

Australian Hydrological Geospatial Fabric (Geofabric) Tutorial

Accumulate Attributes with ArchHydro

Version 2.0 – November 2011



Australian Government
Bureau of Meteorology



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1 Introduction

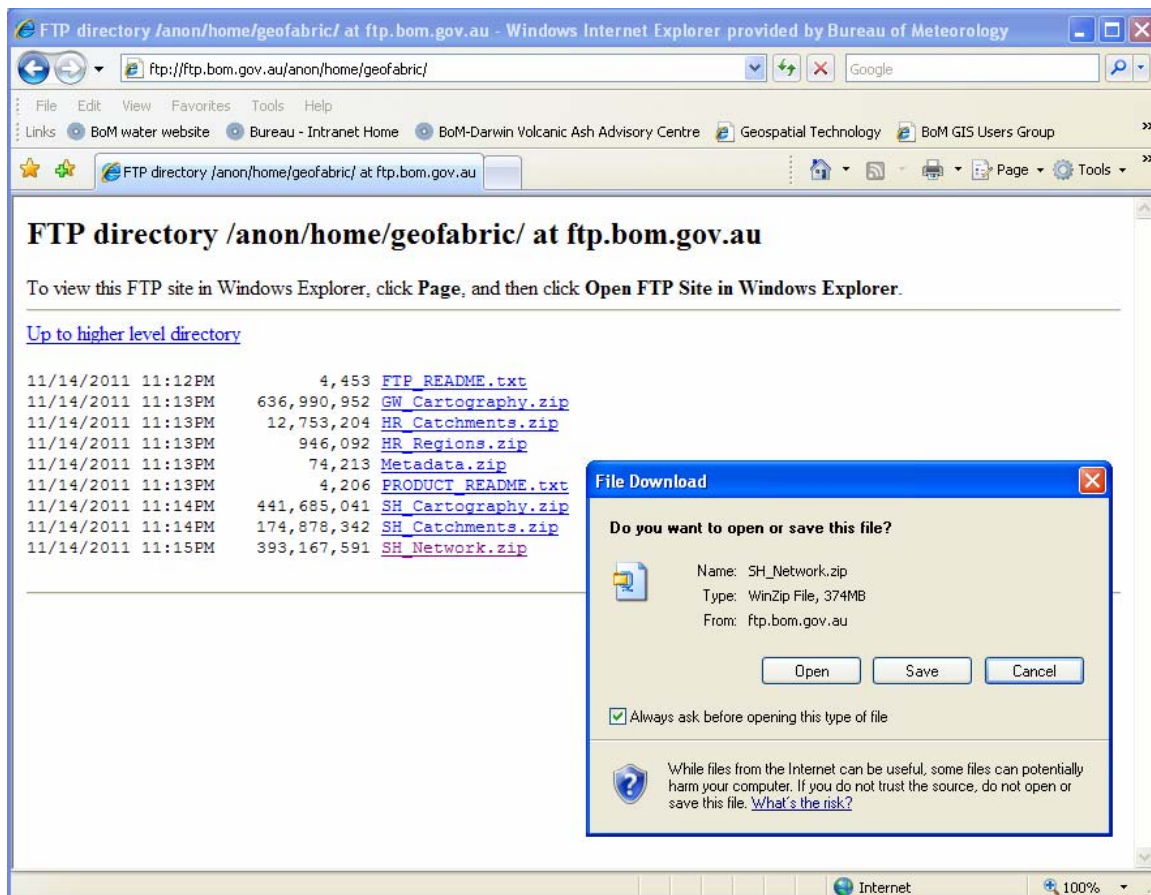
Geofabric Surface Network is intended to be used in stream flow tracing operations, which utilises the product's full topological connection. This product is also designed to be largely compatible with ESRI's ArcHydro for Surface Water toolset.

This tutorial describes the steps required in order to use the ArcHydro Accumulate Attributes tool to calculate the total upstream drainage area at each node in the stream network. This operation provides just one example of the potential opened up by using geometric networks together with relationship classes in an ESRI Geodatabase environment.

2 Tutorial

1 Download the Geofabric Surface Network File Geodatabase from the Geofabric ftp site

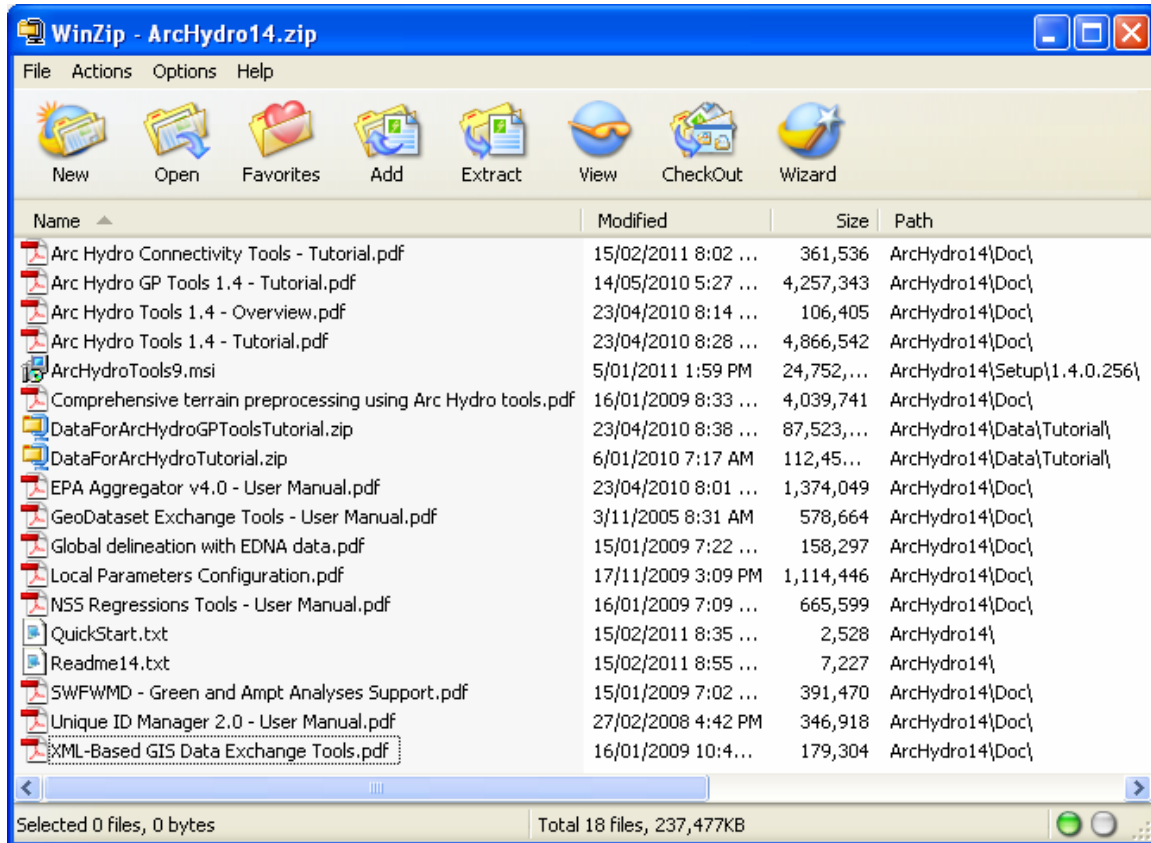
- 1.1 From the [Bureau of Meteorology Geofabric](#) website browse to Downloads and select [Download the Geofabric data from the Geofabric FTP site](#). Select SH_Network.zip and save.



- 1.2 Unzip the downloaded file, making sure that the resulting folder ends with .gdb (e.g. the contents of the file SH_Network.zip should be unzipped to a folder called SH_Network.gdb).

2 Install the ArcHydro for Surface Water toolset

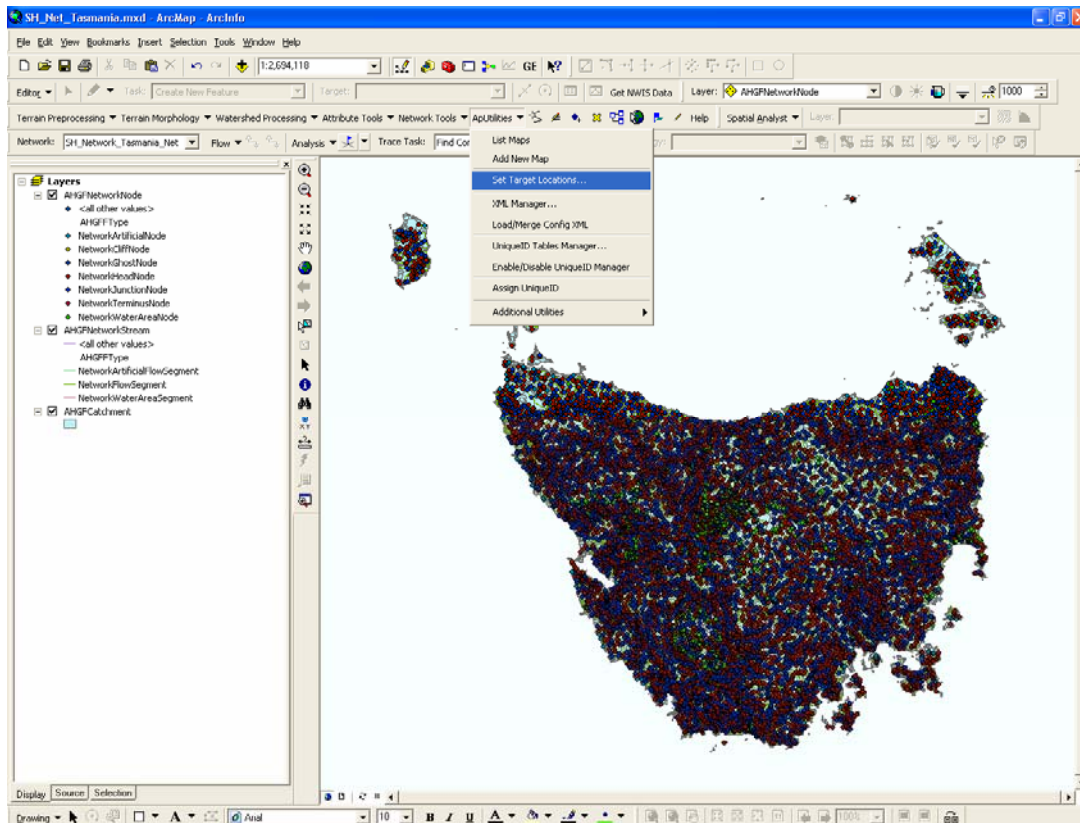
- 2.1 Download the latest version of the ArcHydro Tools for surface water from the ESRI ArcGIS [ArcHydro Resource Centre](#) website.
- 2.2 Unzip the contents of the downloaded zip file (ArcHydro14.zip) to an appropriate directory.



- 2.3 Follow the instructions for installing the ArcHydro tools included in the download.

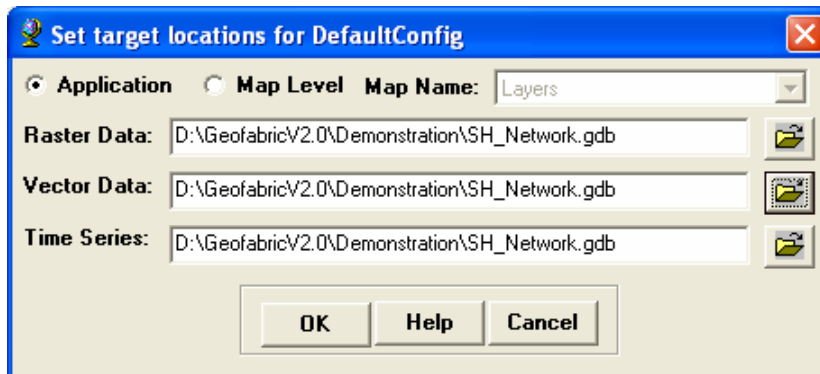
3 Use the ArcHydro Accumulate Attributes tool to calculate the total upstream drainage area for each node

- 3.1 Start a new ArcMap session and add in the AHGFNetworkStream, AHGFNetworkNode and AHGFCatchment feature classes from the data that was downloaded in step 1.
- 3.2 Ensure that the ArcHydro toolbar is visible (if not, choose View>Toolbars>ArcHydro Tools X) and choose Set Target Locations from the ApUtilities menu:



- 3.3 Set the default target workspaces in ApNConfig, DefaultConfig and HydroConfig in order to configure the ArcHydro project (this list may depend upon the version of ArcHydro tools installed).

Note: this step isn't strictly necessary for the purposes of this tutorial; however, it is good practice to perform this step each time a new ArcHydro project is created.



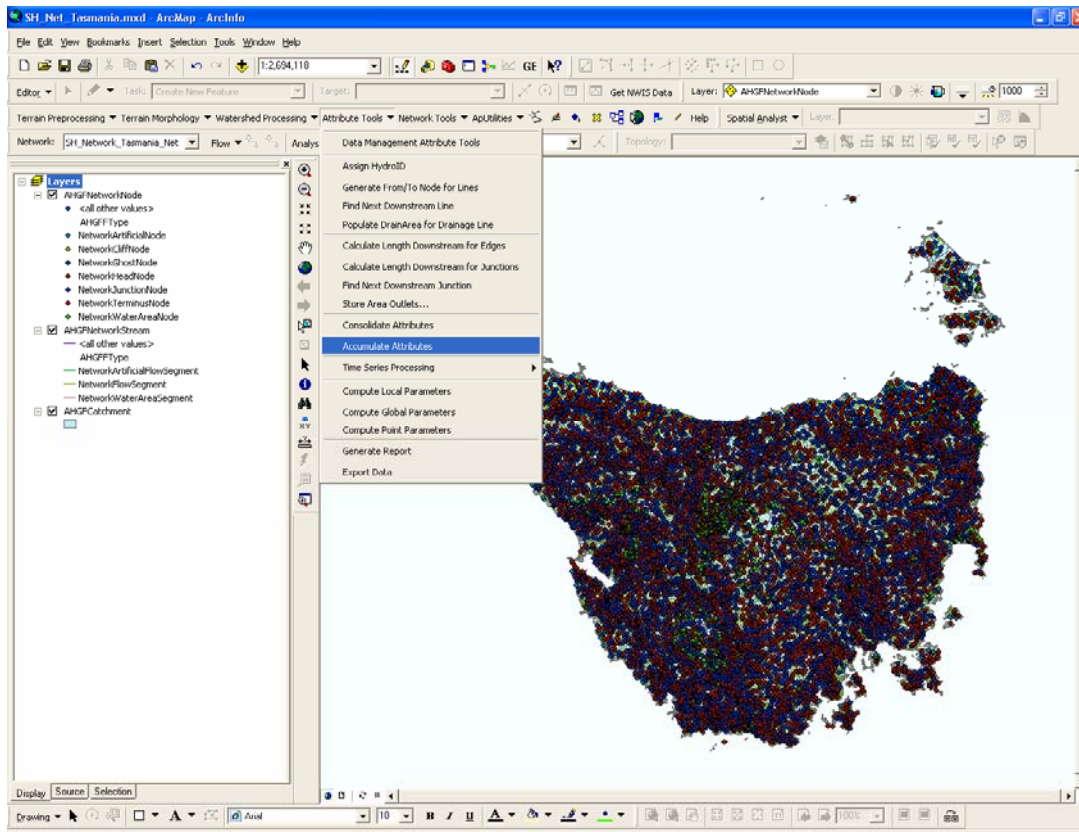
- 3.4 Save the ArcHydro project by naming and saving the MXD file:

- 3.4.1 Select Save from the File menu.

- 3.4.2 Enter an appropriate name for the MXD file (e.g. SH_Net_Tasmania.mxd) and click [OK].

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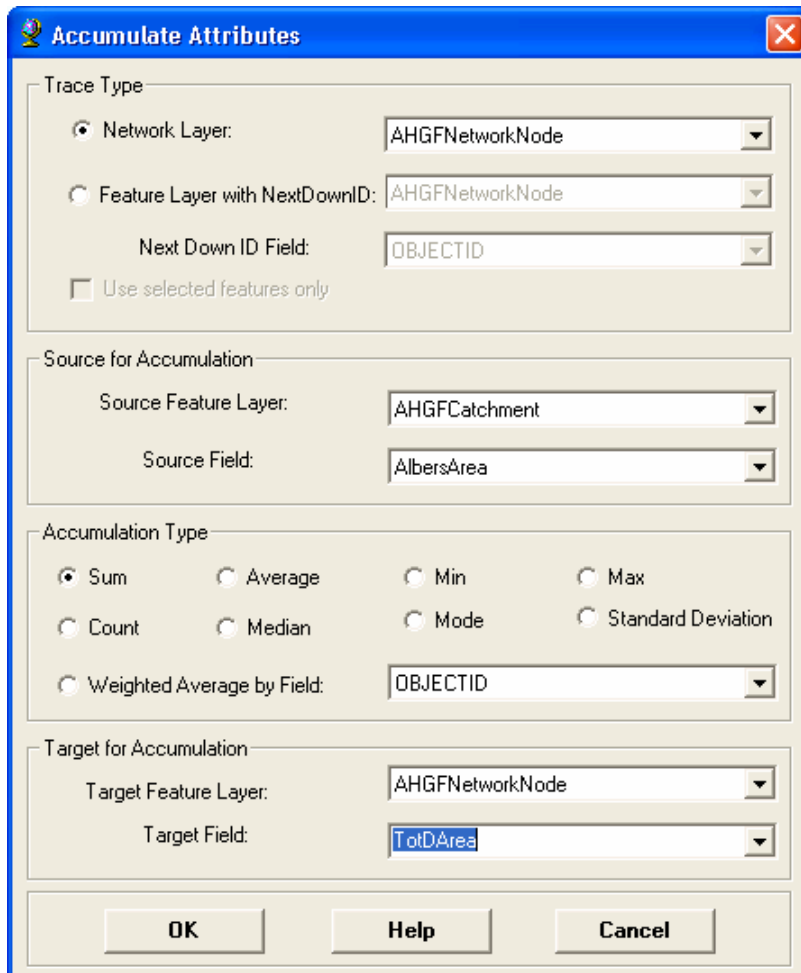
- 3.5 After ensuring that ArcCatalog is closed down (to avoid potential locking problems in ArcGIS Desktop 9.x), choose the Accumulate Attributes tool from the ArcHydro Attribute Tools menu.



- 3.6 Configure the parameters for the Accumulate Attributes tool to calculate the total upstream drainage area for each node in the stream network and assign this value to a new attribute field in AHGFNetworkNode:
 - 3.6.1 For Trace Type, select Network Layer: AHGFNetworkNode.
 - 3.6.2 For Source for Accumulation, set the Source Feature Layer: to AHGFCatchment and Source Field: to AlbersArea.
Note: Any feature classes that are related (via a relationship class) to the feature class selected under Network Layer will automatically be available in the drop-down list under Source Feature Layer.
 - 3.6.3 Choose the Sum option for Accumulation Type.
 - 3.6.4 Select AHGFNetworkNode for Target Features Layer: and type the name of a new field to be added (e.g. TotDArea) in the Target Field: box (i.e. the target field can be created on the fly).

3.6.5 Click [OK] to execute the Accumulate Attributes tool.

Note: This operation may take a while to run to completion, especially if the dataset chosen for Network Layer: contains many features. Alternatively, the tool can also be configured to run on selected features only.



3.7 When the tool has finished running:



3.7.1 Zoom in to locate an area of interest.

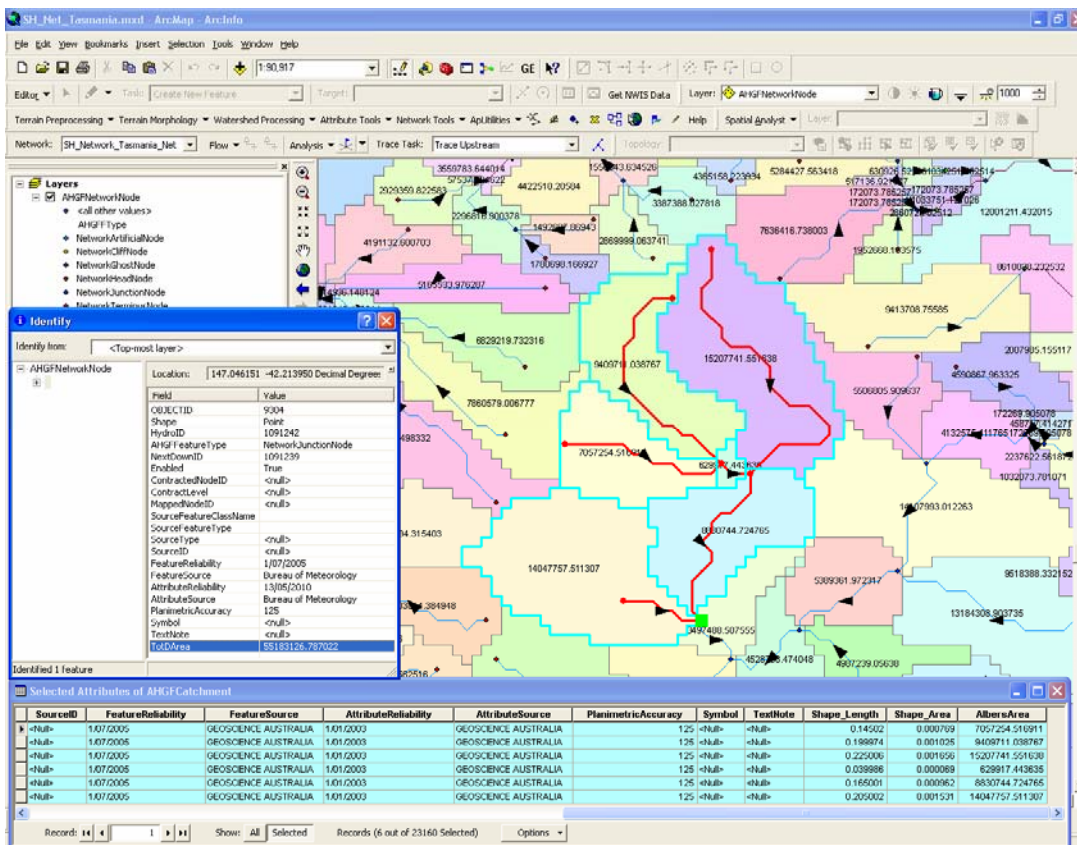
3.7.2 Right-click on the AHGFCatchment layer, choose Open Attribute Table and scroll to the end to display the content of the AlbersArea field.

3.7.3 Choose a node at some point on the stream network.

Note: the chosen node in the figure below is marked with a Junction Flag (green box). This has been done for visualisation purposes only (see the accompanying *Tutorial - Building and using a Geometric Network* or ESRI documentation for more information on Utility Network Analyst tools).

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- 3.7.4 Whilst holding down the [Shift] key, use the Select Features tool () to in turn select each of the AHGFCatchment features which drain to the chosen node. Alternatively, use the CatchmentDrainsToSegment relationship class between the features of AHGFNetworkStream and AHGFCatchment in order to automatically select the related records: Click on the [Options] button and select CatchmentDrainsToSegment: drains from the Related Tables menu option.
- 3.7.5 Click on the [Selected] button at the bottom of the AHGFCatchment attribute table to switch the display to the currently selected features.
- 3.7.6 Click on the chosen node with the Identify tool () active to display the node's attributes.
- 3.7.7 By manual or other means, sum the values of the AlbersArea column of the AHGFCatchment attribute table and compare the value stored in the new field added by the Accumulate Attributes tool in step 3.6.5 (e.g. TotDArea). The two values should be approximately equal.



The screenshot shows the ArcMap interface with a hydrological network map. The Identify tool window is open, displaying the attributes of a selected node. The map shows a network of streams and catchments in various colors. The Identify tool window shows the selected node's location and various attributes including OBJECTID, Shape, Hybrid, AHGF feature type, and TotDArea.

SourceID	FeatureReliability	FeatureSource	AttributeReliability	AttributeSource	PlanimetricAccuracy	Symbol	TextNote	Shape_Length	Shape_Area	AlbersArea
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.14502	0.000709	7057254.510911
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.198874	0.001025	8408711.038767
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.222006	0.001050	15207747.551630
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.039968	0.000069	623917.443635
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.165001	0.000062	8830744.724765
<Null>	1/07/2005	GEOSCIENCE AUSTRALIA	1/01/2003	GEOSCIENCE AUSTRALIA	125	<Null>	<Null>	0.205002	0.001521	14047757.511307



Water Information
DATA › INFORMATION › INSIGHT

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

For more information

Visit our website at www.bom.gov.au/water

Send an email request to waterinfo@bom.gov.au



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