



Australian Government

**National Land & Water Resources Audit**

*An initiative of the Australian Government*

**NATIVE VEGETATION  
COMMUNITIES' INTEGRITY**

INDICATOR HEADING

**Native vegetation extent and  
distribution**

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INDICATOR PROTOCOL

**The extent of present native vegetation  
by IBRA sub-region (measured in  
hectares)**

**Endorsed**

This protocol has been endorsed by the National Land and Water Resources Audit Advisory Council. Version 1 – June 2008. The indicators will need to be further developed as identified within the protocol.

[www.nlwra.gov.au](http://www.nlwra.gov.au)

The extent of present native vegetation by IBRA  
sub-region (measured in hectares)

# Status of indicator agreement

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The National Land & Water Resources Audit (the Audit) coordinates the collation of data to support reporting on natural resource condition required under the National NRM Monitoring and Evaluation Framework (National M&E Framework).

The National M&E Framework identifies three requirements for monitoring natural resource condition:

- a set of resource condition indicators to measure progress toward the agreed national outcomes on a medium and long term basis
- a set of indicators for monitoring community and social processes relevant to or affected by NRM programs, as well as measures of the adoption of sustainable development and production techniques
- contextual data pertinent to the indicator being considered.

The Audit Advisory Council has agreed to a process for achieving a practical set of indicators under the National Monitoring and Evaluation Framework.

This process is to:

- obtain on-going **recommendations** from the relevant **National Coordination Committees** for each thematic area (including “Matters for Target”) on appropriate indicators, protocols and information needs
- seek **endorsement** from the **Audit Advisory Council** that the indicators and protocols can be implemented at the national, state / territory and regional levels
- seek **agreement** from the Natural Resource Policies and Programs Committee (**NRPPC**) (or the Marine and Coastal Committee –**MACC**- for Estuarine, Coastal and Marine) that the indicators will be used and promoted by jurisdictions to underpin evaluations of NRM initiatives.

The NRPPC and MACC report to the Natural Resource Management Ministerial Council (NRMMC).

# Indicator Protocol:

## The extent of present native vegetation by IBRA sub-region (measured in hectares)

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### Matter for target:

Native vegetation communities' integrity.

### Indicator heading:

Native vegetation extent and distribution.

### Indicator name:

The extent of present native vegetation by IBRA sub-region measured in hectares.

## I. Definition

The extent of present native vegetation by IBRA sub-region means the total number of hectares of native vegetation that remain within each sub-region from the Interim Bioregional Regionalisation of Australia (IBRA).

<<http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/index.html>>

Native vegetation is broadly defined as stands or blocks of naturally occurring plant communities whose presence and survival in a specific location is not due to human intervention.

All native vegetation must be mapped to enable measures for targets based on this indicator to be set. However, mapping and reporting on the extent of all present native vegetation requires a definition for 'native vegetation' by which areas of vegetation can be classified as either native or non-native.

There are differences in the working definitions of 'native' in the vegetation mapping of different States and Territories. The key areas of difference relate to levels of disturbance (such as partial clearing, grazing or weed invasion). Some States and Territories (for example) either:

- include or exclude naturalised exotic species when mapping native vegetation; or
- map disturbed native vegetation as 'potential' native vegetation.

In both these examples the resultant datasets do not represent what native vegetation is actually found in a pattern observed in an aerial photograph and on the ground, therefore these datasets are not a case of 'what you see is what you get'. In some regions there may also be finer scale mapping, sometimes prepared outside State or Territory agency mapping programs, which uses a different definition of native vegetation.

These discrepancies are not considered to be deterrents to the application of the indicator for setting targets, provided these differences in approaches are acknowledged in the process of aggregation for national reporting (NLWRA 2001a). The documentation of native vegetation mapping should make clear which definition of 'native' is being used.

This indicator is not concerned with distinct types of native vegetation, which are considered under two related extent and distribution indicators –

- the extent of each priority native vegetation type by IBRA sub-region, and;
- the remaining proportion of each priority native vegetation type in each IBRA sub-region measured as a percentage of the estimated pre-1750 extent.

Indicators for native vegetation communities' integrity have been developed and recommended by the Executive Steering Committee for Australian Vegetation Information (ESCAVI) a high level committee with representation from the Australian Government, each State and Territory government and the National Land & Water Resources Audit.

## **2. Rationale**

### **2.1 Why do we want to know it?**

The extent and distribution of present native vegetation is a key indicator of the status of our natural resource base. Native vegetation binds and nourishes soils; shelters and sustains wildlife; protects streams, wetlands, estuaries, and coastlines; absorbs carbon dioxide and emits oxygen.

The National Land & Water Resources Audit's (NLWRA) landscape health and biodiversity assessments highlight that the loss of native vegetation is the major cause of landscape degradation and the decline of biodiversity in Australia. Effects of removal may be compounded by the degradation of remaining native vegetation, for example through unsustainable grazing pressure, insect attack, disease, weeds, rising water tables, salinity, inappropriate fire management, unsustainable firewood gathering or neglect <<http://www.environment.gov.au/land/vegetation/index.html>>.

The loss of native vegetation is closely associated with impacts such as:

- declining conservation status of species and ecosystems;
- reduced stability of soils, changed hydrological balances; or
- declining quality of surface water.

Mapped information on the distribution of native vegetation is important in planning for biodiversity conservation, as well other natural resource management planning (e.g. the NLWRA used the percentage of remaining native vegetation to establish the severity of fragmentation [NLWRA 2001, pp. 113–116]). Fragmentation information can be used to identify native vegetation patches that are important for regional conservation and areas that are a priority for rehabilitation. Native vegetation extent also has strong links to salinity and water quality management and the provision of other ecosystem services.

## **3. Monitoring methodology**

This section describes the 'things which should be measured'. Measuring the extent of native vegetation usually requires the production and analysis of spatial information. Since the aim

of all resource condition indicators is to assist in the assessment of change, this indicator also details the required approach for the development of change information. Without a standardised approach to change assessment it would be impossible to ensure that reporting is consistent across the country.

The monitoring components required for this indicator are:

- baseline information for a point in time on the extent of present native vegetation and
- change information on the extent of present native vegetation at intervals from the baseline year.

*Baseline information* should cover the broadest possible geographic range (ideally the whole area of interest) and documents the presence of native vegetation at a particular time. The *baseline* is the benchmark against which change can be determined following subsequent re-measurement and comparison. Baselines may be updated at appropriate intervals if new information becomes available, resulting in the creation of new baselines against which change can be measured. All baseline information should be clearly identified for the year it represents as well as recording the year in which it was measured and mapped.

*Change information* is generated from comparison of a new measurement against the baseline. If mapping resources are limited, change information may be restricted to those areas which have undergone potential change. The dates of the datasets (the year they represent as well as the year they were created) should always be clearly identified.

This chapter sets out the required approaches to information gathering for this indicator. Minimum requirements are identified as ‘required’ with some activities being identified as ‘preferred’. The intent is to set out the best practice or optimal approaches recommended for implementation.

### **3.1 Monitoring location selection (scale) (currency)**

Monitoring extent of native vegetation should cover the entire area of interest with change detection focusing on those areas of potential change if monitoring resources are restricted.

As this indicator is concerned with measuring the area of native vegetation, the scale of mapping is an important consideration. Mapping scale can determine the minimum size of mapped areas and can also affect area calculations due to the spatial definition (or resolution) of the objects being mapped. A patch of native vegetation mapped at 1:250 000 scale will look very different to the same patch mapped at 1:10 000 scale.

#### **Scale of mapping Required**

The scale of mapping of the extent of native vegetation should reflect the characteristics of the remnant vegetation (variability in structure and type, degree and nature of fragmentation, etc). As a guide, scales of mapping should be:

- 1:25 000 or better in metropolitan areas, wetland and riparian zones, and for native vegetation types with specialised habitat or which occur in small or fragmented areas;
- 1:100 000 (preferably 1: 50 000 or better) in the intensive land use or agricultural zone; and
- at least 1:250 000 (or preferably 1:100 000) in the extensive rangelands and pastoral zones.

The suggested scales relate to the scale of mapping and/or reporting products, not the scale of data collection and capture which is usually finer.

Mapping at the suggested scales is important for target setting across the region. These thresholds also define the scale of data sets required for regional planning and management. Greater detail is required in areas with intensive land use and clearing. The majority of the decisions relating to natural resources and environmental management are made in these areas. They include key areas for biodiversity loss, dryland salinity, soil erosion, urban expansion and the degradation of key ecosystems such as rivers and estuaries. As a general rule, less detail and precision is required for vegetation information in the extensive land use zone (or rangelands NLWRA 2001b) either because there have been fewer human impacts or the areas are remote and not as intensively used.

Mapping at these scales across a region reflects current thinking about the appropriate scales for native vegetation mapping for regional scale planning and on-ground planning and management. Mapping at 1:25 000 scale for riparian vegetation is recommended in the Riverine Vegetation Mapping Scoping Study (Sinclair Knight Merz 2000).

### **Currency of mapping**

The establishment of baseline information on the extent of native vegetation should occur at the beginning of an investment program so that future assessments of the effectiveness of activities can be undertaken. An appropriate baseline is critical to enable regional and on-ground planning and management to be based on the most current and practical methods of mapping. Techniques to map the extent of woody vegetation are well established (NLWRA 2001a). Approaches to mapping and monitoring the extent of grasslands and open woodlands generally require more intensive and often field based techniques. Further development of such techniques has been identified by ESCAVI as an issue for future work.

### **Required**

Currency of mapping should be at least within two to three years of the reporting date as some removal of native vegetation can occur in relatively short time periods (Note: this is not the Monitoring Frequency – this is discussed under section 3.2 below). In areas of high clearing activity this reporting should be supplemented by information on the likely areas of clearing in the two to three year period. This could include evidence such as clearing permits or expert opinion and targeted reconnaissance mapping. In areas of little clearing or with clearing controls, an update of the extent of native vegetation based on an assessment of clearing permits or other information and current land use and land management practices could be used.

### **Preferred**

Ideally the currency of extent mapping should be within only one to two years before the date of reporting. In areas of high clearing activity this should be supplemented by information on the likely areas of additional clearing in that one to two year period. This could include evidence such as clearing permits or expert opinion and targeted reconnaissance mapping. In areas of little clearing or with clearing controls, an update of the extent of native vegetation based on an assessment of clearing permits or other information, in particular whether clearing within areas with permits has been undertaken, and current land use and land management practices could be used. A full coverage of the region may not be required. A targeted approach based on areas of expected change or areas of specific investment may provide adequate information to meet reporting requirements.

## **3.2 Monitoring frequency**

### **Required**

Measurement of the current extent is required at least every three years, unless there is long term evidence and broad acceptance that clearing of native vegetation has ceased in the region. In such regions five yearly measurements and monitoring is required.

IBRA sub-regions in which clearing rates are known to be relatively high should be monitored every 12–18 months.

The frequency of reporting change in the extent of native vegetation should be informed by an understanding of the prevalence of drivers of change. Regions where change is understood to be more rapid need to report more frequently than those where clearing is a less critical NRM issue. The National Land & Water Resources Audit's Landscape Health Assessment provides an example, for Queensland only, of information on recent trends in land clearing rates (NLWRA 2000)

<[http://www.anra.gov.au/topics/vegetation/pubs/landscape\\_health/landscape\\_health\\_contents.html](http://www.anra.gov.au/topics/vegetation/pubs/landscape_health/landscape_health_contents.html)>. The Audit also reports the latest available information on the extent of native vegetation through Australia's Resources Online <[www.anra.gov.au/aro](http://www.anra.gov.au/aro)>. Other reports such as state of environment reporting may also indicate areas where more frequent monitoring should be applied. Where possible, measurement and reporting should be coordinated with State and Territory state of environment reporting processes.

### **3.3 Data measurement method**

Assessment of change from a baseline will usually be based on the comparison of new extent information with previous measurements. Alternatively, limited mapping, focusing on particular areas where change is known to have occurred, may be carried out and used to detect change against a previous baseline. For either approach, the following requirements apply.

#### **Required**

Remote sensing classification and analysis methods (digital and manual techniques) including use of:

- aerial photography;
- satellite imagery; and possibly
- videography.

The use of these methods will result in various scales of mapping and the detection of different components of the native vegetation. Choice of methods and techniques will therefore be dependent on the scale of mapping required and the type of native vegetation being measured but must result in the mapping of all native vegetation (including open woodlands and grasslands).

This mapping should be supplemented with site survey data, clearing permits, photo points, observational data targeted on areas of non-woody vegetation and on areas of known change within vegetation types of particular significance. In most instances, local expertise and knowledge will need to be used. Published mapping projects using accepted methods with accuracy and quality assessment are required to ensure that the method can be repeated to allow for real on-ground changes to be detected.

## **Preferred**

In addition to the required elements above, it is preferable that any local mapping exercises should undergo a peer review or critique process including independent field validation to assess their compatibility with state agency processes and data.

### **3.4 Data collation / calculation method**

The mapping of native vegetation extent at two or more dates allows an assessment of the changes (positive and negative) from the baseline of the extent of present native vegetation. This enables either the loss (through clearing, thinning or other events) or addition (through rehabilitation, regrowth and other events) of the extent of native vegetation from the baseline to be determined.

The determination of change in the present extent of native vegetation is made by comparing baselines of area-based data derived from area-based mapping. This comparison will usually require significant expert analysis and interpretation.

There are a number of attributes to consider in the mapping of the extent of present native vegetation. These comprise the scale, currency and method of mapping and the definition of native vegetation which will define the outer limit of the vegetation to be mapped.

## **Required**

The change of the extent of native vegetation from the baseline should be calculated for each date mapped from the baseline and labeled with the type of change (positive or negative). This is achieved by intersecting the data for the baseline and subsequent date by sub-region. A manual interpretation of the changes in some areas may be required where mapped data are unavailable and could be supported by the use of targeted repeat imagery and photo points. Final data sets for each date (baseline and subsequent dates and change layers) should be documented to the ANZLIC metadata standard (see section 3.5).

## **Preferred**

The cause of change and changed land use or land management (one selection in each category) should also be recorded, according to the following four categories.

### **1. Type of change**

- Native vegetation changed to non-native vegetation (negative)
- Non-native vegetation to native vegetation (positive)
- No change (stable)

### **2. Cause of change**

- Clearing for agriculture
- Conversion for agriculture
- Plantation establishment
- Revegetation
- Land abandonment
- Pest or disease invasion
- Farm tree planting
- Urban and/or infrastructure development

- Salinity
- Other (please specify)

### 3. Land use change

For land use change refer to the Australian Land Use and Management (ALUM) Classification which is available through [http://adl.brs.gov.au/mapserv/landuse/alum\\_classification.html](http://adl.brs.gov.au/mapserv/landuse/alum_classification.html). Use level 2 of the classification from the latest version 6 to classify prior and current land uses (e.g. from 'nature conservation' to 'grazing modified pastures').

- From one ALUM class (Version 6) to another class
- No change

### 4. Source and reliability of information (examples listed)

- Published/unpublished
- Map-based / non-map-based
- Local knowledge
- Expert opinion

An analysis of threats to the native vegetation could also be recorded and may act as a trigger to identify issues in the region and target management actions.

### 3.5 Data storage and management

The relevant State and Territory agencies should be consulted on the storage and management issues for vegetation data to ensure consistency with their information systems and compatibility with the National Vegetation Information System (NVIS) framework (see <http://www.environment.gov.au/erin/nvis/about.html>).

All new data sets should be documented according to the ANZLIC standard for metadata (data documentation - see <http://www.anzlic.org.au/metadata/>) and registered in the appropriate jurisdictional node of the Australian Spatial Data Directory (ASDD – see <http://asdd.ga.gov.au/>).

Guidelines on best practice data and information management methods have been developed by the NLWRA and ANZLIC and published in the Natural Resource Management Information Toolkit (see <http://nlwra.gov.au/toolkit/index.html>).

### 3.6 Data analysis and interpretation

ESCAVI has recognised the need for collection of vegetation data to accord with existing State and Territory processes, to ensure consistency in target setting between regions and to allow compilation of monitoring data for higher level reporting. State and Territory governments have legislative responsibility for mapping native vegetation and have long-established mapping programs which are integrated with the NVIS through the coordination of ESCAVI.

Responsibility for collection of data in accordance with this indicator rests primarily with State and Territory agencies. Other major sources of vegetation data often not incorporated into State mapping are from local councils, environmental impact statements, privately funded surveys and data collection on Australian Government lands. Regions should consult with State and Territory agencies concerning the appropriateness of using information from such sources as a basis for measurement under this indicator.

ESCAVI is currently coordinating a program to implement a standardised national approach to vegetation survey and mapping within each State and Territory. This builds on the work undertaken by the NLWRA in establishing NVIS. This program has progressively been implemented with an operational system for Australia-wide reporting now largely established. Data on the extent of native vegetation will eventually be incorporated with other vegetation mapping and compiled from all States and Territories to update the NVIS database.

### **3.7 Reliability, validity and quality assurance**

This section describes steps which must be taken to help satisfy end users and stakeholders that the information on which target setting and monitoring is based is as reliable as possible.

#### **Required**

When collecting data under this measure regions should document:

- all methods of data collection, collation and analysis;
- rules or models used;
- sensitivities of techniques and limitations on the use of the data;
- status of method used (such as whether it is published or has been peer reviewed for the application); and
- the degree to which the 'required' parts of this measure have been met.

Maintaining a link to the source information for each polygon is also essential. This is important in subsequent analyses to ensure that it is clear where data are collated from vegetation mapped at different dates using different methods.

## **4. Reporting / information products**

### **4.1 Audiences**

As for all indicators, NRM regional bodies and their stakeholders will be key users of the information generated through this protocol. Project staff seeking an improved basis for planning vegetation management actions and assessing progress will be particularly interested. Policy makers at the state/territory and national levels will also be interested in this information, particularly for its capacity to contribute towards statewide and national pictures of vegetation change, as well as for its capacity to improve regional NRM planning. In most cases it is envisaged that state-based vegetation mapping and monitoring programs will be largely responsible for generation of information under this protocol.

Secondary users are expected to be industry groups, researchers, educators and the general public.

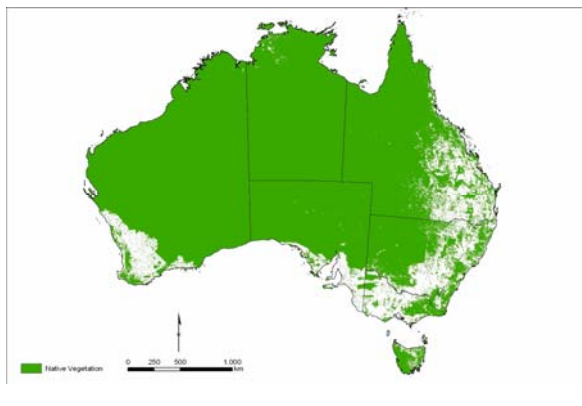
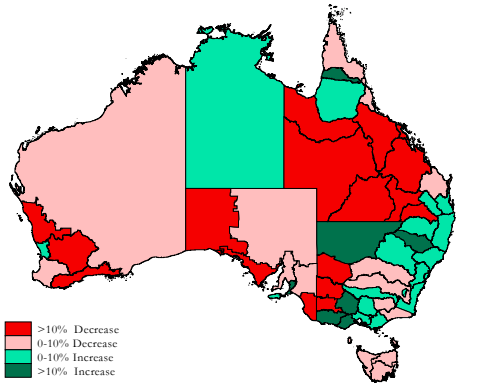
## 4.2 Products

Information products refer to a range of data and information in a format that helps decision makers to answer the particular questions they have. Information products can be raw data or derived data sets that have been integrated with other essential contextual or useful data. They can be presented as maps, tables, graphs or innovative visualisations.

### Maps and spatial data

- Maps of the extent and distribution of present vegetation showing native vegetation and IBRA sub-region boundaries – a map each for the baseline and each subsequent date mapped.
- Maps showing the areas of change to the extent of native vegetation (positive and negative) for each date mapped from the baseline.
- Maps describing causes of change for areas where change has occurred.

### Examples

	
<p>Map of extent of native vegetation derived from data collated in NVIS (2004)</p>	<p>Map of percent increase/decrease in net woody forest extent between 1972 and 2004 for 56 NRM regions (Source: analysis of NCAS data in McDonald &amp; Pinner, NLWRA 2007).</p>

## Tabular information

- Extent of present native vegetation by IBRA sub-region in hectares for baseline and each subsequent date mapped. The area of native vegetation as a percentage of the total area of the IBRA sub-region can also be shown.
- Area of change between each date from the baseline measured in hectares (separate reporting for periodical and cumulative change).
- Type, cause and land-use for each area of change recorded.
- Graphs showing trends in extent for each IBRA sub-region over time

### Example

Region_ID	Date_of_Reading	Date_of_Publish	Extent (Ha)	Total Area (Ha)	%	Class
Australia	2004	2008	655,588,226	769,020,814	85	1
ACT	2004	2006	133200	243,151	55	2
NSW	2004	2006	48895181	80,838,173	60	2
NT	2004	2007	132,421,716	134,313,828	99	1
QLD	1997	2006	142,291,344	172,939,770	82	1
QLD	1999	2006	141,404,233	172,939,770	82	1
QLD	2000	2006	140,771,382	172,939,770	81	1
QLD	2001	2006	140,546,799	172,939,770	81	1
QLD	2003	2006	139,819,766	172,939,770	81	1
SA	2004	2007	84,416,131	98,432,191	86	1
TAS	2005	2007	5,044,200	6,865,400	73	2
VIC	2005	2008	10,569,891	22,687,003	47	3
WA	2004	2007	234,288,141	252,701,298	93	1

Source: collation of state and territory native vegetation extent baseline (circa 2004) statistics, NLWRA 2008.  
Note – data supplied by individual jurisdictions is subject to their own definition of native vegetation.

## Documentation

- On mapping, measurement methods and sources of information including metadata.
- On the causes of changes to the extent of native vegetation.

### 4.3 Confidentiality

Reporting based on this protocol is not expected to precipitate confidentiality issues over and above those that might arise through existing state/territory approaches to vegetation mapping and monitoring.

#### **4.4 Data collation/calculation method**

Information products may require the collation and analysis of a number of data sets. The details of the source data and the processes used to create the products should be documented.

- List and document available sources of information.
- Assess each data set against requirements for suitability for use.
- Identify data and information gaps, determine priorities (eg. risk assessment) and assess methods to fill gaps.
- Fill gaps. Where gaps cannot be filled identify an alternative strategy or timeline.
- If multiple sources of data, collate the various data into a single or a series of spatial data sets for each date, ensuring that the most accurate data are used across the region. Maintaining a link to the source information for each mapped feature is critical (e.g. if data are collated from vegetation mapped at different dates using different methods this should be noted).
- Intersect the baseline and each subsequent date of the extent of native vegetation mapped with the IBRA sub-regional boundaries for calculations of extent by sub-region by hectares within the region of interest.
- Document final data sets for each date (baseline and subsequent dates) to the ANZLIC metadata standard.

Note: A native vegetation extent baseline composed from a variety of mapped sources will need to be used with care when assessing changes in the extent of native vegetation. A lack of information about particular vegetation types, e.g. riparian, may require expert interpretation.

#### **4.5 Data analysis, integration and interpretation information**

Sections 3.3 to 3.7 above set out requirements for developing information under this protocol. As evidenced in those sections, the process of scaling up from site scale to landscape-wide maps of vegetation involves considerable data analysis, integration and interpretation. As a consequence, the reporting products for this indicator are already post-analysis and contain significant interpretation of site and remotely sensed information. They are readily useable in NRM planning and reporting, although it can be expected that some additional interpretation will be required, particularly in relation to causality of detected changes.

#### **4.6 Data access and storage**

Information collected through this indicator should accord with existing state/territory based vegetation mapping activities. Where governments have invested public money in the preparation of data and information against this indicator there is a reasonable expectation that this information should be made publicly available and accessible. Notwithstanding this, there may be cases where the public interest is not served by providing access to detailed information, for example the location of rare species which may be targeted for illegal collection.

In most cases, State/territory agencies will be closely involved with the NRM regions application of this protocol. Data should be incorporated into the relevant state or territory-wide datasets and made available nationally via the NVIS and Australia's Resources Online.

#### **4.7 Product definition statement**

The primary information products generated using this protocol will be regional maps and tables showing the extent of native vegetation, intersected with IBRA regions/subregions. Individual products should have an associated product definition statement as per Appendix A

so that their source data, analysis process and usage can be easily understood.

## **5. Current national activities**

The assessment of the extent of native vegetation complements and builds on a number of existing government activities, including:

- The Audit and BRS have worked together with states and territories, through ESCAVI, to develop a national 2004 baseline of the extent of native vegetation (as defined individually by each jurisdiction). This will be reported by the Audit through Australia's Resources Online and by BRS in the national Vegetation Assessment 2008 (in prep).
- extent of native vegetation is one of the core attributes that have been developed for the State of the Environment Reporting (ANZECC State of the Environment Reporting Taskforce 2000, see *Biodiversity Indicator 7*);
- the *National Framework for the Management and Monitoring of Australia's Native Vegetation* has been developed by the Australian Government, State and Territory governments (NRMMC 2001);
- extent of native forests is reported in the Indicators of Sustainable Forest Management (Montreal Process Implementation Group 1998); and
- Australian Greenhouse Office has developed the National Carbon Accounting System which includes satellite monitoring of changes in woody forest vegetation, <<http://www.greenhouse.gov.au/ncas>>.

## **6. Future development**

This protocol is considered sufficient to guide the generation of nationally consistent native vegetation extent data for use in NRM regional planning. Future updates may be required in response to user feedback and reviews of progress in vegetation management at the NRM regional level.

## **7. Links to other indicators**

Information from this indicator heading will contribute to an understanding of native vegetation ecosystems and the management actions necessary to maintain biodiversity. Data from these measures should provide input to, be linked to and be interpreted in conjunction with the related protocols for the following indicator headings:

- native vegetation condition;
- river condition;
- wetland ecosystem extent and distribution;
- wetland ecosystem condition;
- estuarine, coastal and marine habitat extent and distribution;
- estuarine, coastal and marine habitats condition;
- selected significant native species and ecological communities extent and conservation status; and

- selected ecologically significant invasive species extent and impact.

## 8. Further information

Further information on native vegetation data, relevant to this indicator, can be found at the following sources:

- Summary data products from the *Australian Native Vegetation Assessment 2001* (NLWRA 2001) are available from the Australian Natural Resources Atlas <<http://www.anra.gov.au>>.
- The ‘map-maker’ tool from the Australian Natural Resources Atlas <<http://www.anra.gov.au/mapmaker>> can be used to map estimated pre-1750 and present major vegetation groups.
- Summary native vegetation data for Australia can be downloaded from the Australian Natural Resources Data Library <<http://adl.brs.gov.au/anrdl/php/>> and the Australian Government Department of the Environment Heritage and the Arts Environmental Data Directory <<http://www.environment.gov.au/erin/edd>>
- Detailed data are available from State and Territory data custodians.
- Other data on native vegetation can be found through the Australian Spatial Data Directory <<http://www.auslig.gov.au/asdd.html>>
- Australian Government national *State of the Environment* reports available from <<http://www.environment.gov.au/soe/index.html>>
- Australian Government national *State of the Forests* reports available from <<http://www.daff.gov.au/forestry>>

## 9. References

- Australian and New Zealand Environment and Conservation Council (ANZECC) State of the Environment Reporting Taskforce 2000, Core Environmental Indicators for Reporting on the State of the Environment, Environment Australia, Canberra, <[www.ea.gov.au/soe/publications/coreindicators.html](http://www.ea.gov.au/soe/publications/coreindicators.html)>.
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- Montreal Process Implementation Group 1998, A Framework of Regional (subnational) Level Criteria & Indicators of Sustainable Forest Management in Australia, <[www.affa.gov.au/corporate\\_docs/publications/pdf/forestry/sustainability/national/framework.pdf](http://www.affa.gov.au/corporate_docs/publications/pdf/forestry/sustainability/national/framework.pdf)>
- National Land and Water Resources Audit (NLWRA) 2000, Landscape Health in Australia, National Land and Water Resources Audit, Canberra, <[http://audit.ea.gov.au/ANRA/vegetation/docs/landscape\\_health/Landscape\\_Health\\_Contents.html](http://audit.ea.gov.au/ANRA/vegetation/docs/landscape_health/Landscape_Health_Contents.html)>.
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## 10. Glossary

### **ANZLIC metadata standard**

Minimum requirements for metadata to be included in the Australian Spatial Data Directory.

### **Australian Land Use and Management classification**

A national land use classification system that enables land use information to be collected systematically for a wide range of potential users across Australia. Refer to Australian Land Use Management (ALUM) Classification and use level 2 classes from the latest version 6 to classify prior and current land uses (eg from ‘nature conservation’ to ‘grazing modified pastures’).

### **ESCAVI**

The Executive Steering Committee for Australian Vegetation Information. Includes representatives from all States and Territories and the Australian Government and guides the maintenance and ongoing development of the National Vegetation Information System (NVIS), including the further development of standards for the extent of vegetation information collection and storage.

### **Estimated pre-1750**

The term ‘estimated pre-1750’ has been agreed by the Executive Steering Committee for Australian Vegetation Information (ESCAVI) to encompass the range of different terms and definitions used by different jurisdictions (e.g. pre-European, pre-intensification, pre-disturbance etc).

### **IBRA sub-region**

Interim Biological Regionalisation of Australia sub-regions provide a valuable bioregional context for mapping and reporting the extent of vegetation. The focus of this measure is primarily on the mapping and reporting of the extent of native vegetation and no detail on IBRA datasets is provided in this measure. IBRA sub-region data and detail on this mapping is available through The Australian Government Department of the Environment, Heritage and the Arts.

### **Native vegetation**

Different State and Territory vegetation mapping programs currently use different definitions of ‘native’. *Appendix A* provides a summary of the definitions used in each jurisdiction.

### **Native Vegetation Information System (NVIS)**

Defines an agreed framework and guidelines for collecting, compiling and monitoring Australia’s vegetation. The NVIS also comprises a data system which provides a common basis for analysing and reporting vegetation data, and stores information on the status of Australia’s native vegetation.

### **NVIS classification hierarchy**

A hierarchical classification, defined in the NVIS framework, for describing the floristic and structural attributes of Australia’s native vegetation. The hierarchical classification has six levels (I – VI) from class to sub-association.

### **Priority native vegetation types**

Priority native vegetation types are those vegetation types identified by the region as priorities for target setting. Ideally they should be determined from comprehensive information on the extent and distribution of all vegetation types. It is recognised that regions differ in the availability of information and will determine priority vegetation types through a range of means.

### **Vegetation type**

Vegetation types refer to the structural and floristic classification of native vegetation and should be classified to at least NVIS Level V (vegetation association) or equivalent.

## Appendix I: Information product template (V2.2)

<b>Information Product Name</b>		
<b>Product ID or reference number</b>	Jurisdiction, agency or custodian's reference number if applicable.	
<b>URL for product metadata</b>	A webpage reference to where more comprehensive details of the product are recorded.	
<b>Jurisdiction</b>		
<b>Custodian</b>		
<b>Contact details</b>	Relevant person, position, branch/unit/section, location and phone, email contacts.	
<b>Relevant Matter for Target</b>	Which NM&EF Matter for Target does this product relate to?	
<b>Relevant National Indicator</b>	Which NM&EF Indicator(s), if any, does this product relate to?	
<b>Relevant State/Territory Indicator</b>	Which State/Territory Indicator(s), if any, does this product relate to?	
<b>Description</b>	Provide a brief description of the product including the purpose and the output file format.	
<b>Source data name and ASDD link</b>	Name all the source dataset(s) used to produce the product. Provide references to metadata for source datasets used. This should be either the ASDD metadata reference or other URL. If any source dataset is not already described to ASDD Page 0 standard, please complete the accompanying template.	
<b>Source data attributes used</b>	Please list the attributes used from each of the source datasets to produce the information product.	
<b>Processing of source data</b>	Please describe the steps taken in processing and combining the source data to produce the information product.	
<b>Status</b>	What is the current status of the product? If the product is "In progress" or "Is planned", please complete as many of the remaining descriptors as are known.	<ul style="list-style-type: none"> <li>a. Currently exists</li> <li>b. In progress</li> <li>c. Is planned</li> </ul>
<b>Coverage</b>	How much of the State/Territory distribution of the resource (or applicable part of the State/Territory) is covered by the product?	<ul style="list-style-type: none"> <li>a. 80-100%</li> <li>b. 50-80%</li> <li>c. 20-50%</li> <li>d. 0-20%</li> </ul>
<b>Recency</b>	What is the age of the dominant contributing data?	<ul style="list-style-type: none"> <li>a. 2005-2000</li> <li>b. 2000-1995</li> <li>c. 1995-1985</li> <li>d. 1985-1970</li> <li>e. 1970-1950</li> <li>f. &lt;1950</li> </ul>

<b>Trend</b>	Does the dataset support trend interpretation?	<ul style="list-style-type: none"> <li>a. Sequence (e.g. river flow, rainfall)</li> <li>b. Multiple (few) (e.g. land use 1990 &amp; 2000)</li> <li>c. Single (e.g. soil type)</li> </ul>
<b>Usability scale</b>	What is the finest resolution that maintains confidence in the product, i.e. not to be used at 1:100,000 or less.	<ul style="list-style-type: none"> <li>a. Local</li> <li>b. Regional</li> <li>c. State</li> <li>d. National</li> </ul>
<b>Availability</b>	What is the public availability of the product? Is a licence required for outside users?	<ul style="list-style-type: none"> <li>a. Open</li> <li>b. Restricted/licence</li> <li>c. Closed</li> </ul>
<b>Delivery</b>	How is the product best delivered?	<ul style="list-style-type: none"> <li>a. Web Services</li> <li>b. Digital data</li> <li>c. Electronic document</li> <li>d. Paper document</li> </ul>
<b>Content type</b>	What type of information does the product represent?	<ul style="list-style-type: none"> <li>a. Real data</li> <li>b. Mixture of real &amp; modelled data</li> <li>c. Modelled data</li> </ul>
<b>Update</b>	What will be the frequency of update for the product?	<ul style="list-style-type: none"> <li>a. Frequently</li> <li>b. At least once/planned</li> <li>c. Not planned/unknown</li> </ul>
<b>Other relevant information</b>	Please add any other important information relevant to this information product that should be known.	