Technical Documentation Version 7.0

Subbasins

CADSWES

Center for Advanced Decision Support for Water and Environmental Systems

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Subbasins
Table of Contents

Introduction 1

Creating New Subbasins 1

Adding and removing Subbasin members 2

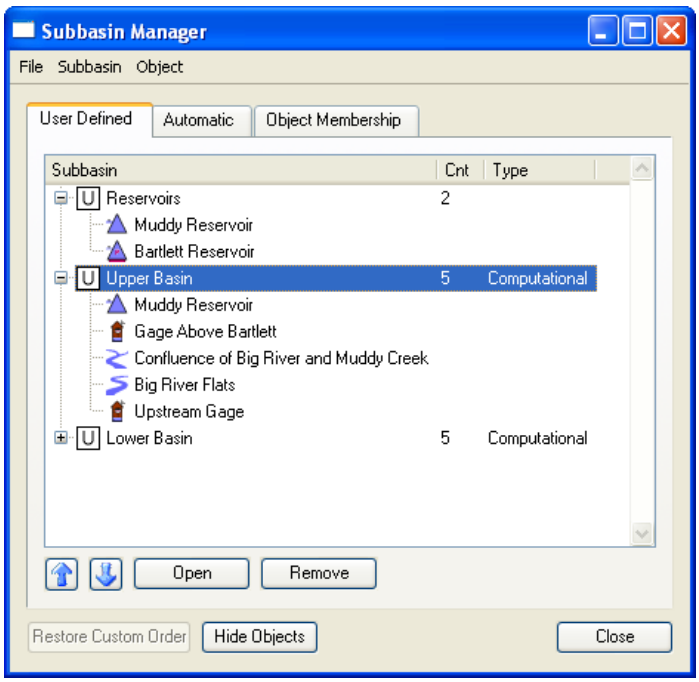
Viewing an Object's Subbasin Memberships 3

Selecting Objects belonging to a subbasin 3

Computational Subbasin 4

Subbasins

1. Introduction



Subbasins are user-defined sets of objects that can be referenced by name. Subbasins are typically defined to represent connected parts of the basin network, such as "Reservoirs above Powell" or "Holston System." The objects in the Subbasin can be referenced as a group in RPL sets including Expression Slots, Optimization Constraints, and Rules. The subbasin manager is used to create and edit subbasins. To open the **Subbasin Manager** dialog, select **Workspace ➥ Edit Subbasins...**

The Subbasin Manager shows three tabs; **User Defined**, **Automatic,** and **Object Membership**. The **User Defined** tab allows the user to show/create/edit subbasins defined by the user. User Defined Subbasins are displayed with a "U" icon next to their name. The **Automatic** tab allows users to show fundamental Subbasins which are automatically defined by RiverWare, and may be used in expressions and constraints in the same manner. These include groups such as "Entire Network", "Reaches", "Reservoir", "DataObj", etc... Automatic subbasins are displayed with an "A" icon next to their name. The Object Membership tab allows the user to show all of the subbasins to which an object belongs.

2. Creating New Subbasins

To create a new user defined subbasin, first select (highlight) the desired objects on the workspace. In the subbasin manager, make sure you are in the **User Defined** tab. Next, click **Subbasin ➥ Append New Subbasin**. A new subbasin is created that contains the selected objects on the workspace. The name of the subbasin can be modified by single clicking on the name and entering a new name (or using the right-click **Edit Subbasin Name** menu). Alternately, you do not need to select the objects before creating the subbasin. Instead create an empty subbasin and then add objects to it using the selector as described **HERE (Section 3)**. Additional subbasins can be created or removed using the menu options in the **Subbasin** menu to append or insert a new subbasin.

An additional menu option, **Append Typed Subbasin** allows the user to add a subbasin that has a special classification. These include

- No-Optimization
- Smooth-Energy
- Preferred-Customer
- Allocated
- Computational

The first four types are used in optimization, the Computational Subbasin is described **HERE (Section 6)**. A Computational Subbasin can also be added using the **Subbasin ➥ Append Computational Subbasin** menu.

3. Adding and removing Subbasin members

Objects are added to the subbasin through either the **Subbasin** menu or the right click context menu. There are two general methods to add objects to an existing subbasin. Highlight the desired subbasin on the **User Defined** tab, then:

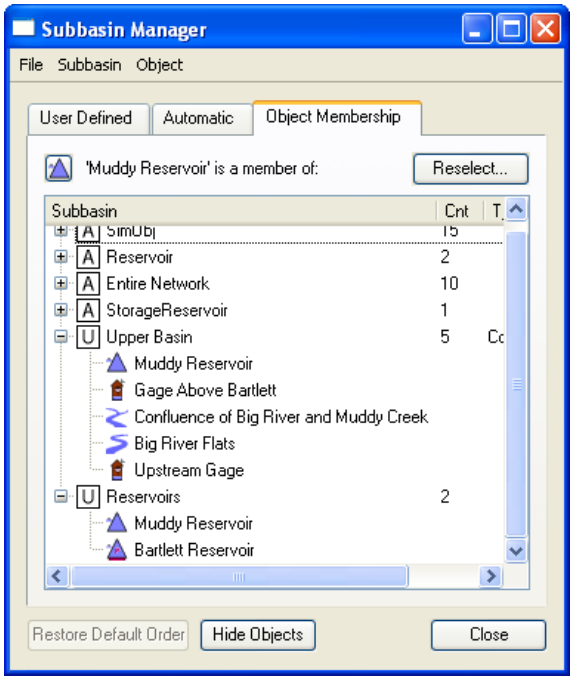
- Select the **Subbasin ➥ Append Objects using the Object Selector** or right click ➥ **Append Objects with Object Selector** to open the selector dialog. You can use filtering or other tools on the selector to choose the desired objects.
- Highlighting the object on the workspace, then click either **Subbasin ➥ Append Objects from Workspace Selection** or **Subbasin ➥ Replace Objects from Workspace Selection.** Note, these two options are only available if the subbasin is selected on the subbasin manager, not the objects in the subbasin.

Objects and entire subbasins are removed from the **Subbasin Manager** by highlighting them and clicking the **Remove** button on the bottom of the subbasin manager dialog (or through the right-click context menu). Objects and subbasin can be moved up or down in the list using the appropriate buttons. In addition, subbasins can be sorted by clicking on any of the column headings: **Subbasin**, **Cnt** or **Type**. To return to the previous custom order, user the **Restore Custom Order** button. Computational subbasins can be opened by highlighting the subbasin then clicking the **Open** button or double clicking the subbasin name. On other subbasins, if you double click a subbasin, it will toggle the tree-view displaying the objects. If at any time in the Subbasin Manager you wish to close all the tree-views of the objects, click the **Hide Objects** button.

Note about Aggregate Objects: Aggregate objects (Aggregate Reach and Aggregate Diversion Site) have special behavior because their elements are objects themselves:

- When an aggregate object is added to a subbasin using a **workspace selection**, then all elements are also added to the subbasin. Any new elements will be automatically added to that subbasin. But if an element is removed from the subbasin, it is not automatically added back when the model is saved and loaded (as happened in previous versions of RiverWare). Also, once an element is removed, any new elements will not be automatically added to the subbasin.
- When the **object selector** is used to add objects to a subbasin, aggregate elements are only added to the subbasin if they are explicitly selected. Then, adding new elements to the aggregate will not automatically add them to the subbasin.

4. Viewing an Object's Subbasin Memberships



From the subbasin manager **User Defined** or **Automatic** tabs, the membership of an object can be viewed by highlighting a single object then selecting **Object ➥ List Subbasin Membership**. The subbasin manager automatically switches to the **Object Membership** tab. Displayed are the subbasin to which that object belongs, both automatic (A) and user defined (U). You can also access this tab directly and use the **Select** or **Reselect** button to bring up the object selector. The screenshot to the right shows this tab of the Subbasin Manager.

Water User Groups: Water Users have another way to display subbasin membership. Each Water User object contain a List Slot called **Water User Groups** that has a list of all of the subbasins to which the Water User is a member. Click **HERE (Objects.pdf)** for documentation of this slot.

This slot was added to provide access to the subbasin membership from the object itself. Thus, the user can go into the object itself and see that a particular Water User belongs to subbasin A, B, and C, all from the object.

5. Selecting Objects belonging to a subbasin

From the Object menu, you can also choose to **Select Objects on Workspace**. This option will highlight and select the object on the workspace. Double click an object in the subbasin manager to open the object directly. The right-click context menus have options to:

- **Select Objects on Workspace**: select the object on the workspace. No scrolling is performed.

- **Select Objects and Show Workspace**: select the object(s), then brings the workspace to the front of the screen. No scrolling is performed.
- Scroll to Object on the workspace: Scroll the workspace the selected objects.

Similarly, with a subbasin selected, use the **Subbasin ➥ Select Member Objects on Workspace** menu to select all of the objects on the workspace for the selected subbasin or selection. In addition, if you double click a subbasin in the manager, it will select all the objects on the workspace.

6. Computational Subbasin

The Computational Subbasin supports computations that involve more than one object, so-called "global" solutions, though they need not encompass the entire network. A Computational Subbasin is created through the same dialogs as other typed subbasins, but it, like simulation objects, contains slots and other attributes that you can inspect and change, by "opening" the subbasin. To open a computational subbasin from the main workspace use the **Workspace ➥ Open Computational Subbasin** and select the desired basin from the list. To open a computational subbasin from the subbasin manager, select the subbasin, then click the **Open** button or double click the subbasin name. Computational subbasins contain no general slots; all slots are dependent on user-selectable methods. For more information on the available methods and their specific slots, click **HERE (Objects.pdf, Section 7.1.1)** to go to the object documentation.