NVIS Implementation Project - WA

Damian Shepherd

Department of Agriculture,
Western Australia

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Government of Western Australia

Department of Conservation and Land Managment
Government of Western Australia

Towards an Information System for Vegetation in Western Australia

Introduction - the National Vegetation Information System

A partnership has been established between the States and Territories, and a number of Commonwealth agencies to develop a cohesive national framework for compiling, and communicating information about Australia's vegetation. The result of this partnership is the National Vegetation Information System (NVIS) - a nationally consistent framework for describing and compiling data on vegetation types in Australia.

This framework will provide a consistent system for compiling and analysing information about vegetation and reporting on this information from regional to national levels.

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Introduction

The NVIS framework and associated Australian Vegetation Attributes specifies guidelines to describe structural and floristic characteristics of vegetation, data quality (metadata in addition to that collated for ANZLIC Page 0), and sources of vegetation information collected in Australia.

The NVIS information framework defines a hierarchical classification system for describing the structural and floristic patterns of vegetation in the landscape. Collectively, the different levels in the classification provide a description of vegetation that can be related to spatial areas in vegetation mapping.

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Introduction

This framework provides guidelines for standardising the level of detail within a data set, and within and between the States and Territories. It also provides a flexible framework for generating outputs such as map products at various levels and scales.

The hierarchy is based on six levels, representing broad vegetation classifications at national scales (Levels I-III) to a detailed level of information for users at state and regional scales (Levels IV-VI).

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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)

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Hierarchical Level	Description	Notes	NVIS description
I	Class	Class one is not used in the WA System **The original description for this unit is Tall forest; karri *(Eucalyptus diverscolor)***	Tree
II	Structural Formation		Open forest
III	Broad Floristic Formation		Eucalyptus open forest
IV	Sub-Formation	+ is used to denote the dominant element of the vegetation unit	+Eucalyptus open forest \ mixed shrubland \ mixed open shrubland
V	***ASSOCIATION***	U, M and G are used to denote Upper, Middle and Ground strata in the vegetation described. +/- indicates that a species may or may not be present at a particular site within this mapped unit. ^ is used to denote elements of the description that do not vary throughout the vegetation described. \ is used to separate elements of a stratum description. ; is used to separate stratum descriptions	U+^Eucalyptus diversicolour+/-Eucalyptus marginata+/-Corymbia calophylla\^tree\8\i; M+/-Acacia pentadenia+/-Albizia lophantha+/-Bossiaea aquifolium\shrub,vine,cycad,xanthorrhoea\4\c; G+/-Anigozanthos flavidus+/-Dampiera hederacea+/-Lepidosperma longitudinale\shrub,sedge,forb\i
VI	***SUB-ASSOCIATION***		U1+^Eucalyptus diversicolour\^tree\8\i; U2+/-Eucalyptus marginata+/-Corymbia calophylla\tree\8\i; U3+/-Allocasuarina decussata+/-Eucalyptus megacarpa\^tree\7\i; U4+/-Agonis flexuosa+/-Banksia grandis+/-Banksia verticillata+/-Persoonia longifolia\^tree\6\i; M1+/-Acacia pentadenia+/-Albizia lophantha+/-Bossiaea aquifolium+/-Chorilaena quercifolia+/-Pimelea clavata\^shrub\4\c; M2+/-Acacia divergens+/-Bossiaea linophylla+/-Cassytha glabella+/-Chorizema diversifolium+/-Clematis pubescens\shrub,vine,cycad,xanthorrhoea\3\c G1+/-Anigozanthos flavidus+/-Dampiera hederacea+/-Lepidosperma longitudinale\shrub,sedge,forb\2\i

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Project Overview

The Western Australian project had a number of major components:

- Collation of more detailed attribution for Western Australian vegetation types,
- Revision of the WA Pre-European vegetation type spatial dataset,
- Generation of NVIS Level 5 and 6 descriptions for these vegetation types,
- Implementation of the NVIS data model in Western Australia,

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Detailed attribution of the pre-European vegetation dataset

The compilation of vegetation and structure data for the pre-European Western Australian dataset was the major time component of this project.

This work involved the scanning of the published 1:250,00 and 1:1 million scale WA Vegetation Survey series and conversion to digital text data using optical character recognition.

Species lists were then compiled from these data into the final WA data model, and cross checked and augmented with the original published material and, in a hand full of examples, ancillary information.

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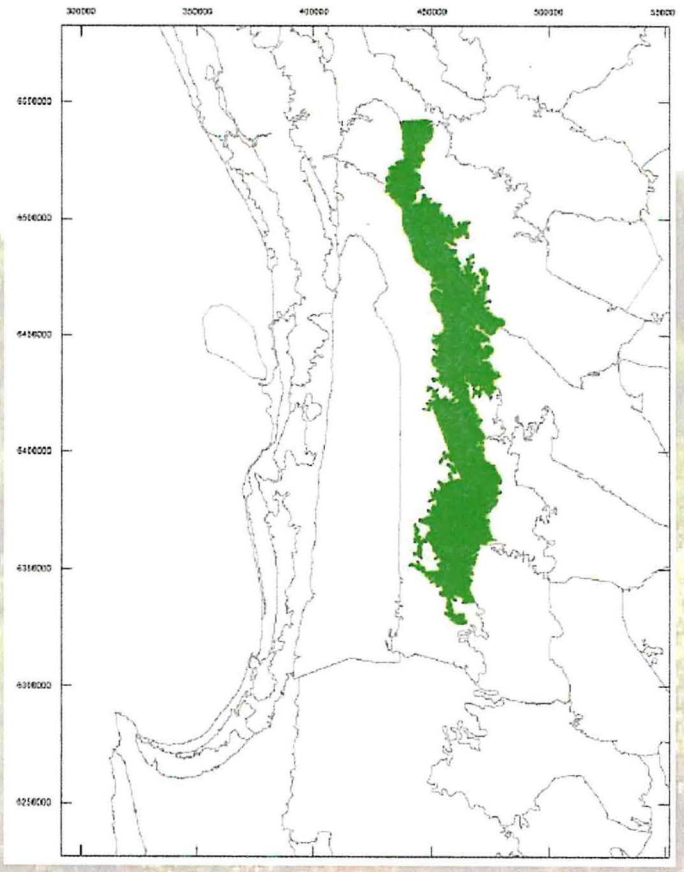
Detailed attribution of the pre-European vegetation dataset

The opportunity was also taken during this exercise to compile detailed descriptions of Vegetation Systems and Sub-regions - these are considered interim landscape level environmental descriptors.



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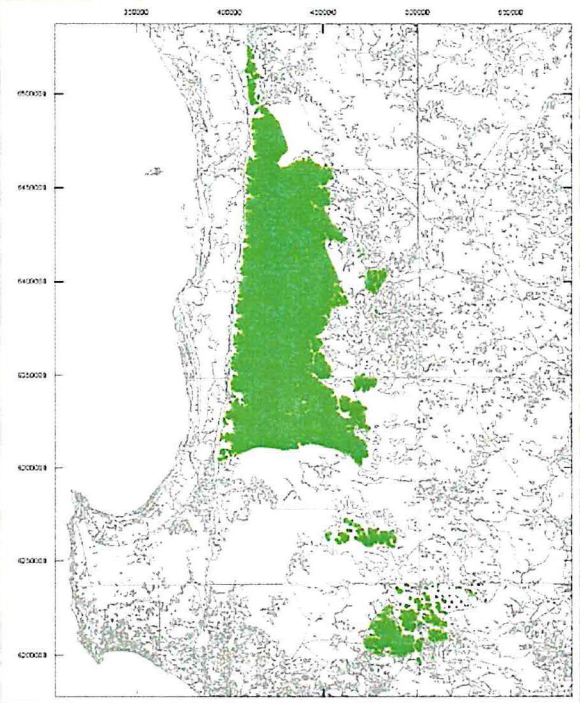
Detailed attribution of the pre-European vegetation dataset

In some cases, environmental descriptors were also described at the vegetation description level.



Vegetation Map Unit (System Association 3.3) - Environmental Descriptors

Description 1
DARLING - DALE - Massive gravels with sandy loam matrix on the highest ground
Description 2
DARLING - DALE - Upper slopes and ridges
Description 3
DARLING - DALE - Sandy gravels on mid and lower slopes
Description 4
DARLING - DALE - Lower and middle slopes of valleys with superficial wash of gravel and kaolinitic clay
Description 5
DARLING - DALE - Lower and middle slopes with good brown loam soil
Description 6
DARLING - DALE - Fertile loams on slopes of main river valleys
Description 7
DARLING - DALE - Gravelly sands, transitional between swamps and gravelly slopes
Description 8
DARLING - DALE - Winter-wet sandy loams on lower slopes and valley floors
Description 9
DARLING - DALE - Seasonally waterlogged sandy loams with hardpan on lower slopes and valley floors

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Updates to the pre-European vegetation spatial dataset

During this project the c.1:250,000 scale pre-European vegetation spatial dataset was revised. The revision involved several activities:

- Rectification of the dataset to topographic features from the State topographic dataset (primarily using the coastline and lakes),
- Correction of dataset attribution of on mapsheet edges,
- Correction of boundaries to some map units,
- Creation of a new Vegetation Systems map (based on 1:250,000 map unit boundaries) that forms a scale hierarchy with the 1:250,000 scale map units and IBRA regions and sub-regions.

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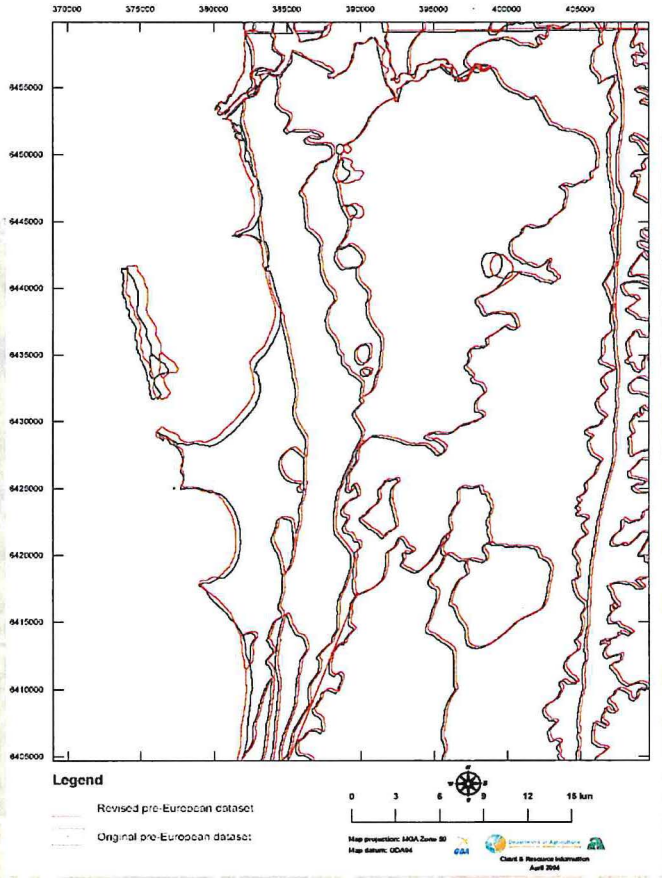
Updates to the pre-European vegetation spatial dataset

The result of this process is a dataset that is more spatially accurate and allows the integration of more detailed attribute data.



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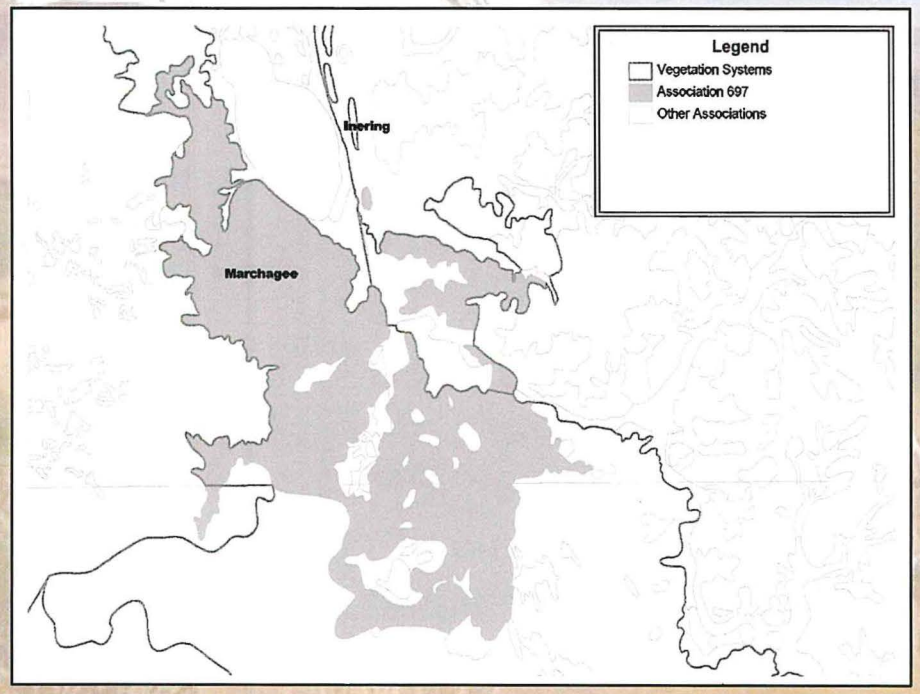
Use of environmental descriptors in the Western Australian dataset

During this project, Vegetation Associations in the established pre-European Vegetation spatial dataset were intersected with Vegetation Systems to generate a new version of the dataset.

The result of this process is the sub-division of smallest units currently recognised in the pre-European vegetation mapping – Associations - into smaller units – System-based Associations



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Use of environmental descriptors in the Western Australian dataset

Vegetation Systems are areas or groups of areas in which vegetation types occur in a recurring pattern of topography, soils and vegetation. This concept is analogous to that of Land Systems in soil-landscape mapping, but retains a focus on the distribution of vegetation types as the primary method for distinguishing between landscape units.

Vegetation Systems were digitised during the current project as sub-units of the well established IBRA regions and sub-regions

There is now a continuous hierarchy of phytogeographic classification – combining elements of vegetation distribution and landscape types. This hierarchy runs from IBRA regions at the broadest level, through IBRA sub-regions to Vegetation Systems, and finally to System-based Vegetation Associations - the base unit at this time.

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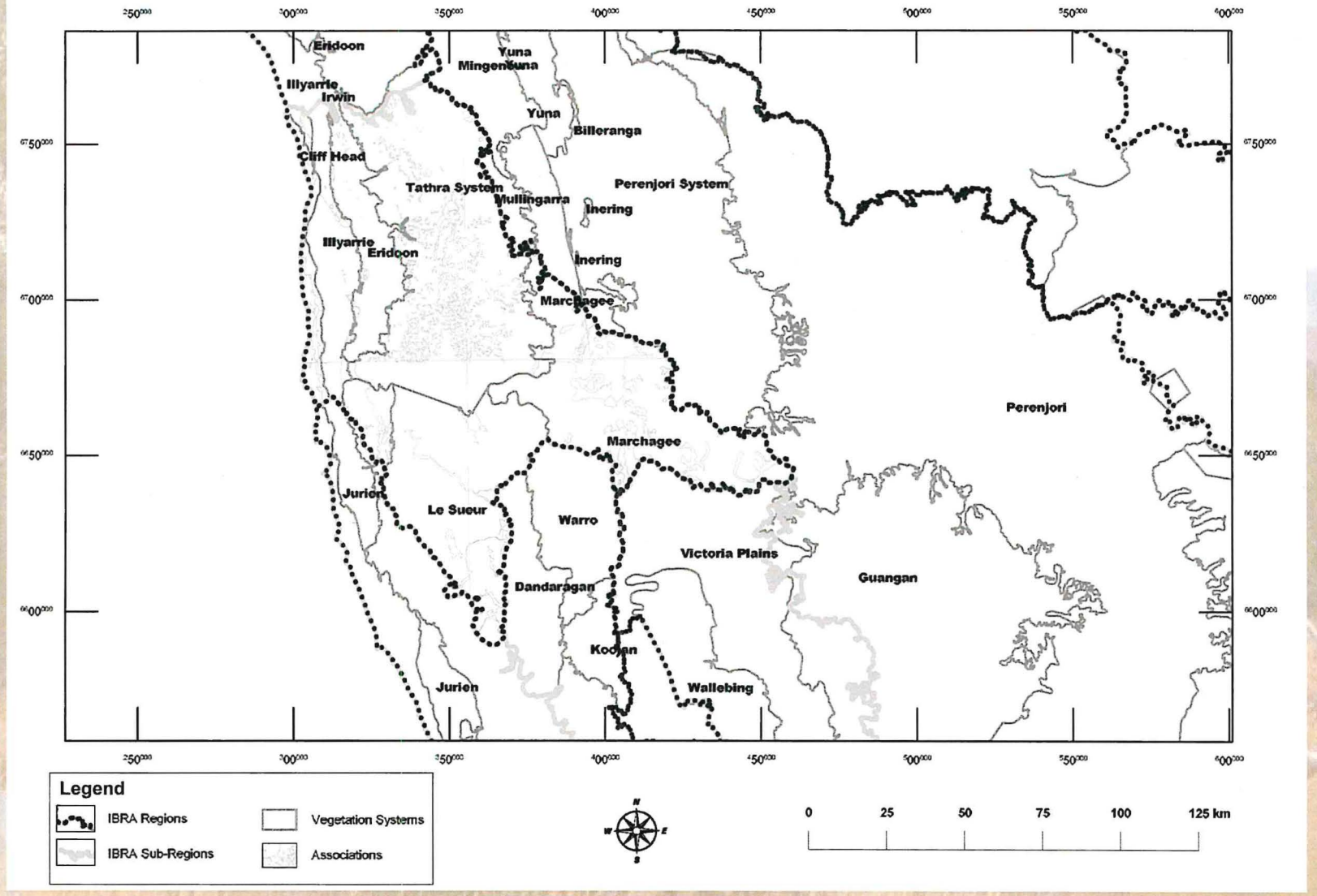

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Use of environmental descriptors in the Western Australian dataset

These new units better match the original descriptions of the units and allow detailed attribution of vegetation floristics and structure, locality and landscape position. This was essential for attribution to levels 5 and 6 of the NVIS hierarchy.

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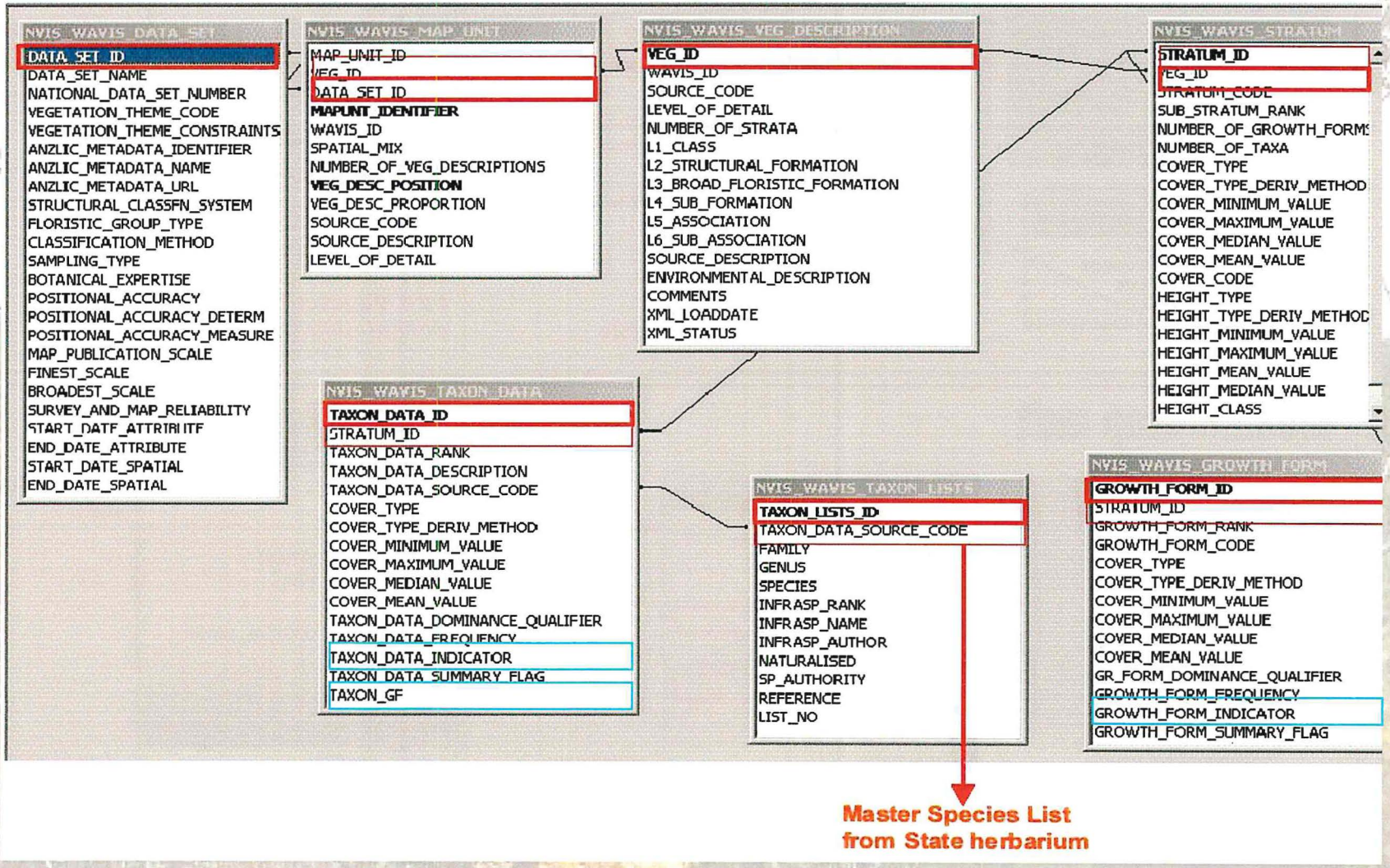
Implementation of the NVIS data model



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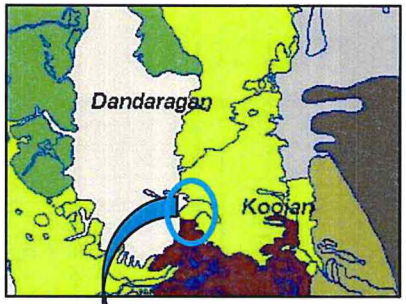
'Pure' map unit



EXAMPLE_SPATIAL_D...
POLY_ID
POLY_AREA
POLY_PERIMETER
POLY_DATE
MAP_UNIT

WAVIS_MAP_UNIT
DATSET_ID
NVIS_ID
MAPUNT_ID
VEG_DESC_POSITION
SRC_CODE
SOURCE_DESCRIPTION
NUMBER_OF_VEG_DESCRIPTIONS
SPATIAL_MIX
MOSAIC_TYPE
VEG_DESC_PROPORTION
MAPUNT_NO

Source code: 10.1
Spatial Mix: Pure

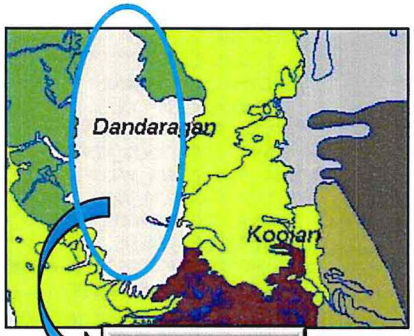
WAVIS_VEG_DESCRIPTION
VEGDSC_ID
VEGDSC_NUMBER
NVIS_ID
SOURCE_CODE
SOURCE_DESCRIPTION
SOURCE_CODE_TYPE
ENTRY_LEVEL
DOMINANT_ECOLOGICAL_LAYER
STRATA

Single vegetation unit

1 record in the MAP_UNIT table

Source code is the original unit number (10) followed by a Vegetation System designation (.1)

Mosaic map unit



EXAMPLE_SPATIAL_D...
POLY_ID
POLY_AREA
POLY_PERIMETER
POLY_DATE
MAP_UNIT

WAVIS_MAP_UNIT
DATSET_ID
NVIS_ID
MAPUNT_ID
VEG_DESC_POSITION
SRC_CODE
SOURCE_DESCRIPTION
NUMBER_OF_VEG_DESCRIPTIONS
SPATIAL_MIX
MOSAIC_TYPE
VEG_DESC_PROPORTION
MAPUNT_NO

Source code: 10.2
Spatial Mix: Mosaic

unknown

WAVIS_VEG_DESCRIPTION
VEGDSC_ID
VEGDSC_NUMBER
NVIS_ID
SOURCE_CODE
SOURCE_DESCRIPTION
SOURCE_CODE_TYPE
ENTRY_LEVEL
DOMINANT_ECOLOGICAL_LAYER
STRATA

Vegetation unit 1

WAVIS_VEG_DESCRIPTION
VEGDSC_ID
VEGDSC_NUMBER
NVIS_ID
SOURCE_CODE
SOURCE_DESCRIPTION
SOURCE_CODE_TYPE
ENTRY_LEVEL
DOMINANT_ECOLOGICAL_LAYER
STRATA

Vegetation unit 2

2 records in the MAP_UNIT table

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Enhanced vegetation status reporting in the WA Vegetation Information System

An important outcome of the process of combining Vegetation Systems and Associations is the significant enhancement of reporting capabilities on the status of vegetation in Western Australia.

Prior to the current project, vegetation units in the established pre-European vegetation spatial dataset mapped at scales between 1:250,000 and 1:1 million were, in effect, mosaics of potentially quite dissimilar vegetation.

There were 831 vegetation mapping units and descriptions in the original version of the dataset.

There are now 1620 map units associated with 2150 vegetation descriptions.

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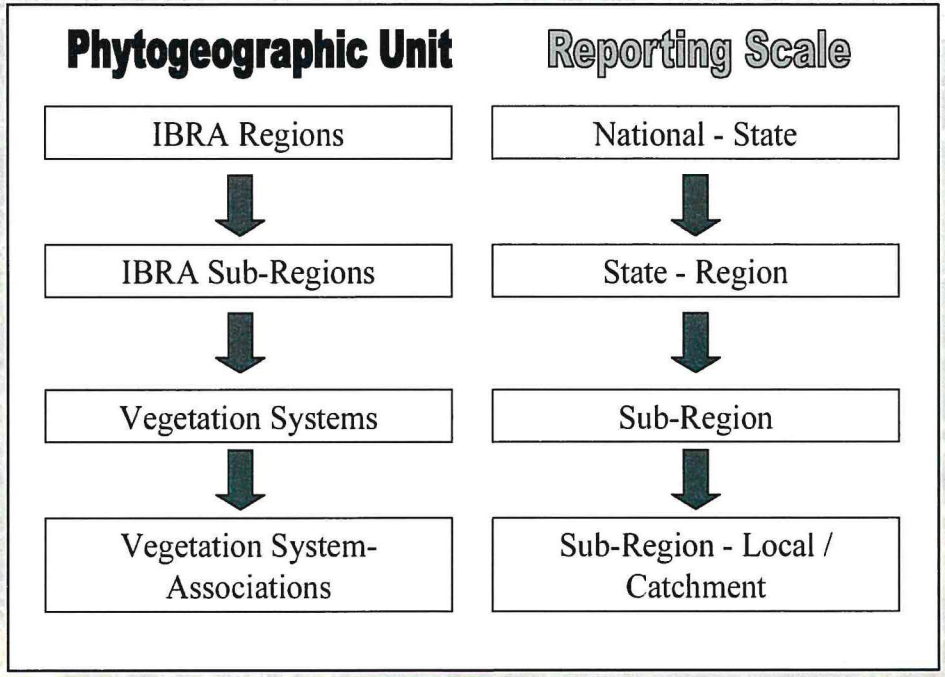
Enhanced vegetation status reporting in the WA Vegetation Information System

Following the current work it is possible to report at finer scales than used for previous assessments of the status of vegetation types. This can be achieved using the better defined vegetation descriptions described through the current project.

This capability is now in line with those currently used in some other jurisdictions. This will also more adequately satisfy the requirements of indicators for State of Environment (SoE) reporting.



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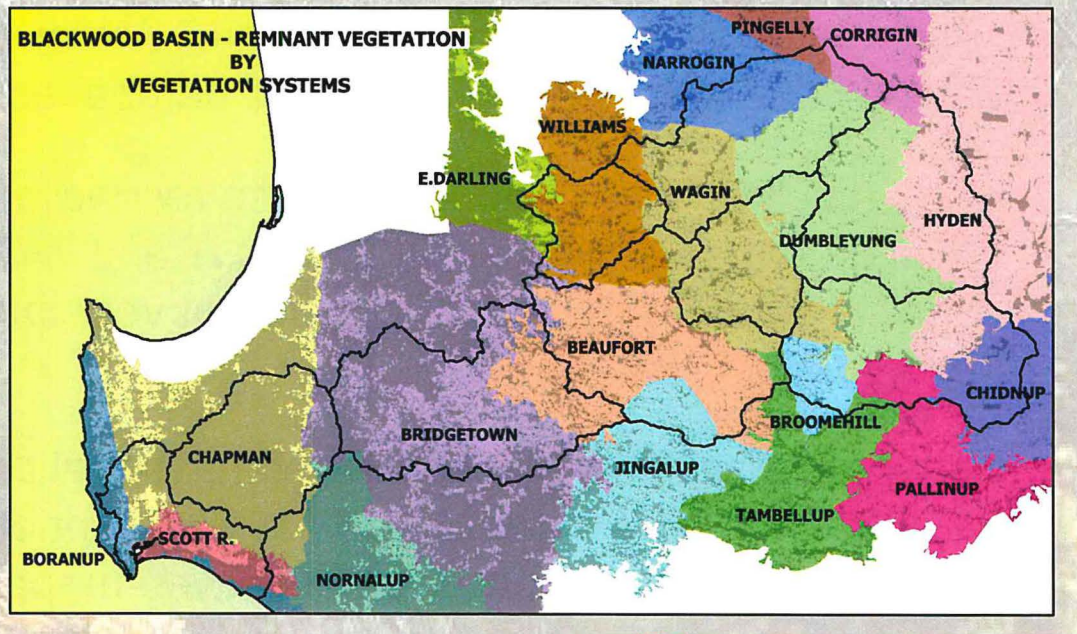
Enhanced vegetation status reporting in the WA Vegetation Information System

Prior to the current project, 831 vegetation types (Associations) were recognised in Western Australia, as the current project nears completion – we now recognise nearly 3000 vegetation types (System-based Associations). Some of these still consist of mosaics, but there are now separate descriptions for each component of the mosaics.

Preliminary data from the new System-based Associations dataset has already found utility in a recent assessment of Assets, Values, Threats and Issues in the Blackwood Basin.



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Other key outcomes for users of native vegetation data in Western Australia and across Australia

The other key outcomes from the project have been:

- An information framework, nationally supported, into which additional existing and new vegetation information can be compiled,

- Collaboration in maintaining the NVIS dataset through a distributed national system of State-maintained databases.

- The results of this project have also reconciled previous conflicts in vegetation mapping across the WA/NT and WA/SA borders. These conflicts arose from the use of different vegetation classification systems between WA, NT and SA.

- Integration with a well established relational database and GIS infrastructure. This will facilitate development of new information products including OGC-compliant interactive web-mapping,