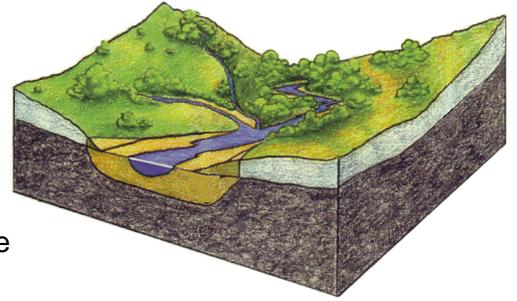


Create a Watershed

Overview:

Youth create a three-dimensional model of a watershed, define vocabulary, identify key geographic features, predict drainage patterns, and identify natural and human environmental impacts.



A watershed model can demonstrate runoff in action and the potential for collecting water in a landscape through passive rainwater harvesting methods.

Materials:

- 2 sheets of 8 ½” by 11” photocopy paper for each participant, pair, or small group
- Transparent tape
- Water soluble markers (not permanent) (1 each of red, blue, green, brown, black, purple, orange, yellow for each person, pair, or small group)
- Spray bottle filled with water
- “Arizona Watershed Map” (included)

Activity Duration:

45 minutes

Preparation:

- Collect all the necessary materials.
- Photocopy or bookmark the “Arizona Watershed Map.”

Activity Steps:

1. Explain the basic concepts of a watershed. A watershed is the land that water flows across, through, or under on its way to a stream, river or lake, or closed basin. A watershed is like a natural bathtub that drains out at the lowest point.
2. Explain that the United States is divided into seven large regions. Arizona is a part of the Colorado River Basin and is divided into 84 major watersheds. There are many more sub-watersheds that are smaller drainage areas. Show participants the “Arizona Watershed” map and explain that this activity will demonstrate aspects of watersheds.
3. Distribute all the materials for the activity.
4. Have participants crumple one of their two sheets of paper into a tight ball.
5. Have them carefully unfold the paper ball to expose the four corners of the sheet of paper. (Note: The paper should not be completely opened up and flattened. One side should bulge upward like a mountain. The “mountain” will become the summit of the model.)
6. Participants will carefully and gently pull the corners of the top sheet out slightly and fasten the edges to the bottom sheet of paper with transparent tape. The bottom sheet should extend beyond the top sheet on all sides which will cause the top sheet to stand up like a mountain. (See examples).
7. Ask the participants what the top of a mountain is called. (Answer: summit or peak)

8. Ask youth the name of the sharper edges that connect the peaks. (Answer: ridgelines)
9. Help participants locate the summit(s) on their models. Using a blue marker, they will draw lines along the ridges.
10. Water moves downhill because of gravity. The ridges deflect water to one side or the other. Ask participants what the degree of slope has to do with water speed (velocity) and erosion.



11. Ask youth to define a low lying area between ridges. (Answer: valley) Help them to locate valley bottoms where water would flow when it would run off of the summit, ridges and slopes. Participants use green markers to outline valley areas.
12. Participants look at their models and identify distinct watersheds that are defined with blue and green markers. Have participants count how many watersheds they have on their model.
13. Have participants decide if there are any places on their model where they could have a farm. Using the brown marker, have them darken 2-3 areas (no bigger than a dime) that they might believe would be good for farming.
14. Have participants decide if they could have a town somewhere. Use black grids to designate town areas. Keep areas to no more than 1" X 1."
15. Use other colored markers to identify/describe/locate wastewater treatment plants, mines, landfills, and toxic waste sites.
16. Encourage participants to not overly clutter their models. Suggestions are for 2-3 mines, 1-2 landfills, 1-2 wastewater treatment plants, 2-3 farms/ranches, etc. A dime size colored dot can best represent a specific feature.

Suggested marker colors:

- Blue - Summit and ridges
- Green - Valley
- Brown - Farm/ranch
- Black- Town
- Orange - Waste water treatment plant
- Yellow - Mine
- Purple - Landfill
- Red - Toxic waste site

17. Once the model is complete, ask the youth a few questions about their choices in placing the different sites where they did.
18. Take the models outside or to a place where water will not be damaging. Participants introduce a "monsoon" rain shower by spraying water over their models, using spray bottles at a distance of 9-12 inches. Ask participants to spray 5 sprays and watch what happens to their models. Have them spray 5 more sprays and watch. Have youth continue spraying water in 5-spray increments until there is some flooding. Ask participants to explain (in writing or out loud) the changes they see in their models after adding water.
19. Ask youth to locate areas where erosion, floods, runoff, and pollution have taken place. Ask what problems participants can identify (such as issues relating to blended colors). Ask participants follow-up questions and ask what they could have done to place their communities differently?
20. If space, weather, and time permit, the models can be air dried and used for follow-up observation and activities. Encourage youth to take the models home and explain a watershed to their families to increase awareness of watershed resources.

Follow Up Questions for Participants (To Answer in Writing or Aloud):

- How many watersheds are on your model?
- Where is the highest point on your model?
- Where is the lowest point on your model?
- What are the lowest areas called?
- Where are the ridges?
- Are some ridges steeper than others?
- Do the valleys vary a lot in size?
- Can upper valleys exist?
- Where would you most likely find towns and why?
- What are some benefits of being in a valley? (it is the most level area, good land for growing, more water available, etc.)
- What are some potentially negative aspects of being in a valley? (flooding, aquifer contamination, etc.)
- How can runoff water be contained or managed? (permeable surfaces, contouring landscapes to capture water, etc.)
- How can rainwater harvesting help watersheds?
- If you were to do this activity again, would you place your farms, towns, wastewater treatment plants, etc. differently?

Sources:

Adapted with permission from a lesson developed by Russ Raden, former Arizona Cooperative Extension staff member

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Arizona watershed map:

Arizona Department of Water Resources granted permission for inclusion

3550 N. Central Ave

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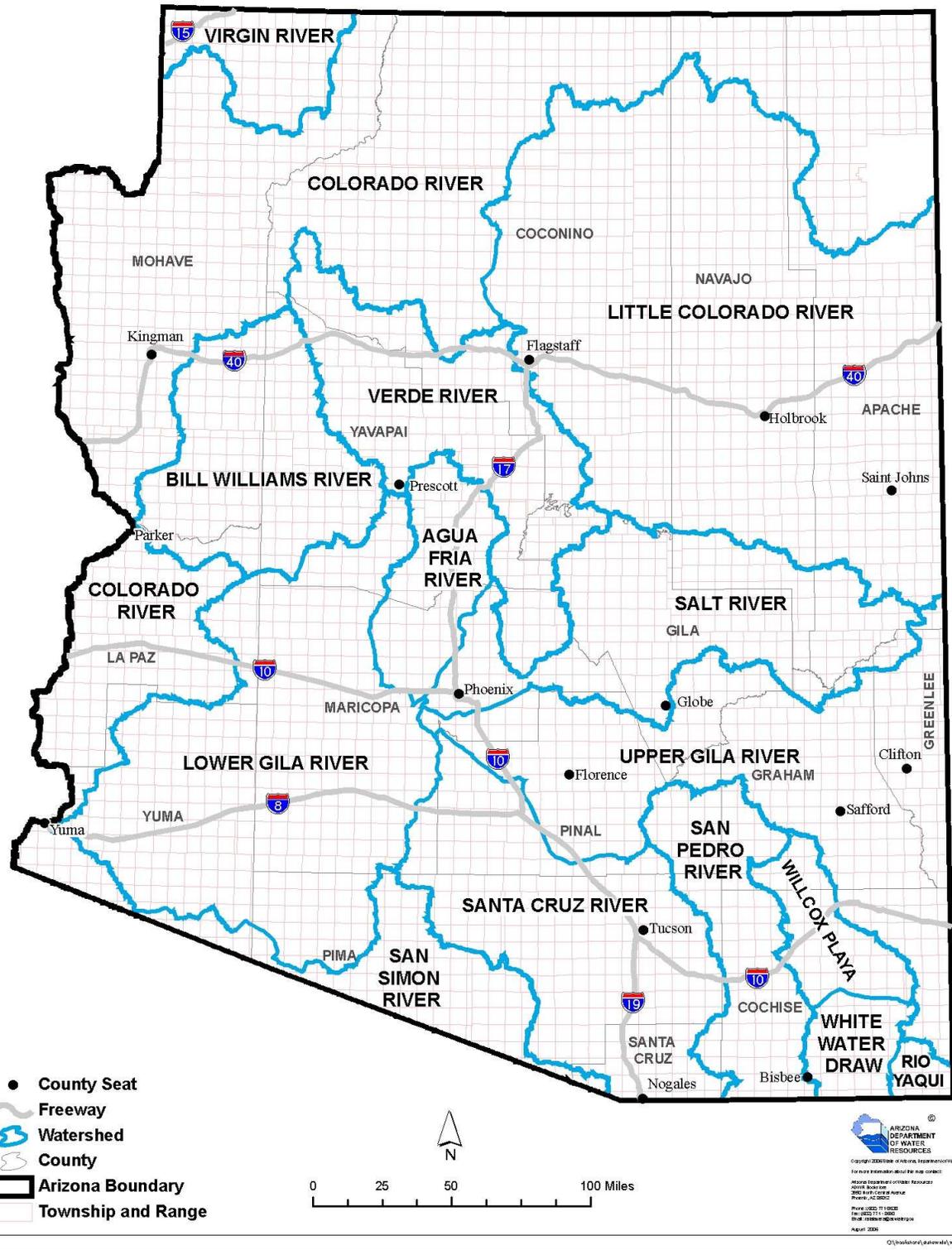
(602) 771-8500

www.azwater.gov/



Model before and after spraying

ARIZONA WATERSHEDS



Watershed map courtesy of Arizona Department of Water Resources