

Workshop 2 – Basic Guide Curve Operations

Introduction

The objective of this workshop is to demonstrate how to construct and use alternatives. Alternative construction is fundamental to the development of a simulation and its subsequent analysis. You will also analyze the results of the simulation to gain an understanding of the basic guide curve operation.

Problem Description

You will start this workshop with the “solution” watershed from Workshop 1. In that workshop, you developed a reservoir network for the Ventura River basin and the Crazy Mountain reservoir.

In this workshop you will:

- Create a Basic Guide Curve Operation set at Crazy Mountain Reservoir
- Create an alternative that will use the existing network and operation set
- Define the lookback (initial) conditions and attach time series data
- Create a simulation in the simulation module
- Compute varying alternatives and analyze results

This workshop will use functions from the Reservoir Network Module and the Simulation Module. The references (CrazyMountainData.xlsx and CrazyMountainRegManual.pdf) from Workshop 1 will be used in this workshop also.

Tasks

1. Copy **Ventura.dss** from **C:\Class\Workshop 2 – DSS Data** to **C:\Class\My Watersheds\WS2_Start\shared** directory using Windows Explorer.
2. Start ResSim and open your starting watershed: **WS2_Start**.
3. Create a Basic Guide Curve Operation set:
 - From the **Reservoir Network** module, select the **Network** menu and **Open** the *01 Standard* network.
 - Open the **Reservoir Editor** by selecting **Reservoirs...** from the **Edit** menu.
 - Select the **Operations** tab and select **Operations⇒New** from the menu bar. Name the new operation set as **Basic GC**, add a description “**Basic Guide Curve Operation**”, and press **OK**. (A set of default reservoir zones will be generated and a zone tree will appear.)
 - Right-click on the **Flood Control** zone in the zone tree and select **Rename...** Rename the zone to “**Normal Flood Control**”.
 - Add three more **Zones: Top of Dam, Major Flood Control** and **Drought Contingency** by selecting **New...** from the **Zone Menu** at the top of the Editor.

- Click on each zone and fill the corresponding **Date-Elevation** information provided in the **CrazyMountainData.xlsx** spreadsheet under the “WS#2 Basic Guide Curve Oper Set” tab. If the top elevation does not change throughout the year, then enter the value for 01Jan. (Section III of the Regulation Manual also shows the reservoir zone definitions for Crazy Mountain Lake.)
- Press **OK** to apply changes and close the reservoir editor.

Did You Know?

*By default, the top of the Conservation Zone is used as the Guide Curve. The Reservoir Editor (**Operations** tab, **Zone-Rules** sub-tab) gives a visual clue to the zone used for the Guide Curve by displaying its name in bold type. You can assign the Guide Curve to the top of another zone by right-clicking on the desired zone and selecting **Set Guide Curve** from the popup menu.*

- Save the Network and the Watershed by selecting **Network⇒Save** and then **File⇒Save Watershed** from the menu bar.

4. Create an Alternative

- In the Reservoir Network module, click on **Alternative** in the menu bar and **Edit...** to open the Alternative Editor. Create a NEW alternative (click on **Alternative** in the menu bar and **New...**) based on the “01 Standard” network, and name the alternative “GC_ops” and give a description.
- In the **Alternative Editor**, notice that the “01 Standard” network has been associated with this alternative. Under the Run Control tab, choose the desired time step (1Hour) and flow computation method (Instantaneous).
- Select the **Operations** tab in the middle of the window. For the reservoir, select the Basic GC operations set. Save the alternative.
- Select the **Lookback** tab. Define the lookback information for each element of the reservoir(s) using the drop-down menus in the Type column. The lookback elevation and release will be associated with observed Time-Series data (see Type column). There is zero spill in the lookback period. **Save the alternative.** *It is important to save the alternative at this point to update the Time-Series tab.*
- Select the **Time-Series** tab. Associate the time series records to the inflow locations and the lookback conditions. Using the **Ventura.DSS** file that you copied to the shared directory, attach the records as shown in the following table to the associated locations in the table on the **Time-Series** tab. In order to do this, select a local inflow entry and then click the **Select DSS Path...** button at the bottom of the window. Open Ventura.DSS and select the appropriate dataset. Click the **Set Pathname** button. Repeat for all local inflow locations. Save the alternative. Save the watershed.

Location	A	B Part	C Part	E Part	F Part
Crazy Mt. Local Inflow		CRAZY MT INFLOW	FLOW	1HOUR	1997 FLOOD
Rockville Local Inflow		ROCKVILLE LOCAL	FLOW	1HOUR	1997 FLOOD
Villanova Local Inflow		VILLANOVA	FLOW	1HOUR	1997 FLOOD
Greenfield Local Inflow		GREENFIELD LOCAL	FLOW	1HOUR	1997 FLOOD
Bethesda Local Inflow		BETHESDA	FLOW	1HOUR	1997 FLOOD
River Pointe Local Inflow		RIVER POINTE LOCAL	FLOW	1HOUR	1997 FLOOD
Crazy Mountain-Pool		CRAZY MT	ELEV	30MIN	OBS
Crazy Mountain-Controlled Outlet		CRAZY MT RELEASE	FLOW	30MIN	OBS

5. Create varying alternatives

- Create three new alternatives (“at GC”, “below GC”, and “above GC”) in the Network Module by duplicating the “GC_ops” alternative. You can make copies of the “GC_ops” alternative by using the **Save As** option in the **Alternative Editor**.
- In the Run Control tab, make sure the time step and flow computation method are correct.
- In the **Lookback** tab, modify the Lookback Elevations such that one alternative starts at guide curve (683.0’), another starts 3 feet below guide curve, and the other starts 3 feet above guide curve.
- Save each alternative, and then close the **Alternative Editor**.

6. Create a Simulation

- Switch to the **Simulation Module** and create a new Simulation (using Simulation, **New...**) and name it “Sim 01 19Jun1997”. Specify the time window as shown below and select your four alternatives.

	Date	Time
Start	19JUN1997	0300
Lookback	15JUN1997	0300
End	27JUN1997	2400

- In the **Simulation Control Panel**, for each alternative right-click, **Set As Active** and **Compute** one at a time. Alternatively, you may select **Compute** from the shortcut menu, without setting the alternative as active.

7. Analyze the operations for each alternative.

- After all alternatives have been computed, you can view results using the default plots and reports, accessible by right-clicking on a project element.
- In the **Simulation Control** panel, check the box next to the alternative you wish to analyze. You can check the boxes next to all computed alternatives if you wish to view results simultaneously.
 - *(For example, you can check the boxes next to the four alternatives you have computed. Then, regardless of which alternative you have **Set As Active**, you can launch the reservoir plot and the results for the checked alternatives would all display in the same plot. Use DSS-View to look at the “simulation.dss” file if the default plots don’t provide what you’re looking for.)*

Questions

- I) At the start of the simulation (19Jun1997 at 03:00), what was the elevation of the reservoir for the following alternatives? How far from guide curve was this elevation?

GC Ops:

at GC:

below GC:

above GC:

- II) For each Alternative, what release did the reservoir make during its first decision interval, and why?

GC Ops:

at GC:

below GC:

above GC:

- III) What happens to the releases when the pool elevation reaches guide curve?

IV) How many time steps did it take to get back to guide curve, and why?

GC Ops:

at GC:

below GC:

above GC:

****Bonus Task**

Once the tasks of this workshop are completed, go to the Simulation module, then preview and experiment with a predefined User Report "Workshop_#2_Report".

Access this report by first setting Active one alternative at a time, then launching the "Workshop_#2_Report" from the Simulation Module's Reports>User's Reports menu.

Questions

V) At the start of the simulation (19Jun1997 03:00), what is the active reservoir zone?
What is the percent storage encroached/filled in that zone?

GC Ops:

at GC:

below GC:

above GC:

Edit "Workshop_#2_Report" from the Simulation Module's Reports menu, and experiment as you wish with modifications to this User Report, for example:

Modify/Personalize Report Header/Footer: Change text/font/size.

Edit Contents: Insert/delete/hide columns; create a column that performs calculations.