APPENDIX 1.

Index of AWRD main buttons, menu items and additional functions

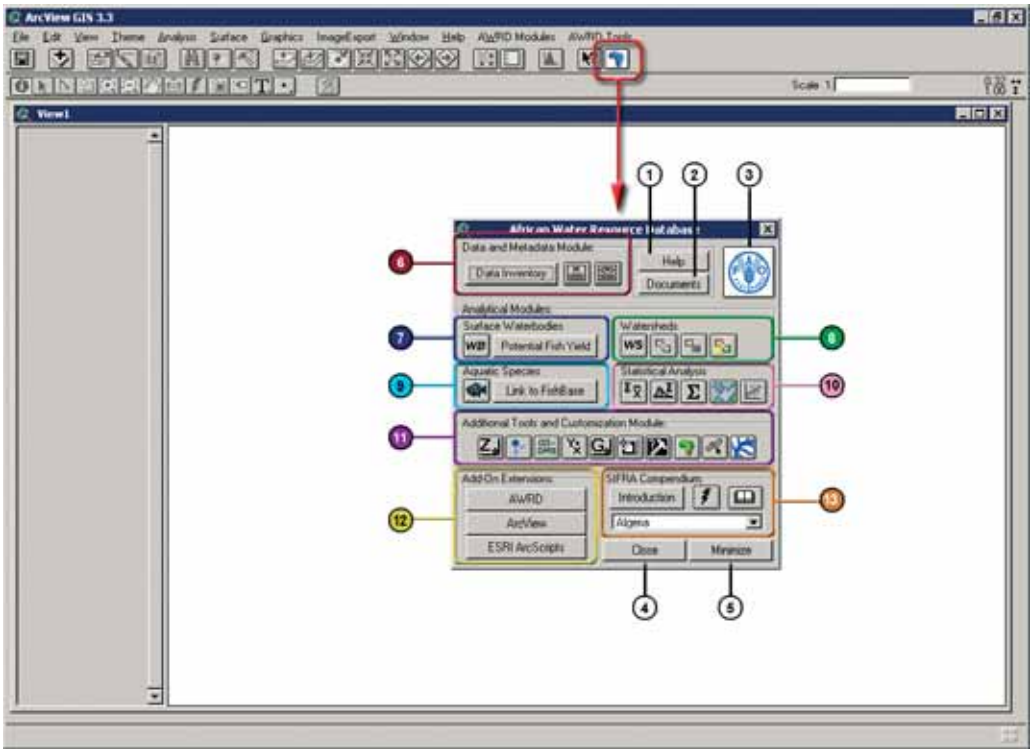
The purpose of this Appendix is to provide user with a complete summary list of AWRD main functions available through buttons and/or menu options as shown in detail in Appendix 2 and 3.

1.1 AWRD INTERFACE, MENUS AND ADDITIONAL VIEW AND TABLE FUNCTIONS

AWRD interface

For most users, the primary source for AWRD functions will be the AWRD Interface, accessible by clicking the  button in the ArcView View button bar (Figure A1).

FIGURE A1
The AWRD Interface



This interface offers links to five generic buttons; six AWRD Modules; Add-on extensions and a link to the SIFRA Compendium Table A.1.

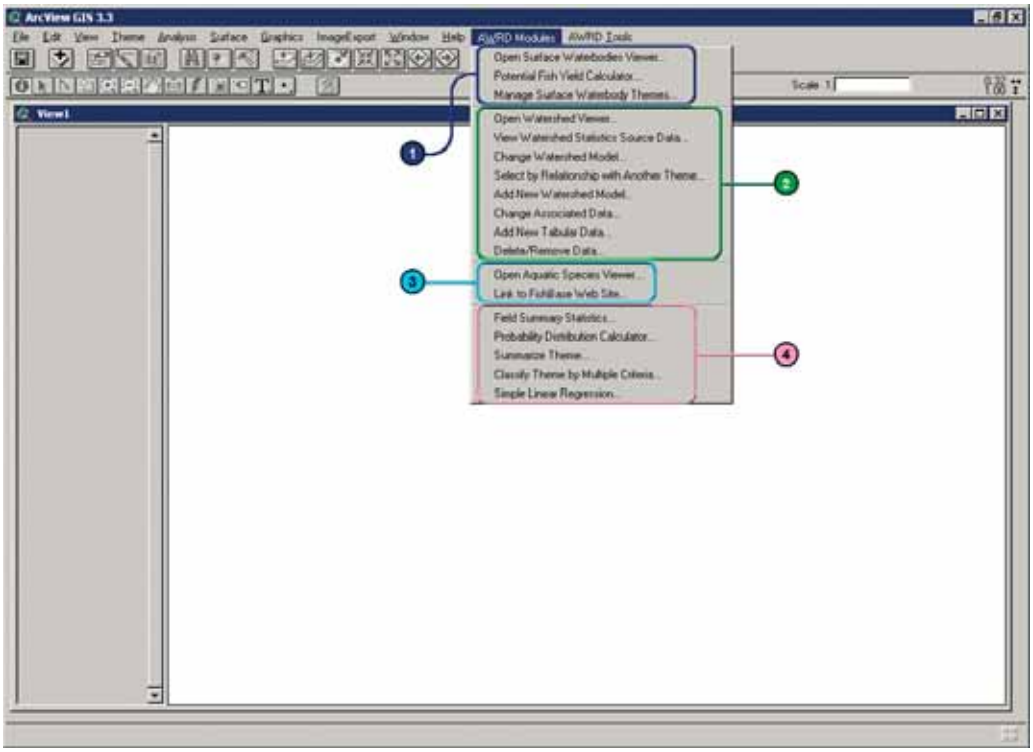
TABLE A.1
AWRD interface description

Label (Fig. 1.2)	AWRD Generic buttons	Description
1	Help	Help: this button opens an Help file specific for the AWRD Interface, describing in details all the buttons and functions available.
2	Documents	Documents: Documents used, referenced by, or supporting AWRD data and functions.
3		FAO: this button links users directly to FAO Fisheries Web page.
4	Close	Close: This button permits user to close the AWRD Interface when desired.
5	Minimize	Minimize: AWRD Interface: this button reduces the size of the AWRD Interface.
	AWRD Analytical Modules	
6	Data and Metadata	Comprised of a "Data Inventory" and metadata tools.
7	Surface Waterbodies	Provides tools for analysing surface waterbody data and for predicting potential fish yield.
8	Watersheds	Includes several tools for reviewing statistics on watersheds, identifying and selecting watersheds based on their location within the hydrological network, and for selecting watersheds based on their proximity to other features.
9	Aquatic Species	Provides tools to view the known distributions of aquatic species, to identify species within a particular area and to easily review data on different species.
10	Statistical Analysis	Includes several tools for analysing data including descriptive statistics, simple linear regression, classification and testing values against several probability distributions.
11	Additional Tools and Customization	The AWRD includes several additional tools to enhance the analytical power of the four modules. These tools can be used in conjunction with any of the modules.
12	Add-on Extensions	Extensions are tools which can be added to ArcView to enhance the overall functionality of the software. The AWRD itself is an example of an ArcView extension. The AWRD provides a simple means of reviewing, loading and/or unloading a number of additional extensions written by the authors of the AWRD ("AWRD" button), as well as the basic ArcView extensions ("ArcView" button) and many more customized tools developed by ArcView user community ("ESRI ArcScripts" button).
13	SIFRA Compendium	The Source Book for the Inland Fishery Resources of Africa (SIFRA) (Vanden Bossche and Bernacsek, 1990a; 1990 b; 1991) is a comprehensive compendium of information on physical characteristics, limnology and fisheries in Africa, organized by country. The AWRD provides tools to review the SIFRA data on a particular country by either selecting it from a list or by clicking on the country in the View.

AWRD Modules menu

The AWRD Modules menu provides direct access to four of the six AWRD modules: (1) surface waterbodies; (2) watersheds; (3) aquatic species and (4) statistical analysis (Figure A.2). These four modules are primarily designed for analytical purposes.

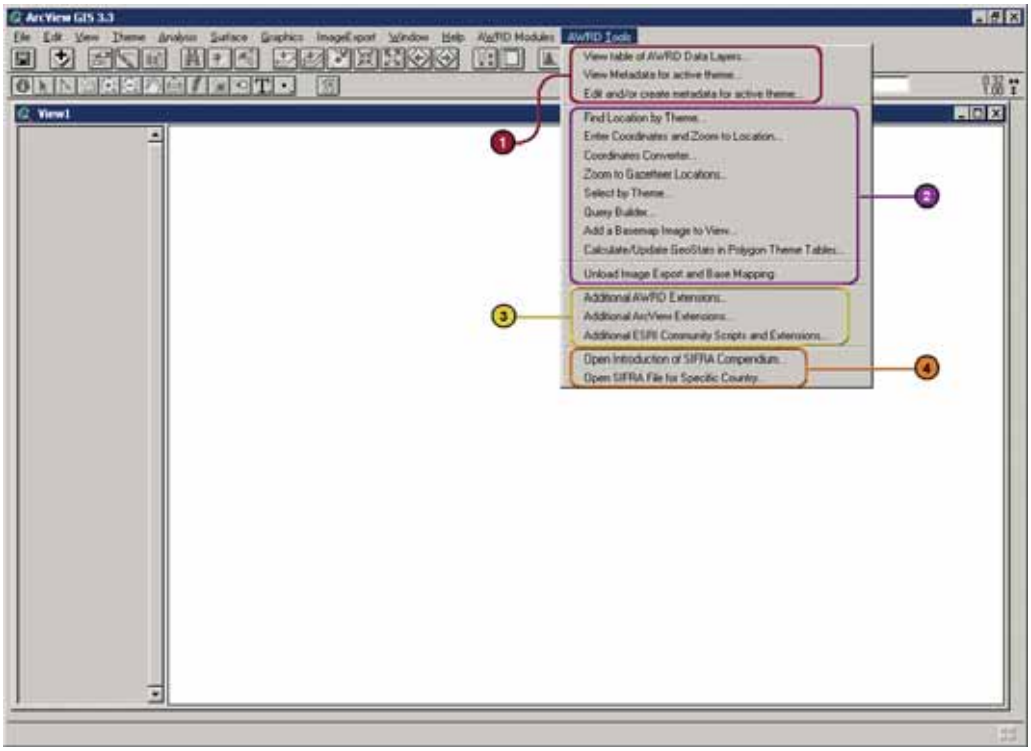
FIGURE A.2
The AWRD Modules menu



AWRD Tools menu

The AWRD Tools menu provides direct access to many of the more general GIS-based tools. The AWRD Tools menu is separated into four sections based on: (1) Data and Metadata Module; (2) Additional Tools and Customization Module; (3) Add-on extensions; and (4) SIFRA compendium (Figure A.3).

FIGURE A.3
The AWRD Tools menu



Additional AWRD tools

In addition to the primary AWRD interface and menu items, the AWRD also includes several general tools and functions that enhance basic ArcView functions. Table A.2 provides a summary of these tools.

TABLE A.2
Additional AWRD tools

AWRD More tools	Description
AWRD Help menu options	The standard ArcView "Help" menu, available in any View, Table and Layout menu bar includes six AWRD specific options: Four references to Help files; AWRD Documents; and a link to the FAO Fisheries Web site.
Additional AWRD View tools	In addition to the primary AWRD Interface and menus, the AWRD also includes several general tools and functions that enhance basic ArcView functions, as well as tools to quickly load AWRD data into the view and to modify polygon theme symbology.
Additional AWRD table tools	The AWRD contains a few tools designed specifically to work with "tables" in ArcView.
Information and Editing Tools	All table information and editing tools are located in the "Edit", "Table" and "Field" menus
Excel Import and Export Tools	The AWRD provides tools to import and export to Microsoft Excel spreadsheets. Both of these functions require that Microsoft Excel be installed on the user's computer and are available as buttons in any Table button bar.

1.2 DATA AND METADATA MODULE

The Data and Metadata Module can be accessed by clicking the three buttons in the AWRD Interface or by selecting the respective menu options in the View and AWRD Tools menus (Figure A4 and Table A.3).

FIGURE A4
Data and Metadata Module

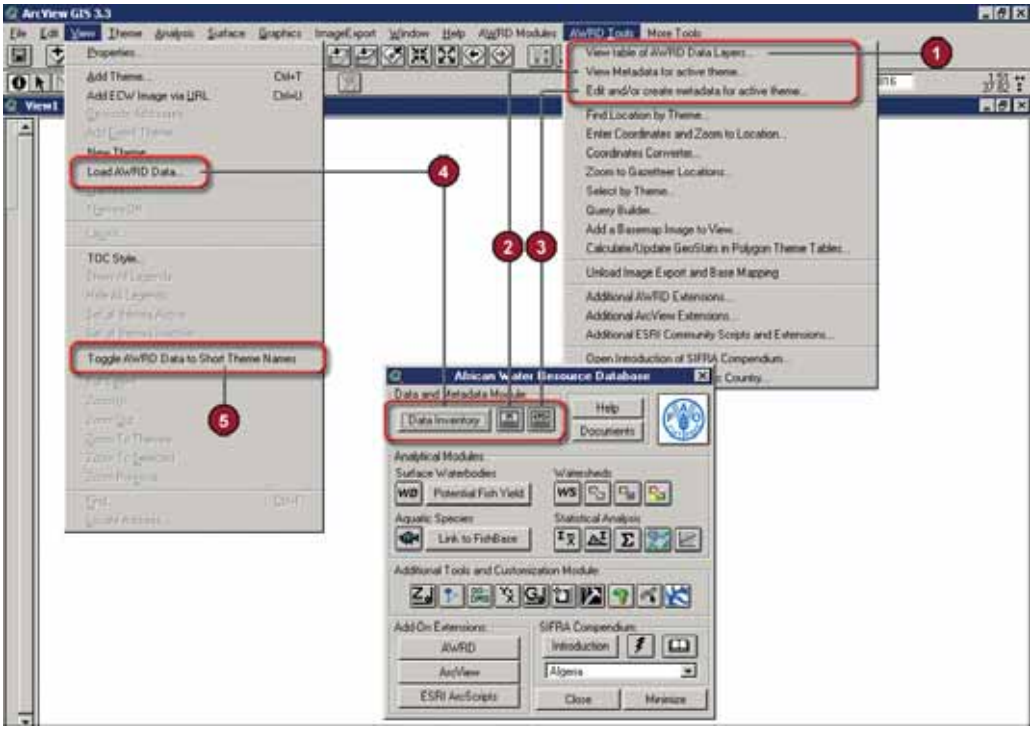


TABLE A.3
Data and Metadata Module buttons and menu items

Label (Fig. 1.5)	AWRD Interface button	AWRD Tools menu option	View menu option	Action executed
1	--	"View Table of AWRD Data Layers..."	--	View Table of AWRD Data Layers: the Data Inventory button opens a table summarizing the various data layers provided with the AWRD, including the dataset name, source, data type and a brief description. This Table is a stand-alone version of Table 1.1, with many additional attributes describing each dataset.
2		"View Metadata for active theme..."	--	View Metadata for Active Theme: this tool provides the means to display any metadata associated with the active theme.
3		"Edit and/ or create metadata for active theme..."	--	Edit/Create Metadata for ActiveTheme: this tool provides the means to create or edit any metadata associated with the active theme.
4	Data Inventory	--	"Load AWRD Data..."	Load AWRD Data: This tool allows you to quickly find and load AWRD data into your view.
5	--	--	"Toggle AWRD Data Names"	Toggle AWRD to Short/Long Theme Names: This tool changes the name of your dataset in your view, switching between long descriptive names and abbreviated names.

1.3 SURFACE WATERBODIES MODULE

The Surface Waterbodies (SWB) Module is designed to provide users of the AWRD with quick and easy access to data on the surface waterbodies of Africa, as well as providing users with a method to predict potential SWB yields based on two possible models. The module is designed to work with a variety of surface waterbody datasets, including seven of the surface waterbody (SWB) layers resident within the SWB portion of the AWRD.

Open the Surface Waterbodies Viewer by clicking on the  button in the AWRD Interface, or by clicking the "*Open Surface Waterbodies Viewer...*" menu option in the AWRD Modules menu (Figure A5)

FIGURE A5
Surface Waterbodies Module

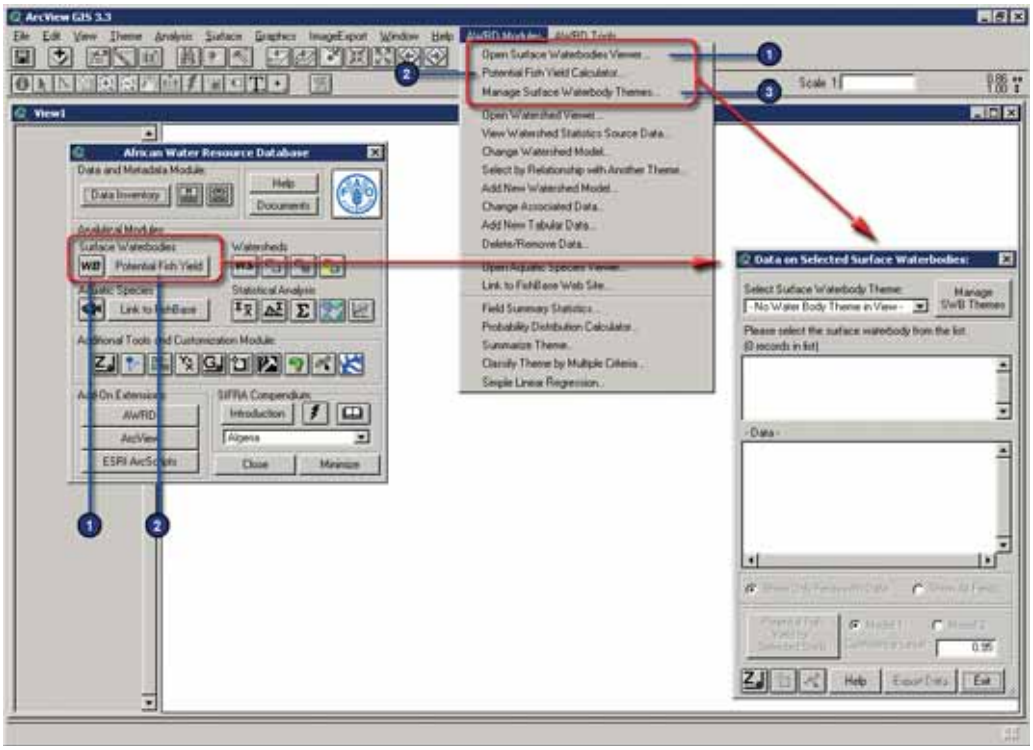


Table A.4 provides a summary of the buttons available in the Surface Waterbodies Module.

TABLE A.4
Surface Waterbodies Module buttons and menu items

Label (Fig. 1.21)	AWRD button	AWRD menu option	Action executed
1	WB	AWRD Modules *"Open Surface Waterbodies Viewer..."*	*Open Surface Waterbodies Viewer*: this tool opens the main Surface Waterbodies Viewer window is the basic interface for the Surface Waterbodies Module.
2	Potential Fish Yield	AWRD Modules *"Potential Fish Yield Calculator..."*	*Potential Fish Yield Calculator:* this function takes advantage of models developed by Halls (1999) to predict potential yield of a surface waterbody in tonnes per year based on the surface area of the waterbody and, potentially, the mean annual air temperature of that waterbodies drainage basin.
3	Manage SWB Themes	AWRD Modules *"Manage Surface Waterbody Themes..."*	*Manage Surface Waterbodies Themes*: this function allows you to register new surface waterbody themes so that they can be used with the Surface Waterbodies Module, or delete currently registered themes.

Surface waterbodies viewer

The surface waterbodies viewer dialog contains five buttons for estimating Potential Fish Yield; finding Locations; selecting surface waterbodies; reporting Geostatistics and exporting data (Figure A6 and Table A.5).

FIGURE A6
The surface waterbodies viewer dialog

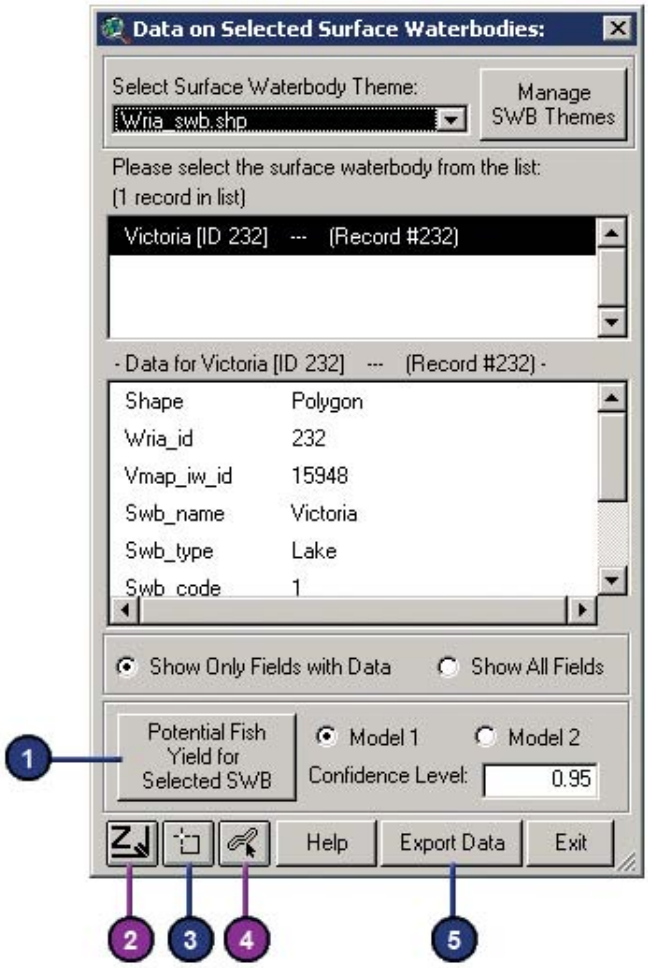


TABLE A.5
Surface waterbodies viewer buttons and menu items

Label (Fig. 1.22)	AWRD button	AWRD menu option	Action executed
1	Potential Fish Yield for Selected SWB	N/A	*Potential Fish Yield Calculator for selected SWB:* this tool automatically reports results on Potential Fish Yield for the selected waterbody.
2		AWRD Tools *"Find Location by Theme..."*	*Find Location by Theme*: this tool allows you to find and zoom to particular features by selecting that feature from a list.
3		N/A	*Select Surface Waterbodies:* this tool works as the standard ArcView selection tool, permitting users to select features by clicking on the map.
4		N/A	*Report GeoStats for Lines or Polygons You Select:* this tool reports the length of line features, and the area and perimeter length of polygon features, using both projected and spherical coordinates.
5	Export Data	N/A	The Export Data button allows users to save the current set of selected waterbodies, plus the summary statistics, to a new dBASE table where it can be used with many other software packages.

Note: Numbers 2 and 4 are shown in violet color because they originate from the "Additional Tools and Customization Module".

1.4 WATERSHEDS MODULE

This module offers a wide variety of tools specifically designed to analyse and visualize watersheds. These tools take advantage of the hydrologic relationships between watersheds and use these relationships to identify which watersheds are upstream, which are downstream, and which make up the overall flow regime and/or megabasin. In addition to watersheds, users can also use this module to visualize and possibly analyse data based on any polygonal data type, including administrative boundaries, simple watershed delineations, or surface water bodies. The Watersheds Module is opened or started by clicking on the  button on the AWRD Interface, or by clicking the "*Open Watershed Viewer...*" menu option in the AWRD Modules menu (Figure A7 and Table A.6).

FIGURE A7
Starting the Watersheds Module

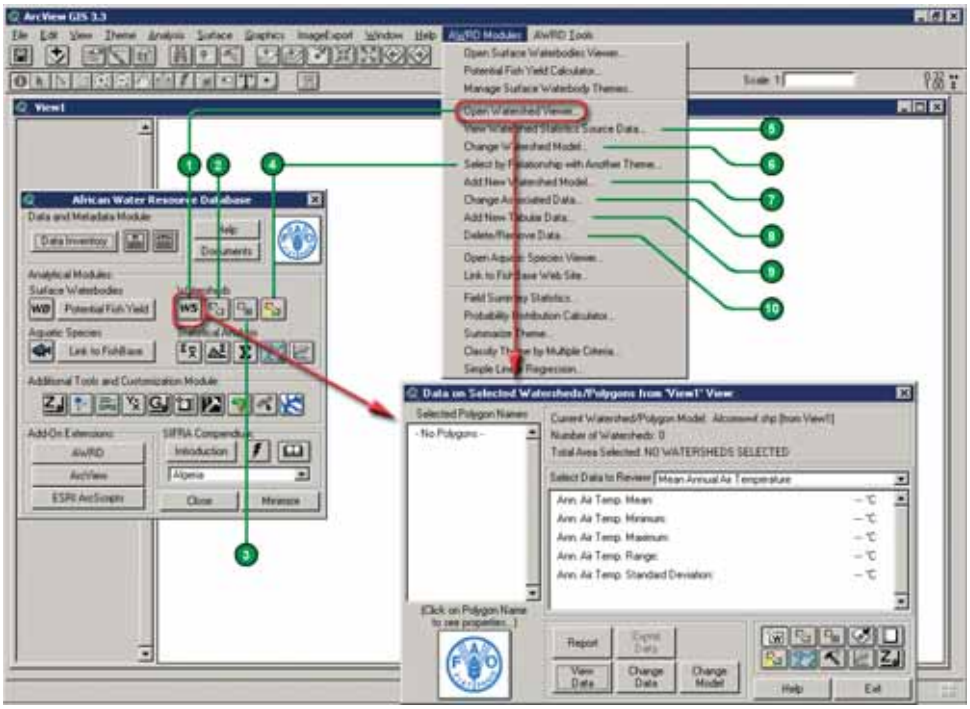


TABLE A.6
Watersheds Module buttons and menu items

Label (Fig. 1.28)	AWRD button	AWRD Modules menu option	Action executed
1	WS	"*Open Watershed Viewer...*"	*Open Watershed Viewer*: Opens the Watershed Statistics Viewer dialog, allowing you to conduct a wide variety of analyses on watershed themes
2		N/A	*Select Upstream and Downstream Watersheds*: clicking this tool opens the Watershed Selection Criteria tool dialog, allowing users to select watersheds based on their hydrological relationship to a particular watershed selected by the user.
3		N/A	*Identify Upstream and Downstream Watersheds*: this tool opens the "Watershed Visualization Tools" dialog to produce a clear visual map of all the watersheds that are hydrologically related to any particular watershed, i.e. watersheds that are upstream, downstream, or within the same megabasin, plus toools to zoom to the extents of any of these components, to flash the borders of any region, to move upstream or downstream from the base watershed, and to save the flow regime.
4		"Select Watersheds by Relationship with Another Theme…"	*Select by Relationship with Another Theme*: clicking this tool opens the "Select Watersheds by Other Themes" dialog, allowing users to select watersheds based on their hydrological and/or spatial relationship to selected features in another theme.
5	View Data	"View Watershed Statistics Source Data…"	*View Source Data:* this function shows you the background data used to generate the watershed statistics for a particular watershed theme. If Spatial Analyst is installed, the background data will be added as grids. Otherwise the data will be added as greyscale images.
6	Change Model	"Change Watershed Model…"	*Change Model*: this function is used to change or switch analyses between watershed models. This extension comes with several options (see discussion of Watershed Models) and provides users the ability to customize the AWRD by adding their own data.
7	N/A	"Add New Watershed Model…"	*Add New Watershed Model:* this function allows users to register new custom watershed models or other polygonal themes so they can be used with the tool-sets of the AWRD Watersheds Module. This tool comes with a Simple and an Advanced version.
8	Change Data	"Change Associated Data…"	*Change Data*: this function allows the user to customize which data themes (e.g. elevation, precipitation, population densities, etc.) the AWRD should calculate statistics for.

9	N/A	"Add New Tabular Data…"	***Add New Tabular Data:*** this function allows a user to generate new data from grid themes.
10	N/A	"Delete/Remove Data…"	***Delete/Remove Data:*** this function allows users to delete and/or unregister watershed models, grid themes and specific data tables.

Watersheds maintenance tools

The watershed maintenance tools dialog contains five buttons for exporting and viewing data, and for changing watershed model preferences (Figure A8 and Table A.7).

FIGURE A8
The watershed maintenance tools

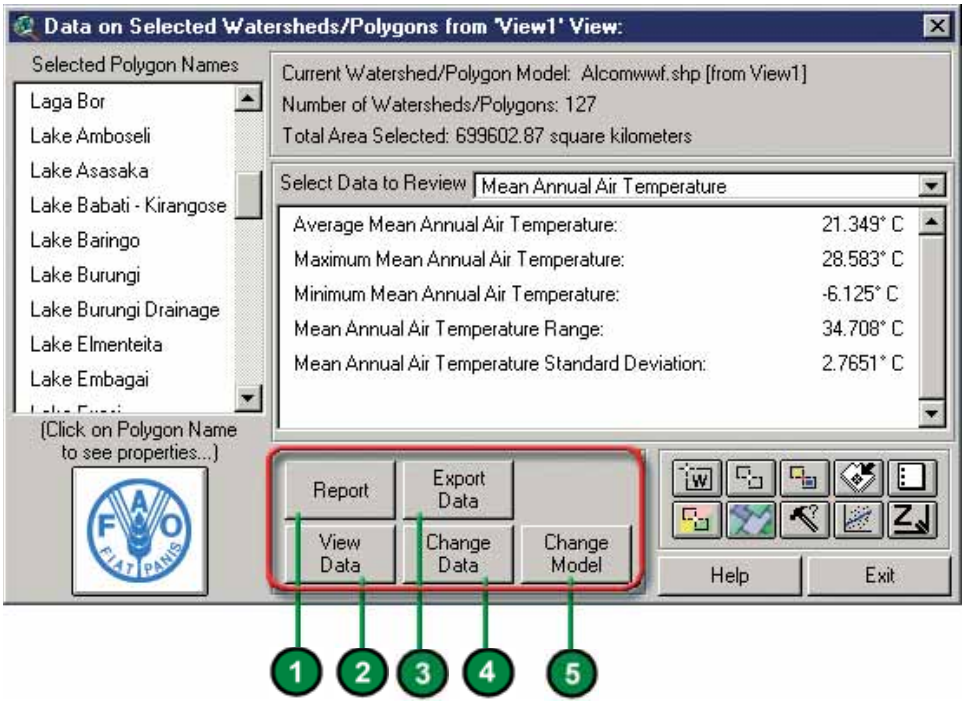


Table A.7 provides a summary of the buttons available in the watershed maintenance tools.

TABLE A.7
Watersheds maintenance tools buttons

Label (Fig.1.29)	AWRD button	AWRD Modules menu option	Action executed
1	Report	N/A	Report: The Report button produces a text report summarizing all the data currently presented on the watershed statistics module. The report is saved as a text file on the hard drive and also appears in a text report on the screen.
2	Export Data	N/A	***Export Data:*** The Export Data button allows users to save the current set of selected watersheds, plus the summary statistics, to a new dBASE table where it can be used with many other software packages.
3	View Data	*"View Watershed Statistics Source Data…"*	***View Source Data:*** This function shows you the background data used to generate the watershed statistics for a particular watershed theme. If Spatial Analyst is installed, the background data will be added as grids. Otherwise the data will be added as greyscale images.
4	Change Data	*"Change Associated Data…"*	***Change Data***: This function allows the user to customize which data themes (e.g. elevation, precipitation, population densities, etc.) the AWRD should calculate statistics for.
5	Change Model	*"Change Watershed Model…"*	***Change Model***: This function is used to change or switch analyses between watershed models. This extension comes with several options (see 4.2 Watershed Models) and provides users the ability to customize the AWRD by adding their own data.

Watershed selection and analysis tools

The watersheds selection and analysis tools contains ten buttons for selecting and analysing watersheds (Figure A9 and Table A.8).

FIGURE A9
Watershed selection and analysis tools

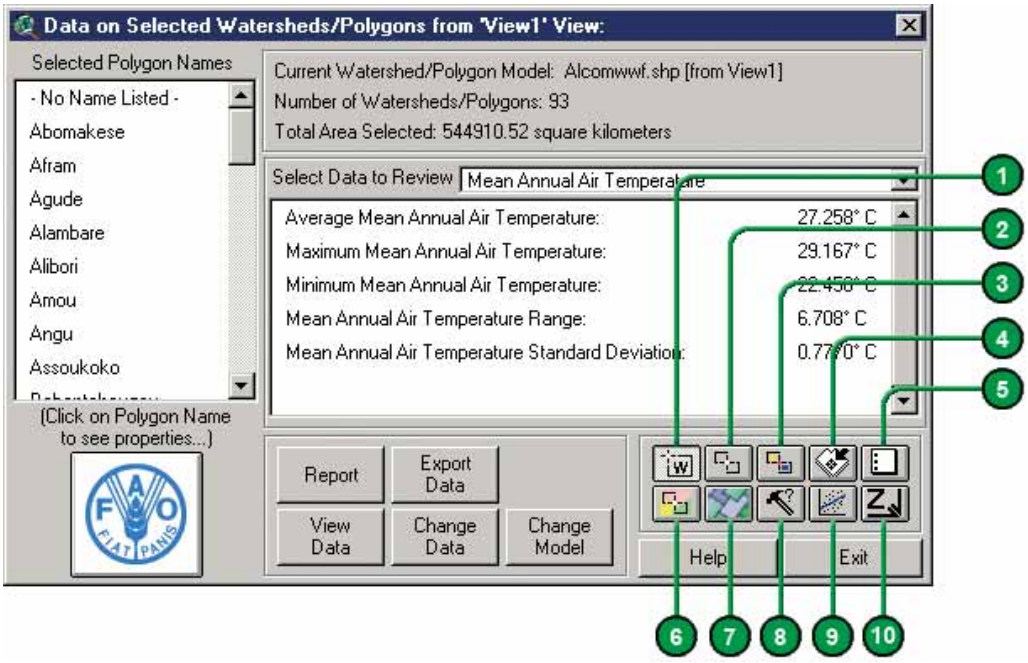


TABLE A.8
Watershed selection and analysis tools buttons

Label (Fig.1.50)	AWRD button	AWRD menu option	Action executed
1		N/A	*Select Features*: clicking this tool allows the user to select watersheds directly from a view by clicking on them. The user can also hold the mouse button down to draw a rectangle and select several watersheds simultaneously, or can hold the Shift key down to unselect currently selected watersheds.
2		N/A	*Select Upstream and Downstream Watersheds*: clicking this tool opens the "Watershed Selection Tool" dialog, allowing users to select watersheds based on their hydrological relationship to a particular watershed selected by the user.
3		N/A	*Identify Upstream and Downstream Watersheds*: this tool opens the "Watershed Visualization Tools" dialog to produce a clear visual map of all the watersheds that are hydrologically related to any particular watershed, i.e. watersheds that are upstream, downstream, or within the same megabasin, plus to zoom to the extents of any of these component, to flash their borders of any region, and to move upstream or downstream from the base watershed, and to save the flow regime.
4		N/A	*Zoom to Selected Watersheds*: clicking this tool zooms into the full extent of all the selected watersheds within the user's current view.
5		N/A	*Clear Selection*: clicking this tool clears the selection set so that no watersheds are selected. The Watershed Statistics Viewer updates itself to show that no watersheds are selected.
6		AWRD Modules *"Select by Relationship with Another Theme..."*	*Select by Relationship with Another Theme*: clicking this tool opens the "Select by Relationship with Another Theme" dialog, allowing users to select watersheds based on their hydrological and/or spatial relationship to selected features in another theme.
7		AWRD Modules *"Classify Theme by Multiple Criteria..."*	*Classify Watershed/Polygon Model by Multiple Criteria*: the classification and ranking tools provide users with the means to classify features according to a wide variety of simple and complex functions. With these tools, users can rank features based on either single or multiple criteria, as well as identify features that do not meet any selection criteria at all. This function is described in detail in Section 1.6.

8		AWRD Tools *"Query Builder..."*	***Model Query Builder:*** this tool gives the user the ability to apply complex queries to the data to either select features or to apply a theme definition. This function is described in detail in Section 1.7.
9		AWRD Modules *"Simple Linear Regression..."*	***Watershed Model Regression***: this tool provides a method for analysing linear relationships between data in watersheds, letting the user identify whether a dependent variable varies in a predictable way over different levels of the independent variable. This function is described in detail in Section 1.6.
10		AWRD Tools *"Find Location by Theme..."*	***Find Location by Theme***: this tool offers several methods for locating particular features. This function is described in detail in Section 1.7.

Watershed zooming tools

These tools let users quickly zoom to regions of a view based on a watershed's position in a hydrological network (Figure A10 and Table A.9).

FIGURE A10
Watershed zooming tools

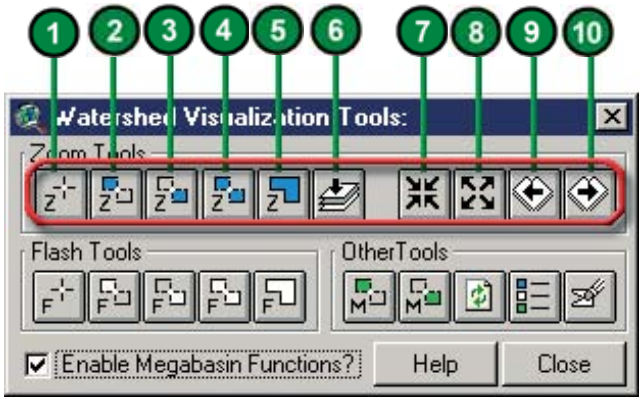


TABLE A.9
Watershed zooming tools buttons

Label (Fig.1.58)	AWRD button	Action executed
1		***Zoom to Extent of Selected Polygon***: zooms to the extent of the "selected" watershed/polygon.
2		***Zoom to Extent of Upstream Polygons***: zooms to upstream watersheds. This button is disabled if there are no upstream watersheds.
3		***Zoom to Extent of Downstream Polygons***: zooms to downstream watersheds. This button is disabled if there are no downstream watersheds.
4		***Zoom to Extent of Upstream and Downstream Polygons***: zooms to the total extent of the upstream, downstream and selected watersheds.
5		***Zoom to Extent of Megabasin***: zooms to the entire megabasin. This button will only be enabled if the "Enable Megabasin Functions?" checkbox is checked.
6		***Zoom to Extent of Model Theme***: zooms to the full extent of the entire model.
7		***Zoom In***: zooms into the centre of the view by 150%.
8		***Zoom Out***: zooms out from the centre of the view by 150%.
9		***Zoom to Previous Extent***: returns the view display to the last zoom scale, similar to the "back" button on an internet browser.
10		***Zoom to Next Extent***: returns the view display to the next zoom scale if one exists, similar to the "forward" button on an internet browser

Watershed flashing tools

These tools are intended to draw users' attention to either a particular watershed or the components comprising the flow regime related to this watershed by generating and "flashing" temporary graphic images of the flow regime boundaries on the screen (Figure A11 and Table A.10). Because these graphics are only temporary, they will remain on a view only until it is refreshed. This tool is especially useful for identifying components of the flow regime when the user has chosen to zoom in, zoom out, pan, or "walk" up or down stream. It is also useful for identifying hydrologically related watersheds which are not directly upstream or downstream of the focal watershed (i.e. those lying within the megabasin), when the default legend does not depict the watershed boundaries.

FIGURE A.11
The watershed flashing tools

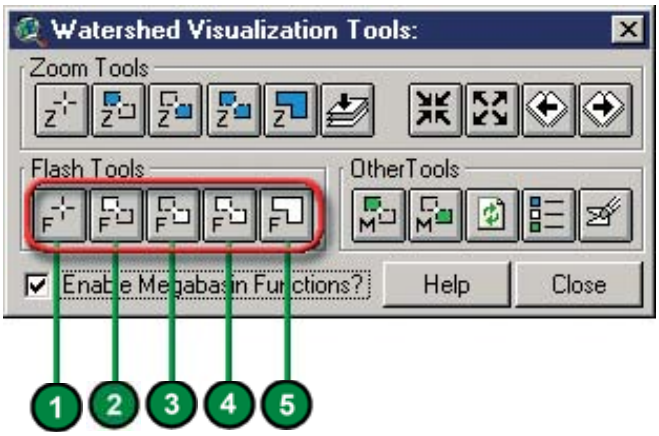


TABLE A.10
Watershed flashing tools buttons

Label (Fig.1.60)	AWRD button	Action executed
1		*Flash Boundary of Selected Polygon*: flashes the boundary of the base watershed, leaving a temporary graphic boundary around it using a white colour.
2		*Flash Upstream Boundary*: flashes the boundaries of ***any*** upstream component watersheds of a flow regime related to the base watershed, leaving temporary green graphic boundaries around them.
3		*Flash Downstream Boundary*: flashes the boundaries of ***any*** downstream component watersheds of a flow regime, leaving temporary red graphic boundaries around them.
4		*Flash Upstream and Downstream Boundary*: flashes the boundaries of both upstream and downstream watersheds leaving temporary green and red graphic boundaries respectively.
5		*Flash Megabasin Boundary*: flashes the boundaries of the megabasin watersheds, leaving grey boundaries around them; enabled only if the "Enable Megabasin Functions?" checkbox is checked.

Other watershed visualization tools

The "Identify up/Down Tools" dialog includes two tools that enable users to effectively "walk" iteratively either upstream or downstream from any watershed within a watershed model, and another tool to customize and save the default legends associated with the visualization tools (Figure A12 and Table A.11).

FIGURE A12
Other watershed visualization tools

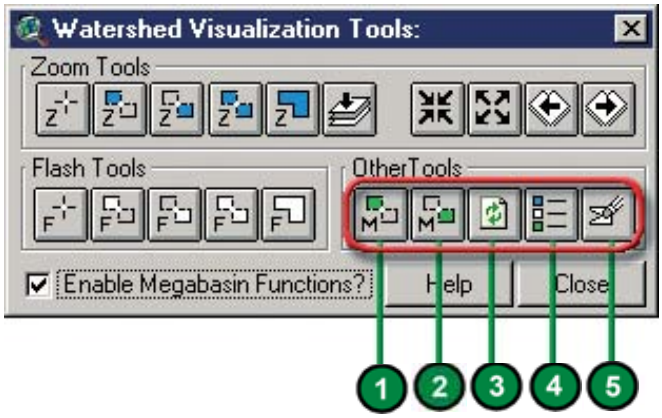


TABLE A.11
Other watershed visualization tools buttons

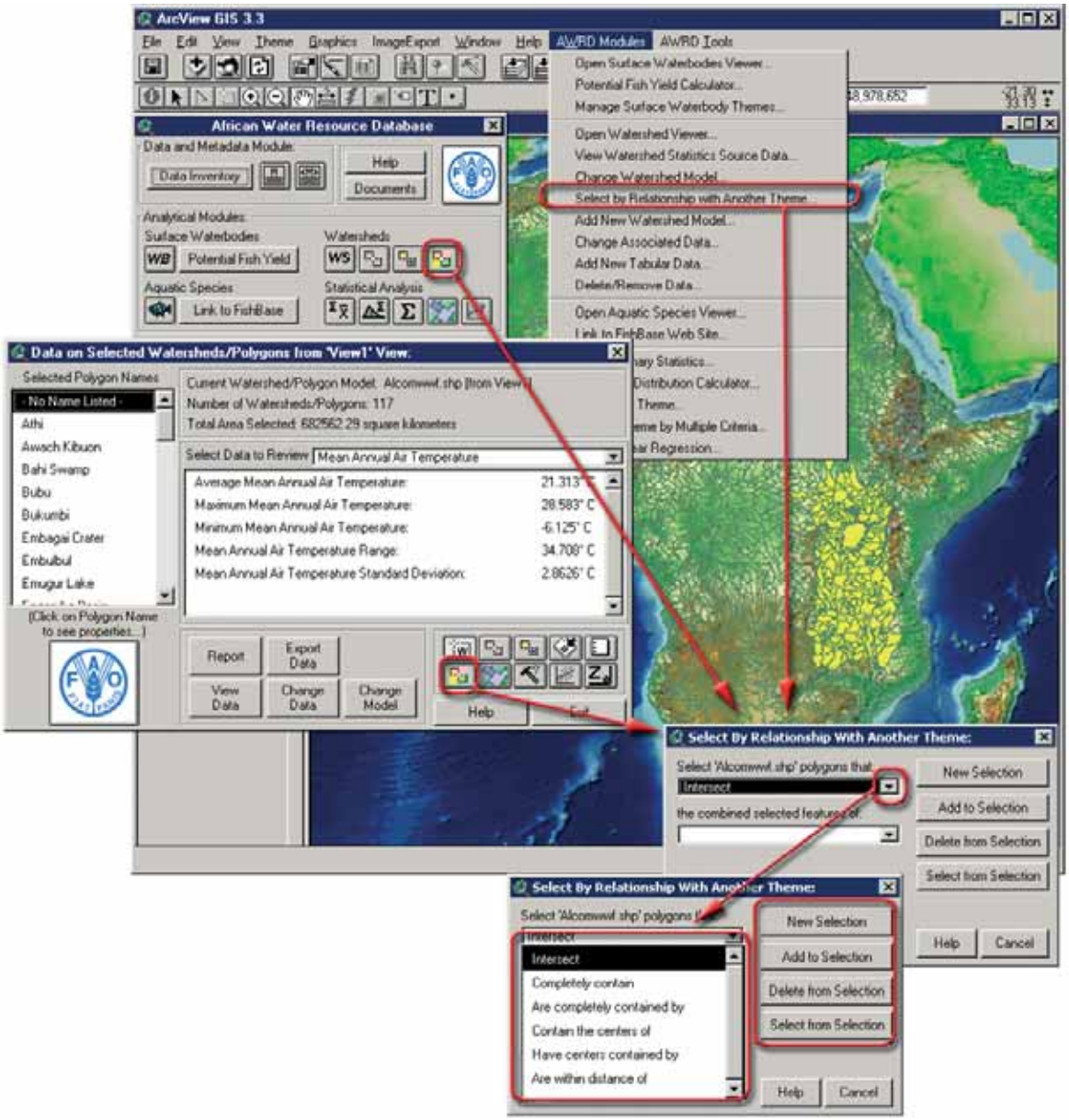
Label (Fig.1.61)	AWRD button	Action executed
1		*Move Upstream*: this tool identifies the watershed(s) immediately upstream from the focal watershed and regenerates the display. Because multiple watersheds may exist upstream, the user is prompted to select which upstream branch to go to; tool enabled only if there is a watershed upstream.
2		*Move Downstream*: This tool identifies the watershed immediately downstream from the focal watershed and regenerates the display; tool is enabled only if there is a downstream watershed.
3		*Refresh Screen*: this redraws the screen. Any temporary graphics produced by the "Flash" tools or other watershed visualization tools are removed from the display of the View.
4		*Change Legend Shading Preference*: this button allows users to change the default semi-transparent legend used by the "Identify Up/Down Tools" to alternative AWRD or custom legends designed by the user.
5		*Export or Create Outline of Up/Down Flow regime*: this tool provides users with a means to save and possibly aggregate the results of any specific watershed visualization.

Select by Relationship with Another Theme Tool

Within the AWRD, users are provided with a variety of methods for the selection of watersheds, including selections based on the current selection set for other feature themes. The Select by Another Theme tool allows users to select watersheds based on where they lie in relation to selected features from another theme.

The Select by Relationship with Another Theme tool is opened by clicking on the button on AWRD Interface or the Watershed Module dialog, or by selecting the option "Select by Relationship with Another Theme…" in the AWRD Modules menu. The dialog automatically assumes the user is going to select watersheds from the current watershed model, based on some type of spatial relationship the watersheds may have with the selected features in another theme. To use this tool, first select those features from that other theme before opening this dialog. To illustrate these functions, the country of the Republic of Botswana has been selected from the theme named "countries.shp". The following examples will identify watersheds that are upstream and downstream from the Republic of Botswana. The first drop down list contains a variety of possible spatial relationships (Figure A13).

FIGURE A13
Various spatial relationships available with the Select by Relationship with Another Theme Tool



- *Intersect*: Selects all watersheds that touch the Republic of Botswana.
- *Completely contain*: Selects all watersheds that completely contain the country of Botswana. In this example, this option would not select any watersheds because no single watershed is large enough to contain all of the Republic of Botswana.
- *Are completely contained by*: Selects all watersheds that are completely contained within the borders of the Republic of Botswana.
- *Contain the centres of*: Selects the single watershed that contains the centre point of the Republic of Botswana.
- *Have centres contained by*: Selects all watersheds whose centres are located within the borders of the Republic of Botswana.
- *Are within distance of*: Selects all watersheds that are within a minimum distance of the Republic of Botswana.

There are four selection options relating to whether the user wishes to make a new selection or not (Table A.12).

TABLE A.12
Select by relationship with another theme tool buttons

Label (Fig1.66)	AWRD button	Action executed
1	New Selection	Clears out any previous selection of watersheds and makes a new one based on the specified spatial relationship.
2	Add to Selection	Selects watersheds based on the specified spatial relationship and combines the selection with the previous selection of watersheds.
3	Delete from Selection	Makes a selection based on the specified spatial relationship, and then subtracts this selection from the previous selection. The resulting selection represents the entire previous selection except those watersheds which met the current selection criteria.
4	Select from Selection	Only selects those watersheds that were previously selected and which meet the current selection criteria.

1.5 AQUATIC SPECIES MODULE

The Aquatic Species Module provides users with the ability to spatially visualize the distributions of aquatic species, identify all species within a particular area, and to potentially access a large amount of descriptive information on those species via the "FishBase" Internet database (Figure A14 and Table A.13).

FIGURE A14
The Aquatic Species Module

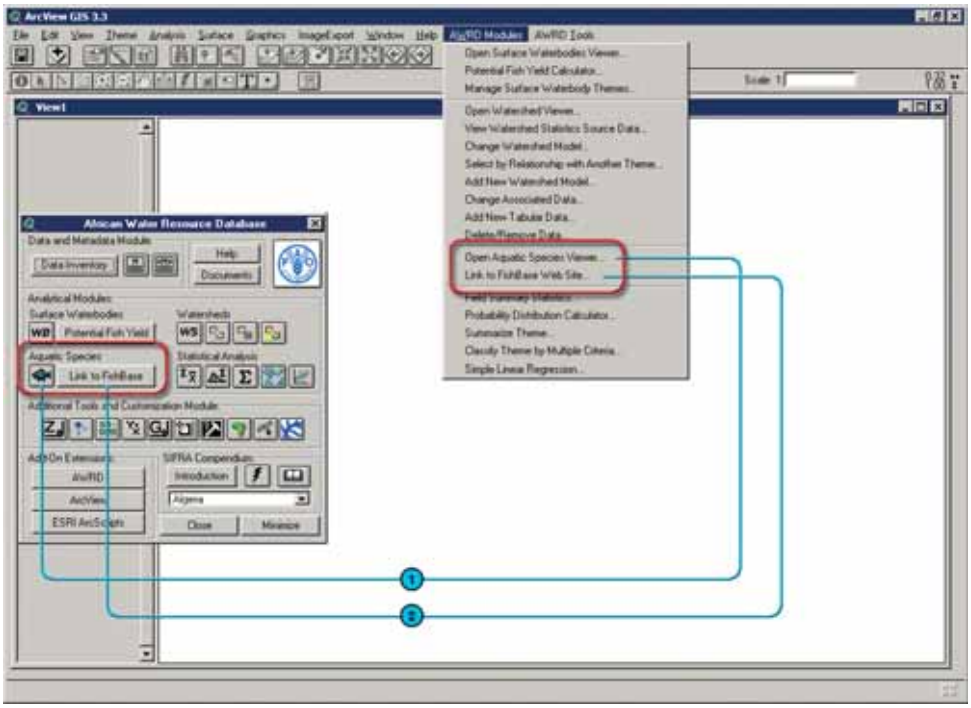


TABLE A.13
Aquatic Species Module buttons and menu items

Label (Fig. 1.70)	AQSP Module button	AWRD Modules menu option	Action executed
1		"Open Aquatic Species Viewer…"	*Open Aquatic Species Viewer*: opens the main Aquatic Species dialog, with tools to view the known distributions of aquatic species, to identify species within a particular area, and to easily review data and pictorial representations of different species.
2	Link to FishBase...	"Link to FishBase Web Site…"	Links user directly to the FishBase Web site, allowing searches for of over 28 000 species of fish.

Aquatic Species Viewer

The module is opened by clicking on the  button on the AWRD Interface, or by clicking the "*Open Aquatic Species Viewer...*" menu option in the AWRD Modules menu. In addition to opening the module, this tool automatically opens a View called *Aquatic Species Distributions* which will then enable users to view species distribution maps of the various fish species (Figure A15 and Table A.14).

FIGURE A15
Aquatic Species Viewer

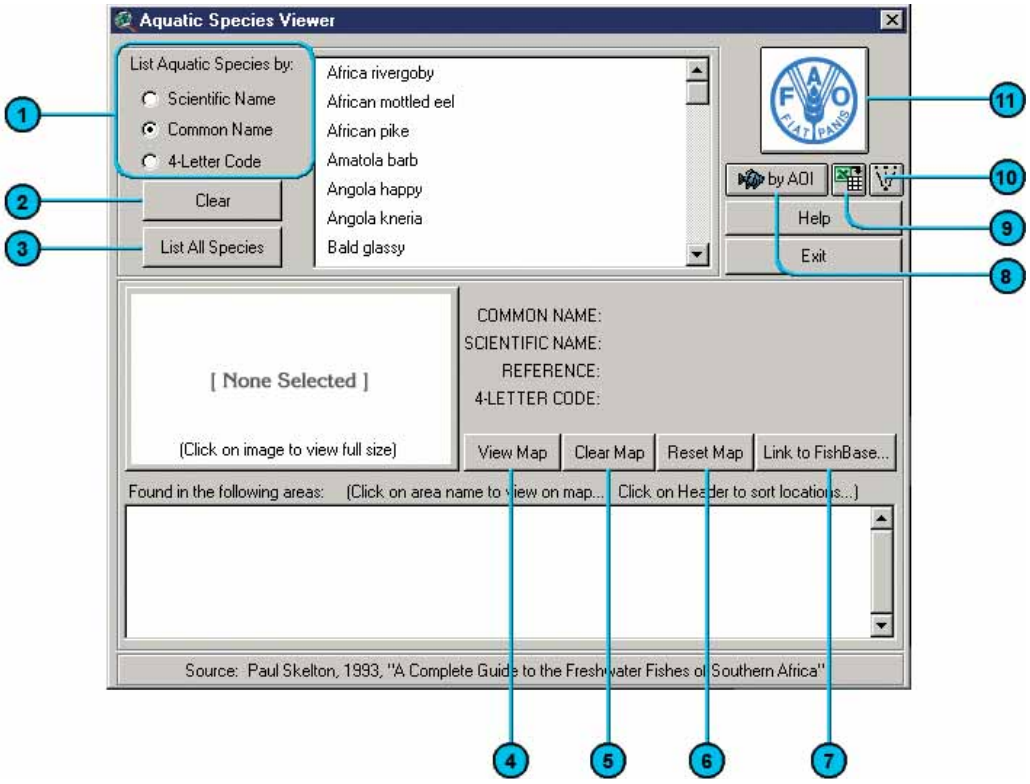


TABLE A.14
Aquatic Species Viewer buttons and menu items

Label (Fig. 1.71)	AQSP Module button	AWRD Modules menu option	Action executed
1	Scientific Name / Common Name / 4-Letter Code	N/A	A grouping of 3 radio buttons on the dialog, which allow the user to view/select portfolios of data for each aquatic species based on its: Scientific Name, Common Name, or a four letter encoding string.
2	Clear	N/A	Clears the current species selection from the list on the top of the Aquatic Species interface, and removes any image from the central image viewing box.
3	List All Species	N/A	Refreshes and fully populates the Aquatic Species list from a sub-selection set of species created using the ***Identify Species by AOI*** tool described in the row below.
4	View Map / Add To Map	N/A	Adds a theme to the view illustrating the geographic distribution of the current species. Displays the geographic distribution of a species. Users may add as many distributions as they wish onto the "map" in the view. The first time a distribution is created a shapefile is written to the hard drive. Afterwards data are retrieved when distribution is required.
5	Clear Map	N/A	Removes map graphics from the view. These graphics are created using the "Aquatic Species by Area of Interest" button.

6	Reset Map	N/A	Delete all species distribution maps currently displayed on the "Aquatic Species Distributions" view, but will not delete the source shapefiles from the hard drive.
7	Link to FishBase...	"AWRD Modules" menu: ***"Link to FishBase Web Site..."***	Gives users an automatic link to summary data on that species located on the FishBase Web site.
8	by AOI	N/A	*Aquatic Species by Area of Iinterest*: this tool allows user to select an area of interest (AOI) on a View and identify all fish species that have been recorded there. Users can define the AOI based on watershed, political, or a various custom defined methods.
9		N/A	*Import Table from Excel:* This tool converts an Excel table to a dBASE file and adds it to ArcView. It is included in the Aquatic Species Module because occasionally aquatic species data may be downloaded in Excel format.
10		N/A	*Convert Multipoints to Points:* Generates point shapefiles of individual species from the overal species distribution shapefile.
11		"Help" menu: ***"Link to FAO Fisheries Web site..."***	*Link to FAO Fisheries Web Site...:* This tool links directly to FAO Fisheries web site (http://www.fao.org/fi/default_all.asp).

1.6 STATISTICAL ANALYSIS MODULE

The AWRD Statistical Analysis Module, accessible via the AWRD Modules menu or through the buttons in the AWRD Interface, provides users with three different toolsets or calculators for deriving descriptive data based on either statistical summaries or probability distributions (the "Field Summary Statistics", the "Probability Distribution Calculator" and the "Summarize Theme") together with a classification and ranking tool ("Classify Theme by Multiple Criteria") and a regression tool ("Simple Linear Regression") (Figure A16 and Table A.15).

FIGURE A16
The Statistical Analysis Module

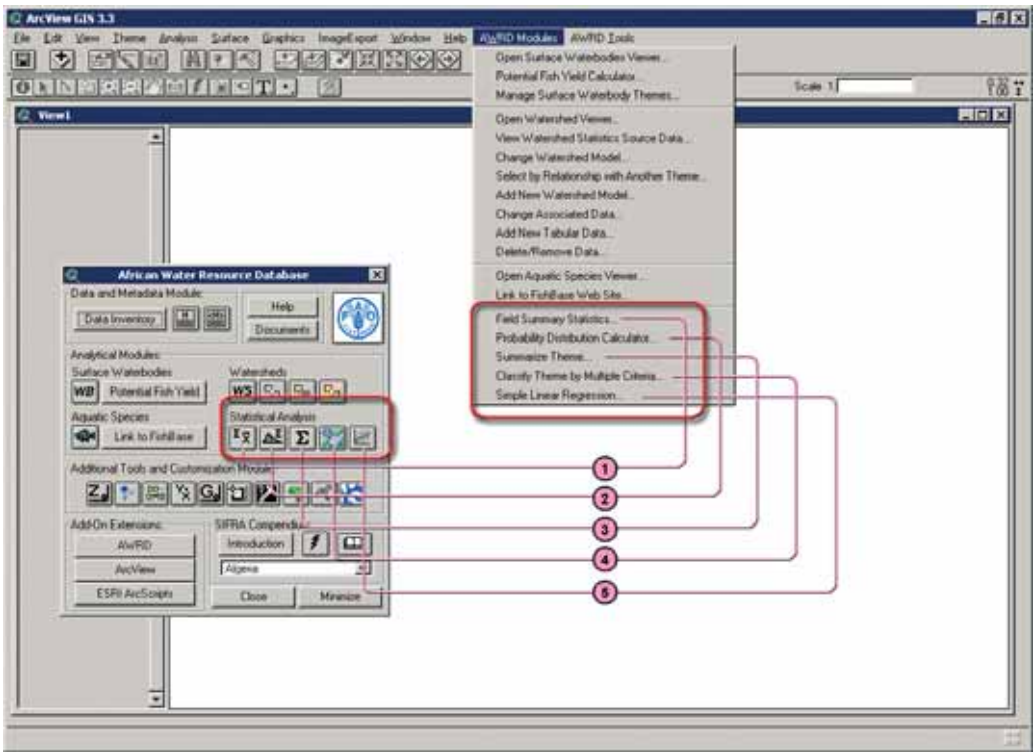


TABLE A.15
Statistical Analysis Module buttons and menu items

Label (Fig.1.82)	AWRD Interface button	AWRD Modules menu option	Action executed
1		"Field Summary Statistics…"	*Field Summary Statistics*: this function allows you to generate a wide set of descriptive statistics on a theme.
2		"Probability Distribution Calculator…"	*Probability Distribution Calculator*: this function allows you to test critical values for probability levels based on several commonly-used statistical distributions. It calculates the probability, the cumulative probability and the inverse probability.
3		"Summarize Theme…"	*Summarize Theme*: this function allows you to group features in a theme based on common attribute values, and then generate several descriptive statistics for each group.
4		"Classify Theme by Multiple Criteria…"	*Classify Theme by Multiple Criteria*: this function allows you to classify features in a theme based on complex criteria, and to save the criteria sets for use with other datasets.
5		"Simple Linear Regression…"	*Simple Linear Regression*: this function allows you to conduct a simple linear regression on pairs of fields in a theme attribute table, including generating an ANOVA table, P-values, confidence bands and tests of the regression line slope.

1.7 ADDITIONAL TOOLS AND CUSTOMIZATION MODULE

The Additional Tools and Customization Module contained within the AWRD (Figure A17) provide users with a wide variety of additional functions, including locational referencing; river identification; selecting by themes; query building; adding basemap image to view; and calculating and reporting geostatistics. There are ten tool-sets that can be accessed via the menu options in the AWRD Tools menu and the View Theme menu, and ten tool-sets accessible from buttons on the Additional Tools and Customization Module box in the AWRD Interface. These tools functions are summarized in Table A.16.

FIGURE A17
The Additional Tools and Customization Module

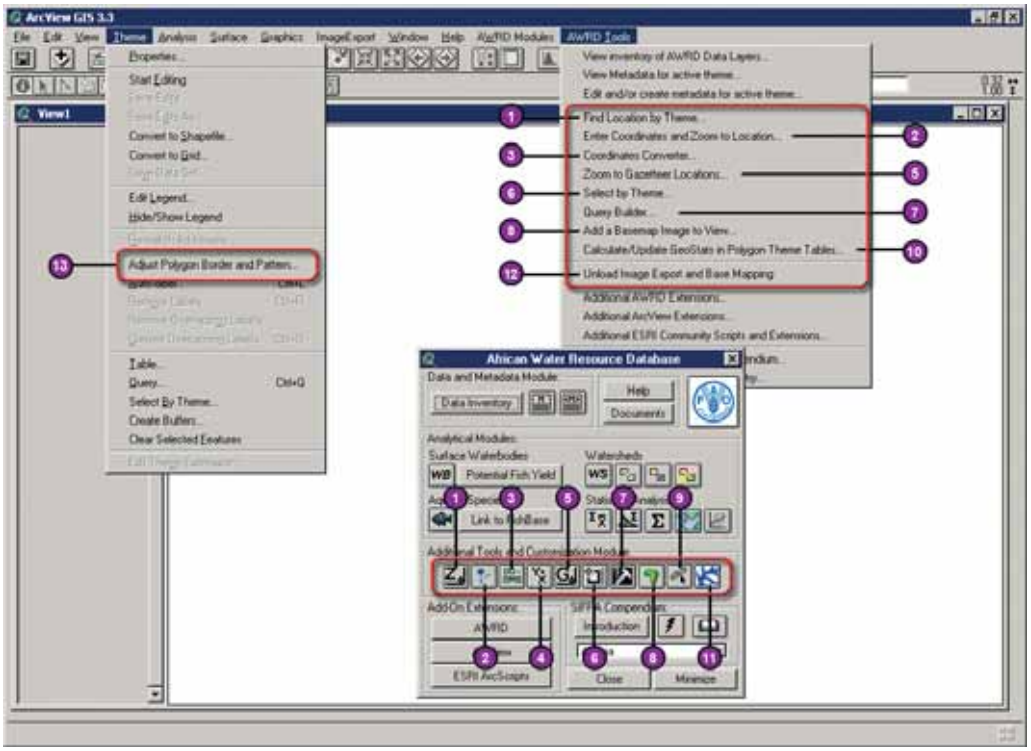


TABLE A.16
Additional Tools and Customization Module buttons and menu items

Label (Fig. 1.101)	AWRD Interface button	AWRD Tools menu option	Action executed
1		*"Find Location by Theme..."*	*Find Location by Theme*: this tool allows you to find and zoom to particular features by selecting that feature from a list.
2		"Enter Coordinates and Zoom to Location..."	*Enter Coordinates and Zoom to Location*: this tool allows you to zoom directly to a location by entering the XY coordinates.
3		"Coordinates Converter..."	*Coordinates Converter*: the Coordinate Conversion tool provides a way to convert coordinate values between several commonly-used coordinate formats, including Decimal Degrees, Degrees/Minutes, Degrees/Minutes/Seconds, and projected coordinates.
4		N/A	*Click on screen to get coordinates*: this Report Coordinates tool tells you the coordinates of a point on the screen, in both Decimal Degrees and Projected values.
5		"Zoom to Gazetteer Locations..."	*Zoom to Gazetteer Locations*: this tool allows you to search for locations using their Gazetteer coordinates. The Gazetteer database is an extremely large and detailed dataset of point locations.
6		*"Select by Theme..."*	*Select by Theme*: this tool provides a means to select features from one theme that have some type of proximity relationship (i.e. intersect with, are contained by, are within distance of, etc.) with the selected features of another theme.
7		*"Query Builder..."*	*Query Builder*: this tool provides a comprehensive way to either select or view features in a theme based on a complex query to the feature attribute table.
8		*"Add a Basemap Image to View..."*	*Add a Basemap Image to View*: this tool allows you to quickly and easily add a background image to a view. These images can be very useful for both aesthetic and analytical purposes.
9		N/A	*Report GeoStats for Lines or Polygons You Select*: this tool reports the length of line features, and the area and perimeter length of polygon features, using both projected and spherical coordinates.
10	N/A	"Calculate/Update GeoStats in Polygon Theme Tables..."	This function calculates or updates geostatiscal data in Polygon theme tables.
11		N/A	*Select Adjacent River of Same Level*: the River Identification tool allows you to select, and potentially set a name for, continuous reaches of river segments that are of the same order.
Image Export and Base Mapping Tool			
12	N/A	*"Unload Image Export and Base Mapping"* or *"Load Image Export and Base Mapping"*	This tool unloads/loads the Image Export and Base Mapping tool, comprised of a complex set of geo-referenced image output, View and Layout manipulation tools accessible trough a menu interface (i.e. ImageExport). It will load automatically when the AWRD extension is loaded; thereafter it can be loaded and unloaded by selecting the two alternative options in the AWRD Tools menu.
From View Theme Menu			
13	N/A	"Adjust Polygon Border and Pattern"	This tool simplifies the process of making attractive legends for polygon themes. It includes functions to modify or eliminate the polygon borders, and/or to set transparency patterns simultaneously for all classifications in a legend.

1.8 ADD-ON EXTENSIONS AND ADDITIONAL AWRD TABLE AND VIEW FUNCTIONS

Adding additional extensions to your project

Extensions are tools which can be added to ArcView to enhance the overall functionality of the software. Often these extensions are not automatically loaded when ArcView is started, but they can be loaded at any time by users who seek some particular specialized tool. If an ArcView project is saved with any extensions loaded, then those extensions will be automatically loaded the next time that project is opened. The AWRD itself is an example of an ArcView extension. The AWRD provides a simple means of reviewing, loading and/or unloading a number of additional extensions written by the

authors of the AWRD as well as the basic set of ArcView extensions provided by ESRI. Many more customized tools are available from the general ArcView user community (Figure A18 and Table A.17).

FIGURE A18
The Add-on Extensions

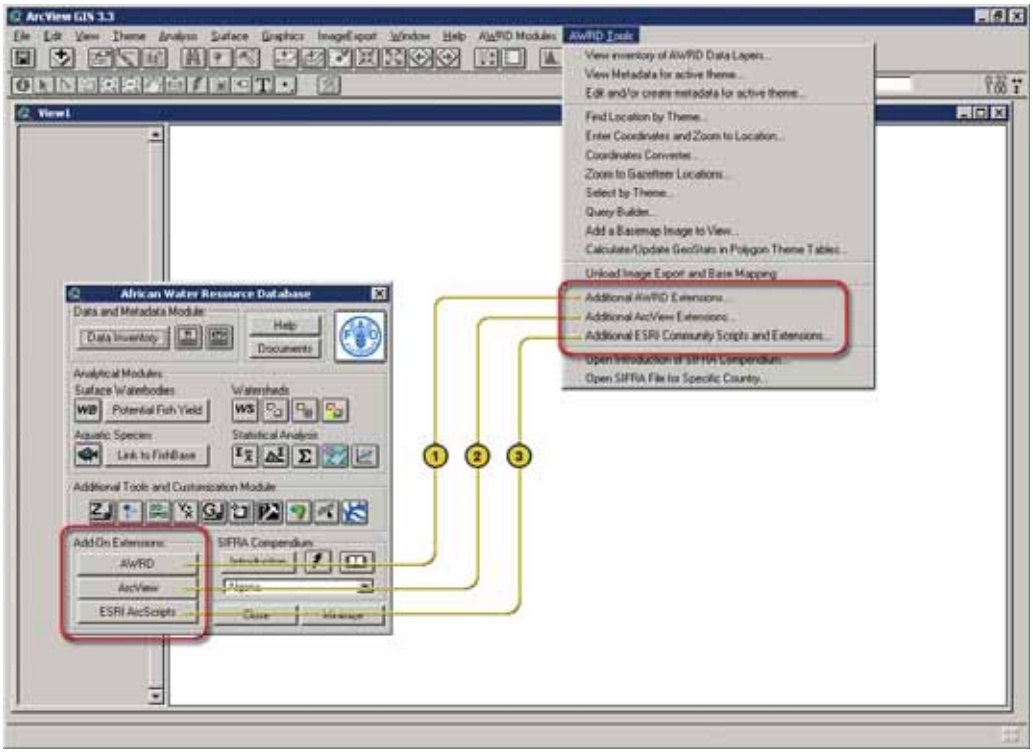


TABLE A.17
Add on Extensions buttons and menu items

Label (Fig.1.135)	AWRD Interface button	AWRD Tools menu option	Action executed
1	AWRD	"Additional AWRD Extensions…"	*AdditionalAWRD Extensions*: this function provides a simple way to review and load any of the additional extensions provided with the AWRD.
2	ArcView	"Additional ArcView Extensions…"	*Additional ArcView Extensions:* this function provides a simple way to review and load any of the standard extensions that come installed with ArcView.
3	ESRI ArcScripts	"Additional ESRI Community Scripts and Extensions…"	*Additional ESRI CommunityScripts and Extensions*: this function opens Internet Explorer directly to the ESRI ArcScripts site, allowing searches of extensions developed by the ArcView user community.

1.9 SIFRA COMPENDIUM

The Committee for Inland Fisheries for Africa Source Book for the Inland Fishery Resources of Africa (SIFRA) (Vanden Bossche and Bernacsek, 1990a; 1990 b; 1991) is a compendium of information on physical characteristics, limnology and fisheries in Africa, organized by country (Figure A19 and Table A.18).

FIGURE A19
The SIFRA Compendium

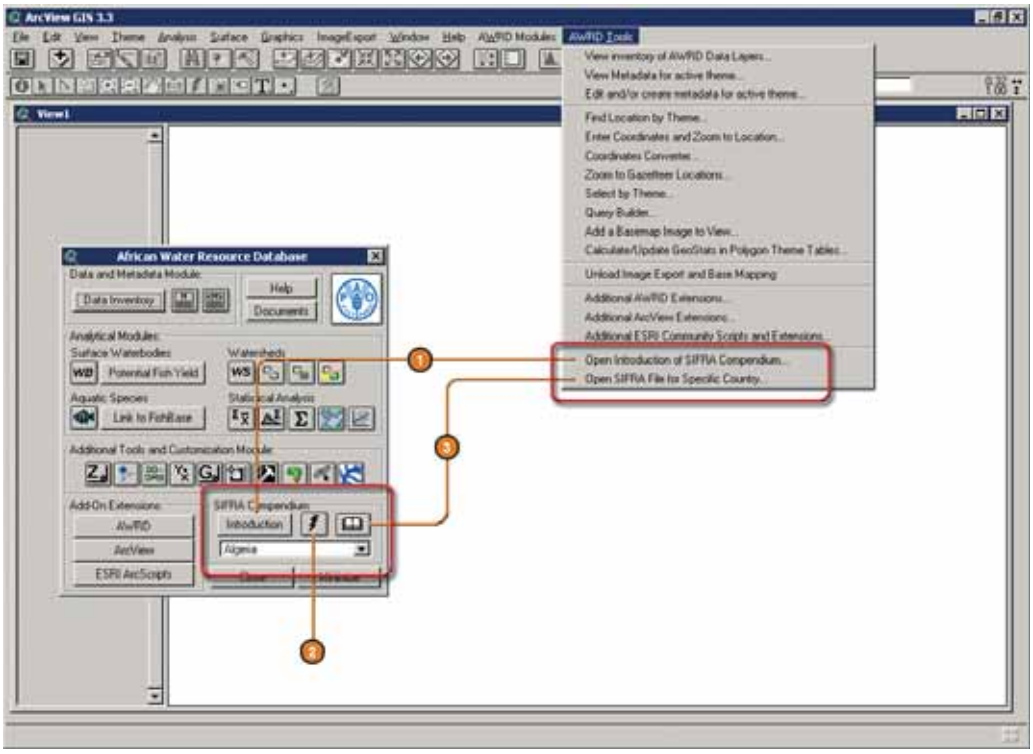


TABLE A.18
SIFRA Compendium buttons and menu items

Label (Fig.1.145)	AWRD Interface button	AWRD Tools menu option	Action executed
1	Introduction	"Open Introduction of SIFRA Compendium…"	*Open Introduction of SIFRA Compendium*: this function opens the introduction to the Committee for Inland Fisheries for Africa - Source Book for the Inland Fishery Resources of Africa (SIFRA). The SIFRA Compendium is a comprehensive compendium of information on physical characteristics, limnology and fisheries in Africa, organized by country.
2		N/A	*Open SIFRA data by Clicking on Country*: this function can be used to open any country based SIFRA file for Africa by clicking over the appropriate country in the active View.
3		"Open SIFRA File for Specific Country…"	*Open Selected SIFRA File*: this function depends on the drop-down list of the alphabetized countries in Africa. Select a country from the list and then click the button to open the SIFRA file on that country.