

Using the RiverWare Viewer

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What is the RiverWare Viewer?

The RiverWare Viewer is a "read-only" version of RiverWare that CU-CADSWES offers at no cost to those who would like to view the output of model runs, but do not need to build, modify or run models. The RiverWare Viewer is a version of RiverWare in which some functionality is not available. In particular, you cannot modify data, methods or rules. You may view and export the output and you may re-save the model file in order to save your plots and other output configurations. More details about the capabilities are described below.

What does the Version Number Mean?

The RiverWare Viewer was first made available with RiverWare V.4.4.2 on March 22, 2004. The Viewer always has the same version number as the corresponding full version of RiverWare released at the same time. Just as in the full RiverWare software, the Viewer can read model files that were saved with the current version or an older version of either RiverWare or the RiverWare Viewer. If, in the future, you want to view the output of a model saved with RiverWare V.4.4.5, you would need to download and install the RiverWare Viewer with a version of 4.4.5 or higher. Beginning with V4.4.2, each version of RiverWare will be released with a corresponding version of the Viewer.

How Can I Obtain the RiverWare Viewer?

To run the RiverWare Viewer, you will download and install the RiverWare Viewer executable as described on the CADSWES web page <http://cadswes.colorado.edu/riverware/viewer>. In addition, you will need a RiverWare license file that you can obtain from CADSWES. Please contact installsupport@cadswes.colorado.edu to obtain a license file. The license file allows you to run the Viewer on a specific computer for a definite period, e.g., one year, during which you may download and run any new versions released during that time.

What Help or Support is Available to Users of the RiverWare Viewer?

CADSWES has not yet developed complete instructions for using the RiverWare Viewer. This document is intended to provide some guidance in its use. If you need further assistance in using the RiverWare Viewer, please contact the agency, company or person who provides you with the model file and ruleset to view. They would be the best source of information about the model and the results. Also they may be willing to assist you in using the tool to accomplish your objectives. In addition you may wish to register for a RiverWare training class at CADSWES or purchase user support hours. For information about these options, contact rwinfo@cadswes.colorado.edu.

The remainder of this document describes some of the features available to users of the RiverWare Viewer and outlines the functions of the full RiverWare software that are not available in the Viewer.

RiverWare Features for Viewing Model Information and Results

1. Load a Model

The main purpose of the RiverWare Viewer is to load and view a model file created and saved by others. After bringing up RiverWare Viewer, select Model → Load from the main menu bar at the top of the Workspace. A file chooser will appear. RiverWare files typically have an .mdl extension and often are saved in compressed form, noted by the .gz extension. When you have selected the model file of interest, the model will be loaded into the Workspace. The model includes the objects, links, all data associated with the objects, and numerous other configurations and selections.

2. Model Info Dialog

New in V.4.4.2, a Model Info dialog stores a history of when and by whom a model is saved. It also stores users' comments in an editable text field. To access the Model Info Dialog, select Model → Model Info from the main workspace menu.

The Model File Info dialog box contains a "File Save History" field and a "File Comment" field. The File Save History field saves the user name, date, time, and version of RiverWare with which the model was last saved. If a model is viewed and saved with RiverWare Viewer the File Save History will indicate the save information from the full version of RiverWare as well all subsequent saves from the RiverWare Viewer. The File Comment field is an editable text field in which users can type any information or comments about the model. This information is stored in the model file. The most recently registered save is printed in the dialogists when a model is loaded.

Note that the Model Info Dialog registers the save information *only the first time you do a save during a RiverWare session*. If you want to register the save in subsequent saves you must use the "save as" option.

3. View Data in Slots

Slots are the data structures for all data in RiverWare. Slots "live" on the objects (reservoirs, reaches, etc.) to which the data applies. Open an object by double-clicking on the icon on the Workspace. The Open Object dialog for each object lists the slots on that object. Open a slot by double-clicking on the slot icon to left of the slot name. The Open Slot dialog shows the data, either timeseries or table data. Timeseries data can be plotted from the Open Slot dialog.

Data will be displayed in the units selected when the model was saved. However, you may change the display units to your preferred unit by selecting different units in the View → Configuration dialog. Similarly the precision of the display may be modified by the RiverWare Viewer.

4. View Many Slots Simultaneously in the System Control Table

The System Control Table (SCT) is a spreadsheet-like view of the data in RiverWare's timeseries slots. You may configure any number of SCTs to view various combinations of slots simultaneously. Each SCT is saved as a separate file. You may use SCTs configured by others for the model of interest and you may create and save your own SCTs. For detailed information on configuring and using the SCT tool, see the online help. Select Help → RiverWare Help to bring up the online help. From the Bookmarks select the "User Interface" documentation, then select "SCT 2.0 System Control Table" documentation. The documentation describes the use of the SCT for

the full version of RiverWare. The use of the SCT from the RiverWare Viewer is similar, except that data cannot be edited and runs cannot be executed.

5. Plot Data

From the RiverWare Viewer, you may create and save customized plots of any data in a loaded model. This is done through the Output Manager. In addition, the model file you loaded may have customized plots already configured and saved. Complete instructions for creating and customizing plots are given in the online help. Select Help → RiverWare Help to bring up the online help. From the Bookmarks select the “User Interface” documentation, then select “Plot Dialog” documentation.

6. Export Data

The RiverWare Viewer allows you to export data from the model through the Data Management Interface (DMI) utility. You may create and save DMIs or execute DMIs created and saved with the model file you have loaded. For a detailed description of the DMI utility, see the online help. The DMI concepts are explained in the DMI Documentation at the top level of the online help. Recent improvements to the user interface are described under the “User Interface” documentation in the “Data Management Interface” document.

7. View Methods and Physical Process Algorithms

To understand the physical process modeling that resulted in the outputs you see in the model, you can view the methods selected on each object. Open an object and select the “Methods” tab at the top. A list of method categories appears, each with its corresponding selected method. You may not change the method selected in the RiverWare Viewer. To find out the details of the algorithm executed by the method, see the online help. Select Help → RiverWare Help to bring up the online help. From the Bookmarks select the “Simulation Objects” documentation, then select the Object Name on which the method of interest has been selected. Under “User Methods” the method categories and the methods available under each category are listed. The documentation describes the inputs and outputs for each method as well as the calculations.

8. View Rulesets and the Affects of Rules on the Solution

If the outputs in the model file are the results of a Rulebased Simulation run, the ruleset used in the run is of primary interest to the RiverWare Viewer user. The ruleset is saved in a separate file, typically with a .rls extension. To load the ruleset, select from the top menu bar Policy → Ruleset → Open. The ruleset will open and you may view the ruleset and any individual rules by opening the rule from the ruleset.

In addition to the logic in the rules, you may be interested in seeing exactly how the rules affected the output of the model. Select from the main Workspace menu bar Utilities → Model Run Analysis. An analysis grid will appear that shows which policies (rule numbers) affected the solution of each object at each timestep. Each cell in the grid shows two rule numbers. Up arrows indicate the Inflow slot (information or flow coming from upstream was set by this rule or by simulation resulting from this rule). Down arrows indicate the Outflow slot (the Outflow of the object was set by this rule or by the simulation resulting from this rule.) A value with no arrow on a Reservoir refers to the rule number that set the storage or elevation of the rule. An ‘R’ flag next to the value indicates that the rule set this value directly. Values without the ‘R’ flag were set during the simulation that resulted from the setting of the value by the rule.

To easily see all model results due to a certain rule, you can color code the rule number on this grid. Select View → List Rules/Set Rule Colors from the top of the Analysis Dialog. In addition, this view shows all rules that “succeeded” in setting values at each timestep in the model.

9. Other Output Options

In addition to plots, you may output data as RiverWare Data Format (rdf) or as a comma delimited file that can be read in by other applications such as spreadsheets. The rdf file can be read by the ExcelWriter, a special tool to facilitate sending RiverWare output to Excel. If you wish to use the ExcelWriter, contact rwinfo@cadswes.colorado.edu or ask the authors of the model file you are working with to provide you with the executable and documentation.

Differences Between RiverWare and RiverWare Viewer

The following is a brief summary of the functionality of the RiverWare Viewer compared with that of the full RiverWare software:

Model Runs:

- Model runs cannot be performed.
- The run init date, finish date, timestep size, and number of timesteps cannot be edited.

Workspace:

- Models can be loaded and saved.
- Objects on the workspace cannot be created, moved, imported, or deleted.
- Links cannot be added or deleted.

Objects:

- Values and flags cannot be modified on any slot.
- Slot data can be exported, but not imported.
- Objects cannot be renamed.
- Method selections cannot be changed.
- Slots cannot be added, deleted, or renamed on data objects.
- User can change the displayed ordering of slots in the Open Object dialog.
- Units can be changed on a slot, and all values will be converted to the new units.

Rules:

- Rulesets can be loaded but not saved.
- New rulesets cannot be created.
- Rules, groups and functions cannot be created, edited, or deleted.

Accounts:

- Accounts cannot be created, edited, or destroyed.
- Values and flags cannot be set on accounting slots, including import.
- Exchanges, paybacks, and supplies cannot be created, edited, or destroyed.
- Methods cannot be edited on accounts.

SCT:

- Only the new SCT user interface is available.
- User can create new SCTs or load existing SCTs.
- Slot values and flags cannot be edited from an SCT.

Output:

- Plots can be created, edited, and saved with the model.
- Export DMIs can be created and invoked, but import DMIs cannot be invoked.
- The Output Manager is fully enabled: users can create RiverWare data files and comma-delimited data files.