Department of Conservation and Land Management
Department of Agriculture
Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT

Milestone Report 1.3 System Specification for the Western Australian Vegetation Information System (including data model)

Database redesign and updates planned for the current project

This work builds on that already completed last year through the National Land and Water Resources Audit and NVIS Stage1. The project will address an important information gap in NVIS (spatial) data sets for Western Australia (pre - European and current extent) identified following the completion of NVIS Stage 1. This is the lack of NVIS levels 4 and 5 attributes and collation of floristic data for map units from which to compile these attributes.

A second issue that will be resolved in the current project are map unit mismatches across 1:250,000 mapsheet boundaries. These occur mainly where the original mapping was published at different scales (ie. 1:250,00 and 1:1,000,000). This change in published map scale broadly defines the boundary between intensive land-use in the south west of WA and extensive land-use (mainly pastoralism) in the remainder of the State.

The project will also facilitate the future maintenance of NVIS in Western Australia by re-designing the Western Australian database, establishing NVIS attributes as a core component of the Western Australian vegetation information system. The proposed structure of the vegetation information system at the conclusion of the current project is illustrated in Figure 1.

This report details the structure of the Western Australian Vegetation Information System being implemented through the current project. The report also describes the function of the information system and the methods to be used to update and import/export data from the system.

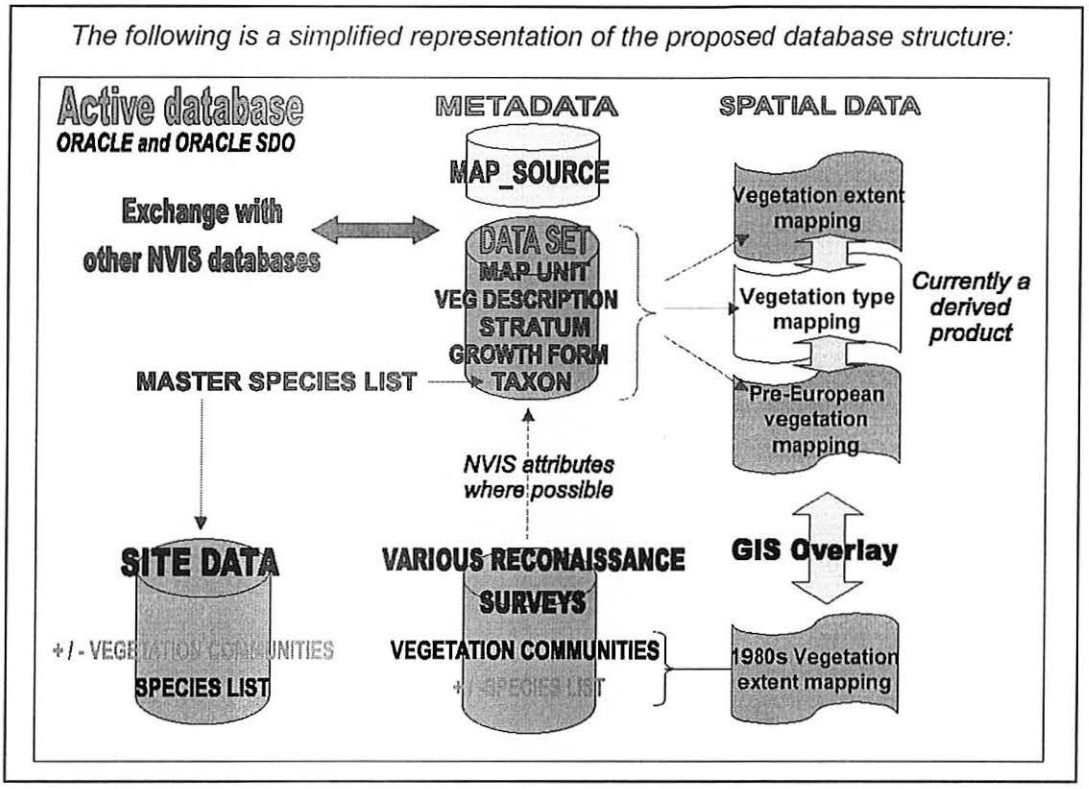


Figure 1. Simplified schematic of the proposed structure of the Western Australian vegetation information system.

Proposed table structure for the WA Vegetation Information System

The proposed table structure for the WA vegetation information system is a simplification of currently existing tables and relationships. Shepherd (1995) and Woodman and Heinrich (1999) described the structure of the existing information database in detail. The core set of tables – DATA_SET, MAP_UNIT, VEG_DESCRIPTION, STRATUM, GROWTH_FORM and TAXON – are based on those already used in the NVIS system. Table structures, field data types and table relationships between these tables will duplicate those used by the Commonwealth.

Data currently stored separately in the WA pre-European vegetation and current vegetation extent databases will be migrated to these tables. For these tables, links to the original data will be maintained through the storage of the source codes and descriptions in the MAP_UNIT table.

The existing tables and table relationships used for storing reconnaissance survey data (linked to the original 1980's vegetation extent mapping) will be retained. For these data it will be difficult to generate and NVIS description, but these data could be readily linked with the current spatial data and NVIS descriptions following the database redesign to inform improvements to the mapping.

The existing tables storing site-based data will also be retained with no changes to the table structures. However - as for the reconnaissance survey data - these could also be linked with the current spatial data following the database redesign. An entity-relationship diagram for the proposed WA Vegetation Information System is illustrated in Figure 2.

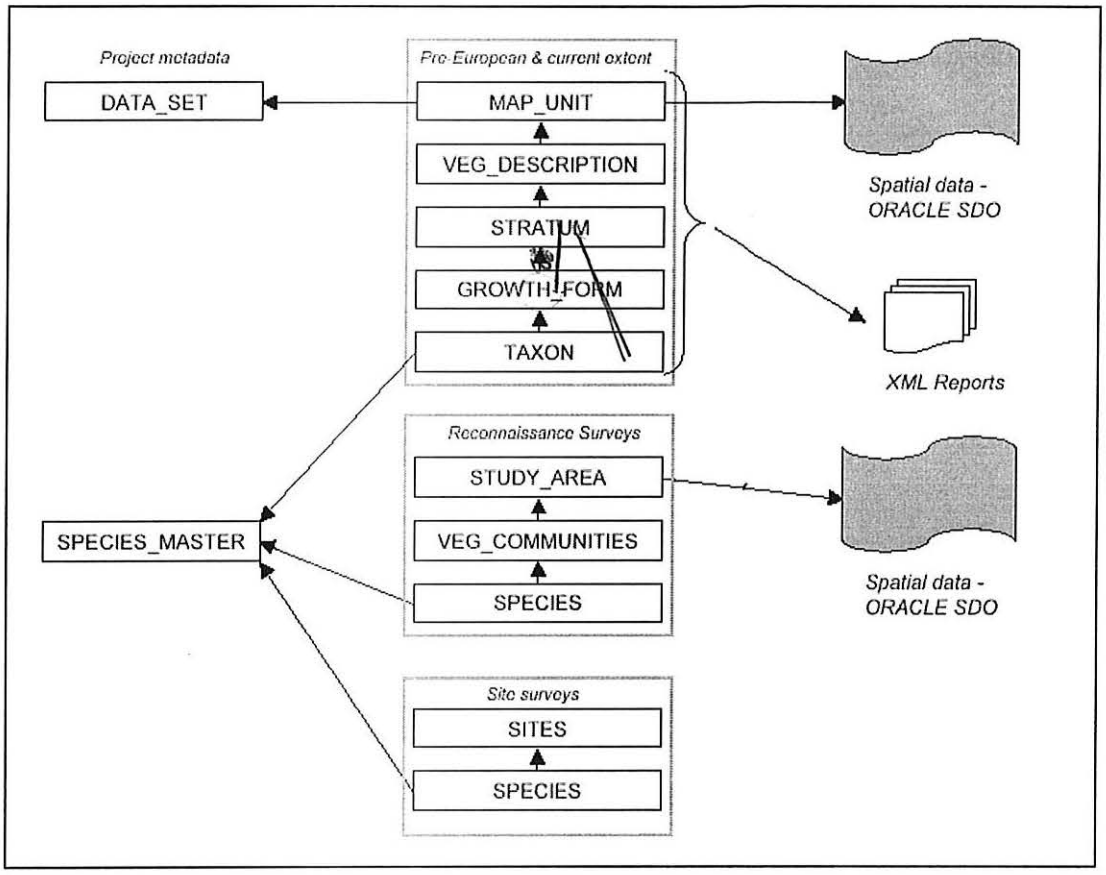


Figure 2. Entity-relationship diagram for the Western Australian vegetation information system. *(A more detailed diagram including field names is included as an appendix to this report)*

An important change to the current WA information system will be the linkage of NVIS datasets to a master species list. The master species list is a duplicate of the species list maintained by the WA State Herbarium (Department of Conservation and Land Management). It should be noted that because there are few vouchers available for the Principal State vegetation dataset (pre-European vegetation), no attempt will be made through this project to reconcile all taxonomy described in the dataset with current taxonomy. However, unrecognised and superseded taxonomy will be flagged when this link is established in the information system.

Another innovation on the current information system will be the incorporation of a facility to generate XML reports for database attributes and NVIS vegetation descriptions from the information system. The WA custodians of the information system intend to utilise the tool developed by Environment Australia for this purpose. It is understood that because WA are adopting the core structure and table relationships from the Commonwealth NVIS that this system can be readily implemented in the WA system. The details for the incorporation of this XML report tool remain to be resolved between the WA custodians and the Commonwealth.

Vegetation classification system

A vegetation classification system based on the work of Beard (1974) and Hopkins et al (2002 in press) has been used to describe vegetation units in the principal State vegetation dataset (pre-European vegetation). This system was described extensively in milestone report 1.2 for this project. Use of this dataset is well established in WA. This classification system and the current set of vegetation units are readily accommodated in the NVIS.

The outstanding issue related to differences between the WA classification system and those used in other jurisdictions in describing savanna grasslands/woodlands will be resolved in the current project by refining NVIS State 1 data for WA. Cover classes for these data will be re-interpreted with relation to dominance in biomass. Biomass was agreed as the descriptive component to be used to define dominance at the NVIS workshop November 26-28, 2002.

Maintenance of vegetation descriptions

A set of rules for the construction of NVIS level 1 – 6 descriptions was also defined through the workshop of November 26-28, 2002. Details of these rules have been documented in the workshop minutes and will not be repeated in this report. The WA vegetation information system will utilise these rules to define a unique set of vegetation descriptions. Where issues arise in defining vegetation types that are very similar or apparently identical, expert knowledge from the data custodian will be used to inform the classification. The custodians of the State vegetation information system (Department of Agriculture WA and Department of Conservation and Land Management WA) will maintain a reference set of unique descriptions.

Description of naturalised and exotic species

Naturalised and exotic species are not currently included in the NVIS dataset for WA. This dataset is based on pre-European vegetation descriptions. For extant vegetation these data have been intersected with current vegetation extent (excluding plantations) to generate a surrogate extent vegetation-by-type dataset. The limitations of this dataset in describing all vegetation in Western Australia are recognised and noted in using these data for reporting (Beeston et al 2001).

Updating these data to describe extant vegetation – including modifications to the original structure and floristics – are beyond the scope of the current project. However, the need to develop such a dataset in the near future is recognised and the development of the WA vegetation information system will anticipate this development. It is proposed that naturalised and exotic species be dealt with as with other taxa – in terms of inclusion in database tables and in the NVIS descriptions at each level in the hierarchy. However, these taxa will be flagged using a trigger from the master species table. The details for how these would be flagged in an NVIS description (symbology etc.) remain to be resolved.

Vegetation mosaics (heterogeneous spatial units)

Currently the WA NVIS dataset includes a number of map units that consist of multiple components – usually two. These are called mosaic units. For NVIS Stage 1 these units were described as a single map unit. However, the NVIS framework and database structure is designed to store data for single component map units. An allowance is made in the NVIS structure to flag a map unit as a component of a mosaic through the SPATIAL_MIX field in the MAP_UNIT table.

The current Western Australian project will address this issue by separately describing the components of mosaic units and flagging these map units as components of mosaics. In most cases mosaics in the WA dataset consist of map units that occur elsewhere as single 'pure' map units. However, there are some mosaic units in the current dataset for which the component units occur only in a mosaic. In both cases the component units will be described separately in the updated WA dataset.

References

Beard J.S. and Webb M.J. 1974, The vegetation survey of Western Australia: its aims, objects and methods. Great Sandy Desert. Part 1 of explanatory notes to sheet 2. Vegetation Survey of Western Australia, 1:1,000,000 Vegetation Series, University of Western Australia, Nedlands, Perth.

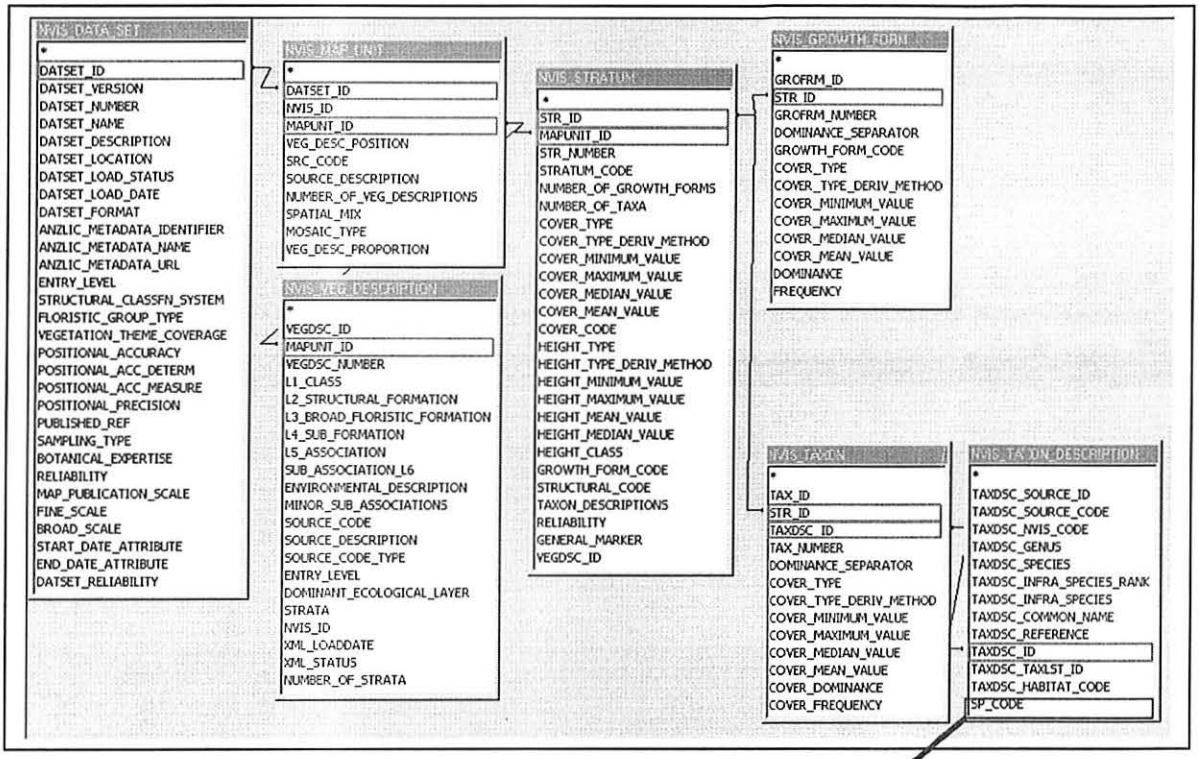
Beeston G.R., Hopkins A.J.M. and Shepherd D.P. (eds.) 2001, Land-use and Vegetation, Western Australia. Unpublished Report. Department of Agriculture Western Australia, South Perth and National Land and Water Resources Audit, Canberra.

Hopkins A.J.M., Beeston G.R., Harvey J.M., Lemin, H. and Shepherd D.P. 2002, A Database on the Vegetation of Western Australia. Stage 1. Resource Management Technical Report 250. (in press). Department of Agriculture WA, South Perth

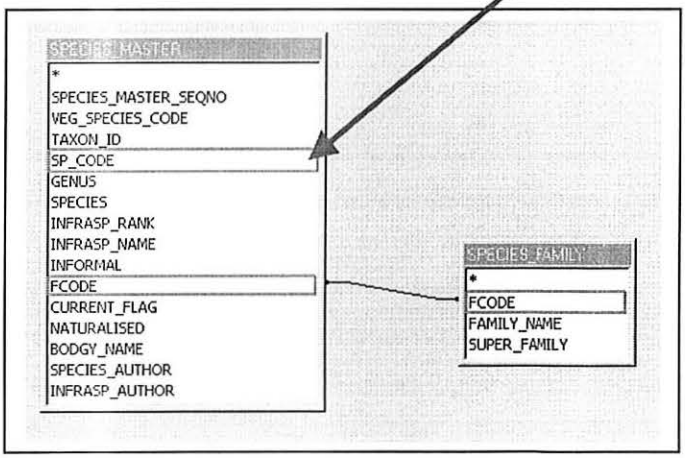
Shepherd D.P. 1995, *The remnant vegetation database* Unpublished report to the Spatial Resource Information Group, Department of Agriculture WA, November 1995

Woodman S. and Heinrich L 1999, Proposal to standardise the storage of flora species data. Unpublished report to the Spatial Resource Information Group, Department of Agriculture, WA Database Software Pty Ltd, January 1999

Appendix. Entity Relationship diagrams for WA Vegetation Information Tables



1. Core attribute tables



2. WA Taxonomy reference tables