



**Water Information**  
DATA › INFORMATION › INSIGHT

# Australian Hydrological Geospatial Fabric (Geofabric) Data Product Specification - Surface Catchments

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Version 1.0



**Australian Government**  
**Bureau of Meteorology**

[www.bom.gov.au/water](http://www.bom.gov.au/water)

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## Preface

This document is based upon the AS/NZS ISO 19131:2008 Geographic information - Data product specifications standard <sup>1</sup>. The document provides a framework for the completion of a Data Product Specification (DPS) for geographic data product produced as part of the Geofabric project.

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<sup>1</sup> AS/NZS, "AS/NZS ISO 19131:2008 Geographic information - Data product specifications" (AS/NZS, July 21, 2008), <http://www.saiglobal.com/online/>.

## 1 Overview

### 1.1 Data product specification title

Australian Hydrological Geospatial Fabric - Surface Catchments Version 1.0 Data  
Product Specification Version 0.6

### 1.2 Reference date

2010-06-18

### 1.3 Responsible party

Contact organisation: Bureau of Meteorology

Contact position: Geofabric Team

Contact person:

Mail address:

Locality:

State:

Country:

Postcode:

Telephone:

Facsimile:

Electronic mail address: [ahgf@bom.gov.au](mailto:ahgf@bom.gov.au)

### 1.4 Data product specification language

English

### 1.5 Terms and definitions

Please refer to the Glossary in the Geofabric Product Guide

## 1.6 Abbreviations and acronyms

|        |  |
|--------|--|
| AWRIS  | Australian Water Resource Information System                 |
| Bureau | Australian Government: Bureau of Meteorology                 |
| CSIRO  | Commonwealth Scientific and Industrial Research Organisation |
| GA     | Geoscience Australia   |
| GDA94  | Geodetic Datum of Australia 1994                             |
| ISO    | International Organization for Standardization               |

## 1.7 Informal description of data product

The *Geofabric Surface Catchments* product is largely based on feature classes created from ANUDEM derived streams (ANUDEM streams) as supplied by GA. The GA supplied data products were integrated into the Geofabric Maintenance Geodatabase using a series of scripted procedures that created additional features and unique IDs – HydroIDs – which are generated during the data post-processing load procedures carried out by the Bureau. The data product is delivered as a series of related feature classes as an ESRI File Geodatabase.

*Geofabric Surface Catchments* is intended to support the Geofabric and provide a topographic basis for classification and reporting of analyses of subcatchments.

The AHGFcatchment polygons are converted from a regular 9 second grid delineating the National Catchment Boundaries (NCBs) for the Australian continent. The NCBs delineate hierarchically nested catchments derived using an automated drainage analysis procedure, based on a multi-flow extension of the flow direction grid associated with the GEODATA National 9 Second DEM version 3 (GEODATA 9 Second Flow Direction Grid (D8-9S), ANZLIC unique identifier: ANZCW0703012015).

At the highest levels in the hierarchy the NCBs aggregate the 9 second drainage basins into 12 topographically-defined Drainage Divisions (Level 1) and 191 catchment units (Level 2) approximating the Australian Water Resources Council (AWRC) River Basins where possible (Australia's River Basins v1 Geoscience Australia, 1997, v1. ANZLIC identifier: ANZCW0703005427). At lower levels, the Level 2 units are subdivided into successively finer sub-catchments using a modified version of the Pfafstetter reference system (Pfafstetter) (Verdin, K. L. and Verdin, J. P. (1999) A topological system for delineation and codification of the Earth's river basins. *Journal of Hydrology*, 218(1–2), 1–12).

The AHGFContractedCatchments are aggregations of the 9 second catchments that participate in a relationship of common areal extent based upon the location of a Contracted Node, from both the *Geofabric Surface Cartography* and *Geofabric Surface Network* products. Levels of Contracted Confidence are further described in the Geofabric Product Guide.



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The data product extent is Geographic Australia (as defined by *Acts Interpretation Act 1901*). The product will be updated periodically to reflect changed attribution and new data sources.

## 2 Specification scope

### 2.1 Scope identification

Global

### 2.2 Level

Dataset

### 2.3 Level name

Global scope

### 2.4 Level description

This is the default root level global scope used by this data product and relates to all data within the product.

### 2.5 Extent

#### 2.5.1 Description

Data for this scope relates to Australia excluding external territories - Geographic Australia (as defined by *Acts Interpretation Act 1901*).

#### 2.5.2 Geographic extent

##### West bound longitude

112.8 °

##### East bound longitude

154.1 °

##### South bound latitude

-44.0 °

##### North bound latitude

-8.9 °

**2.5.3 Temporal extent**

2010-06-18

**Start date**

1992-01-01

**End date**

Now

### 3 Data product identification

#### 3.1 Title

Geofabric Surface Catchments

#### 3.2 Alternate title

Geofabric Surface Hydrology Catchments 1:250,000 - Version 1.0

#### 3.3 Product ID

Geofabric Surface Catchment V1.0

ANZCW0503900102

#### 3.4 Abstract

The *Geofabric Surface Hydrology Catchments* product provides a set of stream segment level boundaries which may be used singly or in aggregation. The product contains a predefined set of contracted catchments as well as the fully disaggregated catchments. Both feature classes are based upon the inputs from ANUDEM derived National Catchment Boundaries (NCBs) for Australia.

The AHGFContractedCatchments are based upon the fully disaggregated stream segment catchments of the 9 second Catchments foundation data. The AHGFContractedCatchments is the set of predefined aggregated catchments. This is the component of the product whose outflow node is guaranteed to persist and is listed in the contracted node attributes.

#### 3.5 Purpose

This product is intended to support the creation of or definition of topologically consistent and hydrologically enforced streamflow aggregation boundaries.

This product is intended to supplement the *Geofabric Surface Cartography* and *Geofabric Surface Network* data products. This product is also used to support the definition of the *Geofabric Surface Catchments* for the Geofabric and provides a spatial framework for analysis and assessment of streams and their catchments.

##### 3.5.1 Use case

Stream network analysis and surface hydrologic analysis by aggregated catchment boundaries.

### **3.6 Topic category**

- 007 - environment
- 012 - inland water
- 014 - oceans
- 017 - structure
- 018 - transportation

### **3.7 Spatial representation**

- 001 - vector

### **3.8 Spatial resolution**

#### **3.8.1 Spatial denominator**

250,000

### **3.9 Geographic bounding box**

#### **3.9.1 West bound longitude**

112.8 °

#### **3.9.2 East bound longitude**

154.1 °

#### **3.9.3 South bound latitude**

-44 °

#### **3.9.4 North bound latitude**

-8.9 °

### **3.10 Geographic identifier**

#### **3.10.1 Identifier authority**

ANZLIC – the Spatial Information Council

#### **3.10.2 Identifier code**

AUS

#### **3.10.3 Code space (register URL)**

ANZLIC

<http://asdd.ga.gov.au/asdd/profileinfo/anzlic-allgens.xml>

### **3.11 Reference to specification scope**

Global

## 4 Data content and structure

### 4.1 Description

The product consists of the following components which combine to give a complete data product:

#### Vector data

The data is available as an ESRI File Geodatabase: Geofabric Surface Catchments V1.0. The ESRI File Geodatabase reflects the stored environment of the data SDE export format. In its native ESRI File Geodatabase format, Geofabric Surface Catchments V1.0 consists of a single feature dataset/theme – SH-Catchment – containing two feature classes, one relationship classes and one ancillary lookup table. The geodatabase structure provides greater efficiencies in the management and revision source topographic data, which are now reflected in a more sophisticated data product suitable for a range of hydrological applications.

#### Geofabric Product Guide

This guide describes the Geofabric Surface Catchments, particularly the geodatabase format, with the aim of describing:

- important and common geospatial data characteristics
- geodatabase components and data concepts
- hierarchy of feature structure and attributes
- accuracy of the data

#### Licence Agreement Creative Commons

The licence agreement details the conditions of use for the data including any referencing requirements.

## 4.2 Feature information

### 4.2.1 Application schema

[http://www.bom.gov.au/water/geofabric/documents/schema\\_catchments.pdf](http://www.bom.gov.au/water/geofabric/documents/schema_catchments.pdf)

### 4.2.2 Feature catalogue

#### Product Feature Type Registry - Surface Hydrology Catchment

| <b>AGHF_Catchment - Feature Class.Subtype(Type)</b>          | <b>Feature Class Geometry</b> | <b>AGHF Feature Type Number</b> |
|--|-------------------------------|---------------------------------|
| AHGFCatchment  | polygon                       | 21                              |
| AHGFFeatureTypeRegistryContractedCatchment.ContractArea      | polygon                       | 22                              |
| AHGFFeatureTypeRegistryContractedCatchment.NonContractedArea | polygon                       | 23                              |
| AHGFFeatureTypeRegistryContractedCatchment.NoFlowArea        | polygon                       | 24                              |
| NCBPfaster   | na                            | table                           |

Highlighted text indicates a Bureau created feature.

## 4.3 Reference to specification scope

Global



## **5 Reference systems**

### **5.1 Spatial reference system**

#### **5.1.1 Name**

GDA94

#### **5.1.2 Code**

4283

#### **5.1.3 Code space**

EPSG\_v65

### **5.2 Temporal reference system**

Gregorian calendar

### **5.3 Reference system scope**

Global

## 6 Data quality

### 6.1 Data quality scope

#### 6.1.1 Scope code

Dataset

#### 6.1.2 Extent

Australia (excluding external territories)

#### 6.1.3 Scope description

The data quality metadata relates to the entire dataset comprising this data product.

### 6.2 Data quality lineage

#### 6.2.1 Lineage statement

##### Data sources

The *AGHFCatchments* are the lowest level streamflow catchments based upon the inputs from ANUDEM streams. The catchment boundaries are based upon a single AHGFNetworkStreamSegment extent over GEODATA National 9 Second DEM grid. These catchments form the basis of aggregated catchment boundaries, either by Contracted Nodes or by Pfafstetter ID Levels. These polygons are converted from a regular 9 second grid delineating the National Catchment Boundaries (NCBs) for the Australian continent.

The NCBs delineate hierarchically nested catchments derived using an automated drainage analysis procedure based on a multi-flow extension of the flow direction grid associated with the GEODATA national 9 second DEM Version 3 (D8-9S, ANZLIC unique identifier: ANZCW0703012015).

At the highest levels in the hierarchy the NCBs aggregate the 9 second drainage basins (into 12 topographically defined Drainage Divisions (Level 1) and 191 catchment units (Level 2) approximating the Australian Water Resources Council (AWRC) River Basins (Australia's River Basins v1 Geoscience Australia, 1997, v1. ANZLIC identifier: ANZCW0703005427) where possible.

At lower levels, the Level 2 units are subdivided into successively finer sub-catchments using a modified version of the Pfafstetter (Verdin, K. L. and Verdin, J. P. (1999) A topological system for delineation and codification of the Earth's river basins. *Journal of Hydrology*, 218(1–2), 1–12).

This layer delineates the lowest level catchment units being the sub-catchments draining directly to a stream segment in the ANUDEM stream layer or, where there are

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no ANUDEM derived streams (ANUDEM streams), the 9 second drainage basin. The higher level catchment membership of each of these sub-catchments is derived from its NCB code.

AHGFCContractedCatchments are aggregations of the 9 second catchments that participate in a relationship of common areal extent, based upon the location of a Contracted Node from both the *Geofabric Surface Cartography* and *Geofabric Surface Network* products. Levels of Contracted Confidence are further described in the Geofabric Product Guide.

### Processing steps:

1. ANUDEM v1.0 National Catchment Boundaries (NCBs) dataset is received and loaded into the Geofabric development GIS environment.
2. feature classes from ANUDEM NCBs are recomposed into composited Geofabric Framework Dataset feature classes in the Geofabric Maintenance Geodatabase.
3. re-composited feature classes in the Geofabric Maintenance Geodatabase Feature Dataset are assigned unique Hydro-IDs using ESRI ArcHydro for Surface Water (ArcHydro: 1.4.0.180 and ApFramework: 3.1.0.84)
4. feature classes from the Geofabric Maintenance Geodatabase Feature Dataset are extracted and reassigned to the Geofabric Surface Catchment Feature Dataset within the Geofabric Surface Catchment Geodatabase.

A complete set of data mappings, from input source data to Geofabric Products, is included in the Geofabric Product Guide, Appendices.

[http://www.bom.gov.au/water/geofabric/documents/product\\_guide.pdf](http://www.bom.gov.au/water/geofabric/documents/product_guide.pdf)

### 6.3 Quality scope

Global

## 7 Data capture

### 7.1 Data capture statement

This is primarily a derived data product from AusHydro v1.0 (AusHydro) and ANUDEM streams, however, specific features were created by the Bureau during the data-loading process (refer to the AusHydro data lineage in the Geofabric Product Guide for information about data capture and processing of source data used to create this product).

[http://www.bom.gov.au/water/geofabric/documents/product\\_guide.pdf](http://www.bom.gov.au/water/geofabric/documents/product_guide.pdf)

The following feature is created during the data-loading process into the Geofabric Maintenance Geodatabase:

- AHGFContractedCatchments

### 7.2 Data capture scope

Global

## **8 Data maintenance**

### **8.1 Maintenance and update frequency**

Irregular

### **8.2 Other maintenance information**

The product will be updated periodically as deemed necessary, to reflect changed attribution and new data sources.

### **8.3 Maintenance scope**

Global

## **9 Portrayal information**

### **9.1 Bibliographic reference to portrayal catalogue**

Not applicable

### **9.2 Portrayal scope**

Global

## 10 Data Product Delivery

### 10.1 Delivery format 1

#### 10.1.1 Format name

ESRI ArcGIS File Geodatabase or ESRI ArcGIS Personal Geodatabase

#### 10.1.2 Format version

ArcGIS v9.3

#### 10.1.3 Language used within the dataset

English

#### 10.1.4 Full name of the character coding standard used

### 10.2 Delivery medium 1

#### 10.2.1 Units of delivery

National dataset

#### 10.2.2 Estimated size of a unit in the specified format

SH\_Catchment.gdb = 281 Megabytes

#### 10.2.3 Medium name

#### 10.2.4 Online delivery URL

<http://www.bom.gov.au/water/geofabric/download.shtml>

### 10.3 Other delivery information

### 10.4 Delivery scope

Global

## 11 Additional information

### 11.1 Additional information

**Licensing and access constraints:**

Licensed for use under Creative Commons Attribution 2.5

**Special features of the supplied data product or its component parts:**

Spatial data in the ESRI File or Personal Geodatabase, Geofabric Product Guide and Data Product Specifications

**Limitation or constraints on product use:**

As per Creative Commons Attribution 2.5 licence

**Layer files or queries that operate on the data product:**

Geofabric\_Surface\_Catchments.LYR

**Related data products:**

- *Geofabric Surface Cartography*
- *Geofabric Surface Network*

### 11.2 Additional information scope

Global



## 12 Metadata

### Metadata format

Metadata compliant with ANZLIC Metadata Profile Version 1.1 of AS/NZS ISO 19115 was produced for this data product. The metadata profile is available at dataset level. Feature level metadata is provided within the ArcGIS ArcCatalog FGDC style sheet for all feature types included within this product and describes the lineage of feature.

### Metadata encoding

ArcGIS FGDC and ANZLIC compliant feature metadata.

### References to metadata for data product and component parts:

An ISO 19115 compliant XML file of the Geofabric Surface Catchment metadata statement accompanies the Product (SH-Catchment.xml) and is viewable using either the ArcGIS ISO 19139 ArcCatalog metadata style sheet or the ANZMet Lite version 1.0 metadata creation tool available from

<http://www.osdm.gov.au/Metadata/ANZLIC+metadata+resources/ANZMet+Toolkit+%28final+draft+-+07.2009%29/default.aspx>



Through the *Water Act 2007*, the Australian Government has given the Bureau of Meteorology responsibility for compiling and delivering comprehensive water information across Australia.

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Send an email request to [waterinfo@bom.gov.au](mailto:waterinfo@bom.gov.au)



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