

LESSON 2: WATERSHEDS

CONCEPTS:

Systems & Systems Models
Watershed
Water Cycle

NGSS:

3-LS2 – Ecosystems & Interactions
4-ESS2 – Earth's Systems
4-ESS3 – Earth & Human Activity
5-LS1 – Energy & Matter
5-LS2 – Ecosystems

DURATION:

30-45 minutes

SUMMARY

Students will make a model of a watershed. They will observe how surface water flow is determined by the shape of the land. Students will visually observe the physical characteristics of a watershed, and investigate the impacts of human land use decisions.

OBJECTIVES

Learn what watershed are and their function as water collectors.

Learn the different layers of a forest and their roles.

Learn how water moves from forest to faucet.

Learn how human activity can alter watersheds and water quality.

MATERIALS

- Plain scrap paper (2 per student pair)
- Spray Bottles
- Water
- Water-based marker (blue, brown, and black for each pair)

ACTIVITY

Students will follow the instruction on the student worksheets to conduct their experiments.

*Activity from the Alice Ferguson Foundation: http://fergusonfoundation.org/teacher_resources/crumpled_paper.pdf

Expanded Activity (additional 20-30 minutes):

Use Google Maps to explore your watershed. Discuss human land use, alterations of waterways, agriculture, etc. to discuss how this might alter the water quality that feed into the ocean.

Student Worksheets - Pt. 1

Name:

Set Up: Experiment #1: Follow the instructions below to set up the experiment.

1. Crumple up the piece of paper your teacher gave you, and then smooth it back out most of the way. It should still be a bit crumpled, showing small ridges (high points) and valleys (low points).
2. Imagine that this paper is a section of land, and find the ridgelines (the tops of the fold-lines).
3. Use a washable blue marker (not permanent) to color along the ridgelines on your "land."

Make Your Hypotheses: You are going to "rain" on your landform. Answer the following questions to make your hypotheses before conducting the experiment.

1. What do you think will happen to your land when it "rains?"
2. What will happen to the blue ridge lines you colored?
3. Where will the "rainwater" travel?

Run the Experiment: Follow the directions below to conduct the experiment.

1. Use a spray bottle of water to create a "rainstorm" over your land. You want to create gentle sprays of mist.
2. Observe what happens after every misting.
3. As your "rainfall" accumulates, observe the pathways where the excess "rainfall" travels.

Student Worksheets - Pt. 2

Record Your Observations: In the space below, record your observations about what happened (Use words and pictures if you wish).

Student Worksheets - Pt. 3

Analyze Your Data and Draw Conclusions: Answer the following questions and complete the activities to analyze and draw conclusions about your data.

1. Explain how your hypotheses were or were not accurate.
2. How did the “rainfall” travel over your land?
3. Where did the water collect? Explain why this happened.
4. Find an area on your land where water collected. This is a lake, and you get to name it! My lake is called:

.
5. Look for the major stream running into your lake. Name this stream as well. My stream is called:

Student Worksheets - Pt. 4

6. This stream may have several tributaries (small streams which run into the larger stream). How many does your stream have?

7. With your finger, trace your stream all the way back up to where it starts at the top of the ridge. (This should be a path of blue ink.) When you reach the top, this is the edge of the watershed for your stream and lake.

8. Trace the entire edge of the watershed with your finger, by following the ridgeline. This will be something like tracing the edge of a bowl.

All of the inside, downward-sloping area you have just outlined is the watershed for your stream and lake.

9. Draw a picture of your watershed below. Label your stream and lake.

10. How many other watersheds can you find on your "land?"

11. How would you define the word "watershed?"

Student Worksheets - Pt. 5

Set Up: Experiment #2: Follow the instructions below to set up the second experiment.

1. On a fresh sheet of paper, draw some of the ways people use the land. Include a house/community, farm, factory, and some streets/highways.
2. Using the color key below, color your areas with markers.

Use these colors to represent What Might be in this watershed:

Brown = Farms
Red = Landfills & Factories
Black = Houses & Streets

3. Crumple this paper, and smooth it in the same way you did the first one.
4. Use the blue marker to trace the ridgelines on this paper.

Make Your Hypotheses: Make hypotheses about what you think will happen when you “rain” on your land this time.

Run Your Experiment: Gently mist your new land with water from your spray bottle. Observe what happens, and how the water travels.

Record Your Observations: Record your observations (in words and pictures) here.

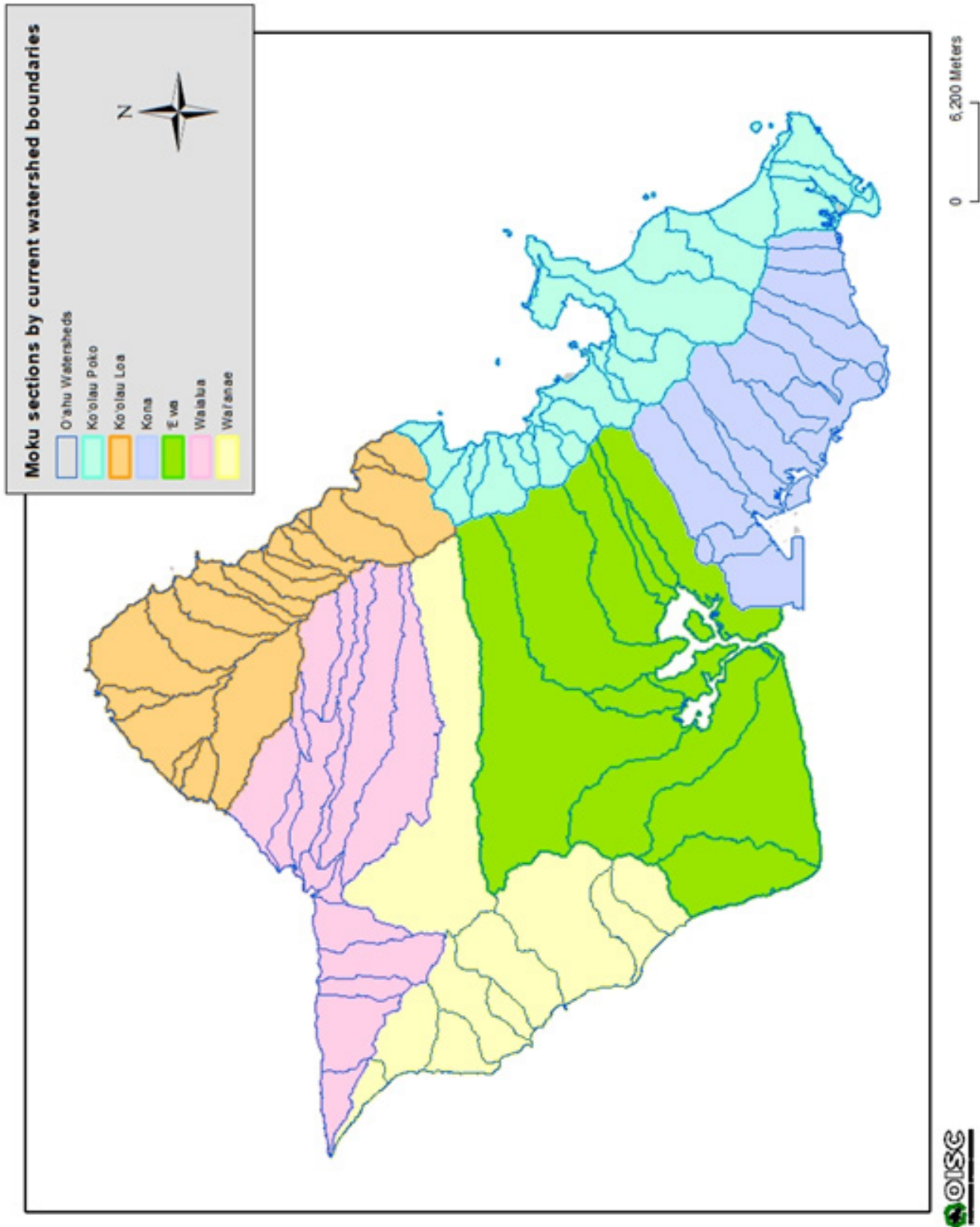
Student Worksheets - Pt. 6

Answer the following questions to analyze and draw conclusions about your data.

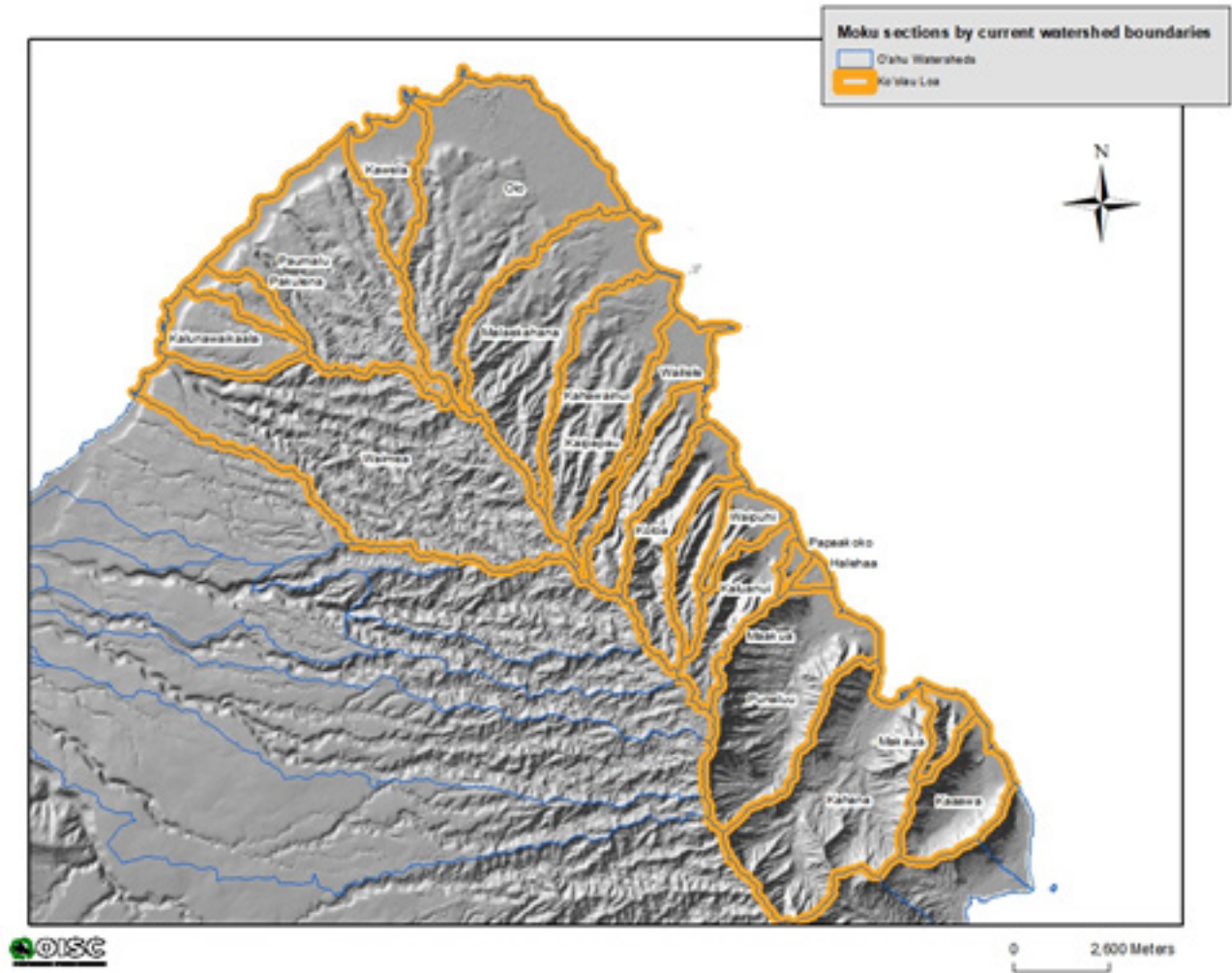
Conclusions

1. What happened in your second experiment?
2. What do you think the colors could represent in real life?
 - Brown =
 - Red =
 - Black =
3. Where were the colors in the end?
4. Where are you in this watershed? What kinds of pollution do you think you add to the watershed?

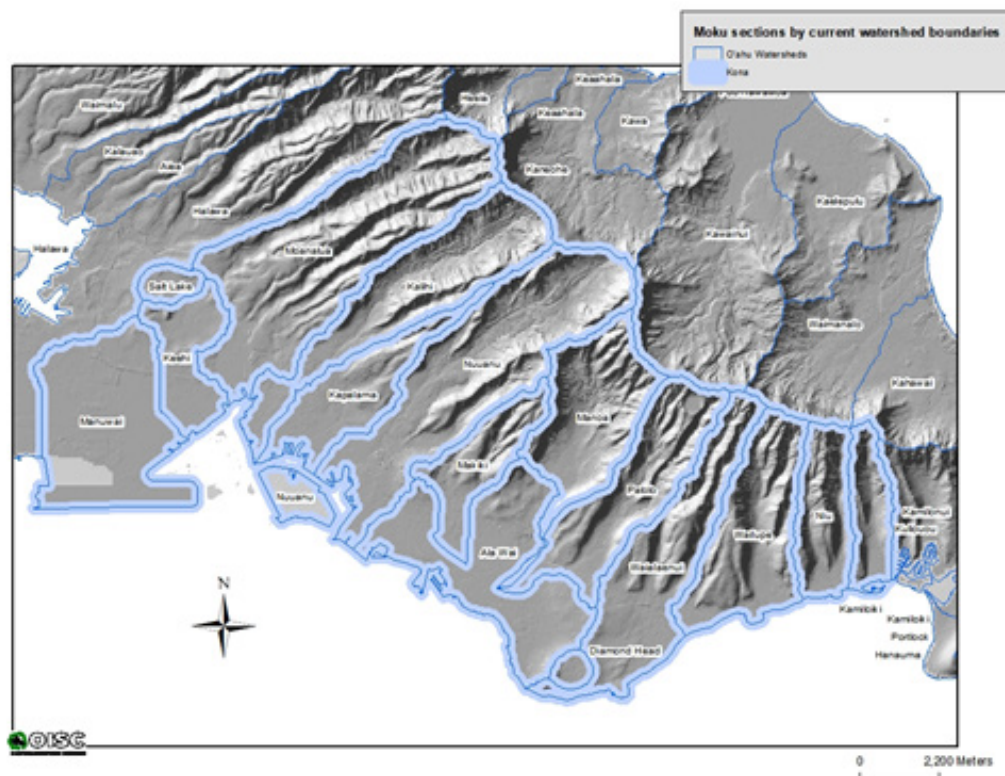
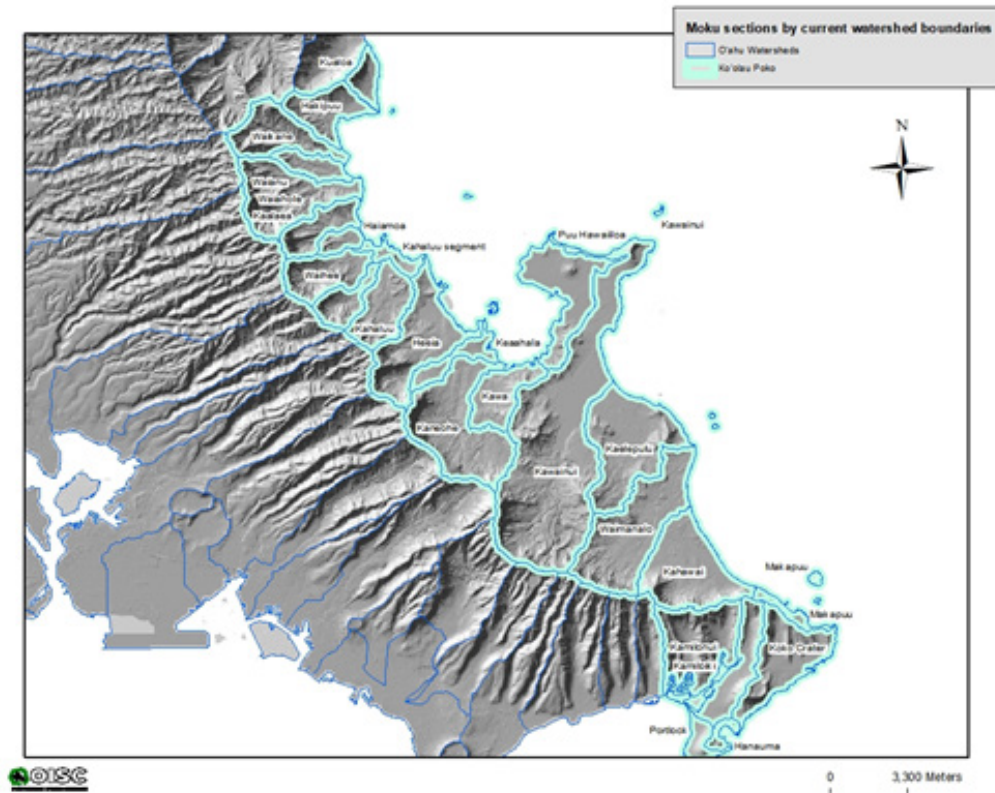
Watershed Maps



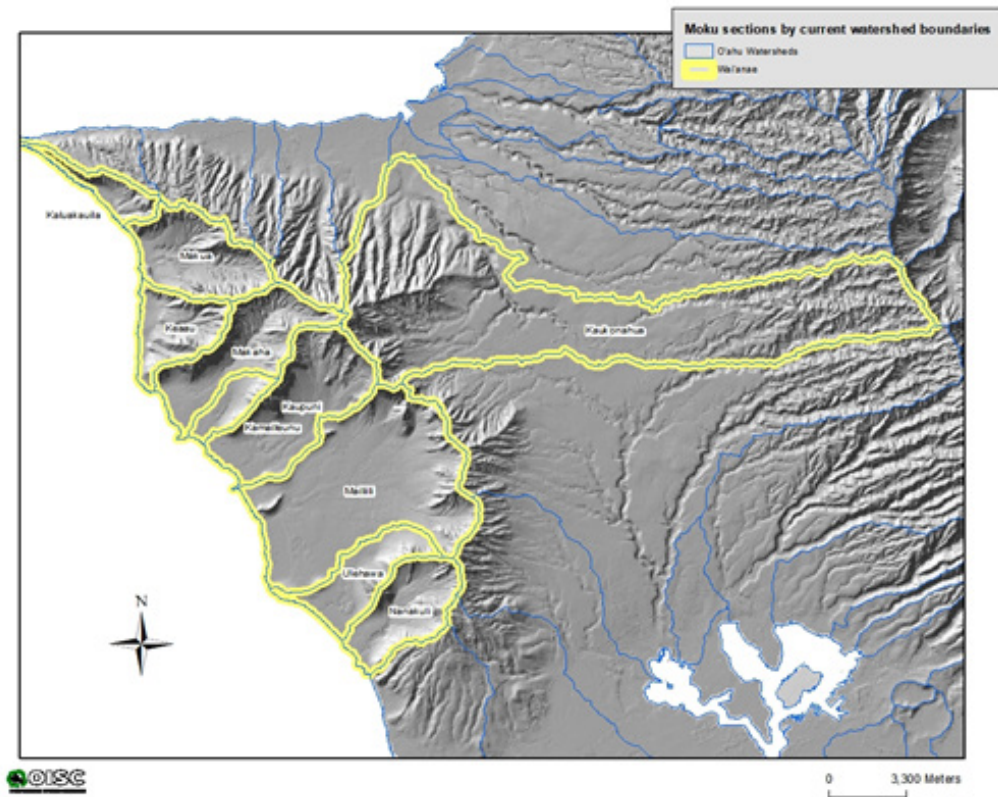
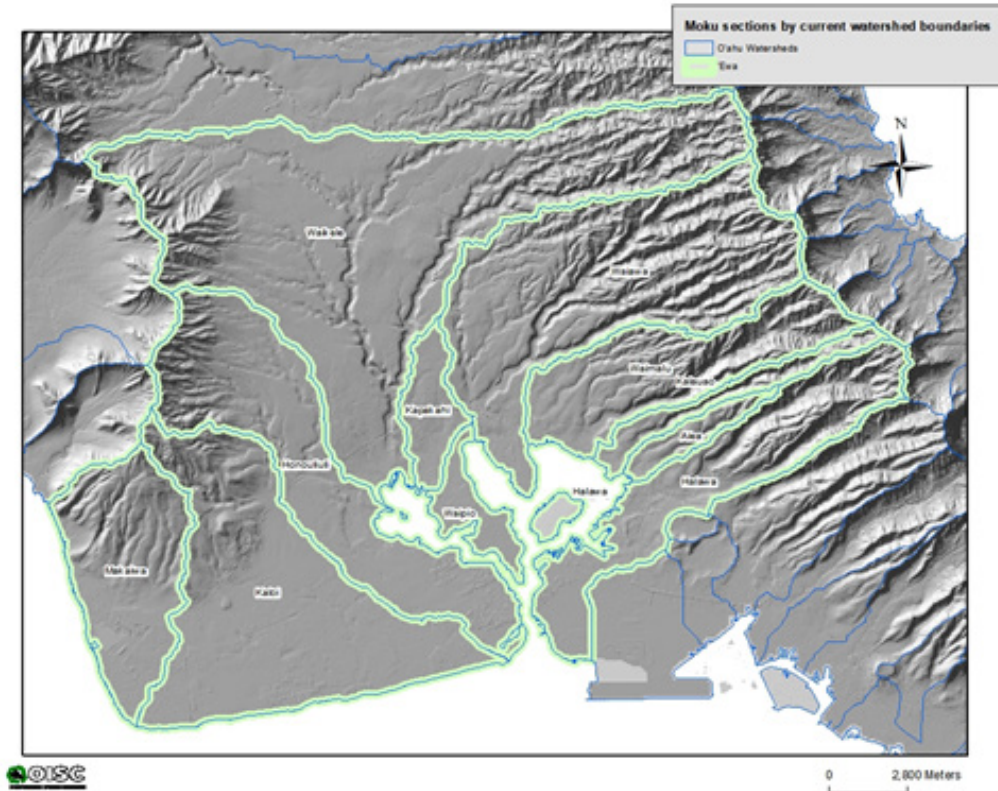
Watershed Maps



Watershed Maps



Watershed Maps



Watershed Maps

