

The Watershed Project



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Chapter 1

Introduction

“There is nothing to fear except watersheds themselves.”

In the beginning God created the heaven and the earth. Then the earth created watersheds. Watersheds are as important to hydrology as atoms are to chemistry. They are the basic unit of hydrology; the building blocks of all natural water systems.

Sometimes watershed concepts can be very difficult to comprehend. While many of the concepts are fairly straightforward and easy to understand, converting their meaning into language can hide their simplicity and make them appear to complex. Even the basic idea of what a watershed means is fairly simple to understand however when a student reads the definition, "an area of land defined by an outflow point as that area wherein any precipitation that strikes the surface will travel a path which eventually takes it through the given outflow point.", the simplicity instantly vanishes.

Fortunately, we are living in a world full of wonderful technology. Everyday computers are playing a larger role within the classroom. We can

use these computers to bring students one step closer to the watershed.

Instead of looking at pictures and text, the student is able to interact with the watershed. Instead of looking at a plain formula, the student can plug different values of variables and watch the effect it has upon the blackstone river. Instead of learning how to draw a watershed, the student can actually do it and be graded instantly thereby reinforcing learning. Most importantly it makes learning fun which in turn makes teaching more effective.

You used to have to learn about the watershed. Now you can experience it. Sit, back, relax. Prepare for a trip to the watershed.



Chapter 2

Organization

“Give me watersheds or give me death.”

The Watershed Project is divided into three parts or modules as we like to call them. Each module has a specific topic or group of topics that are explained by the content within the module.

Module #1 is meant as an introduction to lead students into the field of hydrology. Basic concepts are taught on various screens through text and pictures. Some pictures are static while other ones feature animated arrows and graphics to help convey the ideas.

Module #2 answers the question, "What is a watershed?". The student is led step by step following the path of single raindrop. From that path the student can generalize to more raindrops and then to the watershed concepts. At the end of the module, the student is given the opportunity to draw their own watershed upon a topographical map. The students sketches out the outline and then can be graded by the computer.

Module #3 explores the time evolution of a watershed and the concepts involving stream flow generation. The first part of module #3 outlines the basic concepts. At the end of the module the student gets an opportunity to directly interact with the watershed. First the student can tweak variables and observe the effects they have upon the flow of a river. Then the student can change the same variables and actually watch the rivers height vary.



Chapter 3

Basic Navigation

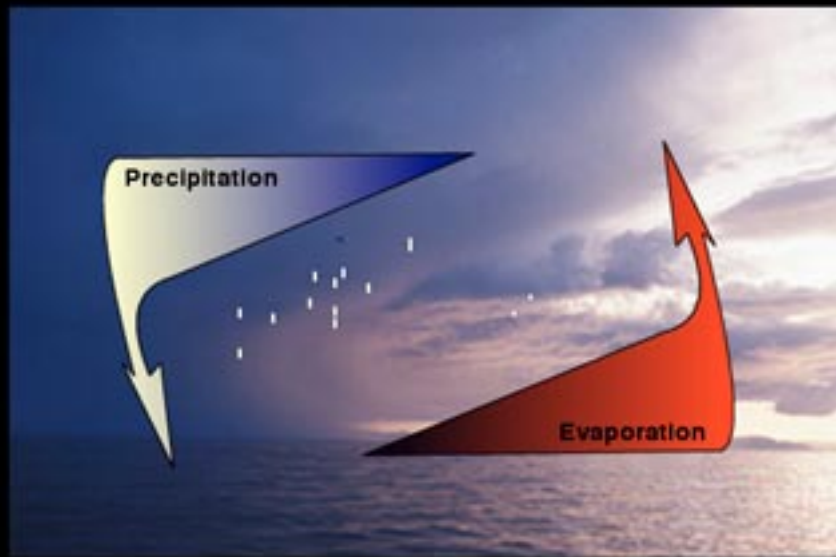
“One small rain drop for man. One giant watershed for mankind.”

When the starting screen starts up you are presented with a variety of options. You can visit one of the modules, check out the glossary, or view our about box.

The basic navigation through modules is very easy. On the bottom right corner of every screen is a next and previous button. By clicking the next button you are brought to the next slide. By clicking on the previous button you are brought to the previous slide. Its as simple as that!

The bottom of every screen also contains a link to the glossary and back to the index or startup screen. Therefore you can quickly navigate through any part of the program.

Once a module is done the student is brought back to the startup screen where they can start a new module, check out the glossary, or view the about box.



The water that falls on the oceans soon evaporates back into the atmosphere.

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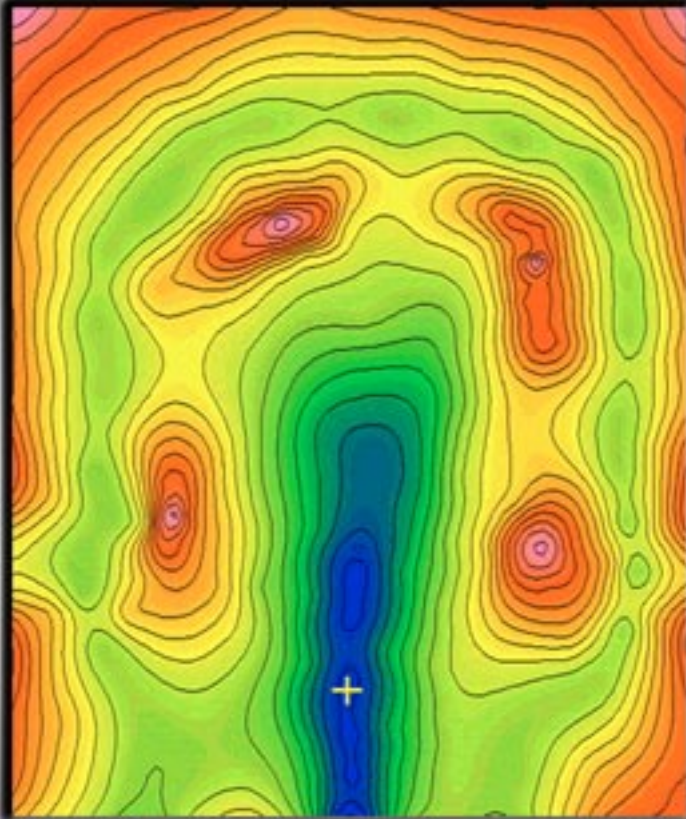
Chapter 4

Watershed Delineation

“To be. Or not to be. That is the watershed.”

The end of module #2 offers a unique experience for the student. Usually a student only reads about how to draw a watershed. If they are lucky, they have pictures that they can draw it on themselves. However situations like this don't allow the student to attempt to draw the watershed correctly as well as receive instant performance ratings. When a student is done they can get a grade on their delineation of the watershed. This helps to encourage the student to do better thereby raising their grade. They can also overlay their answer with the correct answer thereby seeing exactly where they went wrong.

Delineating the watershed is very easy. You can just click and drag the mouse over the proposed outline of the watershed. When done all you must do is click the done button. Your performance rating will pop in the percent box. To see the answer, simply click the answer button. To try again, click the try again button to clear the screen.



+ = Outflow Point

Done

Try Again

Answer

Accuracy Score = 0%

Module 2 Delineating Watersheds

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Chapter 5

Watershed Simulation

“It was a dark and stormy watershed...”

The end of module #3 offers the most exciting experience for the student. By changing various factors, students are able to watch the actual flow of the blackstone river. The student can also watch the river rise and fall as if they were looking right out of their own window.

Although module #3 may look intimidating, its fairly straightforward to use. The variables are represented as sliders on the right side of the screen. By clicking on the sliders and dragging the mouse horizontally one can choose the appropriate values for the factors. When the student is ready, clicking on the compute button starts the simulation.

On the graphing screen, a graph will be drawn for each station. The current station is shown on the bottom of the screen. Stations are also color coded with the key to make viewing easy.

On the simulation screen, pressing the compute button will start the rivers simulation. The factors can be changed and the simulator run as many times as the student likes.

