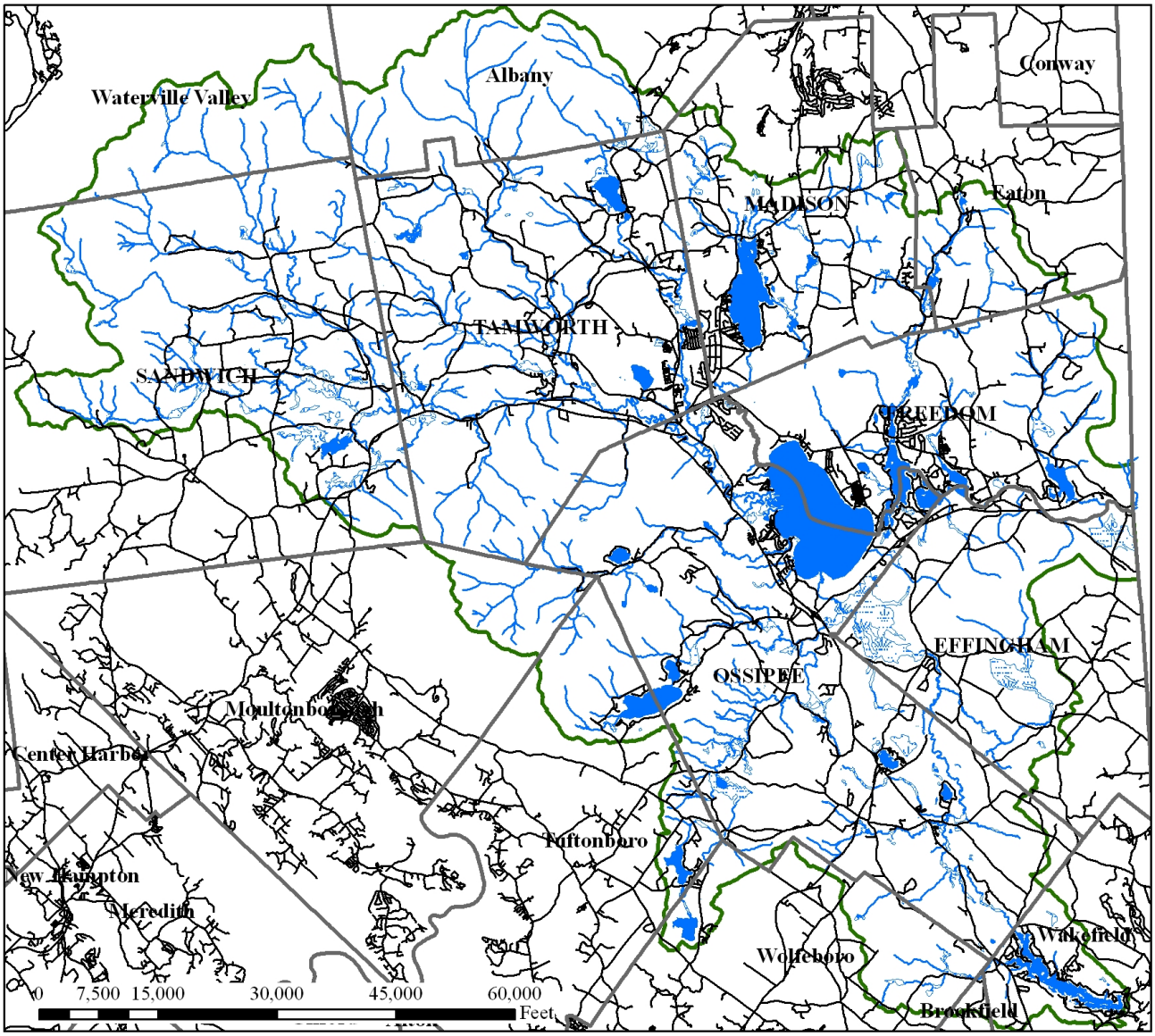
Chapter 2: Surface Water



What do you know about the Ossipee Watershed?

- Color in the Ossipee Watershed.
- Can you find Ossipee Lake, Silver Lake, or Chocorua Lake? Label them on the map.
- Can you find the Bearcamp River or the Pine River? Label them on the map.
- Do you see a large wetland area on the map? Do you know what it is called?

Stream Table Activity Directions

Experiment One

Soil spreader

- Slope the soil down towards the edge of the pan with the hole in it, keeping the soil 3 inches away from the hole.
- Create a stream down the middle of the slope by digging a curved channel (no wider than 2 fingers) into the sand. The stream should not be dug all the way to the bottom of the pan.
- Place the stream table on the desk. Prop the stream table up with a book and extend the end with the hole in it just over the edge of the table.

Group

- Predict what you think will happen when water flows down the river.
- Where will the water go?
- What will happen to the land? To the water as it flows down the river?

Recorder

- Record the group's predictions.

Bucket Holder

- In preparation for the stream flow, place the bucket on the floor beneath the hole in the stream table.

Water collector

- Hold the clear plastic cup (without a hole in it) directly under the hole in the stream table to collect the runoff from the stream.

Water maker

- Fill the cup *with the small hole* up to the line with water (making sure to plug the hole with a finger)
- Place the cup at the beginning of the stream channel and release your finger

Group

- Observe what is happening to the stream channel.

Water Collector

- When the clear plastic cup is full, place it on the table.

Group

- Discuss the affects of rain on the soil and the appearance of the water collected in the cup.

Recorder

- Record the group's observations.

Stream Table Activity Directions

Experiment Two

Now, we will see what happens when more water flows down a river.

Group

- Discuss why you think, in the real world, there could be more water flowing in the river.

Recorder

- Record the group's thoughts.

Soil spreader

- Recreate a slope similar to the one you made at the beginning of the class.
- Dig a stream similar to the one dug in the first experiment.

Group

- Develop a hypothesis – how will the greater flow of water affect the land and water flowing in the river?

Everyone

- Repeat the instructions from Experiment One. This time the **water maker** should use the plastic cup with the *large hole*.

Group

- Compare and contrast what happened to the soil, how much water ran off the land, and how the runoff water from the two trials looked.

Recorder

- Record the group's ideas.

Stream Table Activity Worksheet

Experiment One

Make Predictions

When you add water to the stream, where will the water go?

_____

_____

_____

What will happen to the land when you add water to the stream?

_____

_____

_____

What will happen to the water as it flows through the stream?

_____

_____

_____

Make Observations

What happened to the land around the stream after you added water?

_____

_____

_____

Is the water you collected from the stream different from the water you added? If it is, describe the difference.

_____

_____

_____

Stream Table Activity Worksheet

Experiment Two

Have a Discussion

In a real stream, what would cause there to be more water in the stream?

_____

_____

_____

Make a Prediction

How will adding more water to the stream affect what happened to the land and water?

_____

_____

_____

Make Observations

What happened to the land around the stream after you added water?

_____

_____

_____

Is the water you collected from the stream different from the water you added? If it is, describe the difference.

_____

_____

_____

Make Comparisons

How was the water you collected from the two experiments different?

_____

_____

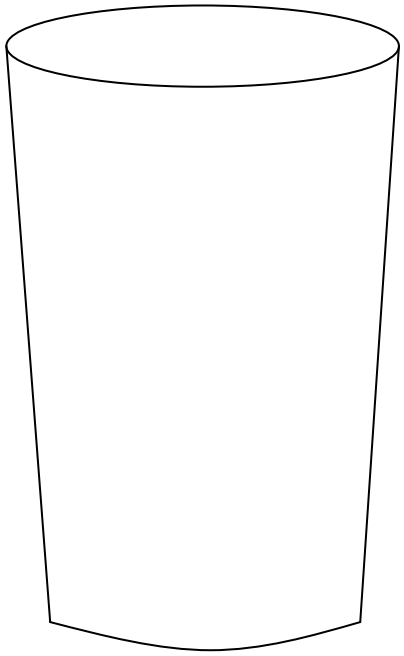
How was the way the land changed the same or different between the two experiments?

Draw what happened in the space below. Make sure to label the stream channel and any places where deposition and erosion occurred. Label any interesting observations.

Topsy Turvy Lake Turnover Worksheet

Part 1

Draw what happened in the first experiment.



Part 2

Describe what happened in the second experiment.

Glossary

Adjacent watershed: The higher ground that captures runoff and drains to the stream, often defined by the land extending from the riparian zone to about a quarter mile from the stream.

Algae: Simple single-celled (phytoplankton), colonial, or multi-celled, mostly aquatic plants, containing chlorophyll and lacking roots, stems and leaves.

Algal Bloom: A heavy growth of algae in and on a body of water. This is usually a result of high nitrates and phosphate concentrations entering waterbodies.

Best management practices (BMPs): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution.

Deposition: The process of dropping material that is being transported by water or wind.

Emergent plants: Plants with true stems, roots, and leaves with most of their vegetative parts above the water.

Epilimnion: The upper, well-circulated, warm layer of a thermally stratified lake.

Erosion: The gradual wearing away of land surface materials, especially rocks, sediments, and soils, by the action of water, wind, or a glacier. Usually erosion also involves the transport of eroded material from one place to another.

Eutrophic lake: "Eu" means true and can be translated to mean true nutrients or truly nutrient rich. Eutrophic lakes are high in nutrients and support an abundance of life including a diversity of vegetation, frequent algae blooms, and large fish populations.

Floodplain: The low area of land that surrounds a stream and holds the overflow of water during a flood.

Floating plants: Plants that are detached from any substrate and are therefore drifting in the water.

Headwaters: The origins of a stream.

Hypolimnion: The deep, cold, relatively undisturbed bottom waters of a thermally stratified lake.

Impervious surface: A paved or other hard surface that does not allow water to penetrate.

Impaired waterbody: A waterbody with chronic or recurring violations of water quality standards or beneficial uses identified by state and national environmental agencies.

Macroinvertebrate: Organism that lacks a backbone and is large enough to be seen with the naked eye. Examples include crayfish, mussels, aquatic snails, aquatic worms, and the larvae of insects.

Mesotrophic lake: "Meso" means middle or mid. Mestrophic lakes have medium levels of nutrients and these waterbodies tend to be clear, have beds of submerged plants, and can have seasonal variations in oxygen level that limit high water quality fish from thriving.

Metalimnion (thermocline): The middle layer in a thermally stratified lake where the decrease in temperature with depth is at its greatest.

Nitrogen: The most abundant atmospheric gas, nitrogen comprises approximately 78% of the Earth's atmosphere. This element is especially important for plant growth and is used by both plants and animals to carry out many of the functions of life.

Non-point source pollution: Sources of pollution that are distributed throughout the landscape and find their way into surface water as runoff flows over land surfaces.

Nutrients: Inorganic substances (most commonly nitrogen and phosphorus) required by plants to manufacture food through photosynthesis.

Oligotrophic lake: "Oligo" means very little. Oligotrophic lakes are low in nutrients and therefore tend to have little plant and algae growth; have deep, clear water; and support many fish species that require cold, well-oxygenated waters.

Point source pollution: Sources of pollution that are easily traced back to a specific discharge point, such as sewage treatment plant and industrial effluent pipes.

Pool: A pool is deep with slow moving water and a stream bottom that consists of soft, fine sediments.

Riffle: A riffle is shallow with fast, turbulent water running over rocks. Riffles are often characterized by white caps, where water flowing quickly over rocks mixes the water with the air resulting in the highest dissolved oxygen concentrations in the stream.

Riparian zone: The riparian zone is the area adjacent to and along a stream that is often covered by vegetation.

Run: A run or glide is deep with gently and smooth flowing water and little or no turbulence. Making sure that a mix of pool, riffle, and run habitats are available within the stream system will help protect a diversity of aquatic life.

Runoff: Water from rain, snowmelt, or irrigation that flows over the ground and returns to streams. It can collect pollutants from air or land and carry them to streams and other surface waters.

Sediment: Soil, sand or minerals washed from land into surface waters.

Septic system: A system that treats and disposes of household wastewater under the ground.

Stream channel: The land surface that is completely covered by flowing water.

Streamside cover: Any overhanging vegetation that offers protection and shading for the stream and its aquatic inhabitants.

Submergent (submerged) plants: Plants that are completely immersed in water.

Substrate: The material that makes up the bottom of a stream and can include: clay, silt, sand, gravel, cobble, boulder, or bedrock. These substrate types are differentiated by their size.

Surface water: Surface water refers to all the features that hold water on the Earth's surface including: oceans, streams, rivers, lakes, ponds, wetlands, etc.

Thermal stratification: A process by which a deep lake becomes layered by temperature in the summer months.

Trophic states: A way to classify and refer to different types of lakes based on the amount of available nutrients (nitrogen and phosphorus) for aquatic life. The root of the word "trophy" means nutrients.

Water quality: The ability of a waterbody to support all appropriate beneficial uses. Beneficial uses refer to the ways water is used by humans and wildlife, such as for drinking water and fish habitat. If water supports a beneficial use, water quality is said to be "good" or "unimpaired". If water does not support a beneficial use, water quality is said to be "poor" or "impaired".