ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand

Version 2 (February 2001)

Metadata for spatial data directories in Australia and New Zealand

Prepared for ANZLIC by the ANZLIC Metadata Working Group

ANZLIC
the Spatial Information Council

Document history

Version	Date	Note
2	26 Feb 2001	

These Guidelines may be updated from time to time. The current version is available via the ANZLIC Metadata Working Group web page
http://www.anzlic.org.au/asdi/metagrp.htm

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Chapter One
Introduction

This document presents the ANZLIC Metadata Guidelines, Version 2, Core metadata elements for geographic data in Australia and New Zealand. This introductory chapter provides background information on ANZLIC and its activities that relate to metadata. It also outlines the history of the development of the metadata guidelines, together with information on the review process that has led to the preparation of Version 2 of the guidelines.

1.1 What is ANZLIC?

ANZLIC, the Spatial Information Council, is the peak inter-governmental council responsible for the coordination of spatial[1] information management in Australia and New Zealand. It provides focus and leadership for the spatial information community.

Over the past fourteen years, ANZLIC has emerged as the key agent in improving the management of spatial information in Australia and New Zealand. The Council's success has come from its strategy of working through its structure of jurisdictional coordinating bodies to encourage, foster and coordinate the efforts of experts and agencies throughout the region. Through that structure, it has drawn upon a great wealth of knowledge and experience to develop policies, standards and activities that have gained widespread acceptance. Further information about ANZLIC and its activities is given on its web site http://www.anzlic.org.au/

1.2 Strategic Context for ANZLIC's Metadata Activities

ANZLIC has adopted a Strategic Plan for 2000 – 2005 with the Vision that

> *Australia's and New Zealand's economic growth and social and environmental interests are underpinned by quality, spatially-referenced information*[2]*.*

[1] "Spatial" information is information about features on the earth's surface, both natural and man-made.

[2] *"quality spatially referenced data" means spatially referenced information that is current, complete, accurate, affordable, accessible and integratable.*

To achieve its Vision, ANZLIC has established the following goals for the period 2000 to 2002:

1. *A comprehensive framework of policies and standards.*

2. *Availability of accessible and SDI[3]-compliant fundamental datasets.*

3. *Recognition at all levels of government, industry and the community, of the necessity for quality, spatially-referenced information.*

4. *A competitive, innovative and robust spatial information industry.*

With regard to policies and standards, ANZLIC's Metadata Guidelines were developed in 1996 and have since been widely accepted in Australia's spatial information community. The Guidelines define metadata elements that describe characteristics of spatial datasets maintained in the public and private sectors.

Associated with the first of the goals listed above, the Action Plan specifies that, by July 2001, ANZLIC will:

- review the emerging ISO 19115 international metadata standard,
- revise the ANZLIC Metadata Guidelines, and
- make any necessary recommendations to Standards Australia and Standards New Zealand regarding the adoption of the ISO metadata standard.

This document is the revised version of the ANZLIC Metadata Guidelines.

A key action associated with the second of the goals ("availability of accessible and SDI-compliant fundamental datasets") is the development of a national spatial clearinghouse. The clearinghouse will provide the environment for users to access data, products and services.

A cornerstone of clearinghouse development is metadata – information about data. The concept of the clearinghouse is based upon discovery of and access to spatial information. Metadata provides this gateway to spatial information.

The principal vehicle for the distribution of ANZLIC-compliant metadata is the Australian Spatial Data Directory (ASDD), a distributed web-based system. The ASDD was launched in 1998 and has since steadily grown in content to become the key source of spatial information in Australia with metadata being contributed by data custodians throughout Australia. In July 2000 the ASDD included twenty nodes and descriptions of almost 40,000 metadata records.

Currently, the ASDD (http://www.environment.gov.au/net/asdd/) provides a discovery service for spatial information. However, plans are underway to further develop the

[3] *a spatial data infrastructure (SDI) consists of fundamental spatial datasets which comply with prescribed technical standards and to which access is provided, through an integrated distribution mechanism under a set of consistent policies and administrative arrangements. Australia's implementation of an SDI is known as the Australian Spatial Data Infrastructure (ASDI).*

ASDD from a discovery system into a portal that also provides information about and access to spatial products and services. The ASDD gateway web site is maintained and developed by the Commonwealth on behalf of ANZLIC through the ASDD National Coordination Group (NCG). The ASDD NCG comprises representatives from Environment Australia, Australian Surveying and Land Information Group (AUSLIG), and the Bureau of Resource Sciences (BRS).

1.3 ANZLIC's Metadata Working Group

ANZLIC's vision for metadata is:

> Users of spatial data in Australia and New Zealand will have online access to information directories that are accurate and current and are in an internationally compatible format to better enable them to identify, to locate and, then, to access the information they require.

To achieve this vision, the following strategies are being progressed:

- Raising Awareness of the Importance of Metadata for Data Management
- Improving Collection and Management of Metadata
- Implementing the New International Metadata Standard
- Continuous improvement of the ASDD

In 1995, ANZLIC formed its Metadata Working Group (AMWG). The key outputs of the Group to date have been the development of the Core Metadata Elements and the design and coordination of the ASDD.

The Core Metadata Elements were first described in the ANZLIC Guidelines: Core Metadata Elements Version 1, July 1996. The document included an attachment "Recommended Guidelines for the Transfer of ANZLIC Metadata Core Element". A revised version (Version 2.0) of the attachment was issued in January 1997.

In 1997, AMWG coordinated the development of a simple PC-based tool (using Microsoft Access) to facilitate the collection of metadata. The tool, known as the Metadata Entry Tool (MET) was distributed free of charge. ANZLIC's MET has been widely distributed in both government agencies and the private sector.

In 1998 the Australian Spatial Data Directory was launched.

During 2000, AMWG carried out a review of the metadata guidelines. The review has resulted in the publication of Version 2 of the guidelines. Recently, AMWG has also been researching the development of Web-based metadata entry tools and metadata management tools.

Further information about the AMWG and its activities is given on its web page http://www.anzlic.org.au/asdi/metagrp.htm

1.4 Review of ANZLIC Metadata Guidelines

Version 1 of the ANZLIC Metadata Guidelines was published in 1996. An associated paper "Attachment 2: Recommended Guidelines for the Transfer of ANZLIC Metadata Core Element" was subsequently published. These reference documents have been well received by the geospatial industry. However, with use, some inconsistencies and deficiencies have been identified, and some additional metadata elements have been defined.

Consequently, in November 1999 the ANZLIC Metadata Working Group initiated a minor review of the ANZLIC guidelines. The review was seen as an interim measure pending the finalisation of the international standard "ISO 19115, Geographic information – Metadata". A further revision of the ANZLIC guidelines is likely to be undertaken once the international standard becomes stable.

This review has seven aims. These are:

- correct inconsistencies and deficiencies in the current core elements;
- describe elements that have been subsequently defined but are not included in the guidelines;
- harmonise the ANZMETA DTD with the Metadata Guideline Elements;
- describe the current working environment of ANZLIC, the Working Group and implementation of Australian Spatial Data Infrastructure including the Australian Spatial Data Directory and MET tool;
- describe the current environment for the transfer of ANZLIC metadata core elements;
- publish all the above ensuring the guidelines are consistent; and
- provide the foundation for the addition of new metadata elements to the ANZLIC profile.

The review and the publication of a revised version (Version 2) of the ANZLIC Metadata Guidelines is intended as an interim measure. When the international metadata standard has been finalised, it is envisaged that the ANZLIC Guidelines will be further revised to align with the international standard.

1.5 What's new in Version 2 of the ANZLIC Metadata Guidelines

The main changes between Version 1 and Version 2 of the Guidelines are summarised below:

- A complete re-write of the introductory chapters of Version 1 of the Guidelines. In particular, the Australian Spatial Data Infrastructure (ASDI), Australian Spatial Data Directory (ASDD) and *ISO 19115 Geographic Information – Metadata* standard are now recognised.
- Publication of ANZMETA XML Document Type Definition (DTD) 1.3 that fully supports the transfer of metadata records conforming with these guidelines.
- ANZLIC text format (character delimited ascii file) exchange format does not fully support this version of the elements and should only be used with legacy systems or metadata records.

- Metadata elements that are included in these guidelines and were not previously documented are:
  - ANZLIC Identifier
  - Geographic Bounding Box including:
    - North Bounding Latitude
    - West Bounding Longitude
    - South Bounding Latitude
    - East Bounding Longitude
- Geographic Extent Name is now expressed as three separate elements:
  - GEN Category
  - GEN Custodial Jurisdiction
  - GEN Name
- Date format has been changed to conform with ISO 8601. That is, Beginning Date, Ending Date and Metadata Date should now be expressed as yyyy-mm-dd
- Lineage, Positional Accuracy, Attribute Accuracy, Logical Consistency, Completeness and Additional Metadata elements are now 4000 characters long.
- Contact Position element is now 40 characters long.
- Definition of Additional Metadata has been changed to include any additional metadata that supports documentation of the dataset; not just a reference to where additional metadata may found.

The relevant section of the Guidelines should be consulted for further information.

1.6 This document

This document presents the Version 2 of the ANZLIC Metadata Guidelines. The introductory chapter gives background information on ANZLIC and the activities of its Metadata Working Group. Chapter 2 gives background information on metadata, outlines the current situation with regard to standards for metadata, and then outlines the ANZLIC core metadata elements and the transfer formats for ANZLIC metadata. Chapter 3 presents detailed guidelines for completing each of the ANZLIC core metadata elements, and Chapter 4 deals with issues associated with the implementation of metadata standards and the ANZLIC Guidelines in particular.

This document is designed for use by data custodians to assist them in their work of creating, storing and distributing core metadata elements. The document includes some introductory information on metadata, its use and its management. References are also included to sources of more detailed information that users may require as they become more experienced with metadata and its use as an aid to data management within their own agencies.

Chapter Two
Metadata and Metadata Standards

This chapter gives background information on metadata, outlines the current situation with regard to standards for metadata, and then describes the ANZLIC core metadata elements and the transfer formats for ANZLIC metadata.

2.1 What is Metadata?

Metadata is data about data. In other words, it is a structured summary of information that describes the data. Metadata includes, but is not restricted to, characteristics such as the content, quality, currency, access and availability of the data. For spatial information or information with a geographic component, metadata deals with the "what, when, who, where and how" of the data.

The concept of metadata is becoming increasingly familiar to people who deal with information and spatial information in particular. Library catalogues are a well-established example of metadata records that help with the discovery, use and management of collections of books, documents and other information. A map legend is another common example of metadata that provides information about the publisher and publication date, scale, accuracy, datum and other characteristics of the map. Metadata is also commonly used at the level of a series of printed maps. In a similar way, metadata is also applied to digital spatial data at the levels of series of datasets, individual datasets, tiles of datasets or even down to the feature level. The only major difference that exists between spatial metadata and metadata collected in conventional library catalogue systems is the emphasis on the spatial component – or the "where" element.

Metadata for spatial information is required for a range of purposes. Among other things, metadata is used to provide:

- detailed information about data collection methods, integration and analysis techniques applied to source data that is required to support the preparation of scientific reports;
- information about the accuracy of source datasets, processing history, and archival procedures that is required to effectively manage and utilise data within custodian organisations;
- information about projection specifications, scale, exchange format, compression and file system format that should accompany data transfers to other organisations;
- adequate descriptions of the content, quality and geographic extent of datasets that are required so potential users of existing data can assess its suitability for their own purposes;
- summary descriptions of content and quality, as well as contact information, that are required for inclusion in directory systems; and
- information about access software for datasets as well as software parameters that are needed for direct online display and query of data.

Metadata needs to be collected at different levels to satisfy different purposes. These purposes can be broadly grouped into five distinct but complementary categories, each of which requires a different level of information:

- Data discovery
- Data assessment to determine fitness for use
- Data access
- Data use
- Data transfer
- Data management

In general, the amount of information and the degree of detail that is required increases from the “data discovery” level through to the “data management” level.

Metadata for data discovery purposes represents the minimum amount of information required to convey to the enquirer the nature and content of the data resource. This falls into broad categories that answer the "what, when, who, where and how" questions about spatial data:

- *What* – title and description of the data set.
- *When* – when the data set was created and the update cycle, if any.
- *Who* – data set originator or creator and supplier.
- *Where* – the geographical extent of the data set based on lat / long coordinates, geographical names or administrative areas.
- *How* – how to obtain more information about the data set, how to order the data set, available formats, access constraints etc.

The ANZLIC Metadata Guidelines have been developed to promote a consistent standard of description for this small number of "core" metadata elements that are generally common for all types of data. The core metadata elements are designed to satisfy the needs of data discovery. Thus the core metadata can be used to identify what data exists, to describe its content and geographic extent, to enable potential users to assess the suitability of the data for various purposes, and to indicate where more information about the data can be obtained. As well as satisfying these needs, the core elements also form the basis for jurisdictions and agencies to develop additional metadata elements to provide more detailed metadata to assist the assessment, access, use, transfer and management of data.

2.2 Metadata Standards for Geographic Information

Ideally, metadata specifications should be linked to a documented standard that has been developed through a consultative process involving data custodians, data users and technical "experts". Such a standard will provide a basis from which agencies and data custodians will be able to further develop individual profiles or sub standards to meet their own detailed specific needs, particularly for data management within the agency. It is also probable that if a standard is well accepted within the geospatial community, commercial tools will be developed to assist in its implementation.

Standardisation and consistency are necessary to ensure that comparisons can be made by data users about the suitability of data from different sources. Two standards in particular have a strong influence on the development of the ANZLIC Metadata Guidelines – past and future.

2.2.1 FGDC Content Standard for Digital Geospatial Metadata.

In the United States, the Federal Geographic Data Committee (FGDC) approved their Content Standard for Digital Geospatial Metadata in 1994. This is a national spatial metadata standard developed to support the US National Spatial Data Infrastructure. The standard specified the structure and content of some 220 metadata elements. The FGDC standard influenced the early stages of the development of the ANZLIC Guidelines.

Version 2 of the FGDC standard was endorsed in 1998 with the addition of guidelines for the development of profiles and user-defined metadata entities and elements (extensibility). Further information is available on http://fgdc.er.usgs.gov/metadata/metadata.html

2.2.2 ISO 19115, Geographic information – Metadata.

The ISO 19100 series is a multi-part International Standard for Geographic Information that is being developed by Technical Committee 211 Geographic information/Geomatics of the International Organisation for Standardisation (ISO). ISO 19115, Geographic information – Metadata is part of the ISO 19100 series.

In February 2001, the Technical Committee 211 Secretariat announced that the standard ISO 19115, Geographic information – Metadata had been approved for publication as a Draft International Standard (DIS). This standard provides a procedure for describing digital geographic datasets using a comprehensive set of metadata elements. These elements support four major uses: discovery of data, determining data fitness for use, data access and use of data.

The standard provides information about the identification, extent, quality, spatial and temporal schema, spatial reference and distribution of digital geographic data. It is applicable to the cataloguing of datasets, dataset series and individual geographic features and feature properties.

It is envisaged that in the future all existing spatial metadata standards will converge through the ISO initiative. Indeed, most of the existing standards already have a great deal in common, and a robust international discussion has ensured that the ISO standard has accommodated most international requirements. The development of the ISO standard has equally benefited from the experiences of the various national bodies including ANZLIC.

Further information about the ISO standard and ANZLIC's participation in its development is given on http://www.anzlic.org.au/asdi/metaiso.htm

2.3 ANZLIC Metadata Guidelines

The approach taken by ANZLIC in developing the 1996 version of the ANZLIC Metadata Guidelines was deliberately less ambitious than that taken in the US. ANZLIC recognised that:

- users need a sufficient level of detail, clarity and accuracy in the metadata to be able to judge whether the data set meets their needs, and
- maintaining a comprehensive metadata directory imposes a significant burden on data custodians.

The ANZLIC Metadata Guidelines specify a set of core metadata elements that aims to strike a balance between these two factors. The core metadata elements are described in detail in Chapter 3.

While ANZLIC did not adopt the US approach in full, the ANZLIC Guidelines were, as far as possible, made consistent with the FGDC's guidelines on Digital Geospatial Metadata. The ANZLIC Guidelines were also made consistent with the Australia New Zealand Standard on Spatial Data Transfer AS/NZS 4270.

During the past three years, considerable liaison has occurred between Standards Australia, ANZLIC and ISO/TC 211 regarding the new international metadata standard for geographic information, ISO 19115. The aim of this liaison has been to harmonise the ANZLIC metadata elements with the new ISO standard.

A mapping between the ANZLIC core metadata elements and the draft version of the ISO 19115 has been prepared and is given in Appendix 1. This mapping may need to be amended as the development of ISO 19115 continues. The current mapping is maintained and is available at http://www.anzlic.org.au/asdi/isomap.htm

Once ISO 19115 is finalised, an ANZLIC “profile” will be implemented. This profile will consist of a choice of the metadata elements available in ISO 19115. The profile will supersede the existing ANZLIC set of core metadata elements. It is expected that minimal change will occur between the current ANZLIC metadata elements and the ISO-compliant profile.

Chapter Three
ANZLIC Core Metadata Elements

This chapter commences with an overview of the ANZLIC core metadata elements. It then presents guidelines for the preparation of metadata records. The guidelines include:

- general documentation guidelines,
- detailed guidelines for the content of each of the ANZLIC core metadata elements, and
- a specification for the format of the metadata record.

3.1 ANZLIC Elements Overview

The ANZLIC set of core metadata elements consists of 41 elements. They were originally based on the United States Federal Geographic Data Committee (FGDC)'s *Content Standard for Digital Geospatial Metadata* and have been made consistent with the *Australian New Zealand Standard on Spatial Data Transfer AS/NZS 4270*. This revision has also considered the draft standard *ISO 19115 Geographic information – Metadata.*

The ANZLIC core metadata elements are listed in Table 1 and are represented graphically in Figure 1. An example of a data model implementing these elements is shown in Figure 2.

To assist in describing and referencing core elements, those that relate to similar information have been grouped into ten different categories – dataset, custodian, description, data currency, dataset status, access, data quality, contact information, metadata date and additional metadata.

- ***Dataset***, ***Custodian*** and ***Description*** categories provide essential information about the content of the data, the agency responsible for its collection and maintenance, and the geographic area it covers. The inclusion of the Search Word(s) element is intended to make it easier for non-specialist users to search directories for information categorised under broad, general subject headings. Subject specialists would normally find more detailed information about the content of the dataset in the abstract.

- ***Data Currency*** and ***Dataset Status*** categories establish the time frame of the data described.

- ***Access*** category is intended to provide potential users of datasets with sufficient information to determine if the data is in a suitable format or able to be transformed for their purpose. Access to some data is restricted for a variety of reasons. However, it is important that the existence of these datasets and the constraints on their use for other purposes are clearly identified in directory systems.

- ***Data Quality*** information is critical to determining the usefulness of a dataset for a particular application. While lineage, positional accuracy, attribute accuracy, logical consistency and completeness have not always been well documented in the past, the national directory system must provide relevant information about data quality at the highest level – at least a summary or overview.

- ***Contact Information*** provides address details for the contact person in the contact organisation that is responsible for delivery of the dataset to other users.

- ***Metadata Date*** establishes the currency of the directory entry.

- ***Additional Metadata*** provides additional information that supports documentation of the dataset. This additional information may include a link to the source of more detailed information about a dataset through specific theme directory systems, such as the Marine and Coastal Data Directory of Australia ("Blue Pages"), individual agency level directories or Web-based sources of information. It may also include references to any relevant reports or other documentation.

For each of the core metadata elements, Table 1 describes the following characteristics:

- **Category**
- **Element**
- **Definition of Element**
- **Obligation (Obln)**
- **Maximum Occurrence (Max Occ)**
- **Type:** A combination of Field Type and Length of Field

Full details of these characteristics are given in Section 3.3 below.

Table 1: A summary of the ANZLIC Core Metadata Elements

Category	Element	Definition of Element	Obln	Max Occ	Field
Dataset	ANZLIC Identifier	The unique identifier given to the dataset by ANZLIC.	M	1	Text(15)
	Title	The ordinary name of the dataset.	M	1	Text(160)
Custodian	Custodian	The business name of the custodial organisation or responsible party associated with the dataset.	M	1	Text(120)
	Jurisdiction	The state or country in which the Custodian of the dataset is domiciled.	M	1	Text(30)
Description	Abstract	A brief narrative summary of the content of the dataset.	M	1	Text(2000)
	Search Word	Words likely to be used by a non-expert to find the dataset.	M	N	Text(60)
	Geographic Extent Name	The ordinary name of one or more pre-defined, known geographic objects that reasonably show the extent of geographic coverage of the dataset. This element is usually implemented as three discrete elements as listed below	O	N	
	GEN Category	Category to which the Geographic Extent Name belongs including map series, local government area, and drainage divisions and major river basins.	C	1[1]	Text(80)
	GEN Custodial Jurisdiction	Country, state or territory that is responsible for maintaining the detail of the geographic object	C	1[1]	Text(30)
	GEN Name	Name of the geographic object.	C	1[1]	Text(80)
	Geographic Extent Polygon	Boundary enclosing the dataset expressed as a closed set of geographic coordinates (latitude, longitude) of the polygon referenced to GDA94. This is an alternate way of describing geographic extent of the dataset if no pre-defined area is satisfactory.	O	N	Text(1000)
	Geographic Bounding Box	A rectangle defining the minimum and maximum coordinates of the entire data. This element is implemented as four discrete elements as listed below.	M	1	
	North Bounding Latitude	Northern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	1	Signed Real Number
	South Bounding Latitude	Southern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	1	Signed Real Number
	East Bounding Longitude	Eastern-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees	M	1	Signed Real Number
	West Bounding Longitude	Western-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.	M	1	Signed Real Number
Data Currency	Beginning date	Earliest date at which the phenomena in the dataset actually occurred.	M	1	Text(10)
	Ending date	Latest date at which the phenomena in the dataset actually occurred.	M	1	Text(10)
Dataset Status	Progress	The status of the process of creation of the dataset.	M	1	Text(20)

	Maintenance and Update Frequency	Frequency of changes or additions that are made to the dataset after its initial completion.	M	1	Text(20)
Access	Stored Data Format	The format in which the dataset is stored by the custodian.	M	1	Text(500)
	Available Format Type	The format in which the dataset is available.	O	N	Text(240)
	Access Constraint	Any restrictions or legal prerequisites that may apply to the access and use of the dataset including licensing, liability and copyright.	M	1	Text(500)
Data Quality	Lineage	A brief history of the source and processing steps used to produce the dataset.	M	1	Text(4000)
	Positional Accuracy	A brief assessment of the closeness of the location of spatial objects in the dataset in relation to their true position on the Earth.	M	1	Text(4000)
	Attribute Accuracy	A brief assessment of the reliability assigned to features in the dataset in relation to their real world values.	M	1	Text(4000)
	Logical Consistency	A brief assessment of the degree of adherence of logical rules of data structure, attribution and relationships. Data structure can be conceptual, logical or physical.	M	1	Text(4000)
	Completeness	A brief assessment of the extent and range in regard to completeness of coverage, completeness of classification and completeness of verification.	M	1	Text(4000)
Contact Information	Contact Organisation	Name of the organisation from which the dataset may be obtained.	M	1[2]	Text(120)
	Contact Position	The position in the Contact Organisation that will answer questions about the dataset.	M	1[2]	Text(40)
	Mail Address	Postal address or delivery point of the Contact Position.	M	2[2]	Text(40)
	Locality	Locality associated with the Mail Address.	M	1[2]	Text(60)
	State	Aust: State associated with the Mail Address NZ: Optional extension for Locality.	M	1[2]	Text(40)
	Country	Country associated with the Mail Address.	M	1[2]	Text(40)
	Postcode	Aust: Postcode associated the Mail Address. NZ: Optional postcode for mail sorting.	M	1[2]	Text(10)
	Telephone	Telephone number of the Contact Position.	O	1[2]	Text(25)
	Facsimile	Facsimile number of the Contact Position.	O	1[2]	Text(25)
	Electronic Mail Address	Electronic Mail Address of the Contact Position.	O	1[2]	Text(80)
Metadata Date	Metadata Date	Date on which the metadata record was created or modified.	M	1	Text(10)
Additional Metadata	Additional Metadata	Any additional metadata the supports documentation of the dataset including a reference to another directory or report.	O	1	Text(4000)

[1] Dependent upon the repeatability of the parent element.
[2] Number of occurrences associated with each contact – a dataset may have many contacts

Figure 1: Graphical Representation of the ANZLIC Core Metadata Elements: Version 2

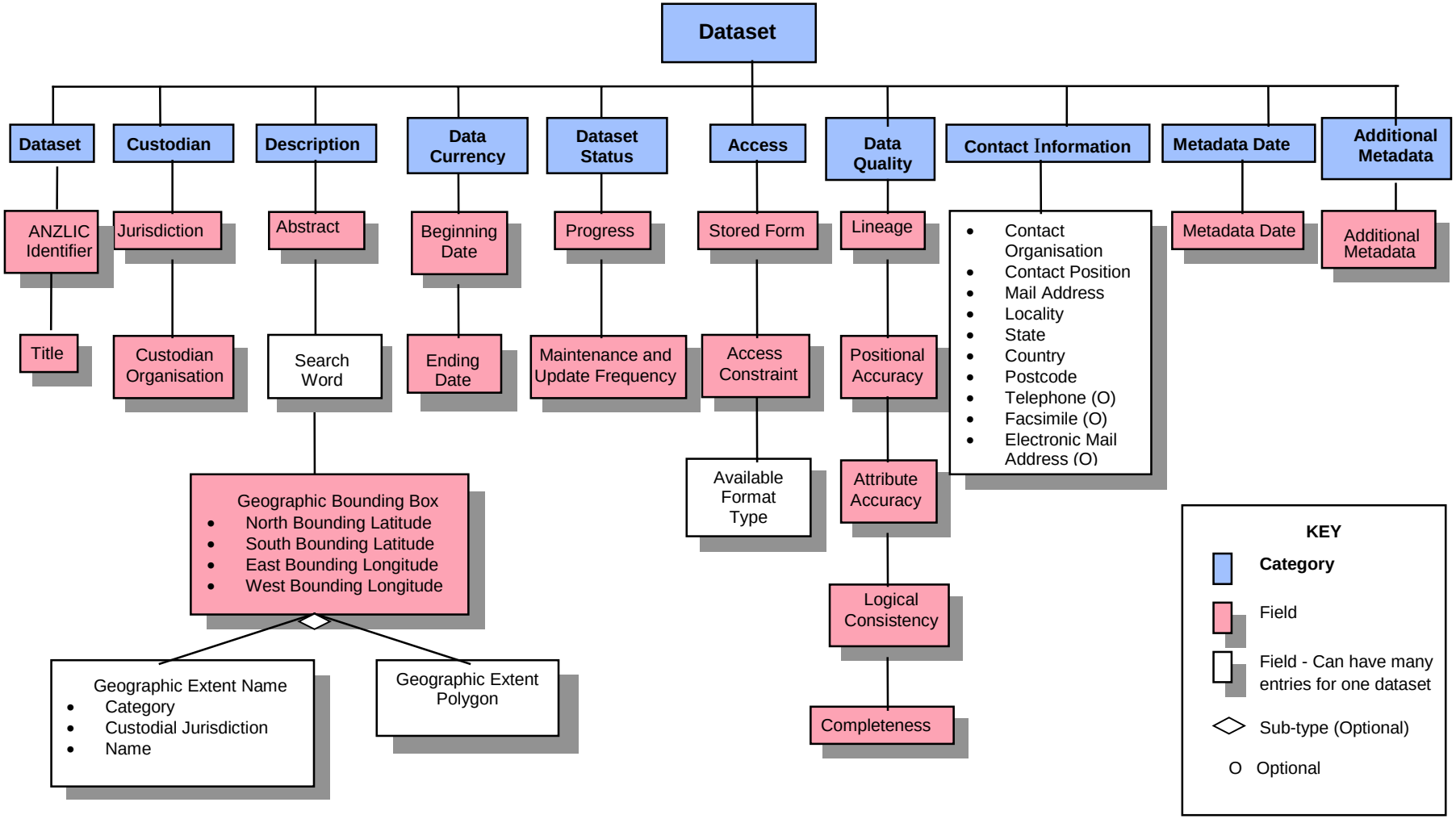
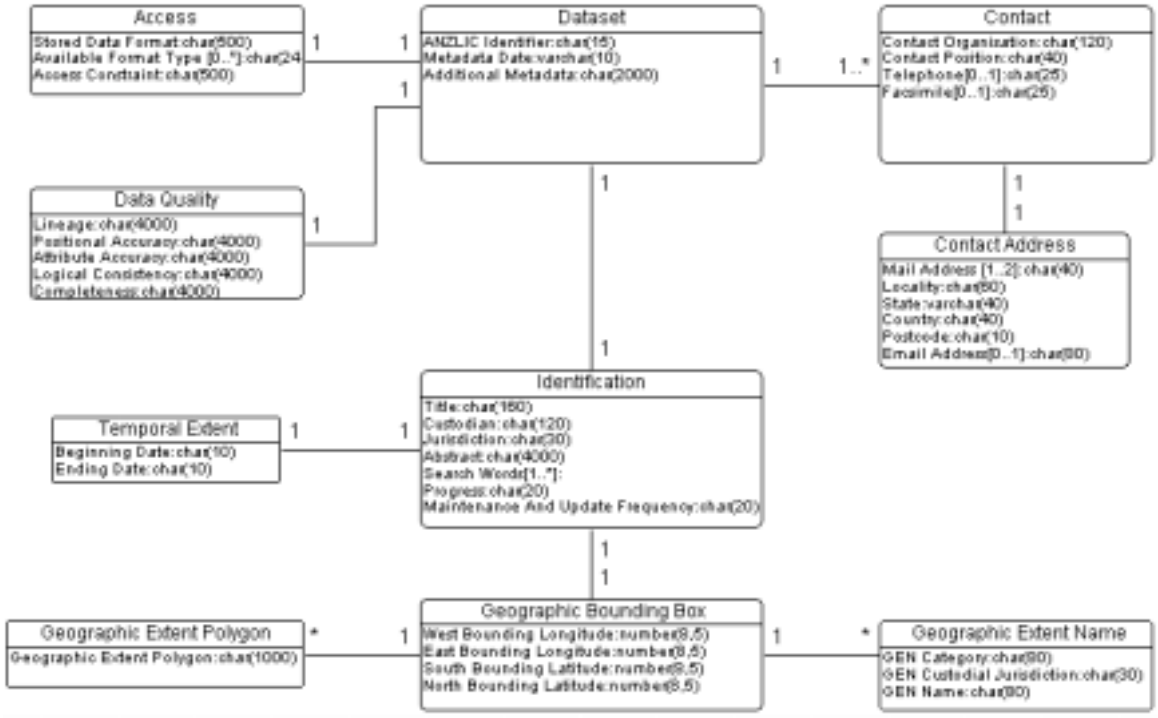


Figure 2: An Example of a Data Model Implementing the ANZLIC Core Metadata Elements



3.2 General Documentation Guidelines

Wording and phrasing should be carefully considered when preparing a metadata record for a particular dataset. The content of each element should be clear and succinct so as to ensure that the dataset can be easily discovered when searching spatial directories and undertaking general Internet searches. This is especially important when completing key elements such as Title and Abstract.

The metadata record should be written so that it can be read and understood not only by the specialised or technical users of the data, but also by general users of spatial information. Where appropriate, the metadata record should include references to more technical documents of particular interest to specialists.

Certain characters are not allowed in the content including ampersand “&”, less than “<” and greater than “>”. These characters are reserved in HTML and XML and have special uses. Use the full words “and”, “less than” and “greater than” or use the XML Character Entities & < and >. Double quotes (“), single quotes (‘) and percents (%) may also be misrepresented when published or searched.

Care should be taken when copying and pasting content from other applications such as Word documents. This action can introduce hidden characters in the metadata record that may adversely affect applications that read the metadata record. This problem may be avoided by copying from a plain text editor.

3.3 Guidelines for the content of ANZLIC Core Metadata Elements

In this section, detailed guidelines are presented for the content of each of the separate metadata elements that together make up the metadata record. Each of the core metadata elements is dealt with in turn, and for each element the detailed guideline is structured under the following headings:

Heading	Description
Category	Name of the category (see Section 3.1 and Table 1 above) in which the metadata element is grouped.
Element	Name of the element.
Definition of Element	A short explanation of the purpose of the element including any important issues that should be addressed when completing the element.
Obligation	An element may be Mandatory (M), Optional (O) or Conditional (C). Mandatory requires an element to be completed whilst optional means the element may be left blank. Conditional means completion of the element may become mandatory if another element is completed. For instance, GEN Category must be completed if either GEN Custodial Jurisdiction or the GEN name is completed. In other instances it may be left blank.
Maximum Occurrence	The number of times that an element may be repeated. The repeatability of an element is defined in relationship to its parent. For instance, a metadata record may have many Contact Organisations associated with it even though each Contact metadata record may have only one Contact Organisation.
Allowable Content	A set of terms that can be used within the element. Element qualifiers refine the meaning of an element, allowing more specific description.
Format Rules	A set of standards/methods that indicate how the element value is encoded or from which fixed vocabulary (thesaurus) the element value originated. The list of value qualifiers given for each element is not exhaustive, but consists of indicative examples only.
Field Type	Data type that is applicable to the element. Field Types include Text and Signed Real Number.
Length of Field	Length of the data type.
Other Comments	Additional relevant information about the element.
Examples	Some examples of the element's use.

Category: Dataset

Element: ANZLIC IDENTIFIER

Definition of Element:

This is the unique identifier given to the dataset by ANZLIC. It ensures all datasets listed in the ASDD and jurisdictional directories are uniquely and permanently identified.

The ANZLIC Identifier is assigned when the metadata record for the dataset is created. It will remain unchanged even if the metadata provider or custodian of the dataset changes.

This is not meant to be an intelligent key. It is not always possible to identify the Custodian of the dataset using the ANZLIC Identifier as the ANZLIC Identifier of a dataset will not change when the custodianship of the dataset is transferred from one custodian to another.

It is the responsibility of the dataset custodian to ensure the ANZLIC Identifier is unique. Difficulties are likely to be incurred when searching the ASDD or importing data if the ANZLIC Identifier is not unique.

The ANZLIC Identifier is a structured key and has the following four components:

- ANZLIC — 3 character prefix identifying the metadata record is within the ANZLIC directory system.
- JURISDICTION — 2 character code identifying a jurisdiction.
- ORGANISATION — 4 digit integer identifying the organisation that initially published the metadata.
- ITEM — 6 digit integer identifying the directory item.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

- ANZLIC — ANZ
- JURISDICTION

AC	Australian Capital Territory
CW	Commonwealth
NS	New South Wales
NT	Northern Territory
NZ	New Zealand
QL	Queensland
SA	South Australia
TA	Tasmania
VI	Victoria
WA	Western Australia

Format Rules:

- ORGANISATION — 4 integers with leading spaces padded with a zero (0).
- ITEM — 6 integers with leading spaces padded with a zero (0).

Field Type: Text

Field Length: 15 characters composed of:

- ANZLIC — 3 characters
- JURISDICTION — 2 characters

- ORGANISATION 4 characters
- ITEM 6 characters

Other comments:

The ANZLIC Identifier may be likened to an International Standard Book Number (ISBN) which is a unique identifier that is applied to each edition or variant of a publication.

The ANZLIC Identifier facilitates linking of the metadata record to and from other information systems including the Internet and other directories.

The Identifier is also used as the unique file name for the metadata document, e.g. ANZVI0808020041.xml.

As the ANZLIC Identifier is structured key, it is allocated using a strict hierarchy. ANZLIC is in responsible for identifying a JURISDICTION that may allocate an ORGANISATION identifier. These jurisdictions are listed above. The AMWG member in each JURISDICTION in turn is responsible for managing the allocation of ORGANISATION identifiers. Each ORGANISATION must then ensure a unique ITEM identifier is applied to each dataset.

Example:

Example 1:
ANZTA2411000001

Category: Dataset

Element: TITLE

Definition of Element:

This element represents the name that is in common usage.

It provides a clear and concise indication of the content of the dataset.

The dataset title should be assigned by the custodial organisation.

Allowable Content:

Careful consideration should be given when naming a dataset. It is an important element for the identification and discovery of a dataset.

The name should be in plain language (ie preferably not solely in acronym form) and should convey a clear impression of the information contained in the dataset.

The title should be as descriptive as possible without being verbose. It should include the spatial and, if not currently maintained, the temporal extent of the dataset

An ordinary user should easily understand the title of the dataset. In other words, it should not be composed entirely of acronyms or short titles that are only evident to an existing user or someone in the custodian organisation associated with the dataset.

If the dataset is also known by an acronym or synonym include this at the end of the full name.

The title should not include any special characters such as ampersands (&), double quotes (“), single quotes (‘), less than and greater than signs (<>) and percents (%) as these may be misrepresented when being published or searched. Special characters that may be used include round brackets “()”, hyphens “-“ and commas.

Obligation: Mandatory

Maximum Occurrence: 1

Format Rules:

A plain language name for the dataset should be used in preference to acronyms unless the acronym is commonly used and widely recognised by the public.

Field Type: Text

Field Length: Maximum 160 characters.

Other comments:

The title of the dataset is an important search field. Often the title will form the basis of a targeted search in a data directory such as the Australian Spatial Data Directory (ASDD). Likewise it may be part of a HTML Title tag which Internet search engines thrive upon.

A spatial dataset is any collection of information that can be geographically referenced. It may be about environment, transport, population, utilities, property or any other geographic information.

Datasets need not be in digital form. They also include printed and manuscript cartographic resources such as maps and aerial photographs.

The international standard “ISO 19115, Geographic information – Metadata” defines a dataset as an “identifiable collection of data”, and notes that a “dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a dataset.”

In general terms, each discrete data resource should have a discrete metadata record. Metadata can exist at the collection level (e.g. map series), at the data product level (e.g. an airphoto mosaic), at a dataset level (e.g. a vector dataset), a group of features of a certain type (e.g. road bridges) or a specific feature (e.g. the Sydney Harbour Bridge). In practice, most metadata is collected at the dataset level. Further detailed information on metadata hierarchy and its implementation is available in Annex H and Annex I of the international standard ISO 19115.

In line with this concept of metadata hierarchy, a dataset may be described in more than one metadata record. A dataset may be part of a collection. In this instance, the dataset may be described in two metadata records: as a dataset in its own right and as part of a collection. In another instance, the dataset may be more discrete. For example, an aerial photograph may be described individually and as part of a collection of aerial photographs. An organisation may choose to produce a metadata record for each aerial photograph and a metadata record for the collection.

Where the dataset is a component of a collection it is recommended that the collection name be also included in the dataset title, in order to identify the dataset’s relationship to other integrated datasets. In this case, use an ordinary descriptive name, followed by the collection name or acronym.

It is recommended that metadata records are created for all datasets held by the organisation, including those datasets for which the organisation is not custodian, to facilitate internal use and management of data. Ideally, all datasets sourced externally will be accompanied with their own existing metadata records.

Example:

Example 1:
A Study of the Flora of the Clarence Valley

Example 2:
Vicmap Digital Property (VDP)

Example 3:
Bathymetry of the Gulf of Carpentaria and the Arafura Sea, Edition 1

Category: Custodian

Element: CUSTODIAN

Definition of Element:

This is the business name of the custodial organisation or responsible party associated with the dataset.

Custodianship is a concept recognised by ANZLIC and the draft *ISO 19115 Geographic Information – Metadata* standard. Custodianship is described in more detail in *ANZLIC Issues Paper No 1, April 1990.*

The custodian is the organisation responsible for ensuring the accuracy, currency, storage, security and distribution of the dataset. In fulfilling these responsibilities, the custodian is expected to consult with, and take into account the needs of users other than itself. The custodian may choose to delegate these functions but remains responsible for the published metadata record.

The custodian of a dataset need not necessarily be the holder of the copyright, or the originator of the data, although in many cases the custodian will be both of these.

A private organisation or an individual may be a custodian.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

The recognised business name of the organisation should be given in full.

If the organisation is also known by a common acronym include this at the end of the full name.

If the organisation is a government department or agency, the country, state or territory that the organisation has jurisdiction over should be included.

Format Rules: Ordinary name of organisation followed where relevant by its acronym in round brackets**.**

Field Type: Text

Field Length: Maximum 120 characters.

Other comments:

For more information on the concept of custodianship please see ANZLIC Issues Paper No 1 1990 at http://www.anzlic.org.au/policy/custodn/contents.htm

A dataset may only have one custodian. Other organisations that have a vested interested in the custodianship of dataset may be acknowledged in the Abstract or Additional Metadata.

Example:

Example 1:
VICROADS

Example 2:
NSW Environment Protection Authority

Example 3:
Australian Surveying and Land Information Group (AUSLIG)

Category: Custodian

Element: JURISDICTION

Definition of Element:

The jurisdiction is the name of the State or Country in which the custodian of the dataset is domiciled. If the custodian has offices in more than one Australian state, the custodian may choose “Australia” or one of the states in which it is domiciled. If the custodian is an agency of the Commonwealth of Australia or the Government of New Zealand, the name “Australia” or “New Zealand” should be used

If the custodian is a private company, individual, institution, community organisation or group or other non government entity, it is the name of the jurisdiction most relevant to its activities. For instance, the jurisdiction Australia or New Zealand would apply to a company operating nationally. A local community group operating only in Tasmania, would have the jurisdiction Tasmania.

If the custodian is an Australian local government authority, the jurisdiction is the State or Territory of the relevant local government area.

Obligation: Mandatory

Allowable Content for Australia and New Zealand:

Australia
Australian Capital Territory
New South Wales
New Zealand
Northern Territory
Queensland
South Australia
Tasmania
Victoria
Western Australia

Format Rules: Full name of the jurisdiction.

Field Type: Text

Field Length: Maximum 30 characters.

Other comments:

This element is included in recognition of the federal nature of Australia. It is assumed that many of the datasets likely to be included in high level directories originate in government organisations.

This element is not particularly meaningful when applied to non-government organisations. At best it indicates which jurisdiction may have the closest relationship to the custodian of the dataset.

Over the years this element has lost its relevance. Today a significant amount of data is collected and maintained by non-government organisations. As this element is not particularly meaningful in this instance, it is likely to be discarded in a major revision of these guidelines.

The Jurisdiction Custodian that forms part of the ANZLIC Identifier may be different from the Jurisdiction.

Examples:

See Allowable Content above.

Category: Description

Element: ABSTRACT

Definition of Element:

This element is a brief narrative summary of the content of the dataset. Like the Title of a dataset, careful consideration should be given when preparing an Abstract as it is an important element for the identification and discovery of a dataset.

Other material to be conveyed in this element may include a description of the purpose for which the dataset was created, and a textual description of the spatial extent of the data contained in the dataset.

Other information usefully conveyed in the abstract could include a listing of the attributes about which data is held, whether the dataset is a stand alone dataset or part of an integrated system.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

Generally, the Abstract should describe the contents of the dataset for a non-expert user, in plain language.

It should be more than a repeat of the title.

Format Rules: Free text.

Field Type: Text

Field Length: Maximum 2000 characters.

Other comments: Nil

Example:

Example 1: *Psyllid Affected Areas at 1:25 000 (PSYLLID25*)
This layer shows the distribution and severity of psyllid infestation of selected Forest Blocks. It facilitates targeting of psyllid control and monitoring and may be of use in predictive modelling. This is an interim layer awaiting the formation of the Psyllid Working Group.

PSYLLID25 is used to target areas affected by psyllids when planning control works and monitoring programs. This layer may be overlayed with temperature, rainfall, elevation and aspect to determine correlations and to facilitate predictive modelling.

Example 2: *Aeroplan Landbase*
The Aeroplan Landbase is a topographic database of surface features derived from aerial photography. It consists of linework, polygons and attributes. The base product is Aeroplan 0.5, 1:1,000 scale for urban areas.

The Aeroplan Landbase provides an economic and accurate digital map base for facilities management and many engineering applications. It can be used in conjunction with DCDB and image maps.

Example 3: *Bathymetry of the Gulf of Carpentaria and the Arafura Sea Edition 1*

The bathymetry of the Gulf of Carpentaria and the Arafura Sea, Edition 1, is a dataset that contains digital bathymetric information of the Gulf of Carpentaria and the Arafura Sea, Australia, Papua New Guinea, and Indonesia. The digital data in this data base are the latitude longitude coordinates of the end points of vectors that represent bathymetric contours. Contours were hand drawn using digital systematic survey soundings obtained from the RAN Hydrographic Office and using a variety of nautical charts from a variety of sources.

Example 4: *Brisbane Region Street and Address Network - Version 3.3*
Street centrelines with address ranges for all areas within the Brisbane Region. The dataset includes street classification hierarchies, dual carriage ways for major four lane highways, freeways and motorways, roundabouts and one-way indicators. The dataset is a subset of a street and address network that covers the whole of Queensland.

Category: Description

Element: SEARCH WORD

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.

Obligation: Mandatory

Maximum Occurrence: Many

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

Field Length: Maximum string 60 characters.

Other comments:

It is expected that most implementations of these ANZLIC guidelines will provide the above Search Words in a pick list. The sophistication of the search software will vary from system

implementation to system implementation. The following operations of the Search Words in the Search Words field should be possible (as a minimum):

- Selecting the word AGRICULTURE should collect all datasets with this word whether alone or in combination, including, for example, AGRICULTURE Crops.

- If, however, the Search Word AGRICULTURE Crops only were selected, any datasets with the Search Word of AGRICULTURE alone, or AGRICULTURE Irrigation, would not be picked up.

- Qualifier words are intended to allow the searcher to be very specific. For instance, a search using WATER Groundwater Research would collect only those datasets where all of those three criteria were entered.

Searching on Qualifier words only (eg searching for all datasets where the word Monitoring is used) will depend on the system implementation and software.

Searching on word combinations in fields other than the Search Word field will also depend upon the system implementation and software.

Do not list a major Search Word ie. “WATER” when a more detailed Search Word ie. “WATER Rivers” is provided. That is, a metadata record would not be described by the Search Words “WATER” and “WATER Rivers; preferably the latter.

Example:

Example 1: *Bathymethry of the Gulf of Carpentaria and the Arafura Sea, Edition 1*
MARINE Geology and Geophysics

Example 2: *Possible Scenarios for the Spread of Rabbit Calicivirus Disease (RCD) to December 1995*
DISEASE
FAUNA Exotic
FAUNA Vertebrates
AGRICULTURE

Example 3: *Status Report on Water Quality in the Tweed, Brunswick, Richmond and Clarence Rivers*
WATER Hydrology
WATER Quality
WATER Quality Monitoring

Category: Description

Elements: GEOGRAPHIC EXTENT NAME

Definition of Element:

The ordinary name of one or more pre-defined, known geographic objects that will reasonably show the extent of geographic coverage of the dataset. It is not intended that this element will show the exact extent of the dataset.

The geographic extent of a dataset may be described by this element or the Geographic Extent Polygon element but not both.

Where the coordinate pairs have to be manually entered, the Geographic Extent Name element should be completed in preference to the Geographic Extent Polygon element. Where it is possible to calculate the coordinates directly from the dataset, the Geographic Extent Polygon element should be completed in preference to the Geographic Extent Name element.

Multiple entries are possible.

These lists of geographic extent names are usually recorded in a government gazetteer.

The Geographic Extent Name consists of the following three elements that together uniquely identify a geographic object:

- GEN_CATEGORY Category to which the Geographic Extent Name belongs.
- GEN_CUSTODIAL_JURISDICTION
  Country, state or territory that is responsible for maintaining the detail of the geographic object.
- GEN_NAME Name of the geographic object

Obligation: Optional

Maximum Occurrence: Many

Allowable Content for Australia:

The following categories are recognised at a National level. Other categories may be used but they will not be recognised at a National level and they will not be contained in the Geographic Extent Name thesaurus that supports this metadata element.

- GEN_CATEGORY Australia
  State or Territory
  External Territories
  1:1 000 000 Map Series
  1:250 000 Map Series
  1:100 000 Map Series
  1:50 000 Map Series
  1:25 000 Map Series
  Local Government Areas (LGA)
  Statistical Local Areas (SLA)
  Drainage Divisions and Major River Basins
  Interim Biogeographic Regionalisation of Australia (IBRA)
  Interim Marine and Coastal Regionalisation of Australia (IMCRA)
  Australian Navigational Charts
  Ocean and Sea Regions

Marsden Grid Squares 1 degree
Marsden Grid Squares 5 degrees
Marsden Grid Squares 10 degrees

- GEN_CUSTODIAL_JURISDICTION
  Australia
  Australian Capital Territory
  New South Wales
  New Zealand
  Northern Territory
  Queensland
  South Australia
  Tasmania
  Victoria
  Western Australia
  Other

Allowable Content for New Zealand:

One or more of the following:

New Zealand [for national coverage]
NZ Antarctic Territory
North Island
South Island
Stewart Island
Offshore Islands
NZ Overseas Territories
Regional Authorities
Territorial Authorities (Districts and Cities)
New Zealand Exclusive Economic Zone [200 mile limit]
NZ Territorial Sea [12 mile limit]
NZ Continental Shelf [when defined]
Infomap 262 Series 1:250 000 Map Sheets
Infomap 260 Series 1:50 000 Map Sheets
Statistical Areas
Maori Land Court Districts
Iwi Areas (Maori Tribal Regions)
Metropolitan and major urban areas
National Parks and Maritime/Historic Parks
Ecological Regions and Districts
Major Catchment Areas
Regional Health Authority Areas

Format Rules for New Zealand:

There may be one or many entries for this element. Each entry should be selected from the objects from the classifications set out above. If none of the objects is a suitable representation of geographic extent, then the next field (Geographic Extent Polygon) should be used.

Local Authority Names are as defined by the Local Government Act.

Geographic Extent Polygons for New Zealand are as recorded by Land Information New Zealand except for the following:

Regional and Territorial Authorities as recorded by Statistics New Zealand and Land Information New Zealand.

Statistical Areas as defined by Statistics New Zealand.

Maori Land Court Districts and Iwi Areas (Maori Tribal Regions) as defined by the Maori Land Court.

Metropolitan and major urban areas as defined by Statistics New Zealand and Land Information New Zealand.

National Parks and Maritime/Historic Parks as defined by the Department of Conservation.

Ecological Regions and Districts as defined by the Department of Conservation.

Major Catchment Areas as defined by Regional Authorities.

Regional Health Authority Areas as defined by the Ministry of Health.

Field Type: Text

Field Length:

- GEN_CATEGORY Maximum string 80 characters
- GEN_CUSTODIAL_JURISDICTION
  Maximum string 30 characters
- GEN_NAME Maximum string 80 characters

Other comments: Repeating values allowed.

A current list of Geographic Extent Names including associated metadata and downloadable files is available at http://www.auslig.gov.au/asdi/genreg.htm

Where the coordinate pairs have to be manually entered, the GEN element has many advantages over the GEP element. These are:

- Reducing the likelihood of making errors when calculating the coordinates of the geographic bounding box. This is the primary purpose of the element.
- Quicker to complete.
- Easier to relate to a GEN; an object such as a Local Government Area with which they may be familiar, than a GEP; a set of coordinates.
- Not as complex. There is no need to worry about the format, accuracy and datum of the coordinates. That is latitude, longitude versus longitude, latitude, where the comma and spaces go, how many decimal points and the datum that is to be used.
- More useful when making a free text search
- More meaningful. A user may get a feel for the geographic extent of a dataset from the GEN eg. Hindmarsh LGA, which they probably will not get from a set of coordinates.

The GEN Categories that are recognised at the National Level are described in the following table. The Notes column provides some GEN Category specific formatting and indicates where definitive source information may be found.

Table 2: Geographic Extent Names

Category	Custodial Jurisdiction	Notes
Australia	Australia	The only acceptable content is: Australia excluding external territories Australia including external territories
State or Territory	States/Territories	The only acceptable content is one or more of the six States and two Territories.
External Territories	Australia	There are seven official external territories administered by Australia. See the listing on AUSLIG's Website: http://www.auslig.gov.au/products/maps/external.htm. The only acceptable content is one or more of the seven external territories.
1:1 000 000 Map Series 1:250 000 Map Series 1:100 000 Map Series	Australia	The map sheet name will be listed first, followed by the map sheet number. Both the 1: 1 000 000 and 1:250 000 Map Series includes offshore maps.
1:50 000 Map Series	Australia/ States/Territories	The map sheet name will be listed first, followed by the map sheet number. The Commonwealth is custodian for the Army's 1:50 000 series (areas not covered by the States or Territories).
1:25 000 Map Series	States/Territories	The map sheet name will be listed first, followed by the map sheet number.
Local Government Areas (LGA)	States/Territories	The Australian Bureau of Statistics Catalogue 1216.0 – Australian Standard Geographical Classification lists Local Government Areas. Latest edition is 17th 1999. Available for download (on subscription) from the ABS Web site: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/NT0000A726.
Statistical Local Areas (SLA)	Australia	See listing in Australian Bureau of Statistics Catalogue 1216.0 – Australian Standard Geographical Classification (as above).

Category	Custodial Jurisdiction	Notes
Drainage Divisions and Major River Basins	Australia	There are 12 drainage divisions comprising 244 major river basins. Refer to the listings and terminology in Review of Australia's Water Resources, 1975 (Canberra, AGPS, 1976). The only acceptable content is one or more of these drainage divisions (12) or major river basins (244).
Interim Biogeographic Regionalisation of Australia (IBRA)	Australia	See listing on the Environment Australia Web site: http://www.environment.gov.au/bg/nrs/ibraimcr/ibra_95/app1.htm
Interim Marine and Coastal Regionalisation of Australia (IMCRA)	Australia	See listing on the Environment Australia Web site: http://www.environment.gov.au/marine/mpa/imcra/index.htm
Australian Navigational Charts	Australia	See listing on the Australia Hydrographic Office's Web site: http://www.hydro.navy.gov.au/prodserv/index3.htm
Ocean and Sea Regions	Australia	See listing on the Blue Pages Web site: http://www.environment.gov.au/cgi-data/mcdd/location.options
Marsden Grid Squares 1 degree Marsden Grid Squares 5 degrees Marsden Grid Squares 10 degrees	Australia	Created by the World Meteorological Organisation and adopted by the Intergovernmental Oceanographic Commission. Available from AODC, ERIN and CSIRO Division of Marine Research.

For further information on geographic areas and regions in New Zealand refer to the “Atlas of New Zealand Boundaries” maintained by the Department of Geography, University of Auckland.

Example:

Example 1:

- GEN_CATEGORY Australia
- GEN_CUSTODIAL_JURISDICTION Australia
- GEN_NAME Australia excluding external territories

Example 2:

- GEN_CATEGORY 1:100 000 Map Series
- GEN_CUSTODIAL_JURISDICTION Australia
- GEN_NAME Bendigo 7724

1:100 000 Map Sheet

Example 3:

- GEN_CATEGORY Local Government Area (LGA)
- GEN_CUSTODIAL_JURISDICTION
  Queensland
- GEN_NAME Ipswich City Council

Category: Description

Element: GEOGRAPHIC EXTENT POLYGON

Definition of Element:

Boundary enclosing the dataset expressed as a closed set of geographic coordinates (latitude, longitude) of the polygon referenced to GDA94. It is not intended that this element will show the exact geographic extent of the dataset.

A set of at least four coordinate pairs (a closed polygon) are used to record the longitude and latitude in decimal degrees of the geographic extent of the dataset referenced to GDA94. The last point replicates the first point.

The geographic extent of a dataset may be described by this element or the Geographic Extent Name element but not both.

Where it is possible to calculate the coordinates directly from the dataset, this element should be completed in preference to the Geographic Extent Name element. If the coordinate pairs must be manually entered, the Geographic Extent Name should be completed in preference to this element.

Multiple Geographic Extent Polygons may be described.

Obligation: Optional

Maximum Occurrence: Many

Allowable Content:

Coordinates are reference to GDA94.

Longitude and latitude coordinates are given in decimal degrees.

Complex extents of irregular polygons should not be described in great detail. A generalised or stylised polygon or minimum bounding rectangle should be provided.

Interior polygon rings (doughnut polygons) cannot be described.

Format Rules:

Coordinates may be up to five decimal places.

A coordinate pair is specified as a longitude coordinate and latitude coordinate separated by a space (x,y). Coordinates pairs will be separated by a comma.

Negative coordinates will be signed, that is, have a leading negative prefix "-" while positive coordinates will be unsigned.

It is suggested that polygon coordinates should be specified in a clockwise order starting at the north-west vertex and proceeding around the polygon in a clockwise order.

Field Type: Real number

Length of Field: Maximum 1000 character string per polygon.

Other comments:

The distance covered by 0.001 degrees of latitude remains constant at 110 metres. However, the distance covered by 0.001 degrees of longitude decreases upon moving southwards. At the Tropic of Capricorn (22.5 degrees latitude) 102 metres is covered, on Port Phillip Bay (30 degrees latitude) 86 metres is covered and at Hobart (42 degrees latitude) 81 metres is covered by 0.001 degrees of longitude.

In this instance, coordinates referenced to GDA94 and WGS 84 are, for practical purposes, inter-changeable.

Geographic Extent Name should be completed in preference to Geographic Extent Polygon as it describes the area in common terms ie. the name of a Local Government Area, rather than a set of numbers that most readers have difficulty relating to. It also reduces the likelihood of errors when entering the geographic coverage of a dataset.

Ideally coordinates should be specified to at least one metre accuracy (five decimal places) to facilitate accurate searching by coordinates. However, coordinates specified to 1 kilometre accuracy (2 decimal places) are acceptable, especially when manually calculating the coordinates or describing a fuzzy shape.

Example:

Example 1:
115.5811 -31.4553,116.4157 -31.4618,115.5654 -32.4672,116.4092 -32.4740,
115.5811 -31.4553

Example 2:
130.0 -3.0, 149.0 -3.0,149.0 -18.0,130.0 -18.0, 130.0 -3.0

Category: Description

Element: GEOGRAPHIC BOUNDING BOX

Definition of Element:

This rectangle defines the minimum and maximum coordinates of the entire dataset. These coordinates may be used to filter datasets according to the area of interest and to generate a box showing the approximate coverage of a dataset.

The Geographic Bounding Box consists of the following four elements:

- North Bounding Latitude — Northern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.
- South Bounding Latitude — Southern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.
- East Bounding Longitude — Eastern-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.
- West Bounding Longitude — Western-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

Coordinates are referenced to GDA94.

- North Bounding Latitude — -90.0 <= North Bounding Latitude value <= 90.0; North Bounding Latitude value >= South Bounding Latitude value.
- South Bounding Latitude — -90.0 <= South Bounding Latitude value <= 90.0; South Bounding Latitude value <= North Bounding Latitude value.
- East Bounding Longitude — -180.0 <= East Bounding Longitude value <= 180.0
- West Bounding Longitude — -180.0 <= West Bounding Longitude value <= 180.0

Format Rules:

Express longitude and latitude coordinates in decimal degrees up to five decimal places (approx. 1 metre) that reflect the accuracy of the source data.

Latitudes in the southern hemisphere have negative coordinates.

Longitudes in the western hemisphere have negative coordinates.

Negative coordinates will be signed, that is, have a leading negative prefix “-“ while positive coordinates will be unsigned.

Field Type: Signed Real number

Length of Field: Signed Real Number

Other comments:

These elements are calculated from the Geographic Extent Polygon or the Geographic Extent Name. This is the outer extent of all the individual defined geographic extents of the datasets.

The distance covered by 0.001 degrees of latitude remains constant at 110 metres. However, the distance covered by 0.001 degrees of longitude decreases upon moving southwards. At the Tropic of Capricorn (22.5 degrees latitude) 102 meters is covered, on Port Phillip Bay (30 degrees latitude) 86 meters is covered and at Hobart (42 degrees latitude) 81 metres is covered by 0.001 degrees of longitude.

Coordinates referenced to Geocentric Datum of Australia 1994 (GDA94) and World Geodetic System 1994 (WGS 84) are, for practical purposes, inter-changeable.

Example:

Example 1: *Australia*

- North Bounding Latitude -9
- South Bounding Latitude -44
- East Bounding Longitude: 154
- West Bounding Longitude 112

Example 2: *Broome port and harbour*

- North Bounding Latitude -17.9755
- South Bounding Latitude -18.0177
- East Bounding Longitude: 122.2206
- West Bounding Longitude 122.1764

Example 3: *A point in New South Wales*

- North Bounding Latitude -34.7556
- South Bounding Latitude -34.7556
- East Bounding Longitude 149.7387
- West Bounding Longitude 149.7387

Category: Data Currency

Element: BEGINNING DATE

Definition of Element:

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.

This element records the age of the data itself. It is possible that data may be recorded many years after an event eg an earthquake or a flood. It is the date that the event itself occurred which is required in this element.

The date of conversion of data from one form to another form or one database to another, or the date of conversion of the dataset to a specific format or to a specific system should not be recorded.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

A date expressed as yyyy-mm-dd or the words “Not Known” if the Beginning Date is not know.

Where the year and month are known and the day is not known, enter only the year and month, for example, 2000-12.

Where only the year is known, enter only the year, for example 2000.

Format Rules: yyyy-mm-dd
Not Known

Date format complies with ISO 8601. Months and days must be padded with leading zeros if normally represented by a single digit.

Field Type: Text

Length of Field: Maximum 10 characters.

Other comments:

Dates were expressed as ddmmmyyyy in Version 1 of this ANZLIC standard. This format had to be changed to the current format of yyyy-mm-dd to support sorting and filtering of records based on Beginning Date and Ending Date. Dates may be displayed in any format when reported, for example in HTML or plain text reports.

Example:

Example 1:
1995-01-01

Example 2:
2000-12

Example 3:

Not Known

Category: Data Currency

Element: ENDING DATE

Definition of Element:

The latest 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.

This element records the age of the data itself. It is possible that data may be recorded many years after an event eg an earthquake or a flood. It is the date that the event itself occurred which is required in this element.

If the dataset is ongoing, use the word “Current” to indicate that no final date is applicable.

Obligation: Mandatory

Allowable Content:

A date expressed as yyyy-mm-dd, the word “Current” if the dataset is continuing or the words “Not Known” if the Ending Date is not known.

Where the year and month are known and the day is not known, enter only the year and month, for example, 2000-12.

Where only the year is known, enter only the year, for example 2000.

Format Rules: yyyy-mm-dd
Not Known
Current

Date format complies with ISO 8601. Months and days must be padded with leading zeros if normally represented by a single digit.

Field Type: Text

Length of Field: Maximum 10 characters.

Other comments:

Dates were expressed as ddmmmyyyy in Version 1 of this ANZLIC standard. This format had to be changed to the current format of yyyy-mm-dd to support sorting and filtering of records based on Beginning Date and Ending Date. Dates may be displayed in any format when reported in, for example, HTML or plain text reports.

Example:
Example 1:
1995-04-14

Example 2:
1998-05

Example 3:
Current

Category: Dataset Status

Element: PROGRESS

Definition of Element:

The status of the dataset.

If the dataset collection has concluded, pick the option “Complete”. If the dataset collection is underway at the time of creation of the metadata record, use the option “In Progress”. If the dataset collection has been proposed but has not commenced, use the option “Planned”.

If the dataset status is unknown, use the term “Not known”.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

One of the following:

Complete
In Progress
Planned
Not known

Format Rules:

Field Type: Text

Length of Field: Maximum 20 characters.

Other comments: Nil.

Example: See Allowable Content.

Category: Dataset Status

Element: MAINTENANCE AND UPDATE FREQUENCY

Definition of Element:

This element is intended to describe the frequency of changes or additions that are made to the dataset after its initial completion.

The frequency of changes to the data should be recorded, not the frequency of re-issue or publication.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

One of the following:

Continual
Daily
Weekly
Monthly
Quarterly
Bi-annually
Annually
As required
Irregular
Not Planned
Not Known

Format Rules:

Field Type: Text

Length of Field: Maximum 20 characters.

Other comments: Nil.

Example: See Allowable Content.

Category: Access

Element: STORED DATA FORMAT

Definition of Element:

This element allows for the description of the format in which the dataset is stored by the custodian. It is in two parts; a mandatory component that identifies one of two pre-defined basic dataset types and an optional extension in free text.

It is intended that the custodian will indicate:
- whether the dataset is stored in either digital or non digital form
- the format that it is stored in (e.g. transparency, paper, microfiche, ASCII Text, Arc/Info, DXF, Oracle database, Excel spreadsheet).

If the data is in digital form then the description should include:
- digital representation (e.g. point, raster or vector data)
- software version number (if applicable)

If the data is in non digital form, the description should be sufficient to allow a searcher to quickly grasp the medium in which the dataset is held eg film, paper form, actual specimens.

The following further details, if known, could be included:
- number of records
- number of polygons or arcs
- number of files

The coordinate reference systems, including datum, should also be described.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

The word DIGITAL or the word NONDIGITAL, and free text extension if desired.

Format Rules:

Write the mandatory part of the element DIGITAL and NONDIGITAL in upper case.

Length of Field: Maximum 500 characters.

Other Comments: Nil.

Example:

Example 1:
DIGITAL Arc/Info 7.0.3 under Sun OS, vector coverage, lambert 135, 187 polygons

Example 2:
DIGITAL data are stored in separate files for each contour level. Each file has a header that describes the format and the number of records in the file. The files are in ASCII, approximately 5.5 Mbytes, for map scales 1:750,000 to 1:2,500,000

Example 3:

NONDIGITAL Transparency

Example 4:
DIGITAL database and hardcopy maps. Dataset size is approximately 40 MB.

Category: Access

Element: AVAILABLE FORMAT TYPE

Definition of Element:

This element describes the formats in which the dataset is available. It is in two parts - a mandatory component which notifies whether the dataset is in one or both of two pre-defined basic types (digital or non digital) and an optional extension in free text.

The format of the data (including version number) and the coordinate reference system (including datum) in which the data is available may be described. Supported media used to transfer the data may also be included.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

The word DIGITAL or the word NONDIGITAL, and free text extension if desired.

Format Rules:

Write the mandatory part of the element DIGITAL and NONDIGITAL in upper case.

Field Type: Text

Length of Field: Maximum 240 characters per type.

Other comments: Repeating values allowed.

Example:

Example 1:
NONDIGITAL - Printed Maps
NONDIGITAL - Reports

Example 2:
DIGITAL - ARC/INFO Coverage
DIGITAL - MapInfo TAB file

Category: Access

Element: ACCESS CONSTRAINT

Definition of Element:

This element describes any restrictions or legal prerequisites that may apply to the access and use of the dataset, for example, a licence/ royalty agreement requirement. If access is unrestricted, that too should be stated.

This element may describe access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource. It may also describe any of the above constraints, restrictions or limitation, or warnings on using the resource.

If the dataset is only available in one particular delivery mode, eg available only through inter library loan, this should be indicated. If payment is required, this should be stated. If only some users are permitted access to the dataset, this too should be stated.

In New Zealand supply of most government held information is subject to Crown Copyright, and may require the payment of a licence fee or royalties.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content:

Free text description of restrictions if any on access to the dataset. If there are no restrictions, that should be stated.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 500 characters.

Other comments: Nil.

Example:

Example 1:
Internal use in government at cost of transfer and restricted access licence for non- government at a negotiable price.

Example 2:
No restrictions

Example 3:
Cost $20 Report and $10 Map.

Example 4:
Written application.

Example 5:
Contact the Senior Environmental Scientist to discuss user requirements and costs.

Category: Data Quality

Element: LINEAGE

Definition of Element:

Lineage is a history of both the source data and the processing steps used to produce the dataset.

It is information about the events or source data used in constructing the data specified by the scope or lack of knowledge about lineage.

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
- dates of various parts of the process.

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.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable content:

Free text. If no answer is possible, use one of the following; Not Known, Not Documented or Not Relevant.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments: Nil.

Example

Example 1: *Possible Scenarios for the Spread of Rabbit Calicivirus Disease (RCD) to December 1995*

Source data for this project includes the AUSLIG 1:250 000 coastline, State boundaries and master names file. Representations of affected rabbit distribution were compiled by matching to the Master Names File or by direct coordinate references. The potential for disease spread was hand digitised as an indicative representation only. Rabbit distribution is based on the feral animal (rabbit) data created by the Agriculture and Natural Resources Branch of BRS but is generalised and expanded to the region indicated in the “Vertebrate Pests - Rabbits” book (BRS). Potential area for disease spread was defined by digitising a zone representing geostrophic (prevailing wind pattern) winds. Location of outbreaks is derived from AQIS reports.

Example 2: *Status Report on Water Quality in the Tweed, Brunswick, Richmond and Clarence Rivers*

The four major river catchments, the Tweed, Brunswick, Richmond and Clarence river valleys in the Upper North East region were selected for the water quality study. Combined these four catchments cover over 90% of the region.

The ANZECC (Australia and New Zealand Environment conservation Council) Australian Water Quality Guidelines for Fresh and Marine Waters were used as the basis of this study. The EPA project book, an operational manual, was developed for the study together with field sheets/submission sheets.

A total of 143 sites were selected and these were chosen to be evenly distributed throughout the region on the major rivers and tributaries. The logistics of collecting samples from the sites was a major concern as there was some 7000km between sites which took the field team 5 weeks to complete. The sampling cycle was 6 - 8 weeks length and 7 full cycles were done.

Environmental water quality attributes to be measured at each sampling location included field observations and measurements, general water quality, nutrients, chlorophyll-A, major dissolved salts and bacteria.

Example 3: *Ecological Vegetation Classes at 1:100,000 (EVC100)*

Data Collection Method: Field Measurements Field Notes Aerial Photo Interpretation Flora and Fauna Branch Two-way Analysis Tables to determine species groupings.

Data Set Source: The EVC datasets have been developed as part of the Central Highlands Oldgrowth (CHOG) Project and East Gippsland Oldgrowth (EGOG) Project.

Source Material Input Scale: 1:100,000

Additional Processing Steps: No processing performed.

Example 4: *Cadastral/Topographic 1:50000 series*

The topographic data was captured photogrammetrically at 1:25,000 from 1:25,000 aerial photography. Land tenure information has been manually plotted from survey bearing and distance information. Other data has been included from State, Federal and Local Government sources. Manual Generalisation of data.

Example 5: *Brisbane Region Street and Address Network - Version 3.3*

Source Data History

Original dataset compiled from road casement boundaries within the Queensland Department of Natural Resources' Digital Cadastral Database (DCDB). The DCDB was created by hand digitising film positives of various scales (1:2500 in urban areas up to 1:250000 in rural areas).

Processing Steps

Street centrelines were originally derived from the DCDB road casement boundaries by automatic centreline generating software. Considerable cleaning (ie. smoothing of lines, clarification of intersections, etc.) was then undertaken manually. Data is now maintained by hand digitising street centrelines from regular DCDB road casement boundary updates along with aerial photography interpretation and selected field verification.

Category: Data Quality

Element: POSITIONAL ACCURACY

Definition of Element:

Positional accuracy is an assessment of the closeness of the location of the spatial objects 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.

Positional accuracy may not be relevant to datasets that are indirectly geographically referenced. In this case choose Not Relevant from the list below.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable content:

Free text. If no answer is possible, use one of the following: Not Known, Not Documented or Not Relevant.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments: Nil.

Example

Example 1: *Forest Types*
Forest type boundaries were delineated on 1:15 000 or 1:25 000 aerial photos. Graphic (analogue) maps were hand digitised (0.5mm error) or scanned and adjusted where discrepancies compared to air photos occurred as for example misplacement of drainage, state forest roads, etc. The forest type boundaries were transferred from the aerial photographs to the digitised topographic maps to produce maps with the location of provisional forest type zones (an intermediate data set used in later processing). Sketch Master, Radial line plots, and Micromap 3D software are used in the processing. Questionable boundaries between forest types are checked in the field.

The forest type map was then compiled from this data set using a GIS package (ArcInfo).

Example 2: *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.

Example 3: *Current wetlands environments and extent (WETLAND_1994)*
Precision: 10m to 100m Determination: Deductive estimate. Ad-hoc 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. When resources permit, the 1:25,000 library hydrology and roads layers should be used to identify layer inconsistencies which may indicate specific wetlands which require translation, rotation or boundary modifications.

Example 4: *Coastal habitats for birdlife, mammals (CRA)*
The Atlas is a composite product and the positional accuracy depends on the source of the data.

Category: Data Quality

Element: ATTRIBUTE ACCURACY

Definition of Element:

Attribute accuracy is an assessment of the reliability of values assigned to features in the dataset in relation to their true 'real world' values.

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.

Any factors that may have influenced attriubute values should also be mentioned.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable content:

Free text. If no answer is possible, use one of the following: Not Known, Not Documented or Not Relevant.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments: Nil.

Example

Example 1: *Status Report on Water Quality in the Tweed, Brunswick, Richmond and Clarence Rivers*

Water quality attributes were measured at site and others were analysed from samples sent to selected laboratories.

On site testing of the water quality was done using a Horiba U10 Water Checker (Japanese) and the Yeocal Dissolved Oxygen meter (Australian) and was done according to the US Standard Methods for the testing of water and waste water.

The selected laboratories were Richmond Pathology Services, Ensight Australian Water Technologies and Tweed Council Water Laboratories. The performance of these laboratories was tested against control laboratories which were the Department of Health, Division of Analytical Laboratories, Lidcombe and EPA Laboratory. All laboratories are NATA registered except for the Tweed Council Laboratory. The laboratory analyses were done according to

methods described in the procedures manual for each laboratory and are generally based on US Standard Methods.

Example 2: *Forest Types*
The attribute of this dataset is the forest type that 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. The forest type classification is based on economic and forest management considerations rather than on purely scientific ones. 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:. Whilst the leagues must be recognised as being essentially artificial groupings, they in most cases serve to unite those types which are most closely related to each other. 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.

Example 3: *Soil Landscapes of the Michelago 1:100 000 Sheet*
The attributes associated with the soil landscape maps are: the primary attribute, the soil landscape and the associated attribute, the soil materials.

The soil landscapes include Geology, Topography, Vegetation, Community land use, Existing erosion/land degradation, Included soil landscapes. Each of these can be taken out and shown in a derivative map. The soil landscapes are individualised by the recognisable topographies and soils which can be mapped into the same unit.

The soil materials is a categorical attribute stated in the map legends, and detailing the soil description (it is not mapped and consist of soil morphological characteristics and laboratory tests results). The detailed description is recorded in the report that accompanies the soil landscape map sheet.

The attribute accuracy, as the closeness to field reality, is unknown considering the fuzzy distribution and the composition heterogeneity of the primary attribute, soil landscape.

Example 4: *Brisbane Region Street and Address Network - Version 3.3*
Street address numbers are sourced either from Local Government Authorities or field verification. Street classification consists of 8 categories. These are:

- Freeways/Motorways
- Highways
- Secondary Roads
- Local Collector Roads

- Streets
- Private or Restricted Roads
- Unconstructed /Impassable
- Pedestrian Malls

This street classification methodology does not conform to any national standard. One way indicators are stored for each street centreline as a “0” or “null” for bi-directional travel and “1” for positive direction travel.

The accuracy of the attribute information is estimated at 99%. Street names were originally sourced from the DCDB. The accuracy (ie. spelling and correct location) of these street names were then validated against Local Government Authority databases along with selected field verification. Checks for null entries appearing in the Road Name and Road Type attribute fields were also carried out.

Category: Data Quality

Element: LOGICAL CONSISTENCY

Definition of Element:

Logical consistency describes the degree of adherence of logical rules of data structure, attribution and relationships. Data structure can be conceptual, logical or physical.

It is an assessment of how well the logical relationships between items in the dataset, or spatial objects in the dataset, are maintained.

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 on the relationships.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable content:

Free text. If no answer is possible, use one of the following; Not Known, Not Documented or Not Relevant.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments: Nil.

Example

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 food 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

Example 3: *Ecological Vegetation Classes at 1:100,000 (EVC100)*
There is a many to one relationship between the items FC (floristic community) and EVC (ecological vegetation class). This relationship is expressed in detail in the lookup table EVC100_FCEVC.LUT

Example 4: *Metropolitan Road Centreline Network*
The digitised data has been visually verified against Main Roads' State of Construction plans and metropolitan street directories.

Category: Data Quality

Element: COMPLETENESS

Definition of Element:

Completeness is an assessment of the extent and range of the dataset with regard to completeness of coverage, completeness of classification and completeness of verification.

Completeness of coverage is an assessment of the proportion of the dataset available in its entirety (ie. spatial and attribute).

- 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 clusters of small areas amalgamated into one if they lie within a certain distance of each other?
- Are lines smoothed for presentation? If so, what method has been used?

Completeness of verification is an assessment of the amount of "work" (ie. fieldwork or other methods) carried out to validate the correct representation of 'real world' features contained within the dataset.

- What is the extent and method of field verification carried out to validate both spatial and attribute data?
- Are the positions of any spatial objects in the dataset inferred? If so, what is the method of inference?

Obligation: Mandatory

Maximum Occurrence: 1

Allowable content:

Free text. If no answer is possible, use one of the following: Not Known, Not Documented or Not Relevant.

Format Rules: Sentences are preferred.

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments: Nil.

Example

Example 1: *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 of all maps are urged to consult map legends because of the ongoing changes to the classification (type numbers and description for types that have been recognised since the first edition of the Baur classification report). Maps without update classification will remain in use until time permits their revision.

Example 2: *Brisbane Region Street and Address Network - Version 3.3*

Completeness of coverage

99% of all gazetted streets are included in the dataset. Private streets are included only where they form an important part of the overall street network.

Completeness of classification

All streets are assigned a Road Name. The value “ROAD” is assigned to a street where no road name is available.

Completeness of verification

Spatial and Attribute verification of the dataset is performed by the following methods:

- aerial photography interpretation
- Local Government Authority confirmation
- selective field verification
- user feedback

Example 3: *Psyllid Affected Areas at 1:25 000 (PSYLLID25*

Complete for selected blocks.

Example 4: *Land Information Access*

Tenure details complete and verified. Street Address details partial complete.

Category: Contact Information

Element: CONTACT ORGANISATION

Definition of Element:

This is the ordinary name of the organisation with which contact should be made to obtain the dataset itself, 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.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts).

Allowable Content:

This is the ordinary name of the contact organisation in full.

If the contact organisation is also known by a common acronym, include this at the end of the full name in round brackets.

If the contact organisation is usually known only by an acronym, use only the acronym without brackets.

Format Rules: Ordinary name of organisation followed where relevant by its acronym in round brackets**.**

Field Type: Text

Field Length: Maximum 120 characters.

Other comments: Multiple contacts may be allowed for the one dataset. Repeating values possible.

Example:

Example 1:
Land Information Group (LIG)

Category: Contact Information

Element: CONTACT POSITION

Definition of Element:

The position title given by the Contact Organisation to the holder of the position who is required to answer questions about the dataset.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts).

Allowable Content:

The title of the position is preferred to the name of a person, as position titles tend to change less frequently than the occupants of positions.

There is no need to add the name of the administrative unit in which the person works, for example, Southern Region. That the position is based in the Southern Region should be obvious from the address of the contact position.

Field Type: Text

Field Length: Maximum 40 characters.

Other comments: Repeating values allowed.

Example:

Example 1:
Manager, Cadastral and Toponomy Information

Example 2:
Data Manager

Example 3
Manager, Land Inquiry Centre

Example 4:
Manager, Survey and Properties

Category: Contact Information

Element: MAIL ADDRESS

Definition of Element:

This element describes the postal address or delivery point of the Contact Position. It is not intended that this element describe the physical location of the Contact Position, which could include floor numbers or building names. The intention is provide an address to which a potential user of the dataset can write to obtain further information.

This element may be repeated once.

Obligation: Mandatory

Maximum Occurrence: 2 (but there may be many Contacts).

Allowable Content:

Content should include street name and number, where applicable. If the address is a post office box or bag, the number of the box or the bag should appear in the first instance of the element.

Format Rules:

No commas should be used in this field. Postal addresses should be written without spaces or full stops, for example; GPO Box 123, PO Box 123 or Locked Bag 1500. Words such as Street or Road may be abbreviated in the normal way to St or Rd.

Field Type: Text

Field Length: Maximum 40 characters.

Other comments: One repeating element is allowed.

In Version 1 of these guidelines, this element was represented as two separate elements: Mail Address 1 and Mail Address 2. These elements may still be represented as such in existing applications.

Example:

Example 1:
Queens Square
Corner Macquarie St and Prince Albert Rd

Example 2:
134 King St

Example 3:
PO Box A2134

Example 4:
Building 2
423 Pennant Hills Rd

Example 5:
Private Bag 1234

Example 6:
Level 1 XYZ Building
987 Main Road

Category: Contact Information

Element: LOCALITY

Definition of Element:

This element is the name of the locality where the Contact Position is located. A locality may be a suburb, town, rural district, place or an actual locality.

For New Zealand there are two elements available for locality - this element and State or Locality 2.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts).

Allowable Content:

The ordinary name of the suburb or the place or locality of the mailing address.

The Locality should be capitalised.

Format Rules: No commas.

Field Type: Text

Field Length: Maximum 60 characters.

Other comments: Nil.

Example:

Example 1
MELBOURNE

Category: Contact Information

Element: STATE

Definition of Element:

This is the name of the State or Territory, in acronym form, for Australian entries. This is a mandatory field for Australia.

In New Zealand the field is optional. For localities requiring two fields (eg suburb and city) this field will be used for the second part of the locality.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content for Australia:

AAT
ACT
Christmas Island
Cocos (Keeling) Islands
Norfolk Island
NSW
NT
QLD
SA
TAS
VIC
WA

Allowable content for New Zealand:

The second name where the locality requires two parts, for example the city name where this is preceded by a suburb.

In New Zealand the suburb name and the city name are often both required where street names are duplicated within a territorial authority.

Format Rules:

See allowable content above.

Field Type: Text

Field Length: Maximum 40 characters.

Other comments: Nil.

Example:

Example 1:
VIC

Category: Contact Information

Element: COUNTRY

Definition of Element:

The name of the country where the Contact Position for the dataset is located.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content:

Names of countries only.

Format Rules: Acronyms acceptable where commonly used eg UK, NZ.

Field Type: Text

Field Length: Maximum 40 characters.

Other comments: Repeating values allowed.

Example:

Example 1: Australia

Example 2: NZ

Example 3: Fiji

Category: Contact Information

Element: POSTCODE

Definition of Element:

The official postcode for the address of the Contact Position. This element is optional in New Zealand.

Obligation: Mandatory

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content:

In Australia and New Zealand this will be a four integer number. In New Zealand this field is optional.

Format Rules:

Field Type: Alphanumeric

Field Length: Maximum 10 characters.

Other comments:

New Zealand has official postcodes, but these are not routinely used for mail delivery, but are used by some organisations for bulk mail sorting.

Example:

Example 1:
3101

Category: Contact Information

Element: TELEPHONE

Definition of Element:

The telephone number of the Contact Position.

Obligation: Optional

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content for Australia:

Any valid telephone number.

Allowable content for New Zealand:

One or more of the following:

Country code + Area Code + local telephone number

Country code + Mobile Service Code + Mobile telephone number

Country code + Other Service Code + Telephone number

National Freephone Access Code + Freephone number

Format Rules for Australia:

Do not use commas, brackets or hyphens.

The STD code, Mobile Access Code, or Freecall number is usually separated from the remainder of the number by a space.

Country Code is optional and is usually not necessary.

Format Rules for New Zealand:

Country code, then space then Service or Area Code, then space followed by the telephone number with a space following the third digit for 6 and 7 digit numbers.

For national Freephone numbers that cannot be accessed internationally, do not enter the country code.

For toll calls and calls to mobile phone within New Zealand, the National Access Code is used in place of the Country Code.

Field Type: Alphanumeric

Field Length: Maximum 25 characters.

Other comments: Nil.

Example:

Example 1:
03 9603 9119

Example 2:
0419 234 456

Example 3:
64 25 543 210

Category: Contact Information

Element: FACSIMILE

Definition of Element:

The facsimile number of the Contact Position.

Obligation: Optional

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content for Australia:

As for the Telephone element.

Allowable Content for New Zealand:

As for the Telephone element.

Format Rules for Australia:

As for the Telephone element.

Format Rules for New Zealand:

As for the Telephone element.

Field Type: Alphanumeric

Field Length: Maximum 25 characters.

Other comments: Repeating values allowed.

Example: As for the Telephone element.

Category: Contact Information

Element: ELECTRONIC MAIL ADDRESS

Definition of Element:

Address of the electronic mailbox of the Contact Position.

Obligation: Optional

Maximum Occurrence: 1 (but there may be many Contacts)

Allowable Content:

If an Internet compatible e-mail address is not available, the entry “Not known” or “None” should be given.

Format Rules:

Use conventional addresses wherever possible.

Field Type: Alphanumeric

Field Length: Maximum 80 characters.

Other comments: Repeating values allowed.

Example:

Example 1:
bforner@ozemail.com.au

Example 2:
ross.honeyman@nre.vic.gov.au

Example 3:
someone@hh.dosli.govt.nz

Category: Metadata Date

Element: METADATA DATE

Definition of Element:

This element describes he date on which the metadata was created or modified.

Obligation: Mandatory

Maximum Occurrence: 1

Allowable Content: A date.

Format Rules: yyyy-mm-dd

Date format complies with ISO 8601.

Months and days must be padded with leading zeros if normally represented by a single digit.

Refer to Beginning Date for further information.

Field Type: Text

Length of Field: Maximum 10 characters.

Other comments: Nil.

Example:

Example 1: 1996-03-22

Category: Additional Metadata

Element: ADDITIONAL METADATA

Definition of Element:

This element describes any additional metadata that supports documentation of the dataset, for example attribute information. It could include an Internet address or a reference to another directory. It may also suggest that more information should be sought from the contact position.

Obligation: Optional

Maximum Occurrence: 1

Allowable Content: Free text

Format Rules:

Field Type: Text

Length of Field: Maximum 4000 characters.

Other comments:

The definition of this element has been broadened from Version 1 of the guidelines to include any supplementary information about the dataset; not just where additional metadata about the dataset may be accessed.

Example:

Example 1: *Vicmap Digital Property*
Visit www.giconnections.vic.gov.au where you may view the data on-line using Vicmap Digital Property "professional" map viewer, down load sample files and down load a detailed product description. The site also includes a list of current data suppliers and the services that they provide.

3.4 Format of ANZLIC Metadata Records

The previous section (Section 3.3) presents guidelines for completing each of the core metadata elements. The guidelines specify the **content** of each of the separate metadata elements that together make up the metadata record.

For the metadata record to be truly useful, it must be capable of being readily exchanged and of being read by software that indexes, searches and retrieves the metadata records. To achieve this, the metadata record must be available in a well-structured and reliable **format**.

The "ANZLIC Guidelines: Core Metadata Elements, Version 1" specified this format as a delimited ASCII text format using many separate files. However, this simple format is now being replaced by the more reliable XML.

The eXtensible Markup Language (XML) is the perfect answer to this need. XML is a plain-text format that is independent of computing platforms, vendors, and software. XML is a so-called “meta-markup language” that has been developed to convey data. It is used to encapsulate data into files that can be

- displayed within web browsers,
- exchanged across the Internet between different computer applications and businesses, and
- stored in and retrieved from databases.

The XML solution has three components:

- the Document Type Definition (DTD) which defines the set of structural rules and relationships and allows for the validation of metadata structure;
- the metadata record expressed in XML; and
- a stylesheet, using either the Cascading Style Sheets (CSS) or XML Style Language (XSL), to define how the content will be presented.

In this way, XML separates the structure and content from the presentation.

Many software tools for processing the XML metadata are available because XML is based on the well-established Standard Generalised Markup Language (SGML) which is the cornerstone of the publishing industry.

XML has international support, and there is now consensus within the geospatial community that metadata should be exchanged in this format. This approach has been incorporated in the forthcoming international standard “ISO 19115, Geographic information – Metadata”.

The format of ANZLIC metadata records must conform to the rules established by the "ANZMETA Document Type Definition" which is available in Appendix 2 and at http://www.environment.gov.au/net/anzmeta/

An example of a metadata record conforming to the ANZMETA DTD is given in Appendix 3. Other examples are given at http://www.environment.gov.au/net/anzmeta/

The detailed specifications contained in the ANZMETA DTD need to be used by programmers who are importing or exporting metadata records. The specifications also need to be followed in the development of metadata entry tools and metadata management systems to ensure that these systems have the capacity to import and export metadata records in the specified format.

Chapter Four
Implementing the Standards

Within any particular organisation, the approach taken to implementing the ANZLIC Metadata Guidelines will vary and will depend on factors such as the size and diversity of the organisation's data holdings and the existing data management arrangements within the organisation. For some organisations, a comparatively simple and unsophisticated approach may be appropriate, at least in the early stages. For other organisations, particularly those with large and complex data holdings, more advanced methods and tools may be required for effective management of data and associated metadata. These more advanced mechanisms may include those acquired from commercial or "in-house" sources, and may include systems that can extract some of the elements of the metadata automatically from the data itself.

This chapter deals with issues associated with the implementation of the ANZLIC Guidelines. The issues are presented under the headings of metadata collection and storage, the Australian Spatial Data Directory (ASDD), and the relationship between the ASDD, jurisdictional or theme directories and agency directories. The information has been drawn from a variety of sources, and some references are given to sources of more detailed information. One particularly relevant reference on metadata and the implementation of standards is the Global Spatial Data Infrastructure Cookbook (particularly "Chapter Three: Metadata – Describing geospatial data") which is available at http://www.gsdi.org/pubs/cookbook/cookbook806.pdf

This chapter concludes with information on how data custodians can provide feedback on the ANZLIC Metadata Guidelines. Contact details are presented for the ANZLIC Secretariat and for the Metadata Working Group, together with information on how data custodians and others can participate in the OZMETA Discussion Group, an online discussion group dealing with matters relating to metadata and its use.

4.1 Metadata Collection and Storage

Once an organisation has made a commitment to devote resources to the task of collecting and maintaining metadata for its data holdings, the next step usually involves preparing an inventory of the data holdings. Ideally, metadata records should be created at the time the data is collected or, even earlier, in the planning stage. Wherever possible, the process of creating the metadata should involve those personnel with a detailed knowledge of the data. In those organisations with large holdings of existing data, decisions will need to be made regarding the priorities for creating the metadata records for the different datasets.

Decisions will also be required regarding the type of data resource to be documented, or, in other words, what should constitute a "dataset". This question has been discussed already in these Guidelines in Section 3.3 in the detailed guidelines for the metadata element "Title". The international standard "ISO 19115, Geographic information – Metadata" defines a dataset as an "identifiable collection of data", and notes that a "dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a

dataset." In general terms, each discrete data resource should have a discrete metadata record. Metadata can exist at the collection level (e.g. map series), at the data product level (e.g. an airphoto mosaic), at a dataset level (e.g. a vector dataset), a group of features of a certain type (e.g. road bridges) or a specific feature (e.g. the Sydney Harbour Bridge). In practice, most metadata is collected at the dataset level. Further detailed information on metadata hierarchy and its implementation is available in Annex H and Annex I of the international standard ISO 19115.

In the past, particularly in organisations with small data holdings, metadata has often been collected and stored in comparatively simple systems, either as paper-based records or in digital form using standard word processing, spreadsheet or database systems. As the data holdings have grown and as the uses and benefits of metadata have become better understood, these systems have usually been replaced by more flexible and purpose-built systems.

Various different facilities are available to assist in the capturing of metadata and in entering it into a metadata directory. Jurisdictions and custodial organisations are encouraged to obtain (or develop) and use their own metadata entry and/or management tools that best suit their needs. Information on some of these tools that are capable of handling the ANZLIC core metadata elements is available at http://www.environment.gov.au/net/asdd/tech/tools.html . Other more general information on metadata collection and management tools is available at http://www.fgdc.gov/metadata/toollist/metatools797.html

One of these tools is the ANZLIC Metadata Entry Tool (MET) which was developed specifically to assist with the implementation of the ANZLIC Metadata Guidelines. The MET is based on MSAccess97 run-time software. The tool is designed to support the capture of metadata and to ensure a consistent standards-based description of the defined core metadata elements. The MET may be used within organisations to store and manage metadata records in the associated metadata database (ANZDATA.MDB). This software tool is available for use by dataset custodians throughout Australia and New Zealand.

Customised copies of the MET are available from the Working Group members (http://www.anzlic.org.au/asdi/amwg_members.htm) in the various jurisdictions.

4.2 The Australian Spatial Data Directory (ASDD)

Metadata directories are an important tool particularly for use in assisting with data discovery. The Internet-based Australian Spatial Data Directory (ASDD) is one such directory that enables a user to search for descriptions (i.e. metadata records) of spatial information maintained by government agencies and commercial organisations across Australia using a distributed directory system.

The Australian Spatial Data Directory (ASDD) is a national initiative supported by all governments under the auspices of the Australia New Zealand Land Information Council (ANZLIC). The ASDD aims to improve access to Australian spatial data for industry, government, education and the general community through effective documentation, advertisement and distribution. The directory links government and commercial nodes in each State/Territory and spatial data agencies within the Commonwealth Government.

Implementation of directories such as the ASDD depends on metadata records that comply with standards and that use XML and Document Type Definitions (DTDs). The technology being used for the ASDD is the Z39.50 search and retrieval protocol which, when combined with the World Wide Web, provides a simple method of searching for and discovering spatial data. This approach has the advantage that metadata is kept close to its source. A full description of the ASDD, including implementation and co-ordination, technical documentation and descriptions of the Z39.50 and other mechanisms involved, is given at http://www.environment.gov.au/net/asdd/

The ASDD employs the Z39.50 protocol because it forms a unified and well-known interface to diverse information systems and directories at many distributed nodes. In this way, various metadata management systems can co-exist or be upgraded behind the scenes, while maintaining a consistent user interface. The architecture of the ASDD is well suited to accommodating any ISO metadata standard changes ensuring a full compliance with the international standard.

The metadata records that can be accessed via the ASDD originate from a wide range of different custodial organisations. Data custodians are encouraged to contribute metadata records to the ASDD.

An organisation contributing to the ASDD should be limit their contribution to metadata records for datasets for which the organisation is the designated custodian. In general, the contribution should not include metadata records for datasets sourced from another custodian. . An exception may exist where the contributor of the metadata record has been delegated this responsibility by the custodian of the dataset. These arrangements are designed to ensure that multiple entries for the same dataset are not listed in the ASDD.

Metadata records may be contributed to the ASDD either by providing metadata to a relevant node of the ASDD, or by establishing their own individual node. A list of the existing ASDD nodes and contact details is given at http://www.environment.gov.au/net/asdd/tech/node/

Information on the procedure for establishing individual ASDD nodes is given at http://www.environment.gov.au/net/asdd/tech/individual.html

4.3 The Relationship between the ASDD, Jurisdictional or Theme Directories and Agency Directories

The ASDD is a national metadata directory system that provides an effective means for the discovery of geographic data. Most jurisdictions and several or theme-based organisations are currently collecting metadata and contributing it to jurisdiction or theme-based directories.

There would be little benefit in jurisdiction or theme-based metadata directories that contained only the highest-level core metadata elements. Development of such directories usually arises to meet a need for additional metadata elements of particular relevance to the jurisdiction or theme. In order to establish consistency and to reduce duplication of effort, a degree of cooperation and collaboration, particularly in relation to the process of record collection, is required between initiatives at the national, theme, jurisdictional and organisational levels.

To this end, ANZLIC has adopted a "Pages" concept as the basis for a national metadata framework where more general information is recorded at the highest level (Page 0) and additional information relevant to particular themes, jurisdictions and organisations is recorded at lower levels (Page 1, Page 2). This concept is illustrated in Figure 3.

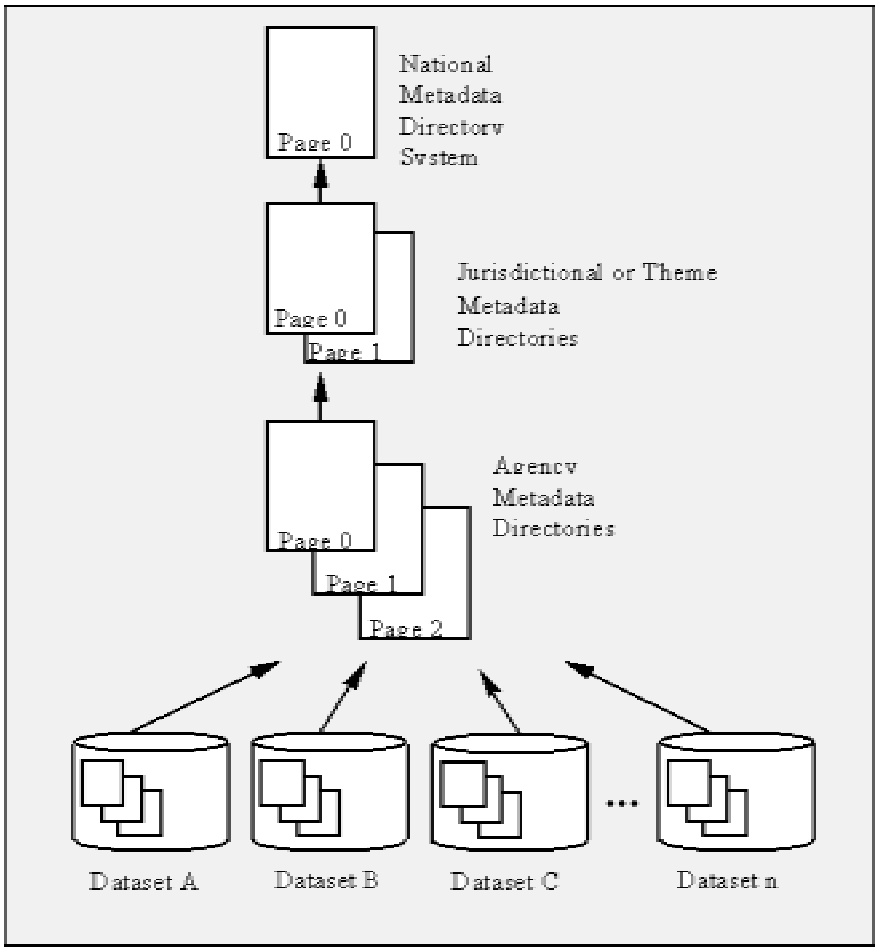
Page 0 consists of the ANZLIC core metadata elements, and is the information that is available in the ASDD.

Page 1 elements provide additional information to further support data discovery and management at the jurisdictional, organisational or thematic level. Theme directories provide the opportunity for agencies with like interests (e.g. marine) at the national, state/territory, local government, academic, community or private industry levels to include additional information that is relevant to the theme but which is not required at Page 0. By adopting a common standard, sharing of information across a specialised discipline is facilitated. In some instances, particular Page 1 elements may be repeated across many different themes or jurisdictions. When this occurs, the particular elements may be considered for addition to the list of standard Page 0 elements.

Page 2 elements consist of any additional elements adopted by an agency or business primarily to satisfy their own specific and detailed data/metadata management and discovery requirements. Typically, the agency would not include the Page 2 elements in metadata published on an “external” directory.

In order to ensure consistency, it is suggested that any metadata elements that are specified at the Page 1 or Page 2 level should be consistent with corresponding metadata elements in the ISO Standard.

Figure 3 The Pages Concept



4.4 Feedback on the ANZLIC Metadata Guidelines

These guidelines are under constant review by the ANZLIC Metadata Working Group (AMWG). The AMWG has representation from all jurisdictions in Australia. The next review of this document (predicted to be early – mid 2001) will occur when the ISO ratify the TC211 19115 International Metadata standard and an Australian profile of the standard is released as ANZLIC Metadata Standard Version 2. At this time a corresponding new Version 3 of the ANZMETA DTD will be released.

Two forums exist to raise any metadata or ASDD issues: The open OZMETA Discussion List and the AMWG jurisdictional representatives. Issues raised by these forums are lodged and dealt with by the AMWG through its regular meetings and teleconferences. A list of current and resolved issues is maintained on the AMWG web site.

4.4.1 The OZMETA Discussion Group.

A discussion group has been established on behalf of the AMWG to provide a forum for discussion of matters relating to metadata and its use. Information about the group and how to participate in it is given on the group's web site (http://www.environment.gov.au/net/discussion_groups/ozmeta-l_main.html)

4.4.2 ANZLIC Metadata Working Group.

Each jurisdiction is represented on the AMWG. You can contact your jurisdictional member to request a copy of the MET, a customised Metadatabase for your agency, assistance and raise issues or provide feedback.

Information about the Working Group, its current activities and contact details for your jurisdictional representative is available at the AWMG web site (http://www.anzlic.org.au/asdi/metagrp.htm)

Appendix 1
Metadata Element Comparison between
ANZLIC & ISO/DIS 19115

ANZLIC Category	ANZLIC Name	ANZLIC Definition	ANZLIC Obligation	ISO Name*	ISO Definition	ISO Obligation
Metadata	ANZLIC Identifier	The unique identifier given to the dataset by ANZLIC.	M	fileIdentifier (#2)	unique identifier for this metadata file	O
Dataset	Title	The ordinary name of the dataset.	M	title (# 362)	name by which the cited resource is known.	M
	Custodian	The business name of the custodial organisation or responsible party associated with the dataset.	M	organisationName (#378)	name of the responsible organisation	C
	Jurisdiction	The state or country in which the Custodian of the dataset is domiciled.	M	administrativeArea (#385)	state, province of the location	O
Description	Abstract	A brief narrative summary of the content of the dataset.	M	abstract (# 25)	brief narrative summary of the content of the resource(s)	M
	Search Word	Words likely to be used by a non-expert to find the dataset.	M	keyword (# 55)	commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject	M
	Geographic Extent Name	The ordinary name of one or more pre-defined, known geographic objects that reasonably show the extent of geographic coverage of the dataset. This element is usually implemented as three discrete elements, as listed below.	O	geographicDescription (#350)	identifier used to represent a geographic area.	
	GEN Category	Category to which the Geographic Extent Name belongs including map series, local government area, and drainage divisions and major river basins.	C	geographicIdentifier (#351)	identifier used to represent a geographic area	M
	GEN Custodial Jurisdiction	Country, state or territory that is responsible for maintaining the detail of the geographic object.	C	administrativeArea (#385)	state, province of the location	O
	GEN Name	Name of the geographic object.	C	geographicIdentifier (#351)	identifier used to represent a geographic area.	M

	Geographic Extent Polygon	Boundary enclosing the dataset expressed as a closed set of geographic coordinates (latitude, longitude) of the polygon referenced to GDA94. This is an alternate way of describing geographic extent of the dataset if no pre-defined area is satisfactory.	O	polygon (# 344)	sets of points defining the bounding polygon	M
	Geographic Bounding Box	A rectangle defining the minimum and maximum coordinates of the entire data. This element is implemented as four discrete elements as listed below.	M	geographicBoundingBox (#345) - comprised of following four elements:	Geographic position of the dataset. NOTE: this is only an approximate reference so specifying the coordinate system is unnecessary.	
	North Bounding Latitude	Northern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	northBoundLatitude (#349)	northern-most coordinate of the limit of the dataset extent expressed in latitude in decimal degrees (positive north).	M
	South Bounding Latitude	Southern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	southBoundLatitude (#348)	southern-most coordinate of the limit of the dataset extent expressed in latitude in decimal degrees (positive north).	M
	East Bounding Longitude	Eastern-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.	M	eastBoundLongitude (#347)	eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east).	M
	West Bounding Longitude	Western-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.	M	westBoundLongitude (#346)	western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east).	M
Data Currency	Beginning Date	Earliest date at which the phenomena in the dataset actually occurred.	M	extent (#353)	date & time for the content of the dataset	M
	Ending Date	Latest date at which the phenomena in the dataset actually occurred.	M	extent (#353)	date & time for the content of the dataset	M
Dataset Status	Progress	The status of the process of creation of the dataset.	M	status (# 28)	status of the resource(s)	O (For domain, see Code List B.5.23)
	Maintenance & Update Frequency	Frequency of changes or additions that are made to the dataset after its initial completion.	M	maintenanceAndUpdateFrequency (# 145)	frequency with which changes & additions are made to the resource after the initial resource is completed	M (For domain, see Code List B.5.18)

Access	Stored Data Format	The format in which the dataset is stored by the custodian.	M	environmentDescription (#44)	description of the dataset in the producer's processing environment, including items such as the software, the computer operating system, file name & the dataset size	O
	Available Format Type	The format in which the dataset is available.	O	name (# 287)	name of the data transfer format(s)	M
	Access Constraint	Any restrictions or legal prerequisites that may apply to the access and use of the dataset including licensing, liability and copyright.	M	useConstraints (#73)	constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations or warnings on using the resource	O (For domain, see Code List B.5.24)
Data Quality	Lineage	A brief history of the source and processing steps used to produce the dataset.	M	statement (#85)	general explanation of the data producer's knowledge about the lineage of a dataset	C
	Positional Accuracy	A brief assessment of the closeness of the location of spatial objects in the dataset in relation to their true position on the Earth.	M	DQ_PositionalAccuracy(#118).result(#109).DQ_QuantitativeResult(#135).value(#139)	quantitative value or values, content determined by the evaluation procedure used. (see definition for Positional Accuracy in #118)	M
	Attribute Accuracy	A brief assessment of the reliability assigned to features in the dataset in relation to their real world values.	M	DQ_ThematicAccuracy(#126).result(#109).DQ_QuantitativeResult(#135).value(#139)	quantitative value or values, content determined by the evaluation procedure used. (see definition for Thematic Accuracy in #126)	M
	Logical Consistency	A brief assessment of the degree of adherence of logical rules of data structure, attribution and relationships. Data structure can be conceptual, logical or physical.	M	DQ_LogicalConsistency(#113).result(#109).DQ_QuantitativeResult(#135).value(#139)	quantitative value or values, content determined by the evaluation procedure used. (see definition for Logical Consistency in #113)	M
	Completeness	A brief assessment of the extent and range in regard to completeness of coverage, completeness of classification and completeness of verification.	M	DQ_Completeness(#110).result(#109).DQ_QuantitativeResult(#135).value(#139)	quantitative value or values, content determined by the evaluation procedure used. (see definition for Completeness in #110)	M

Contact Information	Contact Organisation	Name of the organisation from which the dataset may be obtained.	M	organisationName (#378)	name of the responsible organisation	C
	Contact Position	The position in the Contact Organisation that will answer questions about the dataset.	M	positionName (#379)	role or position of the responsible person	C
	Mail Address	Postal address or delivery point of the Contact Position.	M	deliveryPoint (#383)	address line for the location (ISO 11180, Annex A)	O
	Locality	Locality associated with the Mail Address.	M	city (#384)	city of the location	O
	State or Locality 2	Aust: State associated with the Mail Address. NZ: Optional extension for Locality.	M	administrativeArea (#385)	state, province of the location	O
	Country	Country associated with the Mail Address.	M	country (#387)	country of the physical address	O
	Postcode	Aust: Postcode associated with the Mail Address. NZ: Optional postcode for mail sorting.	M	postalCode (#386)	ZIP or other postal code	O
	Telephone	Telephone number of the Contact Position.	O	voice (#410)	telephone number by which individuals can speak to the responsible organisation or individual.	O
	Facsimile	Facsimile number of the Contact Position.	O	facsimile (#411)	telephone number of a facsimile machine for the responsible organisation or individual	O
	Electronic Mail Address	Electronic Mail Address of the Contact Position.	O	electronicMailAddress (#388)	address of the electronic mailbox of the responsible organisation or individual	O
Metadata Date	Metadata Date	Date on which the metadata record was created or modified.	M	dateStamp (#9)	date that the metadata was created	M
Additional Metadata	Additional Metadata	Any additional metadata the supports documentation of the dataset including a reference to another directory or report.	O	supplementalInformation (#46)	any other descriptive information about the dataset	O

Appendix 2
ANZMETA Document Type Definition (DTD)

```
<!--
Name:      ANZLIC Metadata ANZMETA DTD Version 1.3
Purpose:   This XML Document Type Definition defines the ANZLIC
           Metadata Core Element Structure for use with SGML/XML
           compliant parsers, viewers, and other tools
Reference: Australia New Zealand Land Information Council -
           Metadata Guidelines
Date:      2001-02-09
Author:    ANZLIC Metadata Working Group
Ref: http://www.environment.gov.au/net/dtd/anzmeta-1.3.dtd
Doc: http://www.environment.gov.au/net/anzmeta/anzmeta-1.3.html
Doc: http://www.anzlic.org.au/asdi/metaelem.htm
Thesauri: http://www.environment.gov.au/net/anzmeta/thesauri.html
Thesauri: http://www.auslig.gov.au/asdi/genreg.htm

Changes:
2001-02-09 v1.3
  added <vertex> container within <dsgpolyo>,
  added missing entity set ISOnum.pen,
  changed declarations of entity sets to be local references
  because Schema.Net has removed the entity sets,
  added comment that you must use Open Catalogs to resolve any
  external references,
  added "custodian" attribute to "keyword" to assist with the
  documentation of Geographic Extent Names,
  <spdom> and <distinfo> containers are now mandatory
1999-03-04 v1.2
  Facilitate extension, use XML character entities,
  added "identifier" attribute to "keyword",
  added thesauri for place-keyword
1998-01-19 v1.1
  Initial release

Example Usage:
  This is how your XML instance documents should
  declare this DTD ...

<?xml version="1.0"?>
<!DOCTYPE anzmeta PUBLIC "-//ANZLIC//DTD ANZMETA 1.3//EN"
 "http://www.environment.gov.au/net/dtd/anzmeta-1.3.dtd">
<anzmeta>
...
</anzmeta>

Layout of this DTD:
  Character mnemonic entities
    - allows author to use special characters
  HTML style markup
    - allows author to use some simple HTML tags, such as:
      lists, paragraph, preformatted, emphasis, ...
  Re-usable elements
```

```
   - defines some elements that are used in various places
  Each section of metadata ...
   - define entities and elements for the metadata structure

Further information:
  See the documentation URL, as well as documentation for each
  of the previous DTDs.
  Rather than write your own full DTD, please build upon this
  DTD using the extension mechanism explained in the v1.2 doco.

          www.environment.gov.au/net/anzmeta/
-->

<!-- Character mnemonic entities ================================= -->
<!--                                                             -->
<!-- Note: you must use Open Catalogs with your XML parser       -->
<!--       to resolve any external references                    -->
<!--       see the ANZMETA documentation URL for discussion      -->

<!ENTITY % ISOlat1 PUBLIC
  "ISO 8879:1986//ENTITIES Added Latin 1//EN//XML" "ISOlat1.pen">
%ISOlat1;

<!ENTITY % ISOgrk1 PUBLIC
  "ISO 9573-15:1993//ENTITIES Greek Letters//EN//XML" "ISOgrk1.pen">
%ISOgrk1;

<!ENTITY % ISOpub PUBLIC
  "ISO 8879:1986//ENTITIES Publishing//EN//XML" "ISOpub.pen">
%ISOpub;

<!ENTITY % ISOtech PUBLIC
  "ISO 8879:1986//ENTITIES General Technical//EN//XML" "ISOtech.pen">
%ISOtech;

<!ENTITY % ISOnum PUBLIC
  "ISO 8879:1986//ENTITIES Numeric and Special Graphic//EN//XML" "ISOnum.pen">
%ISOnum;

<!-- HTML style markup ========================================== -->

<!ENTITY % fontstyle "tt | i | b | big | small">
<!ENTITY % phrase "em">
<!ENTITY % special "a | br | sub | sup">

<!ENTITY % inline "#PCDATA | %fontstyle; | %phrase; | %special;">

<!ELEMENT tt (%inline;)*>
<!ELEMENT i (%inline;)*>
<!ELEMENT b (%inline;)*>
<!ELEMENT big (%inline;)*>
<!ELEMENT small (%inline;)*>
<!ELEMENT em (%inline;)*>

<!ELEMENT sub (%inline;)*>
<!ELEMENT sup (%inline;)*>
```

```
<!ELEMENT br EMPTY>

<!ENTITY % list "ul | ol">
<!ENTITY % preformatted "pre">

<!ENTITY % block "p | %list; | %preformatted; | dl">
<!ENTITY % flow "%inline; | %block;">

<!ENTITY % URI "CDATA">
<!ELEMENT a (%inline;)*>
<!ATTLIST a
   href %URI; #IMPLIED>

<!ELEMENT p (%inline;)*>
<!ELEMENT dl (dt|dd)*>
<!ELEMENT dt (%inline;)*>
<!ELEMENT dd (%flow;)*>
<!ELEMENT ol (li)+>
<!ELEMENT ul (li)+>
<!ELEMENT li (%flow;)*>
<!ELEMENT pre (#PCDATA | tt | i | b | em | br)*>

<!-- Re-usable elements ========================================== -->

<!ELEMENT keyword  (%inline;)*>
<!ATTLIST keyword
   qualifier CDATA #IMPLIED
   identifier CDATA #IMPLIED
   custodian CDATA #IMPLIED
   thesaurus CDATA #IMPLIED >

<!-- Note: controlled vocabularies for the following thesauri are  -->
<!--       available from the abovementioned documentation URL.    -->
<!-- Note: preferably use the following values for the             -->
<!--       thesaurus attribute ...                                 -->
<!--  anzlic-theme | anzlic-update | anzlic-progress |             -->
<!--  anzlic-begdate | anzlic-enddate | anzlic-jurisdic            -->
<!--  ... for the place-keyword (GEN) use the values defined in    -->
<!--      the ANZLIC Guidelines, e.g. "1:100 000 Map Series"       -->

<!ELEMENT date     (#PCDATA)>
<!-- Note: the content of the date element is expected to contain  -->
<!--       an ISO 8601 string, i.e. YYYY-MM-DD or YYYY-MM or YYYY  -->

<!-- Top Level Element ========================================== -->

<!ENTITY % local.anzmeta.content "">
<!ELEMENT anzmeta  (citeinfo, descript, timeperd, status,
                distinfo, dataqual, cntinfo+, metainfo,
                supplinf? %local.anzmeta.content;)>

<!-- Citation Information ======================================== -->

<!ENTITY % local.citeinfo.content "">
<!ELEMENT citeinfo (uniqueid, title, origin %local.citeinfo.content;)>
```

```
<!ELEMENT uniqueid (#PCDATA)>
<!ELEMENT title    (%inline;)*>
<!ELEMENT origin   (custod, jurisdic)>
<!ELEMENT custod   (%inline;)*>
<!ELEMENT jurisdic (keyword)+>

<!-- Description ================================================ -->

<!ENTITY % local.descript.content "">
<!ELEMENT descript (abstract, theme+, spdom %local.descript.content;)>

<!ELEMENT abstract (%flow;)*>
<!ELEMENT theme    (keyword)+>
<!ELEMENT spdom    (place*, bounding)>

<!ELEMENT place    (dsgpolyo+ | keyword)>
<!ELEMENT dsgpolyo (vertex, (vertex)+)>

<!ENTITY % COORDINATE "#PCDATA">
<!ELEMENT long     (%COORDINATE;)>
<!ELEMENT lat      (%COORDINATE;)>
<!ELEMENT vertex   (long, lat)>

<!ELEMENT bounding (northbc, southbc, eastbc, westbc)>
<!ELEMENT northbc  (%COORDINATE;)>
<!ELEMENT southbc  (%COORDINATE;)>
<!ELEMENT eastbc   (%COORDINATE;)>
<!ELEMENT westbc   (%COORDINATE;)>

<!-- Data Currency ============================================== -->

<!ENTITY % local.timeperd.content "">
<!ELEMENT timeperd (begdate, enddate %local.timeperd.content;)>
<!ELEMENT begdate  (date | keyword)>
<!ELEMENT enddate  (date | keyword)>

<!-- Dataset Status ============================================= -->

<!ENTITY % local.status.content "">
<!ELEMENT status   (progress, update %local.status.content;)>
<!ELEMENT progress (keyword)>
<!ELEMENT update   (keyword)>

<!-- Access ===================================================== -->

<!ENTITY % local.distinfo.content "">
<!ELEMENT distinfo (native, avlform?, accconst %local.distinfo.content;)>
<!ELEMENT native   (nondig | digform)+>
<!ELEMENT nondig   (formname)>
<!ELEMENT digform  (formname)>
<!ELEMENT formname (%inline;)*>
<!ELEMENT avlform  (nondig | digform)+>
<!ELEMENT accconst (%flow;)*>

<!-- Data Quality =============================================== -->
```

```
<!ENTITY % local.dataqual.content "">
<!ELEMENT dataqual (lineage, posacc, attracc, logic, complete
                %local.dataqual.content;)>
<!ELEMENT lineage  (%flow;)*>
<!ELEMENT posacc   (%flow;)*>
<!ELEMENT attracc  (%flow;)*>
<!ELEMENT logic    (%flow;)*>
<!ELEMENT complete (%flow;)*>

<!-- Contact Information ======================================== -->

<!ENTITY % local.cntinfo.content "">
<!ELEMENT cntinfo  (cntorg, cntpos, address, address?, city,
                state, country, postal, cntvoice?, cntfax?,
                cntemail? %local.cntinfo.content;)>
<!ELEMENT cntorg   (%inline;)*>
<!ELEMENT cntpos   (%inline;)*>
<!ELEMENT address  (%inline;)*>
<!ELEMENT city     (%inline;)*>
<!ELEMENT state    (%inline;)*>
<!ELEMENT country  (%inline;)*>
<!ELEMENT postal   (%inline;)*>
<!ELEMENT cntvoice (%inline;)*>
<!ELEMENT cntfax   (%inline;)*>
<!ELEMENT cntemail (%inline;)*>

<!-- Metadata Information ======================================= -->

<!ENTITY % local.metainfo.content "">
<!ELEMENT metainfo (metd %local.metainfo.content;)>
<!ELEMENT metd     (date)>

<!-- Supplementary Information ================================== -->

<!ELEMENT supplinf (%flow;)*>

<!-- END ======================================================== -->
```

Appendix 3
An Example of a Metadata Record conforming to the ANZMETA Document Type Definition (DTD)

```
<?xml version="1.0"?>
<!DOCTYPE anzmeta PUBLIC "-//ANZLIC//DTD ANZMETA 1.3//EN"
 "http://www.environment.gov.au/net/anzmeta/anzmeta-1.3.dtd">
<anzmeta>
  <citeinfo>
    <uniqueid>ANZVI0803002001</uniqueid>
    <title>spatial-dtd13-7 ... Jervis Bay (1:100k 9027) and Kiama (1:100k 9028)</title>
    <origin>
      <custod>
        IndexGeo Pty Ltd
      </custod>
      <jurisdic>
        <keyword thesaurus="anzlic-jurisdic">
          Australia
        </keyword>
      </jurisdic>
    </origin>
  </citeinfo>
  <descript>
    <abstract>
      <p>Testing purposes only ...</p>
      <ul>
        <li>Jervis Bay (1:100k 9027)</li>
        <li>clear water</li>
      </ul>
      <p>Also, this document is verifying DTD v1.3</p>
    </abstract>
    <theme>
      <keyword qualifier="Monitoring">
        BOUNDARIES Administrative
      </keyword>
    </theme>
    <spdom>
      <place>
        <keyword thesaurus="1:100 000 Map Series" identifier="9027"
              custodian="Australia">
          JERVIS BAY
        </keyword>
      </place>
      <place>
        <keyword thesaurus="1:100 000 Map Series" identifier="9028"
              custodian="Australia">
          KIAMA
        </keyword>
      </place>
      <bounding>
        <northbc>-34.5</northbc>
        <southbc>-35.5</southbc>
        <eastbc>151.0</eastbc>
```

```
      <westbc>150.5</westbc>
    </bounding>
  </spdom>
</descript>
<timeperd>
  <begdate>
    <date>
      1999-06-09
    </date>
  </begdate>
  <enddate>
    <keyword>
      Current
    </keyword>
  </enddate>
</timeperd>
<status>
  <progress>
    <keyword>
      Complete
    </keyword>
  </progress>
  <update>
    <keyword>
      Not Planned
    </keyword>
  </update>
</status>
<distinfo>
  <native>
    <digform>
      <formname>
        ASCII
      </formname>
    </digform>
  </native>
  <avlform>
    <digform>
      <formname>
        ASCII
      </formname>
    </digform>
  </avlform>
  <accconst>
    No restrictions
  </accconst>
</distinfo>
<dataqual>
  <lineage>
    Not documented
  </lineage>
  <posacc>
    Not documented
  </posacc>
  <attracc>
    Not documented
```

```
    </attracc>
    <logic>
      Not documented
    </logic>
    <complete>
      Not documented
    </complete>
  </dataqual>
  <cntinfo>
    <cntorg>IndexGeo Pty Ltd</cntorg>
    <cntpos>Data Manager</cntpos>
    <address>160 Cowper Street</address>
    <city>Goulburn</city>
    <state>NSW</state>
    <country>Australia</country>
    <postal>2580</postal>
    <cntemail>data@indexgeo.com.au</cntemail>
  </cntinfo>
  <metainfo>
    <metd>
      <date>
        2000-09-04
      </date>
    </metd>
  </metainfo>
  <supplinf>
    <p>See <a href="http://www.indexgeo.com.au/data/test/spatial-13/">
http://www.indexgeo.com.au/data/test/spatial-13/</a></p>
  </supplinf>
</anzmeta>
```