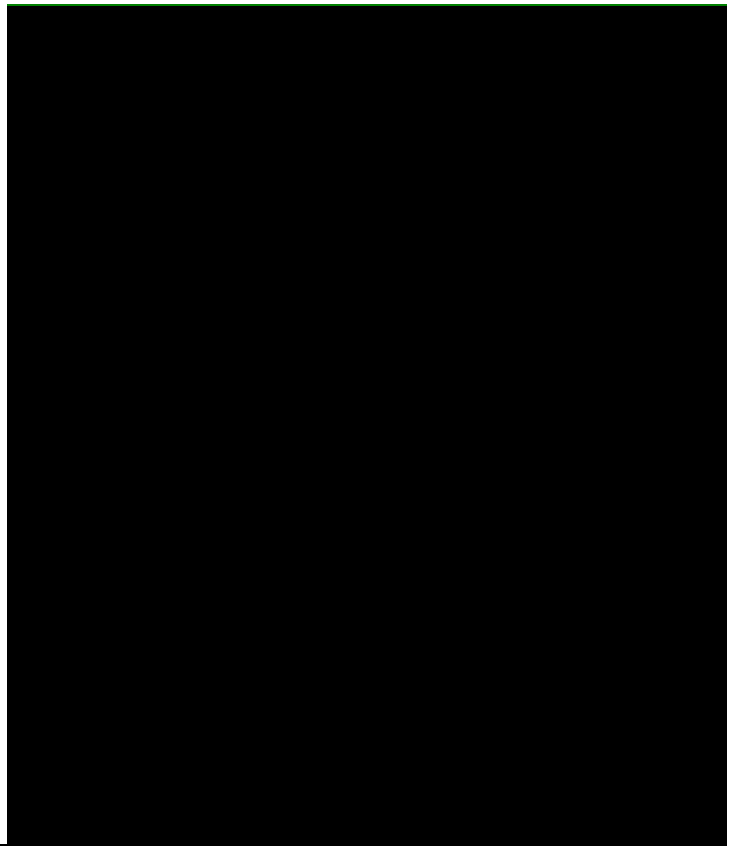

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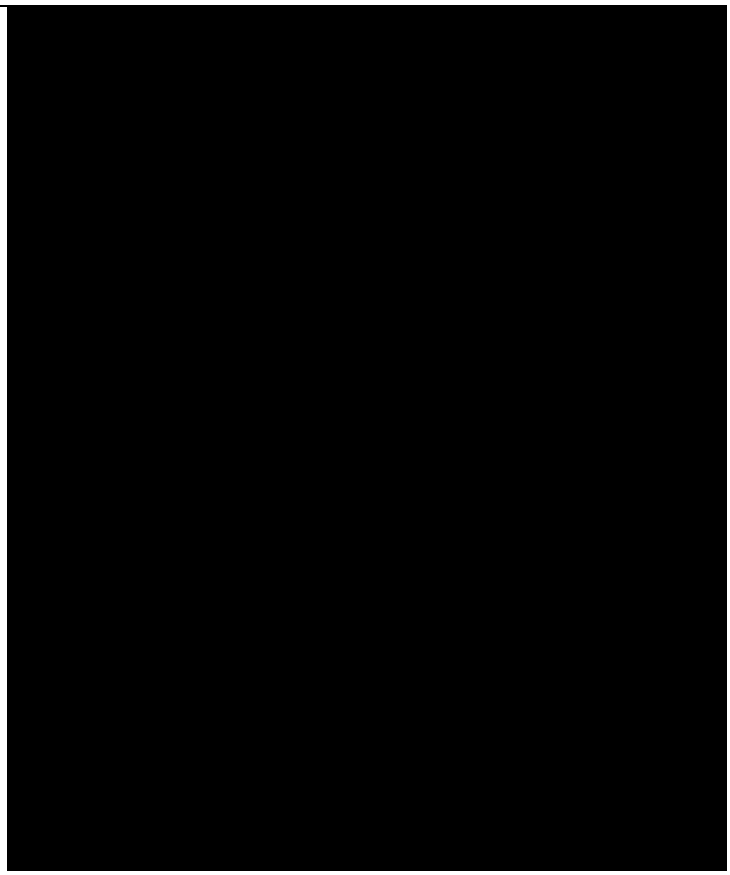
CRA DATA MANUAL

A report undertaken for the NSW CRA/RFA Steering Committee

11th May 1998



CRA DATA MANUAL

CRA/RFA DATA MANAGEMENT GROUP

A report undertaken for the NSW CRA/RFA Steering Committee
project number NA 19/MUL

11th May 1998

Report Status

This report has been prepared as a working paper for the NSW CRA/RFA Steering Committee under the direction of the Data Management Group. It is recognised that it may contain errors that require correction but it is released to be consistent with the principle that information related to the comprehensive regional assessment process in New South Wales will be made publicly available.

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

Resource and Conservation Division, Department of Urban Affairs and Planning

GPO Box 3927
SYDNEY NSW 2001

Phone: (02) 9228 3166
Fax: (02) 9228 4967

Forests Taskforce, Department of the Prime Minister and Cabinet

3-5 National Circuit
BARTON ACT 2600

Phone**:** 1800 650 983
Fax: (02) 6271 5511

This project has been jointly funded by the New South Wales and Commonwealth Governments. The work undertaken within this project has been managed by the joint NSW / Commonwealth CRA/RFA Steering Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

The project has been overseen and the methodology has been developed through the Data Management Group which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

The efforts of Jane Andrews and John Chu in developing the Manual are gratefully acknowledged.

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FIGURES and TABLES

1.0 INTRODUCTION

1.1 Background

The broad parameters for undertaking Regional Forest Agreements (RFA) between the Commonwealth and State Governments are set out in the Scoping Agreement signed on 25 January 1996. The Scoping Agreement adopts the requirements of several documents. These include the Intergovernmental Agreement on the Environment (IGAE), the National Forest Policy Statement (NFPS), the JANIS Criteria, the NSW Wilderness Act and the National Strategy for Ecologically Sustainable Development (NSESD).

The Scoping Agreement specifies the broad objectives of the RFA process as ensuring:

- the protection of conservation values;
- the basis for long term ecologically sustainable management of forests;
- the basis for an internationally competitive forest products industry; and
- the effective use of other economic and social resources of the regions.

The Comprehensive Regional Assessment (CRA) process brings information on environmental, economic and social values together in order to meet these objectives, leading to an RFA.

The CRA Data Management Group, comprising information professionals from NSW Department of Land and Water Conservation (DLWC), State Forests of NSW (SFNSW), NSW National Parks and Wildlife Service (NPWS), Bureau of Resource Sciences (BRS), Environment Australia, as well as non government organisation representatives, coordinates the development and implementation of standards and guidelines for the management and use of data for all CRAs in NSW.

There is a clear need for communication on common information issues during all phases of the CRA process. It is important that resources are not wasted in duplication of effort in obtaining and/or producing data. The CRA Data Manual has been developed by the Data Management Group as a means of communicating information on data issues common to all CRA Technical Committees, Project Managers and involved agencies.

1.2 CRA Data Manual

The CRA Data Manual contains information on specifications, guidelines and standards for data including:

- metadata
- spatial data standards
- spatial referencing standards
- data transfer standards.

In addition, to assist in clarification on the use and limitations of the Manual, included are overviews of various data processes involved in each CRA/RFA. These are:

- data integration (Section 2.1)
- the data audit process (Section 2.2)
- process for data supply (Section 4.0)
- process for data distribution (Section 5.0)
- process for data updates (Section 6.0)
- data archive (Section 11.0)
- data access (Section 12.0).

Some of these processes are the subject of more detailed documentation elsewhere. For example, data audit is detailed in the Data Audit Process Document Outline (Attachment 2); and data access and the RFA Data Archive are more fully described in CRA/RFA Data Access Principles, New South Wales (Attachment 3). More detailed information on data integration is contained in the Eden Integration and Options Development Manual.

2.0 KEY DATA INTEGRATION AND INFORMATION ISSUES

The CRA Data Management Group has identified a number of key issues which should be taken into consideration by Project Managers developing datasets for inclusion in the CRA/RFA process.

At the time of writing, the first NSW RFA is being negotiated i.e. the RFA for the Eden region. Several issues have been highlighted as a result of the Eden RFA integration exercise. In particular, it is crucial that there be a clear understanding of what data are required, and in what capacity/context a given dataset is required. Further, datasets must be useable and datasets must be properly documented.

Some of the problems arising during the Eden experience may be attributed to an incomplete understanding of exactly what is required to feed into the data integration process. Other problems were associated with inadequate adherence to data audit procedures, and especially with inadequate data documentation.

Before expanding on key data integration and information issues, a brief overview is presented of the data audit and data integration processes.

2.1 The Data Audit Process

Before a dataset is deemed acceptable for use in the CRA/RFA process, it must be "accredited" with respect to minimum data quality requirements and agreed standards for the purpose for which the dataset is to be used.

Each data-generating project requires:

- the development of a full project scope and proposal
- project approval by the relevant technical committee
- progressive documentation of scope items/tasks
- acceptance of the final project report by the Joint Steering Committee or its delegate.

At the outset, it is most important that the project scope ensures that the project has a *data audit* component.

As it relates to the CRA, the data audit process is detailed in the Data Audit Process Document Outline (included at the end of this manual as Attachment 2). Briefly, data audit involves the review of existing data to assess its quality, integrity and suitability for use for a particular purpose. Further, the review identifies gaps in existing information which might necessitate additional survey and assessment. Some projects may have several iterations of a data audit (e.g. flora and fauna survey), and this should be indicated in the approach detailed in the project proposal.

Data Auditing Reporting

The Data Audit Process Document Outline outlines three components of data audit reporting, namely:

- identification of data gaps;
- documentation of data (i.e. the compilation of *metadata*); and
- assessment of data utility and recommendations (i.e. an assessment of the ability of the data to be used in other projects).

The project proposal should be developed with full consideration of the data audit process report. Only on completion of a data audit process/report will any data/data layer be deemed accredited by the Joint Steering Committee for the CRA/RFA process.

2.2 Data Integration

Integration is broadly defined as that stage of the Regional Forest Agreement process following the Comprehensive Regional Assessments where the outputs of all the assessments are combined and linked with other technical and policy information. These are then used to develop and evaluate a range of land use and management options.

For each study area in the RFA process, the Steering Committee will agree on what data sets (draft and final) will be required to enable the RFA to be developed. These assessment data will usually comprise source and derived data, such as modelled data, classified data and/or aggregated data processed from source data. For example, fauna and flora models, woody/non-woody cover and the planning unit layer. Some data may also be required to provide context for options development. Data required may be spatial/non-spatial, digital/non-digital, tabular or textual.

The core of the integration process will be Geographic Information Systems (GIS) based. GIS are computer based handling and display systems which process geographically coded information. GIS provide methods to manipulate data in a number of ways including storage, retrieval, overlay, comparison, and mathematical and statistical calculations. Arc/Info, a powerful GIS developed by ESRI, has been selected as the GIS “work-horse” for CRA integration exercises.

Interacting with the GIS will be a range of software programs which have been approved by the Steering Committee for use in the integration process, including C-Plan, FRAMES and FORUM. These programs are described in more detail in Section 9.2. The software is to be utilised within a logical framework where data will be displayed and analysed with appropriate feedback and interaction mechanisms. Non-digital data will also be used to inform decisions at key stages of the process. Figure 1 shows the logical relationships between the major elements of the decision and integration system.

Not all stakeholders have access to Arc/Info, so two other systems developed by ESRI may be used by participants at the options development stage:

- ArcView - a desktop GIS capable of data manipulation and analysis;
- ArcExplorer - not an analytical program, but available free via the internet and able to view and query GIS data.

For more information on the GIS and other programs approved for CRA use, refer to Section 9.2.

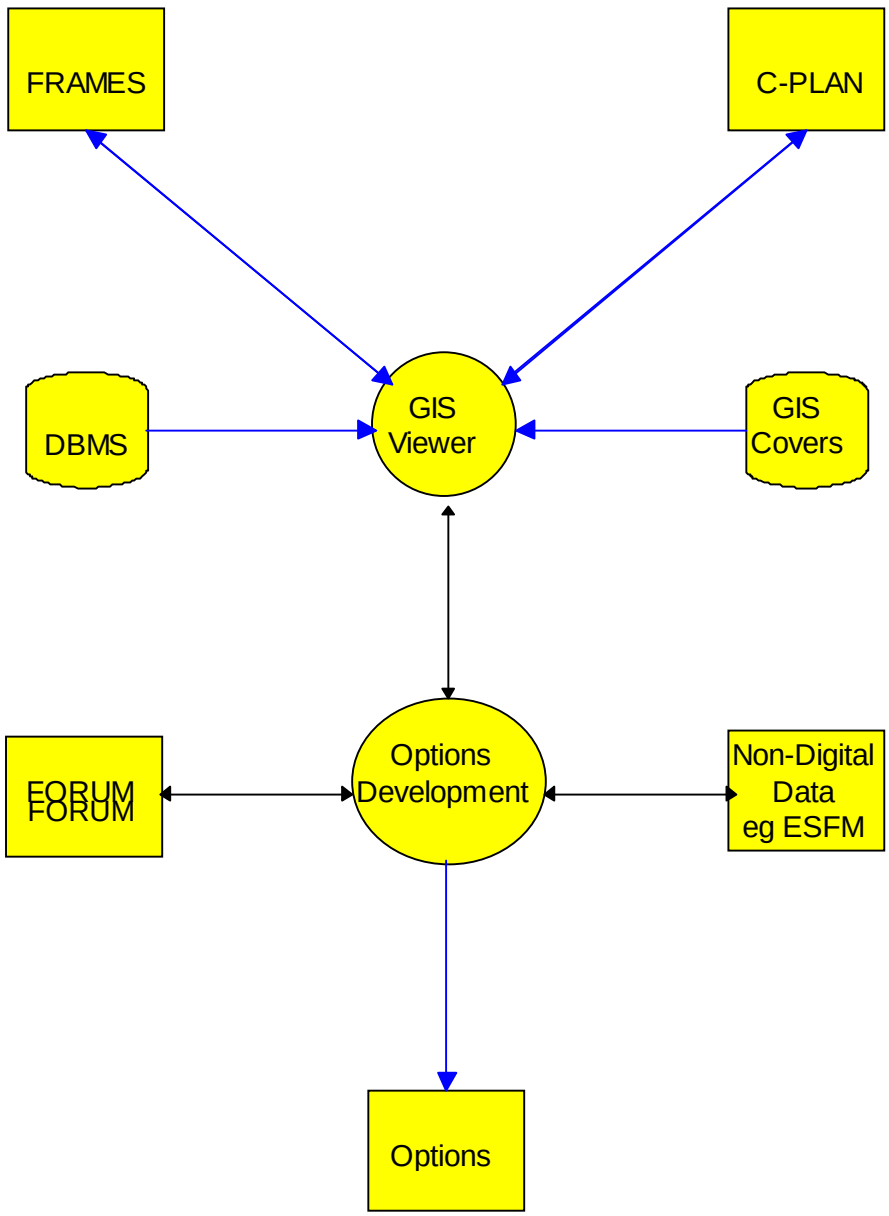


Figure 1: Decision and Integration System Logical Diagram

2.3 Key Issues

Define key datasets required for integration

There is a danger that much of the data provided to integration will not be as relevant as was anticipated at the project formulation stage.

In order for data to satisfy accreditation standards and be accepted for integration purposes, a number of criteria must be satisfied. In particular:

It is crucial that Project Managers understand what their project outcomes will be.

- Project proposals should clearly specify the project outputs.
- Project Managers should have a clear understanding of how output data will be used. Data for example, may be used in one of the software tools (e.g. species targets in C-Plan), as a document to inform options development, or a combination of these. A clear understanding is essential if Project Managers are to provide data in the format required at the time required.

Data dependencies between projects

Data links and dependencies with other projects, and the nature of those data links, should be specified in the project proposal. Without this information it becomes very difficult to manage projects which rely on data inputs from other projects.

Datasets must be useable

For example

- A dataset with 500 fields is too large to be useful.
- Project Managers should ensure that attribute lists and descriptions are included in the metadata.

Appropriate documention of datasets

- Intermediate datasets must be identified, and where intermediate products are distributed they must be accompanied by metadata.
- Metadata should be updated with each version of the dataset.
- Metadata should be compiled by the data generator.
- All fields should be filled in on the metadata proforma.

Compliance with spatial data standards, specifications, conventions

- Spatial data standards (Section 7.2). Project Managers should take care to avoid, for example, lack of topology, slivers or dangle errors, incorrect attribution, non-unique identifiers, etc.
- Spatial referencing (Section 7.3). For example Project Managers should ensure use of correct projection co-ordinates.
- Datasets should comply with the standards specified in the Manual for data transfer (Section 8).

- Datasets should comply with the naming conventions stipulated in the Manual (Section 9.5).

3.0 METADATA GUIDELINES FOR CRA DATA

3.1 What are Metadata and why document them?

Metadata are perhaps most simply defined as “data about the data”. A more formal definition is that metadata are descriptive information about the content, quality, condition and other characteristics of data that has been collected for a particular purpose.

Metadata are an important aspect of data maintenance and are important in providing information about data to potential users. When stored in a directory, metadata can inform potential users of, for example:

- the availability of a dataset on a particular subject and who to contact for the data;
- the limitations and accuracies of the dataset;
- the fitness of a dataset to meet a specific need;
- means of accessing a dataset; and
- information required for the processing and use of a dataset.

If potential users are ignorant of the existence of a dataset, or if there is insufficient information available to assess the suitability of the dataset, valuable resources may be wasted in reproducing data.

The need for data to be accompanied by quality documentation has been recognised for some time, both in Australia and overseas. Several agencies have developed guidelines for metadata content, for example the US Federal Geographic Data Committee (FGDC, 1994) and the Australia and New Zealand Land Information Council (ANZLIC, 1996). The ANZLIC guidelines form the basis for metadata documentation in the NSW CRA/RFA process.

Metadata contents can vary between datasets, depending on database design and the type of data being documented (e.g. digital/non-digital, spatial/non-spatial, etc). However, certain fundamental elements are suitable for most purposes, regardless of the type or level of data. These common elements include the key technical characteristics of the data, access conditions and procedures, and how to obtain further information.

3.2 How does metadata assist the CRA process ?

The need for information to support decision making is common across all projects and activities being undertaken within the CRA/RFA process. With the number of agencies and groups involved in the CRA process, the diversity of data generated across projects is immense. Datasets are not only valuable to the initial user but to other potential users both within the CRA/RFA process and beyond.

Metadata statements can assist Technical Committees and other data users to determine the availability and suitability of existing source data as well as derived information. Acquisition of data is made easier because a preview of the technical attributes is available before obtaining the actual data.

As the CRA progresses from region to region, it is important that all datasets imported and exported from CRA projects are documented. In this way, existing data can be used for

other purposes if they are suitable. This reduces duplication of effort and provides a technical standard for developing new datasets.

It is important that anyone involved in the CRA process who is planning to utilise source datasets for CRA projects should first acquire metadata:

- to allow proper assessment of the fitness of the source data for the projects(s); and
- to promote usage of the same dataset where two or more similar datasets exist. For example, where more than one DEM exists for a region, as a general rule all projects should use the same DEM.

A uniform approach to data documentation will ensure that all inputs to integration and options development are documented in a consistent manner according to the requirements of the RFA process. It will also ensure that version control during Integration is maximised.

3.3 NSW CRA/RFA metadata proformas

Two proformas have been created to document metadata during the CRA process: the NSW CRA/RFA Metadata Proforma (to document datasets), and the NSW CRA/RFA Software System Metadata Proforma (to document computer systems developed specifically for CRA projects).

The **NSW CRA/RFA Metadata Proforma** should be completed for all datasets used in the CRA/RFA process. It is essentially an expansion of the Metadata Guidelines developed by the Australia and New Zealand Land Information Council (ANZLIC, 1996) for spatial data. To ensure that metadata collected for the CRA process are consistent with the ANZLIC guidelines, all core elements from the ANZLIC guidelines have been retained. In addition, a number of fields have been created specifically for the CRA process. These additional elements were selected to increase the utility of datasets for use during the CRA process (especially during integration). In the summary of proforma fields presented in Table 1, additional elements have been marked with an asterisk (*). Please remember that the effectiveness of metadata is dependent on the completeness and integrity of the documentation. It is important that Project Managers ensure all applicable fields of the CRA metadata proforma are completed for each output dataset. Because the ANZLIC Metadata Guidelines were developed specifically for spatial datasets, some of the fields may not be relevant to non-spatial datasets. Where fields are not applicable to non-spatial datasets they should be marked N.S..

The **NSW CRA/RFA Software System Metadata** proforma has been developed to document computer systems developed specifically for CRA projects. The fields in the software system metadata proforma are shown in Table 2.

Please note that Tables 1 and 2 do not contain detailed descriptions of the requirements for proforma fields. Tables 1 and 2 are included at the end of Section 3 simply for clarification. More detailed information to help with the correct completion of Metadata Proformas is contained in Attachment 1.

3.4 Completing metadata proformas

It is essential that all persons who contribute data to the CRA process complete a metadata proforma for each dataset. In the case of data generated for the CRA/RFA, the metadata compiler should be the dataset creator. For a given project, the person nominated as Project Manager in the project specifications has responsibility for ensuring data documentation requirements for that project are met. Project data will not be approved until metadata statements are completed for all datasets associated with the project.

The Resource and Conservation Division (RACD) has established a database which contains all submitted metadata proformas from agencies and other groups providing data to the CRA/RFA process.

More detailed information to help with the correct completion of Metadata Proformas is contained in Attachment 1, comprising:

- **A.1.1 Guidelines for completing CRA/RFA Metadata Proformas**. The guidelines are set out as tables containing details of what is required to be documented in each proforma field.

- **A.1.2 CRA/RFA Metadata Picklists**. Some proforma fields require users to select elements from a predefined list.

- **A.1.3 Metadata examples from Eden CRA.** To assist in filling out the Metadata proformas, Attachment 1 contains worked examples of metadata proformas which were completed as part of the Eden CRA.

- **A.1.4 CRA/RFA Metadata Proformas** i.e. word document templates of the NSW CRA/RFA Metadata Proforma (for datasets), and the NSW CRA/RFA Software System proforma (for customised software).

If desired, the Metadata Proforma templates can be printed and used as rough working copies for draft versions of metadata. However, for completion of the ***final*** Metadata Proforma:

- In the case of the **Software System proforma *only***, the word document template should be filled in electronically.

- In the case of the **NSW CRA/RFA Metadata Proforma**, the template should ***not*** be used. Rather, the final metadata should be completed using one of two methods:

  i) **ANZLIC Metadata entry tool.** (Available from RACD - contact John Ross ph (02) 9391 2022); or

  ii) **Cradoco tool** (for Arc/Info data. Available from RACD - contact John Ross) Cradoco is a modification of the original Arcdoco tool developed by BRS. Arcdoco tool is a tool designed to facilitate the recording of metadata consistent with ANZLIC's Metadata Guidelines for Arc/Info coverages, grids, tins and images. It is written in Arc Macro Language (AML). The original AML was developed by NRIC, BRS and is now available on the web at the URL:
  http://www.nric.gov.au/download

BRS has modified Arcdoco to produce Cradoco which includes the expanded version of the core ANZLIC elements with additional CRA elements. The tool contains both interactive and automatic elements. Cradoco produces a text file that can be translated into HTML and read through Word, Netscape etc using a simple Perl script. It also produces Info files that automatically stay with and travel with the dataset.

It is planned that an ArcView extension be developed for the documentation of ArcView data.

3.5 Agency Contacts for Metadata Compilation

If participants in the CRA process have any questions about compiling metadata, they should speak to the relevant contact person as nominated below:

RACD	John Ross (02) 9391 2022
SFNSW:	David Loane (02) 9980 4268
NSW NPWS:	GIS CRA Unit Manager (02) 9585 6693
BRS:	Melissa Wood (06) 9272 4680
LIC:	Gary Taunton (02) 6332 8200
DLWC	Ray Boynton (02) 9895 7516
DMR:	David Suppel (02) 9901 8345
Environment Australia:	Maria Cofinas (06) 274 1051

Table 1: Summary of elements for NSW CRA/RFA metadata proforma

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATASET	**Title**	The name of the dataset.
	Custodian	The primary organisation associated with the dataset and responsible for its maintenance.
	Jurisdiction	The State or Country of the custodian
DESCRIPTION	**Abstract**	A characterisation of the dataset, including a brief summary and the intentions with which the dataset was developed.
	Search Word(s)	A common use word or phrase used to describe the dataset, chosen from a predefined list.
	Geographic Extent Name(s)	A picklist of pre-defined geographic extents, such as map sheets, local government areas, catchments, CRA regions, that reasonably indicate the spatial coverage of the dataset.
	Geographic Extent Polygon(s)	An alternative way of describing geographic extent if no pre-defined area is satisfactory. Defined as a series of coordinate pairs that define the area(s) covered by the dataset.
DATA CURRENCY	**Beginning date**	The earliest date from which information contained in the dataset is current.
	Ending date	The latest date to which the information in the dataset is current.
DATASET STATUS	**Progress**	Progress status of the dataset e.g. complete, in progress etc
	Maintenance and update frequency	The frequency of changes and additions made to the dataset after initial completion.
ACCESS	**Stored Data Format**	A description of the format in which the data is stored.
	Available format types	A description of any format types both digital and non-digital in which the dataset is available.
	Access constraints	Any special restrictions or limitations on obtaining the dataset, and any restrictions or legal prerequisites for using the dataset.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATA QUALITY	**Lineage**	Information about events, parameters and source data which constructed the dataset, and information about the responsible parties.
	Positional accuracy	An assessment of the accuracy of the positions of spatial objects in the dataset.
	Attribute accuracy	An assessment of the accuracy of the identification of entities and the assignment of attribute values in the dataset.
	Logical consistency	An explanation of the fidelity or consistency of relationships in the datasets and the checking methods used.
	Completeness	Information about omissions, selection criteria, generalisations, definitions used, and other rules used to derive the dataset.
CONTACT ADDRESS	**Contact organisation**	The name of the organisation with which contact may be made to enquire further about the dataset.
	Contact Organisation Jurisdiction	The State or Country of the contact organisation
	Contact position	The position title of the individual within the organisation who is responsible for answering questions about the dataset.
	Mail Address 1	The mailing address of the contact position.
	Mail Address 2	Optional extension of mail address 1
	Suburb/Place/ Locality	The suburb, place or locality of the mailing address.
	State/Locality 2	State of mail address.
	Country	Country of the mailing address.
	Postcode	The postcode of the mailing address.
	Telephone	The telephone number of the contact position.
	Facsimile	The fax number of the contact position.
	Electronic mail address	The electronic mailbox address of the contact position or organisation.

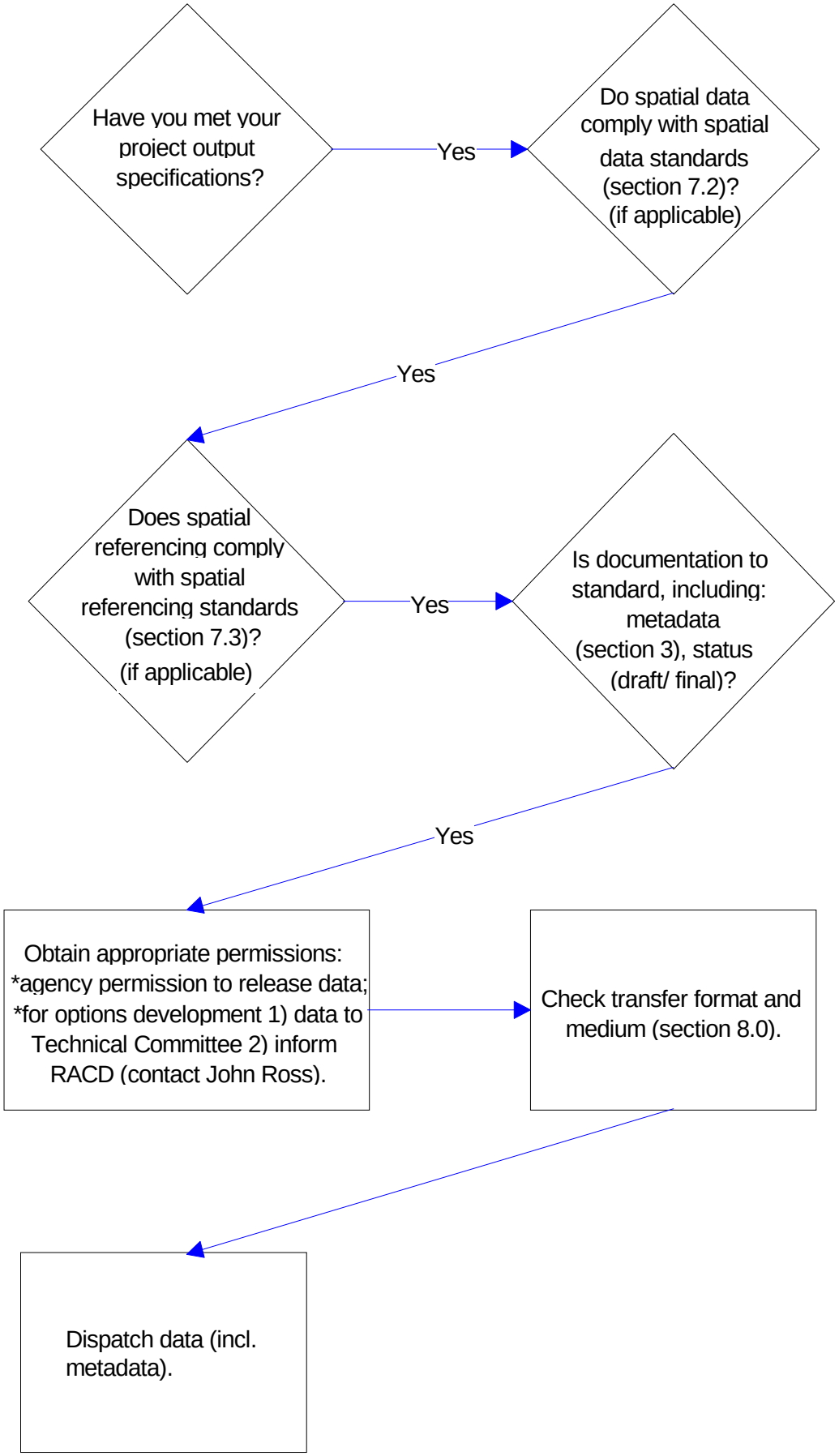
METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
ADDITIONAL METADATA and DATE	**Metadata date**	The date that the metadata were created or last updated.
	Additional Metadata	This section should include: i) the name(s) of the author(s) of the metadata sheet; ii) a description of the full directory pathway to the data; iii) an indication of where additional metadata about the dataset may be accessible e.g. the name of any other directory system(s) where more detailed metadata are recorded; and iv) any other information the author wishes to communicate to users which is not covered by the other proforma fields.
CRA/RFA PAGE 1 INFORMATION	***CRA Project Name**	The name of the approved CRA project for which the data has been created
	***CRA Project Number**	The number assigned to the approved CRA project
EXTENDED DESCRIPTION DETAILS	***Type of feature**	The type of feature held in the dataset e.g. point locality records, grid cell, vector or polygon data.
	***Attribute/Field List**	A list of the attribute codes or names of the dataset.
	***Attribute/Field Description**	A description of the attribute codes or names for the dataset
	***Scale/Resolution**	The scale or resolution at which the dataset has been captured or derived
DATASET ENVIRONMENT	***Software**	The name and version of the software in which the dataset has been developed/used
	***Computer Operating System**	Operating system in which the data has been developed/used.
	***Dataset Size**	Size of dataset

Note: Fields denoted with an asterisk (*) are fields additional to the ANZLIC Guidelines.

Table 2: Summary of elements for NSW CRA/RFA Software System Metadata

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
SOFTWARE SYSTEM	**Name of System:**	Name of the system.
CONTACT ADDRESS	**Contact organisation**	The name of the organisation, and where appropriate, the unit or branch within an organisation with which contact may be made to enquire further about the system
	Contact position	The position title of the individual within the organisation who is responsible for answering questions about the system
	Mail address	The mailing address of the contact position
	Suburb/place/ locality	The suburb, place or locality of the mailing address
	State	State of mail address.
	Country	The Country of the mail address
	Postcode	The postcode of the mail address
	Telephone	Telephone number of the contact position
	Facsimile	Facsimile number of the contact position
	Electronic mail address	Electronic mail address of the contact position
DESCRIPTION	**Description**	Description of the system
	Availability	The availability of the system
	Minimum Hardware Requirements	Minimum hardware requirements to operate the system
	Minimum Software Requirements	Minimum software requirements to operate the system
	Input Format/Type	Input data format required to operate the system
	Output Format/Type	Format of the output data from the system
	Dataset size	Dataset size which can be processed by the system.
ADDITIONAL METADATA	**Metadata Date**	The date that the metadata were created or last updated
	Metadata sheet compiled by	Author(s) of metadata sheet
	References	Any documentation published or unpublished referring to the development of the system.
	Notes	Any additional information regarding the software system which the metadata compiler would like to communicate

4.0 PROCESS FOR DATA SUPPLY



5.0 PROCESS FOR DATA DISTRIBUTION

Once all CRA project data and fundamental datasets have been supplied to the collating agency the data will be test loaded and previewed. The data will then be copied to one or more CD Roms and duplicate CD Roms will be made for each of the government agencies and stakeholder groups represented on the Steering Committee.

The data will be distributed by RACD to government agencies and stakeholder groups by Express Post. A period of 4 weeks will be available for data familiarisation before the Integration and Options Development stages of the CRA/RFA process. During the period of data familiarisation there may be a need to issue supplementary or update CD Roms to government agencies and stakeholders. This will be done as quickly as possible to allow groups maximum time to take account of the new/revised data.

The data (and updates) may be available from the FTP sites if required.

Note: This process is currently being reviewed by the Data Management Group for future CRAs. A data checklist will be forwarded to project managers as soon as it is developed and will be included in the next version of the CRA Data Manual.

6.0 DATA UPDATE PROCESS

This section is concerned with the process for updating ‘completed’ project data, when the data has been signed off for options development by the Technical Committee i.e. what happens where problems are identified with data that have been accredited for integration purposes.

The process should follow the following steps:

1. The Technical Committee signs off on a dataset.

2. A problem is identified with the dataset - alert RACD.

- If the problem is a minor one, RACD will contact the agency/project manager that supplied the data, and try to sort out an acceptable solution.

- If a major or policy problem is identified, RACD will refer the matter to the Technical Committee.

3. The Technical Committee will inform the project manager of necessary changes to the data i.e. the dataset is returned to original organisation and any data changes will be made by the original supplying agency. Unless otherwise agreed, data will **not** be changed by the receiving/collating agency.

4. The Steering Committee will inform all parties that there is a problem with the dataset, and that a corrected version is being developed.

5. Once clearance is given by RACD, the corrected dataset will be redistributed by the data collators (unless otherwise agreed).

7.0 DATA QUALITY STANDARDS

When using spatial data for assessment work it is essential that users can have confidence in the quality of the data and its documentation.

7.1 Metadata

Metadata Guidelines for CRA data are discussed in Section 3.

7.2 Spatial Data Standards

7.2.1 Arc/Info

Wherever possible, all vector datasets should be created and updated in Arc/Info. All modification of linework should be in ArcEdit (**not** ArcView).

7.2.2 ArcView

- Grid and point datasets may be created in ArcView.
  Please note that there is a difference in grid offsets between ArcView (ArcView reads a grid cell from its centre) and Arc/Info (Arc/Info reads a grid from the lower left corner). This offset difference should be borne in mind when comparing Arc/Info with ArcView grids. A grid dataset should be created and updated using the same system.

- Vector datasets should **not** be created in ArcView.

- Database (.dbf) files may be edited in ArcView.

- Linework should **not** be edited in ArcView. If linework editing in ArcView is absolutely unavoidable, then the editing procedure **must** be documented in the metadata. The topology should preferably be rebuilt in Arc/Info, however note that there may be problems converting a shape file to a coverage (see your GIS contact person).

- Please remember that, when changing area units (e.g. metres squared to hectares), or when creating a new area field with different area units, then the newly derived field will need to be recalculated. In addition, any dependent fields (for example deriving percentage area or deriving number of points per hectare) will need to be recalculated.

7.2.3 Spatial Data Checklist:

- The tolerances used when editing/analysing the data should reflect the precision of the data. Fuzzy tolerances and dangle lengths should be appropriate to the scale of the data. Guidelines for setting fuzzy tolerances are presented in Section 7.2.4.

- There should be no dangle errors in the data.

- There should be no slivers in the coverage.

- There should be no edit masks in the coverage.

- The coverage must have topology - i.e. it has been built.
- Projection information should be clearly and appropriately defined (see Section 7.3).
- Datasets should be useable e.g. a dataset with 500 fields is too large to be useful.
- Make sure all attributes are labelled, and labelled correctly. Unique identifiers must be unique.
- Make sure coverages are accompanied by lookup tables where relevant.
- Directories and names of files should comply with the character limit and other naming standards outlined in Section 9.5. Dataset names should relate as closely as possible to the theme of the project.

7.2.4 Tolerances

Fuzzy tolerance

When using spatial data the tolerances in Arc/Info must be carefully considered. The fuzzy tolerance is the minimum distance separating arc co-ordinates in a coverage irrespective of whether they are on different arcs or represent nodes. If two or more co-ordinates are within this distance they are snapped together.

For data transformed to AMG co-ordinates, the minimum effective fuzzy tolerance is:

Map Scale	Fuzzy tolerance (metres)
1:1 000	0.050
1:2 500	0.127
1:10 000	0.508
1:25 000	1.270
1:50 000	2.540
1:100 000	5.080
1:250 000	12.700
1:500 000	25.400
1:1 000 000	50.800

Set tolerance values at the beginning of a project, and maintain them, using the TOLERANCE command.

A fuzzy tolerance that is too small will result in some intersecting arcs not forming a node or some slivers not being removed. A fuzzy tolerance that is too big will distort arcs and create ‘knots’.

A fuzzy tolerance of 0.0 will result in the default value being used, or it will be read from the TOL file. The default value is calculated as: width of coverage boundary/10 000 or 0.002 if the boundary width is less than 100 units.

Other

As a general rule, the following tolerances (in metres) should be used when digitising:

Map Scale	Snap distance	Weed	Grain

1:1 000	0.5	0.5	0.5
1:2 500	1.3	1.3	1.3
1:10 000	5.8	5.8	5.8
1:25 000	12.7	12.7	12.7
1:50 000	25.4	25.4	25.4
1:100 000	50.8	50.8	50.8
1:250 000	127.0	127.0	127.0
1:500 000	254.0	254.0	254.0
1:1 000 000	508.0	508.0	508.0

Note: These tolerances were derived from:

NRIC (1993) “Project Standards and System Procedures for the Use of Geographic Information Systems”.

ArcDoc V 7.1.2, 1982-1997 Environmental Systems Research Institute, Inc.

GIS Divison, NPWS (1998) Arc/INFO tolerance guidelines for GIS Division, NPWS. Internal working document. (Unpub).

• 7.3 Spatial Referencing Standards

The map projection adopted for the NSW CRA process is the Australian Map Grid (AMG) projection. Referencing zones for the CRA regions are:

- Eden Zone 55
- Southern Zone 55
- Sydney Basin Zone 56
- Lower North-East Zone 56
- Upper North-East Zone 56

Data supplied in AMG projection should contain full coordinates {6 digits eastings (x) and 7 digit northings (y)}. Non AMG projected data must be accompanied with complete documentation explaining transformation to full AMG coordinates.

The equivalent in Arc/Info is UTM Zone 55 or 56 (**not** Transverse Mercator)

Use standard UTM Zone 55 or 56 (i.e. the default Arc/Info settings) as follows, and state what you have you have used:

Zone 55
Projection transverse
spheroid Australian
Datum AGD 66
units metres
parameters

scale factor at central meridian	0.9996
longitude of central meridian	147 00 00
longitude of central meridian	0 00 00
false easting (metres)	500000
false northing (metres)	10000000

Zone 56	
Projection transverse	
spheroid Australian	
Datum AUA	
units metres	
parameters	
scale factor at cental meridian	0.9996
longitude of central meridian	153 00 00
longitude of central meridian	0 00 00
false easting (metres)	500000
false northing (metres)	10000000

All data for a region must be stored in the same projection to allow users to view it using the ArcView desktop mapping software.

Note: As indicated above, the datum selected for use in the CRA program is AUA. It is intended that a different standard - the Geocentric Datum of Australia (GDA) - be implemented throughout agencies in Australia by 2000. Some agencies have already made the switch to GDA, and these agencies should remember to reproject data for CRA use to spheroid Australian specifications.

More information about GDA may be found on the AUSLIG web site at:
http://www.auslig.gov.au/geodesy/gda.htm

• 8.0 DATA TRANSFER STANDARDS

Transfer standards provide an intermediate format for the transfer of data between different computing environments. They comprise a set of rules for encoding data into fields, records and files for transfer via a specified medium.

To adopt a consistent and rational data transfer standard for the CRA process, agencies should perform data transfers in formats that are compatible with systems used by all agencies within the CRA program. The data in transit should be accompanied by a metadata statement indicating the export format used and the version of software which created the export. Since it is common for agencies to possess different versions of similar software packages, the data distributor should confirm that the exported material is accessible by the data user. For example, a document saved as Word 97 format cannot be read on Word 6 or below.

8.1 Import/Export Formats

Below is a listing of available import/export formats for softwares used in the CRA process.

8.1.1 Arc/Info (latest version 7.1)

- Reads standard formats: DXF, DLG, IGDS, TIGER, CGM, EPS, SDTS;
- Reads and writes standard image data: ERDAS, BIL, TIFF;
- Reads ArcView shape and CGM files, as well as PC ARC/INFO export files;
- Writes third party formats: DXF, DLG, IGDES, TIGER, CGM, EPS, Adobe Illustrator;

- Writes standard image data: TIFF, JPEG, BIL, BIP, ERDAS.

8.1.2 ArcView (latest version 3.0)

- Reads map data directly from shapefiles, ARC/INFO, PC ARC/INFO, ArcCAD, AutoCAD (DXF and DWG), and Intergraph(DGN). Directly imports map data from MapInfo, Atlas GIS, and ASCII;
- Opens image data from TIFF, JPEG, EPS, BMP, LAN, BIL, BSQ, BIP, RLC, ERDAS Imagine, Landsat, SPOT, SunRaster, CGM, WMF, GIF, and PICT;
- Uses database tables directly from ASCII, dBASE, INFO, ACCESS, Oracle, FoxBase, SQL Server, Sybase, Paradox, DB2, Ingres, and any ODBC/SQL compliant database;
- Connects to ESRI's Spatial Database Engine (SDE) as a client for spatial database access.

8.1.3 ArcExplorer

- Views ESRI shapefiles, ARC/INFO coverages, and Spatial Database Engine (SDE) layers;
- Displays image files including JPEG, BMP, TIFF, Sun Raster, ERDAS IMAGINE, BSQ, BIL, and BIP.

8.1.4 C-Plan

- Linkages to WinERMS and ArcView by the use of Dynamic Data Exchange (DDE) and a Database Management System (DBMS);
- Imports from comma delimited file (CSV) and dBASE IV (DBF) formats;
- Reports in ASCII text (TXT) and comma delimited (CSV) formats.

8.1.5 Microsoft Access

There is a problem importing and using imported databases created in different versions of Microsoft Access. MS Access data should be saved in one of two formats:

- Microsoft Access version 2.0 (operating system windows 3.11); or
- as a standard export format (.CSV).
-

8.1.6 Microsoft Excel

All spreadsheets must be able to be imported into Microsoft Excel version 5.0.
Supported file formats include:
Microsoft Excel Workbook
Template
Formatted text (space delimited)
Text (tab delimited)
CSV (comma delimited)
Microsoft Excel for Worksheet
Microsoft Excel 3.0 Worksheet
Microsoft Excel 4.0 Worksheet
Microsoft Excel 2.1 Worksheet
Microsoft Excel 4.0 Workbook
WK3, FM3 (1-2-3)
WK3 (1-2-3)

WK1, FMT (1-2-3)
WK1, ALL (1-2-3)
WK1, (1-2-3)
WKS (1-2-3)
WQ1 (Quattro Pro/DOS)
DBF 4 (dBASE IV)
DBF 3 (dBASE III)
DBF 2 (dBASE II)
Text (MacIntosh)
Text (OS/2 or MS DOS)
CSV (MacIntosh)
CSV (OS/2 or MS DOS)
DIF (data interchange format)
SYLK (symbolic link)

8.1.7 Microsoft Word

For reporting and exchange of textually-based information, Microsoft Word version 6.0 has been adopted as the standard. Note that **MS Word version 6.0 will not read documents saved as Word 97 format.**

Word 6.0 will convert the following applications:
Microsoft Word 3.0 - 6.0 for Windows and MS-DOS
Microsoft Word 4.*x* and 5.*x* for MacIntosh
WordPerfect 5.*x* for MS-DOS and Windows
Microsoft Write for Windows
Microsoft Excel BIFF 2.*x*, 3.0, 4.0* and 5.0
Lotus 1-2-3 2.*x* and 3.*x**
RFT-DCA
* The converter can open, but not save, documents in this file format.

If you need to exchange documents between Word 6.0 and an application for which there is no converter, you can save your document in a plain-text file format i.e. as a document with the .RFT (rich text format) or .TXT filename extension, e.g. ASCII text or MS-DOS text. Note that most plain-text file formats do not include formatting codes, and therefore some formatting may be lost when you convert a document to a plain-text format. (The .RFT format is an exception, and will save all formatting).

• 8.2 Virus Control

To reduce the risk of providing corrupted or virus-infected data, files should be scanned for viruses before being transferred to the selected transfer medium. Once the files have been transferred to the medium, it is good practice to copy the files back to the system for verification. This may be tedious and time consuming work for the provider, but far more time will be lost by provider and receiver if the data are not error and virus-free.

• 8.3 Recommended methods/media for data transfer

The most rapid means to transfer data is via one of the electronic methods, such as facsimile, FTP (file transfer protocol) or electronic mail. Each of these methods has its

advantages and disadvantages. Postal or courier mail is slower, but may be preferred over electronic methods in certain situations e.g. where:

- original papers (not facsimiles) require signing
- it is important to preserve the quality of hardcopy maps or photographs
- the size of electronic files or internet availability makes transfer to diskette/tape/CDR, which is then dispatched by mail, the preferred option.

The following table has been created to assist data providers and acquirers in selecting a suitable method and medium for data transfer. The preferred transfer method should be discussed and agreed upon at the outset before data is dispatched. Where expensive transfer media are used, e.g. Jazz discs, they are to be returned to the data provider.

Table 3: Recommended Data Transfer Methods and Media

Data Type	Method & Media	Affecting Factors
Original signed papers/contacts	Mail or facsimile	Urgency
Papers/reports/field notes (hardcopy)	Mail or facsimile	Size <20 pp for fax
Electronic documents, spreadsheets	Email or FTP* or diskette**	Size < 1 megabyte; Internet availability
Paper maps/photographs	Mail or facsimile	Size - can only fax A4; quality
Database files	FTP* or diskette** or EXABYTE tapes or CDR	Size and Internet availability; access to tape drive
GIS coverage, DEM, model	FTP* or diskette** or EXABYTE tapes or CDR	Size and Internet availability; access to tape drive
Image files/aerial and satellite imagery/digital photography	FTP* or diskette** or EXABYTE tapes or CDR	Size and Internet availability; access to tape drive
Audio	Audio cassette	NA
Video	Video cassette	NA

* FTP not preferred for large files where phone lines are used
** Diskette = 3.5 inch floppy; Jazz disc; ZIP

8.4 Data transfer costs

Any minor costs involved in the acquisition or distribution of data are subject to individual agencies expense. As noted above, where expensive transfer media are used (e.g. Jazz discs) they should be returned to the data provider.

Where the cost of transfer is significant or concerns a non-CRA agency, it is recommended that such matters be bought forward to RACD attention.

9.0 PRINCIPLES FOR DEVELOPMENT & MAINTENANCE OF NEGOTIATION DATABASES FOR NSW RFA REGIONS

9.1 Software Catalogue

The software systems outlined in this section will only include those that have been investigated and accepted for the CRA process by stakeholders, committees and work groups. Recommendation of these systems was based on several factors contributed from 'Review of Information Technologies for Consideration in CRA of Forests' K. Malafant and S. Davey (1996). These include:

- ease of importing data and input data requirements
- output information and compatibility with other systems
- reliability and transparency of technology
- resources required to implement and operate the system
- fitness for purpose for use in CRAs.

9.1.1 Arc/Info

Arc/Info is a complete GIS solution that offers automation, management, display, and quality output of geographic data. Developed by ESRI, Arc/Info contains a broad selection of functions and tools along with an extensive listing of import/export formats. For these reasons, and because Arc/Info is commonly used across government agencies, Arc/Info version 7.1 has been chosen to be the primary GIS package for the CRA process. It is the data creation tool for polygon and vector datasets for CRA purposes because it can build topology (unlike ArcView).

Contact: your own GIS Division

9.1.2 ArcView

ArcView is a desktop GIS that allows users to organise data, query data using digital maps, and create new geographic data from existing data. It does not build topology. Used as client to Arc/Info and Spatial Database Engine (SDE) data, ArcView can deliver solutions to simple and complex queries by integrating maps with databases.
ArcView is capable of importing and exporting a large range of file formats and the graphical interface can be customised to suit different analysis without programming. The latest version is 3.0.

Contact: your own GIS Division

9.1.3 ArcExplorer

ArcExplorer is a free distribution software application that can display and query GIS data both locally and over the Internet. Developed by ESRI, ArcExplorer is an inexpensive way to explore Arc/Info coverages, SDE layers and a number of common image formats.

ArcExplorer can perform basic spatial functions like pan, zoom, identify, locate, and query with geographic and attribute data, as well as download and print maps directly from the Internet map servers. The latest version is 1.0.137. Grid sets are only viewable as images.

Contact: your own GIS Division

9.2 CRA Software

The following software programs were approved for use in the Eden CRA/RFA and/or are under consideration for use in future CRAs. This is not an exhaustable list and may be revised during future CRAs.

(E) indicates the software was approved for use in the Eden CRA/RFA.

9.2.1 **FORUM** (Forest Resource Use Model) *(E)*

FORUM is a regional linear programming model of forest production which incorporates the variables and relationships of an operating forest system. Developed by ABARE, its primary function is to measure the direct impacts on local or regional forest-based industries of changes in wood flow, industry structure, prices and market.

The model estimates a set of control variables which maximises forest return subject to a set of constraints. The method used in FORUM includes discounted cash flows, residual pricing and linear programming. The system is not intended to be a land optimisation model but rather a tool to evaluate the effects of alternative forest processing options.

Contact: Kenton Lawson ph: (02) 6272 2133

9.2.2 **C-Plan** *(E)*

Developed by NSW NPWS, C-Plan is an interactive planning tool which incorporates the concept of Site Irreplaceability (importance of land areas for conserving biodiversity) with a Geographic Information System (GIS). All calculations are based on a matrix of sites by features, biological species/units or other measure of the environment, which are updated continuously as sites are excluded or 'deferred' for protection. C-Plan can be linked with ArcView or WinERMS to enable users to visually monitor the reserve scenario as it changes and to actively interact with the graphical interface. It is a P.C.-based platform with operating system windows NT version 4.0.

Contact: Bob Pressey ph: (02) 6773 7128

9.2.3 **FRAMES** *(E)*

Eden CRA

Access database - Existing resource data, retained tree information, net harvestable area, site productivity and available volumes by species (as well as yield tables generated from the growth and modifier models) were compiled into a Microsoft Access database. A series of tables and queries were built into the database to generate the various components of wood flow including sawlog and pulwood volume predictions from multi-aged forests, fire regrowth, harvesting regrowth, as well as regrowth and region summaries.

STANDSIM - is a deterministic growth simulation model originally designed for even-aged, single species stands. The model was modified for *E. sieberi* dominated stands in the Eden CRA region to produce estimates of sustained yield.

Upper North East, Lower North East and Southern CRAs

MARVL - is a system for assessment of recoverable volume in stands that are ready or nearly ready for harvest. The name stands fo **M**ethod for the **A**ssessment of **R**ecoverable **V**olumes by **L**og type. MARVL has been customised to accommodate the inventory design adopted for UNE, LNE and STH CRA regions. It has the capability to store plot data, species codes, taper functions, diameter increment functions and other user defined variables associated with the Strategic Inventory and Biometric Models projects.

Contact: Tony O'Hara ph: (02) 9980 4164

9.2.4 SPECTRUM *(E)*

The SPECTRUM model was developed for the ESFM Group by Bureau of Resource Sciences. SPECTRUM is used to aid trade-offs in multiple-use forest management. The management of native forests is becoming increasingly difficult with the need to trade-off multiple-uses of forests sustainably. A trade-off is a process of balancing conflicting objectives and arises from having more than one objective which cannot be simultaneously achieved. Some examples of multiple-use are recreation, water production, timber harvesting and wildlife management.

SPECTRUM is a matrix-generator for linear programming that is specifically designed to schedule the management of a forest land over time. SPECTRUM has a pull-down menu front-end that runs native on the DOS platform. It consists of a data entry system, model manager, matrix generator and report software. SPECTRUM accepts tabular information of the size of each management unit (in hectares), potential silvicultural and management prescriptions for each management unit, revenue and costs associated with each prescription and constraints on the management units (e.g. harvest levels must be non-declining over time). The current SPECTRUM matrix can be solved using a LP solver called C-WHIZ. Developments are under way to allow the use of other LP solvers such as LINDO.

The output from SPECTRUM is an allocation of the prescriptions that may be applied to the management units in each time period to achieve the desired objective. A beta version of a visualisation tool called SPECTRAVISION, which is a modified version of ArcView3, may be used to verify a mixed-integer or integer programing solution. The tool gives the ability to visualise optimisation results that are area-based and thus enable adjacency constraints to be monitored. The model is being further developed to assess ESFM and to interface with Whatif/LUPIS. Wood and water yield, management cost, silvicultural regimes and habitat considerations have been incorporated into the Eden model.

Contact Oliver Chikumbo ph (02) 6272 5751

9.2.5 Whatif?/LUPIS *(E)*

The Bureau of Resource Sciences developed Whatif?/LUPIS for the ESFM Group to facilitate consideration of the two central mechanisms of ecologically sustainable forest management - that is, (i) land allocation and management decisions and (ii) guidance for future management, particularly in off-reserve situations. Whatif?/LUPIS was developed using Whatif?, an object-oriented decision support system and scenario analysis package marketed by ROBBERT Associates, Ottawa. Whatif? provides a structured set of tools that enable users to interact, express their ideas and apply information to help resolve economical and ecological resource-related issues.

LUPIS is a landuse planning algorithm which has been incorporated into a Whatif? framework. The algorithm is a surrogate for linear programming and assists in the identification of a preferred management or land use plan for a nominated area conditional

upon inputs and values expressed by the user. It is comprehensive in that it has the capability of simultaneously considering numerous competing land uses in an allocation study. The model is Unix based with a Mac interface. User friendly interfaces such as linking spatial outputs to Arcview, still need to be developed.

Contact Jane Stewart or Kim Malafant ph (02) 6272 3541 or 6272 4697

9.2.6 Suite of Social Assessment Software *(E)*

Social Impact Analysis

ithink ANALYST for Macintosh Version 5.0 (a social Impact Model was developed by Environmentrics (Sydney) which inputs cosial data and develops a dynamic visual display of predicted scale and time dimension of social impacts)

Contact: Sue Richards, DPIE. ph: (02) 6272 6698

9.2.7 Conservation Assessment Database (CAD) *(E)*

CAD is a Microsoft Access Database which was developed by Environment Australia to store data collected as part of the Response to Disturbance Project. The database holds information on the life history, critical resource requirements, disturbance responses and management needs of both flora and fauna species occurring in an RFA region. CAD references all data stored to either a bibliographic reference, expert opinion or an unpublished study, and allows the user to add information about their knowledge of the reliability of the stored data.

Contact : Peter J. Lawrence ph: (02) 6274 1399

9.2.8 Gap Analysis Tool

The Survey Gap Analysis Tool is an ArcView extension developed by NSW NPWS. The extension facilitates analysis of how well existing biological survey sites cover a region, both geographically and environmentally. Maps generated from this analysis enable users to identify and prioritise gaps in existing survey coverage that need to be filled by further survey work. New survey sites can be selected interactively on the screen. As sites are selected, the mapped analysis of survey adequacy across the region is progressively updated. Unlike most previous approaches to survey gap analysis, this tool analyses survey adequacy within a continuous environmental/geographical space rather than an arbitrarily categorised space. The ArcView extension is written in the Avenue scripting language with calls to the GridIO library and DLLs written in C++.

Contact: Simon Ferrier ph: (02) 6773 7216

9.2.9 Species Distribution Modelling Toolkit (SPMODEL) *(E)*

The Species Distribution Modelling Toolkit (SPMODEL) is an Arc/Info GIS application with a menu interface designed to model and map the abundance or likelihood of occurrence of biological entities, such as species, habitat components or communities. SPMODEL was developed by the Environment Forest Taskforce, E.A., in conjunction with Mr Graham Watson. The software incorporates S-Plus code to statistically model relationships between the presence or abundance of biological entities, and environmental data, either collected from sites or mapped over the region. Menu driven Arc/Info modules prepare mapped environmental data (Arc/Info grid coverages) and site-based data for input to S-Plus. Relationships between the presence or abundance of, for example, species, and

environmental factors are then generated using GLM and GAM regression modelling techniques. These models are used to predict the probability of occurrence or abundance of species at any given location, defined in terms of its environmental attributes. Regional maps of the predicted probability of occurrence or abundance of species are produced by interpolating model results using selected environmental Arc/Info grid coverages.

Contact: David Barrett ph: (02) 2174 1836

9.2.10 Data Audit Methodology (DAM) *(E)*

The Data Audit Methodology toolkit (DAM) is a series of menu driven Arc/Info modules designed to investigate the adequacy of site-base biological survey data for modelling and mapping the distribution of biological entities such as species, habitat components or communities. Application of the software to existing site-based survey data helps to identify data gaps and priority areas for further survey work. Developed by the Environment Forest Taskforce, EA, the methodology assists users to identify geographic and environmental biases in survey data and to ascertain the adequacy of sampling of biological entities within particular environments. Specifically, the DAM toolkit is able to produce and map a regional environmental stratification, calculate and map the number and density of survey sites per stratum (and per polygon per stratum), and plot for each stratum a species accumulation curve and estimated probability that further sampling will detect a previously undetected species.

Contact: David Barrett ph: (02) 2174 1836

Any new technologies that have emerged in the market since the writing of this manual would not have been evaluated, but if a product is thought to have potential benefit to the CRA process, a submission can be forward to RACD for evaluation.

9.3 Platform for Integration

Prior to Integration the Steering Committee will determine the mix of P.C. and Unix based platforms which will be used.

9.4 Maintenance

The receiving/collating agency may “improve” datasets which have been accepted for use in the integration exercise; however it must not “change” the datasets. In other words, maintenance involves “cosmetic” changes, for example clarifying codes or correcting labelling errors, **not** changing the linework.

If data needs to be changed, they should be returned to the agency which supplied them, as outlined in Section 6.0.

As described in Section 7.2, for vector datasets created in Arc/Info, labels and tags may be changed in ArcView however linework should be edited in Arc/Info.

9.5 Standards

Datasets should comply with the following naming conventions:

- Directory names should be a maximum of 8 characters without spaces and capitals.
- File names should be a maximum of 8 characters.3 characters without spaces and capitals.
- The name should relate as closely as possible to the "theme" of the dataset, not its purpose (e.g. **not** C-Plan).

At the negotiation stage of the process, when data is distributed for options development, the negotiation database will feature the same directory structure for all (structure to be decided).

It is anticipated that data will be distributed in two formats - Arcview shape files and Arcinfo coverages - unless otherwise requested.

Note: The data will be developed as Arcinfo coverages and only converted to shapefiles when approved for distribution.

10. HARDCOPY MAPPING STANDARDS

Mapping standards have been developed to provide a minimum standard and common look for the presentation of hardcopy maps to be prepared as part of the CRA/RFA process.

These standards cover elements such as font and font size, title block, logos, colours and shading, legends, borderlines, graticule tics or intersections, and presentation of information relating e.g. to scale, map projection, map status, source data and copyright.

The Data Management Group will develop region specific templates/layouts in Arcview and ArcInfo. The mapping standards will be available from RACD (contact Fiona Campbell ph: (02) 9228 3239).

11.0 RFA DATA ARCHIVE

The RFA Data Archive will include copies of all information required for the purposes of meeting Regional Forest Agreement obligations and undertaking RFA assessments (as determined by the Steering Committee). The purpose of the Archive is to allow review and monitoring for the length of the RFA program. Archived datasets will give baseline information which can be compared with the updated datasets held by custodial agencies. The Archive will be finalised for each RFA region prior to signing the RFA.

The Archive will include final datasets plus associated metadata. Where appropriate, the Archive will also include customised software developed for use in the RFA process (for example C-plan). Prior to the signing of the RFA, contributing agencies will lodge an electronic copy of the relevant information products. Wherever possible, copies will be held at two State and two Commonwealth locations.

More information on the RFA Data Archive is contained in CRA/RFA Data Access Principles (Attachment 3).

12.0 DATA ACCESS

Data supplied and created for the CRA process are available to all stakeholders, committees and work groups subject to conditions as outlined in the CRA/RFA Data Access Principles document (Attachment 3). The contents of this paper identify issues related to data distribution, ownership, custodianship and archiving for the NSW CRA/RFA process.

A number of datasets held and maintained by the Land Information Centre (LIC) at Bathurst are critical to the NSW CRA/RFA process.

• 13.0 FUNDAMENTAL / CROSSCUTTING DATASETS

There are a number of datasets which are not created as a result of a project emanating from one of the four CRA Technical Committees (i.e. Environment and Heritage, ESFM, Economic and Social, FRAMES). These datasets generally provide context to project data during the Integration and Options Development stage of the CRA/RFA process. Such datasets may be

- existing datasets held by an agency which require no modification (e.g. historical staellite imagery, DEM, roads); or

- existing datasets which require value-adding to make it more suitable for use in the CRA/RFA process (e.g. current Landsat TM, operational boundaries, tenure and planning unit layer).

A list of such datasets which will be available during the Integration and Options Development stage of the CRA/RFA process is currently being prepared by the Data Management Group, in consultation with Technical Committees, for each CRA region.

14.0 GLOSSARY

Accuracy The closeness of results of observations, computations or estimates to true values or the values accepted as being true.

ANZLIC Australia and New Zealand Land Information Council

Attribute A defined characteristic of an entity type e.g. composition

Attribute value A specific quality or quantity assigned to an attribute for a specific entity instance.

BRS Bureau of Resource Sciences, ACT

CRA Comprehensive Regional Assessment

Data This includes data and information (processed data) including spatial and non -spatial elements.

Dataset A collection of related data.

DLWC NSW Department of Land and Water Conservation

DMR Department of Mineral Resources

EA Environment Australia

GIS Geographical Information Systems are computer based handling and display systems which process geographically coded information. GIS programs provide methods to manipulate data in a number of ways including storage, etrieval, overlay, mathematical calculations and spatial comparison. The programs generally provide for output in text, graphical, statistical and map formats.

LIC Land Information Centre

Metadata Data about the content, quality, condition and other characteristics of data.

NFPS National Forest Policy Statement

NPWS NSW National Parks and Wildlife Service

RACD Resource and Conservation Division, NSW Department of Urban Affairs and Planning.

Raster A raster coverage records spatial information as points in a regular network of grid cells.

RFA Regional Forest Agreement

SFNSW State Forests of New South Wales

Vector A vector coverage records data as patterns of points, lines and polygons.

15.0 REFERENCES

Australia New Zealand Land Information Council, 1996. Metadata Guidelines Version 1. Prepared by the ANZLIC Working Group on Metadata, ACT.

Federal Geographic Data Committee, 1994. Content Standards for Digital Geospatial Metadata. Washington D.C.

Malafant, K. and Davey, S., 1996. Review of Information Technologies for Consideration in CRA of Forests. ACT.

Attachment A.1

METADATA ATTACHMENT

Attachment 1.1: GUIDELINES FOR COMPLETING CRA/RFA METADATA PROFORMAS

NSW CRA/RFA metadata proforma

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
DATASET	**Title**	The name given to the dataset by the custodial organisation. It should convey a clear impression of the information contained in the dataset, and should provide a unique reference to the dataset.	Text Maximum 160 characters	The name of the dataset followed by, where appropriate, an acronym enclosed in round brackets. For example: Eden Planning Unit Layer Digital Cadastral Database (DCDB)
	Custodian	The primary organisation associated with the data set and responsible for its maintenance and distribution. The custodian of the data need not necessarily be the holder of the copyright or the originator of the data, nor is the custodian necessarily a government organisation.	Text Maximum 120 characters	Full title of the organisation as it is normally recognised or trades under. If the organisation is also known by a common acronym, include this in round brackets at the end of the full name. If the organisation is usually known only by an acronym, use only the acronym without brackets. For example: NSW National Parks and Wildlife Service Australian Surveying and Land Information Group (AUSLIG) ERSIS Australia Pty Ltd.
	Jurisdiction	The State or Country in which the custodian is domiciled. If the custodian has offices in more than one State of Australia, the jurisdiction "Australia" should be used.	Text Maximum 30 characters	One only of the following: Australia; Australian Capital Territory; New South Wales; New Zealand; Northern Territory; Queensland; South Australia; Tasmania; Victoria; Western Australia; Other.
DESCRIPTION	**Abstract**	A characterisation of the data set and its contents. It may be a brief narrative, a summary or an abstract.	Text Maximum 2000 characters	The Abstract should describe the contents of the dataset for a non-expert user, in plain language. Information contained in the Abstract may include: • a description of the purpose for which the dataset was created • a textual description of the spatial extent of the data contained in the dataset • a listing of the attributes about which data is held • whether the dataset is a stand alone dataset or part of an integrated system.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
DESCRIPTION (Continued)	**Search Word(s)**	One or more common words or phrases that describe the dataset, chosen from a predefined list. Search words should be selected from the searcher's standpoint, and should be words likely to be used by person who does not necessarily have expertise in the subject matter. Where several terms may be relevant to the content of the dataset, the most concise term should be used. When a dataset contains diverse information, multiple search words may be allocated.	Text Maximum string 60 characters	At least one search word must be used, selected from the Search Word Picklist in A.1.2. The main search word should be capitalised. Qualifier words are intended to allow the searcher to be very specific. For example, for a dataset described by the Search Words WATER Quality Monitoring: • a searcher selecting the Search Words WATER, or WATER Quality, or WATER Quality Monitoring, will identify the dataset; • a searcher selecting the words WATER Supply or Water Supply Monitoring will **not** pick up the dataset.
	Geographic Extent Name(s)	Use either this element or the following element Geographic Extent Polygon, whichever is easier, but **not both.** Geographic Extent Name(s) is the ordinary name of one or more pre-defined geographic areas that would reasonably (not necessarily exactly) show the extent of the geographic coverage of the dataset.	Text Maximum 100 characters per Extent Name	If you choose to use this, rather than the following, element, at least one entry must be selected from the Geographic Extent Name(s) Picklist in A.1.2. Multiple entries may be selected from the picklist. If none of the picklist choices is a suitable representation of geographic extent, then the next field (Geographic Extent Polygon) should be used.
	Geographic Extent Polygon(s)	A set (or sets) of at least four co-ordinate pairs (i.e. a closed polygon) to record the latitude and longitude in decimal degrees of the geographic extent of the dataset where there is not a suitable predefined geographic extent available in the previous element (Geographic Extent Name).	Real number. Maximum 1,000 character string per polygon	Any number of sets of at least four coordinate pairs, where each polygon is closed by the repeat of the first pair. The coordinate pairs are to record latitude and longitude in decimal degrees to up to four decimal places of precision. For example 1 [from Bathymetry of the Gulf of Carpentaria] -3.0 130.0, -3.0.0 149.0, -18.0 149.0, -18.0 130.0, -3.0, 130.0
DATA CURRENCY	**Beginning date**	The earliest date from which information contained in the dataset Is current i.e. the earliest date at which the phenomena in the dataset actually occurred. This is not necessarily the date on which a record was entered into a database.	Text Maximum 10 characters	A date expressed as ddmmmyyyy, or the words "Not Known". Where the year and month are known, but the day is not known, use 01 as the default day. Where the year is known but the day and month are not known, use 01JAN as the default day and month. For example 01JAN1885.
	Ending date	The last date for a record contained within the dataset. If the dataset is ongoing, use the word "Current" to indicate that no final date is applicable.	Text Maximum 10 characters	A date expressed as ddmmmyyyy, or the word "Current" if the dataset is continuing. Where the year and month are known, but the day is not known, use 28, 29, 30 or 31 as the default day (as appropriate to the month concerned). Where the year is known but the day and month are not known, use 31DEC as the default day and month.

				For example 30APR1992
METADATA CATEGORY	**CORE METADATA ELEMENT**	**DESCRIPTION**	**FORM OF ENTRY**	**DOMAIN/PICKLIST**
DATASET STATUS	**Progress**	Progress status of the creation of the dataset.	Text Maximum 20 characters	Select one only of the following four options: Complete, In Progress, Planned, Not Known. If the dataset collection has concluded, pick “Complete”. If the dataset collection is underway at the time of creation of the metadata record, pick “In Progress”. If the dataset collection has been proposed but has not commenced, pick “Planned”. If the status of dataset creation is unknown, pick “Not Known”.
	Maintenance and update frequency	The frequency with which changes or additions are made to the dataset after its initial completion. The changes to the data should be recorded, not the frequency of re-issue or publication.	Text Maximum 20 characters	Select one only of the following: Continual, Daily, Weekly, Monthly, Quarterly, Bi-annually, Annually, As required, Irregular, Not planned, Not Known. If, for example, a dataset is maintained both monthly and daily, the most frequent rate of changes, i.e. daily, should be recorded.
ACCESS	**Stored Data Format**	A description of the format in which the dataset is stored by the custodian. This field must include whether the dataset is held in digital and/or non digital form, and should include the format type in which the dataset is stored (e.g. transparency, paper, microfiche, ASCII Text, ARC/INFO, DXF, Oracle database, Excel spreadsheet). Software version number (if applicable) may be included.	Text Maximum 500 characters	The word DIGITAL and free text extension if desired, and/or the word NONDIGITAL and free text extension if desired. Write the mandatory part of the element DIGITAL and NONDIGITAL in upper case. Example 1 [Old Growth Forest]: DIGITAL ARC/INFO Example 2 [Coastal habitats for birdlife, mammals]: DIGITAL ASCII and NONDIGITAL Plotted maps
	Available format Type(s)	A description of the formats in which the dataset is available. This field must include whether the dataset is available in digital and/or non digital form, and should include the format types, both digital and non-digital, in which the dataset is available. Software version number (if applicable) may be included.	Text Maximum 240 characters per type	The word DIGITAL and free text extension if desired, and/or the word NONDIGITAL and free text extension if desired. Write the mandatory part of the element DIGITAL and NONDIGITAL in upper case. Example 1 [Old Growth Forest]: DIGITAL ARC/INFO DIGITAL ArcView Example 2 [Coastal habitats for birdlife, mammals]: DIGITAL ASCII (GINA) NONDIGITAL Plotted maps NONDIGITAL reports

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
ACCESS (Continued)	**Access constraints**	Any restrictions or legal prerequisites that may apply to obtaining or using the dataset. For example, whether the dataset is classified Restricted (i.e. the data is considered sensitive by a data owner and only available from the custodian by agreement of data owners); or Licensed **(**available to third parties under a licence agreement with the custodian); or Unrestricted. If payment is required, this should be stated.	Text Maximum 500 characters	Free text describing any restrictions or legal prerequisites that may apply to accessing or using the dataset. Example 1 [Eden Planning Unit Layer]: Data has been compiled and manipulated for NSW CRA process and therefore the use of this data is restricted to projects being undertaken within the NSW CRA under the CRA Data Licence Agreement. Example 2 [National Estate - Delineated Natural Landscapes]: Publicly available with written permission of the custodian.
DATA QUALITY	**Lineage**	Lineage is a history of both the source data and the processing steps used to produce the dataset. The source data used to produce the dataset may consist of one or more data sources. The history of the source data generally includes: • a description of the source data • the scale(s) of the source data • the media type(s) of the source data • the date(s) of the source data. The processing steps are the sequence of operational steps performed on the source data to arrive at the final dataset. The history of the processing steps generally includes: • the data capture method(s) • any intermediate processing method(s) • the method(s) used to generate the final product. • dates of various parts of the process	Text Maximum 2,000 characters	Sentences are preferred. If no answer is possible, select one of the following: Not Known, Not Documented, Not Relevant. For example [summarised from Current Wetlands Environments and Extent] Data Collection Method: Aerial photography interpretation. Data Set Source: The data has been prepared primarily from standard Survey and Mapping Victoria photo runs with some local revisions based on other historical sources. Source Material Input Scale: 1:25000 (approx.) Additional Processing Steps: The data has been inserted into covers based on 1:100,000 mapsheet tiles via one or more of four processes: 1)Pre ARC/INFO data [omitted from this summary] 2)Direct digitising from aerial photography: A facility is provided in the Wetlands Mapping System to digitise data directly from aerial photographs. This facility uses the ARC/INFO photo registration process which requires a minimum of five tic points to be defined. This process is used for editing or adding individual wetlands. 3)Digitising from 1:25,000 survey map overlays: Some 1:100,000 mapsheets have been processed by digitising in ARC/INFO using marked up overlays of 1:25,000 mapsheets. 4)Scanning of 1:25,000 survey map overlays: On more complex mapsheets the marked up overlays have been scanned into SCITEX format files. These files have then been converted into ARC/INFO GENERATE input files and imported into ARC/INFO for final editing and adding of attributes.
METADATA CATEGORY	**CORE METADATA ELEMENT**	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST

DATA QUALITY (Continued)	**Positional accuracy**	An assessment of the closeness of the location of spatial objects in the dataset in relation to their true positions on the earth's surface. The positional accuracy generally includes: • a horizontal accuracy assessment • a vertical accuracy assessment • an explanation of how the accuracy assessments were determined. The horizontal and vertical positional accuracy should be the assessed accuracy after all transformations have been carried out. This can be derived from a statistical analysis of tests eg root mean square error (RMSE) or standard deviation (SD). A precise positional accuracy assessment may not always be possible. In these cases an intuitive estimate of the expected positional accuracy based on previous experience or expected likely maximum error is acceptable. In many cases this may be "just a feel" for the data but it is important to state this.	Text Maximum 2,000 characters	Sentences are preferred. Positional accuracy may not be relevant to datasets that are indirectly geographically referenced. In this case write Not Relevant. If no answer is possible, select one of Not Known, Not Documented or Not Relevant. Example 1 [Current wetlands environments and extent] Precision: 10m to 100m. Determination: Deductive estimate. Comparisons with 1:25,000 layer data and various sorts of imagery indicated good correlation in terms of shape and size but with errors of the order indicated above in terms of position and/or rotation. Example 2 [Coastal habitats for birdlife, mammals (CRA)] The Atlas is a composite product and the positional accuracy depends on the source of the data. Example 3 [Old Growth Forest for Eden CRA] All data layers were derived at a scale of 1:25 000. Accuracy checked to within 37.5 metres from linear control features (e.g. coastline, drainage lines) displayed on 1:25 000 topographic maps was accepted. Example 4:[Soil Landscapes of the Michelago 1:100 000 Sheet] The soil landscapes boundaries identification is based on their dominant geomorphic process. The estimated positional accuracy of map polygons boundaries is within 25m on 1:25 000 map. The description sites are located using Australian Map Grid Eastings and Northings. This grid reference would be accurate to within 25m. Once the grid reference is reached, the text and the Soil Data System notes will record a brief description of the actual location, referenced to local points. The estimated vertical position accuracy (assessed soil horizons depths extent) is + 2cm where data is collected. The predictability elsewhere for that soil landscape is indicated in the report.
METADATA CATEGORY	**CORE METADATA ELEMENT**	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST

DATA QUALITY (Continued)	**Attribute accuracy**	An assessment of the accuracy of identification of entities and the assignment of attribute values in the dataset. The attribute accuracy generally includes: • the classification method used to assign values to features in the dataset • an attribute accuracy assessment of how well the attributes conform to the classification method (generally expressed as a percentage) • an explanation of how the attribute accuracy assessment was determined. A precise attribute accuracy assessment may not always be possible. In these cases an intuitive estimate of the expected attribute accuracy or the likely maximum error based on previous experience is acceptable. In many cases this may be "just a feel" for the data but it is important to state this.	Text Maximum 2,000 characters	Sentences are preferred. If no answer is possible, select one of Not Known, Not Documented or Not Relevant. Example 1 [Forest Types (summarised)] The attribute of this data set is the forest type which is defined as any group of tree-dominated stands which possess a general similarity in composition and character. The classification in forest type was never intended as an ecological classification of forest vegetation in NSW. Considerations in using forest type classification were: • the forest types are recognisable from aerial photographs • each approved forest type is known to occur over appreciable land areas, and thus guarantees its representation at different scales for management planning as well as for day-to-day forest operations. • each forest type is regarded as being sufficiently distinct from all others to warrant separate description. There are 192 forest types identified and described by the Forestry Commission of NSW. Each type is given a distinctive number as a numerical reference. These 192 types are divided into three major groups. Within each of these groups the types are further combined into assemblages of related types, called “leagues”. The numbers given to forest types run ordinal through each league, with a gap in the series between most leagues so that, should further types be subsequently needed, these can be fitted into the existing framework of leagues and major groups. The Aerial Photograph Interpreters do ground checks on forest types to check and correct identification. Their route is recorded on the aerial photographs together with the check points. The resource reports record where indicator species are present and any discrepancies that exist between the aerial photograph and the ground.
METADATA CATEGORY	**CORE METADATA ELEMENT**	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST

DATA QUALITY (Continued)	**Logical consistency**	Spatial objects can be points, lines or polygons within the dataset that are used to represent true 'real world' features. When recording spatial objects into a dataset a number of inconsistencies can occur. An assessment for logical consistency documents for these inconsistencies. Tests are generally in the form of the following questions: • Are all points labelled? • Do lines intersect at nodes? • Do lines cross unintentionally? • Do all lines exist? • Are lines duplicated? • Do lines overshoot or undershoot? • Are all lines labelled? • Do all polygon boundaries close? • Are all polygons labelled? • Do any polygons have duplicate labels? • Are all points, lines and polygons topologically related? If the dataset is stored digitally then the tests for logical consistency can be carried out automatically using geographic information system software. This element can also apply in the case of datasets where there are other logical relationships between items or objects (other than spatial objects) in the dataset. In such cases describe any tests carried out on the relationships.	Text Maximum 2,000 characters	Sentences are preferred. If no answer is possible, select one of Not Known, Not Documented or Not Relevant. Example 1 [Bathymetry of the Gulf of Carpentaria and the Arafura Sea, Edition 1] All lines were visually checked at 1:1 000 000 and 1:250 000 scale to verify that no lines crossed, that there were no extraneous line segments and that all lines had the correct contour value. Multiple and dangling lines were edited using in-house software. Example 2: [Forest Types] The logical consistency tests done were: • a test of valid values within each forest type • a visual check of the maps, especially in the preparatory stages of map production, and • a topological consistency check. The valid value test checks for alien trees in well established tree formations. The Photogrammetrist does a visual check to detect gaps in linework, to identify abnormal feature positions, correct line feature sharpness and to reposition displaced features as creeks out of their flood plain or misplaced forest roads. The GIS package (ArcInfo) was used to do topological consistency check to detect flaws in the spatial data structure and to flag them as errors. This check insures that all classified polygons are closed, nodes are formed at the intersection of lines and that there is only one label within each polygon, etc

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
DATA QUALITY (Continued)	**Completeness**	An assessment of the extent and range of the dataset with regard to completeness of coverage, classification and verification. Completeness of coverage is an assessment of the proportion of the dataset available in its entirety.. • Is the spatial data coverage complete for the entire dataset? • If not what amount of spatial data is incomplete? • Are attribute data available for the entire dataset? • If not what amount of attribute data is incomplete? Completeness of classification is an assessment of how well the chosen classification method (refer to attribute accuracy) is able to represent the 'real world' features contained within the dataset. • Is the adopted classification method exhaustive? • Does the classification method generalise any features represented in the dataset? For example: • Are there minimum area or minimum width rules used to represent features? (ie. roads less than 30 metres wide are represented as a single line) • Must a lake be a certain area before it is included on a map at a scale of 1:100000? • Are lines smoothed for presentation? If so, what method has been used? Completeness of verification assesses the amount of "work" (field work or other) carried out to validate the correct representation of 'real world' features. • What is the extent and method of field verification carried out to validate spatial and attribute data? Are the positions of any spatial objects in the dataset inferred? If so, what is the method of inference?	Text Maximum 2,000 characters	Sentences are preferred. If no answer is possible, select one of Not Known, Not Documented or Not Relevant. Example [Forest Types] Forest types are usually mapped at a scale of 1:25 000 following their delineation on aerial photographs of similar or larger scales (1:15 000). While quite small areas of special value can be readily identified in the field for individual management, areas less than 2 ha size, or 50 m in width were not represented. Map legends are compact and standardised. Forest type numbers are shown on maps , but legends carry only limited descriptive information, such as actual major species occurring within types. Users are urged to consult map legends because of the ongoing changes to the classification (type numbers and description for types which have been recognised since the first edition of the Bauer classification report). Maps without update classification will remain in use until time permits their revision.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
CONTACT ADDRESS	**Contact organisation**	The name of the organisation with which contact should be made to obtain the dataset, or to obtain more detailed information about the dataset. The contact organisation need not be the same organisation as the Custodian Organisation. A business unit within the Custodian Organisation may be the Contact Organisation.	Text Maximum 120 characters	Full title of the organisation as it is normally recognised or trades under. If the organisation is also known by a common acronym, include this in round brackets at the end of the full name. If the organisation is usually known only by an acronym, use only the acronym without brackets. For example: NSW National Parks and Wildlife Service Australian Surveying and Land Information Group (AUSLIG) ERSIS Australia Pty Ltd.
	Contact Position	The position title of the individual within the Contact Organisation who is required to answer questions about the dataset.	Text Maximum 40 characters	The position title of the individual within the organisation who is responsible for answering questions about the dataset. For example: Manager - GIS Division CRA Old Growth Coordinator - Land Assessment Unit Project Manager - Social Assessment Unit.
	Mail address 1	This element is to be used in conjunction with the following element Mail Element 2. These two elements together describe the mailing address of the Contact Position.	Text Maximum 40 characters	This element is to be used in conjunction with the following element Mail Element 2, which together describe the mailing address of the Contact Position. The content of these two elements should include street name and number, where applicable. If the address is a post office bag or box, this information should appear in Mail Address 1. No commas should be used in this field. Postal addresses should be written without spaces or full stops. Example 1 : [Mail address 1]: Queens Square [Mail address 2]: Corner Macquarie St & Albert Rd [Suburb][State][Postcode]:Sydney NSW 2000 Example 2: [Mail address 1]: Building 2 [Mail address 2]: 423 Pennant Hills Rd [Suburb][State][Postcode]:Pennant Hills NSW 2120 Example 3: [Mail address 1]: 134 King St [Suburb Locality][State][Postcode] Adelaide SA 5000 Example 4: [Mail address 1]: PO Box A2134 [Suburb][State][Postcode]:Sydney South NSW 2000

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
CONTACT ADDRESS (continued)	**Mail address 2**	This is an optional element where the mailing address of the Contact Position requires 2 lines.	Text Maximum 40 characters	Used where the mailing address of the Contact Position requires more than one line e.g. in examples 1 and 2 above. For a significant number of addresses, this element may not need to be used e.g. in examples 3 and 4 above.
	Suburb /Place/ Locality	The name of the suburb of the mailing address of the Contact Position, or if the place is not known by a suburb name, the ordinary name of the place or locality.	Text Maximum 60 characters	The suburb, place or locality of the mailing address. See Mail address 1 for examples.
	State/Locality 2	The name of the State or Territory, in acronym form, of the mailing address of the Contact Position.	Text Maximum 40 characters	Select one of: AAT, ACT, Christmas Island, Cocos (Keeling) Islands, Norfolk Island, NSW, NT, QLD, SA, TAS, VIC, WA.
	Country	The name of the country where the Contact Position for the dataset is located.	Text Maximum 40 characters	Acronyms acceptable where commonly used. Examples: Australia, NZ.
	Postcode	Postcode of the mailing address of the Contact Position.	Alphanumeric Maximum 10 characters	4 characters e.g. 2350
	Telephone	The telephone number of the Contact Position.	Alphanumeric Maximum 25 characters	One or more of the following three options: STD code local telephone number; Mobile access number plus number; 1800 plus number [freecall]. Do not use commas, brackets or hyphens. Give full STD, Mobile access code, or Freecall, then a space; then up to four numbers of the telephone number; then a space; then the final three or four numbers. STD example: 02 9537 1246 Mobile example: 015 234 567 Freecall example: 1800 123 234
	Facsimile	The fax number of the Contact Position.	Alphanumeric Maximum 25 characters	As for telephone number element.
	Electronic mail address	The electronic mailbox address of the Contact Position.	Alphanumeric Maximum 80 characters	Addresses in Internet or Compuserve compatible form only should be included. If a compatible email address is not available, the entry “Not known” or “None” should be given. For example: bforner@ozemail.com.au; 100242.3420@compuserve.com

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
ADDITIONAL METADATA & DATE	**Metadata date**	The date that the metadata were created or last updated.	Text Maximum 10 characters	DD/MMM/YYYY e.g. 14FEB1997
	Additional metadata	This field should contain: • the name(s) of the author(s) of the metadata sheet • a description of the full directory pathway to the data. Where applicable, the author can also include in this field: • an indication of where additional metadata about the dataset may be accessible; and • any other information the author wishes to communicate to users which is not covered by the other proforma fields.	Text Maximum 240 characters	This field should contain: i) the name(s) of the person(s) who completed the metadata sheet, followed by (optionally) the name of their organisation enclosed in round brackets. ii) a description of the full directory pathway to the data; iii) (optionally) information about where additional metadata about the dataset may be accessible e.g. the name of any other directory system(s) where more detailed metadata are recorded; iv) (optionally) any other information the author wishes to communicate to users which is not covered by the other proforma fields. Example 1 [Eden Planning Unit Layer] Mark Cameron (NPWS) and David Loane (State Forests). C:\CRA Eden\C-Plan\NPWS\edn_pu.shp Example 2 [National Estate - delineated natural landscapes] P. Hodgson (NSW Section, EFT, EA) C:\CRA Eden\C-Plan\EA\estate\dellnscp For further information consult the National Wilderness Inventory Database (NWI)

At this point, click on “click on here to see further information”.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
CRA/RFA PAGE 1 INFORMATION	**CRA Project Name**	The name of the approved CRA project for which the dataset has been created.	Text Maximum 100 characters	Name of the CRA project as it appears on the approved CRA Project Proposal Proforma.
	CRA Project Number	The number assigned to the approved CRA project.	Alphanumeric Maximum 25 characters	The number assigned to the approved CRA project.
EXTENDED DESCRIPTION DETAILS	**Type of feature**	The type of feature held in the dataset e.g. point locality records, grid cell, vector or polygon data.	Text	One or more of the following: point data, polygon data, grid cell, digitised data.
	Attribute/Field List	A list of all the attribute codes/names/numbers contained in the dataset.	Alphanumeric.	A list of all the attribute codes/names/numbers contained in the dataset. For example, from the Eden Planning Unit Layer (partial List only): Area, Perimeter, C1200-id, ALC, Coup_no, Log_yr
	Attribute/Field Description	A description of each attribute code/name/number contained in the dataset. The object is to clarify the attribute codes and make the dataset useable and meaningful to others.	Alphanumeric and text.	A description of each of the attribute codes/names/numbers contained in the dataset and which were listed in the previous field (Attribute/Field List). Descriptions should be comprehensive enough to make the attribute categories meaningful to other users. For example, for the attribute codes listed above from the Eden Planning Unit Layer: Area = m2, Perimeter = meter, C1200-id = unique id from c1200 (subcatchment layer), ALC = Aboriginal Land Claim, Coup_no = Sub Compartment number, Log_yr = year of last logging activity relevant to regrowth only i.e. does not apply to multi aged forest within the coupe.
	Scale/ Resolution	The scale of the maps used in creating the dataset, or the resolution at which the dataset has been captured or derived	Alphanumeric Maximum 100 characters	The scale or resolution at which the dataset has been captured or derived. For example: 1:25 000, 1:50 000, 1:100 000, 1:250 000.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
DATASET ENVIRONMENT	**Software**	The name and version number of the software used in the creation of the dataset.	Alphanumeric Maximum 100 characters	The name of the software and, where applicable, an acronym enclosed in round brackets, followed by the version number of the software enclosed in round brackets For example: Arc/Info (version 7.1) Environmental Resource Mapping System (E-RMS) (Version 2.1).
	Computer Operating system	The name of the computer operating system in which the dataset has been created or developed.	Alphanumeric Maximum 100 characters	The name of the computer operating system e.g. DOS 6.2, UNIX.
	Dataset size	The approximate size of the dataset.	Alphanumeric Maximum 50 characters	The approximate size of the dataset in megabytes. Up to 2 decimal places. For example: 18.3 MB

NSW CRA/RFA Software System Metadata

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
SOFTWARE SYSTEM	Name of system	Name of the software system developed for the NSW CRA/RFA	Text	Name of the system followed by, where appropriate, an acronym enclosed in round brackets. For example: C-Plan Forest Resource Use Model (FRAMES)
	Contact Organisation	The name of the organisation and, where appropriate, the unit or branch within the organisation with which contact may be made to enquire further about the system.	Text	Full title of the organisation as it is normally recognised or trades under. If the organisation is also known by a common acronym, include this in round brackets at the end of the full name. If the organisation is usually known only by an acronym, use only the acronym without brackets. For example: NSW National Parks and Wildlife Service - Land Assessment Unit Australian Surveying and Land Information Group (AUSLIG) ERSIS Australia Pty Ltd.
CONTACT ADDRESS	Contact Position	The position title of the individual within the organisation who is responsible for answering questions about the system.	Text	The position title of the individual within the organisation who is responsible for answering questions about the system. For example: Manager - GIS Division Project Officer C-Plan support and development
	Mail Address	The mailing address of the Contact Position.	Text	The mailing address of the Contact Position, including the street name and number and/or post office bag or box as applicable.
	Suburb/Place/ Locality	The suburb of the mailing address of the Contact Position, or if the place is not known by a suburb name, the ordinary name of the place or locality.	Text	The suburb, place or locality of the mailing address e.g. Pennant Hills Armidale
	State	The name of the State or Territory, in acronym form, of the Contact Position.	Text	Select one of: AAT, ACT, Christmas Island, Cocos (Keeling) Islands, Norfolk Island, NSW, NT, QLD, SA, TAS, VIC, WA
	Country	The name of the country where the Contact Position for the system is located.	Text	Acronyms acceptable where commonly used. Examples: Australia, NZ.
	Postcode	The postcode of the mailing address of the Contact Position.	Alphanumeric	4 characters e.g. 2350

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
CONTACT ADDRESS (continued)	Telephone	The telephone number of the Contact Position.	Alphanumeric	One or more of the following options: STD code local telephone number e.g. 02 9537 1246 Mobile access number plus number e.g. 015 234 567 1800 pus number e.g. 1800 123 234
	Facsimile	The fax number of the Contact Position	Alphanumeric	The fax number of the Contact Position
	Electronic mail address	The electronic mailbox address of the Contact Position	Alphanumeric	Addresses in Internet or Compuserve compatible form only should be included. Is a compatible email address is not available, the entry “Not Known” or “None” should be given. Example 1: bforner@ozemail.com.au Example 2: 100242.3420@compuserve.com
DESCRIPTION	Description	A characterisation of the software system. It may be a brief narrative, a summary or an abstract. This field may include a description of the purpose for which the software was created, and whether it is stand alone or part of an integrated system.	Text	Sentences preferred. Example 1:[C-Plan] C-Plan is a windows based interactive planning tool which incorporates the concept of Site Irreplaceability (importance of land areas for conserving biodiversity) with a GIS. All calculations are based on a matrix of sites by features, biological species/units or other measure of the environment, which are updated continuously as sites are excluded or ‘deferred’ for protection. C-Plan can be linked with ArcView or Win ERMS to enable users to visually monitor the reserve scenario as it changes and to actively interact with the graphical interface.
	Availability	Any restrictions that may apply to the distribution or use of the system. For example, whether the software is restricted to CRA use only.	Text	Free text describing any restrictions to the distribution or use of the system. For example: System available on request to contact organisation, subject to payment and the signing of a licence agreement
	Minimum Hardware Requirements	Minimum hardware requirements to operate the system.	Text	Free text. For example [C-Plan]: IBM compatible computer system with at least 32 Mb RAM (recommend > 64 Mb). Hard drive dependent on size of database.
	Minimum Software Requirements	Minimum software required to run the system, including any particular software packages needed to operate the system.	Text	Free text. For example [C-Plan]: Windows NT 3.51 (or higher) operating system GIS - ArcView 3.0 or WinERMS Microsoft Excel (used for formatting CSV files)

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION	FORM OF ENTRY	DOMAIN/PICKLIST
DESCRIPTION (continued)	Input Format/Type	Input data format required to operate the system.	Text	Free text. For example [C-Plan]: Comma delimited files containing all the biological and resource data (see C-Plan Manual for a more detailed description of input format).
	Output Format/Type	Format of the output data from the system.	Text	Free text. For example [C-Plan]: Comma delimited files viewed in excel.
	Dataset size	Size of the dataset which can be processed.	Text	Free text. For example [C-Plan]: Can process any number of sites and features. Turnaround time is highly dependent on the amount of RAM in the system. For more than 100,000 sites with many features (>100), processing time will be slow (turnaround time of minutes).
ADDITIONAL METADATA	Metadata date	The date that the metadata were created or last updated.	Date	DD/MMM/YYYY e.g. 25FEB1998
	Metadata sheet complied by	The name(s) of the person(s) who completed the metadata sheet. The organisation to which the metadata compiler(s) belongs may also be included.	Text	The name(s) of the person(s) who completed the metadata sheet, followed by (optionally) the name of their organisation enclosed in round brackets.
	References	Any documentation published or unpublished referring to the development of the system	Text	Free text. For example [C-Plan]: Pressey, R.L., Johnson, I.R and Wilson, P.D. (1994). Shades of irreplaceability: towards a measure of contribution of sites to a reservation goal. *Biodiversity and Conservation* **3** pp 242-246.
	Notes	Any other information which might be useful to the user and which is not covered by the other categories.	Text	Free text description of any additional information.

A.1.2 CRA/RFA METADATA PICKLISTS

Category: Description

Element: SEARCH WORD(S)

Definition of Element:

Words likely to be used for searching by a person who does not necessarily have expertise in the subject matter being searched. The words are created from the user or searchers viewpoint not from that of the writer of the abstract or the Custodian of the dataset. Where a number of terms may be relevant to the content of the dataset, the most concise term should be used. When a dataset contains diverse information, multiple search words may be allocated.

Allowable Content:

AGRICULTURE
AGRICULTURE Crops
AGRICULTURE Livestock
AGRICULTURE Horticulture
AGRICULTURE Irrigation

ATMOSPHERE
ATMOSPHERE Air Quality
ATMOSPHERE Ozone
ATMOSPHERE Greenhouse
ATMOSPHERE Pressure

BOUNDARIES
BOUNDARIES Administrative
BOUNDARIES Biophysical
BOUNDARIES Cultural

CLIMATE AND WEATHER
CLIMATE AND WEATHER Meteorology
CLIMATE AND WEATHER Climate change
CLIMATE AND WEATHER Drought
CLIMATE AND WEATHER El Nino
CLIMATE AND WEATHER Extreme weather events
CLIMATE AND WEATHER Radiation
CLIMATE AND WEATHER Rainfall
CLIMATE AND WEATHER Temperature

DEMOGRAPHY

DISEASE

ECOLOGY
ECOLOGY Community
ECOLOGY Ecosystem
ECOLOGY Habitat
ECOLOGY Landscape

ENERGY
ENERGY Coal
ENERGY Electricity
ENERGY Petroleum
ENERGY Renewable
ENERGY Use

FAUNA
FAUNA Exotic
FAUNA Insects
FAUNA Invertebrates
FAUNA Native

FAUNA Vertebrates

FISHERIES
FISHERIES Aquaculture
FISHERIES Freshwater
FISHERIES Marine
FISHERIES Recreational

FLORA
FLORA Exotic
FLORA Native

FORESTS
FORESTS Agriforestry
FORESTS Natural
FORESTS Plantation

GEOSCIENCES
GEOSCIENCES Hydrogeology
GEOSCIENCES Geochemistry
GEOSCIENCES Geology
GEOSCIENCES Geomorphology
GEOSCIENCES Geophysics

HAZARDS
HAZARDS Cyclones
HAZARDS Drought
HAZARDS Earthquake
HAZARDS Fire
HAZARDS Flood
HAZARDS Landslip
HAZARDS Manmade
HAZARDS Pests
HAZARDS Severe local storms
HAZARDS Tsunamis

HEALTH

HERITAGE
HERITAGE Aboriginal
HERITAGE Architectural
HERITAGE Natural
HERITAGE World

HUMAN ENVIRONMENT
HUMAN ENVIRONMENT Economics
HUMAN ENVIRONMENT Housing
HUMAN ENVIRONMENT Livability
HUMAN ENVIRONMENT Planning
HUMAN ENVIRONMENT Structures and Facilities
HUMAN ENVIRONMENT Urban Design

INDUSTRY
INDUSTRY Manufacturing
INDUSTRY Mining
INDUSTRY Primary
INDUSTRY Service
INDUSTRY Other

LAND
LAND Cadastre
LAND Cover
LAND Geodesy
LAND Geography
LAND Ownership
LAND Topography
LAND Use
LAND Valuation

MARINE
MARINE Biology
MARINE Coasts
MARINE Estuaries
MARINE Geology and Geophysics
MARINE Reefs
MARINE Human Impacts
MARINE Meteorology

MINERALS

MOLECULAR BIOLOGY
MOLECULAR BIOLOGY Genetics

OCEANOGRAPHY
OCEANOGRAPHY Physical
OCEANOGRAPHY Chemical

PHOTOGRAPHY AND IMAGERY
PHOTOGRAPHY AND IMAGERY Aerial
PHOTOGRAPHY AND IMAGERY Remote Sensing
PHOTOGRAPHY AND IMAGERY Satellite

POLLUTION
POLLUTION Air
POLLUTION Noise
POLLUTION Soil
POLLUTION Water

SOIL
SOIL Erosion
SOIL Biology
SOIL Chemistry
SOIL Physics

TRANSPORTATION
TRANSPORTATION Air
TRANSPORTATION Land
TRANSPORTATION Marine

UTILITIES

VEGETATION
VEGETATION Floristic
VEGETATION Structural

WASTE
WASTE Liquid
WASTE Solid
WASTE Toxic
WASTE Sewage
WASTE Greenhouse gas
WASTE Heat

WATER
WATER Groundwater
WATER Hydrology
WATER Hydrochemistry
WATER Lakes
WATER Rivers
WATER Salinity
WATER Supply
WATER Surface
WATER Quality
WATER Wetlands

Qualifier words that may be added to any of the above:

Biodiversity

Classification
Conservation
Distribution
Exploration
Indicators
Inventory
Management
Mapping
Maps
Models
Monitoring
Networks
Planning
Production
Reference
Reports
Research
Reserve
Resources
Statistics
Surveys
Sustainability

Format Rules: At least one search word must be used**.** The main search word should be capitalised.

Field Type: Text

Category: Description

Element: GEOGRAPHIC EXTENT NAME(S)

Definition of Element:

Use either this element or the element Geographic Extent Polygon, but not both. This is the ordinary name of one or more pre-defined, known geographic objects that would reasonably show the extent of geographic coverage of the dataset. It is not intended to show the exact extent. Use this element or the following element, whichever is the easier. Multiple entries are possible.

Allowable Content for Australia:

One or more of the following:

Australia excluding external territories
Australia including external territories
State or Territory
External Territories

Name and/or Number 1:1 000 000 Map Sheet (including offshore)
Name and/or Number 1:250 000 Map Sheet (including offshore)
Name and/or Number 1:100 000 Map Sheet
Name and/or Number 1:50 000 Map Sheet
Name and/or Number 1:25 000 Map Sheet

Eden CRA Region
Southern CRA Region
Sydney Basin CRA Region
Lower North-East CRA Region
Upper North-East CRA Region

Local Government Areas

Statistical Local Areas

Major Catchment Basins

Interim Biogeographic Regionalisation of Australia (IBRA) Version 4.0

Interim Marine and Coastal Regionalisation of Australia (IMCRA)

Australian Navigational Charts

Oceans and Seas regions

Marsden Grid Squares

Format Rules for Australia:

There must be at least one, and may be many, entries for this element. If none of the objects is a suitable representation of geographic extent, then Geographic Extent Polygon should be used.

In the case of map sheets, the name and/or number of the sheet should be stated first.

In the case of Local Government Areas and Statistical Local Areas, please use names as found in the *Australian Standard Geographical Classification, ASGC, Catalogue 1216.0*, published by the Australian Bureau of Statistics.

In the case of major catchment basins, please refer to Major Drainage Basins as in Map 5 of the *Review of Australia's Water Resources, Division of National Mapping, Department of Minerals and Energy 1975*. This report is now out of print, but a digital representation of the Major Drainage Basins is available from AUSLIG (Australian Surveying and Land Information Group).

An Interim Biogeographic Regionalisation of Australia: A Framework for setting Priorities in the National System of Reserves Version 4.0 Cooperative Program (IBRA*)* Edited by R Thackway and I D Creswell, Australian Nature Conservation Agency, Canberra, 1995.

The *Interim Marine and Coastal Regionalisation for Australia (IMCRA)* is due to be published shortly by AUSLIG at 1:100 000 scale.

Australian Navigational Charts published by the Hydrographic Service RAN, various series and scales including Port Charts (1:5000 to 1:25000), Approach Charts (1:25000 to 1:75000), Coastal Navigation Series 1:150000 and 1:300000, Small Scale Series 1:1000000 and IHO Series 1:1500000, 1:3000000 and 1:10000000.

Ocean and sea regions are defined in *Limits of Oceans and Seas* published by the International Hydrographic Bureau, Special Publication 23, Draft Fourth Edition 1986.

Marsden Grid Squares in 10^0, 5^0 and 1^0 created by the World Meteorological Organisation and adopted by the International Oceanographic Commission.

A.1.3 METADATA EXAMPLES FROM EDEN CRA

Software System Metadata Example

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
SOFTWARE SYSTEM	**Name of System:**	C-Plan
CONTACT ADDRESS	**Contact organisation**	NSW National Parks and Wildlife Service Biodiversity Survey and Research Division Planning Unit
	Contact position	Project Officer (C-Plan support and development)
	Mail address	PO Box 402
	Suburb/place/ locality	Armidale
	State	NSW
	Country	Australia
	Postcode	2350
	Telephone	02 6773 7207
	Facsimile	02 6772 2424
	Electronic mail address	cplan@ozemail.com.au
DESCRIPTION	**Description**	C-Plan is a windows-based interactive planning tool which incorporates the concept of Site Irreplaceability (importance of land areas for conserving biodiversity) with a GIS. All calculations are based on a matrix of sites by features, biological species/units or other measure of the environment, which are updated continuously as sites are excluded or 'deferred' for protection. C-Plan can be linked with ArcView or WinERMS to enable users to visually monitor the reserve scenario as it changes and to actively interact with the graphical interface.
	Availability	On request
	Minimum Hardware Requirements	IBM compatible PC with the following specs: RAM - at least 32 Mbytes (recommend > 64). Hard drive dependent on size of database.
	Minimum Software Requirements	Windows NT 3.51 (or higher) operating system GIS ArcView 3.0 or WinERMS Microsoft Excel (used for formatting CSV files).

	Input Format/Type	Comma delimited files containing all the biological and resource data (see C-Plan Manual for more detailed description of input format).
	Output Format/Type	Comma delimited files viewed in Excel
	Dataset size	Can process any number of sites and features. Turnaround time is highly dependent on the amount of RAM in the system. For more than 100,000 sites with many features (>100) processing will be slow (turnaround time of minutes).
ADDITIONAL METADATA	**Metadata Date**	25FEB1998
	Metadata sheet compiled by	Tom Barrett
	References	C-Plan Manual (supplied with C-Plan) Pressey, R.l., Johnson, I. R. and Wilson, P.D. (1994). Shades of irreplaceability: towards a measure of contribution of sites to a reservation goal. *Biodiversity and Conservation* **3:** pp 242-246
	Notes	

A.1.4 CRA/RFA METADATA PROFORMAS

NSW CRA/RFA Metadata Proforma

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATASET	Title	
	Custodian	
	Jurisdiction	
DESCRIPTION	Abstract	
	Search Word(s)	
	Geographic Extent Name(s)	
	Geographic Extent Polygon(s)	
DATA CURRENCY	Beginning date	
	Ending date	
DATASET STATUS	Progress	
	Maintenance and update frequency	
ACCESS	Stored Data Format	
	Available format types	
	Access constraints	

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATA QUALITY	**Lineage**	
	Positional accuracy	
	Attribute accuracy	
	Logical consistency	
	Completeness	

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
CONTACT ADDRESS	Contact organisation	
	Contact position	
	Mail Address 1	
	Mail Address 2	
	Suburb/Place/ Locality	
	State/Locality 2	
	Country	
	Postcode	
	Telephone	
	Facsimile	
	Electronic mail address	
ADDITIONAL METADATA and DATE	Metadata date	
	Additional Metadata	
CRA/RFA PAGE 1 INFORMATION	CRA Project Name	
	CRA Project Number	
EXTENDED DESCRIPTION DETAILS	Type of feature	
	Attribute/Field List	
	Attribute/Field Description	
	Scale/Resolution	
DATASET ENVIRONMENT	Software	
	Computer Operating System	
	Dataset Size	

Note: All final copies of NSW CRA/RFA metadata proformas should be completed using the ANZLIC metadata entry tool or the Cradoco tool (see CRA Data Manual section 3.4 for details). This template is provided for use in writing draft versions only.

NSW CRA/RFA Software System Metadata Proforma

Note: Final metadata reports for CRA/RFA software system metadata should be completed using this template.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
SOFTWARE SYSTEM	Name of System:	
CONTACT ADDRESS	Contact organisation	
	Contact position	
	Mail address	
	Suburb/place/ locality	
	State	
	Country	
	Postcode	
	Telephone	
	Facsimile	
	Electronic mail address	
DESCRIPTION	Description	
	Availability	
	Minimum Hardware Requirements	
	Minimum Software Requirements	
	Input Format/Type	
	Output Format/Type	
	Dataset size	
ADDITIONAL METADATA	Metadata Date	
	Metadata sheet compiled by	
	References	
	Notes	

Attachment A.2

DATA AUDIT PROCESS DOCUMENT

DATA AUDIT PROCESS DOCUMENT OUTLINE

1. BACKGROUND

The Intergovernmental Agreement on the Environment (IGAE) and National Forest Policy Statement (NFPS) identify accreditation of State land and resource planning systems as a mechanism for satisfying Commonwealth interests in relation to environmental obligations. Accreditation of State land and resource planning systems by the Commonwealth should be pursued within an agreed framework to satisfy the NFPS requirement that 'strategic land use decision making in relation to forests' should be based on the 'application and evaluation of comparable, high quality data which are available to all participants in the process' (NFPS p. 23).

The broad parameters for undertaking Regional Forest Agreements (RFA) between the Commonwealth and State governments are set out in the Scoping Agreement signed on 25 January 1996. The scoping agreement identifies the need to address accreditation of existing information for resource planning purposes. Governments agreed in the scoping agreement to develop a list of standard data items, data quality assurance standards, criteria and guidelines to describe the data necessary. Furthermore, gaps in existing information and processes will be identified for additional survey and assessment exercises. Data accreditation will be a logical outcome of the data audit process.

2. DEFINITION OF DATA AUDIT

The data audit process involves a review of data on a project basis to assess quality, integrity and suitability for use for a particular purpose including identification of data gaps and processing methods.

Data accreditation is a logical outcome of the data audit process within each project and encompasses the development of a full project scope and proposal, project approval, reporting mechanisms achieved and having the final report accepted by the Joint Steering Committee or its delegate. By following this process, the data is accredited for the scope of the project.

3. APPROACH TO DATA AUDIT IN NSW CRA/RFA

Data requirements for projects will be identified from projects or assessments specified within the Strategic Technical Framework. Data audit will be carried out on a project by project basis. All projects will have a data audit component and comply with standards and guidelines developed and approved in the CRA/RFA process.

3.1 Project Data Audit Component:

At the start of the project, the approach to data audit should be detailed, including if a data audit is *not* needed and why. An initial data audit would be conducted with the available data appropriate to the project. Some projects may have several iterations of a data audit (eg. flora and fauna survey), and this should be indicated in the approach detailed in the project proposal.

Data audit outcomes should to be documented throughout the life of the project according to the defined reporting schedule and in the final report

4. OBJECTIVES

4.1 Overall objective:

Data audit will ensure that the process and quality of data used is of the highest standard available, and that the outcomes from assessments/projects will meet the requirements of the CRA and integration leading to an RFA.

4.2 Specific Objectives:

- To *identify, evaluate and document* all data/data layers and processing methods to be used in CRAs of NSW forests.
- To *accredit* data/data layers with respect to minimum data quality requirements and agreed standards (eg. scale, classifications, etc) for the purpose for which the data/data layers are used in each assessment/project.
- To document the *validation* of new data, including any field validation, and final outcomes/products derived during the CRA process.
- For dedicated data audit projects, to *inform* other assessments/projects on the appropriate use of the audited data/data layers.

5. GLOSSARY OF TERMS

ANZLIC	Australia and New Zealand Land Information Council
CRA	Comprehensive Regional Assessment
Data	This includes data and information (processed data) including spatial and non-spatial elements.
IGAE	Inter Governmental Agreement on the Environment
NFPS	National Forest Policy Statement
RFA	Regional Forest Agreement

6. DESCRIPTION OF PROCESS

6.1 Scope of Data Audit

The data audit process should address the following procedures:

As a first step, *identification of gaps* should be undertaken by identifying and assessing existing information.

Full *documentation* of data/data layers as per ANZLIC Core Metadata Standards plus additional fields as required should be carried out. For example, derived data layers such as modelled species distributions, are not adequately covered by the ANZLIC standards.There are also a couple of fields that are required for CRA purposes that are not in the ANZLIC standards (eg. attribute list and definition, and scale).

Identification of processing methods for data/data layers and *evaluation of these processing methods* as a component of the data audit task in the project scope Therefore, approval of scoped projects should acknowledge that the evaluation of processing methods will be covered in the data audit task of the project and detail will

be given in project reports. Processing methodology should include any agreed criteria for deriving data layers where appropriate. Standard guidelines developed by other working groups need to be integrated into project scopes (eg. agreed guidelines on vegetation classification from the Forest Ecosystem Working Group). This is mandatory for new data and outputs; existing data should have a Metadata statement as a minimum, describing how it was derived.

Assessment of the quality of data/data layers for a purpose. This assessment will be project specific and may be qualitative and/or quantitative (eg. Data Audit Methodology (DAM) Toolkit - Environment Australia). As part of data quality assessments three criteria need to be met. Firstly, project scopes need to specify standards (eg. scale, classifications, validation requirements) through project requirements. Secondly, quantitative assessments of data quality need to be project specific (eg. assessment of the quality of species data for species modeling or for identifying refugia in this case, there are standard codes in flora and fauna databases to assist with data quality assessments). Thirdly, projects involving species modeling must include steps for the validation of the models and obtain stakeholder sign-off.

Assessment of the utility of data/data layers/outcomes/software also needs to be addressed. Project scopes should specify formats for data to facilitate inter-agency exchange (ie. standard format). The degree to which data/data layers may be used may vary according to the objectives of the assessment/project. This has significant implications for data accreditation. For example,
- use the data/data layer as is for required purpose;
- use a sub-set of the data for required purpose;
- data requires enhancement for required purpose; or
- data not appropriate for required purpose.

Any caveats on the utility of data/data layers need to be documented in the appropriate project reports.

In the case where dedicated 'data audit' projects are required (eg. cultural heritage data audit project), one of the outcomes from the project/s should be *recommendations* that inform other specific assessments/projects on the use of the data/data layers that have been audited. This has significant implications for data accreditation. For example, accrediting data/data layers for one assessment may not be appropriate for another assessment which has different objectives.

Once at the stage of scoping broad and specific projects, the assessments/projects need to be reviewed and the data/data layer requirements identified in order to assign agency responsibilities for data/data layer acquisition.

6.2 Implementation

Responsibility for the coordination and implementation of the data audit component of projects, which includes ensuring that the linkages with other projects are identified and managed, should be a component of the projects' management arrangements.

Project scopes need to meet the following criteria:

Foremost, all projects should have a data audit component which should follow the guidelines being developed by the Data Audit Working Group. Data accreditation will be a logical outcome of the data audit process.

Data requirements are to be specified in detail in the project proposals in terms of inputs, outputs, and any derived and intermediate data/data layers that are required. Identification, evaluation and documentation of data/data layers, processing methods, minimum data quality requirements, and any agreed standards (eg. scale, classification, etc) also need to be included.

With regards to data validation, any projects with a modelling component need to document how the model will be (or was for existing models) validated. Furthermore, validation of any new data (including any field validation) and any final outcomes/products needs to be documented

For dedicated 'data audit' projects, recommendations to inform other assessments on the appropriate use of the audited data/data layers should be completed. All projects need to reference the 'Strategic Technical Framework' in terms of the linkages with other assessed project areas to ensure that there is no duplication of data audit tasks and data compilation.

Data audit needs to be documented progressively as the Scope items/tasks above are undertaken. This will inform the data audit components of other projects and avoid duplication of data audit tasks. A suggested process for data audit documentation is that a standard document containing the elements of the data audit scope be filled out as data audit tasks are done (see attachement 1 for suggested standard). The fully completed document would fulfill the final data audit reporting requirements for a project. At any stage of a project, the document could be viewed as a running status report on data audit tasks completed to date. The project for which the data audit report applies to should be clearly defined so that linkages between projects can be ascertained (this is particularly important where common data/data layers may be required for several assessments/projects).

7. DATA AUDIT REPORTING

Reporting will be carried out throughout the duration of the project, rather than at the project end. The data audit report will be made up of a number of sections identifying the key data elements for the project.

The data audit report will be documented as applicable for the project in accordance to the following:

i. Identification of data gaps
This section involves documenting the methodology undertaken in the identification of data gaps for the project. This section should include a primary assessment of the existing information.

ii. Documentation of data.
This section includes full documentation of identified data sets as they become available. The documentation must comply with the following core elements of the ANZLIC Core Metadata standards.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATASET	**Title**	The name of the dataset followed by, where applicable, an acronym enclosed in round brackets.
	Custodian	The primary organisation associated with the dataset and responsible for its maintenance.
	Jurisdiction	The State or Country of the custodian
	CRA Project Name	The name the approved CRA project for which the data has been created
	CRA Project Number	The number assigned to the approved CRA project
CONTACT ADDRESS	**Contact organisation**	The name of the organisation, and where appropriate, the unit or branch within an organisation with which contact may be made to enquire further about the dataset.
	Contact position	The position title of the individual within the organisation who is responsible for the dataset.
	Mail Address 1	The mailing address of the contact position.
	Mail Address 2	Optional extension of mail address 1
	Suburb/Place/Locality	The suburb, place or locality of the mailing address.
	State/Locality 2	State of mail address.
	Country	Country of the mailing address.
	Postcode	The postcode of the mailing address.
	Telephone	The telephone number of the contact position.
	Facsimile	The fax number of the contact position.
	Electronic mail address	The electronic mailbox address of the contact position or organisation.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DESCRIPTION	**Abstract**	A characterisation of the data set, including a brief narrative, summary or abstract and the intentions with which the dataset was developed. May include the textual geographic area of the dataset.
	Search Word	A common use word or phrase used to describe the dataset, chosen from a pre-defined pick list. Minimum of 1.
	Geographic Extent Name(s)	A picklist of pre-defined geographic extents, such as map sheets, local government areas, catchments, CRA regions, that reasonably indicate the spatial coverage of the dataset.
	Geographic Extent Polygon(s)	An alternative way of describing geographic extent if no pre-defined area is satisfactory. Defined as a series of coordinate pairs (represented as latitude and longitude in decimal degrees) that define the area(s) covered by the dataset. The polygons must close and the boundary must not intersect. The minimum number of coordinate pairs per polygon are 3.
	Type of feature	The type of feature held in the dataset e.g. point locality records, grid cell, vector or polygon data.
	Attribute/Field List	A list of the attribute codes or names of the data set.
	Attribute/Field Description	A description of the attribute codes or names for the data set
	Scale/Resolution	The scale or resolution at which the dataset has been captured or derived
DATASET CURRENCY	**Beginning date**	The earliest date from which information contained in the dataset is current.
	Ending date	The latest date to which the information in the dataset is current.
DATASET STATUS	**Progress**	Progress status of the dataset chosen from a pre-defined list
	Maintenance and update frequency	The frequency of changes and additions made to the dataset after initial completion, chosen from a pre-defined list.
DATASET ENVIRONMENT	**Software**	Software in which the dataset has been developed/used
	Computer Operating System	Operating system in which the data has been developed/used/stored
	Dataset Size	Size of dataset

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
ACCESS	**Stored Data Format**	A description of the format in which the data is stored.
	Available format types	A description of any format types both digital and non-digital in which the dataset is available.
	Access constraints	Any restrictions or legal prerequisites for using the dataset. These may include access restraints aimed at protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the dataset.
DATA QUALITY	**Lineage**	Information about events, parameters and source data which constructed the dataset, and information about the responsible parties.
	Positional accuracy	An assessment of the accuracy of the positions of spatial objects in the dataset.
	Attribute accuracy	An assessment of the accuracy of the identification of entities and the assignment of attribute values in the dataset.
	Logical consistency	An explanation of the fidelity of relationships in the datasets and the tests used.
	Completeness	Information about omissions, selection criteria, generalisations, definitions used, and other rules used to derive the dataset.
NOTES	**Notes**	Any additional information regarding the dataset
METADATA DATE	**Metadata date**	The date that the metadata were created or last updated.
METADATA COMPLETED BY	**Metadata sheet compiled by**	Author of metadata sheet
FURTHER INFORMATION	**Further information**	The name of any other directory system(s) where more detailed metadata are recorded.

Additional data needs to be collected for any computer system developed specifically for CRA projects. This information should includeappropriate information on relevant software and hardware.

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATASET ENVIRONMENT	**Name of System:**	Name of the system.
	Contact organisation	The name of the organisation, and where appropriate, the unit or branch within an organisation with which contact may be made to enquire further about the system
	Contact position	The position title of the individual within the organisation who is responsible for the system
	Mail address	The mailing address of the contact position
	Suburb/place/locality	The suburb, place or locality of the mailing address
	State	State of mail address.
	Country	The Country of the mail address
	Postcode	The postcode of the mail address
	Telephone	The telephone number of the contact position
	Facsimile	The facsimile number of the contact position
	Electronic mail address	The electronic mail address of the contact position
	Description	Description of the system
	Availability	The availability of the ssytem
	Miniumum Hardware Requirements	Minimum hardware requirements to operate the system
	Miniumum Software Requirements	Minimum software requirements to operate the system
	Input Format/Type	Input data format required to operate the system
	Output Format/Type	Format of the output data from the system
	References	Any documentation published or unpublished referring to the development of the system.

Additional information regarding core metadata elements and pick lists may be found in:
Australia New Zealand Land Information Council (1996) Metadata Guidelines. Version 1. Prepared by the ANZLIC Working Group on Metadata, July.

A metadata documentation proforma can be found at attachment 1 as a Microsoft Excel spreadsheet. Data for each element must conform to the allowable content and format rules specified in the ANZLIC Metadata Guidelines document.

iii. Assessment of data utility and recommendations.
This section assesses the ability of the data to be used in other projects. A statement on the limitations of all or part of the data should be included. This will aid in the determination of the data suitability for subsequent projects. Any enhancements needed to be made to the data should also be stated here.

In the case of a dedicated data audit project, recommendations will be made on the use of the data in other assessments/projects

Only on completion of a data audit process/report will any data/data layer be deemed accredited by the Joint Steering Committee for the CRA/RFA process.

Attachment A.3

CRA/RFA DATA ACCESS PRINCIPLES

(NEW SOUTH WALES)

CRA/RFA Data Access Principles
New South Wales

1. Introduction

The intention of these principles is to ensure that the data used in the NSW Regional Forest Agreements (RFAs) is readily accessible and available to assist in the development and ongoing implementation of the RFA. It is not generally intended that the data will be used as a mechanism for obtaining income for either government.

This document is intended to provide procedures for issues related to data access, distribution, ownership and custodianship for the NSW CRA/RFA process.

This document expands on the data related principles described in the Scoping Agreement for the NSW RFA. Where an interpretation of a Scoping Agreement principle is made the Scoping Agreement is referred to.

The Scoping Agreement does not explicitly deal with access to software tools that will be used in the NSW CRA/RFA. Access to software tools by agencies and other stakeholders will be dealt with by the Steering Committee on a case-by-case basis.

Non-government participants will have access to data in accordance with this document until the signing of the relevant RFA. In all instances data will be provided to non-government participants at avoidable cost only.

The issue of ongoing access to data by non-government participants beyond the signing of the RFA will be addressed as part of the development of the RFA in accordance with the principles set out in this document.

2. Definitions

For the purpose of this paper the following definitions will apply:

Archived Data:	These data includes source, derived and assessment data which was used to develop the RFA, and shall be accompanied by metadata. The Data Archive is designed to ensure base line data is available for undertaking RFA reviews. Access shall be consistent with the principles contained in this document and arranged through the custodian.
Assessment Data:	All assessment and integration project outputs and products required to complete the NSW Regional Forest Agreements (as determined by the Joint Steering Committee).
Avoidable Cost:	Cost of supply or transfer. The cost incurred in supplying or transferring the information, which would not have been incurred had the transaction not taken place.

Custodian:	A custodian of data, or component of that data, is an individual or organisation having the responsibility to ensure that the data is collected and maintained according to specifications and priorities determined by consultation with the user community, and made available to the community under conditions and in a format that conform with established standards and policies (eg ANZLIC Guidelines for Custodianship, 1998).
Data Availability:	Access and exchange of data via electronic and other means and with the knowledge and advice of the custodian subject to a data agreement.
Data Licence Agreement:	A document which authorises the use of a data set or a number of datasets for a specified purpose. The Licence agreement will also specify any restrictions on the use of the data sets.
Derived Data:	This includes data which is obtained by analysis, modelling, aggregation or other complex manipulation of data. A derived data set can have either source data or other derived data sets as inputs to its creation.
Existing Data:	Data and/or data sets that existed in either Commonwealth or NSW State agencies prior to commencement of assessment or integration projects.
Metadata:	Information about data or datasets including descriptions or specifications of source data or derived information. Metadata are to be recorded in a standard format.
Owner:	The individual organisation or jurisdiction that holds the intellectual property rights over a particular set of information or data.
Software Licence:	A document authorising the use of Software for either general use or for specified purposes.
Software:	Systems, programs and other software tools to be used in assessments (CRAs) and negotiation/integration.
Source Data:	Data which is not obtainable from other data or derivable by combining other data sets.
Trustee:	The individual or organisation holding and maintaining a data set for CRA/RFA use. The trustee may hold and distribute data on behalf of the custodian for CRA/RFA purposes. The responsibilities of the Trustee are only valid prior to the signing of the RFA/s to which the data relates.

3. Metadata

The Australia New Zealand Land Information Council (ANZLIC) metadata standards as supplemented for the NSW CRA/RFA process (see CRA Data Manual) will be used to describe all Source Data and Derived Information. Metadata for a given data set is the responsibility of the custodian for that data set and will be freely exchanged in electronic form.

All Metadata must be approved by the Steering Committee.

The ANZLIC metadata standard has been adopted as the metadata standard for the NSW CRA/RFA. (Reference: ANZLIC *Guidelines: Core Metadata Elements: Version 1 - Metadata for high level land and geographic data directories in Australia and New Zealand.* ANZLIC 1996.).

4. Data Access Categories

There are three categories of data access:

i) Restricted
ii) Licensed
iii) Unrestricted

It is envisaged that, over time, data may be reclassified from one access category to another, subject to the approval of the data owner(s) and the notification of the custodian of this reclassification.

5. Existing Source Data

It is the responsibility of each Technical Committee to ensure that every project conforms to the data audit procedures. The Data Audit Process document describes the process to be followed for data audit and accreditation for the NSW RFAs.

All source data will be described by standard metadata preferably supplied by the provider.

Existing access arrangements imposed by the custodian shall apply to existing source data. Where source data is used as an input to a derived dataset, access to the derived dataset shall be consistent with the principles outlined in section 7 of this document.

Where a need is demonstrated, existing source data will be exchanged between participants subject to a data agreement and to any confidentiality provisions which limits its usage beyond that specifically agreed to for the purposes of the RFA.

Release of existing source data will be determined by the Steering Committee in accordance with section 19d of the Scoping Agreement.

6. Newly Funded Data

The NSW Scoping Agreement states:

> "Where the Commonwealth contributes funds for data collection or collation, the new and enhanced data will be considered jointly owned and New South Wales agrees to provide this data to the Commonwealth electronically in map and tabular form as appropriate." (clause 22)

Furthermore, it is the responsibility of the Steering Committee to "agree on the ownership of all data and priorities for data exchange" (clause 6).

Therefore, in accordance with the principles of the Scoping Agreement, all information whose collection and collation is jointly funded by the Commonwealth and the State for the implementation, monitoring or reporting of the RFA, wherever it is prepared in a form capable of ownership, will become jointly owned unless otherwise agreed by the joint Commonwealth and NSW Steering Committee (see Single Ownership of Newly Funded Data below).

Details of custodianship, management, maintenance, access and use will be agreed to on a case-by-case basis, according to whether data is classified as 'Restricted', 'Licensed' or 'Unrestricted'. Each of these categories has different content, management, maintenance access and use as detailed below. The classification of each dataset will be agreed on a case by case basis and will apply to the datasets agreed for the purposes of the RFA.

Assessment data consisting of newly funded data will be freely exchanged and available to the non-custodian Government and stakeholders for the purpose of the RFA and subject to any confidentiality provisions contained in the Scoping Agreement *(SA para 20 refers).*

All newly funded source data will be described by standard metadata.

Jointly Owned Newly Funded Data

Restricted Data

- Restricted data is data which is considered sensitive by a data owner(s) and is only available to third parties by agreement of both owners on a case-by-case basis.
- The State and Commonwealth governments will agree on the appointment of a single custodian to manage, maintain and release the data.
- A non-custodian owner will be provided with an up to date copy of the data on request.

Except where both data owners agree, Restricted Data may only be used for:

- RFA purposes (to be defined)
- Provision of advice to State or Commonwealth Ministers
- Fulfilling statutory obligations that do not relate to the RFA

Access to Restricted Data by third parties will be subject to users entering into a formal licence agreement with the custodian. It will be the custodian's responsibility to obtain the agreement of both owners before the data may be released.

The custodian will maintain a register of all data transfers which will be available to either government.

Licensed Data

- Licensed data will be available to third parties under a licence agreement with the custodian.
- The State and Commonwealth governments will agree on the appointment of a single Custodian to manage, maintain and release the data.
- A non-custodian owner will be provided with an up-to-date copy of the data on request.

Licensed data may be used:
- by the Commonwealth or State for any internal government purpose; or
- by any third party upon request.

The custodian will maintain a register of all data transfers which will be available to either government.

Unrestricted Data

- Unrestricted data is freely available to the public without restriction.
- The State and Commonwealth governments will agree on the appointment of a single custodian to manage, maintain and release each dataset.

Unrestricted data and products may be used:
- for unrestricted use subject only to the copyright interests of the data owners being protected by the inclusion of the normal copyright symbol and a prominent statement on all data that “copyright is vested in the Crown in Right of the State of New South Wales and the Crown in Right of the Commonwealth of Australia”.

Singly Owned Newly Funded Data

Where the RFA process has funded only the enhancement of, or minor additions to, existing data there may be a case for granting single ownership of the new and enhanced data to the owner of the existing data. In such instances the Data Owner will instruct the custodian to grant the other government a licence agreement in accordance with the data classification.

7. Derived Data

It is recognised that derived data relates to those coverages and products used at the time of Integration and not any later modifications of those data.

Derived data will customarily be jointly owned by the Commonwealth and NSW governments subject to the agreement of the custodian (or custodians in the case of multiple source data layers) and the lead agency involved in its derivation.

The custodian of the derived data will be agreed to by both governments subject to the agreement of the custodian of the source data and the lead agency involved in its derivation.

Both governments agree to negotiate in good faith to resolve the issues of ownership, custodianship and access to the data.

Derived data will fall into three access categories, namely restricted data, licensed data and unrestricted data.

Restricted Derived Data

- Restricted data is data which is considered sensitive by a source data owner or the lead agency responsible for the derivation of the data. It is only available to third parties by agreement of both owners on a case-by-case basis.
- The State and Commonwealth governments will agree on the appointment of a single custodian to manage, maintain and release the data.
- A non-custodian owner will be provided with an up-to-date copy of the data on request.

Except where both data owners agree, Restricted data may only be used for:

- RFA purposes (to be defined);
- Provision of advice to State or Commonwealth Ministers;
- Fulfilling statutory obligations that do not relate to the RFA.

Access to Restricted data by third parties will be subject to users entering into a formal licence agreement with the custodian. It will be the custodian's responsibility to obtain the agreement of both owners before the data may be released.

Licensed Derived Data

- Licensed Derived data will be available to third parties by agreement with the custodian.
- The State and Commonwealth governments will agree on the appointment of a single Custodian to manage, maintain and release the data.
- A non-custodian owner will be provided with an up to date copy of the data on request.

Licensed Derived Data may be used:

- by the Commonwealth or State for any internal government purpose; or
- by any third party upon request.

Access to Licensed Derived data by third parties will be subject to users entering into a formal licence agreement signed by the custodian. The custodian will maintain a register of all data transfers which will be available to either government on request.

Each of the agreed derived data sets is to be described by metadata by the dataset creator and as approved by the Steering Committee.

Assessment data consisting of derived data sets and products will be freely exchanged and available to the non-custodian government and stakeholders for the purpose of the RFA and subject to any confidentiality provisions contained in the Scoping Agreement *(SA para 20 refers).*

During the RFA process, the provision and presentation of derived information to third parties will be determined by the Steering Committee.

Issues relating to the intellectual property of derived data sets will be addressed in a fashion consistent with that outlined above on a case- by-case basis consistent with clause 19 (d) of the Scoping Agreement.

Unrestricted Derived Data

- Unrestricted derived data is freely available to the public without restriction.
- The State and Commonwealth governments will agree on the appointment of a single custodian to manage, maintain and release each dataset.

Unrestricted Derived Data and products may be used:

- for unrestricted use subject only to the copyright interests of the data owners being protected by the inclusion of the normal copyright symbol and a prominent statement on all data that "copyright is vested in the Crown in Right of the State of New South Wales and the Crown in Right of the Commonwealth of Australia".

8. Assessment Data

For each study in the RFA process, the Steering Committee will agree on what data sets (draft and final) will be required to enable the RFA to be developed.

This assessment data will usually comprise both derived data and source data, for example, fauna and flora models, woody/non-woody cover and the planning unit layer.

Some data may also be required to provide context for the integration phase of the process.

Where necessary, agreement may be needed from the relevant Technical Committee on how these derived information sets are expressed as products. An example would be a map showing a number of classes at a particular scale.

Assessment data will be released for distribution as final draft with endorsement of the relevant Technical Committee. To be considered a final draft, a data set will include metadata to the agreed standard.

The final data to be used in integration and options development must be approved by the Steering Committee with advice of the Technical Committees.

Assessment data will normally be available to all relevant parties to the CRA/RFA at the completion of the relevant project, subject to paragraph 19(d) outlined in the Scoping Agreement and other appropriate sections of this document.

9. Participant access to works in progress

The release of draft data is generally discouraged due to difficulties directly related to the incomplete nature of the dataset. These difficulties include decreased data integrity and issues that arise from having more than one representation of the same theme. However, it is recognised that there are a number of instances where it appropriate for some groups or individuals to obtain access to draft datasets.

Approval by Chairs of Technical Committee

Generally, approval for the release of draft data shall be decided on a case-by-case basis by the Co-Chairs of the technical committee responsible for the project to which the draft data relates.

Draft data may be released:

- to test or prototype an approach, or to trial formatting and data conversion techniques (N.B. Data is to be used for testing purposes only, and not used to derive a product for use in the CRA/RFA process); or
- to satisfy statutory requirements not related to the RFA (e.g. use of fauna records to assist SFNSW in setting fauna management prescriptions as part of harvest plan preparation).

If the release of draft data is approved, data may be released to :

- agency personnel, stakeholders or consultants who are actively involved in the conduct of the project (i.e. performs compilation, collation, validation, interpretation or analyses tasks) to which the data relates, or a project reliant on the draft data for testing purposes; and/or
- agency personnel who are reliant on the draft data to satisfy statutory requirements on behalf of the agency requesting the draft data.

Approval by Chairs of Data Management Group

In circumstances where a project is dependent on the output data from other projects to facilitate its completion, release of an incomplete dataset may increase the risk of having two diverging datasets for the same theme. Requests for the release of draft data in such cases shall be determined by the Co-Chairs of the CRA Data Management Group.

Project managers should consider the following issues before requesting release of draft data for such purposes (the Co-Chairs will also base their decision on consideration of these issues):

- the consequences for the project of the requesting agency of not receiving the draft data;
- the scope for the project to wait for the completed dataset; and
- the likelihood of two diverging datasets for the same theme occurring and the impact on the CRA/RFA process of such an occurrence.

Where access to draft data is approved the Data Trustee will provide access and a data licence agreement for the draft data. The Data Trustee will make the data available to the recipient:

- as early as possible after the request;
- in electronic form;
- with metadata attached (as per the CRA Data Manual) including information indicating the limitations of the particular version; and;
- appropriate advice on the use of the data

10. Data Licence

Unless otherwise agreed by the owner(s) of the data, all data distributed to third parties or for use within the RFA process will be accompanied by a data licence covering access and use. The custodian of the data will issue the licence. For use within the RFA it would be expected that the Trustee of the data set would co-ordinate the issue of the licence and distribution of the data set.

Following the signing of the RFA, unless other processes are established, data access and issue of licences will be the direct responsibility of the custodian.

11. Data Request Form

The NSW RFA Request for Data form (Attachment 1) should be forwarded to the data custodian and, if approved, a data licence will be supplied.

12. RFA Data Archive

The intention and purpose of the RFA Data Archive is to ensure baseline data is available for undertaking RFA reviews, not for general access.

The RFA Data Archive will include copies of all information, including metadata, required for the purposes of meeting Regional Forest Agreement obligations and undertaking RFA assessments (as determined by the Steering Committee). Where possible the data will be stored in a published format (e.g. shapefile, RTF, HTML). The Archive will include a list of the data, custodian and access category and will be finalised for each RFA region prior to signing the RFA.

Prior to the signing of the Regional Forest Agreement the responsible agencies will lodge an electronic copy of the relevant information products used in the RFA process in the Archive. Copies of the data will be held at two State and two Commonwealth locations. When this is prevented for existing source data (through provisions of Clauses 19c and 19d of the Scoping Agreement) the data must be archived by the custodian in a manner satisfactory to both governments. This form of remote archiving of data should be avoided wherever possible.

Management and Maintenance of the RFA Data Archive

The managers of the NSW copy of the RFA Data Archive will be State Forests of New South Wales and NSW National Parks and Wildlife Service.

The managers of the Commonwealth copies of the RFA Data Archive will be Environment Australia - Department of Environment, and Department of Primary Industries and Energy.

All archiving of data must provide appropriate security and continuing recoverability of data (preferably by CD ROM).

Use of the RFA Data Archive

The governments will have access to all data in the Archive as baseline data for RFA review purposes:

- to meet obligations described in the Regional Forest Agreement;
- to meet statutory obligations; and
- for the purposes associated with the provision of advice to State or Commonwealth Ministers.

Data from the archive will be accessible, via the custodian, consistent with the principles in this document.

Data in the Archive will not be changed unless to correct an error occurring during the archiving process, in which case all data archives held by governments must be notified and updated by the custodian.

Access to data from the Archive by non-government participants will be restricted. Requests for access will be dealt with on a case-by-case basis in consultation with the custodian.

The Data Archive will not otherwise be accessible to third parties.

13. Data Access to Non-RFA Participants

Data access to non-RFA participants will be addressed on a case-by-case basis, consistent with appropriate sections of this document, using the Data Request Form (attached), through the custodian.

14. Participant Access to Assessment Data Post-RFA Signing

Not later than one month after the signing of the RFA, each participant will delete or cause not to be accessed all copies of data which they do not own but were provided with for RFA purposes.

A copy of the Licensed and Unrestricted Access data as archived will be supplied to all participants subject to the provisions of Clause 19d of the Scoping Agreement.

15. Contacts

NSW National Parks and Wildlife Service
Malcolm Stephens
PO Box 1967
HURSTVILLE NSW 2220
Ph: 02-9585 6444

State Forests of NSW
David Loane
Bldg 2, 423 Pennant Hills Road
PENNANT HILLS NSW 2120
Ph: 02-9980 4100

Department of Primary Industries and Energy - Bureau of Resource Sciences
Phil Tickle
PO Box E11
BARTON ACT 2600
Ph: 02-6272 4689

Environment Australia, Department of Environment
Maria Cofinas
GPO Box 787
CANBERRA ACT 2600
Ph: 02-6274 1051

ATTACHMENT 1

NSW RFA
REQUEST FOR DATA

User/Organisation:.....

Postal address: .....

Contact:.....

Phone: …….. Fax: …….. E-mail: ……

Description of data set/s required: .....

.....

Reason/s for usage:.....

.....

.....

Data custodian and contact (if known).....

AGREEMENT

…… (User/Organisation) agrees to use the data supplied by

…….. .....(Custodian)

for the purposes of .....
(purpose to be consistent with the CRA/RFA Data Access Principles)

The User/Organisation undertakes to abide by any special conditions required and duly forwarded in writing, to the User/Organisation , by the Custodian.

Signed on behalf of the User/Organisation

Name …… Position ……..

Signature …… Date ……..

Approval by Steering Committee	**Approval by Custodian**
Name: ……..	Name: …….
Position:……	Position ……
Signature …… Date: …….	Signature …… Date …….
	Statement of Conditions attached (Yes/No)
	…….

Attachment A.4

PROJECT PROPOSAL PROFORMA

CRA/RFA PROJECT SPECIFICATION

PROJECT NAME: [Complete project title]

PROJECT IDENTIFIER: [Agreed unique identifier]

LOCATION/EXTENT: [CRA location plus geographic area]

ORGANISATION/S: [Agency/s]

CONTACT OFFICER/S: [Name] [Position]

POSTAL ADDRESS: [Details of each officer named above]

TELEPHONE: **FACSIMILE:**

E- MAIL ADDRESS:

LINKAGES/DEPENDENCIES:

[Related projects areas of work plus extent of dependency. Indicate whether the data being created in the project will be used by or feed into other CRA projects. If so, also indicate how it will be used (e.g. fauna survey information will be used to construct fauna models in Response to Disturbance project). Similarly, indicate whether this project will be using data which was created in another CRA project (and how it will be used).]

TYPE OF STUDY:

---

1. BACKGROUND

This should address justification for the project and indicate whether it involves developing other work (in house), filling gaps etc. An identification should also be made of the relevance of the project to the CRA/RFA and elements of the Scoping Agreement. Reference should be made to the relevant area of technical framework addressed by the project. Information should be presented in short, succinct statements.

2. OBJECTIVES OF THE PROJECT

[What is to be achieved from the project]

These should address the project objectives.

3. SCOPE OF THE PROJECT

[What issues/subjects are to be covered by the project]

This section of the brief would define the scope of the project.

4. METHODOLOGY

[How will the project be undertaken and provide a clear list of tasks]

A detailed outline of the steps to be taken, the approach or method to be used and the resources required for each stage of the project. This should include details of any proposed consultation arrangements. Clearly state how data is to be obtained (i.e. whether existing data will be used, whether new data will be collected, whether new data will be derived from existing data). The “Data Audit Process” document should be used to assist in determining which data is appropriate for the project. This document is attached.

A metadata statement must be provided for all data which have been used in the project.

5. CRITICAL PATH

Outcomes/Outputs

[What are the tangible outcomes, or the end products, of the project]

Outputs and outcomes should provide assurance that requirements for CRAs are being met.
Outputs for accreditation purposes: Maps, Metadata; data scale information; list of attributes and statements on assessment and suitability of each data layer, including a statement of the expected format of the data eg. digital Arc/Info coverage; excel spreadsheet etc.

Data Outputs

The final GIS layers or other data products (e.g. databases, models, decision support systems) of the project should be specified here (e.g. 1:25,000 scale map showing sites of historical significance in the LNE CRA region; a database of records of threatened plant species in the UNE CRA region). A metadata statement should be provided for each data layer / data product. The "Data Audit Process" document contains guidelines and a proforma for completing metadata statements. An electronic version of the proforma can be obtained from RACD (02-9391 2022).

The purpose of the data should be stated. For example, as an input to other projects or whether the data is to be used in the Integration and Options Development stage of the CRA. Information should included whether it is suitable for inclusion in C-Plan with targets, used in C-Plan in the site summary table, or as a GIS contextual layer.

Reporting

Need to specify in terms of the method and form of progress reporting and final reporting, reproduction and dissemination arrangements and proposals for any ongoing outcomes.

Need to specify that Progress Reports will be submitted at monthly intervals. These reports are in addition to the Project Reports which report on project findings etc. Make a distinction between these progress reports and Project Reports.

Metadata statements are to be submitted for all input data and output data. If data has been used which originated from another agency then the project manager should obtain a copy of the metadata statement for that data from the agency.

Once final data (and metadata) have been prepared they should be reviewed by the appropriate TC and any modifications required should be made before sending the data to the nominated data collation agency for integration. The metadata statements should be forwarded to RACD before going before the SC. Standards, specification and methods for data collation, preparation and transfer are contained in the CRA Data Manual.

Milestones

[What is the timetable for the project and the identifiable milestones to achieve the specified outcomes]

Indicate the anticipated dates of commencing and anticipated dates of completing the stages of the project, project report (s) and project completion.

Indicate stages at which products need to be forwarded for input into other projects and when input from other projects is required for this project.

Milestones and Timetable

Task/Description	WHO	Commence	Complete/ Submit	Link to Payment Yes/No Amount
Step/Phase/Tasks				
Step/Phase/Tasks				
Step/Phase/Tasks				
Progress Reports				
Draft Final Project Report				
Final Project Report				
Data Quality Metadata Statement				
Administrative Report & Financial Statement				

Need to provide details of the standard and format of the reports as well as the numbers required for submission at the Draft Final Report and Final Report stage.

6(i). BUDGET SUMMARY

[How will funds be spent, from what sources and when. The summary figures provided here should draw on the detailed information provided in section 6 (ii).

[If whole of state project provide these details for each region.]

(a) Budget for Grant Funds

- Salaries and Wages $
- Consultancy Fees $
- Travel costs $
- Administration eg. printing, stationery, typing etc $
- Hire of materials or equipment $
- Purchase of materials $
- Other - identify $

Total Direct Costs **$** _____

(b) Budget for Agency Contribution

- Salaries and Wages $
- Consultancy Fees $
- Travel costs $
- Hire of materials or equipment $
- Purchase of materials $
- Other - identify $

Total Direct/Indirect Costs **$** _____

6ii) Budget Detail

Important please note that:

- A justification should be provided for each budget item/task and should include budget resource assumptions dependencies on existing staff etc.
- All expenditure items for the project need to be identified and costed. Please indicate if the relevant expenditure item cost is an estimate.
- Project Managers should provide information as per the proforma spreadsheet which is attached as Appendix A.
- Statement of major risks in delivering specified outcomes/ outputs of project eg. weather restricting time for fieldwork; negotiating data/ inputs from other parties.

Project Funded by:

Cash		**$'s**	**Agency Contribution (previously termed "in kind")**		**$'s**
(a)	RACD Contribution		(a)	RACD Contribution	
(b)	Commonwealth Contribution		(b)	Commonwealth Contribution	
(c)	Agency Contribution		(c)	Agency Contribution	

Total Project Cost:

(c) Cash Flow

Suggested Approach: RACD will be provided with details of the cash flow of RACD funds for this project in (name Agency) three monthly Summary Progress Reports or alternatively on completion if project of short duration.

7. PAYMENT DETAILS

[How will the grant be paid to the Agency]

For example:

The total grant of $..... will be paid in the following instalment(s):

- An initial payment of $..... for the establishment costs and initial progress on the Project, to be paid within 14 days of the signing of the Memorandum of Understanding by the Director-General of DUAP;
- Instalment payment(s) of $..... to be paid after ..... months to take account of ongoing costs (these should be linked to specific milestones listed in Section 4);
- A final payment of $..... to be paid within 14 days of receipt by DUAP of the Final Report, if DUAP judges it to be satisfactory.

Alternatively:

- payment to be made on completion and submission of approved invoice.

Progress reports should be an integral part of projects as variations often occur with performance standards, cost and time during a project. Procedures in place to address these will enable the project manager

8. PROJECT MANAGEMENT

[By whom and how will the project be managed]

This should include details of the Terms of Reference and membership of any SC or management committee established to oversee the project. Contact information for the nominated project manager and/or consultant(s) must also be included. The relevant consultancy briefs should be submitted to the RACD Secretariat. Agendas and minutes of meetings should be made available if requested.

9. PERFORMANCE INDICATORS

[How did the project/agency perform]

Factors that demonstrate that the project has satisfied RACD and Agency Project objectives as identified in Section 1. For example:

- The project outcomes accord with project objectives.
- Monthly reports are accurate and informative.
- Milestones are reached in a timely manner.
- Critical path traced the most effective management approach.

- Extent and quality of existing information is improved.
- Budgets are adhered to.
- Funds are properly acquitted.

10. QUALITY CONTROL

[Activity to ensure a high quality outcome]

In addition to the description of appropriate performance indicators, the procedures which will ensure the achievement of a high quality project must be outlined.

Definition of Data: This includes data and information (processed data) including spatial and non-spatial elements such as databases and reports.

	Appendix A - Budget Details						
	Project name						
	ITEM	Position/Role (Title only)	Nominated salary/grade		Duration of Employment	Salary /Charge out Rate(inc.oncosts)[1]	Total Costs
1	**Salaries and Wages**						
	Subtotal						
2	**Training (Cost of course only)**	Position/Role	Estimated Cost of Training		Duration of Training		
	Details of training required						
	Subtotal						
3	**Administration** [2]						
	Subtotal						
4	**Contractors**	Position/Role (Descrip. of work)	Estimated Contractor's Rate [3]		Expected Duration of Contract		
	Subtotal						
5	**Vehicles** [4]	Vehicle Category & Hire Rate	Duration of Hire	Running Costs	Estimated Kms for project		
	Vehicle Type & Fittings						
	Subtotal						
6	**Travel & Accom.**	Flight Destination	# Flights	Position / Role	Cost per Flight		
	Subtotal		# nights		Cost per Night		
7	**Materials or Equipment**						
	Subtotal						

8	**Workshops**						
	Independent Invited Experts	Expected Invited Experts	Fees (if any)		# days required		
	Travel	Flight Destination	# Flights		Cost per Flight		
	Accommodation		# nights		Cost per Night		
	Catering						
	Subtotal						
9	**Miscellaneous** [5]						
	Subtotal						
	TOTAL						
	1. Oncosts are calculated as a % of salaries and wages. The Multiplier applied should not exceed agreed 1.5. See RACD / Agency guidelines for more detail.	2. Admin can be represented as a % of salaries and wages or as an In-kind contrib, Multiplier should not exceed 1.5. See RACD / Agency agreed guidelines for more detail.	3 & 4. See RACD / Agency agreed guidelines for details of agreed costs.		5. All Miscellaneous items to be justified.		