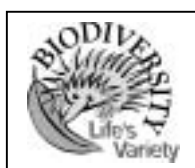




A SPATIAL DATABASE FOR NATIVE VEGETATION MANAGEMENT

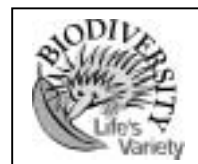
NSW BIODIVERSITY STRATEGY

DRAFT REPORT APRIL 2003



A SPATIAL DATABASE FOR NATIVE VEGETATION MANAGEMENT

A project undertaken for the
NSW Biodiversity Strategy



For more information and for information on access to data contact the:

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EXECUTIVE SUMMARY

The NSW Biodiversity Strategy provided funds to the NSW Department of Land and Water Conservation to enter technical information from clearing applications, breaches and registered property agreements and management contracts approved under the New South Wales Native Vegetation Conservation (NVC) Act 1997 into a spatial database. Set up to report upon activities concerning the management of native vegetation, the database will make information available to other organisations with interests in the management and conservation of native vegetation in NSW.

For clearing consents under the NVC Act, the spatial database is complete up to February 2000. In addition, all known records for registered property agreements and management contracts funded by the Native Vegetation Management Fund, up to June 2001 have been entered into the spatial database. A program for the entry of data into the system is on going.

Work has also commenced on the capture of spatial information for confirmed clearing breaches to the NVC Act.

A secondary objective of the project has been to review the potential for expanding the database to include information in relation to native vegetation activities undertaken by other and non-government agencies on lands not in public ownership. The project reviewed the Voluntary Conservation Agreements managed by the NSW National Parks & Wildlife Service with funds from the Native Vegetation Conservation Fund and the native vegetation management activities undertaken by Landcare groups and by Greening Australia.

In its layout, the report is a comprehensive metadata statement of the database. It includes descriptions of:

- the attributes and classes recorded
- interpretations that can be made from the information
- limitations of the database.

In the final chapter a discussion of the implications of the project for biodiversity conservation management in NSW is presented.

The support of the NSW Biodiversity Strategy for this on-going work by the NSW Department of Land and Water Conservation is gratefully acknowledged.

INTRODUCTION

AIMS OF THE PROJECT

The aim of the project is to enter technical information into a spatial database from clearing applications, breaches and registered property agreements and management contracts approved by the New South Wales (NSW) Department of Land & Water Conservation (DLWC) since 1995. Set up to report upon activities concerning the management of native vegetation, the database will make information available to organisations with interests in the management and conservation of native vegetation in New South Wales. Recording of the data is in a format to enable it to be linked to other databases that describe vegetation communities, ecosystems, conservation status etc. This will provide another data layer to monitor the effects of government decisions in relation to the health and condition of native vegetation communities and the cumulative impacts of such decisions on biodiversity and other environmental issues.

The project focuses on completing the capture of all such approvals issued by the DLWC since the introduction of State Environmental Planning Policy (SEPP) No 46 in August 1995 and its replacement by the Native Vegetation Conservation (NVC) Act in 1997. Another objective of the project is to review the potential for expanding the database to include information relating to native vegetation activities undertaken by other government and non government agencies.

BACKGROUND

The database has been developed to show in a spatial context those activities concerning the management of native vegetation that are undertaken by DLWC. Approvals in relation to clearing consents and refusals, report breaches (ie illegal clearing and breaches to consent conditions), compliance reporting and registered property agreements and management contracts under the NVC Act 1997 are collected and entered in an uniform manner into the spatial database.

Funding from the NSW Biodiversity Strategy has been made available to speed up the data collection and data entry phases for the individual program activities. It is essential that managers and planners have a detailed understanding of the current activities occurring in the management and use of native vegetation in New South Wales. They need to know what vegetation and general ecosystems occur across the State, the pressures being exerted on these communities and ecosystems and their potential cumulative impacts.

Relation to the Biodiversity Strategy

The project provides a spatial description of management decisions being made in relation to native vegetation, specially those areas where:

- vegetation modification/clearing is approved;

- the conservation or re-establishment of native vegetation is occurring on private property funded by government grants;
- breaches to the NVC Act are recorded.

The spatial database is the first stage in a process of integrating vegetation management activities with other natural resource data sets to enable a more detailed analysis and interpretation of landscape processes, rather than individual components of the landscape.

Linkages to Programs within the NSW Biodiversity Strategy

The project is strongly linked to all phases of the biodiversity package because it provides spatial and textual data on the activities related to vegetation management and provides important information on the cumulative impacts of clearing approvals.

Linkages to other programs

Analysis of the data set will have specific implications to:

- regional vegetation plans;
- policies in relation to clearing within specific localities and/or communities;
- targeting funding for off-reserve conservation and funding;
- Comprehensive Regional Assessments;
- target reporting for the Salinity Strategy.

OBJECTIVES OF THE PROJECT

1. Develop protocols and procedures for the coding of data and entry into spatial database.
2. Working with regional staff of DLWC arrange for the coding of all information from development applications to clear under SEPP 46 and the NVC Act, property agreements and management contracts for entry into the spatial database. Provide training in the techniques for data description and coding.
3. Undertake quality assurance checks on the data as they are entered.
4. Develop a series of protocols to analyse the different data sets progressively, which will enable quality assurance checks to be undertaken.
5. Prepare standard formats for reporting of data.
6. Download of data from Genamap system to other GIS software systems.
7. Establish a system for the transfer of data between DLWC and other agencies.

A secondary objective is to review the potential for expanding the database to include information relation to native vegetation activities undertaken by other government and non-government agencies.

PROJECT SEQUENCE

The main objective of the biodiversity funding has been to capture in a consistent digital format all data held by DLWC concerning the management of native vegetation in relation to the NVC Act 1997 and to make the data available to a wide range of government agencies.

A project schedule set out the order by which the DLWC's data were to be captured. The order of data capture was:

- clearing consents issued under SEPP 46 and the NVC Act

- registered property agreements and management contracts funded under the Native Vegetation Management Fund
- clearing breaches identified under the NVC Act.

A number of secondary objectives were included. One of these objectives was to incorporate data for Voluntary Conservation Agreements funded under the Native Vegetation Management Fund. A further objective was to investigate the feasibility of incorporating into the same database any data from non-government agencies such as Greening Australia and Landcare groups for activities that involve the management of native vegetation.

WHAT THE PROGRAM ACHIEVED

DATA HELD BY THE NSW DEPARTMENT OF LAND & WATER CONSERVATION

Clearing Consents

All clearing consents issued between August 1995 and February 2000 by DLWC under SEPP 46 and the NVC Act were entered into a geographic information system or spatial database using Genamap software. This involved extensive crosschecking against regional and head office records to ensure that all records were retrieved and entered. In addition, it involved the identification of clearing approvals issued by individual regions for which there were no records held in head office. Examples include the clearing approvals authorised under the Western Riverina Regional Grassland Plan and some of the early processing of logging applications on protected land.

A DLWC executive decision in March 2000 required that all future spatial information be entered through an ARCview extension of a departmental program called Vegnet and to stop the entry of data into the spatial database.

Vegnet allows the entire procedure for clearing assessments to be documented and provides a series of modules to achieve this. The ARCview data are currently held in shape files but at the time of writing the final report (July 2002), no attempt had been made to link these shape files to the other spatial information. A project proposal is to be developed to trial the transfer of these shape files onto a spatial platform.

The ARCview extension allows the statistical information to be compiled for reporting purposes. A summary of this information is presented on DLWC's web site (www.dlwc.nsw.gov.au). The same information has been used in this report (Information in the Database) to show how the spatial information can be reported and interpreted.

Registered Property Agreements and Management Contracts

All known records, up to June 2001 have been entered into the spatial database. Because a large number of agreements or contracts are still to be finalised, the program for the entry of data into the system is on going.

Breaches

Regional compliance officers of the DLWC assess and record details of all reported breaches. Quality of the data is highly varied. Some of the data are held as shape files on local ARCview systems whereas other data are in hard copy with varying levels of details and quality. Working with compliance managers in head office, a classification

system was developed, based upon a review of existing breach reports and the manner with which they were dealt. A systematic review of regional files commenced to extract those records of illegal clearing which were determined to be breaches of the NVC Act. This decision was essential because a substantial number of the reported clearing breaches fell within the exemptions of the NVC Act.

The progress has been slow because of the turnover of staff and the sketchy recording of data. To date, records have started to be compiled for four regions.

DATA HELD BY OTHER GOVERNMENT AGENCIES

A secondary objective of the project has been to review the potential for expanding the database to include information in relation to native vegetation activities undertaken by other government and non-government agencies on lands not in public ownership.

The data set most compatible to the spatial data being compiled by the Department of Land & Water Conservation is that detailing Voluntary Conservation Agreements funded under the Native Vegetation Management Fund. NSW National Parks & Wildlife Service manage the program. An early series of inquiries revealed that the data set only comprised shape files for the areas subject to the agreement.

The written schedules to these agreements include a generalised description of the native vegetation within the agreement area but this is not linked to any spatial boundaries. Furthermore, individual treatments, such as weed control or replanting, for particular areas are not referenced spatially.

These limitations made it difficult to link the Voluntary Conservation Agreement data with DLWC's spatial database because of the inability to locate with any precision the individual activities.

An initial attempt to reconfigure the data to match the Department of Land & Water Conservation's data set has been made but only with limited success. A number of the Voluntary Conservation Agreements have been coded, but not yet entered into the spatial database.

DATA HELD BY NON GOVERNMENT AGENCIES

The principal activities carried out by non-government agencies in relation to the management of native vegetation on private land are the National Heritage Trust programs administered by community groups (specifically Landcare groups) and Greening Australia.

Native Vegetation Management Projects Implemented by Landcare Groups

A review of the work done by a number of Landcare groups has been undertaken in Murrumbidgee Region. One of the aims of the exercise was to assess the data held by Landcare groups and what was needed to bring it into a format compatible with the spatial data held by DLWC.

Two groups were trialed: Dudauman-Frampton Landcare Group at Cootamundra and the Goonan Creel Landcare group near Harden. Results are reported in Howarth and Mihe (undated) and Howarth (2001).

Vegetation management projects by Landcare groups are not documented in any spatial form. For the trials with the Dudauman-Frampton and Goonan Creek groups, the authors had to work with the members of the Landcare groups to retrieve and depict the information. In addition, recent aerial photography was an essential requirement so that the spatial extent of the vegetation projects could be located

accurately. To gather information on native vegetation management from all Landcare groups will require a combined effort by departmental staff, Landcare coordinators and landholders.

Native Vegetation Management Projects by Implemented by Greening Australia

Greening Australia's vegetation management projects are concentrated in southern New South Wales within a zone corresponding to the Department of Land & Water Conservation's Murray, Murrumbidgee and Central West Regions.

A review of Greening Australia's records at Wagga Wagga, Forbes and Cowra confirmed that the areas receiving grants under the incentive funding program could only be referenced spatially to the property level. Hard copy maps showing the specific areas to be fenced and managed for their native vegetation values were not available in local records. More often, this information was only available from the officer negotiating the agreement. As a consequence, it was not possible to locate with any certainty, the lands that are subject to the conservation agreements. The only reference is to the property, which is located by property name, address and some centroid coordinates.

ACHIEVEMENTS IN RELATION TO THE STATED OBJECTIVES

Program Objective	Program Achievement
Develop protocols and procedures for the coding of data and entry into spatial database.	Completed. Protocols and procedures established and now accepted with department. Data descriptions for use in Vegnet match spatial database codes.
Working with regional staff of DLWC arrange for the coding of all information from development applications to clear under SEPP 46 and the Native Vegetation Conservation Act, property agreements and management contracts for entry into the spatial database. Provide training in the techniques for data description and coding.	Training implemented at start of project for regional staff. Staff have been trained for entry of clearing consent data into Vegnet.
Undertake quality assurance checks on the data as they are entered	All data entered into spatial database has undergone a series of data checks to look for anomalies in data coding. No such checks existed for data entered via Vegnet until December 2001 when a contractor was employed to review the data.
Develop a series of protocols to analyse the different data sets progressively, which will enable quality assurance checks to be undertaken	Completed. This has resulted in a series of protocols for data description to ensure logical sequence in the coding of data. Examples include: 1. Applications to clear native vegetation for hardwood plantations in northern New South Wales (land use code HA) should never involve the clearing of the following structural formation classes: closed forest, open forest or woodland. Officers processing these consents require all

	<p>such areas to be retained. If these codes occur check for likely errors.</p> <p>2. Clearing of isolated trees in paddocks where the understorey is not native vegetation, eg exotic pastures or (most probably a standing crop). Always use the major activity class CIT and the structural formation class: isolated trees.</p> <p>3. Where clearing of trees is to be approved but certain densities of trees are to be retained, use the major activity class CWT. Where there is no requirement to retain a certain percentage or number of trees and the understorey is also native vegetation, use the major activity code CNV.</p>
Prepare standard formats for reporting of data.	Completed. These are demonstrated in this report and for clearing consents are published on the department's Internet site.
Download of data from Genamap system to other GIS software systems.	Completed. Data formatted for ARCInfo and also converted into shape files for export.
Establish a system for the transfer of data between DLWC and other agencies.	Achieved. Copies of the clearing consent files and the registered property agreements and management contracts files forwarded to the NSW National Parks & Wildlife Service. NPWS have started to use the clearing consent files to develop a hazard classification for clearing activities.
Review the potential for expanding the database to include information relation to native vegetation activities undertaken by other government and non-government agencies.	Completed. The proposal is limited by the general absence of maps that show the boundaries of areas subject to agreements and contracts by the non-government agencies.

METHODOLOGY FOR BUILDING THE DATABASE

WHAT'S RECORDED IN THE SPATIAL DATA SET?

The spatial database was set up to record a series of attributes concerning the management of native vegetation. These included the date when the activity was approved, the types of activities carried out, their purposes and a broad description of the existing vegetation.

Although the same database structure was used for clearing consents, registered property agreements and management contracts and breaches, the attribute classes across the different activities can vary. In particular, some of the attribute classes for breach records are substantially different to those for clearing consents, registered property agreements and management contracts, but the overall framework of the database remains the same.

The spatial database records the following attributes:

- a registered number which is the initial identifier to the applicant and the property;
- program activity. This lists the program under which the management of the native vegetation is being considered. Each program activity has a separate identifier, eg Application for Clearing under SEPP 46, Application for Clearing under the Native Vegetation Conservation Act, Registered Property Agreement, Unregistered Property Agreement, Management Contract, Breaches etc. When the program activity code is combined with the registered number, it becomes the unique identifier to the activity on the property;
- status of the application ie whether approved, refused, pending or under consideration;
- date of determination. This is the date when an application was refused or approved, a property agreement or voluntary conservation agreement was signed by the Director-General of DLWC or his nominee, or when a formal decision on an illegal clearing case was determined;
- major activity – in relation to clearing consents, breaches or property agreements and management contracts. For clearing consents, property agreements and management contracts, it is a description of the land management activity that is proposed for a particular parcel of land. For breaches, it is a description of what has actually occurred;
- amount of vegetation to be retained. This is relevant only to lands where clearing is approved. This attribute is not used for property agreements, management contracts or breaches;

- the proposed use of the land under application for clearing, or the reasons for retaining, re-establishing or managing native vegetation. For all breaches, this attribute records the method of clearing used;
- structural formation class of each vegetation group and the two dominant vegetation species in the class. For clearing consents, property agreements and management contracts, the structural formation class records the vegetation that is currently on the site. For breaches, it describes the vegetation that existed on the site before the clearing occurred;
- local government area, state electoral district and catchment area in which the property is located.

DATA SOURCES

The data sources for the project were paper copies of maps and accompanying reports prepared for the clearing consents, property agreements, management contracts and breaches. None of the spatial information was in digital format and only available in hard copy. Text data and aerial photographs were used to help attribute the spatial information. The accompanying table summarises the main data sources for each program activity.

Program Activity	Data Source
Clearing application under SEPP 46 or the Native Vegetation Conservation Act	Assessment report. Assessment map showing areas that could be cleared and areas where vegetation was to be retained; aerial photographs.
Registered Property Agreements and Management Contracts funded from the Native Vegetation Management Fund	First, second and third schedules of contract, site assessment form(s) and map, or sketch diagram, of area(s) subject to contract; aerial photographs.
Illegal clearing (breaches under the Native Vegetation Conservation Act)	Final determination of status of activity, inspection report(s), field survey maps; aerial photographs.
Voluntary Conservation Agreements funded from the Native Vegetation Management Fund	Schedules of contract, site assessment description(s) and map, or sketch diagram, of area(s) subject to contract; aerial photographs.
Revegetation Area Funded by Green Australia's Fencing Incentive Program	Restricted to areas shown on DLWC's Management Contracts and Registered Property Agreements where they occur on the same property; aerial photographs.

BUILDING THE DATA SET

The following table shows how the data sources are used to construct the database

Data Set	Data Source
Registered number	Report
Program activity	Report
Status of the application	Report
Date of determination	Report
Major activity	Map or diagram
Amount of vegetation to be retained	Report
Proposed use of the land	Report
Structural formation class	Aerial photographs
Dominant vegetation species	Site assessment form/report
Local government area	GIS digital file
State electoral district	GIS digital file
Catchment area	GIS digital file

The maps or diagrams prepared as part of the clearing consent, property agreement, management contract or breach report are the base upon which the database entries are constructed and provides the initial boundaries in the spatial record. The map or diagram delineates the area(s) of the major activity(ies), ie the areas that can be cleared or are to be retained in a clearing consent, the area(s) subject to a registered property agreement, management contract or voluntary conservation agreement or the area where an illegal clearing activity has occurred.

Vegetation groups define the next level of subdivision in the spatial record. These are identified from the aerial photographs, by interpreting the stereoscopic image. This process identifies the growth form of the community, the crown separation ratio of woody vegetation or the foliage cover in non-woody vegetation to give the structural formation class (Mc Donald *et al*, 1990). The aerial photographs used must be from the set that was current at the time when the application was assessed.

Polygons were drawn to identify units that were considered to be homogeneous for two features: the proposed clearing or land management activity (ie the major activity) and the structural formation class of the vegetation. Once these polygons were defined, they were tagged and attributed with all the relevant information to create the complete spatial record.

ATTRIBUTE DESCRIPTIONS

Descriptions of the attributes and attribute classes follow. The individual attribute classes were created to record the activities approved under the NVC Act. Because the database was not established until just after the introduction of the NVC Act, the attribute classes were written to describe what had already been approved and written, using exactly the same phrasing. In the early clearing consents there was no standing wording to any of the clearing descriptions and though similar and often expressing the same management requirements or conditions, the wording was not consistent.

The database therefore reflects these inconsistencies in expression. Only at a later stage, was the terminology standardised.

Registered Number

This is an initial identifier to the property and provides some details of when the application was made.

The registered number comprises three sections:

1. two letters specific for an individual DLWC office, eg. GR for Grafton;
2. two numbers for the year in which the application was lodged or when the breach was reported;
3. two numbers that identify the sequential listing of the application or breach in the year (9903 is the third application or breach report in 1999).

A code would read as GR9605.

For breaches assessed by DLWC staff and for voluntary conservation agreements entered into with the NSW National Parks & Wildlife Service, registered numbers do not exist. Arbitrary numbers were assigned for records in the database, using the local DLWC office to provide the first part of the reference code.

Program Activity

This lists the program activity under which native vegetation is being considered. Existing classes and codes are:

Program Activity	Program Code
Application under SEPP 46	01
Application under the Native Vegetation Conservation Act	02
Application under the Soil Conservation Act	03
Application under Section 27G of the Forestry Act 1916	04
Rivercare Project	10
Revegetation Area Funded by Greening Australia's Fencing Incentive Program	11
Revegetation Area Funded under the Native Vegetation Conservation Act	12
Revegetation Area Funded by Green Rivers Project	13
Management Contract	MC
Registered Property Agreement	RP
Unregistered Property Agreement	UP
Voluntary Conservation Agreement	VC
EPA Act	14
Application under the NVCA in relation to Protected Land	15
Western Riverina Regional Grassland Plan	16
Breach under SEPP46 – prosecuted breach	60
Breach under SEPP46 – court facilitated property agreement	61
Breach under SEPP46 – warning letter	62
Breach under SEPP46 – letter of advice	63
Breach under SEPP46 – stop work order	64
Breach under SEPP46 – investigated but no further action (<i>ie cannot verify legal status</i>)	65
Breach under the Native Vegetation Conservation Act 1997 - prosecuted breach	70
Breach under the Native Vegetation Conservation Act 1997 - court facilitated property agreement	71
Breach under the Native Vegetation Conservation Act 1997 –	72

remedial notice	
Breach under the Native Vegetation Conservation Act 1997 – consent order	73
Breach under the Native Vegetation Conservation Act 1997 – warning letter	74
Breach under the Native Vegetation Conservation Act 1997 –letter of advice	75
Breach under the Native Vegetation Conservation Act 1997 – stop work order (Section 46 notice)	76
Breach under the Native Vegetation Conservation Act 1997 – investigated but no further action	77
Breach under the Native Vegetation Conservation Act 1997 – alleged breach (<i>under investigation</i>)	78
Breach under the Native Vegetation Conservation Act 1997 – alleged breach (<i>non compliance with conditions of consent</i>)	79
Breach under the Soil Conservation Act – prosecuted breach	80
Breach under the Soil Conservation Act – negotiated property agreement (non funded)	81
Breach under the Soil Conservation Act – warning letter	82
Breach under the Soil Conservation Act – letter of advice	83
Breach under the Soil Conservation Act – issue of Section 15A notice	84
Breach under the Soil Conservation Act – investigated but no further action	85
Breach under the Soil Conservation Act – alleged breach	86
Other breaches – prosecuted breach	90
Other breaches – negotiated property agreement (non funded)	91
Other breaches – warning letter	92
Other breaches – letter of advice	93
Other breaches – stop work order	94
Other breaches – investigated but no further action	95
Other breaches – alleged breach	96

Note: Classes 05-09 were originally set up to record details of breaches. These have been expanded and incorporated into Classes 60-96, inclusive.

Status of Application

The status of the application records the final decision of the activity and comprises a number of classes specific to each activity.

Activity	Activity Class	Activity Code
Clearing Consent	Pending	P
	Approved	A
	Refused	R
	Deferred Consent	D
Registered and Unregistered Property Agreement and Management Contract	Approved	A
Breach	Under investigation (pending)	P
	Investigation completed	C

Date of Determination

This refers to the date when the clearing consent, property agreement, management contract or breach were approved or signed off by the Regional Director or Director-General. It is entered as 199805 (the year in full, followed by the month).

Proposed Vegetation Management Activity – Major Activity

This is the major activity in relation to vegetation management occurring under the various programs. Classes and codes are specific to the three main activities – clearing consents, property agreements and management contracts or breaches.

Major Activity	Activity Code
Clearing Consent: Clearing Activities Approved	
Clearing under best management practice: blady grass and bracken fern in Hunter and North Coast Regions	BBG
Clearing under best management practice: controlled traffic farming	BCT
Clearing under best management practice: selective hardwood logging in North Coast Region (provisional)	BML
Clearing under best management practice: willows	BMW
Clearing under best management practice: to allow for the establishment of irrigated horticultural enterprises	BPH
Clearing under best management practice: scattered paddock trees to establish pine plantations in Murray & Murrumbidgee Regions	BPP
Clearing under best management practice: river red gum regrowth, 10-15 years old	BRG
Clearing under best management practice: roly poly in Walgett Shire	BRP
Clearing under best management practice: scattered paddock trees to install centre pivot and other self-moving irrigation systems	BST
Clearing under best management practice: exotic plant species on riparian State Protected Land	BWW
Clearing of fallen trees	CFT
Clearing by chaining (plants pushed over but not removed. Regrowth can occur from base of plants)	CHN
Clearing of isolated trees	CIT
Clearing of clumps of trees	CLT
Clearing under exemption ¹	CLX
Clearing of shrubland under the Moree Plains Grassland Plan	CMP
Clearing of native vegetation (when there is no reference to retaining any trees or other vegetation)	CNV
Other clearing ²	COT
Clearing of strips of vegetation	CSV
Clearing of grassland under the Western Riverina Regional Grassland Plan	CWG
Clearing of shrubland under the Western Riverina Regional Grassland Plan	CWS
Clearing of native vegetation (when individual trees, clumps of trees or specific densities of trees or native vegetation are to be retained)	CWT
Clearing of exotic species on protected land, category (a) ³	CXA
Clearing of exotic species on protected land, category (b) ³	CXB
Clearing of exotic species on protected land, category (c) ³	CXC
Clearing of dead trees on protected land	CXD
logging	LGG
lopping of trees	LOP
poisoning, but dead timber is left standing	PON

thinning (as part of a forestry activity) ⁴	THN
underscrubbing (removal or clearance of understorey or ground cover but upper canopy is to be retained)	USG
Clearing Consent: Other Categories	
Land excluded from the Native Vegetation Conservation Act (<i>section 9 of the Act</i>): land to which SEPP 14 - Coastal Wetlands applies	EXB
Land excluded from the Native Vegetation Conservation Act (<i>section 9 of the Act</i>): land to which SEPP 25 - Littoral Rainforests applies	EXC
No further data available	NFD
Area not assessed because it is protected land	NPL
Area excluded at time of pre-application inspection	PAE
Clearing approval issued but clearing preceded the date of application	PVC
Remainder of property (that section of the property not within the area of application)	REM
Clearing approved, but the area involved does not meet the definition of vegetation under the Native Vegetation Conservation Act or does not match the activity proposed (eg logging on areas of grasslands)	RNN
Restoration of area of native vegetation (court order)	RNV
Sowing or cultivation into receding floodwaters	SRW
Clearing Consent: Retention of Native Vegetation	
Proposed conservation area	CON
Area to be conserved as part of Land Use Agreements (Southern Mallee Regional Planning Committee 1999, as amended)	CSM
Area that must not be cleared	NCA
Area that must not be cleared consistent with the proponent's Vegetation Management Plan	NCB
Area that must not be cleared consistent with the conditions of consent	NCC
Area that must not be cleared but access corridor may be cleared	NCD
Area that must not be cleared (protected land)	NCP
Area that must not be cleared because of a statutory requirement (eg Court Order, Local Planning Scheme such as Carrathool Shire)	NSR
Area to be revegetated or restored to native vegetation	REV
Other retention	ROT
Registered and Unregistered Property Agreements and Management Contracts: Native Vegetation Management Proposals	
Management and rehabilitation of degraded lands	MDL
Management of existing native vegetation (<i>with fencing and stock exclusion</i>)	MEV
Management for fire control	MFC
Management of existing native vegetation (<i>no fencing but other land management techniques include weed and vermin control</i>)	MNF
Improvement of existing native vegetation (<i>blocks of land with fencing, stock exclusion and predominantly by allowing regrowth</i>)	MNR
Replanting areas of non-native vegetation to native vegetation to connect existing stands of native vegetation	MRE
Improvement of existing native vegetation (<i>blocks of land with fencing, stock exclusion, weed control and/or replanting of local species</i>)	MRP
Management of riparian zones (<i>corridors as distinct from blocks</i>)	MRZ
Management or establishment of corridors (<i>corridors as distinct from blocks</i>)	MVC
Management of existing vegetation but without the construction of fences	MVA

Breaches: Clearing Activities in Relation to Breaches	
Removal of native vegetation	CNW
Partial removal of native vegetation	
□ Lower canopy	CWL
□ Upper canopy	CWU
Significant damage to native vegetation	CSD
Temporary removal of native vegetation	CTR
Clearing in excess of exemptions	CIX
Clearing within areas where vegetation is to be retained	CNC
Clearing in excess (numbers of trees) of conditions of consent	CCC
Breaches: Restoration or Retention Activities in Relation to Breaches	
Restoration of area of native vegetation	RNV
Retention of area of native vegetation	RNT
Stop work order over remaining uncleared areas	RST
Retention of areas that could be cleared	RWC

Notes

¹ Only a small number of records of clearing carried out under the exemption provisions of the NVC Act occur. Once it was established that this information was not required as part of the consent process, it was no longer included in any of the reports or accompanying maps.

² This class was introduced into the Vegnet database to cover approvals for a range of activities including the burning of woody weed vegetation in western New South Wales

³ Under the Native Vegetation Conservation Act, consent is required to clear exotic trees on State and Regional Protected Land

⁴ 'Forestry activity' encompasses all areas of 'silvicultural activity' outside state forests.

Amount of Tree Cover to be Retained

This attribute is only used in relation to areas where clearing of native vegetation is authorised and refers specifically to a condition of consent attached to the authority. If the conditions of consent do not specify any vegetation to be retained, then the attribute column is not filled in. The attribute is also not filled in for any non-clearing or re-establishment categories or for property agreements or management contracts. The classes and codes are listed in the following table.

Vegetation to be retained as part of the Condition of Consent	Code
Clumps of trees to be retained	01
Individual trees or clumps of trees to be retained	02
Retain 2 trees/ha	03
Retain 3 trees/ha	04
Retain 5 trees/ha	05
Retain 6 trees/ha	06
Retain 10 trees/ha	07
Retain 15 trees/ha	08
Retain 20 trees/ha	09
Retain 30 trees/ha	10
Retain 40 trees/ha	11
Retain 50 trees/ha	12
Retain 60 trees/ha	13
Retain 120 trees/ha	14
Retain 200 trees/ha	15
Retain 250 trees/ha	16

Retention of all belah (<i>Casuarina cristata</i>)	17
Clearing of clumps of trees	18
Felling of dead trees	19
Retention of all grey box (<i>E. microcarpa</i>)	20
Retention of all native vegetation within 10 m of the fence line	21
Retention of all native vegetation	22
Retain more than 90% of the native vegetation	31
Retain between 80-90% of the native vegetation	32
Retain between 70-80% of the native vegetation	33
Retain between 60-70% of the native vegetation	34
Retain between 50-60% of the native vegetation	35
Retain between 40-50% of the native vegetation	36
Retain between 30-40% of the native vegetation	37
Retain between 20-30% of the native vegetation	38
Retain between 10-20% of the native vegetation	39
Retain less than 10% of the native vegetation	40

Proposed Land Use or Vegetation Management at the Site

This attribute covers a number of situations, depending on the major activity being considered:

1. for areas where clearing of native vegetation in all its forms is approved, the proposed use of the land
2. for areas where clearing of native vegetation is not approved or is to be retained and for all property agreements, management contracts and voluntary conservation agreements, the reasons for retaining or managing the native vegetation
3. for breaches to the NVC Act, the method of clearing or the reasons why certain areas are required to be retained under native vegetation.

Clearing: Proposed Use of the Land after Clearing	Land Use Code
access purposes ¹	AC
approved program for land rehabilitation ²	LR
aquaculture development	AQ
cropping	CR
cropping & grazing	CG
fence and fire break construction	FB
fire control	FC
grazing	GR
horticulture	HO
improvement of original vegetation ³	OV
improvement of quality of remaining trees of commercial value	QR
irrigation development	ID
logging	LG
management of river flows and/or flood mitigation	RX
management of surface runoff	MS
mining	MI
on-farm use of wood	FN
plantation – eucalyptus oil	EO
plantation – hardwood	HA
plantation – softwood	SO
plantation – tea-tree	TT
removal of exotic species ⁴	XT
safety purposes	SP

scientific research	SR
tourist development or recreation	TO
urban & rural residential development	RR
utilities (<i>including roads, powerlines, optic fibre cables</i>)	UT
water supply	WS
weed control	WC
other clearing purpose	CT

Notes

¹ Clearing of a corridor of vegetation to allow access.

² Clearing to allow land degradation problems to be treated. For example, trees may be cleared from severely eroded sites to allow these sites to be reshaped, stabilised and then planted to native vegetation.

³ An example would be the burning of woody vegetation in western New South Wales

⁴ See previous note in relation to the clearing of exotic trees on State or Regional Protected Land.

Vegetation Retention: Reason for retaining or managing native vegetation	Code
aboriginal relics	AB
biodiversity value	BV
bore drain	BD
bore drain - 20m either side of a bore drain	BB
bore drain - 40m either side of a bore drain	BA
bore drain - 100m either side of a bore drain	BC
boundary purpose (along fence line)	FE
buffer to national park	NP
buffer zone between activity and riparian zone (Far West Region)	RZ
buffer zone (to boundary, or between areas of cultivation)	BF
catchment protection	CP
critical landscape	CL
critical threshold value for vegetation community	TV
(on) Crown road	CN
cultural heritage	CF
current land use	CU
density of vegetation (woody weeds) not sufficient to justify clearing	JS
drainage management feature	DR
habitat (wildlife) corridor	CO
habitat value	HV
improvement of vegetation community	VI
inholding to national park	IH
karst system	KA
low agricultural potential	LA
management of dryland salinity problem	SC
mass movement potential	MM
old growth forest	OG
prevention of further damage to desirable native species	DN
priority vegetation types for conservation	PC
public road	PR
rare, endangered or threatened ecological community	EC
rare, endangered or threatened fauna species	ES
rare, endangered or threatened flora species	FS
retention of remnant in locality where extensive clearing has occurred	RM
riparian value	RE
riparian management, 5m either side of the drainage features	RG

riparian management, 10m either side of the drainage features	RA
riparian management, 20m either side of the drainage features	RB
riparian management, 50m either side of the drainage features	RC
riparian management, 100m either side of the drainage features	RD
riparian management, 25m either side of the drainage features	RF
riparian management, 30m either side of the drainage features	RI
riparian management, 40m either side of the drainage features	RH
seepage area	SG
soil erosion prevention	SE
species at limit of range	SL
stock shelter	SS
texture contrast soil ¹	TC
trade-off for clearing (type of compensatory area)	TF
travelling stock reserve	TS
visual amenity	VA
wetland	WT
windbreak	WB
other retention purpose	RT

Notes

¹ The reason for retaining native vegetation on a texture contrast soil is to prevent soil erosion, particularly wind erosion in the drier districts of the State.

Vegetation Re-establishment: Reason for re-establishing native vegetation	Code
connectivity (linkage of areas of existing vegetation)	CV
replacement of exotic vegetation	XT
riparian management	RP
trade-off for clearing (no net loss principle)	TR
riparian management	RP

Breaches: Method of Clearing	Code
burn (cool)	bi
burn (hot)	bh
chaining	bc
cutting and removal of stumps	bm
cutting or bulldozing, stacking and/or burning	bd
herbicide – aerial application	ba
herbicide – ground application	bg
lopping, topping etc	bt
logging	bl
ploughing or ripping	bp
ringbarking and/or stem injection	br
submerging (inundation in water storage area)	bs
other (eg copper nails)	bo

Breaches: Purpose of Retention	Code
area of compensation	cm
nature conservation refuge	nc
regeneration area	ra

Structural Formation Class

The structural formation class is assessed according to the method described in the Australian Soil and Land Survey Field Handbook (McDonald *et al*, 1990). Structural formation is defined by two parameters: growth form and crown or foliage cover.

For clearing consents, property agreements and management contracts, the structural formation class(es) on the site(s) at the time of assessment is(are) recorded. For breaches, the structural formation class that existed on the site before the reported clearing is recorded.

The following table describes the growth form classes.

Growth Form	Description	Code
Tree	Woody plants more than 2 m tall with a single stem or branches well above the base.	T
Tree mallee	Woody perennial plant usually of the genus <i>Eucalyptus</i> . Multistemmed with fewer than five trunks of which at least three exceed 100 mm in diameter at breast height. Usually 8 m or more tall.	M
Shrub	Woody plant multistemmed at the base (or within 200 mm from ground level) or, of single-stemmed, less than 2 m tall.	S
Mallee shrub	Commonly less than 8 m tall, usually with five or more trunks, of which at least three of the largest do not exceed 100 mm in diameter at breast height.	Y
Heath shrub	Shrub usually less than 2 m tall, commonly with ericoid leaves.	Z
Chenopod shrub	Xeromorphic single or multistemmed halophyte exhibiting drought and salt tolerance.	C
Tussock Grass (bunch grass)	Forms discrete but open tussocks usually with distinct individual shoots, or if not, then not forming a hummock. These are the common agricultural grasses.	G
Hummock grass	Coarse xeromorphic grass with a mound-like form often dead in the middle; genera are <i>Triodia</i> and <i>Plectrachne</i> .	H
Sod grass	Grass of short to medium height forming compact tussocks in close contact at their base and uniting as a densely interfacing leaf canopy.	D
Sedge	Herbaceous, usually perennial, erect plant generally with a tufted habit and of the families Cyperaceae and Restionaceae	V
Rush	Herbaceous, usually perennial, erect plant. Rushes are grouped in the families Juncaceae, Typhaceae, Restionaceae and the genus <i>Lomandra</i> .	R
Forb	Herbaceous or slightly woody, annual or sometimes perennial plant: not a grass	F
Fern	Characterised by large and usually branched leaves (fronds), herbaceous to arborescent and terrestrial to aquatic; spores in sporangia on the leaves.	E
Moss	Small plant usually with a slender leaf-bearing stem with no true vascular tissue.	O
Vine	Climbing, twining, winding or sprawling plant usually with a woody stem.	L

Crown cover is used as the measure of percentage woody plant cover because it is easily estimated from aerial photographs or large resolution satellite imagery. It is measured using the mean gap between crowns divided by the mean crown width (the

crown separation ratio). The crown separation ratios can provide crown cover classes which are equivalent to the projective foliage cover classes of Specht *et al*, 1974.

Crown separation ratios used are:

Mapping Code	Crown Separation	Field or API Criteria	Crown Separation ratio
D	closed or dense	touching-overlap	<0
M	mid-dense	touching-slight separation	0-0.25
S	sparse	clearly separated	0.25-1
V	very sparse	well separated	1-20
I	isolated plants	isolated	>20
L	isolated clumps	isolated	>20

Foliage cover is used for ground layers and is based upon the percentage ground.

The following classes are used for foliage cover:

Mapping Code	Crown Class	Foliage Cover
D	closed or dense	>70
M	mid-dense	30-70
S	sparse	10-30
V	very sparse	<10
I	isolated plants	<1
L	isolated clumps	<1

Two additional codes were added to describe situations not covered by the above two tables. These were:

- for areas of standing water at the time of assessment: code as WA
- for areas under crop or irrigation: code as KK.

Dominant Vegetation Species

This is an entry for the two dominant species of the structural formation class listed for each polygon according to the preceding tables. It uses a four-digit numeric code, based upon standard codes issued for DLWC's Soil and Land Information System (SALIS). The codes are available on a floppy disk.

Local Government Area

This attribute lists the local government area in which the property is located. The local government areas and their respective codes are:

Albury	ABY	Forbes	FBS	Newcastle	NCE
Armidale	ADE	Gilgandra	GDA	Nundle	NLE
Ballina	BLA	Glen Innes	GNS	Nymboida	NYA
Balranald	BRD	Gloucester	GTR	Oberon	OBN
Barraba	BBA	Gosford	GFD	Orange	OGE
Bathurst	BHT	Goulburn	GBN	Parkes	PKS
Bega Valley	BVY	Grafton	GFN	Parry	PRY
Bellingen	BGN	Great Lakes	GLK	Penrith	PTH
Berrigen	BRN	Greater Lithgow	GLW	Port Stephens	PTS
Bingara	BGA	Greater Taree	GTE	Queanbeyan	QBN
Blacktown	BLN	Griffith	GFH	Quirindi	QDI
Bland	BLD	Gundagai	GGI	Richmond River	RRV
Blayney	BLY	Gunnedah	GDH	Rylstone	RYE
Blue Mountains	BMT	Gunning	GNG	Scone	SCE
Bogan	BOG	Guyra	GYA	Severn	SVN
Bombala	BOA	Harden	HDN	Shellharbour	SHR
Boorowa	BWA	Hastings	HTG	Shoalhaven	SHN
Bourke	BKE	Hawkesbury	HWY	Singleton	STN
Brewarrina	BRE	Hay	HAY	Snowy River	SNR
Broken Hill	BHL	Holbrook	HBK	Sutherland	SUT
Byron	BYN	Holroyd	HRD	Tallaganda	TGA
Cabonne	CBE	Hornsby	HBY	Tamworth	TWH
Camden	CDN	Hume	HUM	Temora	TRA
Campbelltown	CTN	Inverell	INV	Tenterfield	TFD
Carrathool	CTL	Jerilderie	JDE	Tumbarumba	TBA
Casino	CSO	Junee	JNE	Tumut	TMT
Central Darling	CDG	Kempsey	KSY	Tweed	TWD
Cessnock	CES	Kiama	KMA	Ulmarra	UMA
Cobar	CBR	Kyogle	KYE	Unincorporated	UNI
Coffs Harbour	CHR	Lachlan	LHN	Uralla	ULA
Conargo	CGO	Lake Macquarie	LMQ	Urana	URA
Coolah	CLH	Lismore	LME	Wagga Wagga	WGA
Coolamon	CMN	Lockhart	LHT	Wakool	WKL
Cooma-Monaro	CMO	Macleay	MAC	Walcha	WCA
Coonabarabran	CBN	Maitland	MTD	Walgett	WGT
Coonamble	CLE	Manilla	MLA	Warren	WRN
Cootamundra	CTA	Merriwa	MWA	Weddin	WDN
Copmanhurst	CHT	Moree Plains	MPL	Wellington	WTN
Corowa	CWA	Mudgee	MDE	Wentworth	WTH
Cowra	CRA	Mulwaree	MWE	Willoughby	WBY
Crookwell	CWL	Murray	MRY	Windouran	WNN
Culcairn	CHN	Murrumbidgee	MBE	Wingecarribee	WBE
Deniliquin	DQN	Murrurundi	MDI	Wollondilly	WDY
Dubbo	DBO	Muswellbrook	MBK	Wollongong	WLG
Dumaresq	DMQ	Nambucca	NBA	Wyong	WYG
Dungog	DNG	Narrabri	NAI	Yallaro	YRI
Eurobodalla	EDA	Narrandera	NDA	Yarrowlumla	YLA
Evans	EVS	Narromine	NME	Yass	YAS
Fairfield	FLD			Young	YNG

State Electoral District

This attribute lists the state electoral district in which the property is located. The local state electoral districts and their respective codes are:

Albury	ALB	Coffs Harbour	COF	Myall Lakes	MYA
Badgerys Creek	BCK	Dubbo	DUB	Northern Tablelands	NTB
Ballina	BAL	Gosford	GOS	Orange	ORA
Barwon	BAR	Hawkesbury	HAW	Oxley	OXL
Bathurst	BAT	Illawarra	ILL	Peats	PEA
Bega	BEG	Keira	KEI	Port Macquarie	PMA
Blue Mountains	BLU	Kiama	KIA	Port Stephens	PST
Broken Hill	BRO	Lachlan	LAC	South Coast	SCT
Bulli	BUL	Lake Macquarie	LMA	Southern Highlands	SGH
Burrinjuck	BUR	Lismore	LIS	Swansea	SWA
Camden	CAM	Maitland	MAI	Tamworth	TAM
Campbelltown	CTN	Monaro	MON	The Entrance	TEN
Cessnock	CES	Murray	MUR	Upper Hunter	UHU
Charlestown	CHA	Murrumbidgee	MBE	Wagga Wagga	WAG
Clarence	CLA	Murwillumbah	MUW	Wollongong	WOL
				Wyong	WYO

Catchment Area

This attribute lists the catchment area in which the property is located. The catchment areas and their respective codes are:

Bega	Be	Hunter	Hu	Murray	Mu
Bellinger	Bg	Lachlan	La	Murrumbidgee	Mb
Brunswick	Br	Lake George	Lg	Namoi	Na
Castlereagh	Ca	Lake Hume	Lh	Port Stephens/ Wallis Lake	Ps
Clarence	Cl	Lake Illawarra/ Port Hacking	Li	Richmond	Ri
Clyde	Cy	Moruya	Mo	Shoalhaven	Sh
Darling	Da	Lake Macquarie/ Tuggerah Lakes	Lm	Snowy	Sn
Genoa	Ge	Macintyre	Ma	Towamba	To
Gwydir	Gw	Macleay	Mc	Tuross	Tu
Hastings	Ha	Macquarie	Mq	Tweed	Tw
Hawkesbury	Hk	Manning	Mn		

INFORMATION IN THE DATA BASE

The following discussion describes the information currently in the database and how it can be retrieved. The information is presented in tabular format, making it very easy for the potential users to interpret the information in a manner that suits their individual project needs.

CLEARING DETERMINATIONS

The statistical information on clearing determinations is released though the Department's web site (www.dlwc.nsw.gov.au). Whereas the current data on clearing consents are entered through a program called Vegnet, the earlier data are entered through the GIS. Currently, the spatial information in Vegnet is not linked to the earlier spatial information, although work is in progress to achieve this linkage.

The following tables summarise some of the information from the database for the full calendar year 2000 and for the first half of 2001.

Areas approved for clearing

This data set is extracted from the attribute titled "Proposed Vegetation Management Activity – Major Activity". The attribute identifies the areas for which a clearing approval is sought, those areas where the vegetation is to be retained and the remaining areas of the property not subject to the current application.

Area Approved for Clearing for ALL Regions for period 01 Jan 2000 to 31 Dec 2000					
DLWC Region	Area Applied to Clear (ha)	Area Approved to Clear (ha)	Area to be Retained (ha)	Remainder of Property (ha)	Total Area of Property (ha)
Barwon	8965	7003	1962	82220	91186
Central West	14797	8965	5832	33663	48460
Far West	36570	34545	2024	453826	490396
Hunter	8322	5527	2795	14194	22517
Murray	3029	2783	246	68277	71306
Murrumbidgee	10797	4273	6524	256560	267356
North Coast	15963	13385	2578	40894	56857
Sydney-South Coast	2072	1350	721	11696	13768
Total	100515	77831	22684	961331	1061846

Area Approved for Clearing for ALL Regions for period 01 Jan 2001 to 30 June 2001					
DLWC Region	Area Applied to Clear (ha)	Area Approved to Clear (ha)	Area to be Retained (ha)	Remainder of Property (ha)	Total Area of Property (ha)
Barwon	10523	7826	2698	21790	32314
Central West	4474	2521	1953	8711	13185
Far West	18900	18446	455	88273	107173
Hunter	6454	4364	2090	8802	15256
Murray	3518	2229	1290	34643	38161
Murrumbidgee	3732	1977	1755	19141	22873
North Coast	4522	4395	128	15374	19896
Sydney-South Coast	1333	1015	318	2802	4135
Total	53457	42772	10685	199535	252993

Type of Clearing Approved

'Type of clearing approved' is extracted principally from the attribute title 'structural formation class'. In addition to the standard groups, areas of exotic species are extracted from the land use category whereas the figures for clearing of 'invasive native species' are taken from the dominant species information. "Invasive native species" refers to any of the following species: bracken fern, blady grass, roly-poly, red grass (*Bothriochloa* sp.), mimosa bush, cotton bush or dillon bush.

Type of Clearing Approved for ALL Regions for period 01 Jan 2000 to 31 Dec 2000		
Type of clearing	Area (ha)	Percentage
Closed Forest	1052	1.35
Exempt	3372	4.33
Exotics	458	0.59
Grassland	6049	7.77
Invasive Native Species	6009	7.72
Isolated Clumps of Trees	904	1.16
Isolated Trees	8769	11.27
Open Forest	12118	15.57
Open Woodland	11990	15.40
Other	0	0.00
Shrubland	2937	3.77
Woodland	24173	31.06
Total	77831	100.00

Type of Clearing Approved for ALL Regions for period 01 Jan 2001 to 30 June 2001		
Type of clearing	Area (ha)	Percentage
Closed Forest	383.6	0.90
Exempt	1158.5	2.71
Exotics	189.7	0.44
Grassland	2701.8	6.32
Invasive Native Species	422.1	0.99
Isolated Clumps of Trees	14.5	0.03

Isolated Trees	8735.9	20.42
Open Forest	5647.0	13.20
Open Woodland	13675.7	31.97
Shrubland	7441.2	17.40
Woodland	2402.3	5.62
Total	42772.3	100.00

Dominant Species in the Area Approved for Clearing

Within each area approved for clearing, the dominant species for the tallest vegetation on the site is recorded. The dominant species may or may not be the particular species approved to clear. The following two tables list the twenty most recorded species. This data set has particular relevance in identifying what vegetation communities are currently most at threat.

Dominant Species in the Areas Approved for Clearing for All regions for period 01 Jan 2000 to 31 Dec 2000		
Dominant Species – Scientific & (Common Name)	Area (ha)	Percentage
Casuarina cristata ssp. pauper (belah)	9226	11.85
Eucalyptus populnea (bimble box)	9021	11.59
Eucalyptus microtheca (coolibah)	6365	8.18
Eucalyptus dumosa (congo mallee)	3942	5.06
Not specified	3771	4.84
Eucalyptus largiflorens (black box)	2951	3.79
Sclerolaena muricata var. semiglabr (dark roly-poly)	2657	3.44
Casuarina cristata (belah)	1677	2.15
Callitris glaucophylla (white cypress pine)	1674	2.15
Eucalyptus pilularis (blackbutt)	1611	2.07
Eucalyptus maculata (spotted gum)	1578	2.03
Maireana aphylla (cottonbush)	1487	1.91
Eucalyptus tereticornis (forest red gum)	1367	1.76
Eucalyptus camaldulensis (river red gum)	1341	1.72
Dodonaea spp. (hopbushes)	1215	1.56
Eucalyptus saligna (Sydney blue gum)	1172	1.51
Imperata cylindrica (blady grass)	1166	1.50
Eucalyptus oleosa (red mallee)	1004	1.29
Eucalyptus acmenoides (white mahogany)	994	1.28
Austrostipa variabilis (variable speargrass)	941	1.21

Dominant Species in the Areas Approved for Clearing for All regions for period 01 Jan 2001 to 30 June 2001		
Dominant Species – Scientific & (Common Name)	Area (ha)	Percentage
Eucalyptus microtheca (coolibah)	8719	20.38
Eremophila sturtii (turpentine)	6890	16.32
Dodonaea viscosa (sticky hopbush)	5607	13.11
Eucalyptus maculata (spotted gum)	1736	4.06
Eucalyptus populnea (bimble box)	1700	3.98
Eucalyptus albens (white box)	990	2.32
Eucalyptus largiflorens (black box)	969	2.26
Eucalyptus macrorhyncha (red stringybark)	919	2.15

Phalaris aquatica (phalaris)	831	1.94
Poa labillardieri var. labi (tussock grass)	697	1.63
Angophora subvelutina (broad-leaved apple)	681	1.59
Eucalyptus saligna (Sydney blue gum)	663	1.55
Eucalyptus tereticornis (forest red gum)	583	1.36
Danthonia spp. (wallaby grasses)	583	1.36
Eucalyptus propinqua (small-fruited grey gum)	570	1.33
Hedypnois rhagadioloides spp. cre (cretan weed)	520	1.22
Eucalyptus acmenioides (white mahogany)	500	1.17
Holcus lanatus (Yorkshire fog)	470	1.10
Eucalyptus camaldulensis (river red gum)	459	1.07
Eucalyptus dumosa (congoo mallee)	439	1.03

Proposed land use for the area approved for clearing

This data set is extracted from the attribute for 'proposed land use'. Note that the 'other' land use category consists primarily of the following: clearing for the improvement of original vegetation (includes management burns); clearing for utilities (roads, powerlines and cables); removal of exotic species; clearing for urban and rural residential development; clearing for access purposes and clearing for weed control.

Proposed Land Use for the Area Approved for Clearing for All Regions for period 01 Jan 2000 to 31 Dec 2000		
Proposed Land Use Category	Area (ha)	Percentage
Cropping	36068	46.34
Cropping and Grazing	6957	8.94
Grazing	4211	5.41
Hardwood Plantation Establishment	5904	7.59
Horticulture	173	0.22
Irrigation Development	5428	6.97
Logging/Forestry	10539	13.54
Other	7535	9.68
Softwood Plantation Establishment	1016	1.31
Total	77831	100.00

Proposed Land Use for the Area Approved for Clearing for All Regions for period 01 Jan 2001 to 30 June 2001		
Proposed Land Use Category	Area (ha)	Percentage
Cropping	13613.0	31.83
Cropping and Grazing	2120.7	4.96
Grazing	1659.0	3.88
Hardwood Plantation Establishment	2791.1	6.53
Horticulture	75.9	0.18
Irrigation Development	754.6	1.76
Logging/Forestry	5086.4	11.89
Other	13554.8	31.69
Softwood Plantation Establishment	3115.8	7.28
Total	42772.3	100.00

REGISTERED PROPERTY AGREEMENTS AND MANAGEMENT CONTRACTS

The digital recording of information for registered property agreement and management contracts funded under the Native Vegetation Management Fund is ongoing. Legal details of many agreements and contracts are still being searched and until these have been verified none of the data is entered into the database.

The number of registered property agreements and management contracts in the database for each region is given in the following table.

Number of Registered Property Agreements and Management Contracts in the Spatial Database for each Region		
Region	Number of Registered Property Agreements	Number of Management Contracts
Barwon	7	13
Central West	79	104
Far West	0	0
Hunter	15	4
Murray	28	18
Murrumbidgee	24	70
North Coast	77	83
Sydney South Coast	16 (includes one unregistered property agreement)	42
Total	236	324

Various analyses of the data are possible. Examples are highlighted in the next series of tables for registered property agreement and management contracts negotiated by Murrumbidgee Region.

Number of Registered Property Agreements and Management Contracts negotiated on a yearly basis

This information is extracted from the record of when the regional director of Murrumbidgee Region signed the agreement or contract.

Registered Property Agreements and Management Contracts Negotiated for Murrumbidgee Region on a Yearly Basis			
Year	Registered Property Agreements	Management Contracts	Total Area
1998	1	0	1
1999	5	35	40
2000	14	33	47
2001	1	1	2
Date not specified	3	1	4
Total	24	70	94

One of the limitations with the database as it currently stands is that there is no record of the length of the property agreement or management contract. The terms of these agreements or contracts can range from a minimum of ten years to agreements or contracts in perpetuity. The data are available in a series of text databases held by

DLWC and can be linked to the spatial information through the unique registered number for each contract or agreement.

Management Objectives of Registered Property Agreements and Management Contracts

In the written contract, the objectives of the registered property agreement and management contracts are stated in the Third Schedule of the contract between the landholder and DLWC. Most of the stated objectives are clear, but in a number of cases the stated objectives do not match the proposed works commitments by either DLWC or the landholder. In such cases, the proposed objectives are redescribed for entry into the spatial database.

On a single property a number of separate areas may be included in the one registered property agreement or management contract. Each area can have a separate series of objectives, which are shown in detail in the proposed works commitments. This is reflected in the statistics.

Vegetation Management Objectives for all Registered Property Agreements and Management Contracts in Murrumbidgee Region		
Management Objective	Management Code	Area (ha)
habitat value	HV	3173
improvement of vegetation community	VI	1291
retention of remnant in a locality where extensive clearing has occurred	RM	269
priority vegetation types for conservation	PC	226
habitat (wildlife) corridor	CO	108
management of a dryland salinity problem	SC	97
low agricultural potential of land	LA	84
rare, endangered or threatened flora	ES	58
riparian management	RP	56
re-establishment or maintenance of a vegetation corridor	CC	50
soil erosion prevention	SE	22
Total		5434

Proposed Vegetation Management Activity

This data set is extracted from the attribute titled "Proposed Vegetation Management Activity – Major Activity". The attribute identifies the principal vegetation management activities associated with each polygon.

One additional class describes the remaining areas of the property not subject to the current agreement or contract. For these areas, there is no description of the vegetation community. The advantage, however, of defining the entire property is that the property with a registered agreement or management contract can also be shown spatially as well as the specific parcel of land being managed.

Proposed Vegetation Management Activities for all Registered Property Agreements and Management Contracts in Murrumbidgee Region		
Proposed Vegetation Management Activity	Management Activity Code	Area (ha)
Management and rehabilitation of degraded lands	MDL	0
Management of existing native vegetation (<i>with fencing and stock exclusion</i>)	MEV	3835

Management for fire control	MFC	0
Management of existing native vegetation (<i>no fencing but other land management techniques include weed and vermin control</i>)	MNF	0
Improvement of existing native vegetation (<i>blocks of land with fencing, stock exclusion and predominantly by allowing regrowth</i>)	MNR	536
Replanting areas of non-native vegetation to native vegetation to connect existing stands of native vegetation	MRE	0
Improvement of existing native vegetation (<i>blocks of land with fencing, stock exclusion, weed control and/or replanting of local species</i>)	MRP	1034
Management of riparian zones (<i>corridors as distinct from blocks</i>)	MRZ	9
Management or establishment of corridors (<i>corridors as distinct from blocks</i>)	MVC	17
Management of existing vegetation but without the construction of fences	MVA	0
Remainder of property	REM	42819

Principal Vegetation Types Included in the Registered Property Agreements and Management Contracts

'Principal vegetation type' is extracted from the attribute title 'structural formation class.'

Principal Vegetation Types for all Registered Property Agreements and Management Contracts in Murrumbidgee Region		
Principal Vegetation Type	Vegetation code	Area (ha)
Open forest	TM	1014
Woodland	TS	1992
Open Woodland	TV	1472
Isolated trees	TI	337
Isolated clumps of trees	TL	29
Mallee woodland	MS	143
Open mallee woodland	MV	115
Shrubland	SM	28
Open shrubland	SS	3
Sparse shrubland	SV	23
Open chenopod shrubland	CS	38
Grassland	GM & GV	224
Standing crop (to be replanted)	KK	14

Dominant Vegetation Species Conserved Under the Registered Property Agreements and Management Contracts

Within the sites approved for funding for vegetation management, the dominant species for the tallest vegetation on the area is recorded. The following table lists the twenty most recorded species for these private conservation agreements in Murrumbidgee Region.

Dominant Species Conserved under all Registered Property Agreements and Management Contracts in Murrumbidgee Region		
Principal Species – Scientific and Common Name	Species code	Area (ha)
Eucalyptus polyanthemus (red box)	2899	950
Eucalyptus dealbata (tumbledown gum)	2761	580
Eucalyptus rossii (scribbly gum)	2921	542
Eucalyptus mannifera (red spotted gum)	2848	412
Eucalyptus macrorhyncha (red stringybark)	2846	315
Eucalyptus rubida (candlebark gum)	2922	313
Eucalyptus microcarpa (grey box)	2855/2856	264
Eucalyptus blakelyi (blakely's red gum)	2706	212
Eucalyptus dwyeri (dwyer's mallee gum)	2770	174
Eucalyptus albens (white box)	2694	161
Eucalyptus pauciflora (snow gum)	2883	151
Eucalyptus melliodora (yellow box)	2851	157
Eucalyptus sideroxylon (mugga ironbark)	2935	148
Callitris glaucophylla (white cypress pine)	5538	133
Eucalyptus nortonii (long-leaved box)	2866	122
Casuarina sp. (she-oak)	1937	86
Eucalyptus mannifera (brittle gum)	5579	68
Eucalyptus viridis (green mallee)	2971	60
Eucalyptus socialis (red mallee)	2944	57
Eucalyptus bridgesiana (apple box)	2711	42

BREACHES TO THE NATIVE VEGETATION CONSERVATION ACT

This component of the spatial database is still being developed and only a small number of events have been entered. The spatial database only holds records of activities that are determined to be an actual breach of the NVC Act. Reported clearing incidences that are found not to be a breach of the NVC Act because the clearing occurs within the list of exemptions are not entered into the spatial database.

The only record that is available for analysis is the number of entries in the database.

Spatial Database Record of Breaches to the Native Vegetation Conservation Act

Reported Breaches to the Native Vegetation Conservation Act on a Regional Basis	
DLWC Region	Number of Breaches in the Spatial Database
Barwon	12
Central West	20
Far West	0
Hunter	0
Murray	18
Murrumbidgee	6
North Coast	0
Sydney South Coast	0

IMPLICATIONS FOR BIODIVERSITY CONSERVATION MANAGEMENT

The spatial database provides an overview to the management of native vegetation in New South Wales for three specific activities:

- clearing approvals
- registered property agreements and management contracts
- breaches.

The ability to merge information with:

- Voluntary Conservation Agreements (NSW National Parks & Wildlife Service)
- clearing data (such as Rates of Clearing data set held by DLWC)
- state forests, national parks and nature reserves (Digital Cadastre Database)
- and eventually with data provided by non-government agencies (Greening Australia) or community groups (Landcare)

will enable a composite picture of vegetation management in New South Wales to be obtained. The data can also be merged with baseline data sets for native vegetation in New South Wales to identify the threats and opportunities relating to the management of the remaining stands of native vegetation.

USE OF THE SPATIAL DATA

Even with the size of the data set, a series of management decisions can be made from the information.

Clearing Pressures

The spatial data, showing the location of areas where clearing applications have been approved can be combined with the breach data set to identify the districts and vegetation communities most under threat. Spatial information is more meaningful than the straight text information from the Vegnet database because it shows precisely where the clearing pressures occur. For example, the Vegnet text database reveals high levels of clearing approvals for Barwon, Central West and Far West Regions, which occupy almost two-thirds of New South Wales. The spatial data, however, show the pressures concentrated in the northwest corner of the State, centred on Walgett

and Brewarrina Shires whilst large sectors of each region have nil to negligible clearing pressures. Such information can then be used to target a series of incentive projects to retain and manage existing native vegetation.

There is also a strong role for the clearing consent data to be used in the compliance arm of government activities. The spatial boundary data can be used as the base data to check for any breaches to the conditions of consent. These conditions are attached to each clearing approval.

Property Agreements and Management Contracts

Spatial data becomes very powerful in reviewing the needs for native vegetation incentive programs. The existing spatial data set for property agreements and management contracts has the ability to be used to develop programs:

- by targeting specific vegetation communities for further incentive funding;
- dissuading further incentive funding for specific vegetation communities that are well represented in conservation agreements unless the sites are high quality vegetation or poorly conserved within the locality;
- at the property level, identifying opportunities to link existing conservation areas by planting connecting corridors;
- for compliance reporting. Boundaries of the areas covered by the property agreements or management contracts can be superimposed on any new imagery (for example, aerial photographs or Landsat, SPOT or IKONOS satellite imagery). Interpretation of the imagery can then be undertaken to check that activities are not occurring within the boundaries of the agreed conservation zones that are incompatible with the aims and objectives of the property agreements and management contracts. Incompatible activities include cropping, irrigation or cutting or thinning of existing woody vegetation.

Gaps in the Data Set

When government agencies undertake native vegetation management projects, details of the projects are well documented. Spatial information is drawn accurately and the different management activities are set out in detail. For programs managed by non-government agencies, the situation is often not well documented. Management objectives may be reasonably well defined but the spatial information is totally unreliable.

As a result, only part of the picture on vegetation management in NSW is available. Activities funded through the Landcare groups or through Greening Australia are currently not available for reporting by New South Wales authorities.

Federal government authorities need to be persuaded of the value of spatially recording information on vegetation management activities if they wish to obtain a composite picture of what is happening to native vegetation in New South Wales. There is a preferred method for gathering such information. It would require the funding authorities to include the collection and description of spatial information as one of the essential conditions for accepting external funding. The information would be forwarded to a state agency that would act as the custodian of the data and ensure that the data are converted into digital format.

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