



Australian Government

Geoscience Australia

Dams and Water Storages 1990

Product User Guide

**National Mapping Division,
Geoscience Australia**

Published by Geoscience Australia

Published by Geoscience Australia
Department of Industry, Tourism and Resources

© **Commonwealth of Australia, 2004**

1st Edition released: February 2002

2nd Edition released: April 2003

3rd Edition released: July 2004 (Minor corrections)

Technical support:

For up to date information on *Dams and Water Storages 1990* refer to the Geoscience Australia website:
www.ga.gov.au

Please direct queries to:

Geoscience Australia Sales Centre

GPO Box 378

Canberra ACT 2601

Freecall (within Australia): 1800 800 173

Telephone: +61 2 6249 9966

Facsimile: +61 2 6249 9960

Email: sales@ga.gov.au

Internet: www.ga.gov.au

Acknowledgments:

Geoscience Australia gratefully acknowledges contributions to map content. Information is supplied by Commonwealth, State, Territory and local government and private sector agencies and individuals. A comprehensive list is available from our web site.

About this product user guide

This product user guide sets out the fundamental concepts and characteristics of *Dams and Water Storages*. The guide begins with general information and provides more details in later sections. The overview of data content and structure will allow you to make immediate use of the data.

The information in this product user guide was correct at the time of publication and is subject to change. Geoscience Australia assumes no liability resulting from any statements, errors or omissions in the publication or from the use of information contained in this product user guide.

Contents

1	User information	4
1.1	User support/contact information	4
1.2	Geoscience Australia - National Mapping Division	4
2	About Dams and Water Storages 1990.....	5
2.1	Dams and Water Storages 1990 components.....	5
2.2	The Dams and Water Storages 1990 product	5
2.3	Coordinate system.....	5
3	Data loading.....	6
3.1	Application formats	6
3.2	Description of files	6
4	Data characteristics and concepts.....	7
4.1	Dams and Water Storages 1990 data concepts	7
5	Data structure and content	8
5.1	Data structure	8
5.2	Data dictionary	9
6	Data quality information.....	12
	Appendix A: Metadata.....	13
	Appendix B: Authority names.....	16
	Glossary	16

1 User information

1.1 User support/contact information

A copy of the licence conditions are supplied at the time of purchase or download, and should be retained for proof of licensing.

Geoscience Australia welcomes feedback on any aspect of its product or services. Please direct your comments or any queries regarding this document or data to:

Geoscience Australia Sales Centre
GPO Box 378
Canberra ACT 2601
Freecall (within Australia): 1800 800 173
Telephone: +61 2 6249 9966
Facsimile: +61 2 6249 9960
Email: sales@ga.gov.au
Internet: www.ga.gov.au

1.2 Geoscience Australia - National Mapping Division

Geoscience Australia is the national agency for geoscience research and spatial information. It serves government and supports the community through its output areas of geoscience for urban centres, oceans and coasts, and regional and rural areas.

The National Mapping Division within Geoscience Australia undertakes national mapping, remote sensing maritime boundary and land information coordination activities in support of Australia's economic and social development.

2 About Dams and Water Storages 1990

2.1 *Dams and Water Storages 1990 components*

Your data package has two components which combine to give you a complete data product. The components are:

- **Product user guide**
This guide describes the structure and content of *Dams and Water Storages*.
- **Data files**
The number of files will vary with the application format of the data.

2.2 *The Dams and Water Storages 1990 product*

The database contains locational and non-locational information for selected dams and storages in Australia. It extends as far as Australia's off-shore limits, but does not include external Territories. Though the database contains information for those dams and storages owned by a public authority, some significant private dams are included.

The source of this information is primarily the databases of the particular controlling authority for each state and, to a lesser extent, maps and publications of State and Federal agencies, in particular, the Australian National Committee on Large Dams (ANCOLD).

The data covers the whole of Australia, both onshore and offshore, between latitude limits -5°S to -44°S and longitude limits 110°E and 160°E. The scale is independent and latitudes and longitudes are expressed to the nearest 1/10th of a minute.

2.3 *Coordinate system*

Dams and Water Storages 1990 data is available in geographical coordinates (latitude and longitude) in decimal degrees using the Australian Geodetic Datum 1966 (AGD66).

3 Data loading

3.1 Application formats

The *Dams and Water Storages 1990* data is supplied in three application formats:

- ArcInfo Export;
- ArcView Shapefile; and
- MapInfo mid/mif.

3.2 Description of files

The downloaded *Dams and Water Storages 1990* package contains the following files.

Table 1: *Dams and Water Storages 1990* files

Documentation files			
File name	File content		
42358_user_guide.pdf	This user guide		
Data files			
File name	ArcInfo Export (* .e00)	ArcView Shapefile (* .dbf, *.shp, *.shx)	MapInfo mid/mif (* .mid, *.mif)
	File size (KB)	File size (KB)	File size (KB)
aus_dam	256	241	86

4 Data characteristics and concepts

4.1 Dams and Water Storages 1990 data concepts

Each feature in *Dams and Water Storages 1990* is defined by a spatial object and an attribute object.

Feature-based data

Dams and Water Storages 1990 uses a feature-based data model described by the following definitions. These are used to describe data that represent phenomena in the real world:

- **Entity:** A real world phenomenon which cannot be divided into phenomena of the same type.
- **Feature instance:** A single occurrence of a feature which has a unique set of spatial and attribute object values.
- **Attribute:** A descriptive characteristic of a feature. Attributes can be spatial (or locational) and aspatial (or non-locational).
- **Attribute value:** A value assigned to an attribute, either for a feature instance or its attributes.
- **Feature class:** A group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.
- **Entity class:** A group of entities of the same kind, matching the members of a feature class.

The structure of a feature instance in the feature based data model can be summarised as:

$$\text{feature instance} = [\text{spatial object} + \text{attribute object}]$$

Spatial object

Spatial objects are the locational attributes of the feature. They comprise the special cases of points, chains and polygons. Spatial objects have a spatial address which consists of one or more couplets (x, y) or triplets (x, y, z).

A point is the only spatial object contained within *Dams and Water Storages*. The points, which are classified as entity points, have been used to represent point entities, or area entities.

Attribute object

An *attribute object* identifies the class of feature and the non-locational properties of the feature. The following example illustrates the possible content of the attribute object:

Attribute	Attribute value
Feature	Dam
Dams_id	2
Dam_wall	DARWIN RIVER
Dam_state	NT
Water_body	DARWIN RIVER DAM
River	Darwin
Basin	815
Purpose	5
Catchment	206
Capacity	265,000
Surface	4,400
Height	31
Crest	533
Dam_type	E
Owner	PAWA
Dam_date	1972

Figure 1: Example of an attribute object

5 Data structure and content

5.1 Data structure

Dams and Water Storages 1990 is topologically structured and only contains point features. There are no line or polygon features in the product. The point features are linked to an attribute table which contains additional non-locational information. This includes the type and purpose of the dam, structural parameters and ownership details.

5.2 Data dictionary

Table 2: Attribute table of *Dams and Water Storages 1990*

Feature	Description	Object	Attribute	Attribute values	Selection criteria
DAM (dam)	This includes natural lakes used as water storage.	Point	DAM WALL (dam_wall)	Name of dam	Dams have been included with a capacity of more than 200 Megalitres. Smaller dams will be included if owned/controlled by the state water authority and may be included if they are a significant part of a larger system but owned/controlled by some other authority Where data is available for a dam before any major changes (eg. dam wall raised) then it is also included, but particulars will be shown in lower case.
			DAM STATE (dam_state)	NSW = <i>New South Wales</i> NT = <i>Northern Territory</i> QLD = <i>Queensland</i> SA = <i>South Australia</i> TAS = <i>Tasmania</i> WA = <i>Western Australia</i> VIC = <i>Victoria</i>	
			WATERBODY (water_body)	Name of waterbody	
			RIVER (river)	Name of the river and in most cases followed by the river type codes below: BK = <i>Brook</i> BR = <i>Branch</i> CR = <i>Creek</i> L = <i>Lake</i> OS = <i>Off Stream</i> RES = <i>Reservoir</i> R = <i>River</i> RVT = <i>Rivulet</i> TRI = <i>Tributary</i>	

Feature	Description	Object	Attribute	Attribute values	Selection criteria
			BASIN (basin)	WC = <i>Water Course</i> WR = <i>Weir</i> Drainage basin number	
			PURPOSE (purpose) Note: if more than one listed in order of importance	A = <i>Aquifer recharge</i> F = <i>Flood control</i> H = <i>Hydroelectric power generation</i> I = <i>Irrigation</i> N = <i>Navigation</i> P = <i>Thermal power station uses</i> R = <i>Recreation</i> S = <i>Urban; domestic and livestock supplies</i> T = <i>Salt water control</i> U = <i>Urban runoff control</i> W = <i>Waste storage</i>	
			CATCHMENT (catchment)	In square kilometres	
			CAPACITY (capacity)	In ML	
			SURFACE (surface)	In hectares	
			HEIGHT (height)	In metres	
			CREST (crest)	In metres	
			DAM TYPE (dam_type) Note: if more than one listed in order of	C = <i>Concrete (undifferentiated)</i> CA = <i>Concrete arch</i> CB = <i>Concrete buttress</i>	

Feature	Description	Object	Attribute	Attribute values	Selection criteria
			importance	CG = <i>Concrete gravity</i> E = <i>Earth</i> MA = <i>Multiple arch (concrete)</i> R = <i>Rock</i> O = <i>Other (steel piling, timber piling)</i>	
			OWNER (owner)	Name of owning or operating authority. A list of these are available in Appendix B.	
			DAM DATE (dam_date)	Year completed	
			COMMENTS	Additional information	

6 Data quality information

Lineage

Lineage is a history of the spatial data; the source of the data, how they were captured, prepared, revised etc.

Source of the data

Data have been gathered from a variety of sources including:

- State water authorities and other agencies' register of dams;
- Geoscience Australia's 1:100 000 and 1:250 000 maps and plans;
- Various larger scale specialist maps and plans;
- Annual reports; and
- Numerous private industry publications including journals and newspapers.

Data capture procedures

Combining information gleaned from all the above sources, the latitude/longitude of dam was calculated and added directly into the database. Depending on the detail of the source information, the calculated value was to the nearest minute at worst, and second at best.

Positional accuracy

The positional accuracy of any database is dependant on the accuracy of the source material and the particular data capture procedure used. Because *Dams and Water Storages 1990* has had the locational information manually entered, the positional accuracy is fully dependant on the source material.

In general, no more than 10% of well defined points (a point which can be accurately identified on the source material and in the digital data) are in error by more than 0.5mm when measured on the source material. To test this, verification plots were produced from the data at 1:1 million scale and then overlaid on 1:1 million World Aeronautical Charts.

Attribute accuracy

For a given feature, all attributes listed as mandatory are populated. Entireties in other fields depend on data available. The data represents the best available information at the time.

Logical consistency

The logical consistency of *Dams and Water Storages 1990* is defined by validating attributes, topological structure and graphical inconsistency.

Validating attributes

All mandatory attributes for all features contain an entry. A check of the database has been completed to ensure that only valid features and attributes are supplied. This has been achieved using Oracle queries. Oracle query tests carried out include:

- Removal of invalid and system feature codes;
- Check for all point features attached to attribute table;
- Tally of all points and attribute table records;
- Check of layer/network assignment of all features; and
- Cross-check for invalid feature code/type combinations.

Topological structure

For both GeoVision and ArcInfo, the topological structure is fully complete. Corrections were made until Geovision AMS procedures detected zero errors. Iterative corrections were made for anomalous line features detected during the BUILKD procedure of ArcInfo. Data was considered topologically clean only after there was zero label errors and node errors in ArcInfo files.

Data completeness

Completeness is checked through systematic comparison against relevant source material. It is up-to-date to December 1989.

Appendix A: Metadata

Note: This dataset description is metadata (data about data) which describes the actual dataset in accordance with the ANZLIC (Australia New Zealand Land Information Council) Core Metadata [Guidelines](#) Version 2.

Dataset citation

ANZLIC unique identifier: ANZCW0703005382

Title: Dams and Water Storages 1990

Custodian

Custodian: Geoscience Australia

Jurisdiction: Australia

Description

Abstract:

Dams and Water Storages 1990 shows point location and other non-locational information of large reservoirs in Australia owned by a public authority. Attribute information includes:

- Name of the dam wall and associated water body
- Name of the stream on which it is located
- Storage capacity and surface area of the water body
- Ownership
- Construction details of the dam wall

ANZLIC search words:

- WATER Supply Mapping

Geographic extent polygon:

110° -5°, 160° -5°, 160° -44°, 110° -44°, 110° -5°

Geographic bounding box:

North bounding latitude: -5°

South bounding latitude: -44°

East bounding longitude: 160°

West bounding longitude: 110°

Data currency

Beginning date: Not Known

Ending date: 1989-12-01

Dataset status

Progress: Complete

Maintenance and update frequency: Not Known

Access

Stored data format:

Digital: ArcInfo

Available format type:

Digital: ArcInfo Export
Digital: ArcView Shapefile
Digital: MapInfo mid/mif

Access constraints:

The data are subject to Copyright. Data files may be downloaded from Geoscience Australia's website at www.ga.gov.au/download/. A licence agreement is required

Data quality

Lineage:

Data have been gathered from a variety of sources including:

- State water Authorities and other agencies' registers of dams
- Geoscience Australia's 1:100 000 and 1:250 000 topographic maps
- Various larger scale specialist maps and plans
- Annual Reports
- Numerous private industry publications including journals and newspapers

Combining information gleaned from all the above sources, the latitude/longitude of each was calculated and added directly into the database. Depending on the detail of the source information, the calculated value was to the nearest minute at worst, and second at best.

Positional accuracy:

The positional accuracy of any database is dependant on the accuracy of the source material and the particular data capture procedure used. Because the database has had the locational information manually entered, the positional accuracy is fully dependent on the source material.

In general no more than 10% of well defined points are in error by more than 0.5mm when measured on the source material. To test this, verification plots were produced from the data at 1:1 million scale and then overlaid on 1:1 million World Aeronautical Charts.

Attribute accuracy:

For a given feature, all attributes listed as mandatory are populated. Entries in other fields depend on data availability. The data represents the best available information at the time.

Logical Consistency:

The logical consistency of the databases is defined by validating attributes, topological structure and graphical inconsistency.

Validating Attributes

All mandatory attributes for all features contain an entry. A check of the database has been completed to ensure that only valid features and attributes are supplied. This has been achieved using Oracle queries. Oracle query tests carried out include:

- check of valid feature codes
- removal of invalid and system feature codes
- check for all point features attached to attribute table
- tally of all points, attribute table records
- check of layer/network assignment of all features
- cross-check for invalid feature code/type combinations

Topological Structure

For both GeoVision and ArcInfo the topological structure is fully complete. Corrections were made until Geovision AMS procedures detected zero errors. Iterative corrections were made for anomalous line features detected during the BUILD procedure of ArcInfo. Data was considered topologically clean only after there were zero label errors and node errors in ArcInfo files.

Completeness:

Completeness is checked through systematic comparison against relevant source material. It is up-to-date to December 1989.

Contact information

Contact organisation: [Geoscience Australia](#)

Contact position: Geoscience Australia Sales Centre

Mail address: GPO Box 378

Locality: CANBERRA

State: ACT

Country: Australia

Postcode: 2601

Telephone: Australia Freecall 1800 800 173

Facsimile: +61 2 6249 9960

Electronic mail address: sales@ga.gov.au

Metadata information

Metadata date: 2003-04-02

Additional metadata

Metadata reference XHTML: <http://www.ga.gov.au/meta/ANZCW0703005382.html>

Metadata reference XML: <http://www.ga.gov.au/meta/ANZCW0703005382.xml>

Size of dataset: 86 - 256 KB depending on the format

Scale/resolution: 1:1 million

Projection/datum: Geographical coordinates using the Geocentric Datum of Australia 1994 (GDA94). It is also available using the Australian Geodetic Datum 1966 (AGD66).

Appendix B: Authority names

Table 3: Names of owning or operating authorities

State/Territory	Authority	
Australia	CofA	Commonwealth Of Australia
	MDC	Murray Darling Commission
	RMC	River Murray Commission
	SMHEA	Snowy Mountains Hydro Electric Authority
Queensland *Remember to change abbreviations to caps.	BCC	Brisbane City Council
	BESC	Belyando Shire Council
	BLAIR	Blair Athol Coal
	BRC	Border Rivers Commission
	BSC	Burrum Shire Council
	CCM	Capricorn Coal Management
	CGA	Consolidated Goldfields Aust
	CMWB	Cairns -Mulgrave Water Board
	DAA	Department of Aboriginal Affairs
	GAWB	Gladstone Area Water Board
	GCCC	Goldcoast City Council
	HBWSB	Hervey Bay Water Supply Board
	KSC	Kingaroy Shire Council
	LSC	Landsborough Shire Council
	MIM	Mount Isa Mines
	MSC	Maroochy Shire Council
	NSC	Noosa Shire Council
	PRSC	Pine River Shire Council
	QAL	Queensland Alumina Ltd
	QC	Queensland Government
	QEC	Queensland Electricity Commission
	QNPL	Queensland Nichel Pty Ltd
	QWRC	Queensland Water Resources Commission
	RCC	Rockhampton City Council
	RESC	Redland Shire Council
	SSC	Sarina Shire Council
	TOCC	Toowoomba City Council
	TTD	Tableland Tin Drainage
	TVCC	Townsville City Council
	UTAH	Utah Development Company
	WA	Worsley Alumina
	WCC	Warwick City Council
New South Wales	ACC	Armidale City Council
	BACC	Bathurst City Council
	BHWB	Broken Hill Water Board
	BVSC	Bega Valley Shire Council
	CHSC	Coffs Harbour Shire Council
	CMC	Clarence Municipal Commission
	COSC	Coonabarabran Shire Council
	CPC	Commonwealth Portland Cement
	CRSC	Crookwell Shire Council
	CSC	Cabonne Shire Council
	CTCC	Central Tableland County Council
	DJV	Drayton Joint Venture
	ECNSW	Electricity Commission of NSW
	ESC	Eurobodalla Shire Council
	GCC	Goulburn City Council
	GSC	Gosford Shire Council
	HDWB	Hunter District Water Board
	HMC	Hastings Municipal Council
	IMC	Inverell Municipal Council
	JOD	Jododex (Australia) Pty Ltd
	KMC	Kiama Municipal Council
	LCC	Lithgow City Council

State/Territory	Authority
	LGC Lyndhurst Goldfields Company MC Mudgee Council MRCC Manning River County Council MWSDB Water Board NECC New England County Council OCC Orange County Council PMC Parkes Municipal Council PSC Parry Shire Council PSCO Parkes Shire Council PWD Public Works Department Nsw RCCO Rous County Council RSC Rylston Shire Council SCC Shoalhaven City Council SSCO Shoalhaven Shire Council TCC Tamworth City Council TSC Tenterfield Shire Council TWEED Tweed Shire Council WRC Water Resources Commission WSC Wingecarribee Shire Council WYSC Wyong Shire Council YSC Yarrowluma Shire Council
Victoria	ACWSC Ararat City Water Supply Commission BWC Ballarat Water Commission BWT Benalla Water Works Trust CWT Colac Waterworks Trust EWT Euroa Waterworks Trust FCWT Fish Creek Waterworks Trust GCEWT Gembrook Cockatoo Emerald Waterworks Trust GDWB Geelong And District Water Board HWT Hurstbridge Waterworks Trust KWWT Korumburra Waterworks Trust LEWT Lake Entrance Waterworks Trust LVWSB Latrobe Valley Water and Sewerage Board LWT Leongatha Waterworks Trust MAWT Macedon Waterworks Trust MMBW Melbourne Metropolitan Board of Works MWT Maryborough Waterworks Trust RWC Rural Water Commission of Victoria SECV State Electricity Commission of Victoria WIWB Wonthaggi-Inverloch Water Board WMWB Western Moorabool Water Board WWT Westernport Waterworks Trust
Tasmania	BMI BMI Mining Pty Ltd GC Glenorchy Council HCC Hobart City Council HEC Hydro Electric Commission KISMC King Island Scheelite Mine MB Municipality of Burnie MTLMRC Mt Lyell Mining And Railway Co R&CRB Rockhampton And Cascade Race Board R&WSC Rivers And Water Supply Commission
South Australia	DLSA Department of Lands SA ETSA Electricity Trust of SA EWSD Engineering Water Supply Department KML Kanmantoo Mines Ltd
Western Australia	MNM Mount Newman Mine MWA Metropolitan Water Authority PWDWA Public Works Department WA
Northern Territory	ERA Energy Resources of Australia

Glossary

Attribute

A descriptive characteristic of a feature. An attribute has a defined set of attribute values.

Attribute object

The attribute object holds the non-locational or semantic information about the feature instance.

Australian Geodetic Datum 1966 (AGD66)

This datum was adopted in 1966 and is defined by the parameters of the Australian National Spheroid and the coordinates of the Johnston Geodetic Station. This datum is used for the determination of coordinates for some Geoscience Australia products. Superseded by the Geocentric Datum of Australia 1994 (GDA94).

Chain

A line composed of a sequence of non-intersecting line segments bounded by nodes. Chains reference the polygons to the left and right of the chain.

Datum

A mathematical surface from which heights or positions are referenced.

Entity

A real world phenomenon which cannot be divided into phenomena of the same type.

Entity class

A group of entities of the same kind, matching the members of a feature class.

Entity point

An entity point is used to locate point entities represented by a point because of the scale of the source material.

Feature

A feature is the cartographic or digital representation of a class of entity.

Feature class

A feature class is a group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.

Feature instance

A single occurrence of a feature which has a unique set of spatial and attribute object values.

Geocentric Datum of Australia 1994 (GDA94)

The set of geographical coordinates based on the Geocentric Datum of Australia. It is compatible with Global Positioning Systems (GPS). Adopted in 1994 and implemented in the year 2000. Used in production of new editions of 1:100 000 and 1:250 000 NATMAPs.

Geodetic datum

A datum defines the basis of a coordinate system. A local or regional geodetic datum is normally referred to an origin whose coordinates are defined. The datum is associated with a specific reference ellipsoid which best fits the surface (geoid) of the area of interest. A global geodetic datum is now related to the centre of the earth's mass, and its associated spheroid is a best fit to the known size and shape of the whole earth. The position of a point common to two different surveys executed on different geodetic datums will be assigned two different sets of geographical coordinates.

Geographical coordinates

A position given in spherical coordinates commonly known as latitude and longitude.

Geographic Information System (GIS)

A spatial database which is manipulated via a set of spatial operators or commands.

Latitude

The latitude of a feature is its angular distance on a Meridian, measured northwards or southwards from the terrestrial Equator.

Layer

The features in a theme are subdivided into one or more layers on the basis of the spatial objects used to represent the features. Linear networks, polygons and point features are placed in separate layers.

Longitude

An angular distance measured east or west from a reference meridian (usually Greenwich) on the earth's surface.

NATMAP

Geoscience Australia's brand for its popular topographic map range.

Node

A point that is a junction of two or more chains or which is the end point of a chain. Connectivity of chains is indicated by the sharing of nodes at their intersections.

Point

A geometric representation defined by a single (x,y) coordinate pair or an (x,y,z) triplet.

Polygon

A continuous area defined by a set of bounding chains. There is only one external polygon and there may be one or more internal, non-nested inner boundaries.

Positional accuracy

Statistical estimate of the degree to which planimetric coordinates and elevations of features agree with their real world values.

Projection

Any systematic way of representing the meridians and parallels of the earth upon a plane surface or map.

Spatial object

The spatial object holds the locational information of a feature instance. It is composed of either a point, chain or polygon.