the sub-stratum.**
Requirement:	**Optional**
Database Field Name:	**COVER_MINIMUM_VALUE**
Description:	**A percentage value related to the TAXON COVER TYPE, expressed as the minimum value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the**

	lower value of the range.
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**10**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD07 - COVER MAXIMUM VALUE	
Heading	**Details**
Purpose:	**To record the maximum value of cover for the taxon in the sub-stratum.**
Requirement:	**Optional**
Database Field Name:	**COVER_MAXIMUM_VALUE**
Description:	**A percentage value related to the COVER TYPE, expressed as the maximum value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the highest value of the range.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**70**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD08 - COVER MEDIAN VALUE	
Heading	**Details**
Purpose:	**To record the median value of cover for the taxon in the sub-stratum.**
Requirement:	**Optional**
Database Field Name:	**COVER_MEDIAN_VALUE**
Description:	**A percentage value related to the COVER TYPE, expressed as the median value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**60**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD09 - COVER MEAN VALUE	
Heading	**Details**
Purpose:	**To record the mean value of cover for the taxon in the sub-stratum.**
Requirement:	**Recommended**
Database Field Name:	**COVER_MEAN_VALUE**
Description:	**A percentage value related to the COVER TYPE, expressed as the mean value for the (sub-)stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**60**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TD10 - TAXON DATA DOMINANCE QUALIFIER	
Heading	**Details**
Purpose:	**To indicate the type of dominance of the species in the sub-stratum.**
Requirement:	**Recommended**
Database Field Name:	**TAXON_DATA_DOMINANCE_QUALIFIER (was: COVER DOMINANCE)**
Description:	**A value of dominance for the species in the (sub-)stratum. Dominance is the relative contribution the species makes to the biomass of the (sub-)stratum. Dominance can relate to the spatial extent of a species in a vegetation type as well as its dominance at sites. Please see Glossary (Appendix A) for further definitions.**
Value:	**Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**dominant**
Comments:	**The procedures used to generate the contents of this field need to be comprehensively documented in the Data Set table, for each data set.**
Status:	**Implemented in the NVIS Oracle database. The information content needs to be reconciled with the obsolete field TX 2 DOMINANCE_SEPARATOR. Where this cannot be done automatically, the data custodians will need to supply the correct interpretation. Also, codes from Version 5.0 need to be converted to words.**

Look-up Table for: TAXON DATA DOMINANCE QUALIFIER

Code	Explanation
dominant	Dominant species.
co-dominant	A co-dominant species is one which is equally-dominant to one or more other species.
sub-dominant	A sub-dominant species is one which occurs frequently in the vegetation type but has a lesser relative biomass than the dominant species.
indicator	A characteristic or indicator species that is not otherwise dominant in the vegetation type.
other	A species that is not a dominant, co-dominant, sub-dominant or characteristic/indicator species.
unknown	unknown

Attribute: TD11 - TAXON DATA FREQUENCY	
Heading	**Details**
Purpose:	To specify the frequency of a particular taxon across the (sub-)stratum.
Requirement:	Recommended
Database Field Name:	TAXON_DATA_FREQUENCY (was: COVER FREQUENCY)
Description:	A frequency code for the taxon.
Value:	Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.
Example:	A
Comments:	
Status:	Implemented in the NVIS Oracle database. Need to change name in database.

Look-up Table for: TAXON DATA FREQUENCY

Code	Explanation
A	High frequency (abundant) >80%
C	Moderate frequency (common) 50-80%
O	Low frequency (occasional) 10-50%
R	Infrequent (rare) less than 10%

not applicable	not applicable
unknown	unknown

Attribute: TD12 - TAXON DATA ALWAYS THERE	
Heading	**Details**
Purpose:	To indicate whether the species is always present throughout the extent of the vegetation type.
Requirement:	Essential
Database Field Name:	TAXON_DATA_ALWAYS_THERE
Description:	This attribute is used to specify whether a +/- symbol is generated in the vegetation description at levels 5 and 6.
Value:	Character(20); a value of N generates a +/- separator symbol in the level 5 and 6 attributes in the Vegetation Description Table.
Example:	N
Comments:	This field appears to duplicate FREQUENCY, but is meant to be a simple interpretation of frequency in the context of generating vegetation descriptions with +/- symbols between relevant species. There is considerable scope to create and apply a rule, here, when FREQUENCY data are available in the record.
Status:	New field. Yet to be implemented in the NVIS Oracle database. Some information content can be retrieved from DOMINANCE_SEPARATOR in version 5.0 and from SOURCE_CODE. Where this cannot be done automatically, the data custodians will need to supply the correct interpretation.

Look-up Table for: TAXON DATA ALWAYS THERE

Code	Explanation
Y	Yes. The species is always found in the vegetation type. Where quantitative frequency data are available, frequencies greater than 80% (FREQUENCY = 'A'; i.e. high frequency/abundant) generate a Yes value. This generates a "," separator for the species in the level 5 and 6 attributes in the Vegetation Description Table. Where FREQUENCY = 'C' and ALWAYS_THERE = 'Y' a rule could be developed to generate a warning.
N	No. The species may or may not be present. Where quantitative frequency data are available, frequencies less than 80% (FREQUENCY = 'C', 'O', 'R', 'not applicable' and 'unknown'; i.e. lower frequency values) generate a No value This generates a +/- separator symbol for the species in the level 5 and 6 attributes in the Vegetation Description Table.

unknown	**unknown. This option generates a "," separator for the species in the level 5 and 6 attributes in the Vegetation Description Table.**

Attribute: TD13 - TAXON DATA SUMMARY FLAG	
Heading	**Details**
Purpose:	**To give a simple indication as to whether a particular genus is required as a descriptor of the stratum at simpler levels in the NVIS Information Hierarchy and whether the word "mixed" should be appended to a stratum description.**
Requirement:	**Essential**
Database Field Name:	**TAXON_DATA_SUMMARY_FLAG**
Description:	**This is a data value added by the interpreter to a genus characteristic of (and usually dominant in) each level 5 stratum. A value of "Y" is carried through the description in levels 4 (and 3) descriptions in the VEG_DESCRIPTION table as a hat symbol, viz: "^", in front of the genus name. A value of "M" is carried through as a double hat "^^" for situations where the interpreter requires the word "mixed" to be appended to the level 4 (and 3) descriptions.**
Value:	**Character(1); Valid entries: "Y", "M" or "N". A maximum of 2 genera per stratum can be marked ("Y") as descriptive of the stratum at simpler levels in the NVIS Information Hierarchy. If two genera are marked "Y" for a stratum (i.e. at Level 5), these can be in the same or different sub-strata in the corresponding Level 6 description. A maximum of 1 genus per stratum can be marked ("M") as descriptive of the stratum at simpler levels in the NVIS Information Hierarchy.**
Example:	**Y**
Comments:	**Note that this is an interpreted field relating to the suitability of the genus (not the species) for description of the stratum at simpler levels in the NVIS Information Hierarchy. "Unknown" is not an allowable option; "N" is the default. See Section 2 for further discussion of the up-arrow or hat nomenclature; Table 5 gives a summary of allowable uses. Where there are two ("Y") values are assigned in a vegetation description, the level 3 and 4 descriptions will have genus names written in the rank order specified in TAXON_DATA_RANK.**
Status:	**New field. Implemented in the NVIS Oracle database. The second hat per stratum and the "M" option has not yet been implemented in application programming.**

Look-up Table for: TAXON DATA SUMMARY FLAG

Code	Explanation
Y	The genus is descriptive of the stratum at simpler levels in the NVIS Information Hierarchy
M	When combined with the word "mixed" in a vegetation description, the genus is more or less descriptive of the stratum at simpler levels in the NVIS Information Hierarchy
N	The genus is not descriptive of the stratum at simpler levels in the NVIS Information Hierarchy. This is the default value.

Growth Form Information

Attribute: GF01 - GROWTH FORM RANK	
Heading	**Details**
Purpose:	To rank each growth form within the (sub-)stratum in order of decreasing importance in describing the sub-stratum or stratum.
Requirement:	Essential
Database Field Name:	GROWTH_ FORM_RANK (was: GROFRM_NUMBER)
Description:	A number assigned to the growth form indicating the relative importance of the growth form in describing the sub-stratum.
Value:	Number(10); Valid range for NVIS: 1-5, with no ties. Numbers greater than 5 are optional.
Example:	1
Comments:	Importance is usually the dominance of the growth form in the (sub-)stratum, as estimated by biomass. However, once the co-dominant and sub-dominant growth forms have been listed, indicator growth forms (but not otherwise dominant) can be used to characterise the vegetation description.
Status:	Implemented in the NVIS Oracle database.

Attribute: GF02 - GROWTH FORM CODE	
Heading	**Details**
Purpose:	To provide a symbol and name for identifying growth forms in a (sub-)stratum.
Requirement:	Essential
Database Field Name:	GROWTH_FORM_CODE

Description:	**The growth form code describes the habit of a plant, identified most precisely by the position of its perennating buds (Beadle & Costin, 1952).¶ Identification of the dominant growth form for each sub-stratum will contribute to the definition of the structural formation (see Table 4 and levels 1 to 6 in the table: VEG_DESCRIPTION).**
Value:	**Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**T**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: GROWTH FORM CODE

Code	Explanation
T	**tree - Woody plants, more than 2m tall with a single stem or branches well above the base.**
M	**tree mallee - Woody perennial plant usually of the genus Eucalyptus. Multi-stemmed with fewer than 5 trunks of which at least 3 exceed 100mm at breast height (1.3m). Usually 8m or more.**
S	**shrub - Woody plants multi-stemmed at the base (or within 200mm from ground level) or if single stemmed, less than 2m.**
Y	**mallee shrub - Commonly less than 8m tall, usually with 5 or more trunks, of which at least three of the largest do not exceed 100mm at breast height (1.3m).**
Z	**heath shrub - Shrub usually less than 2m, with sclerophyllous leaves having high fibre:protein ratios and with an area of nanophyll or smaller (less than 225 sq. m.). Often a member of one the following families: Epacridaceae, Myrtaceae, Fabaceae and Proteaceae. Commonly occur on nutrient-poor substrates.**
C	**chenopod shrub -Single or multi-stemmed, semi-succulent shrub of the family Chenopodiaceae exhibiting drought and salt tolerance.**
U	**samphire shrub - Genera (of Tribe Salicornioideae, viz: Halosarcia, Pachycornia, Sarcocornia, Sclerostegia, Tecticornia and Tegicornia) with articulate branches, fleshy stems and reduced flowers within the Chenopodiaceae family, succulent chenopods (Wilson 1980). Also the genus Sueda.**
G	**tussock grass - Forms discrete but open tussocks usually with distinct individual shoots, or if not, then forming a hummock. These are the common agricultural grasses.**

H	**hummock grass - Coarse xeromorphic grass with a mound-like form often dead in the middle; genera are Triodia and Plectrachne.**
W	**other grass - Member of the family Poaceae, but having neither a distinctive tussock nor hummock appearance.**
V	**sedge - Herbaceous, usually perennial erect plant generally with a tufted habit and of the families Cyperaceae (true sedges) or Restionaceae (node sedges).**
R	**rush - Herbaceous, usually perennial erect monocot that is neither a grass nor a sedge. For the purposes of NVIS, rushes include the monocotyledon families Juncaceae, Typhaceae, Liliaceae, Iridaceae, Xyridaceae and the genus Lomandra. I.e. "graminoid" or grass-like genera.**
F	**forb - Herbaceous or slightly woody, annual or sometimes perennial plant. (Usually a dicotyledon.).**
D	**tree-fern - Characterised by large and usually branched leaves (fronds), arborescent and terrestrial; spores in sporangia on the leaves.**
E	**fern - Ferns and fern allies. Characterised by large and usually branched leaves (fronds), herbaceous and terrestrial to aquatic; spores in sporangia on the leaves.**
B	**bryophyte - Mosses and Liverworts. Mosses are small plants usually with a slender leaf-bearing stem with no true vascular tissue. Liverworts are often moss-like in appearance or consisting of a flat, ribbon-like green thallus.**
N	**lichen - Composite plant consisting of a fungus living symbiotically with algae: without true roots, stems or leaves.**
K	**epiphyte - Epiphytes, mistletoes and parasites. Plant with roots attached to the aerial portions of other plants. Often could also be another growth form, such as fern or forb.**
L	**vine - Climbing, twining, winding or sprawling plants usually with a woody stem.**
P	**palm - Palms and other arborescent monocotyledons. Members of the Arecaceae or the genus Pandanus. (Pandanus is often multi-stemmed).**
X	**grass-tree - Australian grass trees. Members of the Xanthorroeaceae.**
A	**cycad - Members of the families Cycadaceae and Zamiaceae**
J	**seagrass - Flowering angiosperms forming sparse to dense mats of material at the subtidal and down to 30m below MSL. Occasionally exposed.**
Q	**aquatic - Plant growing in an inland waterway or wetland with the majority of its biomass under water for most of the**

	year. Fresh, saline or brackish water.
O	lower plant - Alga, fungus.
unknown	unknown

Attribute: GF03 - COVER TYPE	
Heading	**Details**
Purpose:	To briefly specify the type of measure used in the COVER VALUE fields (MINIMUM, MAXIMUM, MEDIAN and/or MEAN) in the Growth Form table.
Requirement:	Recommended
Database Field Name:	COVER_TYPE
Description:	The type of measure used for defining the GROWTH FORM COVER VALUES. The valid types are specified in COVER TYPE. This attribute must be completed if any of the COVER VALUE fields (MINIMUM, MAXIMUM, MEDIAN and/or MEAN) are recorded in the GROWTH_FORM table.
Value:	Character(20); This is a value set from a defined lookup table:- Cover Type. The values in the lookup table are set by the administrator and cannot be added to.
Example:	3N
Comments:	**N.B. See ST05 COVER_TYPE for the lookup table.
Status:	Implemented in the NVIS Oracle database.

Attribute: GF04 - COVER TYPE DERIVATION METHOD	
Heading	**Details**
Purpose:	To provide further details on the type of measure used in the COVER VALUE in the Growth Form table.
Requirement:	Optional
Database Field Name:	COVER_TYPE_DERIV_METHOD
Description:	A more detailed description of the GROWTH FORM COVER TYPE recorded. Where a cover abundance rating is recorded, specify the system applied and a reference where applicable
Value:	Character(2000).
Example:	Braun-Blanquet
Comments:	
Status:	Implemented in the NVIS Oracle database.

Attribute: GF05 - COVER MINIMUM VALUE	
Heading	**Details**
Purpose:	**To record the minimum value of cover for the growth form in the sub-stratum.**
Requirement:	**Optional**
Database Field Name:	**COVER_MINIMUM_VALUE**
Description:	**A percentage value related to the GROWTH FORM COVER TYPE, expressed as the minimum value for the growth form in the (sub-)stratum.¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the lowest value of the range.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**10**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: GF06 - COVER MAXIMUM VALUE	
Heading	**Details**
Purpose:	**To record the maximum value of cover for the growth form in the sub-stratum.**
Requirement:	**Optional**
Database Field Name:	**COVER_MAXIMUM_VALUE**
Description:	**A percentage value related to the GROWTH FORM COVER TYPE, expressed as the maximum value for the (sub-)stratum. ¶ Actual values (TYPES 1N-4N), a class value (TYPES 5C-8C) or a qualitative value (TYPE 9Q) may be provided for this attribute. This record relates to the highest value of the class.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**40**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: GF07 - COVER MEDIAN VALUE	
Heading	**Details**
Purpose:	**To record the median value of cover for the growth form in the sub-stratum.**

Requirement:	**Optional**
Database Field Name:	**COVER_MEDIAN_VALUE**
Description:	**A percentage value related to the GROWTH FORM COVER TYPE, expressed as the median value for the growth form for the (sub-) stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**26**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: GF08 - COVER MEAN VALUE	
Heading	**Details**
Purpose:	**To record the mean value of cover for the growth form in the sub-stratum.**
Requirement:	**Recommended**
Database Field Name:	**COVER_MEAN_VALUE**
Description:	**A percentage value related to the attribute GR4 GROWTH FORM: COVER TYPE, expressed as the mean value for growth for the (sub-)stratum.¶ Actual values (TYPES 1N-4N) or a class value (TYPES 5C-8C) may be provided for this attribute.**
Value:	**Number(5,1); Valid entries 0.0-100.0; Missing/unknown values = -9999**
Example:	**40**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: GF09 - GROWTH FORM DOMINANCE QUALIFIER	
Heading	**Details**
Purpose:	**To indicate the type of dominance of the growth form in the sub-stratum.**
Requirement:	**Recommended**
Database Field Name:	**GR_FORM_DOMINANCE_QUALIFIER**
Description:	**A value of dominance for the growth form in the sub-stratum. Dominance is the relative contribution the growth form makes to the biomass of the (sub-)stratum. Dominance can relate to the spatial extent of a growth**

	form in a vegetation type as well as its dominance at sites. Please see Glossary (Appendix A) for further definitions.
Value:	Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.
Example:	indicator
Comments:	The procedures used to generate the contents of this field need to be comprehensively documented in the Data Set table, for each data set.
Status:	Implemented in the NVIS Oracle database. The information content needs to be reconciled with the obsolete field GR 2 DOMINANCE_SEPARATOR. Where this cannot be done automatically, the data custodians will need to supply the correct interpretation. Also, codes from Version 5.0 need to be converted to words.

Look-up Table for: GROWTH FORM DOMINANCE QUALIFIER

Code	Explanation
dominant	Dominant growth form.
co-dominant	A co-dominant growth form is one which has equal dominance to one or more other growth forms.
sub-dominant	A sub-dominant growth form is one which occurs frequently in the vegetation type but has a lesser relative biomass than the dominant growth form.
indicator	A characteristic or indicator growth form that is not otherwise dominant in the vegetation type.
other	A growth form that is not a dominant, co-dominant, sub-dominant or characteristic/indicator species.
unknown	unknown

Attribute: GF10 - GROWTH FORM FREQUENCY	
Heading	**Details**
Purpose:	To specify the frequency of a particular growth form across the sub-stratum.
Requirement:	Optional
Database Field Name:	GROWTH_FORM_FREQUENCY
Description:	This code is a summary of the number of sites with a particular growth form divided by the total number of sites.
Value:	Character(20); This is a value set from a defined lookup table. The values in the lookup table are set by the

	administrator and cannot be added to.
Example:	A
Comments:	The derivation of this field needs to be comprehensively documented in the Data Set table, for each data set.
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: GROWTH FORM FREQUENCY

Code	Explanation
A	High frequency (abundant) >80%
C	Moderate frequency (common) 50-80%
O	Low frequency (occasional) 10-50%
R	Infrequent (rare) less than 10%
not applicable	not applicable
unknown	unknown

Attribute: GF12 - GROWTH FORM ALWAYS THERE	
Heading	Details
Purpose:	To indicate whether the growth form is always present throughout the extent of the vegetation type.
Requirement:	Optional
Database Field Name:	GROWTH_FORM_ALWAYS_THERE
Description:	This attribute is used to specify whether a +/- symbol is generated in the vegetation description at levels 5 and 6.
Value:	Character(20); a value of N generates a +/- separator symbol in the level 5 and 6 attributes in the Vegetation Description Table.
Example:	N
Comments:	This field appears to duplicate FREQUENCY, but is meant to be a simple interpretation of frequency in the context of generating vegetation descriptions with +/- symbols between relevant growth forms. There is considerable scope to create and apply a rule, here, when FREQUENCY data are available in the record.
Status:	New field. Yet to be implemented in the NVIS Oracle database. Some information content can be retrieved from DOMINANCE_SEPARATOR in version 5.0 and from SOURCE_CODE. Where this cannot be done automatically, the data custodians will need to supply the

	correct interpretation.

Look-up Table for: GROWTH FORM ALWAYS THERE

Code	Explanation
Y	**Yes. The growth form is always found in the vegetation type. Where quantitative frequency data are available, frequencies greater than 80% (FREQUENCY = 'A'; i.e. high frequency/abundant) generate a Yes value. This generates a "," separator for the growth form in the level 5 and 6 attributes in the Vegetation Description Table. Where FREQUENCY = 'C' and ALWAYS_THERE = 'Y' a rule could be developed to generate a warning.**
N	**No. The growth form may or may not be present. Where quantitative frequency data are available, frequencies less than 80% (FREQUENCY = 'C', 'O', 'R', 'not applicable' and 'unknown'; i.e. lower frequency values) generate a No value This generates a +/- separator symbol for the growth form in the level 5 and 6 attributes in the Vegetation Description Table.**
unknown	**unknown. This option generates a "," separator for the growth form in the level 5 and 6 attributes in the Vegetation Description Table.**

Attribute: GF13 - GROWTH FORM SUMMARY FLAG	
Heading	**Details**
Purpose:	**To give a simple indication as to whether the particular growth form is required as a descriptor of the stratum at simpler levels in the NVIS Information Hierarchy.**
Requirement:	**Essential**
Database Field Name:	**GROWTH_FORM_SUMMARY_FLAG**
Description:	**This is a Boolean field added to a characteristic (and usually dominant) growth form for the stratum in level 5. The same growth form can be marked in Level 6, but in only one sub-stratum per stratum. It is carried through the description in upper levels of the NVIS Information Hierarchy as a hat symbol, viz: "^", in front of the growth form.**
Value:	**Character(1); Valid entries: "Y" or "N"; "T" or "F". Only one hat per stratum is permitted.**
Example:	**Y**
Comments:	**Note that this is an interpreted field relating to the suitability of the growth form for description of the stratum at simpler levels in the NVIS Information Hierarchy. See Section 2 for further discussion of the up-arrow or hat nomenclature. "Unknown" is not an allowable option; suggest "N" as the default.**

Status:	**New field. Implemented in the NVIS Oracle database.**

Supplementary Taxon Information

Taxon List Origin Information

Attribute: TO01 - TAXON LIST ORIGIN CUSTODIAN	
Heading	**Details**
Purpose:	**To name the custodian of each taxon list used to supply species data to NVIS.**
Requirement:	**QAQC**
Database Field Name:	**TAXON_LIST_ORIGIN_CUSTODIAN (was: TAXON_LIST_SOURCE)**
Description:	**A short description of the originating institution or custodian of the taxon list.¶ The custodian should be an authority within the jurisdiction for supplying current species names.**
Value:	**Character(2000).**
Example:	**Queensland Herbarium**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TO02 - TAXON LIST ORIGIN STATE	
Heading	**Details**
Purpose:	**To name the state of origin of each taxon list used to supply species data to NVIS.**
Requirement:	**QAQC**
Database Field Name:	**TAXON_LIST_ORIGIN_STATE**
Description:	**The state of the source, from which the taxon list has been derived.**
Value:	**Character(20)**
Example:	**4**
Comments:	**May need two attributes.**
Status:	**Implemented in the NVIS Oracle database.**

Look-up Table for: TAXON LIST ORIGIN STATE

Code	Explanation
1	**Australian Capital Territory**

2	New South Wales
3	Northern Territory
4	Queensland
5	South Australia
6	Tasmania
7	Victoria
8	Western Australia

Attribute: TO03 - TAXON LIST ORIGIN DETAILS	
Heading	**Details**
Purpose:	To name the name and date of each taxon list used to supply species data to NVIS.
Requirement:	QAQC
Database Field Name:	TAXON_LIST_ORIGIN_DETAILS
Description:	The name and date of the source list from which the taxon list has been derived.
Value:	Character(2000)
Example:	Victorian Herbarium list, July 1999
Comments:	Any known limitations, errors, caveats or user instructions should be added in this' attribute.
Status:	Implemented in the NVIS Oracle database.

Taxon Source Information

Attribute: TL01 - TAXON LISTS SOURCE CODE	
Heading	**Details**
Purpose:	
Requirement:	Optional
Database Field Name:	TAXON_LISTS_SOURCE_CODE
Description:	The authority's (TAXON SOURCE) code for each taxon used for data entry. This attribute is based on the authority's coding system.
Value:	Character(50).

Example:	**'eucatetr' represents Eucalyptus tetrodonta in a particular dataset or jurisdiction.**
Comments:	**These codes will not be comparable between data sets or jurisdictions and are only used to provide a link to the TAXON SOURCE and TAXON SOURCE IDENTIFIER.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL02 - TAXON LISTS FAMILY	
Heading	**Details**
Purpose:	**To describe a family of a taxon in the master list of a jurisdiction.**
Requirement:	**Recommended**
Database Field Name:	**TAXON_LISTS_FAMILY**
Description:	**Recognised Family name as of time of entry into the database. The data custodian must use the latest taxonomic name for each species.**
Value:	**Character(50).**
Example:	**Myrtaceae**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL03 - TAXON LISTS GENUS	
Heading	**Details**
Purpose:	**To describe a genus of a taxon in the master list of a jurisdiction.**
Requirement:	**Essential**
Database Field Name:	**TAXON_LISTS_GENUS**
Description:	**Recognised Genus name as of time of entry into the database. The data custodian must use the currently-accepted taxonomic name for each species.**
Value:	**Character(50).**
Example:	**Eucalyptus**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL04 - TAXON LISTS SPECIES	
Heading	**Details**
Purpose:	**To describe the species epithet of a taxon in the master list of a jurisdiction.**
Requirement:	**Essential**

Database Field Name:	**TAXON_LISTS_SPECIES**
Description:	**Recognised Species name as of time of entry into the database. The data custodian must use the currently-accepted taxonomic name for each species.**
Value:	**Character(50).**
Example:	**tetrodonta**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL05 - TAXON LISTS AUTHOR	
Heading	**Details**
Purpose:	**To describe an author of a species binomial in the master list of a jurisdiction.**
Requirement:	**Recommended**
Database Field Name:	**TAXON_LISTS_AUTHOR**
Description:	**The author citation of the species in standard abbreviated form.¶ A valid author abbreviation for a species as described in HISPID (1993).**
Value:	**Character(2000).**
Example:	**Mueller, F.J.H. von**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL06 - TAXON LISTS INFRASPECIES RANK	
Heading	**Details**
Purpose:	**To describe the infraspecies rank of a taxon in the master list of a jurisdiction.**
Requirement:	**Recommended**
Database Field Name:	**TAXON_LISTS_INFRA_SPECIES_RANK**
Description:	**A field to indicate the lowest infraspecific rank for the species. This can be left blank if a species has no infraspecies.**
Value:	**Character(50); This is a value set from an expandable lookup table. Initial values are set by the administrator, new values will be added as required, according to the guidelines in Appendix B.**
Example:	**subsp.**
Comments:	**The options: s. lat., s. str. and sp. aff. are conveniently stored in this attribute, but actually refer to the specific**

	epithet (i.e. looking upwards in the taxonomic hierarchy) rather than to the infraspecies.
Status:	Implemented in the NVIS Oracle database.

Look-up Table for: TAXON LISTS INFRASPECIES RANK

Code	Explanation
subsp.	subspecies - Taxon description is at the subspecies level.
var.	variety - Taxon description is at the variety level.
cv.	cultivar - Taxon description is at the cultivar level.
f.	form - Taxon description is at the form level.
s. lat.	sensu lato - The taxon description is at the species level refers to a wide interpretation of the species.
sp. aff.	species with affinity to- The taxon description at the species level refers to an undescribed taxonomic entity that is similar to the described species.
subf.	subform - Taxon description is at the subform level.

Attribute: TL07 - TAXON LISTS INFRASPECIES	
Heading	Details
Purpose:	To describe an infraspecies (subspecies, variety, etc.) name of a taxon in the master list of a jurisdiction.
Requirement:	Recommended
Database Field Name:	TAXON_LISTS_INFRA_SPECIES
Description:	The name of lowest infraspecific rank for the species.¶ Do no enter this field if the INFRASPECIES RANK is not recorded.
Value:	Character(50).
Example:	leptophylla (in Boronia inornata subspecies leptophylla)
Comments:	
Status:	Implemented in the NVIS Oracle database.

Attribute: TL08 - TAXON LISTS INFRASPECIES AUTHOR	
Heading	Details
Purpose:	
Requirement:	Recommended
Database Field Name:	TAXON_LISTS_INFRA_SP_AUTHOR

Description:	**The author citation of the recorded INFRASPECIES in standard abbreviated form.¶ A valid author abbreviation for an infraspecies as described in HISPID (1993).**
Value:	**Character(2000).**
Example:	**Bisby (1994)**
Comments:	
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL09 - TAXON LISTS COMMON NAME	
Heading	**Details**
Purpose:	**To describe the common name of a taxon in the master list of a jurisdiction.**
Requirement:	**Optional**
Database Field Name:	**TAXON_LISTS_COMMON_NAME**
Description:	**The common name applied to the species or infraspecies. Useful for publishing and reporting.**
Value:	**Character(2000).**
Example:	**Sydney bluegum**
Comments:	**The common name will only be applicable to this data set unless differences are resolved between data sets.**
Status:	**Implemented in the NVIS Oracle database.**

Attribute: TL10 - TAXON LISTS REFERENCE	
Heading	**Details**
Purpose:	**To provide further details of the primary reference describing the species.**
Requirement:	**Optional**
Database Field Name:	**TAXON_LISTS_REFERENCE**
Description:	**The author citation of the recorded taxon (SPECIES and/or INFRASPECIES) in long form**
Value:	**Character(2000); Where a secondary reference is present for a taxon, use a semi-colon delimiter after the primary reference and put the secondary reference after it, in this field.**
Example:	**Jessop, J. P. (ed) (September 1993) A List of the Vascular Plants of South Australia. Edition IV. Botanic Gardens of Adelaide and State Herbarium, Adelaide.**
Comments:	**This is more useful than the abbreviated author name, because it can be more-readily looked up.**
Status:	**Implemented in the NVIS Oracle database. Where they exist, incorporate secondary references into this field.**

SECTION FOUR: Rules for Checking Data

Introduction

At a national workshop in November 2002, the NVIS collaborators agreed to the implementation of proposed rules to address the structural and content issues impacting on the quality and consistency of the NVIS dataset. There are three general types of rules (i.e. automated procedures):

1. Those used to check the validity of data within a field;
2. Those used to check the consistency of data in related fields and tables; and
3. Those used to generate the simpler levels i.e. levels I to IV, in the NVIS Information Hierarchy (Table 1).

The first category of rules operate instead of, or as well as, database triggers within one field. These are being implemented in XML. The second category use remaining overlaps and redundancies within the database to maintain the integrity and consistency of the database content, especially the vegetation descriptions and supporting tables. These rules are being implemented in PL/SQL in an Oracle environment. The third set of rules is also being developed in PL/SQL, since these require the collation and concatenation of multiple fields. The NVIS collaborators have agreed that conversion from Level VI to V is best undertaken through an expert decision process, as it is too complex to automate the process considering the large variety of methods and data collected.

The following rules have been agreed, but their implementation is still under development. Additional rules will be developed as necessary.

Data Checking Rules

Preliminary Checks

1. The number_of_strata field must equal the number of Stratum records actually provided.

2. Stratum counts of 0 are allowed to cater for non-vegetation descriptions. If there is a 'no stratum record' then all the following rules are skipped and the parser jumps to the "Various actions on the veg description records".

3. All the Taxon records in a Level 6 (or 5) record must use either the species_code or the species field. (*i.e. it is not assumed yet that Taxon lists will not be maintained in NVIS although that will be proposed. It will not be permitted to mix the supply of taxon descriptions from both available sources i.e. the taxon_description field in the Stratum table and Taxon records stored as codes in the Taxon table. The source must be specified*.)

Type of Update

4. When the Level 6 (or 5) record's attribute is "NEW" then the source_code for the State cannot already exist in NVIS.

5. When the Level 6 (or 5) record's attribute is "UPDATE" but the source_code for the State does not exist in NVIS, then convert the Level 6 (or 5) record's

attribute to 'NEW' and provide an "ACTION WARNING" message to alert the users.

6. When the Level 6 (or 5) record's attribute is "UPDATE" then an update_reason must be provided. If the update_reason is present for records of other status i.e. "NEW", "SPELLING" or "TEST" then it is ignored.

7. To correct the spelling of a Level 6 (or 5) record, its attribute must be set to "SPELLING" and only full taxon_descriptions species can be used. This will replace the previously entered record that was inserted via the "NEW" XML method and has the xml_status flag of 'S' for spelling issues. Messages are provided to indicate if it is successfully deleted and then re-inserted with the correct spelling. Old records in NVIS cannot be updated via this method. (*To update Level 6 (or 5) records that used the species_code, correct them using the "SPELLING" mode of the Taxon List XML load. If maintenance of Taxon lists in NVIS is discontinued this will not be relevant*.)

Across Stratum Checks

8. There must be only one Stratum record that has an attribute of Dominant.

9. There may be only one (or none) of each of the attribute Stratum Codes U1, U2, U3, M1, M2, M3, G1, G2.

10. The number_of_growth_forms field must equal the number of Growth_Form records actually provided.

11. The number_of_taxa field must equal the number of Taxa records actually provided.

12. One and only one of the Upper strata - U1, U2 or U3 must be the "dominant sub-stratum" and have a summary_flag against one of the Taxa and one of the Growth Form records. If the overall Dominant stratum of the Veg Description record is in the Upper strata, then it must be the same stratum as the dominant sub-stratum.

13. One and only one of the Mid strata - M1, M2 or M3 must be the "dominant sub- stratum" and have a summary_flag against one of the Taxa and one of the Growth Form records. If the overall Dominant stratum of the Veg Description record is in the Mid strata, then it must be the same stratum as the dominant sub-stratum.

14. One and only one of the Ground strata - G1 or G2 must be the "dominant sub-stratum" and have a summary_flag against one of the Taxa and one of the Growth Form records. If the overall Dominant stratum of the Veg Description record is in the Ground strata, then it must be the same stratum as the dominant sub- stratum.

15. The Upper sub-strata must appear sequentially. The Upper strata must have a valid U1 sub-stratum before a U2 sub-stratum can exist. The Upper strata must have valid U1 and U2 sub-strata before a U3 can exist.

16. The Mid sub-strata must appear sequentially. The Mid strata must have a valid M1 sub-stratum before an M2 sub-stratum can exist. The Mid strata must have valid M1 and M2 sub-strata before an M3 can exist.

17. The Ground sub-strata must appear sequentially. The Ground strata must have a valid G1 sub-stratum before a G2 sub-stratum can exist.

Height by Stratum

18. The height classes must be sequential, for example the U2 sub-stratum height must not be greater than the U1 sub-stratum height.

19. The Upper strata (U1, U2, U3) height class can only be between 5 and 8. If an Upper stratum is the dominant stratum, then the height class cannot be entered as 'Unknown'. (*If the Upper stratum is not the Dominant stratum, then the height class can be entered as 'Unknown' for a single Upper stratum. If multiple Upper sub-strata exist, then they must all have valid height classes - commented out in XML_XSD 25/10/2002.*)

20. The Mid strata (M1, M2, M3) height class can only be between 3 and 6. If a Mid stratum is the dominant stratum, then the height class cannot be entered as 'Unknown'. (*If the Mid stratum is not the dominant stratum, then the height class can be entered as 'Unknown' for a single Mid stratum. If multiple Mid sub-strata exist, then they must all have valid height classes - commented out in XML_XSD 25/10/2002.*)

21. The Ground strata (G1, G2) height class can only be between 1 and 4. If a Ground stratum is the dominant stratum, then the height class cannot be entered as 'Unknown'. (*If the Ground stratum is not the dominant stratum, then the height class can be entered as 'Unknown' for a single Ground stratum. If multiple Ground sub-strata exist, then they must all have valid height classes - commented out in XML_XSD 25/10/2002.*)

Cover Class by Stratum

22. If an Upper stratum is the dominant stratum, then the cover class cannot be entered as 'Unknown'. (*If the Upper stratum is not the dominant stratum, then the cover class can be entered as 'Unknown' for a single Upper stratum. If multiple Upper sub-strata exist, then they must all have valid cover classes - commented out in XML_XSD 25/10/2002.*)

23. If a Mid stratum is the dominant stratum, then the cover class cannot be entered as 'Unknown'. (*If the Mid stratum is not the dominant stratum, then the cover class can be entered as 'Unknown' for a single Mid stratum. If multiple Mid sub-strata exist, then they must all have valid cover classes - commented out in XML_XSD 25/10/2002.*)

24. If a Ground stratum is the dominant stratum, then the cover class cannot be entered as 'Unknown'. (*If the Ground stratum is not the dominant stratum, then the cover class can be entered as 'Unknown' for a single Ground stratum. If multiple Ground sub-strata exist, then they must all have valid cover classes - commented out in XML_XSD 25/10/2002.*)

Growth Form by Stratum

25. The Upper strata - U1, U2 or U3 can only be tree, tree mallee, shrub, mallee shrub, palm, vine.

26. The Mid strata - M1, M2, M3 can only be shrub, mallee shrub, heath shrub, chenopod shrub, palm, xanthorrhoea, vine, tree, sedge, cycad, fern.

27. The Ground strata - G1 or G2 can only be chenopod shrub, samphire shrub, hummock grass, tussock grass, sedge, rush, forb, fern, moss, lichen, liverwort, vine, cycad, seagrass, shrub, heath shrub, xanthorrhoea.

Taxa - Growth Form Checks

28. For each Taxon record entered with a taxon_list_id and source_code make sure the taxon_list_id exists and that the source_code is unique.

29. For each Taxon record check that one of the growth forms listed matches the growth forms shown for that genus in the Genus/Growth Form table.

30. For each stratum (U, M, G) check that the taxon and growth form identified with the summary_flag '^' are consistent with the Genus/Growth Form table.

Spelling Checks - Taxa

31. For each Taxon record check the spelling of the genus and species against the C/W (SPRAT) taxon table (current_flag can be Y/N). If it doesn't match at all provide a Warning message to the user but still load it.

32. If the genus and species (without any infraspecies) is in the Taxon Revision table of the C/W (SPRAT) taxon database as an old Taxon name (and matches exactly) then create a system administrator warning message to alert the C/W system administrator only.

33. If the genus and species followed by a space ' ' (to indicate there is additional infraspecies info), matches in the Taxon Revision table of SPRAT to an old Taxon name of genus and species with extra infraspecies info. then create a system administrator warning message to alert the C/W system administrator only.

Check: Generated Description = Intended Description

34. The sub_association field that contains the Level 5/6 veg description data must be identical to the description generated from the mandatory fields in the Stratum table and other lower tables.

Appendix A: Glossary

The following definitions apply in this document.

Term	Definition	Reference(s)
API	Aerial photo interpretation/aerial photogrammetry	Brocklehurst, pers. comm., 2000
Accuracy assessment	Usually a statistical analysis of the closeness of estimates to true values or corresponding population values. An accurate estimator carries little or no bias. It may or may not be precise.	Lund 1995
Alliance	A group of floristically related associations of similar structure. The alliance takes its name from the most characteristic dominant species of its component associations.	Beadle and Costin, 1952
Analysis method	Procedures used to derive new information by bringing together and processing the basic data (polygons, lines, points, labels, etc.). Methods used to analyse data and draw conclusions from that data.	Lund 1995; NVIS**
Association	An association is defined as a climax community of which the dominant stratum has a qualitatively uniform floristic composition and which exhibits uniform structure as a whole. For each stratum, the association description of the vegetation type should include floristic information for the dominant and/or diagnostic species (maximum of 3 species per stratum) plus the structural formation (dominant growth form, cover, height are combined as per Table 4). A maximum of three strata (upper, mid and ground;Walker & Hopkins (1990)) are allowed and the dominant stratum is indicated by a plus symbol "+".NVIS Level V.	Beadle and Costin, 1952 NVIS**
Attribute	In a GIS, an attribute is analogous to a data element or column in a data base table. A standardised data field describing qualitative or quantitative information.	Lund 1995; NVIS**
Biomass	The total mass (usually measured as dry weight) of all the living organisms in a given area, population, habitat, or trophic level, often expressed as kg/ha or tonnes per ha. For NVIS, this refers to plant material.	Meagher, 1991
Boolean	A Boolean or logical data type can have only one of two values: true or false (or Yes/No or 1/0).	Parker, 1994 ERIN*
Broad Floristic Formation	Dominant growth form, cover and height (combined into structural formation nomenclature according to Table 4) plus the dominant land cover genus for the dominant stratum. NVIS Level III.	NVIS**
Canopy	A cover of foliage formed either by the community as a whole or by one of its component layers. It may be continuous or discontinuous.	Beadle and Costin, 1952
Characteristic species	The species which distinguish the vegetation community.	Beadle and Costin, 1952
Class	An upper level of the information hierarchy describing growth form and broad structure of the vegetation. NVIS level I.	Walker & Hopkins, 1990
Classification system	The systematic grouping of entities into categories based upon shared characteristics	Lund, 1995
Climax	The final stages of succession. A subjective concept.	Beadle and Costin, 1952
Co-dominant	A species that is equally dominant with one or more other species in the sub-association. In NVIS, co-dominance can also refer to a growth form instead of a species.	NVIS**
Community	A natural aggregate of different species of organisms existing in the same environment. While species within the community interact with each other, forming food chains and other ecological systems, they do not generally interact with species in other communities. For the purposes of NVIS, a community is described as an assemblage of plant species which are structurally and floristically similar and form a repeating 'unit' across the landscape. See also vegetation type below.	Meagher, 1991 NVIS**

Cover	The proportion of the ground occupied by perpendicular projection on to it of the aerial parts of the individuals of the species under consideration.	Kershaw and Looney, 1985.
Cover abundance	A relatively crude estimate of species quantities which may be expedient but necessarily satisfactory for many vegetation description purposes. General expressed in class ranges - eg. The Braun Blanquet cover abundance scale.	Mueller-Dombois, D. and H. Ellenberg, 1974; NVIS**
Crown cover	The cover produced by the foliage and branches of a tree, or collectively of the trees in a plant community, especially a forest. A canopy may be continuous or not, and may not always be formed only by the dominant species.	Meagher, 1991
Data custodian	The data custodian is responsible for ensuring the accuracy, currency, storage, security and distribution of the data set. In fulfilling these responsibilities, the custodian is expected to consult with, and take into account the needs of users other than itself. The custodian may choose to delegate these functions while still retaining responsibility. The custodian of a data set need not necessarily be the holder of the copyright, or the originator of the data, although in many cases the custodian will be both of these.	ANZLIC, 1996
Data Set or Dataset	A unique, spatially defined collection of data, which is relatively homogeneous and is able to be described by a single metadata statement.	ANZLIC, 1996
Dominant	A common species that is always dominant in the sub-association. It has the greatest biomass and is generally the most frequent. Any number of species could be dominant e.g. 1,2,3,4 or 5 depending on the association. See also co-dominant and sub-dominant.	Wilson and Brocklehurst, pers. comm., 2000
Dominant stratum	The stratum which, because of its physiognomy and relative continuity, dominates the rest of the community in the sense that it conditions the habitats of the other strata. The most important or characteristic stratum of a particular vegetation type. It probably occupies the greatest space.	Beadle and Costin, 1952 Brocklehurst, pers. comm., 2000
Ecologically Dominant Stratum	Defined as the stratum making the greatest contribution to the overall biomass of the vegetation type.	
Ecological dominance, **ecologically predominant**	Ecological dominance is defined as the species making the greatest contribution to the overall biomass of the stratum, site, vegetation type etc.	Definition agreed at July workshop, 1999
Ecosystem	An aggregate of animals, plants and other organisms and the non-living parts of the environment, that interacts and which is relatively self-contained in terms of energy flow.	Meagher, 1991 and Lawrence, 1996
Essential	An attribute that must be filled in to adequately to provide a useful Vegetation Description at all levels in the NVIS Information Hierarchy.	NVIS**
Extant	Existing at the present time.	Meagher, 1991
Foliage cover	Is the percentage of the same site occupied by the vertical projection of foliage and branches (if woody).	Carnahan, 1976
Floristics	A description or study of the plant species that occur in a defined area or vegetation type.	Meagher, 1991
Formation	The synthetic structural unit to which are referred all climax communities exhibiting the same structural form, irrespective of floristic composition.	Beadle and Costin, 1952
Frequency	The number of occurrences of one type of event in relation to the total number of events observed in a sample. For NVIS, this could be the number of sites containing a growth forms and/or species compared with the total number of sites in the survey.	Meagher, 1991; NVIS**
GPS	Global Positioning System	Parker, 1994
Growth-form	Habit or general appearance of a plant. Similar in definition to “life form”, but growth form in NVIS is oriented to the classification of Australia’s vegetation, as per Walker & Hopkins (1990).	NVIS**
Habit	The general appearance of a plant (such as shrubby, prostrate, erect, climbing, twining, etc.) used particularly in horticulture.	Meagher, 1991

Height	Measurement from base to top of a stratum, growth form and/or species. Can be calculated for a given community to derive the average height for a given stratum.	Fowler & Fowler, 1996 NVIS**
Image	The recorded representation of an object produced by optical, electro-optical, optical mechanical, or electronic means. It is generally used when the electromagnetic radiation emitted or reflected from a scene is not directly recorded on film.	Harrison & Jupp, 1990
Information Hierarchy	The systematic arrangement of NVIS vegetation attributes in order of descriptive complexity. (See Tables 1 & 6).	NVIS**
Indicator/diagnostic species	A species that characterises a particular vegetation type but which may not necessarily be the most dominant.	Brocklehurst, pers. comm., 2000
Jurisdiction	The jurisdiction is the name of the State or Country in which the custodian of the data set is domiciled.	ANZLIC 1996
Level	The attribute groupings within the NVIS Information Hierarchy that recognise information of similar spatial, structural, growth form and floristic detail.	NVIS**
Life-form	The form characteristically taken by a plant at maturity. (Many categorisations of life forms in the botanical literature are inadequate, or too complicated, for the purpose of classifying Australian vegetation types.) See also Growth Form.	Parker, 1994 ERIN*
Mandatory	An attribute that must be filled in to adequately to identify, locate and manage the main components of the database and information transfer.	Bolton, 1992
Map Unit	A map unit is a spatial category which contains a vegetation type or group of co-occurring vegetation types. The map unit is commonly an item in a map legend and is delineated on the map by means of one to many polygons.	NVIS**
Mapping methods	The identification of selected features, the determination of their boundaries or locations, and the delineation of those boundaries or locations on a suitable base using predefined criteria. Methods or techniques used to produce both the spatial and attribute information for a particular vegetation map	Lund 1995 Brocklehurst, pers. comm., 2003
Metadata	A written description for a data set. Metadata should conform to the ANZLIC Metadata Guidelines, 1996.	ANZLIC, 1996
Missing values	Values that have not been recorded for a given data set. Sometimes referred to as Null values or as –9999 in a GIS system.	NVIS**
Model	A theoretical representation of a system used to predict changes under the influence of various factors.	Meagher, 1991
Mosaic	Two or more vegetation descriptions present within a map unit. This is where the scale of mapping or the spatial patterns is too complex for each vegetation type to be mapped separately.	ERIN*
Percentage cover	The cover of any vegetation as a percentage for a given area.	ERIN*
Physiognomic	Physiognomy is the external appearance of vegetation including such features as colour, luxuriance, seasonality and overall compositional features that can be quickly determined by means of visual assessment. A vegetation classification based on the appearance or physical characteristics of the dominant taxon is called a physiognomic classification. The NVIS Hierarchy is a Physiognomic-Floristic classification, with higher levels containing physiognomic information and the lower, more detailed levels, containing both physiognomic and floristic information.	Jones et al, 1990 Brocklehurst, pers. comm., 2003
Positional accuracy	The degree of conformity with which horizontal positions and vertical values are represented on a map, chart, or related product in relation to an established standard.	Lund 1995
Pre-clearing	Vegetation types and extent before European settlement in Australia. Often referred to as pre-1750 and pre-European vegetation.	ERIN*

Resolution	The resolvability of features for a given map scale. Scale effects resolution. In a larger scale map, the resolution of features more closely matches real-world features because the extent of reduction from ground to map is less. Map resolution may refer to a "minimum mapping unit" or the accuracy at which a given map scale can depict the location and shape of map features.	ESRI, 1994; Lund 1995
Scale	Map scale indicates how much the given area was reduced. For the same size map, features on a small-scale map (1:1,000,000) will be smaller than those on a large-scale map (1:1,200).	ESRI, 1994
Species	A group of organisms that are biologically capable of breeding and producing fertile offspring. It is the lowest normal taxonomic unit in use.	Meagher, 1991
Spectral class	A class which is developed on the basis of the pixel spectral, or radiance, data and/or channels derived from radiance data. In terms of thematic mapping all the pixels which fall into a spectral class are interactively overlaid with a distinct colour to aid in interpretation.	Harrison & Jupp, 1990.
Stratum/Sub-stratum	A layer in a community produced by the occurrence at approximately the same level of an aggregation of plants of the same habit.	Beadle and Costin, 1952; NVIS**
Structural formation	Formation classes defined by growth form and crown separation (woody plants) or foliage cover (ground stratum), and qualified by height class. NVIS level II.	Walker and Hopkins, 1990
Structure	The spatial arrangement (vertically and horizontally) of plants within a community.	Beadle and Costin, 1952; NVIS**
Sub-Association	A sub division of the association determined by a variation in the most important subordinate stratum of the association, without significant qualitative changes in the dominant stratum. In NVIS, for each layer/sub-stratum, the sub-association description of the vegetation type should include floristic information for the dominant and/or diagnostic species (maximum of 5 species per sub-stratum) plus the structural formation (dominant growth form, cover, height are combined as per Table 4). A maximum of eight sub-strata (as per Table 2) are allowed and the dominant sub-stratum is indicated by a plus symbol "+". NVIS level 6.	Beadle and Costin, 1952; NVIS**
Sub-dominant	A species that occurs frequently in the vegetation type but has a lesser relative biomass than the dominant species.	Wilson & Brocklehurst, pers. comm., 2000.
Sub-Formation	Dominant growth form, cover and height (combined into structural formation nomenclature according to Table 4) plus the dominant land cover genus for the three traditional strata. (i.e. Upper, Mid and Ground). NVIS level IV.	NVIS**
Taxon (plural = taxa)	Any of the groups into which living things are formally classified by the scientific community, e.g. species. The taxa in the Linnean system are commonly Kingdom, Phylum, Class, Order, Family, Genus, Species and sub-species/varieties/forms.	Meagher, 1991; ERIN*
URL	Universal Resource Locator	ERIN*
Vegetation	All plants within a specified area. It is usually considered generally and not taxonomically.	Lawrence, 1996
Vegetation description	A set of attribute values pertaining to a vegetation type and contained in the NVIS Information Hierarchy and supporting tables.	NVIS**
Vegetation type	A community that has a floristically uniform structure and composition, often described by its dominant species. In NVIS, a vegetation type is commonly represented by a vegetation description.	Meagher, 1991 ERIN*

ERIN* -pers. comm. staff in the Environmental Resources Information Network, Environment Australia
-no formal reference found for definition agreed for the NVIS.

NVIS** - defined in this document for the purposes of NVIS, including the NVIS Information Hierarchy

Appendix B: Recommended Abbreviations and Contractions for Entering Taxonomic Data into NVIS

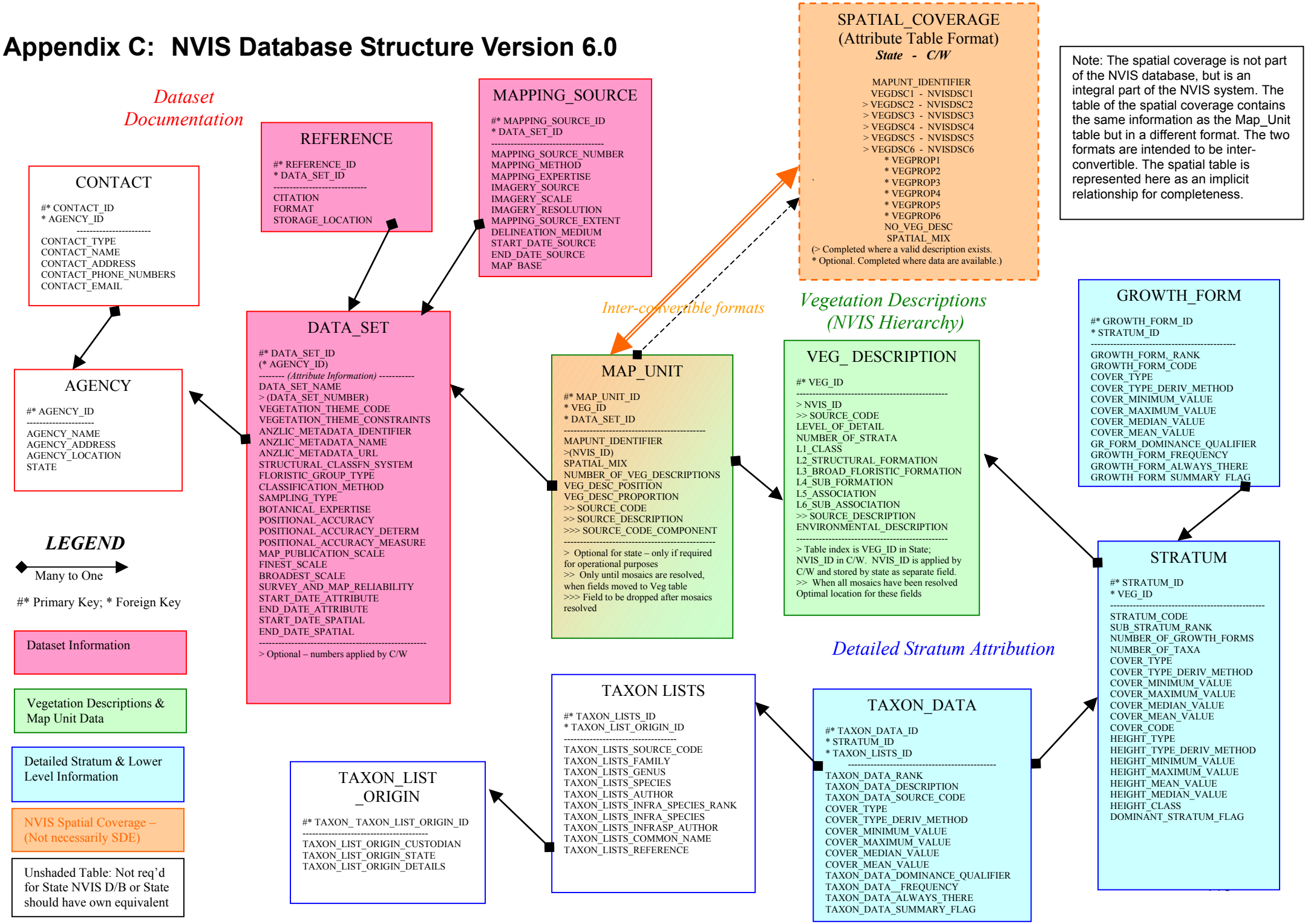
The following abbreviations were adapted from Chapman (2002) and the Herbarium Information Standards and Protocols for Interchange of Data (HISPID4, 2000). HISPID was developed by a committee of representatives from all Australian Herbaria.

cv.	- cultivar
f.	- form/ *forma*
fam.	- family
gen. nov.	- *genus novus* – a newly described genus
ined.	- *ineditus* (unpublished)
ms.	- manuscript (unpublished manuscript name - generally follows an author name)
p.p.	- pro parte (in part)
sect.	- section/*sectio*
s. lat.	- *sensu lato* (in the broad sense)
s. str.	- *sensu stricto* (in the narrow or strict sense)
sp.	- species (singular)
sp. aff.	- species with affinity to …, or close to … (NB. 'aff. sp.' should not be used)
sp. nov.	- *species novus* – a newly described species (NB. 'nov. sp.' should not be used)
spp.	- species (plural)
ssp.	- (not preferred - see subsp.)
subg.	- subgenus
subsp.	- subspecies
subspp.	- subspecies (plural)
syn.	- synonym
var.	- variety

Notes

- The above abbreviations are normally used in the INFRASPECIFIC_RANK attribute in the Taxon_Lists table and in the appropriate place in the full taxon name in the attribute TAXON_DATA_DESCRIPTION in the Taxon_Data table.
- Where full stops are shown, these should be recorded in the data.
- Species names in the NVIS database are input, managed and output in normal, not italic typeface. Future output tools, perhaps based on XML, may include the facility to output species names in italics.
- The common practice in the written literature of abbreviating the genus to its initial capital letter is not permitted in the NVIS database, since ambiguity would soon result.
- Hybrids add considerable complexity to a database (HISPID4, 2000) and are not presently catered for in NVIS.
- The above abbreviations have been combined from the allowable values for HISPID4 (2000) fields: spql and isprk.

Appendix C: NVIS Database Structure Version 6.0



Appendix D: List of NVIS Database Fields by Table

Field_Name	Nullable?	Field_Definition	Old_Field_Name
DATA_SET			
DATA_SET_ID	NOT NULL	NUMBER(10)	DATSET_ID
AGENCY_ID	NOT NULL	NUMBER(10)	AGE_ID
---------- *(Administrative Fields)* ----------	----------	----------	
DATA_SET_NAME (+)	NOT NULL	VARCHAR2(2000)	DATSET_NAME (+)
DATA_SET_NUMBER (+)	NOT NULL	NUMBER(10)	DATSET_NUMBER (+)
VEGETATION_THEME_CODE (+)	NOT NULL	VARCHAR2(20)	DATSET_COVERAGE_TYPE
VEGETATION_THEME_CONSTRAINTS (+)		VARCHAR2(2000)	VEGETATION_THEME_LIMITATIONS (+)
---------- *(Attribute Information)* ----------	----------	----------	
ANZLIC_METADATA_IDENTIFIER		VARCHAR2(50)	
ANZLIC_METADATA_NAME		VARCHAR2(2000)	
ANZLIC_METADATA_URL		VARCHAR2(2000)	
STRUCTURAL_CLASSFN_SYSTEM	NOT NULL	VARCHAR2(50)	
FLORISTIC_GROUP_TYPE		VARCHAR2(20)	
CLASSIFICATION_METHOD	NOT NULL	VARCHAR2(4000)	CLASSIFICATION_SUPPORT
SAMPLING_TYPE	NOT NULL	VARCHAR2(50)	
BOTANICAL_EXPERTISE		VARCHAR2(2000)	
POSITIONAL_ACCURACY	NOT NULL	NUMBER(5,1)	
POSITIONAL_ACCURACY_DETERM	NOT NULL	VARCHAR2(20)	POSITIONAL_ACC_DETERM
POSITIONAL_ACCURACY_MEASURE		VARCHAR2(20)	POSITIONAL_ACC_MEASURE
MAP_PUBLICATION_SCALE	NOT NULL	NUMBER(10)	
FINEST_SCALE		NUMBER(10)	FINE_SCALE
BROADEST_SCALE		NUMBER(10)	BROAD_SCALE
SURVEY_AND_MAP_RELIABILITY	NOT NULL	VARCHAR2(2000)	RELIABILITY
START_DATE_ATTRIBUTE	NOT NULL	DATE	
END_DATE_ATTRIBUTE	NOT NULL	DATE	
START_DATE_SPATIAL (+)	NOT NULL	DATE	
END_DATE_SPATIAL (+)	NOT NULL	DATE	
MAPPING_SOURCE			**MAPPING_METHOD, MAP_SOURCE**
MAPPING_SOURCE_ID (+)	NOT NULL	NUMBER(10)	
DATA_SET_ID	NOT NULL	NUMBER(10)	DATSET_ID
----------	----------	----------	
MAPPING_SOURCE_NUMBER		NUMBER(10)	MAPMTH_NUMBER, MAPSRC_NUMBER
MAPPING_METHOD	NOT NULL	VARCHAR2(2000)	
MAPPING_EXPERTISE		VARCHAR2(2000)	
IMAGERY_SOURCE	NOT NULL	VARCHAR2(2000)	INTERPRETIVE_BASE
IMAGERY_SCALE	NOT NULL	NUMBER(10)	SCALE_OR_RESOLUTION
IMAGERY_RESOLUTION		NUMBER(10)	SCALE_OR_RESOLUTION
MAPPING_SOURCE_EXTENT (+)		VARCHAR2(4000)	
DELINEATION_ MEDIUM		VARCHAR2(2000)	MEDIUM
START_DATE_SOURCE		DATE	START_DATE
END_DATE_SOURCE		DATE	END_DATE
MAP_BASE		VARCHAR2(2000)	
REFERENCE			

REFERENCE_ID	NOT NULL	NUMBER(10)	REF_ID
DATA_SET_ID	NOT NULL	NUMBER(10)	DATSET_ID
----------	----------	----------	
CITATION	NOT NULL	VARCHAR2(2000)	
FORMAT		VARCHAR2(2000)	
STORAGE_LOCATION		VARCHAR2(2000)	
MAP_UNIT			
MAP_UNIT_ID	NOT NULL	NUMBER(10)	
VEG_ID	NOT NULL	NUMBER(10)	
DATA_SET_ID	NOT NULL	NUMBER(10)	DATSET_ID
----------	----------	----------	
MAPUNT_IDENTIFIER	NOT NULL	NUMBER(10)	
NVIS_ID	NOT NULL	NUMBER(10)	States may decide to include this for operational reasons
SPATIAL_MIX	NOT NULL	VARCHAR2(50)	
# MOSAIC_TYPE		VARCHAR2(1)	
NUMBER_OF_VEG_DESCRIPTIONS	NOT NULL	NUMBER(10)	
VEG_DESC_POSITION	NOT NULL	NUMBER(10)	
VEG_DESC_PROPORTION		NUMBER(10)	
# SOURCE_CODE	NOT NULL	VARCHAR2(50)	
# SOURCE_DESCRIPTION	NOT NULL	VARCHAR2(2000)	
# SOURCE_CODE_COMPONENT	NOT NULL	VARCHAR2(50)	SRC_CODE_COMPONENT
VEG_DESCRIPTION			
VEG_ID	NOT NULL	NUMBER(10)	
NVIS_ID		NUMBER(10)	NOT NULL in C/W system
----------	----------	----------	
SOURCE_CODE	NOT NULL	VARCHAR2(50)	
LEVEL_OF_DETAIL (+)	NOT NULL	VARCHAR2(50)	ENTRY_LEVEL (+)
NUMBER_OF_STRATA	NOT NULL	NUMBER(10)	
L1_CLASS	NOT NULL	VARCHAR2(50)	CLASS_L1
L2_STRUCTURAL_FORMATION	NOT NULL	VARCHAR2(2000)	STRUCTURAL_FORMATION_L2
L3_BROAD_FLORISTIC_FORMATION	NOT NULL	VARCHAR2(2000)	BROAD_FLORISTIC_FORMATION_L3
L4_SUB_FORMATION	NOT NULL	VARCHAR2(2000)	SUB_FORMATION_L4
L5_ASSOCIATION	NOT NULL	VARCHAR2(2000)	ASSOCIATION_L5
L6_SUB_ASSOCIATION	NOT NULL	VARCHAR2(2000)	SUB_ASSOCIATION_L6
SOURCE_DESCRIPTION	NOT NULL	VARCHAR2(2000)	
ENVIRONMENTAL_DESCRIPTION		VARCHAR2(2000)	
STATE		VARCHAR2(20)	
COMMENTS		VARCHAR2(2000)	
XML_LOADDATE		DATE	
XML_STATUS		VARCHAR2(50)	
STRATUM			
STRATUM_ID	NOT NULL	NUMBER(10)	STR_ID
VEG_ID (NVIS_ID in C/W system)	NOT NULL	NUMBER(10)	NVIS_ID
----------	----------	----------	
STRATUM_CODE	NOT NULL	VARCHAR2(20)	
SUB_STRATUM_RANK		NUMBER(10)	STR_NUMBER
NUMBER_OF_GROWTH_FORMS	NOT NULL	NUMBER(10)	
NUMBER_OF_TAXA	NOT NULL	NUMBER(10)	

COVER_TYPE	NOT NULL	VARCHAR2(20)	
COVER_TYPE_DERIV_METHOD		VARCHAR2(2000)	
COVER_MINIMUM_VALUE		NUMBER(5,1)	
COVER_MAXIMUM_VALUE		NUMBER(5,1)	
COVER_MEDIAN_VALUE		NUMBER(5,1)	
COVER_MEAN_VALUE	NOT NULL	NUMBER(5,1)	
COVER_CODE	NOT NULL	VARCHAR2(20)	
HEIGHT_TYPE	NOT NULL	VARCHAR2(20)	
HEIGHT_TYPE_DERIV_METHOD		VARCHAR2(2000)	
HEIGHT_MINIMUM_VALUE		NUMBER(5,1)	
HEIGHT_MAXIMUM_VALUE		NUMBER(5,1)	
HEIGHT_MEAN_VALUE	NOT NULL	NUMBER(5,1)	
HEIGHT_MEDIAN_VALUE		NUMBER(5,1)	
HEIGHT_CLASS	NOT NULL	NUMBER(10)	
DOMINANT_STRATUM_FLAG	NOT NULL	VARCHAR2(1)	IS_DOMINANT
TAXON_DATA			**TAXON**
TAXON_DATA_ID	NOT NULL	NUMBER(10)	TAX_ID
STRATUM_ID	NOT NULL	NUMBER(10)	STR_ID
TAXON_LISTS_ID		NUMBER(10)	TAXDSC_ID
----------	----------	----------	
TAXON_DATA_RANK	NOT NULL	NUMBER(10)	TAX_NUMBER
TAXON_DATA_DESCRIPTION (+)	NOT NULL	VARCHAR2(2000)	TAXON_DESCRIPTION
TAXON_DATA_SOURCE_CODE (+)		VARCHAR2(50)	
COVER_TYPE	NOT NULL	VARCHAR2(20)	
COVER_TYPE_DERIV_METHOD		VARCHAR2(2000)	
COVER_MINIMUM_VALUE		NUMBER(5,1)	
COVER_MAXIMUM_VALUE		NUMBER(5,1)	
COVER_MEDIAN_VALUE		NUMBER(5,1)	
COVER_MEAN_VALUE		NUMBER(5,1)	
TAXON_DATA_DOMINANCE_QUALIFIER (+)		VARCHAR2(20)	COVER_DOMINANCE
TAXON_DATA_FREQUENCY		VARCHAR2(20)	C0VER_FREQUENCY
TAXON_DATA_ALWAYS_THERE (+)	NOT NULL	VARCHAR2(20)	
TAXON_DATA_SUMMARY_FLAG (+)	NOT NULL	VARCHAR2(1)	SUMMARY_FLAG
GROWTH_FORM			
GROWTH_FORM_ID	NOT NULL	NUMBER(10)	GROFRM_ID
STRATUM_ID	NOT NULL	NUMBER(10)	STR_ID
----------	----------	----------	
GROWTH_FORM_RANK		NUMBER(10)	GROFRM_NUMBER
GROWTH_FORM_CODE	NOT NULL	VARCHAR2(20)	
COVER_TYPE		VARCHAR2(20)	
COVER_TYPE_DERIV_METHOD		VARCHAR2(2000)	
COVER_MINIMUM_VALUE		NUMBER(5,1)	
COVER_MAXIMUM_VALUE		NUMBER(5,1)	
COVER_MEDIAN_VALUE		NUMBER(5,1)	
COVER_MEAN_VALUE		NUMBER(5,1)	
GR_FORM_DOMINANCE_QUALIFIER (+)		VARCHAR2(20)	DOMINANCE
GROWTH_FORM_FREQUENCY		VARCHAR2(20)	FREQUENCY
GROWTH_FORM_ALWAYS_THERE (+)	NOT NULL	VARCHAR2(20)	
GROWTH_FORM_SUMMARY_FLAG (+)	NOT NULL	VARCHAR2(1)	SUMMARY_FLAG

TAXON_LIST_ORIGIN			**TAXON_LIST**
TAXON_LIST_ORIGIN_ID	NOT NULL	NUMBER(10)	TAXLST_ID
----------	----------	----------	
TAXON_LIST_ORIGIN_CUSTODIAN	NOT NULL	VARCHAR2(2000)	TAXLST_SOURCE
TAXON_LIST_ORIGIN_STATE	NOT NULL	VARCHAR2(20)	STATE
TAXON_LIST_ORIGIN_DETAILS	NOT NULL	VARCHAR2(2000)	TAXLST_NAME
TAXON_LISTS			**TAXON_DESCRIPTION**
TAXON_LISTS_ID	NOT NULL	NUMBER(10)	TAXDSC_ID
TAXON_LIST_ORIGIN_ID	NOT NULL	NUMBER(10)	TAXDSC_TAXLST_ID
----------	----------	----------	----------
TAXON_LISTS_SOURCE_CODE	NOT NULL	VARCHAR2(50)	TAXDSC_SOURCE_CODE
TAXON_LISTS_FAMILY		VARCHAR2(50)	TAXDSC_FAMILY
TAXON_LISTS_GENUS	NOT NULL	VARCHAR2(50)	TAXDSC_GENUS
TAXON_LISTS_SPECIES	NOT NULL	VARCHAR2(50)	TAXDSC_SPECIES
TAXON_LISTS_AUTHOR		VARCHAR2(2000)	TAXDSC_AUTHOR
TAXON_LISTS_INFRA_SPECIES_RANK		VARCHAR2(50)	TAXDSC_INFRA_SPECIES_RANK
TAXON_LISTS_INFRA_SPECIES		VARCHAR2(50)	TAXDSC_INFRA_SPECIES
TAXON_LISTS_INFRA_SP_AUTHOR		VARCHAR2(2000)	TAXDSC_INFRA_SPECIES_AUTHOR
TAXON_LISTS_COMMON_NAME		VARCHAR2(2000)	TAXDSC_COMMON_NAME
TAXON_LISTS_REFERENCE (+)		VARCHAR2(2000)	TAXDSC_REFERENCE
AGENCY			
AGENCY_ID	NOT NULL	NUMBER(10)	AGE_ID
----------	----------	----------	
AGENCY_NAME	NOT NULL	VARCHAR2(2000)	AGE_NAME
AGENCY_ADDRESS		VARCHAR2(2000)	AGE_ADDRESS
AGENCY_LOCATION		VARCHAR2(2000)	AGE_LOCATION
STATE		VARCHAR2(20)	
CONTACT			
CONTACT_ID	NOT NULL	NUMBER(10)	CON_ID
AGENCY_ID	NOT NULL	NUMBER(10)	CON_AGE_ID
----------	----------	----------	
CONTACT_TYPE		VARCHAR2(2000)	CON_TYPE
CONTACT_NAME		VARCHAR2(2000)	CON_NAME
CONTACT_ADDRESS		VARCHAR2(2000)	CON_ADDRESS
CONTACT_PHONE_NUMBERS		VARCHAR2(2000)	CON_PHONE_NUMBERS
CONTACT_EMAIL		VARCHAR2(2000)	CON_EMAIL
VEG_HABITAT			
VEG_HABITAT_ID	NOT NULL	NUMBER(10)	VEGHAB_ID
NVIS_ID	NOT NULL	NUMBER(10)	
----------	----------	----------	
HABITAT_CODE	NOT NULL	VARCHAR2(50)	
HABITAT_TEXT	NOT NULL	VARCHAR2(300)	
ATTRIBUTE_LOOKUP			
TABLE	NOT NULL	VARCHAR2(50)	
FIELD	NOT NULL	VARCHAR2(50)	

LOOKUP_CODE	NOT NULL	VARCHAR2(50)	
LOOKUP_TEXT	NOT NULL	VARCHAR2(4000)	
SPATIAL_DATA (SDE or COVERAGE)			
MAPUNT_IDENTIFIER	NOT_NULL	NUMBER(10)	
VEGDSC1	NOT NULL	VARCHAR2(50)	
VEGDSC2		VARCHAR2(50)	
VEGDSC3		VARCHAR2(50)	
VEGDSC4		VARCHAR2(50)	
VEGDSC5		VARCHAR2(50)	
VEGDSC6		VARCHAR2(50)	
VEGPROP1		NUMBER(5)	
VEGPROP2		NUMBER(5)	
VEGPROP3		NUMBER(5)	
VEGPROP4		NUMBER(5)	
VEGPROP5		NUMBER(5)	
VEGPROP6		NUMBER(5)	
SPATIAL_MIX	NOT NULL	VARCHAR2(30)	
NO_VEG_DESC	NOT NULL	NUMBER(5)	

(+) Fields moved or added during database restructure or subsequently

Shaded tables/fields are probably not relevant to state d/b structure proposals

fields retained until mosaics are resolved in legacy data

(-) deleted fields (not listed)

Appendix E: Acknowledgements - Australian Vegetation Attributes V1.0 – V6.0

The National Land and Water Resources Audit

Over the period 1997-2002, the National Land and Water Resources Audit (Audit or NLWRA), through an investment of $29.4M over five years, coordinated and commissioned a range of assessments that encompassed the Australia's natural resources and biodiversity (NLWRA, 2002). These assessments included surface and groundwater; dryland salinity; native vegetation; rangelands; agriculture, natural resource accounting; river, estuary and catchment health; and terrestrial biodiversity.

The above assessments were major collaborative exercises between research agencies, natural resource managers and community organizations. There was a strong emphasis on data standards and data collation to underpin the assessments. The Audit products are being distributed through the Natural Resources Atlas (http://audit.ea.gov.au/ANRA/atlas_home.cfm) and Natural Resources data Library (http://adl.brs.gov.au/ADLsearch/).

Recommendations for the future included plans for the monitoring and evaluation of Australia's natural resources.

Contributors

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Appendix F: History of Australian Vegetation Attributes Versions V1.0 – V6.0

NVIS Version	*Process used to:*	*Comment*	*Date*
Pre V1.0	Develop	• EA and BRS reviewed the available vegetation attributes frameworks used to compile mapped vegetation data sets to meet identified requirements for various applications and national and international reporting. • National technical workshop convened in Sydney to discuss what the NVIS attribute framework should include.	Jul-Nov 98
1.0	Develop	• V1.0 developed by EA in consultation with NFI. Additional consultations included State and Territory, CSIRO, consultants, Commonwealth and international workers. NVIS attribute framework included metadata, vegetation structure, floristics and condition – as per recommendations of Sydney workshop.	Dec 98–Feb 99
	Review	• EA travelled to each State and Territory and consulted with relevant agencies on V1.0 of the NVIS attribute framework.	Mar 99
2.0	Develop	• V1.0 reviewed and revised based on the input and comment received from State and Territory agencies.	Mar–Apr 99
	Review	• Circulation of V2.0 for input and comment was limited to each State and Territory, EA, BRS, Audit and AGO.	May-Jun 99
3.0	Develop	• V3.0 developed based on the comments received from State and Territory, EA, BRS, Audit and AGO on V2.0.	Jun 99
	Review	• Circulation of V3.0 for input and comment was limited to each State and Territory, EA, BRS, Audit and AGO and formed the basis for discussion at a national technical workshop convened in Canberra. • The main purpose of the workshop was to trial the attribute framework using samples of State and Territory data sets.	Jul 99
4.0	Develop	• V4.0 developed based on the comments received at the national workshop from State and Territory, EA, BRS, Audit and AGO on V3.0. • V4.0 used as the specification for building the NVIS Data Compiler (V1.0) • Report also published by EA on the EA Website	Oct 99
	Review	• Circulation of V4.0 for use in the pilot project in each State and Territory was limited to each State and Territory, EA, BRS, Audit and AGO. • Two national technical workshops were convened in Brisbane and Sydney to review the pilot projects and discuss the operation of the NVIS Vegetation Attributes and NVIS Data Compiler and refine the NVIS attribute framework	Oct 99 – Jan 00
5.0	Develop	• V5.0 developed based on the comments received from State and Territory, EA, and Audit on V4.0. • Version 5.0 was published in June 2000.	Apr 00
	Implement.	• Used in compiling the NVIS State-wide vegetation data sets.	2000-01

	Review	• Feedback on the NVIS data compilation process, resulting in the NVIS (2001) database, included consideration of the attributes V5.0 and related database tools.
		  • National theme workshop. Canberra.
		  • State and Territory stakeholder workshops
			Mar 2001 to Sep 2001

6.0	Develop	• Reviewed Oracle database structure and proposed restructure. • Several workshops and mini-workshops • Database restructure signed off at November 2002 workshop.	August 2001 to Feb 2003
	Review	• Circulated to State and Territory collaborators for comment and finalisation. • Use of V6.0 for development of NVIS-compliant databases in each jurisdiction.	Feb 2003

Appendix G: Summary of Changes Australian Vegetation Attributes V5.0 – V6.0

Since the compilation of the NVIS (2001) dataset, the NVIS database has been redesigned to improve its efficiency. Major changes were made in tables dealing with map units and vegetation descriptions, to reduce duplication and excessive redundancy. Appendix I documents attributes deleted or scheduled for deletion as part of the restructure process.

Subsequent to the restructuring of the NVIS database, an XML-based data transfer protocol has been piloted. This included a set of rules to improve the consistency of content and to generate higher levels in the NVIS Information Hierarchy. A review of the consistency of content in the NVIS (2001) database was also done. These processes provided recommendations for improvements to definitions and look-up tables. Please see the documentation on each attribute in Section 3, for these changes. When the XML-transfer standard and rules have been finalised, these will be published in a subsequent edition of these Attributes.

Other changes from Version 5.0 to 6.0 include:

- Writing a document overview and re-writing the Introduction to make the purpose of the document clearer;
- Changes to the allowable growth form codes and the treatment of minor growth forms in the description of structural formations (Table 4);
- Improved discussion of structural and floristic attributes.
- Changes to the "Requirements" description of each attribute;
- The inclusion of rules to check the quality of data and generate levels of the NVIS Information Hierarchy.
- Addition of the hat "^" and double hat "^^" terminology.
- The allowable values for many attributes were changed from a mixture of cases to all lower-case;
- Removal of "classified" and "missing" as options in many attributes;
- Changes to the formatting of Section 3 to make it easier to find particular attributes;
- Combining the Map_Source and Mapping Method tables into the Mapping_Source table to streamline the documentation of primary sources.
- The addition of several attributes found to be useful by the Commonwealth in the compilation of the NVIS (2000) database;
- Clarification of some attribute names;
- Changed field lengths to a few standard lengths, to simplify program declarations.
- Improved Glossary;
- New standards for abbreviations;
- An Entity:Relationship diagram of the NVIS database; and
- A worked example of the use of the attributes.

Appendix H: References

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Appendix I: Obsolete Attributes

(Australian Vegetation Attributes deleted from Version 5.0 or scheduled for deletion.)

- Appendix I is generated from an XML text master file by formatting scripts.
- The descriptive fields can be added or removed for display purposes.
- References to Table numbers in the attribute descriptions may be to Version 5.0 or 6.0 of the attribute manual.

Data Set Level Attributes

Reference Information

Attribute: DS 5 - ENTRY LEVEL	
Heading	**Details**
Purpose:	**To define the level of data incorporated into the NVIS according to the NVIS Information Hierarchy.**
Requirement:	**Mandatory**
Database Field Name:	**ENTRY_LEVEL**
Description:	**The level of detail in the input data set provided by the data custodian.¶ The target level for incorporation is at the sub-association level.¶ If the sub-association level is not available, then the data set is provided at the level with the greatest degree of integrity.**
Value:	**Character(50). This is a value set from a defined lookup table: - Entry Level. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	
Review:	**Duplicates ENTRY LEVEL in Veg Description Table and is essentially obsolete in this table. Recommend deletion, noting that in the restructured database, data in 2003 onwards will only be entered at levels 5 and 6. The ENTRY_LEVEL field in the VEG_DESCRIPTION table would be retained.**
Status:	**Implemented in NVIS Oracle database, but obsolete field proposed for deletion. For decision by NVIS stakeholders.**

Attribute: DS 8 - VEGETATION THEME COVERAGE	
Heading	**Details**

Purpose:	**To specify the vegetation theme that applies to the ENTRY LEVEL for the dataset.**
Requirement:	**QAQC**
Database Field Name:	**VEGETATION_THEME_COVERAGE**
Description:	**The vegetation theme (pre-clearing or extant) that applies to the dataset.**
Value:	**Character(50). This is a value set from a defined lookup table:- Vegetation Theme. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**Extant only**
Review:	**This field is a mixture of dataset description and a qualifier on completeness. Now covered by shorter VEGETATION_THEME_CODE. If retained, recommend remove "_COVERAGE" from name; change "restricted" to "incomplete", where incomplete does not meet the NVIS specification - e.g. Grasslands are not mapped in RFA areas. If retained, recommend drop "classified" and "missing" as options in the lookup table.**
Status:	**Implemented in the NVIS Oracle database; field name needs changing.**

Look-up Table for: VEGETATION THEME COVERAGE

Code:	Explanation:
extant only	Extant Only - all vegetation ranging from natural to cultivated
extant only - restricted	Extant Only - limited to particular vegetation. Eg woody vegetation, endangered communities
pre-clearing only	Pre-clearing Only - all vegetation ranging from natural to cultivated. Extant not identified
pre-clearing only - restricted	Pre-clearing Only - limited to particular vegetation. Eg woody vegetation, endangered communities
pre-clearing and extant	Extant and Pre-clearing mapped for all vegetation ranging from natural to cultivated.
pre-clearing and extant -	Extant and Pre-clearing mapped for particular vegetation. Eg woody vegetation, endangered communities

restricted	
not applicable	not applicable
unknown	unknown

Positional Accuracy

Attribute: DS 12 - POSITIONAL UNITS	
Heading	**Details**
Purpose:	To specify the unit of measurement for the POSITIONAL ACCURACY (DS 9).
Requirement:	QAQC
Database Field Name:	POSITIONAL_UNITS (was: POSITIONAL_PRECISION)
Description:	This attribute provides information on the confidence level of the DATASET POSITIONAL ACCURACY. The preferred unit of measure is metres.
Value:	Character(30). This is a value set from a defined lookup table:- Positional Units. The values in the lookup table are set by the administrator and can not be added to.
Example:	Metres
Review:	This field does not provide information on precision, but rather the units used for positional accuracy units. All meaningful data in the NVIS(2000) dataset is "metres". Recommend deletion from dataset.
Status:	Implemented in the NVIS Oracle database. Obsolete, since DS 9 POSITIONAL_ACCURACY should always be specified in metres. Need to remove from the database.

Look-up Table for: POSITIONAL UNITS

Code:	Explanation:
centimetres	centimetres
metres	metres
kilometres	kilometres
not applicable	not applicable
missing	missing

unknown	unknown

Map Origins (Methods and Sources)

Attribute: MM 1 - MAPPING METHOD NUMBER	
Heading	**Details**
Purpose:	To identify each mapping method used in each dataset.
Requirement:	QAQC
Database Field Name:	MAPPING_METHOD_NUMBER
Description:	A number assigned to each defined mapping method used in the construction of a dataset. The number is assigned sequentially, beginning with 1, within each dataset. Typical numbers are 1 and 2.
Value:	Number(10)
Example:	2
Review:	The design of NVIS V5.0 assumed that there were many sources for each mapping method. One could argue that the reverse was also possible, making a many to many database link. Anyway, the numbers of records are relatively low, so combining the two tables into one simplifies maintenance.
Status:	Implemented in the NVIS Oracle database. Obsolete field with joining of former MAPPING_METHOD and MAP_SOURCE tables.

Attribute: MS 1 - MAP SOURCE NUMBER	
Heading	**Details**
Purpose:	To identify each map source within each mapping method.
Requirement:	QAQC
Database Field Name:	MAP_SOURCE_NUMBER
Description:	The number assigned to each map source. These numbers are assigned sequentially within each mapping method, beginning with 1.
Value:	Number(10)
Example:	3
Review:	All values in database = 1. I.e. effectively, a 1:1 relationship exists between MAPPING_METHODS and MAP_SOURCE tables. There is therefore a case for combining the tables Mapping_Method and Map_Source

	into the one table. Alternatively, there is a need better instructions on use of the Map_Source table.
Status:	Implemented in the NVIS Oracle database. Obsolete field with joining of former MAPPING_METHOD and MAP_SOURCE tables.

References

Attribute: RF 1 - REFERENCE NUMBER	
Heading	Details
Purpose:	To uniquely identify each reference within each dataset.
Requirement:	Optional
Database Field Name:	REF_NUMBER
Description:	A unique identifier for each reference beginning from 1 in each dataset.
Value:	Number(10); Valid range 1-999999999
Example:	15
Review:	Doesn't seem to add much value and would seem to unnecessarily link generic references to 1 dataset. Multiple entry of generic references would be the result. Recommend further review with a view to deletion.
Status:	Implemented in the NVIS Oracle database.

Map Unit Level Attributes

Core Vegetation

Attribute: MU 13 - SOURCE CODE	
Heading	Details
Purpose:	To enable labelling of each mapping unit with the original mapping code used by the data supplier (usually a State or Territory).
Requirement:	Mandatory
Database Field Name:	SOURCE_CODE
Description:	The original mapping code used by the data custodian for labelling and displaying the map unit.
Value:	Character(50).

Example:	**Mu112aG3**
Review:	**This field has generally been well filled out. However, many source codes for mosaics are yet to be resolved into their component vegetation descriptions.**
Status:	**Implemented in the NVIS Oracle database. NB: This field must be retained in the MAP_UNIT table as an interim measure until all mosaics are resolved into their component vegetation descriptions, when it can be moved to the vegetation description table. SOURCE_CODE, the equivalent field in table:VEG_DESCRIPTION, will be retained.**

Attribute: MU 13A - SOURCE CODE COMPONENT	
Heading	**Details**
Purpose:	**To split the source code as supplied by the data supplier into its components. This assists with the matching of source codes to NVIS descriptions.**
Requirement:	**Mandatory**
Database Field Name:	**SRC_CODE_COMPONENT**
Description:	**A single state source code for a vegetation type. The source codes of the component vegetation associations within the mosaic exist as independent entities within the state system and map directly to NVIS descriptions. There should be no inconsistency mapping source code to vegetation description. Vegetation descriptions are not duplicated so there is no residual redundancy.**
Value:	**Character(50)**
Example:	**9069100~1; 10bh_B~2**
Review:	**This field has been filled out by the Commonwealth as an interim measure. Many source codes for mosaics need to be resolved into their component vegetation descriptions by data custodians.**
Status:	**Implemented in the NVIS Oracle database. NB: This field must be retained in the MAP_UNIT table as an interim measure until all mosaics are resolved into their component vegetation descriptions.**

Attribute: MU 14 - SOURCE DESCRIPTION	
Heading	**Details**
Purpose:	**To describe the mapping unit as used by the data supplier.**
Requirement:	**Mandatory**
Database Field Name:	**SOURCE_DESCRIPTION**
Description:	**The original short description used by the data custodian**

	for characterising the map unit. It is commonly used as the legend for mapping purposes.
Value:	Character (2000).
Example:	Montane grassy woodland¶ Coastal vine-rich forest
Review:	Most mosaics are yet to be resolved into their component vegetation descriptions.
Status:	Implemented in the NVIS Oracle database. This field has been retained in the MAP_UNIT table as an interim measure until all mosaics are resolved into their component vegetation descriptions. SOURCE_DESCRIPTION, the equivalent field in the table:VEG_DESCRIPTION, will be retained.

Attribute: MU 2 - ENTRY LEVEL	
Heading	**Details**
Purpose:	To describe the level of detail in the NVIS Information Hierarchy at which the vegetation descriptions in the dataset have been supplied by the data custodian.
Requirement:	Mandatory
Database Field Name:	ENTRY_LEVEL
Description:	The level of detail in the NVIS Information Hierarchy that the Map Unit was originally mapped at by the data custodian. This is used to differentiate data entry level of map units compiled from various data sets.
Value:	This is a value set from a defined lookup table:- Entry Level. The values in the lookup table are set by the administrator and cannot be added to.
Example:	Formation
Review:	Duplicates dataset ENTRY LEVEL in VEG_DESCRIPTION table. Retain ENTRY LEVEL in VEG_DESCRIPTION table, so that each individual vegetation description can be assigned an ENTRY LEVEL. I.e. the entry level in a dataset can now vary with the level of detail available in the source description.
Status:	Implemented in the NVIS Oracle database. Obsolete in this table. Needs to be deleted from the database.

Look-up Table for: ENTRY LEVEL

Code:	Explanation:
class	Growth form; level 1
formation	Structural formation (Growth form, cover and height are implied as per Table 4 in Section 2.); level 2
broad	Floristic information (usually Genus) plus structural

floristic formation	**formation (Growth form, cover and height are implied as per Table 4 in Section 2.); level 3**
sub-formation	**Floristic information (usually Genus) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2) for each stratum (maximum of 3 strata); level 4**
association	**For each stratum (maximum of 3 strata): floristic information (up to 3 dominant and/or diagnostic species) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2). The ecologically predominant stratum is indicated (with a plus symbol: "+"); level 5**
sub-association	**For each layer/sub-stratum (maximum of 8 sub-strata): floristic information (up to 5 dominant and/or diagnostic species) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2). The ecologically predominant stratum is indicated (with a plus symbol: "+"); level 6**

Attribute: MU 5 - CLASS	
Heading	**Details**
Purpose:	**To describe the class defining the map unit within the NVIS Information Hierarchy (refer to Table 1).**
Requirement:	**Mandatory**
Database Field Name:	**CLASS**
Description:	**This attribute describes the class defining the map unit within the NVIS Information Hierarchy (refer to Table 1).¶ The description of class should include the growth form for the uppermost or ecologically dominant stratum of the dominant sub-association found within the map unit (refer to Tables 2 and 3).¶ This attribute should be derived using a rule set or expert knowledge.**
Value:	**Character (255).**
Example:	**Tree**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 6 - STRUCTURAL FORMATION	
Heading	**Details**
Purpose:	**To describe the structural formation defining the map unit within the NVIS Information Hierarchy (refer to Table 1).**

Requirement:	**Mandatory**
Database Field Name:	**STRUCTURAL_FORMATION**
Description:	**The description of structural formation should include dominant growth form, height and cover for the uppermost or ecologically dominant stratum of the dominant sub-association found within the map unit (refer to Tables 2 and 3).¶ This attribute should be derived using a rule set or expert knowledge.**
Value:	**Character (255).**
Example:	**tall open forest**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 7 - BROAD FLORISTIC FORMATION	
Heading	**Details**
Purpose:	**To define the floristic code reported at the sub-formation level of the NVIS Information Hierarchy (refer to Table 1).**
Requirement:	**Mandatory**
Database Field Name:	**BROAD_FLORISTIC_FORMATION**
Description:	**The code summarises the flora component of the map unit at genus or family level. It should be based on the dominant stratum of the dominant sub-association found within the map unit (refer to tables 2 and 3).¶ The codes have been recorded in lower case to avoid confusion with the growth form codes.**
Value:	**Character (255).**
Example:	**Eucalyptus tall open forest**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 8 - SUB-FORMATION	
Heading	**Details**
Purpose:	**To describe the sub formation defining the map unit within the NVIS Information Hierarchy.**
Requirement:	**Mandatory**

Database Field Name:	**SUB-FORMATION**
Description:	**The description of sub-formation should include the dominant growth form, cover, height and broad floristic code (usually dominant Genus and Family) for the three strata (refer to table 3) of the dominant sub-association found within the map unit.¶ This attribute may be derived using a rule set or expert knowledge.**
Value:	**Character (255).**
Example:	**Eucalyptus tall open forest/Proteaceae open shrubland/mixed groundlayer**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 9 - ASSOCIATION	
Heading	**Details**
Purpose:	**This attribute provides an association level description of the vegetation description as defined within the NVIS Information Hierarchy (refer to Table 1).**
Requirement:	**Mandatory**
Database Field Name:	**ASSOCIATION**
Description:	**The description of association defined for the NVIS includes the dominant growth form, height and cover of the dominant/diagnostic species (maximum of 3) for the three traditional strata (i.e. upper, mid and ground) of the dominant sub-association found within the map unit (refer to Tables 2 and 3).¶ This attribute should be derived using a rule set or expert knowledge.**
Value:	**Character (255).**
Example:	**Refer to the example for Association in Table 2.**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 10 - SUB-ASSOCIATION	
Heading	**Details**
Purpose:	**This attribute describes the sub-association level description of the vegetation description as defined within**

	the NVIS Information Hierarchy (refer to table 1).
Requirement:	**Mandatory**
Database Field Name:	**SUB-ASSOCIATION**
Description:	**The description of sub-association defined for the NVIS includes dominant growth form, height and cover of the dominant/diagnostic species (maximum of 5) for all layers/strata (refer to table 3) of the sub-association within the map unit (refer to Tables 2 and 3).¶ This attribute should be derived using a rule set or expert knowledge.**
Value:	**Character (255).**
Example:	**Refer to the example for Sub-Association in Table 2.**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. The information is most-efficiently stored in the VEG_DESCRIPTION table.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 11 - ENVIRONMENTAL DESCRIPTION	
Heading	**Details**
Purpose:	**To describe the environmental characteristics that occur across the map unit.**
Requirement:	**Optional**
Database Field Name:	**ENVIRONMENTAL_DESCRIPTION**
Description:	**This may be generated from environmental parameters that are supplied in the discrete vegetation descriptions of the map unit or may be taken directly from the original map unit definition.**
Value:	**Character (255).**
Example:	**This type of vegetation occurs on old sand dunes. The distribution appears to correlate with sheltered moist areas on the landward side of the Rainforests on the deep sands along the east coast of the Range. The recorded fire history varies but cool ground fires are likely to be common and patchy.**
Review:	
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: MU 12 - MINOR SUB-ASSOCIATIONS	
Heading	**Details**
Purpose:	**To document the presence of minor sub-associations in**

	the mapping unit.
Requirement:	**Mandatory**
Database Field Name:	**MINOR_SUB-ASSOCIATIONS**
Description:	**Sub-associations smaller than the minimum mapping unit (MMU) are reported, eg. Rainforest patches in broader eucalyptus forests. The scale at which the data set is produced (Reid 1988, Gunn et al 1988) usually defines the MMU. The MMU may differ for units of uniform and elongated shape. The data custodian will determine the number of minor sub-associations to list. It will be necessary to contact the data custodian to access more information on the interpretation of the codes.**
Value:	**Character (255)**
Example:	**Ma25, ge34 ? A data set at 1:100,000 scale, has a minimum mapping area of 20ha. This attribute would record sub-associations that could not be mapped because they were less than 20ha in size.**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the VEG_DESCRIPTION table. This field has been sparsely and inconsistently filled-out. With six available vegetation descriptions per map unit in the spatial coverage, there should be adequate means to document minor types. (The restriction on MMU does not apply.)**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Vegetation Description Level Attributes

Core Vegetation

Attribute: VG 1 - VEGETATION DESCRIPTION NUMBER	
Heading	**Details**
Purpose:	**To uniquely identify each vegetation type within the map unit.**
Requirement:	**Mandatory**
Database Field Name:	**VEG_DSC_NUMBER**
Description:	**Each discrete sub-association within the map unit is assigned a unique number. The most spatially dominant vegetation description must be assigned a value of '1'.¶ The number assigned to the remaining sub-associations (if they exist) should be allocated according to decreasing spatial area. Where there is no clear pattern of spatial**

	dominance for subsequent sub-associations, the numbering can be arbitrary.
Value:	Numeric (1); Multiple entries allowed.
Example:	Map unit1:Sub-association1='1'¶ Map unit 1:Sub-association 2='2' etc.
Review:	This attribute is not needed in this table, after the restructure.
Status:	Implemented in the NVIS Oracle database. Obsolete. Needs to be deleted from the database.

Attribute: VG 2 - ENTRY LEVEL	
Heading	**Details**
Purpose:	To describe the level of detail in the NVIS Information Hierarchy at which the vegetation description has been supplied by the data custodian.
Requirement:	QAQC
Database Field Name:	ENTRY_LEVEL
Description:	This is used to differentiate data entry level of each vegetation description.¶ The vegetation description entry level (association or sub-association) determines the expected detail of stratum information supplied for the vegetation description.
Value:	Character(255). This is a value set from a defined lookup table:- Entry Level. The values in the lookup table are set by the administrator and cannot be added to.
Example:	sub-association
Review:	The NVIS stakeholders have agreed to enter data at the complex levels (5 and 6) only. Are the other allowable values needed for historic purposes?
Status:	Implemented in the NVIS Oracle database. LUT is obsolete in this form.

Look-up Table for: ENTRY LEVEL

Code:	Explanation:
class	Growth form; level 1
formation	Structural formation (Growth form, cover and height are implied as per Table 4 in Section 2.); level 2
broad floristic formation	Floristic information (usually Genus) plus structural formation (Growth form, cover and height are implied as per Table 4 in Section 2.); level 3
sub-formation	Floristic information (usually Genus) plus structural formation (Growth form, cover and height are implied as

	per Table 4 in Section 2) for each stratum (maximum of 3 strata); level 4

Attribute: VG 3 - MAP UNIT SPATIAL EXTENT	
Heading	**Details**
Purpose:	To describe the spatial extent of the sub-association within the map unit
Requirement:	Mandatory
Database Field Name:	MAP_UNIT_SPATIAL_EXTENT
Description:	The spatial extent of the sub-association within the map unit measured as a percentage. The value may be a measured value or an estimated value.¶ Wherever practical, a real value should be provided for this attribute. Estimated values should be in multiples of 5 (i.e. 35% rather than 32% or 37%).¶ Where only one discrete sub-association occurs in the map unit, and it covers the whole unit, the value will be '100' (i.e. 100%).¶ Estimates may require the input of local expertise.
Value:	Integer (3); Valid Range 0-100; Units: percentage
Example:	30
Review:	
Status:	Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)

Attribute: VG 12 - MINOR SUB-ASSOCIATIONS	
Heading	**Details**
Purpose:	
Requirement:	Mandatory
Database Field Name:	MINOR_SUB-ASSOCIATIONS
Description:	This attribute is used to record the occurrence of significant minor sub-associations within the vegetation description.
Value:	Character (255).
Example:	Refer to example for MU12. MINOR SUB ASSOCIATIONS.
Review:	As part of the restructure (2001-2002), this field was found to duplicate information in CLASS of the MAP_UNIT table. This field has been sparsely and inconsistently filled-out. With six available vegetation descriptions per map unit in the spatial coverage, there should be adequate means to document minor types. NVIS stakeholders need to ask whether the framework

	(especially at level 6 and in the lower tables) is adequate to describe the observed variability of a vegetation type.
Status:	**Implemented in the NVIS Oracle database. Obsolete. Needs to be deleted from the database.**

Detailed Vegetation Attributes

Structural Information

Attribute: STR 19 - GROWTH FORM CODE	
Heading	**Details**
Purpose:	**To categorise the growth form of a stratum.**
Requirement:	**Mandatory**
Database Field Name:	**GROWTH_FORM_CODE**
Description:	**The growth form describes the habit of a plant, identified most precisely by the position of its perennating buds (Beadle & Costin 1952). ¶ Identification of the growth form for each sub-stratum will contribute to the definition of the structural formation (see Table 5 and levels 1 to 6 in the table: VEG_DESCRIPTION).**
Value:	**Character(30); This is a value set from a defined lookup table:- Growth Form Code. See attribute: GR 3 GROWTH FORM CODE. The values in the lookup table are set by the administrator and can not be added to.**
Example:	**T**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in GROWTH_FORM_CODE of the GROWTH_FORM table. The information is most-efficiently stored in the GROWTH_FORM table. This attribute should relate to a taxon or a growth form, so is best stored in the TAXON and/or GROWTH_FORM tables. Where a single growth form is required to describe a stratum, as in NVIS Level 4 this information can be generated from other fields, especially SUMMARY_FLAG.**
Status:	**Implemented in the NVIS Oracle database. Obsolete. Need to remove from the database.**

Attribute: STR 20 - STRUCTURAL CODE	
Heading	**Details**
Purpose:	**To briefly document the structure of a stratum in levels 5 and 6.**
Requirement:	**Mandatory**

Database Field Name:	**STRUCTURAL_CODE**
Description:	**The structure coding for the stratum, based on the NVIS Structural Formations Nomenclature.¶ The code is a triplet code based on: [growth form code][height class][cover code].¶ Absent values in the structural codes are denoted by a hash symbol (#).**
Value:	**Character (255).**
Example:	**Removed...**
Review:	**This field has non-normalised content, drawing upon other fields in the STRATUM table.**
Status:	**Implemented in the NVIS Oracle database. Obsolete. Needs to be deleted from the database.**

Attribute: STR 21 - BROAD FLORISTIC	
Heading	**Details**
Purpose:	
Requirement:	**Mandatory**
Database Field Name:	**BROAD_FLORISTIC**
Description:	**This attribute defines the floristic code reported at the sub-formation level of the NVIS Information Hierarchy. The code summarises the flora component of the map unit at genus or family level. It should be based on the dominant stratum of the dominant sub-association found within the map unit.¶ It is kept as a separate attribute for data analysis and reporting.**
Value:	**This is a value set from an expandable lookup table:- Broad Floristic. Initial values are set by the administrator, new values can be added by the data loader.**
Example:	**e - Eucalyptus is the prevalent genus¶ w - Acacia is the prevalent genus**
Review:	**Applied inconsistently in initial compilation exercise.**
Status:	**Obsolete. This field has been removed from the NVIS Oracle Database as part of the restructure (2001-2002)**

Attribute: STR 22 - TAXON DESCRIPTIONS	
Heading	**Details**
Purpose:	**To describe the dominant species of the sub-stratum.**
Requirement:	**Mandatory**
Database Field Name:	**TAXON_DESCRIPTIONS**
Description:	**The full taxonomic names of the dominant taxa for the sub-stratum as listed in the GR2. DOMINANCE**

	SEPARATOR attribute.
Value:	**Character (255).**
Example:	**Eucalyptus obliqua**
Review:	**As part of the restructure (2001-2002), this field was found to duplicate information in the VEG_DESCRIPTION table (sub-association and/or association descriptions) and in the TAXON table (TAXDSC_ID can be linked to TAXON_DESCRIPTION table to generate species names.). Data custodians often appear to use this field to provide fuller species lists for a vegetation type. However, the chance of major inconsistencies remain, unless the field is redefined to include only supplementary species - i.e. those species not recorded in the other tables.**
Status:	**Implemented in the NVIS Oracle database. Obsolete. Needs to be deleted from the database. Recommend investigation of requirement for full species lists in a vegetation description; then, if required, additional design work is needed.**

Growth Form Information

Attribute: GR 2 - DOMINANCE SEPARATOR	
Heading	**Details**
Purpose:	**To specify the symbol to be used when concatenated with other growth forms in the Stratum and Veg-description levels.**
Requirement:	**Mandatory**
Database Field Name:	**DOMINANCE_SEPARATOR**
Description:	**This attribute is used for specifying the dominance separator of this growth form when concatenated with other growth forms at the stratum level:**
Value:	**Character (3) as found in :- Dominance Separator**
Example:	**-**
Review:	**Duplicates GR 10 DOMINANCE. Need to maintain one set properly, rather than two, which are often inconsistent. Letters, rather than symbols, are easier to manage in the normalised part of the database. (Full words would be even better, since these are self-documenting.) An appropriate dominance separator symbol can then be part of the automatic scripting to generate vegetation descriptions from the lower tables.**
Status:	**Implemented in the NVIS Oracle database. Obsolete. The**

	information content needs to be reconciled with GR 10 DOMINANCE. Where this cannot be done automatically, the data custodians will need to supply the correct interpretation. Then this field can be deleted from the database.

Look-up Table for: DOMINANCE SEPARATOR

Code:	Explanation:
.	dominant
,	co-dominant
-	sub-dominant
+/-	sub-dominant, may or may not be present
not applicable	not applicable
missing	missing
unknown	unknown

Taxon Information

Attribute: TX 2 - DOMINANCE SEPARATOR	
Heading	**Details**
Purpose:	**To specify the symbol to be used when concatenated with other taxa in the Stratum and Veg-description levels.**
Requirement:	**Mandatory**
Database Field Name:	**DOMINANCE_SEPARATOR**
Description:	**¶ , co-dominant¶ – sub-dominant¶ +/- sub-dominant, may or may not be present**
Value:	**This is a value set from a defined lookup table. The values in the lookup table are set by the administrator and cannot be added to.**
Example:	**+/-**
Review:	**Duplicates TX 9 (COVER) DOMINANCE. Need to maintain one set properly, rather than two, which are often inconsistent. Letters, rather than symbols, are easier to manage in the normalised part of the database. (Full words would be even better, since these are self-documenting.) An appropriate dominance separator**

	symbol can then be part of the automatic scripting to generate vegetation descriptions from the lower tables.
Status:	**Implemented in the NVIS Oracle database. Obsolete. The information content needs to be reconciled with TX 9 DOMINANCE. Where this cannot be done automatically, the data custodians will need to supply the correct interpretation. Then this field can be deleted from the database.**

Taxon Lists/Description Information

Attribute: TD 1 - SOURCE IDENTIFIER	
Heading	**Details**
Purpose:	
Requirement:	**QAQC**
Database Field Name:	**SOURCE_IDENTIFIER**
Description:	**The authority's (TAXON SOURCE) unique identifiers for each taxon. Multiple entries allowed per TAXON SOURCE.**
Value:	**Number(10); Valid entries 1-9999**
Example:	
Review:	**This attribute duplicates another attribute in the Taxon Lists table, with no benefit.**
Status:	**Implemented in the NVIS Oracle database. Obsolete field, to be deleted.**

Appendix J: Worked Example

- Here is an example of a vegetation description record altered to conform with version 6.0 of the Australian Vegetation Attributes.
- The database keys are shown for illustrative purposes only. Their values should not be copied into the database.
- The example uses a vegetation type with the SOURCE_CODE "51" supplied by the Queensland Herbarium to the NVIS (2000) database.
- This type occurs in about 50 map units, of which 3 are shown, highlighted, below.
- The example illustrates the resolution of mosaics into the preferred format. In this case, all of the relevant data was supplied in the field SOURCE_CODE, but in a sub-optimal format.
- This has been split into the unique SOURCE_CODE_COMPONENT and the corresponding content in VEG_DESC_POSITION and VEG_DESC_PROPORTION.
- The fields marked with asterisks will be deleted from the final NVIS database once the mosaics have been resolved into their component vegetation descriptions. These fields are described in Appendix I.
- I.e. the mosaics are "resolved" when each SOURCE_CODE = Each SOURCE_CODE_COMPONENT.

MAP_UNIT TABLE							
MAP_UNIT_ID	19135	19136	21077	21078	21079	21086	21087
VEG_ID	27	161	161	533	688	161	533
DATA_SET_ID	54	54	54	54	54	54	54
MAPUNT_IDENTIFIER	40519235	40519235	40520224	40520224	40520224	40520228	40520228
SPATIAL_MIX	dominant mosaic	dominant mosaic	mosaic	mosaic	mosaic	dominant mosaic	dominant mosaic
NUMBER_OF_VEG_DESCRIPTIONS	2	2	3	3	3	2	2
VEG_DESC_POSITION	1	2	1	2	3	1	2
VEG_DESC_PROPORTION	70	30	50	40	10	70	30
SOURCE_CODE*	146/51:70/30	146/51:70/30	51/116/196:50/40/10	51/116/196:50/40/10	51/116/196:50/40/10	51/116:70/30	51/116:70/30
SOURCE_DESCRIPTION*	(see below)	(see below)	(see below)	(see below)	(see below)	(see below)	(see below)
SOURCE_CODE_COMPONENT*	146	51	51	116	196	51	116

See the following page for each SOURCE_DESCRIPTION.

MAP_UNIT_ID	SOURCE_DESCRIPTION
19135	Astrebla spp wooded with Acacia spp, Eucalyptus spp and other tall shrubs, Tussock Grassland
19136	Eucalyptus coolabah +/- Casuarina cristata +/- Alectryon oleifolius open-woodland
21077	Eucalyptus coolabah +/- Casuarina cristata +/- Alectryon oleifolius open-woodland
21078	Eucalyptus populnea, Casuarina cristata +/- Tall Shrubs woodland
21079	Acacia cambagei +/- Casuarina cristata open-forest
21086	Eucalyptus coolabah +/- Casuarina cristata +/- Alectryon oleifolius open-woodland
21087	Eucalyptus populnea, Casuarina cristata +/- Tall Shrubs woodland

- The following table shows the description of source code 51 with the "+/-" terminology based on the attribute TAXON_DATA_ALWAYS_THERE.
- The "+/-" terminology for GROWTH_FORM_ALWAYS_THERE has not been shown, since we anticipate that it would be used sparingly.
- Where the mosaic is resolved, the VEG_DESCRIPTION AND MAP_UNIT tables become relatively simple and the number of records is dramatically reduced.

VEG_DESCRIPTION TABLE	
VEG_ID	161
SOURCE_CODE	51
LEVEL_OF_DETAIL	level6_sub-association
NUMBER_OF_STRATA	4
L1_CLASS	Tree
L2_STRUCTURAL_FORMATION	Open woodland
L3_BROAD_FLORISTIC_FORMATION	Eucalyptus open woodland
L4_SUB_FORMATION	+Eucalyptus open woodland\Acacia tall sparse shrubland\Aristida open tussock grassland
L5_ASSOCIATION	U+ ^Eucalyptus coolabah+/-Casuarina cristata+/-Flindersia maculosa\^tree\7\r;M +/-Alectryon oleifolius+/-^Acacia salicina+/-Acacia stenophylla\^shrub\4\r;G ^+/-Aristida ramosa+/-Astrebla squarrosa+/-Bothriochloa decipiens\^tussock grass,forb,sedge\2\i
L6_SUB_ASSOCIATION	U1+ ^Eucalyptus coolabah+/-Casuarina cristata+/-Flindersia maculosa\^tree\7\r;M1 +/-Alectryon oleifolius+/-^Acacia salicina+/-Acacia stenophylla+/-Acacia victoriae subsp. victoriae+/-Eremophila bignoniiflora\^shrub\4\bi;M2 Eremophila longifolia+/-Muehlenbeckia florulenta\shrub\3\r;G1 +/-^Aristida ramosa+/-Astrebla squarrosa+/-Bothriochloa decipiens+/-Dichanthium sericeum+/-Enteropogon acicularis\^tussock grass,forb,sedge\2\i
SOURCE_DESCRIPTION	Eucalyptus coolabah +/- Casuarina cristata +/- Alectryon oleifolius open-woodland
ENVIRONMENTAL_DESCRIPTION	Plains, alluvials and floodplains on Cainozoic sediments.

- The following table provide the detailed components of vegetation SOURCE_CODE 51.

STRATUM TABLE				
STRATUM_ID	365465	365466	365467	365468
VEG_ID	161	161	161	161
STRATUM_CODE	U1	M1	G1	M2
SUB_STRATUM_RANK	1	1	1	2
NUMBER_OF_GROWTH_FORMS	1	1	3	1
NUMBER_OF_TAXA	3	5	5	2
COVER_TYPE	4C	4C	4C	4C
COVER_TYPE_DERIV_METHOD	Unknown	Unknown	Unknown	Unknown
COVER_MINIMUM_VALUE	5	0	15	1
COVER_MAXIMUM_VALUE	10	1	40	5
COVER_MEDIAN_VALUE	-9999	-9999	-9999	-9999
COVER_MEAN_VALUE	7	0	25	3
COVER_CODE	r	bi	i	r
HEIGHT_TYPE	NV	NV	NV	NV
HEIGHT_TYPE_DERIV_METHOD	Unknown	Unknown	Unknown	Unknown
HEIGHT_MINIMUM_VALUE	9	2	0	1
HEIGHT_MAXIMUM_VALUE	15	6	1	2
HEIGHT_MEAN_VALUE	12	4	0.5	1.5
HEIGHT_MEDIAN_VALUE	-9999	-9999	-9999	-9999
HEIGHT_CLASS	7	4	2	3
DOMINANT_STRATUM_FLAG	Y	N	N	N

GROWTH_FORM TABLE						
GROWTH_FORM_ID	4547229	4547230	4547231	4547232	4547233	4547234
STRATUM_ID	365465	365466	365467	365467	365467	365468
GROWTH_FORM_RANK	1	1	1	2	3	1
GROWTH_FORM_CODE	T	S	G	F	V	S
COVER_TYPE	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_TYPE_DERIV_METHOD	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_MINIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MAXIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEDIAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999
GR_FORM_DOMINANCE_QUALIFIER	D	D	D	SD	SD	D
GROWTH_FORM_FREQUENCY	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
GROWTH_FORM_ALWAYS_THERE						
GROWTH_FORM_SUMMARY_FLAG	Y	Y	Y	N	N	N

TAXON_DATA TABLE								
TAXON_DATA_ID	1238981	1238982	1238983	1238984	1238985	1238986	1238987	1238988
STRATUM_ID	365465	365465	365465	365466	365466	365466	365466	365466
TAXON_LISTS_ID	131472	121171	121739	123974	123131	123137	130703	121565
TAXON_DATA_RANK	1	2	3	1	2	3	4	5
TAXON_DATA_DESCRIPTION	Eucalyptus coolabah	Casuarina cristata	Flindersia maculosa	Alectryon oleifolius	Acacia salicina	Acacia stenophylla	Acacia victoriae	Eremophila bignoniiflora
TAXON_DATA_SOURCE_CODE								
COVER_TYPE	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_TYPE_DERIV_METHOD	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_MINIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MAXIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEDIAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-9999
TAXON_DATA_DOMINANCE_QUALIFIER	D	SD	SD	CD	CD	CD	CD	CD
TAXON_DATA_FREQUENCY	A	C	O	C	C	C	C	C
TAXON_DATA_ALWAYS_THERE	Y	N	N	N	N	N	N	N
TAXON_DATA_SUMMARY_FLAG	Y	N	N	N	Y	N	N	N

Table continued

TAXON_DATA_ID	1238989	1238990	1238991	1238992	1238993	1238994	1238995
STRATUM_ID	365467	365467	365467	365467	365467	365468	365468
TAXON_LISTS_ID	130969	123207	132245	130986	130032	121569	132263
TAXON_DATA_RANK	1	2	3	4	5	1	2
TAXON_DATA_DESCRIPTION	Aristida ramosa	Astrebla squarrosa	Bothriochloa decipiens	Dichanthium sericeum	Enteropogon acicularis	Eremophila longifolia	Muehlenbeckia florulenta
TAXON_DATA_SOURCE_CODE							
COVER_TYPE	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_TYPE_DERIV_METHOD	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COVER_MINIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MAXIMUM_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEDIAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999
COVER_MEAN_VALUE	-9999	-9999	-9999	-9999	-9999	-9999	-9999
TAXON_DATA_DOMINANCE_QUALIFIER	CD	CD	CD	CD	CD	D	SD
TAXON_DATA_FREQUENCY	C	C	C	C	C	A	O
TAXON_DATA_ALWAYS_THERE	N	N	N	N	N	Y	N
TAXON_DATA_SUMMARY_FLAG	Y	N	N	N	N	N	N