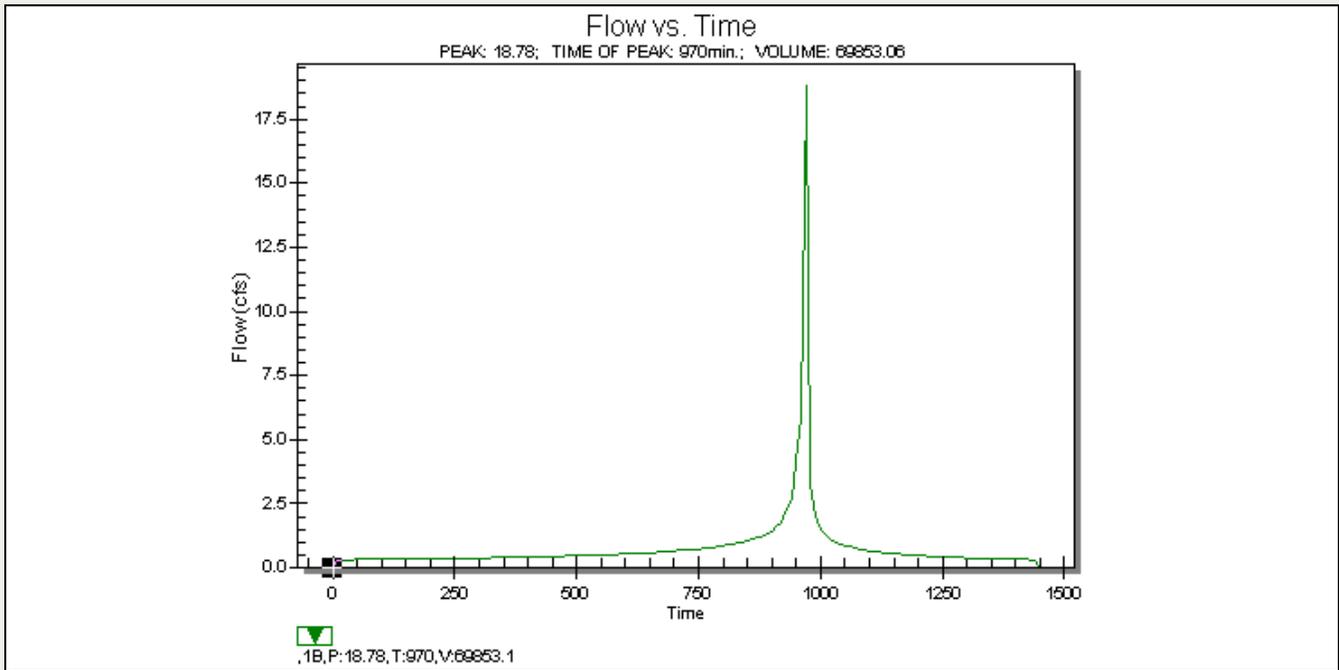




WMS 11.4 Tutorial

### Orange County Small Area Hydrograph

Compute a small area hydrograph based on methods in the Orange County (California) hydrology manual



#### Objectives

This tutorial demonstrates the necessary steps to compute a small area hydrograph using the example problem on page J-3 of the Orange County Hydrology Manual.

#### Prerequisite Tutorials

- Introduction to WMS

#### Required Components

- WMS Core
- OC Hydrograph Model

#### Time

- 20–40 minutes

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## 1 Introduction

This exercise will cover the steps necessary to compute a small area hydrograph using the example problem on page J-3 of the Orange County Hydrology Manual.

The small area hydrographs method is a simpler method that can be used in place of developing and applying a unit hydrograph. This method requires that the concentration time is less than 25 minutes. The 25-minute limitation corresponds to the 25% unit interval of watershed lag when using 5-minute unit rainfalls in the unit hydrograph method.

In the small area hydrograph method, the total catchment area will be used in the calculations.

## 2 Creating Hydrologic Tree (Schematic) Model

Start with creating a hydrologic schematic model.

1. Open WMS. If WMS is already open, click *File* | **New**.
2. Click **Don't Save** if asked to save changes.
3. Switch to the **Hydrologic Modeling Module** .
4. Select *Tree* | *Add* | **Outlet** (or press the O key on the keyboard).
5. Select *Tree* | *Add* | **Basin** (or press the B key on the keyboard).

This generates a basic schematic model (Figure 1) representing a concentration point with one sub-area.

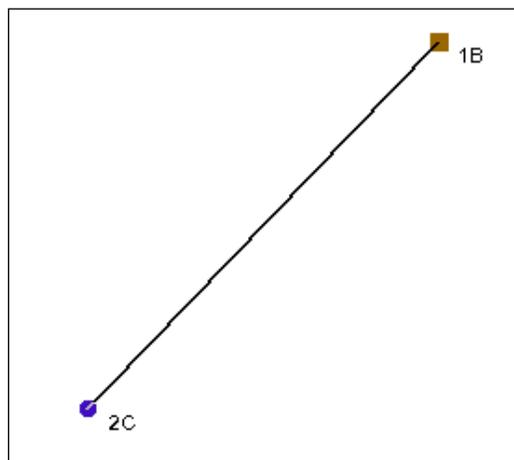


Figure 1 The schematic model

6. Make sure that the *Model* drop-down box is set to "OC Hydrograph".

### 3 Small Area Hydrograph Input Parameters

Now to define the small area hydrograph parameters to generate the hydrograph:

1. Use the **Select basin**  tool to select the sub-area labeled 1B.
2. Select *OC Hydrograph* | **Edit Parameters...** to open the *Edit Orange County Unit Hydrograph Parameters* dialog.
3. In the *Small Area Hydrograph* section of the dialog, click **Define...** to open the *Orange County Small Area Hydrograph Wizard – Step 1 of 2* dialog.
4. Enter a *Basin area* of “8.0” acres.
5. Click **Update Frequency...** to open the *OC Rational Method – Job Control* dialog.
6. Change the *Frequency* to “10-year”.
7. Select **OK** to close the *OC Rational Method – Job Control* dialog.
8. Set the *Time of concentration* to “10.0” min.
9. Enter a *Fm* value of “0.12”.
10. Enter a *Ybar* value of “0.35”.
11. Click on the **Next** button to view the computations in a tabular format.
12. Select **Done** to close the *Orange County Small Area Hydrograph Wizard – Step 2 of 2* dialog.
13. Select **Done** in the *Edit Orange County Unit Hydrograph Parameters* dialog.

With the hydrograph parameters defined, the hydrograph has automatically been generated by WMS. To view the hydrograph:

14. Double-click on the hydrograph icon to open a *Hydrograph* window.

View a plot of the small area runoff hydrograph including the peak flow, time to peak, and volume of runoff as show in Figure 2.

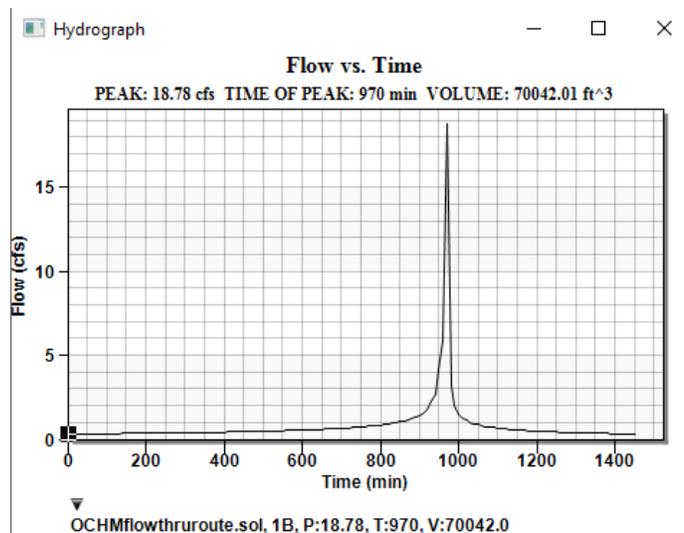


Figure 2 Small runoff hydrograph

15. When done viewing the hydrograph, click  to close the *Hydrograph* window.

## **4 Conclusion**

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This tutorial showed how to compute a Small Area Hydrograph. Feel free to continue experimenting with WMS or exit the program.