Australian Government
Bureau of Meteorology

Explanatory Notes for Water Regulations Metadata and Contextual Information

Category 3: Water storage information, subcategories 3a, 3b, 3c, 3d, 3da, 3e and 3f

Water Information
DATA › INFORMATION › INSIGHT

Date	Version	Status	Owner
January 2015	1.0	Final	Bureau of Meteorology, Regulations and Policy Unit regulations@bom.gov.au

Cover photograph by Lynton Crabb

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1 Introduction

This document provides explanatory information about metadata listed in the document titled *Metadata and Contextual Information Requirements*, for provision with water storage information (Category 3), subcategories 3a, 3b, 3c, 3d, 3da, 3e and 3f.

These explanatory notes apply to:

Category 3: Water storage information

Subcategory 3a: Level of water in a major storage, expressed in metres;

Subcategory 3b: Volume of water in a major storage, expressed in megalitres;

Subcategory 3c: Volume of water released from a major storage, expressed in megalitres;

Subcategory 3d: Total volume of water delivered to a major storage, expressed in megalitres;

Subcategory 3da: Volume of water delivered to a major storage from each water source, expressed in megalitres;

Subcategory 3e: Volume of water in a minor storage, expressed in megalitres; and

Subcategory 3f: A list of major storages owned, operated or regulated by the person required to give the information.

The *Metadata and Contextual Information Requirements* document is incorporated by reference in the Water Regulations 2008 (the regulations). It lists the metadata and contextual information elements that named organisations are required to give when providing their water information to the Bureau of Meteorology (the Bureau).

Previously, the regulations contained generalised requirements and a broad direction for data providers to give all metadata that related to the water information subcategories. The detailed element lists given in this document better define and constrain that generalised requirement and do not change the regulations' requirement for organisations to give their related metadata and contextual information. The Bureau will progressively publish detailed element lists for each category of water information.

As with other requirements in the regulations, you are only required to provide water information that is in your possession, custody or control. If you do not hold particular metadata or contextual information listed in the incorporated document in electronic

format, you are not required to provide it to the Bureau. You are not required to provide information (including metadata) that is already in the Bureau's possession.

This document does not specify how the information shall be encoded or exchanged. Specific data formats, e.g. Water Data Transfer Format (WDTF) contain detail about how metadata can be encoded and provided to the Bureau. More information on data delivery requirements for specific formats can be found at www.bom.gov.au/water/regulations/dataDelivery/overview/index.shtml.

Common and subcategory-specific elements

Some metadata and contextual information elements are common to all subcategories within a water information category. That is, these elements must be provided for each subcategory of water information.

Other metadata and contextual information elements are subcategory-specific. They must be provided for the relevant subcategory, in addition to the common elements.

Chapter 2 explains metadata elements that are common to the water storage information subcategories, except for subcategory 3f.

Chapters 3, 4, 5 and 6 explain subcategory-specific metadata elements for subcategories 3a and 3b, 3c and 3d, 3da and 3e, respectively. All the metadata elements required for subcategory 3f are given in Chapter 7.

For ease of understanding, water storage metadata elements are grouped into seven families (Figure 1) and requirements under each subcategory are shown in Table 1.

All of the metadata elements required to be given with subcategories 3a to 3f may be encoded in the Water Data Transfer Format (WDTF).

For inquiries about the *Metadata and Contextual Information Requirements* document or these explanatory notes please email regulations@bom.gov.au.

Please email any questions about data formats for providing data and metadata to waterdatasupport@bom.gov.au.

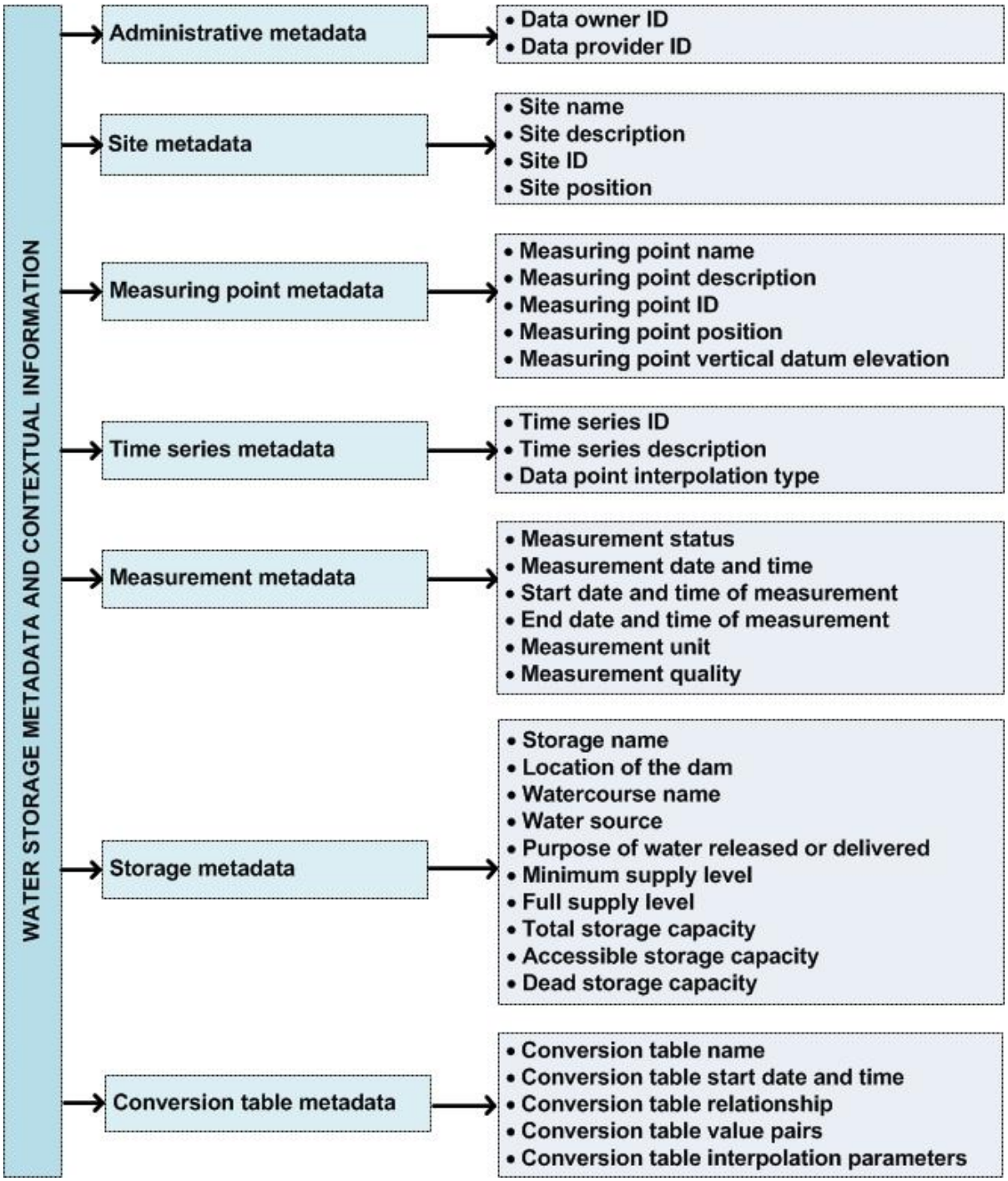


Figure 1 Metadata and contextual information elements for category 3

Table 1 Metadata and contextual information elements by subcategory

Metadata element	Water data subcategory						
	3a	3b	3c	3d	3da	3e	3f
Administrative metadata							
Data owner ID	√	√	√	√	√	√	√
Data provider ID	√	√	√	√	√	√	√
Site metadata							
Site name	√	√	√	√	√	√	
Site description	√	√	√	√	√	√	
Site ID	√	√	√	√	√	√	
Site position	√	√	√	√	√	√	
Measuring point metadata							
Measuring point name	√	√	√	√	√	√	
Measuring point description	√	√	√	√	√	√	
Measuring point ID	√	√	√	√	√	√	
Measuring point position	√	√	√	√	√	√	
Measuring point vertical datum elevation	√	√	√	√			
Time series metadata							
Time series ID	√	√	√	√	√	√	
Time series description	√	√	√	√	√	√	
Data point interpolation type	√	√	√	√	√	√	
Measurement metadata							
Measurement status	√	√	√	√	√	√	
Measurement date and time	√	√				√	
Start date and time of the measurement			√	√	√		
End date and time of the measurement			√	√	√		
Measurement unit	√	√	√	√	√	√	
Measurement quality	√	√	√	√	√	√	

(continued)

Table 1 (continued)

Metadata element	Water data subcategory						
	3a	3b	3c	3d	3da	3e	3f
Storage metadata							
Storage name	√	√	√	√	√	√	√
Location of the dam							√
Watercourse name						√	√
Water source					√		
Purpose of water released or delivered			√	√			
Minimum supply level							√
Full supply level							√
Total storage capacity							√
Accessible storage capacity							√
Dead storage capacity							√
Conversion table metadata							
Conversion table name	√	√	√	√			
Conversion table start date and time	√	√	√	√			
Conversion table relationship parameters	√	√	√	√			
Conversion table value pairs	√	√	√	√			
Conversion table interpolation parameters	√	√	√	√			

2 Common metadata and contextual information for Category 3 (subcategories 3a–3e)

This chapter describes 17 metadata elements common to the first six water storage information subcategories (3a, 3b, 3c, 3d, 3da and 3e).

All the metadata requirements for subcategory 3f—a list of major storages—are described separately in Chapter 7.

2.1 Data owner ID

Description

The unique organisation ID assigned by the Bureau to any organisation that is listed in the Water Regulations 2008.

The data owner is the organisation responsible for managing the collection of water observations (data) and information about these measurements (metadata).The designated data owner may differ from the data provider.

Examples

- w00004
- w00150
- w00098

To request a data owner ID, email waterdata@bom.gov.au

What is the difference between a data owner and provider?

More than 200 organisations are required to give specified water information to the Bureau under the Water Regulations 2008. In some cases, an organisation provides information to the Bureau via a third party, which may be a contractor or another organisation named in the regulations. In each case, the Bureau needs to know both the designated data owner and the data provider. The following scenarios demonstrate the difference between these two metadata elements.

Scenario 1: Organisation A is the designated owner of the data and provides this data directly to the Bureau. In this scenario, organisation A is both the designated data owner and the data provider. There is a single, unique ID for the data owner and the data provider.

Scenario 2: Organisation A is the designated owner of the data. However, there is an arrangement in place with organisation B—which is also named in the Water Regulations—to provide the data to the Bureau on behalf of organisation A. In this scenario, organisation A is the designated data owner, and organisation B is the data provider. The data owner and the data provider will have different unique IDs.

Scenario 3: Organisation A is the designated owner of the data; however, a third party contractor collects and forwards the data to the Bureau on behalf of organisation A. In this scenario, organisation A is the designated data owner, and the contractor is the data provider. The data owner and the data provider will have different unique IDs.

A site is owned and operated by multiple organisations. Who is the data owner?

A single data owner should be nominated as the organisation responsible for managing the collection of a given data set. There may be different nominated data owners for different data sets collected at a given site.

2.2 Data provider ID

Description

The unique organisation ID assigned by the Bureau to any organisation that provides water information to the Bureau.

The data provider is the organisation that provides data and metadata to the Bureau. The designated data owner may differ from the data provider.

Examples

- w00004
- w00150
- w00098

To request a data provider ID, email waterdata@bom.gov.au

2.3 Storage name

Description

The name of the water storage where observations are conducted.

This is the name by which the water storage is most commonly known within the organisation.

Examples

- Happy Valley Reservoir
- Lake Eildon

What is a water storage?

A water storage is defined as a body of water that is naturally occurring, is impounded by a constructed barrier or is within an excavation, and includes ponds, swamps, lakes, wetlands, weirs, dams, basins, reservoirs and open pits.
Source: Water Regulations 2008, Schedule 3 Part 1

What is a major storage?

Any water storage that has a total storage capacity of 1000 million litres (1 GL) or more.
Source: Water Regulations 2008, Schedule 3 Part 1

What is a minor storage?

Any water storage in which water is stored for taking and that meets the following criteria:

a) it is not a major storage;
b) it has a storage capacity of 100 million litres or more;
c) it is not used primarily for the precipitation of ash;
d) it is not a mine tailings dam; and
e) it is not managed by an urban infrastructure operator primarily for the purposes of flood management or pollution abatement.

Source: Water Regulations 2008, Schedule 3 Part 1

2.4 Site name

Description

The name of the site where observations of storage level are conducted.

Examples

- Wyangala Dam at storage gauge
- Lachlan River at Jemalong Weir storage gauge
- Murray River at Hume Dam storage gauge no. 2

What is a site?

A site is defined as ‘a place where observations of the environment are made; typically a physical location where sensors are used to measure the properties of one or more features of the environment (e.g. depth of a river and temperature of the atmosphere)’ (AWID, 2014).

For subcategories 3a, 3b and 3e, a site is a place where storage level is measured.

For subcategories 3c, 3d and 3da, a site is a place where water level or discharge is measured.

A site may also include monitoring equipment used to observe parameters such as rainfall or water quality, and telemetry or logging equipment. A site may contain removable measuring devices.

What is a measuring point?

A measuring point is a place where a particular parameter is measured within a site. This is usually where a sensor is located or where the observation is made.

For category 3, a measuring point can be a gauging station, a weir or a flume or a point where a storage level or discharge measuring device is placed.

What is the relationship between site and measuring point?

The measuring point should be located within the site.

There may be several measuring points within a site, but there must be at least one. At one end of the scale, an organisation may consider each site to consist of a single measuring point. Alternatively, a number of locations where measurements are made can be considered as unique measurement points within the one site.

2.5 Site description

Description

A description of the site where observations are conducted.

The site description may include descriptive information about the parameters measured at the site, physical characteristics of the site or other descriptive information about the extent of the site, site location or purpose.

Examples

- Water storage gauge at Wyangala Dam on the Lachlan River in the Lachlan Valley, 38 km upstream, east of Cowra
- Lake Burragorang, which is formed behind Warragamba Dam
- Lake Sorell at Chillon Point
- This site is located near Bethanga Bridge on Lake Hume. It was established on 16/08/2002 to replace site 409011

2.6 Site ID

Description

The unique identifier of the site where observations are conducted.

The site ID must be unique for this site within your organisation. The site ID must be consistent for all measuring points and time series related to the site. Your organisation is the authority for the uniqueness and persistence of the site ID.

The site ID is used in the Bureau data delivery file naming convention. See www.bom.gov.au/water/regulations/dataDelivery/howto/tsdf.shtml for further information about naming a time series data file.

Examples

- 412010
- 412172

2.7 Site position

Description

The geographic coordinates of a point, that represents the site where observations are conducted, expressed in latitude and longitude with the horizontal coordinate datum.

The horizontal coordinate datum should be either the World Geodetic System 1984 (WGS84) or Geocentric Datum of Australia 1994 (GDA94) system.

Examples

- –33.31406 148.93086; horizontal coordinate datum: GDA94
- –29.54 and 150.59; horizontal coordinate datum: GDA94

2.8 Measuring point name

Description

The name of the measuring point where observations are conducted.

This is the name by which the measuring point is most commonly known within the organisation.

Examples

- Storage gauge at Carcoar Dam
- Storage gauge at Clare Weir

What is a measuring point?

A measuring point is a place where a particular parameter is measured within a site. This is usually where a sensor is located or where the observation is made.

For category 3, a measuring point can be a gauging station, a weir or a flume, where level or discharge measuring device is placed.

What is a site?

A site is defined as ‘a place where observations of the environment are made; typically a physical location where sensors are used to measure the properties of one or more features of the environment (e.g. depth of a river and temperature of the atmosphere)’ (AWID, 2014).

For subcategories 3a, 3b and 3e, a site is a place where a storage gauge is positioned.

For subcategories 3c, 3d and 3da a site is a place where water level or discharge is measured.

A site may also include monitoring equipment used to observe parameters such as rainfall or water quality, and telemetry or logging equipment. A site may contain removable measuring devices.

What is the relationship between site and measuring point?

The measuring point should be located within the site.

There may be several measuring points within a site, but there must be at least one. At one end of the scale, an organisation may consider each site to consist of a single measuring point. Alternatively, a number of locations where measurements are made can be considered as unique measurement points within the one site.

2.9 Measuring point description

Description

A description of the measuring point where observations are conducted.

The measuring point description may include descriptive information about the measuring point location and how the location was set.

Example

- Storage gauge at Clare Weir, the point at which the water released from Burdekin Falls dam is distributed to the end users via the Haughton and Elliot main channels

2.10 Measuring point ID

Description

The identifier of the measuring point where observations are conducted.

The combination of site ID and measuring point ID must be unique within an organisation. Your organisation is responsible for the persistence of the measuring point ID.

Provided the above conditions are met, the same measuring point IDs may be used at different sites. For example, a data provider may identify all surface water level measuring points with a measuring point ID of 2.

Examples

- 1
- 2
- 3
- LVL
- FLOW

2.11 Measuring point position

Description

The geographic coordinates of the measuring point where observations are conducted, expressed in latitude and longitude with the horizontal coordinate datum.

The horizontal coordinate datum should be either the World Geodetic System 1984 (WGS84) or Geocentric Datum of Australia 1994 (GDA94) system.

Example

- –37.314060 145.930861; horizontal coordinate datum: GDA94

2.12 Time series ID

The number used to uniquely identify a time series.

The time series ID should be an integer. Where there is only one time series, the value should be ‘1’.

A new time series ID is necessary to differentiate between two sets of measurements of water level or discharge made by an organisation at a single measuring point, but using different measurement equipment or procedures, or with a different measurement status or granularity of data.

Examples

- 1
- 2

What is a time series?

A time series is a sequence of measurements of a single parameter made over time, by a common data owner/provider, at a common location, and with other common attributes such as:

- measurement status;
- measurement equipment;
- measuring or transmitting procedure;
- data point interpolation type; or
- granularity of data (e.g. measuring or reporting frequency).

It is important to distinguish between time series that differ in relation to one or other of these attributes.

It is also important to distinguish time series from spot samples, which are also collected over time. The key feature of time series is that the user can interpolate between points as the data are continuous.

2.13 Time series description

Description

A description of the time series.

The description may include information about various attributes of the time series that make it unique. The description may refer to time series attributes such as (but not limited to) granularity of data, sensor type and details, data processing and instrument procedures such as calibration. The description may also include information about how this time series relates to other similar time series at the same location.

A time series description should be provided for each time series ID.

Examples

- Time series ‘2’ is a series of measurements recorded by a second submerged pressure sensor installed at the measuring point.
- Time series ‘2’ is a series of measurements recorded at the same measuring point as time series ‘1’. The status of both ‘1’ and ‘2’ series is provisional; however, the granularity of the measurements in time series ‘2’ is different (daily mean).

2.14 Data point interpolation type

Description

A description of the interpolation type.

This element describes how to correctly interpret data points and how to interpolate between points within the time series.

A key feature of a time series is that the user can interpolate between points as the data are collected by an instrument that collects continuous data. By contrast, it may not be valid to interpolate between points in a series of spot samples that are collected over time.

Examples

- Linear interpolation between observation points
- The value for the preceding interval
- Discontinuous data points, no interpolation

(**Appendix A** contains a range of examples of how this may be coded in WDTF*)*

2.15 Measurement status

Description

The level of validation that has been performed on the measurement or series of measurements being provided.

Examples

- The data series has been inspected and validated
- Data values generated from automatic systems (telemetered data)
- Data values not manually inspected and validated

2.16 Measurement unit

Description

The unit of measurement prescribed in the regulation subcategory description.

It is important that the measurement unit is given with each time/value pair in a time series.

Examples

- m (metres) *(This is the prescribed unit of measurement for 3a)*
- ML (megalitres) *(This is the prescribed unit of measurement for 3b, 3c, 3d, 3da and 3e)*

2.17 Measurement quality

Description

The quality of the measurement value(s).

The Bureau has adopted a set of five quality codes, defined as follows:

Quality	Description	Description to be used by the data provider for transferring data to the Bureau
Quality-A	The record set is the best available given the technologies, techniques and monitoring objectives at the time of classification.	The data provider releases the recorded measurements for use, declaring that it is the best available given the technologies, techniques and monitoring objectives at the time of classification.
Quality-B	The record set is compromised in its ability to truly represent the parameter.	The data provider releases the recorded measurement for use with the provision that the data is compromised in its ability to represent the monitored parameter.
Quality-C	The record set is an estimate.	The data provider releases the record set for use, declaring that the data is an estimate
Quality-E	The record set's ability to truly represent the monitored parameter is not known.	The data provider releases the record set declaring that the data's ability to represent the monitored parameter is not known.
Quality-F	The record set is not of release quality or contains missing data.	The data provider releases the record set declaring that the data is missing, void or known to be incorrect.

Examples

- Quality A
- Quality F

3 Subcategory-specific metadata and contextual information: subcategories 3a and 3b

This chapter describes seven metadata elements specific to water data subcategory 3a: Level of water in a major storage, expressed in metres and 3b: Volume of water in a major storage, expressed in megalitres. In addition to these subcategory-specific metadata, data providers should also provide all of the common metadata described in Chapter 2 with their 3a and 3b data.

This chapter largely covers information related to storage level to storage volume conversion tables. Where there are conversion tables for the storage, the data provider must provide them to the Bureau.

What is a conversion table?

A conversion table is a table that shows the equivalent values of the measurement units of two different systems. It enables the conversion of values from one parameter to another, e.g., a table showing the relationship between storage water level (the stage) and its volume.

What is water level?

The elevation of the water surface at a particular time and date, measured relative to a specified datum, typically the Australian Height Datum (AHD) for the mainland and AHD Tas for the State of Tasmania (AWID, 2014).

What is storage volume?

The volume of water stored at a particular time and date. It excludes the dead storage volume and hence is the volume of water that can be accessed under normal circumstances without the installation of additional infrastructure (AWID, 2014).

3.1 Conversion table name

Description

Name of the conversion table.

Examples

- s412010.1.WaterStorageLevelVolume.2
- s412172-ratingtable2

3.2 Conversion table start date and time

Description

The date and time from which the conversion table applies.

Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Example

- 2001-03-30T12:20:00+10:00

3.3 Conversion table relationship

Description

The relationship between parameters that is detailed within the conversion table.

Examples

- Water level to stream flow
- Water level to storage volume

3.4 Conversion table value pairs

Description

A table of two or more value pairs comprising the conversion table points including units and quality codes.

Example

From water level (m)	To storage volume (ML)	Quality
0.0	670	Quality A
1.0	1250.0	Quality A
2.0	2225.0	Quality C

3.5 Conversion table interpolation parameters

Description

The interpolation parameters that are used when interpolating between value pairs in a conversion table. This includes interpolation type and the offset to be used when performing log–log interpolations.

Note that a conversion table log-offset is only required if the conversion table interpolation type is 'logarithmic'.

Examples

- Logarithmic, Log offset = 10
- Linear

What are conversion table interpolation types?

Examples of conversion table interpolation types include:

- Linear: straight line interpolation between conversion table points
- Logarithmic: interpolation between conversion table points in log–log space (after a log offset has been subtracted from the first parameter)
- Power 2/5: linear scale for first parameter (from), power 2/5 scale for second parameter (to).
- Step: step holds the current value until the next one

3.6 Measurement date and time

Description

The date and time of a measurement.

Measurement date and time is a component of each time series data point, recorded and stored when the measurement is taken. Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

3.7 Measuring point vertical datum elevation

Description

The elevation of the vertical datum applicable to the measurement of water storage level, expressed in metres relative to a standard height datum

Water storage level reporting requires capturing measurements and their relationships to a given datum. Where possible, the elevation should be given in metres AHD or metres AHD Tasmania.

Examples

- 25.00 m AHD
- 34.2 m AHD Tasmania

What is Australian Height Datum (AHD)?

The datum that sets mean sea level as zero elevation. Mean sea level was determined from observations recorded by 30 tide gauges around the coast of the Australian continent for the period 1966–1968 (AWID, 2014).

4 Subcategory-specific metadata and contextual information: subcategories 3c and 3d

This chapter describes metadata elements specific to water data subcategory 3c: Volume of water released from a major storage, expressed in megalitres and 3d: Total volume of water delivered to a major storage, expressed in megalitres. In addition to these subcategory-specific metadata, data providers should provide all of the common metadata described in Chapter 2 with their 3c and 3d data.

The 3c and 3d metadata requirements listed in the *Metadata and Contextual Information Requirements* document are associated with provision of this information as volumes. This aligns with the regulations requirement to give 3c and 3d information expressed in megalitres.

We recognise that in some cases organisations may record water released from or delivered to a major storage as flow rate time series information, rather than discrete volumes. In those instances, different metadata are needed to interpret and understand the data.

Sections 4.1 to 4.3 describe additional metadata requirements specific to 3c and 3d data given as volumes expressed in megalitres.

However, organisations which are giving 3c and 3d data to the Bureau as time series flow rate information will need to give an alternate set of metadata (in addition to the common requirements described in Chapter 2). These metadata are described in sections 4.4 to 4.11.

What is storage volume?

The volume of water stored at a particular time and date. It excludes the dead storage volume and hence is the volume of water that can be accessed under normal circumstances without the installation of additional infrastructure (AWID, 2014).

Metadata associated with water released or delivered expressed as volume

If the water released from or delivered to the storage is not associated with a conversion table, no information related to conversion table is required. Start date and time of the measurement and end date and time of the measurement, indicating the timespan across which the volume of water is released or delivered, should be given, along with the purpose of the water release or delivery.

4.1 Start date and time of measurement

Description

The date and time at which the measurement is started.

Time should be in Coordinated Universal Time (UTC). This date/time format complies with the 'W3C' date/time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

4.2 End date and time of measurement

Description

The date and time at which the measurement is completed.

Time should be in Coordinated Universal Time (UTC). This date/time format complies with the 'W3C' date/time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

4.3 Purpose of water released or delivered

Description

Primary purpose of water released from or delivered to a major storage, such as enhancing water supplies for irrigation, maintaining environmental flows, generating hydro-electric power, discharge during a flood etc.

Examples

- Protecting against aquifer salinisation
- Securing and enhancing irrigation water supplies for the township of Warruwi
- Environmental water release to coincide with peak tourism time
- Hydro-electric power generation
- For a balancing storage: water from Wartook storage released into the upper MacKenzie River and then diverted from the Dad and Dave Weir via the Mt Zero Channel to the Mt Zero balancing storage
- Flood discharge

Metadata associated with water released or delivered recorded as flow rate

If the water released from or delivered to the storage is given as flow rate time series data associated with a conversion table (e.g. a spillway discharge rating curve), information related to the conversion table should be given, along with the measurement date and time, the measuring point vertical elevation datum and the purpose of the water release or delivery.

What is a conversion table?

A conversion table is a table that shows the equivalent values of the measurement units of two different systems. It enables the conversion of values from one parameter to another, e.g., a table showing the relationship between water storage level (the stage) and its volume.

What is water level?

The elevation of the water surface at a particular time and date, measured relative to a specified datum, typically the Australian Height Datum (AHD) for the mainland and AHD Tas for the State of Tasmania (AWID, 2014).

4.4 Conversion table name

Description

Name of the conversion table.

Examples

- Spillway discharge ratingtable2
- s412172-ratingtable2

4.5 Conversion table start date and time

Description

The date and time from which the conversion table applies.

Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Example

- 2001-03-30T12:20:00+10:00

4.6 Conversion table relationship

Description

The relationship between parameters that is detailed within the conversion table.

Examples

- Water level to stream flow
- Water level to storage volume

4.7 Conversion table value pairs

Description

A table of two or more value pairs comprising the conversion table points including units and quality codes.

Example

From water level (m)	To flow discharge (ML/d)	Quality
0.0	0.0	Quality A
31.0	310.0	Quality A
32.0	670.0	Quality C

4.8 Conversion table interpolation parameters

Description

The interpolation parameters that are used when interpolating between value pairs in a conversion table. This includes interpolation type and the offset to be used when performing log-log interpolations.

Note that a conversion table log-offset is only required if the conversion table interpolation type is ‘logarithmic’.

Examples

- Logarithmic, Log offset = 10
- Linear

What are conversion table interpolation types?

Examples of conversion table interpolation types include:

- Linear: straight line interpolation between conversion table points
- Logarithmic: interpolation between conversion table points in log-log space (after a log offset has been subtracted from the first parameter)
- Power 2/5: linear scale for first parameter (from), power 2/5 scale for second parameter (to).
- Step: step holds the current value until the next one

4.9 Measurement date and time

Description

The date and time of a measurement.

Measurement date and time is a component of each time series data point and recorded and stored when the measurement is taken. Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

4.10 Measuring point vertical datum elevation

Description

The elevation of the vertical datum applicable to the measurement of water storage level, expressed in metres relative to a standard height datum

Water storage level reporting requires capturing measurements and their relationships to a given datum. Where possible, the elevation should be given in metres AHD or metres AHD Tasmania.

Examples

- 25.00 m AHD
- 34.2 m AHD Tasmania

What is Australian Height Datum (AHD)?

The datum that sets mean sea level as zero elevation. Mean sea level was determined from observations recorded by 30 tide gauges around the coast of the Australian continent for the period 1966–1968 (AWID, 2014).

4.11 Purpose of water released or delivered

Description

Primary purpose of water released from or delivered to a major storage, such as enhancing water supplies for irrigation, maintaining environmental flows, generating hydro-electric power, discharge during a flood etc.

Examples

- Protecting against aquifer salinisation
- Securing and enhancing irrigation water supplies for the township of Warruwi
- Environmental water release to coincide with peak tourism time
- Hydro-electric power generation
- For a balancing storage: water from Wartook storage released into the upper MacKenzie River and then diverted from the Dad and Dave Weir via the Mt Zero Channel to the Mt Zero balancing storage
- Flood discharge

5 Subcategory-specific metadata and contextual information: subcategory 3da

This chapter describes three metadata elements specific to water data subcategory 3da: Volume of water delivered to a major storage from each water source, expressed in megalitres. In addition to these subcategory-specific metadata, data providers should provide all of the common metadata described in Chapter 2 with their 3da data.

5.1 Start date and time of measurement

Description

The date and time on which the measurement is started.

Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

5.2 End date and time of measurement

Description

The date and time on which the measurement is ended.

Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-31T12:20:00+10:00
- 2001-03-31T02:20:00Z

5.3 Water source

Description

The source from which water is delivered for storage, e.g. water sourced from a river, another storage, groundwater etc.

Examples

- Mitta Mitta River
- The Maroondah and Yarra catchments
- The North–South pipeline from the Goulburn River

6 Subcategory-specific metadata and contextual information: subcategory 3e

This chapter describes two metadata elements specific to water data subcategory 3e: Volume of water in a minor storage, expressed in megalitres. In addition to these subcategory-specific metadata, data providers should provide all of the common metadata described in Chapter 2 with their 3e data.

6.1 Watercourse name

Description

The name of the river or stream to which the water storage principally discharges or, if the water storage is not built on a watercourse, list the river name as ‘off stream’.

Examples

- Mills Creek
- Whyanbeel Creek
- Off stream

6.2 Measurement date and time

Description

The date and time of a measurement.

Measurement date and time is a component of each time series data point and recorded and stored when the measurement is taken. Time should be in Coordinated Universal Time (UTC). This date–time format complies with the 'W3C' date–time type. For further information refer to www.w3.org/TR/xmlschema-2/#dateTime.

Examples

- 2001-03-30T12:20:00+10:00
- 2001-03-30T02:20:00Z

7 Subcategory-specific metadata and contextual information: subcategory 3f

This chapter describes all of the metadata elements required for water data subcategory 3f: A list of major storages owned, operated or regulated by the person required to give the information.

7.1 Data owner ID

Description

The unique organisation ID assigned by the Bureau to any organisation that is listed in the Water Regulations 2008.

The data owner is the organisation responsible for managing the collection of water observations (data) and information about these measurements (metadata).The designated data owner may differ from the data provider.

Examples

- w00004
- w00150
- w00098

To request a data owner ID, email waterdata@bom.gov.au

What is the difference between a data owner and provider?

More than 200 organisations are required to provide specified water information to the Bureau under the Water Regulations 2008. In some cases, an organisation provides information to the Bureau via a third party, which may be a contractor or another organisation named in the regulations. In each case, the Bureau needs to know both the designated data owner and the data provider. The following scenarios demonstrate the difference between these two metadata elements.

Scenario 1: Organisation A is the designated owner of the data and provides this data directly to the Bureau. In this scenario, organisation A is both the designated data owner and the data provider. There is a single, unique ID for the data owner and the data provider.

Scenario 2: Organisation A is the designated owner of the data; however, there is an arrangement in place with organisation B – who is also named in the Water Regulations – to provide the data to the Bureau on behalf of organisation A. In this scenario, organisation A is the designated data owner, and organisation B is the data provider. The data owner and the data provider will have different unique IDs.

Scenario 3: Organisation A is the designated owner of the data; however, a third party contractor collects and forwards the data to the Bureau on behalf of organisation A. In this scenario, organisation A is the designated data owner, and the contractor is the data provider. The data owner and the data provider will have different unique IDs.

A site is owned and operated by multiple organisations. Who is the data owner?

A single data owner should be nominated as the organisation responsible for managing the collection of a given data set. There may be different nominated data owners for different data sets collected at a given site.

7.2 Data provider ID

Description

The unique organisation ID assigned by the Bureau to any organisation that provides water information to the Bureau.

The data provider is an organisation that provides data and metadata to the Bureau. The designated data owner may differ from the data provider.

Examples

- w00004
- w00150
- w00098

To request a data provider ID, email waterdata@bom.gov.au

7.3 Storage name

Description

The name of the storage where observations are conducted.

This is the name by which the storage is most commonly known within the organisation.

Examples

- Happy Valley Reservoir
- Lake Eildon

7.4 Location of the dam

Description

The geographic coordinates of a point that represents the location of the dam.

If the dam uses a gazetted geographic description, the coordinates from the gazette can be used.

Examples

- Copeton Dam in NSW is located at latitude –29.54 and longitude 150.59.
- Hinze Dam is located at latitude 28^0 05’ S and longitude 153^0 29’ E

7.5 Watercourse name

Description

The name of the river or stream to which the water storage principally discharges or, if the water storage is not built on a watercourse, list the river name as ‘off stream’.

Examples

- Mills Creek
- Whyanbeel Creek
- Off stream

7.6 Full supply level

Description

The normal maximum operating water level of a water storage when not affected by floods, relative to a specified datum. This water level corresponds to 100 per cent capacity.

This is also known as the water level at which the water storage starts to spill and corresponds to the total storage capacity. In some cases a water level lower than the spillway level may be used for dam safety reasons.

Where possible, full supply level should be given in metres AHD or metres AHD Tasmania.

See Figure 2 for more information.

Examples

- 643.000 m AHD
- 110.500 m AHD Tasmania

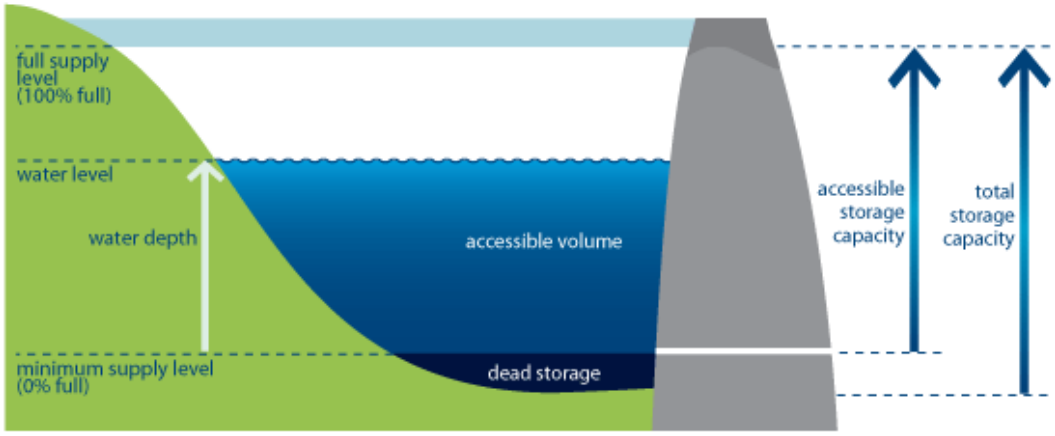


Figure 2 Water storage diagram showing water levels and capacities

7.7 Minimum supply level

Description

The lowest water level to which a water storage can be drawn down (0% full) with existing outlet infrastructure, relative to a specified datum. This is typically equal to the level of the lowest outlet, the lower limit of accessible storage capacity.

Where possible, minimum supply level should be given in metres AHD or metres AHD Tasmania.

See Figure 2 for more information.

Examples

- 631.000 m AHD
- 101.530 m AHD Tasmania

7.8 Total storage capacity

Description

The volume of water that a water storage can hold at the Full Supply Level; equal to the sum of accessible *storage capacity* plus the *dead storage capacity*.

See Figure 2 for more information.

Example

- 11 600 ML

7.9 Accessible storage capacity

Description

The volume of water that a water storage can hold between the minimum supply level and full supply level; equal to the total storage capacity excluding the dead storage capacity. It is the sum of this capacity that is reported for a collection of water storages.

See Figure 2 for more information.

Example

- 12 629 ML

7.10 Dead storage capacity

Description

The portion of a water storage's capacity that is equal to the volume of water below the level of the lowest outlet (the minimum supply level). This water cannot be accessed under normal operating conditions.

See Figure 2 for more information.

Example

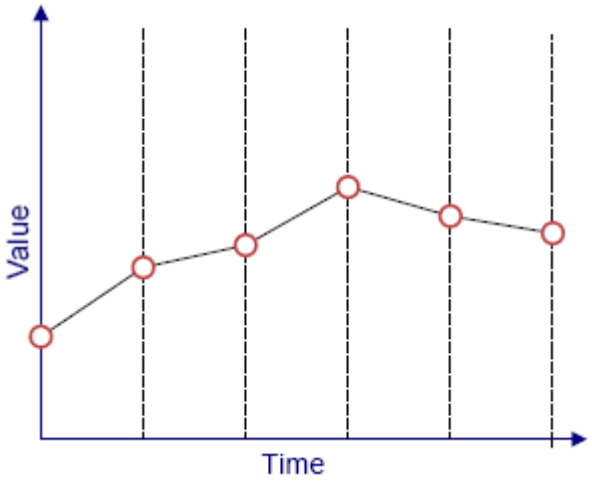
- 140 ML

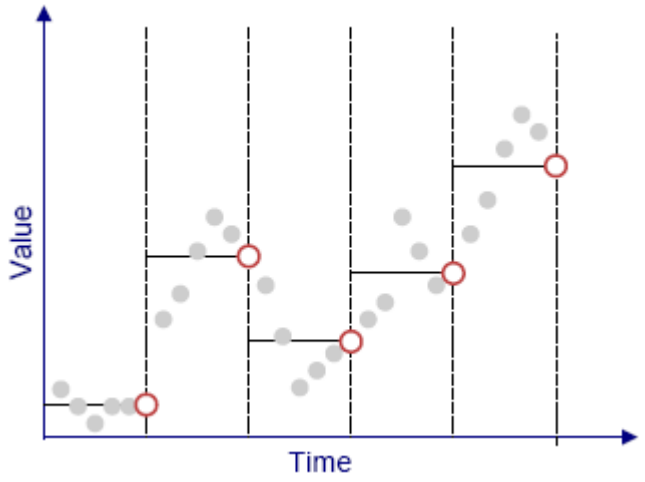
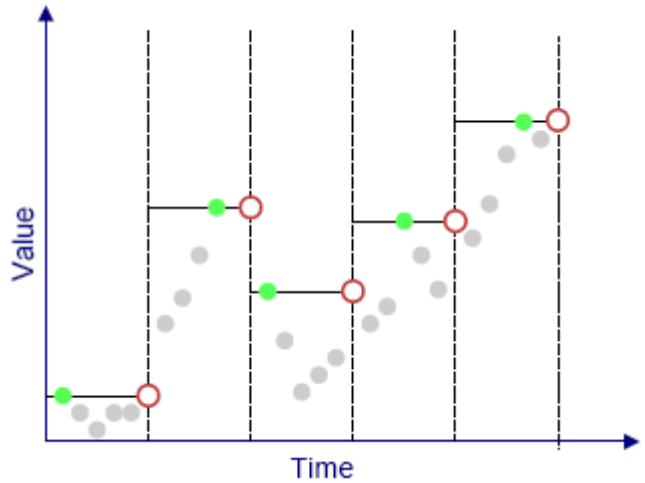
8 References

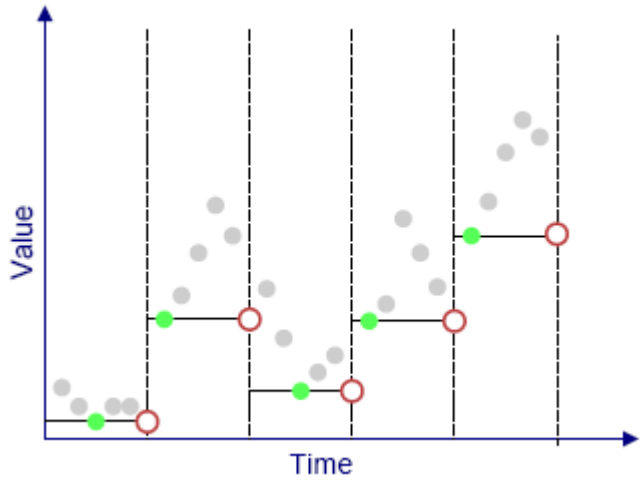
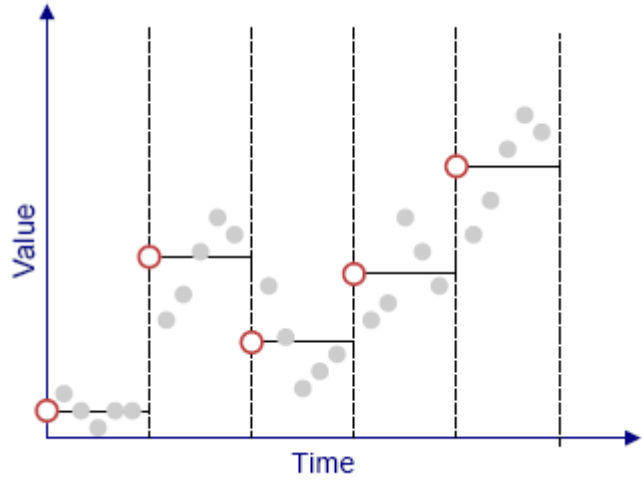
AWID (2014) Australian Water Information Dictionary, Bureau of Meteorology
www.bom.gov.au/water/awid/index.shtml

Appendix A – Data point interpolation type examples

Diagrams and description text adapted from OGC 09-124r2 *Harmonising Standards for Water Observation Data - Discussion Paper, 2007*.

Data point interpolation type	Description
InstVal	**Instantaneous value in a series of connected points. An instantaneous (or continuous) time series indicates the observation result is the value of a parameter at the indicated instant in time. The points are essentially connected and interpolation may occur between points in order to estimate the value of the parameter between points.** **Example: water level gauge measurements** 

Data point interpolation type	Description
PrecVal	**The value for the preceding interval (often a mean value).** **Example: Daily mean discharge.** 
PrecMax	**Maximum in the preceding interval. Value represents the maximum value that was measured during the preceding time interval.** **Example: Monthly maximum discharge.** 

Data point interpolation type	Description
PrecMin	**Minimum in the preceding interval. Value represents the minimum value that was measured during the preceding time interval.** **Example: Daily minimum temperature.** 
SuccVal	**Value in the succeeding interval (often a mean value).** **Example: Daily mean discharge encoded as value representing beginning of interval.** 

Data point interpolation type	Description
NoJoin	**A point that has no connection to neighbouring points. The sampling of the parameter occurs such that it is not possible to regard the series as continuous. The time between samples is too large to classify the measurements as continuous.** **Example: Infrequent water sample measuring pH.**