



## Technical Documentation Version 7.2

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# Release Notes

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Center for Advanced Decision Support for  
Water and Environmental Systems (CADSWES)

UNIVERSITY OF COLORADO **BOULDER**

This document describes new features, enhancements, and changes included in RiverWare<sup>™</sup> Version 7.2. These changes are new to the executable since the release of RiverWare<sup>™</sup> Version 7.1 on Jul 12, 2017.

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# Release Notes Version 7.2

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# Release Notes Version 7.2

This document describes new features, enhancements, and changes in RiverWare Version 7.2.

## 1. Special Attention Notes

Following are special attention notes, indicating that functionality has changed that requires you to update models, that results may differ, or you might get a warning message when you first load a model in 7.2:

- **Save Precision:** When saving model files, there is no longer an option to save with “extended precision” or regular precision. Instead, now **input** values are always saved with full precision (17 digits) while **output** values are saved with a user specified precision. Because saving full precision of input values will increase model size, you may want to decrease the precision of saved output values. This will allow you to offset model size growth as desired. The **Confirm Save Model** dialog gives you an indication of the uncompressed size of series data as you change the output precision.
- **Groundwater Solution:** The Head Based Groundwater solution was modified to prevent negative storage. The new application of **Percolation**, **Evaporation** and **Evapotranspiration** are always applied and thus, could result in model differences for models that previously produced negative Groundwater Storage values.
- **Inline Power Pre-simulation Dispatching:** The **Inline Power Plant** is now able to dispatch before the start of the run. As a result, if your model has pre-simulation inputs, you may need to clear those out to prevent an over determination error.
- **Obsolete Optimization Categories:** The unused **Optimization WU Request Category** and the **Aggregate Optimization Requests** category were removed from the Water User and from the Agg Diversion Site, respectively. Warning messages are posted when a model is first loaded in 7.2.
- **Three Dimensional Table Interpolation changes:** Within three dimensional table interpolation, the “convex hull” test was loosened. But if the test fails, it is now a fatal error. This could cause existing models to abort when previously they did not. If an abort occurs, modify your 3 dimensional table by editing or adding data points.
- **CompletePartialDate with Offset:** Previously, the **CompletePartialDate** RPL Predefined Function could return an incorrect value when the reference date had an offset. For example: `CompletePartialDate(@“October 1”, @“t + 1 year”)` This problem (Issue #6038) has been corrected, but the change could lead to model differences in models that use an offset within the **CompletePartialDate** function.

If you have any questions, please contact [RiverWare-Support@Colorado.edu](mailto:RiverWare-Support@Colorado.edu).

## 2. Data Management Interface

### 2.1 DSS Database DMI Reliability

The DSS Database DMI was modified to improve processing of large data sets. Previously, a timeout could occur unexpectedly. This change makes the DSS DMI more reliable and robust.

### 2.2 Database DMI On/Off States

The Database DMI on/off status was improved as follows:

- Turning off a dataset causes its slot selections to be shown as off.
- Turning off all slot selections causes the dataset to be shown as off.
- The dataset is shown as a tristate (on, off, partially on) based on the state of its slot selections.

In addition, the on/off state is preserved in the model file when saved.

More information can be found [HERE \(DMI.pdf, Section 5.2.2.4\)](#).

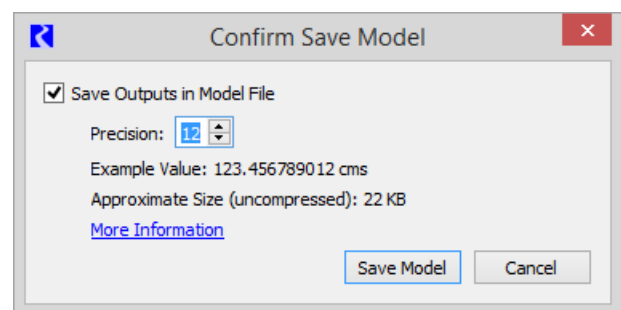
### 2.3 HDB Database DMI Importing Series Slot Notes

The HDB Database DMI was modified to ignore certain exceptions when importing metadata as Series Slot Notes. In addition, the utility now better recognizes missing metadata information.

## 3. Model Files

### 3.1 Precision of Values Saved in Model files

When saving model files, there is no longer an option to save with “extended precision” or regular precision. Instead, now **input** values are always saved with full precision (17 digits) while **output** values are saved with a user specified precision. Because saving full precision of input values will increase model size, you may want to decrease the precision of saved output values. This will allow you to offset model size growth as desired. The **Confirm Save Model** dialog gives you an indication of the uncompressed size of series data as you change the output precision.



Following are details of this change:

- Non-series data (e.g scalars, tables, etc) are always saved with full precision.
- Series values with the I, Z, or i flag are always saved with full precision.
- Series values with the O, R or other flags are saved with the user specified precision. The image above shows the configuration dialog.

- Slot value editors display a maximum of 15 digits.
- Optimization models no longer require “Extended Precision” as input values are always saved with maximum precision.

For more information, click [HERE \(ModelFiles.pdf, Section 4\)](#).

## 4. Objects

### 4.1 Distribution Canal: Request Routing

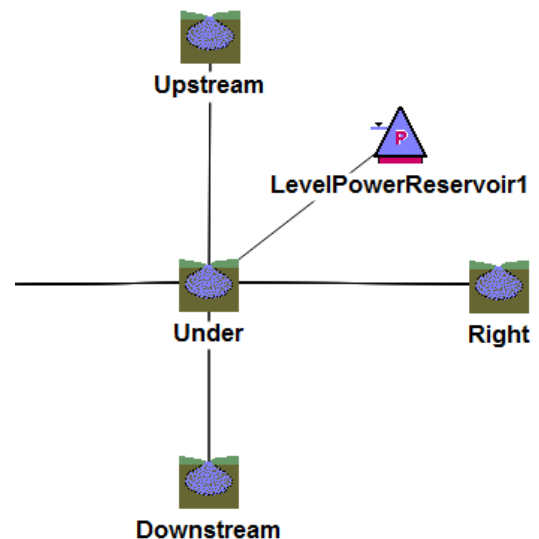
The Distribution Canal now allows a monthly model to propagate requests if the lag is set to zero.

### 4.2 Groundwater

#### 4.2.1 Linking to a Reservoir

A new solution type was added to model the interaction between a Reservoir and the groundwater beneath the reservoir. This “under reservoir” Groundwater object propagates the elevation and flows, but does not track storage. On the Groundwater object, select the new **Head Based Boundary Condition** method in the **Solution Type** category. Then link previous elevations and flow slots. The Groundwater object can then be linked to other Groundwater objects that use the **Head Based Groundwater Grid** method in the **Solution Type** category.

More information can be found [HERE \(Objects.pdf, Section 14.1.1.3\)](#).



#### 4.2.2 Preventing Negative Storage

For Groundwater objects with a Solution Type of **Head Based Groundwater Grid**, the calculation of **Storage** was revised to prevent negative values. The calculation of **Percolation**, **Evaporation** and **Evapotranspiration** are now limited so that they will not cause **Storage** to be negative. Additionally, a new set of slots called **Flow Factor Upstream/Downstream/Left/Right** can optionally be linked to the corresponding **Flow Factor** slot on adjacent Groundwater objects. The **Flow Factor** slots, when linked, compute and limit the lateral flows from one Groundwater object to another when **Storage** is close to zero.

The new application of **Percolation**, **Evaporation** and **Evapotranspiration** are always applied and thus, **could result in model differences** for models that previously produced negative Groundwater Storage values.

Details about how **Storage** is calculated on Groundwater objects with the **Head Based Groundwater Grid** solution can be found [HERE \(Objects.pdf, Section 14.2.2\)](#).

### 4.2.3 Specified Inflows

The Groundwater object was enhanced to allow a **Specified Inflow**. This unengaged flow can be used to add or remove a series of inflows (can be specified as periodic data) to the Groundwater object. More information is available [HERE \(Objects.pdf, Section 14.1.1.2\)](#).

In addition, water quality salinity slots were added to model the addition or subtraction of salt via these flows. Documentation is available [HERE \(WaterQuality.pdf, Section 13.2.1.2.4\)](#).

## 4.3 Inline Power

### 4.3.1 Pre-simulation Dispatching

The **Inline Power Plant** is now able to dispatch before the start of the run. As a result, if your model has pre-simulation inputs, you may need to clear those out to prevent an over determination error.

In addition, the computational subbasin **Initialize flow slots for Routing** was changed to now look downstream through the Inline Power object. Previously, it stopped at this object. Finally, the **Outflow** slot is no longer backcasted, but the Inflow slot will be backcasted if it is not linked.

### 4.3.2 Specify Units Generating: Unit Turbine Release is Now Included

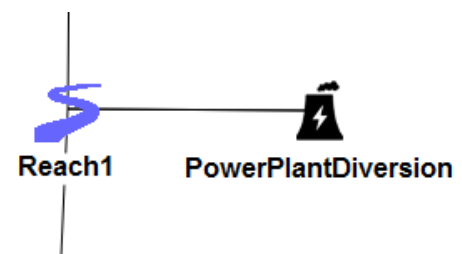
When the **Specify Units Generating** method was originally implemented for RiverWare 7.1, it only included **Generation Capacity**; the **Power** calculation was independent of **Turbine Release**. Now **Unit Turbine Capacity** has been added to the **Unit Capacity** slot, and you can optionally input the **Unit Turbine Capacity**. Also a new **Unit Turbine Release** slot was added which can be optionally input. If you do not input **Unit Turbine Release**, it is calculated by the method by multiplying the **Unit Turbine Capacity** by the **Unit Generation Fraction**. The method also now sets the total plant **Turbine Release**.

As part of this enhancement, the **Unit Capacity** table slot was converted from a 1xN slot with one column for each unit's generation capacity to a Nx2 table with a row for each unit. The first column is now **Unit Turbine Capacity** (flow), and the second column is now **Unit Generation Capacity** (power). If this method was previously implemented in a model using RiverWare 7.1, it will be necessary to repopulate the **Unit Capacity** slot with data the first time the model is loaded in the new version of RiverWare.

See [HERE \(Objects.pdf, Section 15.1.2.3\)](#) for more information.

## 4.4 Power Plant Diversion and Generator Object

A new aggregate object was added: the **Power Plant Diversion**, and its **Generator** elements. Often these are used to model the diversions and depletions required for power plant cooling. This object will divert from a reach, reservoir or aggregate distribution canal to meet the requests. Diversion and depletion requests are computed by one or more linked **Generator** element objects. User selectable methods compute





the required diversion and depletion based on generator characteristics. More information on the **Power Plant Diversion** can be found [HERE \(Power Plant Diversion\)](#) while information on the **Generator** can be found [HERE \(Generator\)](#).

## 4.5 Reservoirs

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### 4.5.1 Linking to Groundwater

A new solution type was added to model the interaction between a Reservoir and the groundwater beneath the reservoir. This “under reservoir” groundwater object propagates the elevation and flows, but does not track storage.

More information on the new **Linked Seepage** method and linking to a Groundwater object can be found [HERE \(Section 4.2.1\)](#).

### 4.5.2 Diversion Power

New categories were added to the reservoirs that enable you to model power produced through the **Diversion** slot. Three new categories were added to the Reservoirs. Each has a default method of None and one new non-default method:

- Diversion Power: **Diversion Power Efficiency Curve**
- Diversion Tailwater: **Diversion Base Value Plus Lookup**
- Diversion Power Bypass: **Diversion Power Bypass Capacity Table**

See [HERE \(Objects.pdf, Section 17.1.27\)](#) for more information.

### 4.5.3 Max Iterations - Default Value

The **Max Iterations** slot on a Reservoir previously had a default value of 20. It is common for iterative solutions to require more than 20 iterations, so the value has been increased to 100. This will not affect existing models. It will only affect new Reservoir objects. Corresponding warning messages were also adjusted. Previously a warning was issued if the slot value was greater than 100. Now the warning is only issued if the slot value is greater than 1000.

## 4.6 Water User

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### 4.6.1 Dispatch Slots

On the Water User, the **Return Flow Salt Mass** was added as a linkable dispatch slot. This slot should be linked for certain salinity modeling approaches, described [HERE \(WaterQuality.pdf, Section 18.1.1.2\)](#).

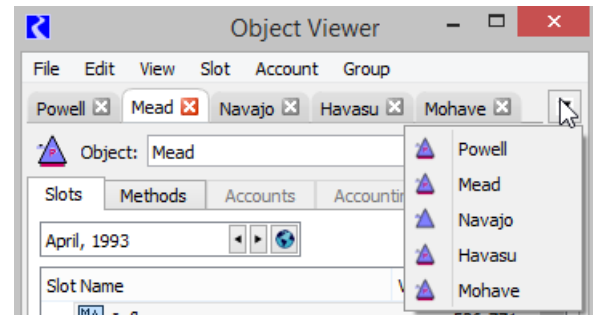
### 4.6.2 Removal of Unused Optimization Categories

The unused **Optimization WU Request Category** and the **Aggregate Optimization Requests** category were removed from the Water User and from the Agg Diversion Site, respectively. Warning messages are posted when a model is first loaded in 7.2.

## 5. Object Dialogs

### 5.1 Object Viewer

The **Object Viewer** now persists within a RiverWare session. You can close the **Object Viewer**, and when you re-open it, the objects will still be there. Use the **Object Viewer** button in the lower right of the workspace to re-show the viewer.



In addition, closing an Open Object dialog or the Object Viewer no longer also closes member Slot dialogs but instead gives you the option to close the slots.

More information, see [HERE \(ObjectDialogs.pdf, Section 1\)](#).

### 5.2 Custom Slots on Element Objects

You can now add custom slots on to an element of an aggregate object. For example, you can create an expression slot on a Reach element of an Aggregate Reach object.

## 6. Optimization

### 6.1 Summation Satisfaction Scaling - Numerical Stability Improvement

For Summation derived objectives, the internal scaling was improved for satisfaction variables, reward variables (if using a Reward Table), and objective function coefficients. This results in better freezing of constraints by reducing the number of constraints with dual prices close to the freezing tolerance and improves numeric stability. In some models, this corrects cases of infeasible solutions and reduces solution time. In some optimization models, this could contribute to different results due to a different set of constraints getting frozen.

### 6.2 Single Derived Objective per Goal

Previously, you were not prevented from including multiple derived objectives (Soft Constraint Sets) in a single goal; however, when this was the case, the resulting derived objectives could have unexpected behavior, and the solution could be incorrect. Now each priority is limited to solving only a single derived objective. If it tries to solve a second derived objective at the same priority, the run will abort with an error message. Any models that currently solve multiple derived objectives in the same goal should be revised so that each derived objective is in its own goal.

### **6.3 Incompatible Units in Constraints and Objectives**

Previously, it was possible to write constraints or objectives with incompatible unit types, and they were not flagged as an error. For example, comparing units of Flow and Volume:

```
ADD CONSTRAINT Res.Outflow[t] <= 100 Acre-Feet
```

This has been corrected by adding a check when the constraint or objective is evaluated (fix to Issue #5906). Now when such cases are encountered, the run will abort with an appropriate error message about incompatible units. This will affect existing models if they currently include constraints or objectives with incompatible units. These constraints and objectives should be corrected to use the appropriate units.

### **6.4 New Message for Skipped Goals**

In some cases a goal is effectively skipped (does not solve the optimization problem) because all constraints that would be added by the goal shrink to constraints that are already frozen. Now in these cases, a new green diagnostic message will be issued stating that this has occurred (fix to Issue #5196).

### **6.5 Simplified Objective for Seed-postponed Problem**

When using a seed to skip the solution of initial goals, the first problem solved involves all of the constraints that were skipped and previously used an objective that was the weighted sum of all of the individual goal objectives. For reasons of numerical stability, the objective now uses equal weighting for all of the individual goal objectives (i.e. a weight of 1.0 for all goals). With this change, two Optimization parameters in the Seed Parameters category were removed because they are no longer used:

- POSTPONED PROBLEM OBJECTIVE METHOD
- SEED MAX OBJECTIVE WEIGHT

Existing models that contain a non-default value for one of these parameters will issue a warning message when they are loaded in 7.2. The parameters will be removed from the model once it is saved in 7.2.

### **6.6 POSAT Display Improved**

In the Priority-oriented Optimization Solution Analysis Tool (POSAT), the three different categories of frozen constraints (New Constraints, Prior Constraints, Physical Constraints) are now displayed on separate tabs in order to make it easier to view lists of multiple frozen constraints. Previously they were three panels on the same tab. See [HERE \(Optimization.pdf, Section 7.1\)](#).

### **6.7 Save CPLEX Problems Selectively**

Previously if you wanted to save the CPLEX problems or CPLEX minimax subproblems from an Optimization run, you had to select that option in Optimization Run Parameters before the start of the run, and the problems for all priorities were saved. This could slow down the run significantly. Now the Save CPLEX Problems parameters are available during the run (this

fixes Issue #933), which makes it possible to selectively save CPLEX problems and thus reduce the time required. For example, to see the problems associated with only a single goal, you could start a run, pause before the goal of interest, check the box to Save CPLEX Problems, continue and execute the goal, then pause and uncheck the box and continue the run.

## 7. Output Devices

### **7.1 Model Reports - Slot Selections Support Wildcards**

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Model Reports provide a way to export information about a RiverWare model or run results to an HTML file. See [HERE \(Output.pdf, Section 4\)](#) for information about this report item.

Many of the items that allow selection of objects, slots, or accounts were modified to allow wild-carding within the selection.

The following model report item types were modified:

- Slot Value Table
- Account Table
- Supply Table

This change only impacts editing of new script actions and new model report items; the behavior of existing model report items is unaffected.

### **7.2 Output Canvas - Flow Lines and Canvas Lines Shown on Workspace**

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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:

## Output

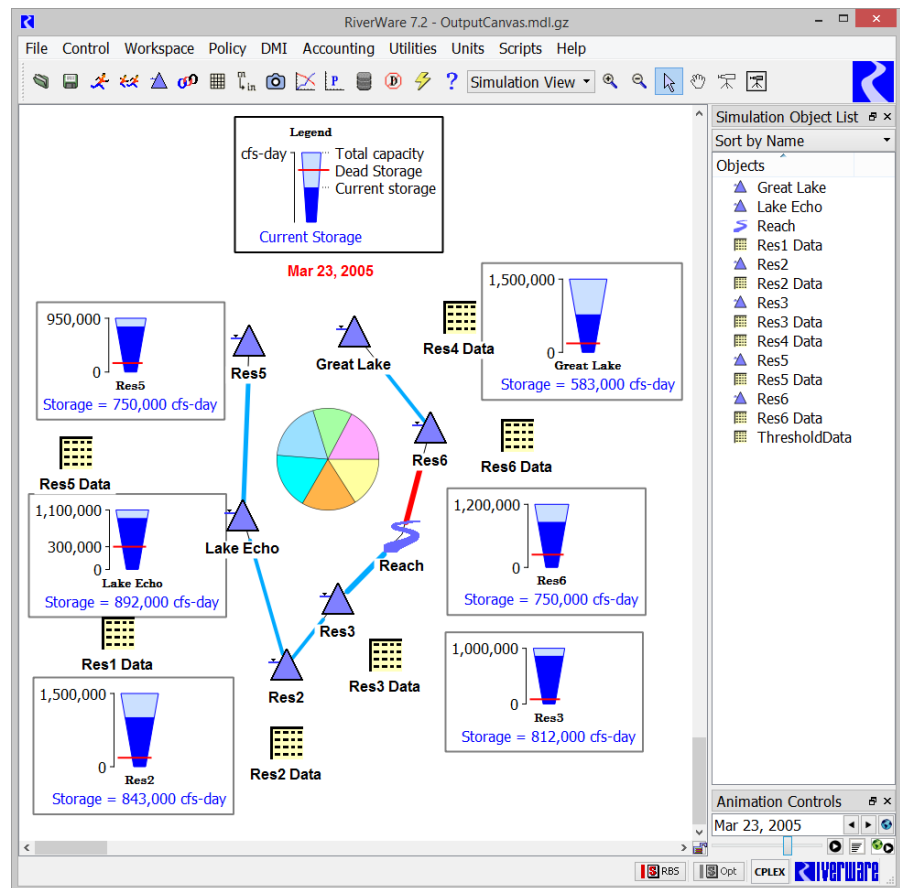
### RDF Files - Improved Performance

In RiverWare 7.1, settings were added to the Output Canvas to optionally show teacups, charts, and text on the geospatial and simulation views. In 7.2, now you can also see Canvas Lines and Flow Lines on the workspace views.

Models previously saved that displayed output canvas items on the workspace may look different when opened. Now, the workspace will automatically display Canvas Lines and Flow Lines from that canvas as well.

For more information, click

[HERE \(Output.pdf, Section 6.7\)](#).



### 7.3 RDF Files - Improved Performance

Performance was improved when writing RDF output through MRM outputs, RDF File Output devices, and Excel Output devices. There is a reasonable improvement when writing to a local disk and a significant improvement when writing to network locations.

## 8. RiverWISE

A new application called the **RiverWare Interactive Scenario Explorer (RiverWISE)** is now available. **RiverWISE** will allow stakeholders to view an exported version of a RiverWare model and to explore alternative scenarios within constraints specified by the model developer. Documentation is available [HERE \(RiverWISE.pdf, Section 1\)](#).

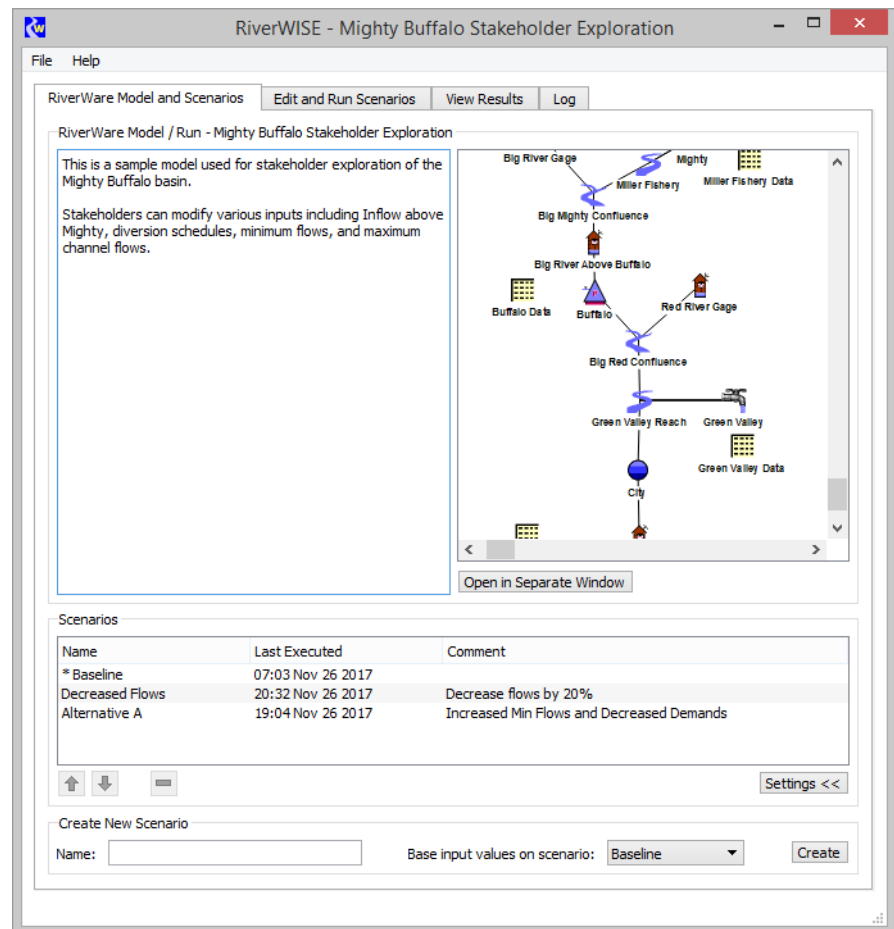


A typical scenario exploration process consists of activities involving a **model developer** and a **stakeholder**. The process begins within RiverWare, with a model developer exporting a RiverWISE file that contains a model description, results from a baseline run of that model, a list of the slots whose values will be visible from within RiverWISE, and a list of the slots whose values can be changed from within RiverWISE. The developer provides the RiverWISE file to a stakeholder.

The stakeholder must download and install RiverWISE and obtain a free RiverWISE license, which is available on the RiverWare.org website (site coming soon). Once the stakeholder has opened the RiverWISE file, she can

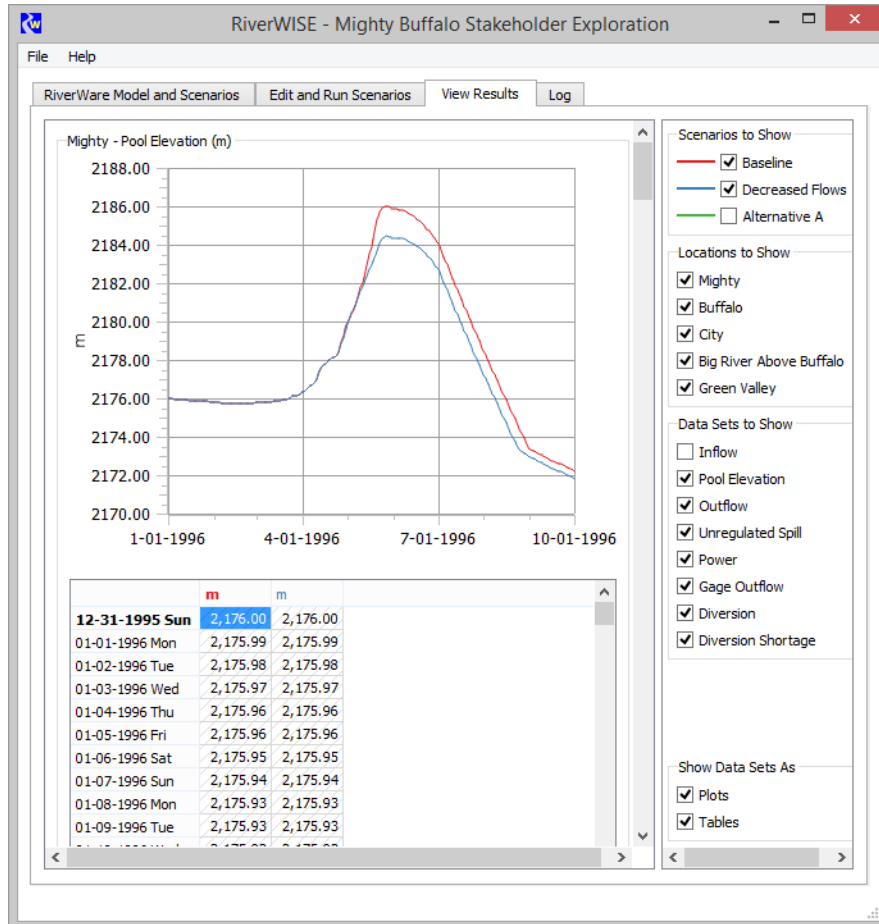
- view baseline run data
- change input slot values
- re-run the simulation
- compare scenario results
- export results
- save scenarios

The stakeholder could then provide the developer with feedback on the baseline model including the scenarios she developed.



**RiverWISE: “RiverWare Model and Scenario” tab showing a description and layout of the model and list of scenarios.**

Following is a screenshot of the results tab showing results for two scenarios:

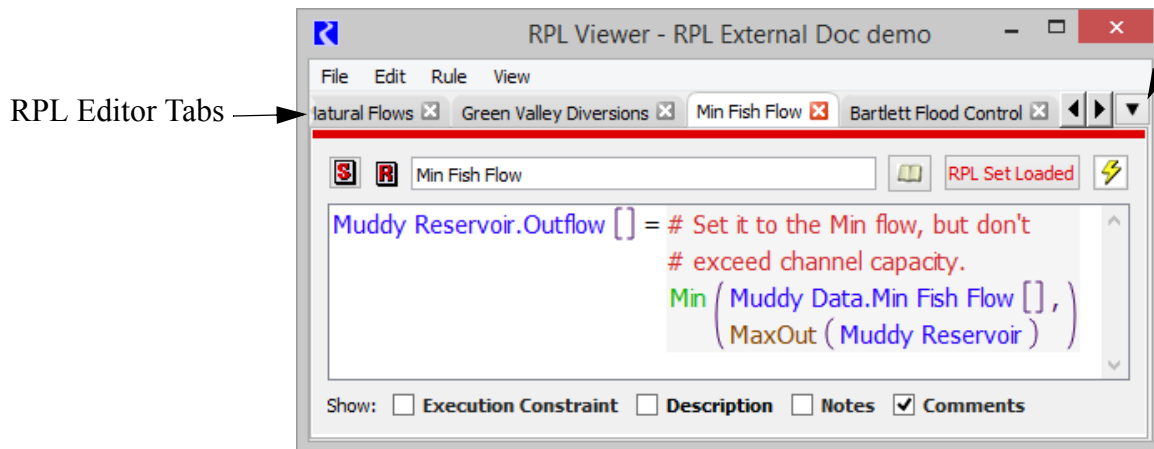


**RiverWISE: “View Results” tab showing modeled results for multiple scenarios.**

## 9. RPL

### 9.1 RPL Viewer

A new tabbed RPL Viewer, has been created for editing Rules, Goals, Methods, and Functions. RPL Editor List



By default, these RPL editors open as tabs in the Viewer but can be removed by dragging the tab off the Viewer. Dock the dialogs by dragging the R, G, M, or F icon onto the viewer. For more information, click [HERE \(RPLUserInterface.pdf, Section 2.1\)](#).

### 9.2 New RPL Predefined Function: ListSlotSet

The new **ListSlotSet** function evaluates to a list of the slots in a given Slot Set. Slot Sets are described [HERE \(Section 15.2\)](#).

For more information on this function, click [HERE \(RPLPredefinedFunctions.pdf, Section 109\)](#).

### 9.3 Rule Execution of DMIs

When adding a Pre-execution or Post-execution DMI to a rule, you can now select the DMI from a menu that lists all of the DMIs available in the model. Previously you had to type in the name of the DMI. For more information, click [HERE \(RPLUserInterface.pdf, Section 2.2.5\)](#).

### 9.4 CompletePartialDate with Offset

Previously, the **CompletePartialDate** RPL Predefined Function could return an incorrect value when the reference date had an offset. For example:

```
CompletePartialDate(@“October 1”, @“t + 1 year”)
```

This problem (Issue #6038) has been corrected, but the change could lead to model differences in models that use an offset within the **CompletePartialDate** function.



## 10. Run Control

### 10.1 Aggregate Inputs During Timestep Size Change

When you change the run control to a certain larger timestep (e.g. daily to monthly), you have the option to aggregate input slot values. Additional options are now provided on how to deal with NaNs and Output values. For more information, click [HERE \(RunControl.pdf, Section 7.1\)](#).

## 11. Scenario Manager

With the introduction of **RiverWISE**, described [HERE \(Section 8\)](#), the **Scenario Manager** has been deprecated. The **Scenario Manager**, described [HERE \(ScenarioManager.pdf, Section 1\)](#), is still fully supported in RiverWare 7.2, but may be disabled in RiverWare 7.3 or later. If you use the Scenario Manager, please contact [RiverWare-Support@colorado.edu](mailto:RiverWare-Support@colorado.edu) with any questions.

## 12. Script Management

### 12.1 New Action: Global Time Scroll

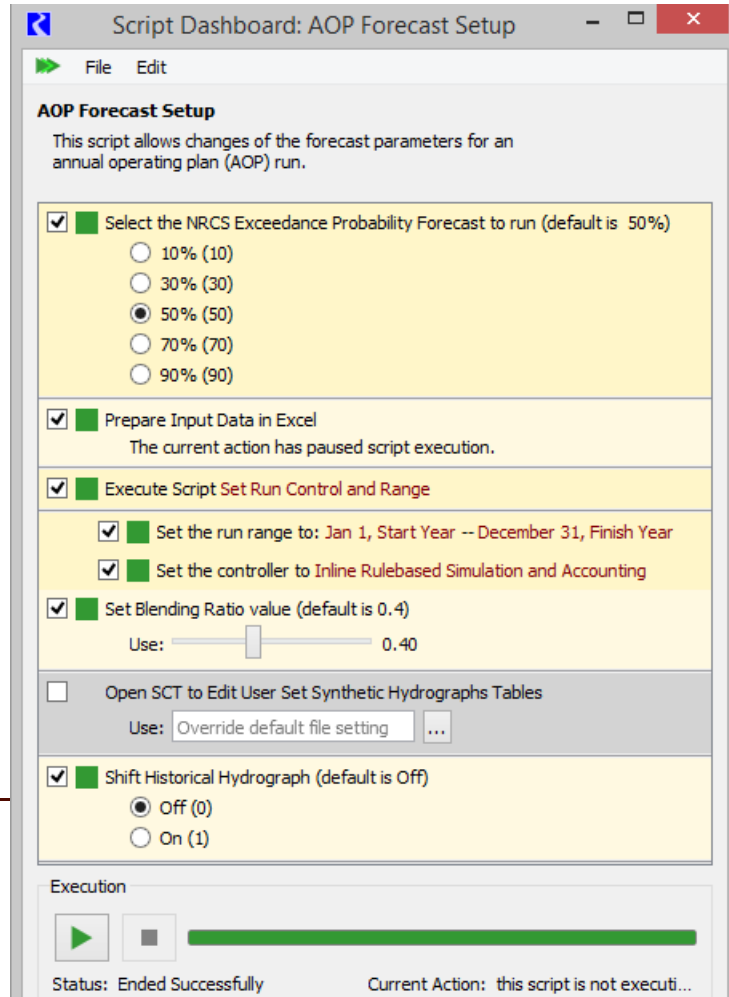
A new **Global Time Scroll** script action was added to set the date at which all time displays are scrolled. The setting allows a specified timestep or a symbolic DateTime. More information is available [HERE \(ScriptManagement.pdf, Section 3.3.18\)](#).

## 12.2 Progress Indicators and Display of Actions

To make script execution more informative, the Script Dashboard has been enhanced to provide visual indicators of the currently executing action and the result of the action. .

In addition, sub-script actions (using the **Execute Script** action) are displayed indented under the calling script action. Progress indicators for sub-script actions are the same as top level.

More information on the dashboard is provided [HERE](#) ([ScriptManagement.pdf, Section 4](#))



## 12.3 Slot Selections support wildcards

Many of the items that allow selection of objects, slots, or accounts were modified to allow wildcarding within the selection. The following script action types were modified:

Clear Scalar Slot Value	Set Method
Clear Table Slot Value	Set Scalar Slot Value
Create Snapshot	Set Series Slot Flags
Evaluate Expression Slots	Set Series Slot Values
Open Objects	Set Table Slot Value
Open Slots	Synchronize Objects

This change only impacts new script actions; the behavior of existing script actions is unaffected.

## 13. SCT

### 13.1 Edit Text Series Slots

**Text Series Slots** were introduced in RiverWare 7.1. Now, they are fully editable from the SCT, including the setting of a multiple cell selection either by typing or entering text in the editor at the top of the SCT.

### 13.2 Set Slot Labels

In the SCT's **Edit Series Slot List** tab, you can now set the labels for multiple slots in one operation. Right click on a selection and choose to **Set Labels to**:

- **Full Slot Names**
- **Slot Names**
- **Slot Column Names**
- **Slot and Column Names**

Click [HERE \(SCT.pdf, Section 8.10\)](#) for more information.

### 13.3 Set Values over Time Range

A new operation on the SCT, **Set Values over Time Range** allows you to specify values on many timesteps at once.

- Set all the timesteps in that range to a specified value, or
- Interpolate the values over that time range to that specified value.

Click [HERE \(SCT.pdf, Section 9.3\)](#) for more information.

Set Slot Values over Time Range

First Timestep: Dec 31, 2017

Last Timestep: Jan 24, 2018

Timestep Count: 25

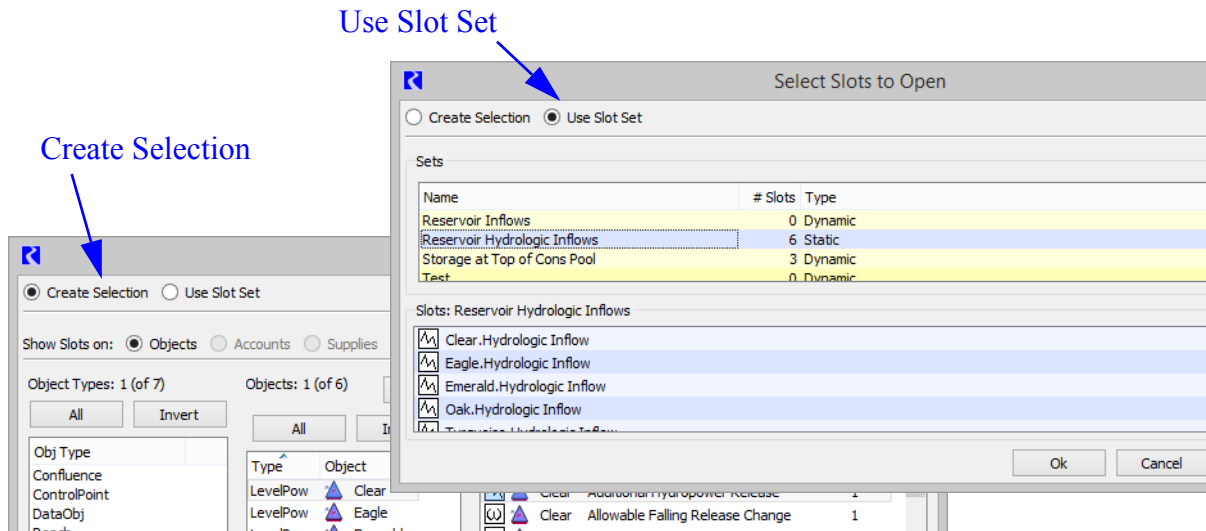
Value: 10 cms

Set Values Interpolate To Cancel

## 14. Selector

### 14.1 Accessing Slot Sets

The selector has been modified to allow you to use a defined Slot Set. The new Slot Set functionality is described [HERE \(Section 15.2\)](#). The selector now has options at the top to either **Create Selection** or **Use Slot Set**

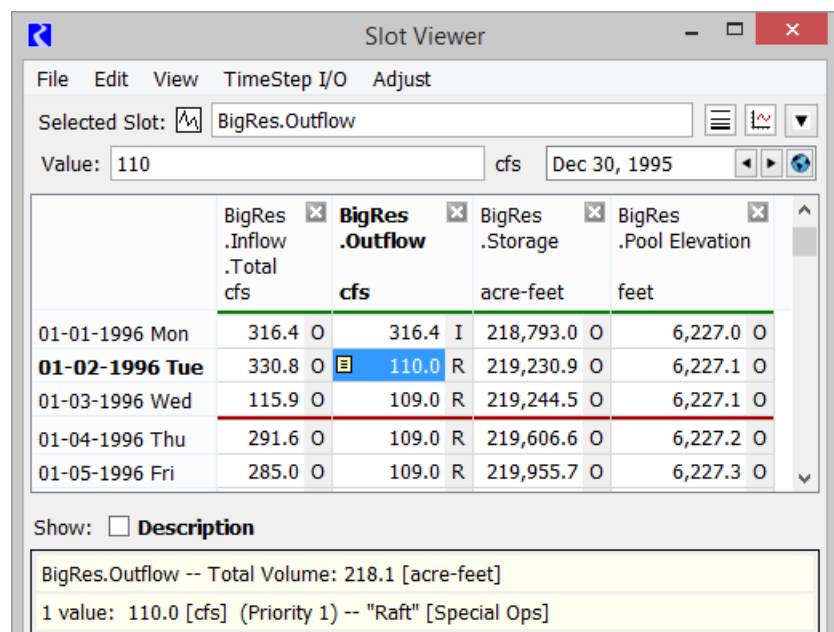


The use of the selector with Slot Sets is described [HERE \(Slots.pdf, Section 8.2.1\)](#).

## 15. Slots

### 15.1 Slot Viewer

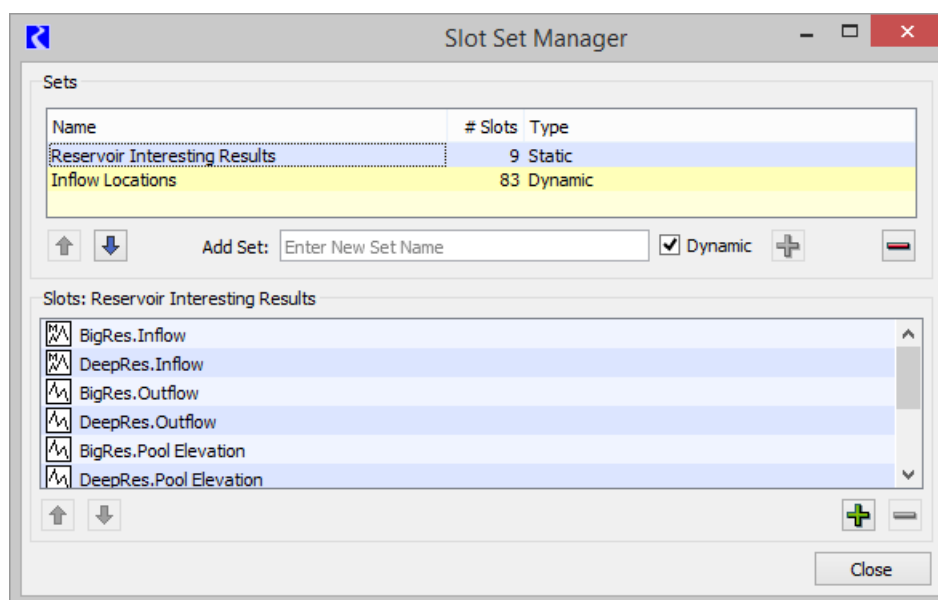
The **Slot Viewer** is now the primary way to look at series slots. It is an ad-hoc tool to view multiple series slots in a single dialog. The slots shown and their order is not persistent in any way on the viewer. Each time a series slot is opened from anywhere in RiverWare, it is added as a column to the **Slot Viewer**. From the **Slot Viewer**, any slot can be “torn off” or dragged off to be shown as an individual **Slot** dialog.



For more information, click [HERE \(Slots.pdf, Section 4.1.2\)](#).

## 15.2 Slot Sets

A new utility called **Slot Sets** can be used to define and name a static or dynamic collection of slots. The named **Slot Set** can then be referenced in contexts that require a user-specified set of slots, such as Script actions, DMIs, and Output Devices. **Slot Sets** can eliminate duplication and ensures consistency across the multiple uses. Within RPL, **Slot Sets** provide a re-usable collection of slots that can be referenced by the new RPL function **ListSlotSet**, described [HERE \(Section 9.2\)](#). For more information on **Slot Sets**, click [HERE \(Slots.pdf, Section 8\)](#).



## 15.3 Expression Slot - Symbolic Date Ranges

A new time series range configuration dialog has been introduced for **Series Slots with Expression**. This new dialog provides the following ways to specify the start and finish dates including:

- Symbolic date functionality
- Selection of RPL Datetime function
- Static Datetime entry.

Series Slots with Expressions saved prior to RiverWare 7.2 that were synced with the run start or the initial date will be transformed to use the syntax “Start Timestep” and “Start Timestep - 1 Timestep”, respectively. Expression slots with no specified start dates will be transformed to a symbolic start date of “Start Timestep”.

More information is available [HERE \(Slots.pdf, p49\)](#).

### 15.4 Series Slot Notes on Accounting Slots

When adding or pasting a series timestep note to an account multislot, you are given the option of instead applying the note to a linked Supply. This is often the intended behavior so that the note appears on the two account multi-slots on both sides of the Supply.

### 15.5 Selection Statistics: Sum Flows to Volume

The numeric statistics shown on slot dialogs and SCTs now show a time-integrated sum for slots having “rate” units (i.e. Flow to Volume, Power to Energy, Velocity to Length).

The total value is shown using the active unit scheme's scale and unit for the time-integrated unit type (i.e. Volume, Energy or Length).

	cfs		
12-31-1995 Sun	20.0	I	0
<b>01-01-1996 Mon</b>	<b>19.9</b>	R	1
<b>01-02-1996 Tue</b>	<b>16.9</b>	R	1
<b>01-03-1996 Wed</b>	<b>15.8</b>	R	1
01-04-1996 Thu	21.3	R	1
01-05-1996 Fri	24.6	R	1
01-06-1996 Sat	18.7	R	1

Integrated Sum

Show:  Description

DeepRes.Outflow -- Total Volume: 104.4 [acre-feet]

3 values: Sum 52.6 -- Ave 17.5 -- Min 15.8 -- Max 19.9

### 15.6 Periodic Slot - Base Year Symbolic Dates

Periodic Slots now support a symbolically specified base year, as shown in the screenshot:

More information is available [HERE \(Slots.pdf, Section 4.12.1\)](#).

Configure Periodic Slot: DeepRes\_Data

Object: DeepRes\_Data

Slot: PeriodicSlot

Period

Year

Qty: 2 Base: Start Timestep

1995

Regular Interval: Month

### 15.7 Time Aggregation Series Slot: NaN Behavior

**Time Aggregation Series Slots** allow you to temporally aggregate another series slot. Options were added on how to deal with NaN values in the input slot data. Now you can choose to not aggregate periods that are partially NaN. For more information, see [HERE \(Slots.pdf, Section 4.7.1\)](#).

### 15.8 3D Table Interpolation

Within three dimensional table interpolation, the “convex hull” test was loosened. But if the test fails, it is now a fatal error. This could cause existing models to abort when previously they did not. If an abort occurs, modify your 3 dimensional table by editing or adding data points.

## 16. Units

### 16.1 New Unit Type: VolumePerEnergy

A new unit type, Volume Per Energy, was added. User units include, for example, m3/MWH (default), gal/GWH, ft3/KWH, cfs/MW.

### 16.2 New Flow and Volume Units

Three new units are now available:

- Flow: **MGD** (million gallons per day) was added. This is identical to **mgd** but a different capitalization.
- Flow: **gal/day** (gallons per day) was added.
- Volume: **MG** (million gallons) was added.

In addition, the conversion factors used for conversions to units involving gallons were made more precise.

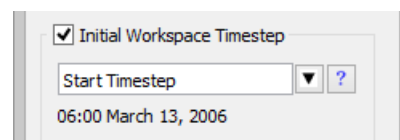
## 17. Workspace

### 17.1 Initial Workspace Timestep

The **Initial Workspace Appearance** dialog now includes an **Initial Workspace Timestep** check box containing a symbolic datetime setting. If enabled, this static or symbolic time is used in these two ways:

- When the model is loaded, a **Global Time Scroll** to the datetime value is made.
- The drop down menu shown with time navigation datetime spinners includes the initial workspace timestep

This is described in detail [HERE \(Workspace.pdf, Section 3.6\)](#).



### 17.2 Middle Button Pans Workspace

You can now use the middle mouse button to pan the workspace views. Middle-click and drag to pan in the Simulation, Accounting and Geospatial Views.

### 17.3 Showing Flow Lines and Canvas Lines on the Workspace

Flow Lines and Canvas Lines can be shown on the Simulation and Geospatial Views of the workspace. You create the lines on an Output Canvas and then specify that they should be shown on the workspace. This is described [HERE \(Section 7.2\)](#).





# Release Notes Version 7.2

## 18. Closed Bug Reports

The following bugs have been closed since the last major release(7.1). For more information on any bug, see the CADSWES website. The bugs are listed in order by bug number:

Num	Synopsis
933	Allow CPLEX problems and subproblems to be saved selectively.
3067	mass balance of accounts sometimes hard to see
3323	When a method category is invalid (because of dependencies), its selected method should go back to the default.
3618	RiverWare hangs after DMI exits
3660	Reservoir Outflow is not guaranteed to equal FC Release plus Surcharge Release
3713	bug 3504 accessing PassThrough account scalar attributes from within RPL
3820	Table Interpolation warning message is not clear
3962	Assertion failed with Database DMI slot list
4067	DMI's dates do not update with run control
4233	CPLEX error of Duplicate Entry stops the run
4260	water rights - control point - monthly timestep - begin of reference year cannot be feb
4267	Incorrect shrinking into a frozen constraint
4321	Feature Request: Pre/Post Execution DMI issues
4328	RPL search and replace annoyance
4351	internal error with MRM consecutive run
4464	Database DMI: Allow specification of model_id in advance
4671	DMI might be doing extra work during MRM
4889	Excel not being treated as a database
5196	Missing diagnostic when constraint is skipped because it modifies a frozen constraint
5203	bug 5171 does not seem to be resolved
5211	Problems when adding a constraint which evaluates to false
5236	Enabling a portion of a goal after disabling makes the goal invalid
5261	Inadequate diagnostic for predefined function (probably)
5309	Slot dialogs show and save 12 sig figs even when value is essentially miniscule
5467	RPL debugger is not breaking on an error
5520	When RHS of constraint references list item, issues an error.
5541	File association after install of 6.5 and 6.5.1
5631	Bad use of DBL_MIN in RiverWare C++ code

Num	Synopsis
5651	A slightly negative diversion supply will not allow account to resolve outflow
5652	Debug only database DMI manager diagnostics crash
5674	Internal Error
5699	DSS DMI Problem. Error says: "DSS read series failed: Error sending header "garbage here": Socket in is not Connected"
5727	row dates on periodic slots do not import
5735	Typing value into Edit Account dialog leads to errors and assertion failures
5746	RPL comparison tolerance is not applied correctly
5749	Opt Analysis Satisfaction incorrect after first iteration of Repeated Minimax
5761	Excel DMI doesn't shut down Excel
5781	RPL set editor 'saved with model' state icon visibility is not always correct
5792	Generate Excel Workbooks from RDF does not work with Distributed Runs
5806	For accounting controllers, Water Quality methods are not hidden when WQ is disabled
5817	Save as Baseline gives bogus warning about unloading ruleset
5820	DataTimes set in slots are always FullDateTime not specified user units
5837	Model Report Crash
5841	Model calculating differently when running in batch mode
5857	Disabled DMI datasets and slot selections are not saved with model
5866	Reading DSS paired data fails with poor message and can't be rerun
5869	Adding Comment to Item in RPL list disables right-click "Enabled" option, deleting comment deletes list item
5879	RPL Search and Replace of names does not work if Rule or Function editor is open
5883	Value set by initialization rule with Z flag displays incorrect tool tip
5887	Exporting and then importing an Excel DMI reorders the slot list
5889	Consecutive MRM Internal Error
5894	RDF to Excel does not handle slash in environment variable correctly
5895	Outflow reserve constraints need additional defined slots
5898	Print Scrn buffer error eliminates much of a screen shot
5906	Unit type mismatch in an opt constraint not caught as an error
5907	Evaluating expression slots after opening a global functions set results in assertion failure
5909	Multiple derived objectives in one opt goal has unexpected behavior
5910	Numerous crashes when clearing workspace
5915	Excel DMI reading table written by range crashes
5918	POSAT incorrectly reporting the number of frozen constraints
5919	POSAT displays frozen new constraints as prior constraints
5920	Note group manager dialog doesn't update when DMI creates groups / notes
5921	Series slot dialog dialog doesn't fully update when DMI creates groups / notes
5928	Generating CPLEX Error 1222 and inconsistent/missing coefficients

Num	Synopsis
5929	Hidden modal dialog
5932	Water user shows efficiency slot even when not a part of currently selected method
5934	DMI check mark color
5936	Prepending a blank to name of Tabular Series Slot report hangs RiverWare
5937	Plot "assertion failed" in Date_Time.cpp
5949	Loading model removes new unit type's standard unit rule
5955	RiverWare crashes when applying changes in DMI editor
5964	Initialization Rule grows Integer Indexed Agg Series slot unnecessarily
5965	URGWOM AOP model run not executing successfully with Windows 10 OS
5966	Slot selection in database DMI not staying "off" after model save and reload
5973	Showing a tooltip raises inactive window obscuring other dialogs
5977	Rpl Editor search & replace description not reflected in editor.
5979	Editing plot axis changes Y axis range
5980	Importing plot causes axis to show different units
5981	Plot time axis settings lost after saving and reloading 'twice'
5982	Opening Agg element from slot gives pink internal error about Object Viewer tab
5984	Run Abort dialog does not appear when aborted run was started with Init button
5985	Crash when attempting to edit RPL from FEWS server instance
5986	Distributed MRM isn't removing partial RDF files
5987	RPL Notes on opt goals are called Rule Notes
5988	Deleting link to a multislot with slot open causes assertion failure
5989	Object viewer drag object tab cursor icon can be difficult to see
5990	SCT does not refresh correctly when paused in RPL Debugger and slot range changes
5991	Entering data while paused in the RPL Debugger crashes RiverWare
5992	Name Map Manager File->Close does nothing
5993	RiverWare crashes whenever browsing for file
5995	DMI Lock icon behavior is backward
5996	Output Canvas background image not displayed
5997	SCT priority column width not correctly sized when paused in RPL Debugger
5998	RPL Element Numbers: the 1 has a different font than the rest
5999	Object Viewer: Switching obj tabs: Loss of vertical scroll position and AggObj treeview expanded states.
6000	Run time is displayed incorrectly after stopping a run after Initialization only
6001	Script description does not wrap in the Script Dashboard
6002	In SCT showing only a single flag in the flag legend prevents SCT from opening
6003	Copying and pasting changes values in cells
6004	Opt comments on variables in frozen constraints use incorrect satisfaction value

Num	Synopsis
6005	WQ model fails when "calculating a non zero value for outflow salt mass but outflow is zero" which I think is a tolerance issue
6006	Erroneous Object Viewer and Open Slot Behavior
6007	RiverSMART confirmation dialog goes off screen
6008	RootSelection serialization doesn't cope with double quotes in names
6009	Cannot add text to rule notes that already have text saved in them.
6010	NaN in Excel imported as integer to non-text slot in RiverWare
6011	Assertion failed
6012	Slot viewer allows text series slots to be configured
6013	Apply Notes to Slots doesn't always set the chosen note.
6014	Invalid function error message for data type mismatch is unhelpful
6015	RPL Viewer - closing a rule also closes the rule to the right
6016	3D Table Interpolation issues warning with bad max value for 32-bit only
6017	Crash when unloading RPL sets with a script
6019	RPL validation fails loading RiverWare from batch script with global set(s)
6020	Crash opening Plot dialog when slots in plots have been deleted
6021	Crash when scaling a Plot that includes slots from a deleted object
6022	Editing a script while paused does not reset Script Dashboard
6023	Crash with large memory usage from numerous diagnostic messages
6024	Issues with Water Balance
6025	Add Text and Add Image dialogs open on the upper left partially off screen
6026	Link arrows go the wrong direction for multislots
6028	Test of new RiverWISE category
6029	SCT display out of alignment after changing configuration
6030	Saving without outputs is not clearing R flags
6031	Diagnostic Window after aborted run continues to come to front and cover Run Control
6032	Outflow does not equal Release plus Spill when Outflow is negative with Unreg Spill
6033	Plot step curve symbols shown at begin and end of timesteps
6034	Duplicating an inactive rule does not give the new rule a unique name
6035	Storage account is not solving for timesteps past end of run even if necessary data are present
6036	Data aggregation, NaN stops script
6038	Bug with Pre-defined function CompletePartialDate
6039	Error when graphing series slot
6042	WRS allotting more water than available in supply chain
6047	Aborted MRM run continues even after abort dialog is shown
6048	Incorrect Rule Opened when two Rules Named the Same
6049	Unit scheme change, precision, scale do not persist when duplicating or copy/paste slots

<b>Num</b>	<b>Synopsis</b>
6052	RplViewer occasional crash on exit
6053	Series Aggregation 'Error on NaN' shouldn't consider unused timesteps with 'First' or 'Last' agg functions.
6057	No way to add custom slots to elements of an aggregate object
6059	Slot Viewer Import Paste does not expand the time range
6061	Account method odd behavior at monthly timestep
6062	Can't delete custom slots from elements of an aggregate object, nor move them to a different object.
6063	Global Time Scroll is ignored when opening slots in the Slot Viewer