



Technical Documentation Version 7.0

Release Notes



CADSWES

Center for Advanced Decision Support for Water and Environmental Systems

This document describes new features, enhancements, and changes included in RiverWaretm Version 7.0. These changes are new to the executable since the release of RiverWaretm Version 6.9 on May 11, 2016.

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This document describes new features, enhancements, and changes in RiverWare Version 7.0.

1. Special Attention Notes

Following are special attention notes, indicating that functionality has changed that requires you to update models or that results may differ. If you have any questions, please contact RiverWare-support@colorado.edu.

- **Input values on slots not in use:** It is possible to change method selection such that input linked series slots are no longer “in use” on the object. The slots and data still exists on the object in case you wish to revert the method selection. Previously, the input values that were not in use would still propagate across the link and could be used by the linked object. This was misleading and has been changed. Now, if a slot is not in use, no propagation of input values will occur at beginning of run. This could change model results if you have inputs on slots that are not in use. If this is the case, modify method selection, change input location, or reconfigure your links.
- **Slope Power Reservoir; Max Outflow computations changes:** If you use either the Max Capacity flag on outflow or the GetMaxOutflowGiven... RPL functions on a Slope Power Reservoir, see the changes described [HERE \(Section 5.2.2\)](#).
- **Reach; No Local Inflow, Solve Outflow method changes:** On a Reach using the **No Local Inflow, Solve Outflow** method (in the Local Inflow and Solution Direction category), it was possible to specify or propagate an Outflow that was inconsistent with the lagged Inflow. This is now an error.

2. Batch Mode

2.1 RCL changes

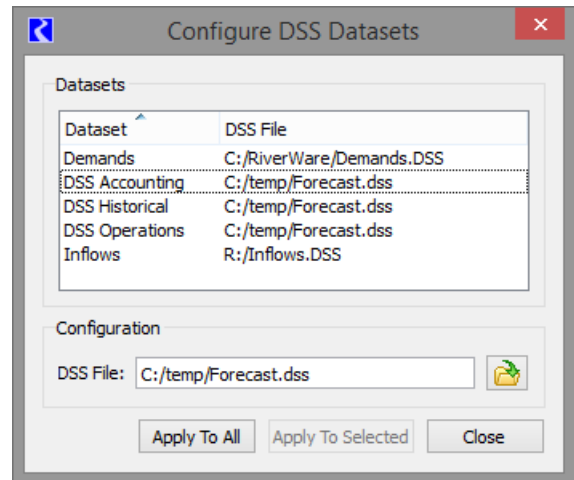
Within Batch Mode and the RiverWare Command Language (RCL), the SetRunInfo command can be used to change the run range. A new argument !StartDate was added to this command. This argument can be used as an alternative to the !InitDate argument.

3. Data Management Interface

3.1 Configure Datasets Utility

A new utility was added to the Database DMI that allows you to configure multiple DSS dataset file paths simultaneously.

For more information, click [HERE \(DMI.pdf, Section 5.2.3.1\)](#).



3.2 Database DMI Copy/Paste

Copying a Database DMI from the DMI Manager was modified to allow for two options:

- **Copy Database DMI Only:** This option copies only the top level Database DMI, but none of the Datasets or Name Maps. When pasted, the new DMI refers to existing Datasets and Name Maps. This was the previous behavior.
- **Copy Database DMI, Datasets, and Name Maps:** This option provides a “deep copy” of the Database DMI and all of the Dataset and Name Maps it accesses. For this option, when pasted, the new Database DMI is connected to newly pasted Datasets and similarly, Name Maps.

For more information, click [HERE \(DMI.pdf, Section 2.2.1\)](#).

3.3 Database DMI Export/Import

The Database DMI Import/Export functionality was improved such that importing a DMI modifies the connections to any Datasets and Name Maps that are also imported. This allows you to take an entire Database DMI, Dataset, and Name Map and move it from one model to another and preserve the connections. For more information, click [HERE \(DMI.pdf, Section 5.5\)](#).

3.4 Excel Database DMI supports Table, Periodic and Scalar slots.

The Excel Dataset and Database DMI now allows you to import or export Table, Periodic and Scalar slot values. Previously, only series slots could be imported or exported. With this new functionality, you can use the **Ranges** approach to specify a range or list of cells in Excel to use or you can use the **Headers** approach and configure your Excel sheet in a specific format.

For more information, click [HERE \(DMI.pdf\)](#).

4. Multiple Run Management

4.1 Input DMI Repeat Count

The MRM input DMI was limited to a maximum repeat count of 999. Now the maximum number of input DMI repetitions and number of traces is limited to 99,999.

4.2 Ordering of Slots in an RDF file

The order of slots in a RiverWare Data Format (RDF) output file now matches the order in the output control file.

4.3 Saved Distributed MRM Run Configurations

With distributed MRM, it is possible to save the configuration file RiverWare creates to a named file and then start distributed multiple runs from the configuration file, thus bypassing the RiverWare interface. This is controlled through the optional **Save Distributed Run Configuration As** field in the MRM configuration dialog. For more information, click [HERE \(MRM.pdf, Section 6.1.1.2\)](#).

Configuration files saved with RiverWare 6.9.7 or earlier will not be compatible with RiverWare 7.0. You will need to regenerate the configuration file through the RiverWare interface.

5. Objects

5.1 Reach - Solve Outflow method with Lagged Inflows

On a Reach using the **No Local Inflow, Solve Outflow** method (in the **Local Inflow and Solution Direction** category), it was possible to specify or propagate an Outflow that was inconsistent with the lagged Inflow. Now, this circumstance will result in an error.

5.2 Reservoirs

5.2.1 Dispatch Slots

The Reservoir slots **Evaporation Rate** and **Precipitation Rate** were added to the list of dispatch slots. Now they are linkable and a new value (input, propagated, set by a rule) will trigger the object to redispach, if possible.

5.2.2 Max Outflow Calculation on the Slope Power Reservoir

The max outflow computation iterates to find the Storage in the Slope Power Reservoir. This calculation uses the current outflow as one of the parameters in the computation (in Impulse Response slope storage calculation especially). Previously, it used the values on the **Outflow** slot which came from a previous dispatch. Once the max computation is complete, it sets the **Outflow** slot. Within the rest of the dispatch, it then uses that **Outflow** as the current value in the slope storage calculation. Since this is different, the **Storage**, **Pool Elevation**, and headwater are all different, thus leading to a different max **Turbine Release** and **Spill**.

The code was changed to use the values that are computed within the iteration for the current **Outflow**. In a test model, this does slightly change results. For example, in one test model, the flow on one timestep went from 293.50 (1000cfs) to 293.52 (1000cfs). The pool then changed by 0.0001ft. On the final timestep, the pool was 0.001ft different. They are not significantly different, but these can compound over time as the storage changes.

5.2.3 Reservoir Accounting Methods

The following two Table Series Slot columns were duplicated on separate Series Slots:

- **Est Sed Deposition** - Accumulated Perm Sediment column was duplicated on the **Accumulated Permanent Sediment** slot. This slot is added by the **Total Vol Sed (Post2000)** method in the **Sediment Transport Calculations** category.
- **Rio Grande Pools** - Carryover Content column was duplicated on the **Carryover Content** slot. This slot is added by the **Abiquiu Gain Loss**, **Jemez Gain Loss** or the **Cochiti Gain Loss** methods in the **Reservoir Account Gain Loss** category.

These series of data are duplicated on the individual series slots. The series slots hold the values used in the calculation but the data is also shown in the original table series slot. (This allows any existing output devices to continue working without changes.) In addition, if the value on series slot is not known, but the value on the table series slot is known, the table series slot value is copied to the series slot at the initial timestep and set as an input. This will preserve it for future runs and when aggregating to monthly.

In addition, previously on the **Present Condition** Table Series Slot, the **River Channel Area** and **Barren Area** values were required inputs on the initial timestep for a monthly run. These are now computed from other data. This slot is part of the **Abiquiu Gain Loss**, **Jemez Gain Loss** or the **Cochiti Gain Loss**, **El Vado Gain Loss**, **Nambe Falls Gain Loss**, and **Elephant Butte Gain Loss** (both variations) methods in the **Reservoir Account Gain Loss** category.

5.3 Reach and Reservoir - Coeff and Exponent and Forecast methods

Within the **Coefficient and Exponent** method on the reach (**Generate Local Inflows** category) and reservoirs (**Generated Forecast Hydrology** category), a minimum deterministic inflow was implemented. Now the **Lower Bound** on the **Deterministic Local/Hydrologic Inflow** slot is used as a minimum value in the computation. Any absolute values smaller than the minimum values behave as though the value is zero; that is, the deterministic value is used directly in place of a forecast value. For more information click [HERE \(Objects.pdf, Section 20.1.4.4\)](#) on the reach and [HERE \(Objects.pdf, Section 22.1.10.4\)](#) on the storage reservoir.

5.4 Water User

5.4.1 Soil Moisture Modifications

The Water User soil moisture return flow methods **Proportional Shortage with Soil Moisture** and **Variable Efficiency with Soil Moisture** were modified with a new slot, **Surface Runoff**. In addition, the **Supplement Diversion including Soil Moisture** method in the **Conjunctive Use** category was modified to have an additional slot, **Supplemental Runoff**.

These slots represent water that is applied that is higher than max infiltration rate and runs off directly. If these slots are linked, the corresponding **Return Flow** does NOT include that water as it goes elsewhere. If they are not linked, the **Return Flow** does include that water and these two slots are for informational purposes. This distinction is needed as the quality of this water is different than the water that moves through the soil. For more information on new water quality salinity methods on the water user, click [HERE \(Section 14.2\)](#).

5.4.2 Water User Performance Improvement

The run time performance of the Water User's **SW GW Impulse Response** return flow routing method was improved. In one test model, the run time was reduced by 27%.

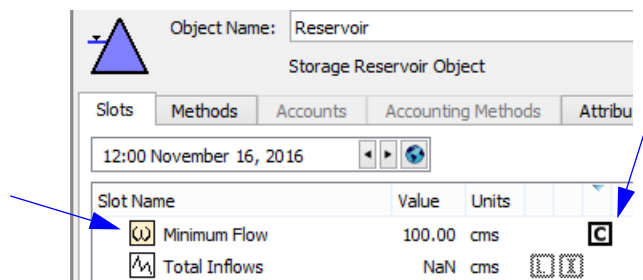
6. Object Dialogs

6.1 Custom Slots on Simulation Objects

You can now create custom slots on any object including Simulation Objects. Previously, custom slots were only allowed on Data Objects. Having custom slots on Simulation objects allows you to locate your custom slots with the object to which they refer. This also makes RPL logic, Scripts, Output Devices, and DMIs much easier. For example, instead of referring to a reservoir's minimum outflow on an accompanying data object, **ReservoirData.MinFlow[]**, you can move the minimum flow custom slot onto the reservoir and refer to it directly: **Reservoir.MinFlow[]**.

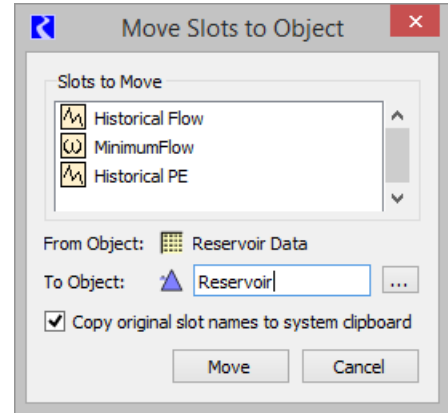
With this enhancement, the Open Object dialog was improved as follows:

- A custom column was added with a **C** icon to indicate a slot is custom. Click on the header to sort and show all custom slots together.
- Custom slots are shown with icons that have a pale yellow background.
- Slot Groups are now allowed on any simulation objects except Aggregate objects.



6.2 Move Slots Utility

- A new **Move Slots** utility was added that allows you to move one or more slots from one object to another. To move slots using the new functionality:
 - Open the object containing the slots that you would like to move
 - Select the slots to be moved.
 - Select the **Move Slots to Object...** menu from the Slots menu or right-click context menu.
 - This will open the **Move Slots to Object** dialog.
 - Select the destination object.
 - Click on the **Move** button.
 - A confirmation dialog is presented; if the action is confirmed and successful, the destination object dialog is opened and the moved slots selected.



7. Optimization

7.1 Negative Hydrologic Inflows

On the Slope Power Reservoir, negative hydrologic inflows are now allowed in optimization.

7.2 Preferred Units

Preferred optimization units were added for the PowerPerFlow unit type: 1 MW/cms.

7.3 Improved Performance for Shrinking Constraints

The efficiency of the internal algorithm for shrinking a constraint to a higher priority constraint with the same left-hand-side was significantly improved. In one large test model, this reduced the overall run time by approximately 25%.

8. Output Devices

8.1 Charts: Video File Animation Generation

Chart animation video files can be generated directly from RiverWare. Basic settings include the frame sampling timestep size, frames per seconds, and format. Four video formats are supported:

- MP4,
- WEBM,
- WMV, and
- animated GIF

In addition, there are advanced settings available for complete customization of the export process.

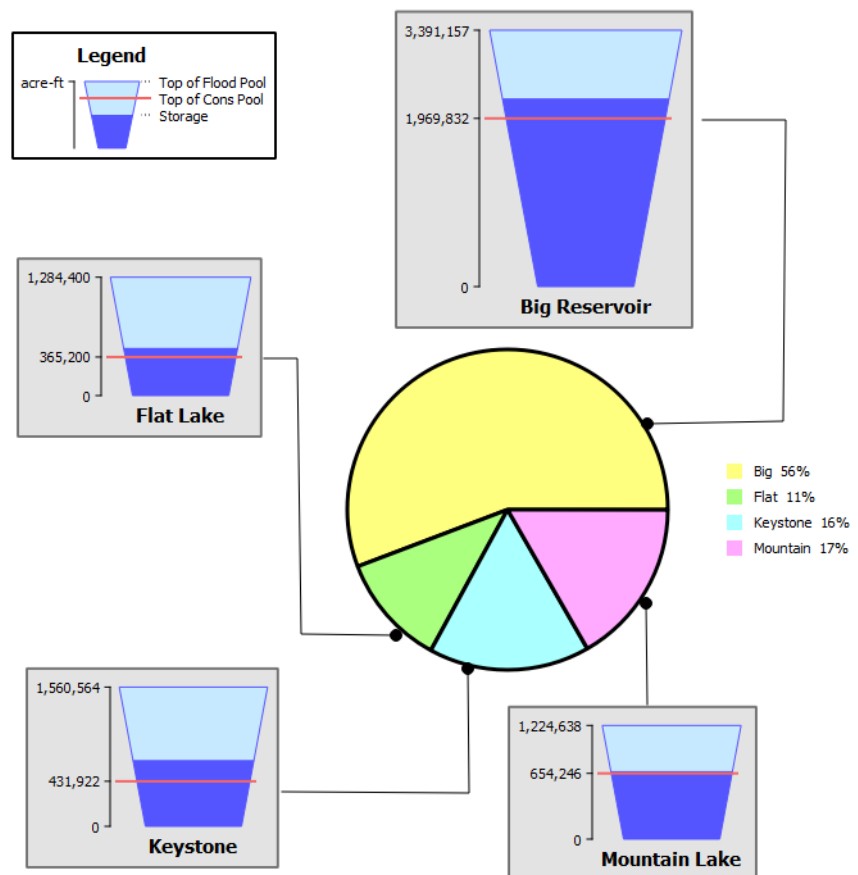
For more information, click [HERE \(Output.pdf, Section 5.5.3\)](#).

8.2 Output Canvas

The Output Canvas, described in [Output.pdf, Section 6](#), allows for visualization of outputs in spatially distributed teacups and flow lines. The following improvements have been added to the Output Canvas:

8.2.1 Canvas Lines

Canvas Lines provide generic lines on the canvas. You can use these for many purposes but were designed to provide pointers to locations on the canvas. You can add end symbols including dots (shown to the right), triangles, and arrow heads. More information is available in [Output.pdf, Section 6.2.3.13](#).



8.2.2 Charts on an Output Canvas

Charts can now be placed on an Output Canvas and will animate at the same time as the canvas. Handles are available for resizing and scaling the selected chart. Geometry fixes to avoid clipping of the chart image due to the chart size specified within the Output Canvas configuration were also implemented. More information is available in [Output.pdf, Section 6.2.3.17](#).

8.2.3 Miscellaneous Enhancements

Following are three miscellaneous enhancements made to the Output Canvas:

- Precision overrides were added for numeric values shown in Teacup, Object Icon, and Text Groups. This setting allows you to control how many digits are shown after the decimal.

- Plain-Text items now allow you to enter multiple lines of text as configured in the editor.
- In Slot Value Text Items, the RPL Priority value can now be shown.

8.3 Plotting

8.3.1 New approach to View and Edit Plot Pages

The Plotting utility was modified to remove the Save approach. Now there is a separate **Plot Page Editor** used to configure the plots and then the **Plot Page** used to view and interact with a plot.

- **Plot Page Editor:** The editor is used to modify the slots shown and the appearance of the plot (colors, line types, markers, etc). New buttons on the left side provide access to add curves and configure the plots. This is shown below on the left.
- **Plot Page:** The **Plot Page** displays the plots and provides interaction with multiple plots. This is shown below on the right.

For more information, click [HERE \(Output.pdf, Section 2\)](#).

The image displays two side-by-side screenshots of the RiverWare software interface, illustrating the new approach to viewing and editing plot pages.

Left Screenshot: Plot Page Editor - Muddy Outflow

- Configuration buttons:** A vertical list of buttons on the left side for configuring the plot, including 'Add Curve', 'Curves', 'Axes', 'Grid', 'Markers', 'Plot Title', 'Background', and 'Legend'.
- Plot Page Name:** The 'Name' field at the top left is labeled 'Muddy Outflow'.
- Layout:** The 'Plot Layout' dropdown is set to '2x1' (rows, columns).
- Plots:** Two plots are shown: 'Muddy Flows' (Flow cfs vs. Date) and 'Muddy Pool' (ft vs. Date). The 'Muddy Flows' plot shows Inflow (green dotted line) and Outflow (black solid line). The 'Muddy Pool' plot shows Pool Elevation (blue solid line) and Flood Control Guide (red solid line).

Right Screenshot: Plot Page - Muddy Outflow

- Select Plot Pages:** A list on the right side allows selecting plot pages, including 'Green Vally Diversions', 'Bartlett', 'Muddy Outflow', and 'Bartlett Outflow'.
- Plots:** The same two plots from the editor are displayed in a view-only mode.
- Interactions:** A 'New...' button at the bottom right is labeled 'Create new or edit this Plot Page'.

In addition, the original plot page dialog (shown to the right), used to select a list of slots to plot, was removed. All configuration is performed in the Plot Page Editor shown in the above left screenshot.



As a result, all snapshot slots can be added directly to a Plot as a unique curve. There is no longer an associated show “Snapshots and Slots” option.

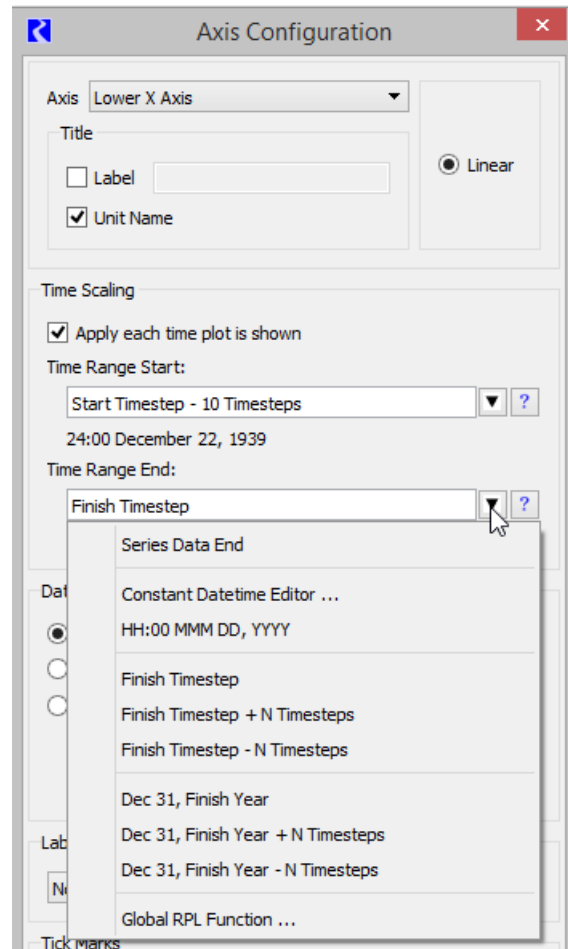
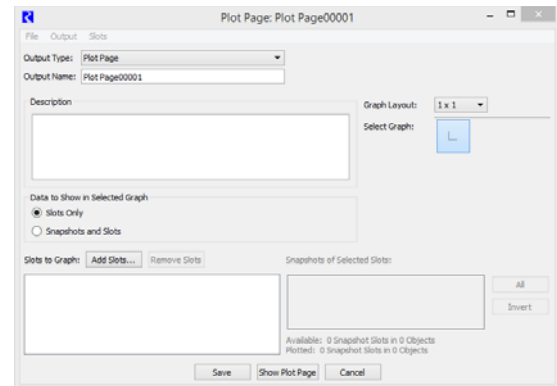
8.3.2 Plotting Scalars

Scalar Slots can now appear in time series plots. Scalars with datetime units are shown as vertical lines. Scalars with any other unit type are shown as horizontal lines.

8.3.3 Time Scaling

The plotting utility now supports a new configurable **Time Scaling** feature for time series plots. This includes the following provisions:

- Time axis configuration options support symbolic dates, for example, Run Start or Finish, plus or minus a specified number of timesteps or basic time units. In addition, any fully specified RPL datetime or global RPL datetime function can be specified. The screenshot to the right shows the axis configuration with time options shown.
- A new time scaling operation (T button, , and Plot menu operation) sets the time range of a graph to the configured datetimes.
- There is an option to automatically apply this configured time scaling to a graph each time the graph is shown.
- The default axis preferences also support this time scaling setting, to be applied to newly created graphs. This replaces a simpler default configuration provision which provided two choices for the initial time range of newly created graphs.
- The **Scale to specified time range** toolbar button (S button, ) now has a shift-click



option. When the button is shift-clicked, all open plot dialogs brought to the front and are synchronized to the specified time range of the clicked plot dialog.

More information is available [HERE \(Output.pdf\)](#)

8.4 Tabular Series Slot Reports - Environment Variables

You can now use environment variables in Tabular Series Slot Report file specifications. For more information, click [HERE \(Output.pdf, Section 3.2.4\)](#).

9. RPL

9.1 RPL Set Comparison Tool

The new **RPL Set Comparison Tool** compares two RPL sets and shows you the differences between the sets. This allows you to see where items are different, what the specific differences are, and allows you to easily access the RPL set dialogs so that you can change one or both sets.

This tool is very useful in the RPL set development processes over time and across multiple developers. It allows the comparison and understanding of development of a RPL set. In addition, it helps assist with merging of changes by providing quick access to the RPL editors and copy/paste functionality.

A screenshot of the tool is shown below. For more information, click [HERE \(RPLUserInterface.pdf, Section 1.7\)](#).

Names and locations of the two sets

Hierarchical view of Results

Name	Priority	Status	Type
BasinFinished		A ≠ B	RBS Ruleset
Name		A ≠ B	Property
Bartlett Rules	1-4	A ≠ B	Policy Group
Bartlett Flood Control	1	B	Rule
Name		B	Property
Description		B	Property
Is Enabled		B	Property
Execution Constraint		B	Property
Pre-execution DMI Name		B	Property
Post-execution DMI Name		B	Property
Stop On NaN		B	Property
Names Color		B	Property
Statements		B	Property
Muddy Res Rules	5-8	A ≠ B	Policy Group
Green Valley Diversions	8	A ≠ B	Rule
Statements		A ≠ B	Property

Selected Property of Set A and Set B with differences highlighted

9.2 RPL Set Name vs Path

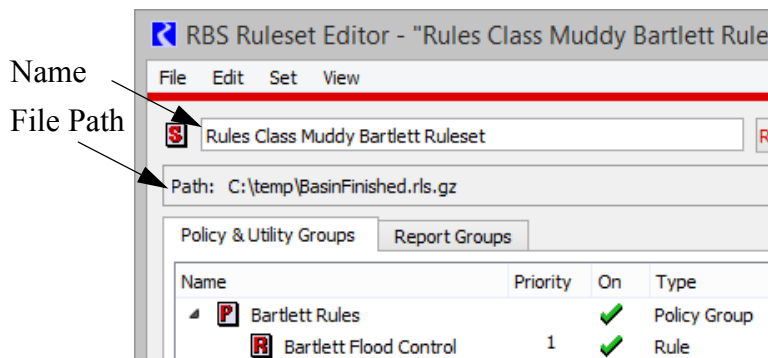
All RPL sets now maintain both a name and a file path (if saved as a separate file).

Previously, these two concepts were intermixed. This allows you additional flexibility as follows:

- Sets saved to a separate file can have a meaningful name that describes the set, like “Operations Ruleset”. The path can then be used strictly as a file name, C:\Operations\OpsSet.v1.2.rls.gz
- Sets saved within the model file have a name that can be used for improved nomenclature. For example an Initialization ruleset could be named “Operations Initialization Set”.

Locations in RiverWare that refer to a set, now uses the set name. For example, in a Model Report, in the **RPL Set** item, you now choose the name of the set, not the path or location.

For more information, click [HERE \(RPLUserInterface.pdf, Section 1.2\)](#).



9.3 RPL Search and Replace Utility

The **RPL Search and Replace** utility, [HERE \(RPLUserInterface.pdf, Section 2.4\)](#), allows you to search for and replace items within a RPL set. The following enhancements were made:

9.3.1 Next / Previous buttons

Buttons were added for advancing forwards or backwards through the search results. These can also be activated using keyboard short cuts:

- **Next Item:** F3
- **Previous Item:** Shift +F3

9.3.2 Scroll To and Select Match

When a match is opened (by double-clicking on that row or by using the next/previous item operation), the relevant dialog is now scrolled so the match is in view and the item is selected.

9.3.3 Expression Slot Descriptions are Searched

Expression slot descriptions are now included in searches when the RPL Expression Slot Functions set is searched and when the **Descriptions** options is checked.

9.4 RPL Editing

9.4.1 Auto-correct of Typed Values

When you double-click on a RPL expression (i.e., on a RPL value or an empty expression in a panel for displaying and editing RPL statements and expressions), a small, in-line editor window is opened at that location, allowing you to type in a value with which to replace the

existing expression. If the value provided is not a valid replacement for the expression, RiverWare now attempts to coerce the input string into one that is valid.

This auto-correction process is guided by the types that can legally replace the existing expression. It tries a series of variations on the specified values, where each variation is an attempt to coerce the input into a different value type. Types are considered in the following order: **DATETIME**, **OBJECT**, **SLOT**, **STRING**, and **LIST**. If a valid auto-correction is found, it is used to replace the existing expression; if not, an error notification is presented, describing the problem with the input.

For example, consider the statement

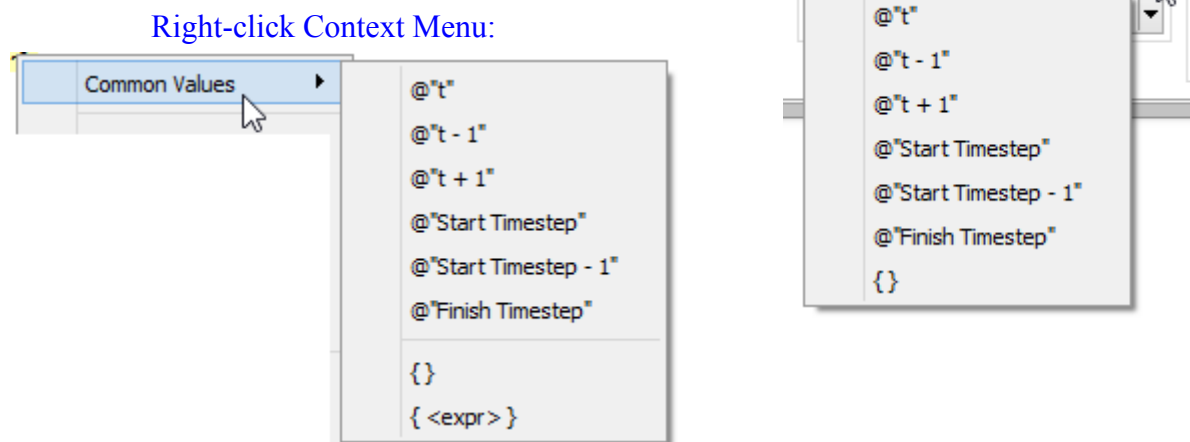
```
WITH (STRING val = <string expr>) DO
  PRINT "value: " CONCAT <expr>
END WITH
```

If the text 't + 1' is entered as the variable value in the With expression, it is interpreted as the String "t + 1" because that is the only legal type for that expression; whereas the same text entered as the right-hand side of the CONCAT expression is interpreted as the DATETIME @"t + 1", because all types are valid in that location and a DATETIME conversion is considered first.

9.4.2 Common Values

Two new operations were added to provide common values when editing RPL expressions.

- A new "Values" button group was added to the palette to support insertion of common values and Flag Values.
- A right-click context menu on any selected RPL expression provides a **Common Values** menu.



9.4.3 Copy and Paste from Variable and Argument Declaration

A RPL variable declaration name can now be copied and pasted into expressions as appropriate.

Within the function editor, you can copy an argument name and paste it into an expression. This works slightly differently. To copy an argument select the argument name by double-clicking on it in the arguments panel, then perform the copy operation using either the right-click context menu or by typing Control + C. You can then paste this argument into an expression in the function using the Control+V keys or right click menus. Note that the Edit->Copy menu does not work to copy the function argument.

9.4.4 Improved History

When you double-click on a literal value or an empty expression, a small, in-line editor window is opened at that location, allowing you to type in a value or select a value from the menu of items previously entered in the frame. Previously, this history menu was sometimes missing entries (especially those that were not a valid value to insert). Now, the history includes all previous entries (except empty strings).

9.4.5 Improved Pasting of Statements with Variables

RPL statements that define a variable (i.e., WITH and FOR statements), now allow better copy and pasting. For example, consider the following logic:

```
WITH (OBJECT res = % "res1") DO
  IF (res & "Inflow" [] == 0.0) THEN
    WITH (NUMERIC flow = 0.0) DO
      PRINT res
    END WITH
  END IF
END WITH
```

Pasting the If statement onto itself previously caused the inner WITH statement to have an validity issue where the reference to “res” within the new Print statement would be reported as invalid. This has been improved so that copy and paste of these types or statements works as expected.

9.4.6 RPL Item Delete Confirmation

Deleting an item from a RPL editor tree view now presents a confirmation dialog.

9.4.7 Stop on NaN for Initialization Rules

The existing **Stop on NaN** property of a rule ([HERE \(RPLUserInterface.pdf, Section 2.1.5\)](#)) allows you to specify that the run should abort instead of having the rule terminate early when a NaN is found in a slot value. This can be used to stop the run when missing data is expected but not found.

If an invalid value (NaN) is encountered while executing an initialization rule with the “Stop on NaN” property enabled (and the RPL debugger is not enabled), the run no longer immediately aborts, but rather posts an error and continues to execute any subsequent

statements in the initialization rule and any subsequent rules in the initialization rules set. After all initialization rules have executed, the run is aborted with the message:

```
Aborting the run because one or more initialization rules with the
"Stop On NaN" property set encountered an invalid value (NaN).
```

If multiple statements access data which are missing, the new behavior allows a single RiverWare run to identify all of these statements. Previously, you would need to resolve the first issue and conduct another run in order to be alerted to the next issue. But, the new behavior can report invalid values that are not in fact independent data issues (i.e., report false negatives), but are rather later rules accessing a value set by an earlier rule that has missing data.

If the RPL Debugger is enabled when an invalid value is encountered by an initialization rule with the "Stop on NaN" property set, RPL execution is paused just before the run is aborted, and the RPL debugger is presented, displaying the error message that is about to be posted.

Note that this represents a change in behavior for existing models, though not for runs that currently complete successfully.

9.5 RPL Predefined Functions - New IntegerWithUnitsToString function

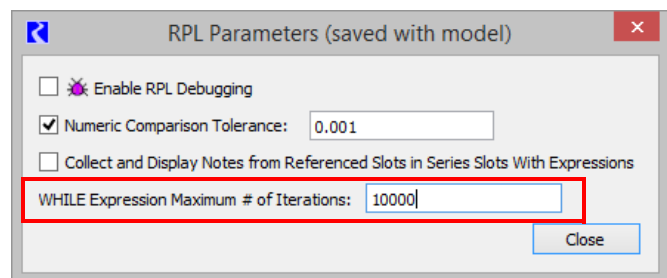
A new RPL Predefined function, IntegerWithUnitsToString, was added. This function allows you to convert the integer portion of a NUMERIC value with the specified units into a string. This provides more flexibility than the existing IntegerToString function that only uses internal units.

For more information on IntegerWithUnitsToString, click [HERE \(RPLPredefinedFunctions.pdf, Section 102\)](#).

9.6 RPL WHILE Expression Maximum Iterations

The RPL **WHILE** expression (added from the palette) is now limited to loop no more than the maximum number of iterations. The maximum iterations is a model specific parameter saved in the RPL Parameters. The default maximum iterations is 10,000 but may be changed using the **Policy** ➔ **RPL Parameters...** menu on the workspace.

If maximum iterations are exceeded, the run is aborted. Click [HERE \(RPLTypesPalette.pdf, Section 2.6\)](#) for more information on the **WHILE** expression.



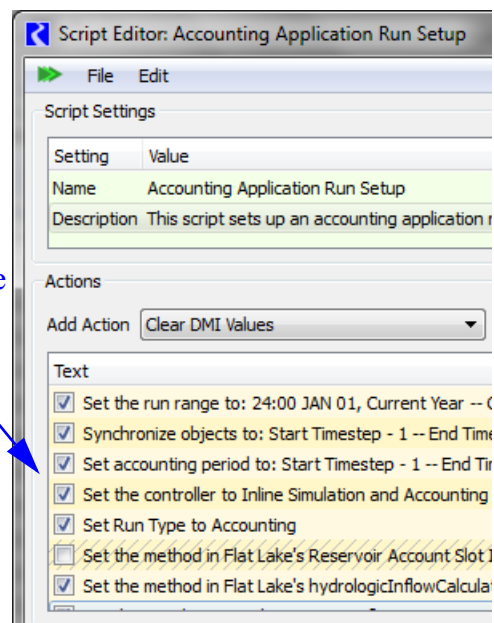
10. Script Management

10.1 Disabling Actions

Previously, actions could be disabled (omitted from script execution) in the **Script Dashboard**. When reopened or if changes were applied from the **Script Editor**, all action checkboxes were turned back on.

Now, action enabledness can also be controlled in the **Script Editor** with checkboxes now appearing with each action item. Action enabledness is now part of the script configuration, and persists when applied from the **Script Editor** and if the model is saved to a model file.

Disable/Enable
Action
Checkboxes



10.2 New Action Types

Following are new action types added to the Script Manager:

- **Enable Dispatching:** Enable or disable dispatching of the specified set of objects.
More information is available [HERE \(ScriptManagement.pdf, Section 3.3.9\)](#).
- **Evaluate Expression Slots:** Evaluate one or more specified Expression Slots.
More information is available [HERE \(ScriptManagement.pdf, Section 3.3.12\)](#).
- **Open Object:** Open the dialog for the specified object(s).
More information is available [HERE \(ScriptManagement.pdf, Section 3.3.21\)](#)

10.3 Set Slot Value Actions

10.3.1 Setting DateTime values

All three slot-setting action types, when used to assign values to DATETIME slots now allow the specification of symbolic DATETIMES, including the name of a Global RPL Function returning a DATETIME value. This applies to these three script action types:

- Set Scalar Slot Value
- Set Series Slot Values
- Set Table Slot Value

10.3.2 Initial/Default Value

The slot value setting for those same three slot-setting Script Action types is now initially NaN, and can be set to NaN. This is supported in both the Script Editor and Script Dashboard.

10.4 Show Dialog Settings

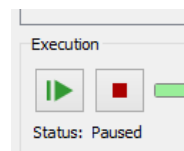
These four existing Script Actions now have a **Show Dialog (Yes/No)** setting:

- Load Goal Set
- Load Ruleset
- Open Global Functions Set
- Replace Initialization Rules Set from File

When this setting is “Yes”, the set dialog for the relevant RPL Set is shown after opening the set.

10.5 Improved status and execution buttons

In both the **Script Editor** and **Script Dashboard**, the icon of the **Play** button changes to a **Resume** icon when the script is paused (e.g. in a Memo script action which has paused script execution).



When the **Script Memo** dialog is closed, the main dialog from which the script execution was started is shown, and raised to the top. This indicates that you should control execution of script from that dialog.

10.6 Improved Navigation

Both the **Script Editor** and **Script Dashboard** action items support new context menus (right-click) to allow you to directly open the dialog for these various objects types (e.g. slots) referred to within the action's configuration settings.

In addition, in the Script Editor, an adjustable “Splitter” was added between the Actions panel and the Selected Action Settings panel.

10.7 Removal of Obsolete Settings

A number of unnecessary or obsolete script action settings were removed. When you first load you model in 7.0, you may see diagnostics indicating these settings were removed. Once saved in 7.0, the messages will on longer be posted.

11. SCT

11.1 Column Width

The SCT now preserves the per-sheet column width specifications for the two relevant SCT row header columns: Slot Label and Slot Units. These are now preserved.

In addition, the scroll position is maintained when switching sheets.

12. Slots

12.1 Custom Slots on any Object

You can now create custom slots on any object including Simulation Objects. Previously, custom slots were only allowed on Data Objects. See [HERE \(Section 6.1\)](#) for more information on changes to the interface when viewing custom slots. In addition, the **Slot Selector** now has a filter called **Is Custom** to allow you to filter by custom slots.

13. Units

13.1 Unit Schemes and Slot Copy Paste

When slots are copied and pasted, the Unit Scheme exceptions are also updated accordingly so that the display attributes of the new slots match those of the original slots.

14. Water Quality

14.1 Pipe Junction

A new **Pipe Junction Water Quality** category was added. In the **Propagate Salt** method, the Pipe Junction methods behave like the confluence object in that it sums salt mass: **Flow 1 Salt Mass + Flow 2 Salt Mass = Flow 3 Salt Mass**. Salt concentrations are a flow weighted average. For more information, see [HERE \(WaterQuality.pdf, Section 14.1.1.2\)](#).

14.2 Water User

On the Water User, two methods were implemented for the new **Salt Storage** category:

- **Soil Moisture Salt Storage** ([WaterQuality.pdf, Section 18.1.2.2](#))
- **Soil Moisture Salt Storage with Supplemental Flow** ([WaterQuality.pdf, Section 18.1.2.3](#))

These methods model the diversion and return flow salt mass and concentration including the storage of salt mass in the soil moisture volume. They are the same except the latter also computes supplemental flow salt and adds it into the salt mass balance.

15. Workspace

15.1 Tool Tips

Tooltips were added or improved on most of the toolbar and other buttons on the Workspace, the SCT, and the Run Control.

Release Notes Version 7.0

16. Closed Bug Reports

The following bugs have been closed since the last major release(6.9). For more information on any bug, see the CADSWES website. The bugs are listed in order by bug number:

Num	Synopsis
3976	RPL Palette needs common timestep buttons or new functions
5478	Cant configure columns individually for Auto Max Turbine Q table
5488	Importing tables and periodic slots with Excel DMI
5516	Likely memory corruption with repeated rules runs
5529	User defined reach account slot inflow method not refiring after dependents change
5535	RiverWare gets confused between similar Rule names
5549	Program unexpectedly shut down
5561	Distributed run MRM using different trace than normal MRM
5565	Non visible input slots are propagating values
5570	Output in accounting slots not cleared at run time if they are after the run end date
5571	Core dump from cut/copy/paste of RPL
5572	Copy paste into a WITH statement makes a rule invalid
5604	RPL copy paste with break points causes assertion failure
5610	Copying a DMI Database. The copy is connected to the copied.
5617	RiverWare crashes - on RBS with diagnostics turned on
5624	Warning Statement causes assertion error when showing statements in set editor
5627	Plot Auto-scale Scales to hidden slots
5635	Model crash if initialized and then run
5649	Crash opening dataset dialog on modified dataset
5653	IntegerToString does not deal well with units
5654	Export Import of Database DMIs do not change references to datasets and namemaps.
5659	6.7 skipping breakpoints
5677	Begin accrual date change on timestep change
5691	Storage being calculated as negative in groundwater objects in RW 6.7.3
5693	File chooser for workspace object export gives the current directory as the suggested file name
5698	RPL search and replace dialog has a couple of minor issues
5710	Unable to create supply between Aggregate Water User and Reservoir Passthrough
5716	Geospatial view config dialog pops up error dialog when no background image path

Num	Synopsis
5720	crash when linking a diversion object passthrough account to a reservoir storage account
5722	Locked SCT fails to open as locked
5725	Unexpected ruleset behavior
5733	Plot Zoom/Pan broken in plots having only Periodic Slots and Empty Series Slots
5737	Plotting: Step curves are clipped misleadingly at edge of plot
5738	Mass Balance Slots: Possible crash deleting multiple slots.
5739	MRM with Ensembles from HDB does not work with Version 6.8
5740	Open Account dialog Value column weirdly aligned
5741	Evaporation and Precipitation Volume not calculating if Pool Elevation and Outflow are inputs
5742	MRM Concurrent Run Trace and DMI Repeat Mismatch
5743	RiverWare can't find the help if RiverWare is started from a different directory
5744	Can't add RPL Utility Group when a Policy Group Item is selected
5747	Copy/move of mass balance summary slot retains reference to original slot
5748	Periodic Slot Plot Labels Changing Back to Default
5750	Pressing "Stop" in the debugger does not disable the "Stop" Button
5751	Opt goal processing takes significantly longer on some goals with no apparent reason
5752	Copy and paste of a slot does not copy description or notes
5753	Infinite RPL 'While' loop decrementing date/time generates error and locks up.
5754	The order of slots in .rdf output does not match order in output control file
5755	Reservoir Segmented 2 Layer Salt method gives no error message for missing initial Bank Storage Salt Conc
5756	Excessive memory issues formulating a goal
5757	Name Maps don't work for all columns of Aggregate Series slot
5758	DSS server doesn't handle errors well
5759	Accounting View not showing cross hatching the same at certain zoom levels
5760	Closing an Open Account dialog using the red X is not the same as using the Close button
5762	Tabular Series Slot Report configuration erased when model saved with configuration open
5765	Some (seemingly) random slots are not saved to rdf files for different scenarios.
5766	Environment variables do not work in Tabular Series Slot Reports
5767	Generating Tabular Series Slot Report as a Script action using ExecuteScript RCL command causes error
5768	Plot Y axis bounds do not persist if plot has no data
5769	DMI import sluggish when DMIs are executed via a script action with SCTs open
5770	RPL Search and Replace deletes "Search for:" when changing the search location
5771	RPL Search and Replace reverts "case" if search performed
5772	DMI import of data onto expression slot should not be permissible
5773	No preferred opt units for PowerPerFlow
5774	Compute aggregate routing coefficients on control point without variable routing upstream not resulting in an error

Closed Bug Reports

5775

Num	Synopsis
5775	Account displays are overlapping in new release
5776	Replacing Initialization Ruleset from a file can cause a crash
5777	bug in Save Model script function
5778	Geospatial view is blank and there is no way to recover it
5779	Supply Links no longer show up in Accounting View
5782	Receiving error message "cwMessageMgr Invalid message identifier: 701" during script execution
5783	Reach No Local Inflow Solve Outflow does not always maintain mass balance
5784	Crash closing and loading large model file
5785	RCL Diagnostic Logs lost when window resizes
5786	Timestep error when switching from daily to monthly timestep.
5787	Diagnostics "copy message line" doesn't always work
5788	Loading a model twice fails on the second load
5789	Inflow Stage Table Look Up won't work with linked Tailwater Base Elevation
5790	Synchronizing a multi-slot before the subslot
5791	Model run fails at high flows and Max Outflow Flag at Kentucky
5793	Printing SCT Slot Selection: Detail Rows for the Last Selected Slot are Omitted
5794	RPL Reopen 'Recent Directory' menus mistakenly include environment symbol name
5795	Hourly Model:Failed interpolation with Cheatham EV table using Storage/PlantPowerTable
5796	Ampersand (&) in Script name results in error upon import into model from a saved script file
5797	Internal Error dialog hidden by Run Aborted dialog Cannot close any dialogs
5798	Unit Generator Power reports internal error when Generators Available slot not populated
5799	RPL Policy can be enabled or disabled within a run
5800	Accounting slots aggregated incorrectly
5802	Chart timestep slider does not scale properly when timestep is different from model timestep
5803	Links remain to slots that are no longer in use after changing methods on a reach object
5804	Crash adding Utility Group to Global Functions Set
5805	Assignment of a FullDateTime to a slot is made incorrectly
5807	Mass Balance slot values not always correct when combining flow and volume slots
5808	Mass Balance Summary slot flow units always default to cfs instead of unit scheme rule
5809	Importing doesn't overwrite existing rules.
5810	Can't export or copy and paste report groups.
5811	RPL set editor is not deleted / "show statements" setting not saved reliably
5812	Edit Links dialog does not allow link creation
5814	Applying slot filter to all objects can add slots to filter list that do not exist on other objects
5815	Crash starting model run
5816	Exceptions for unit type NONE do not get applied correctly

Num	Synopsis
5818	Model Report stripped of contents after save and reload of model
5819	RPL "Common Values" menu is disabled when it shouldn't be
5821	Set Dimensions for a Table Slot does not resize the table immediately
5822	Delete Column from a Table Slot does not present a confirmation dialog
5823	Expression Slots always reduce the evaluation range by one timestep
5824	RiverWare crashes when opening function from RPL Analysis, deleting that function, and then saving the ruleset
5825	RiverWare stopped working when using RPL Set Comparison Tool
5827	Series Slot Notes bookmarks are repeating entries when notes column is shown
5828	In the Excel Dataset dialog, both radio buttons can be disabled
5829	Water Right Solver crash
5830	Script Set Scalar Slot Value action does not always use the default value
5832	Adding an empty Periodic Slot as the first slot in an empty plot fails an assertion.
5833	Changing grid line color in plot preferences results in no grid lines until RiverWare is restarted
5834	Excel DMI with 2 column table crashes
5835	Memory leak when a RootSelection is created from text
5836	Plotting - Show Curve Tool Tips menu is not functional
5838	Changing type of WITH variable crashes, QT5?
5840	When the Water Rights Solver aborts, there is a long delay before the interface is usable
5842	RPL Set Comparison Read Set from Model always reads in RBS Ruleset
5843	Plot Editor/Viewer: Hide curve, legend button synchronization problem
5844	Plot shift-click on scale to time range does not bring all plots to front
5845	Accounting slot flag set to input
5846	Plot Membership selection
5847	plot editor legend area height is too small to show text when scrolling is required
5848	Evaluation of scalar slot expression fails unnecessarily when it involves a symbolic date/time
5849	Excel DMI can leave TableSlot in broken state
5850	Crash when re-running a water rights accounting model after an abort
5851	Crash opening series slot w/ expression RPL set
5852	Reach Object with Time Lag routing method doesn't solve following script clearing of inputs
5854	Turning on Dispatch Management Slot diagnostics leads to crash
5855	Periodic Table Slot dialog has Delete Column menu enabled when no are columns selected