

Lab: Color Me a WaterShed

(modified from Project Wet)

Part 1 - Map Overview:

- Choose a color to represent each land use area and note the color on each map key.
- Lightly color each land use area on each map (located at end of this document) using the colors of your key.
- Compare land use area in each time period, noting changes in each type of land use area, as you answer the following questions.

Questions:

1. What happens to forest cover through time from Map A to Map C? What land use(s) is replacing the forest through time?
2. Which map has the most land devoted to human settlement?
3. Where are most of the human settlements located? What factors may have been involved in the decision to locate human settlement in the present location?
4. What effect might the human settlement have on the watershed?
5. Propose a different way to handle human settlement - starting with Map A.

Part 2 - Map Analysis:

- Determine the land area of maps A, B, and C. Each grid unit = 1 km²
- Calculate the land coverage for each land use type (i.e. forest, agriculture, grasslands, etc) in square kilometers AND percentage of total watershed land area shown on the map. Record in the table below.

Area of Land Coverage

	Map A 100 years ago		Map B 50 years ago		Map C Present	
	km ²	%	km ²	%	km ²	%
Land coverage						
Forest						
Grasslands						
Wetlands						
Residential						
Agricultural						
Stream						

Questions:

1. Which land coverage do you think could absorb the most water in a storm? WHY?
2. Which land coverage do you think could absorb the least water in a storm? WHY?
3. What percentage of water in a storm do you think will run-off the land in this portion of the watershed?
4. Do you think this volume will increase or decrease with the changes in land coverage over time? WHY?

Part 3 - Predicting the Future:

- Assume an unusual storm dropped 5 cm (0.05m) of rain evenly across the entire watershed shown on the map. Use the data from the table above (Area of Land Coverage) to calculate the amount of water in cubic meters (m³) that fell on each watershed land use area in each time period. Record in the table below.
- Each land use sheds water at a different rate. Use the hypothetical estimates of runoff to calculate the amount of water in cubic meters (m³) that will runoff into the stream. Record in the table below.

Volume of Rain and Volume of Runoff

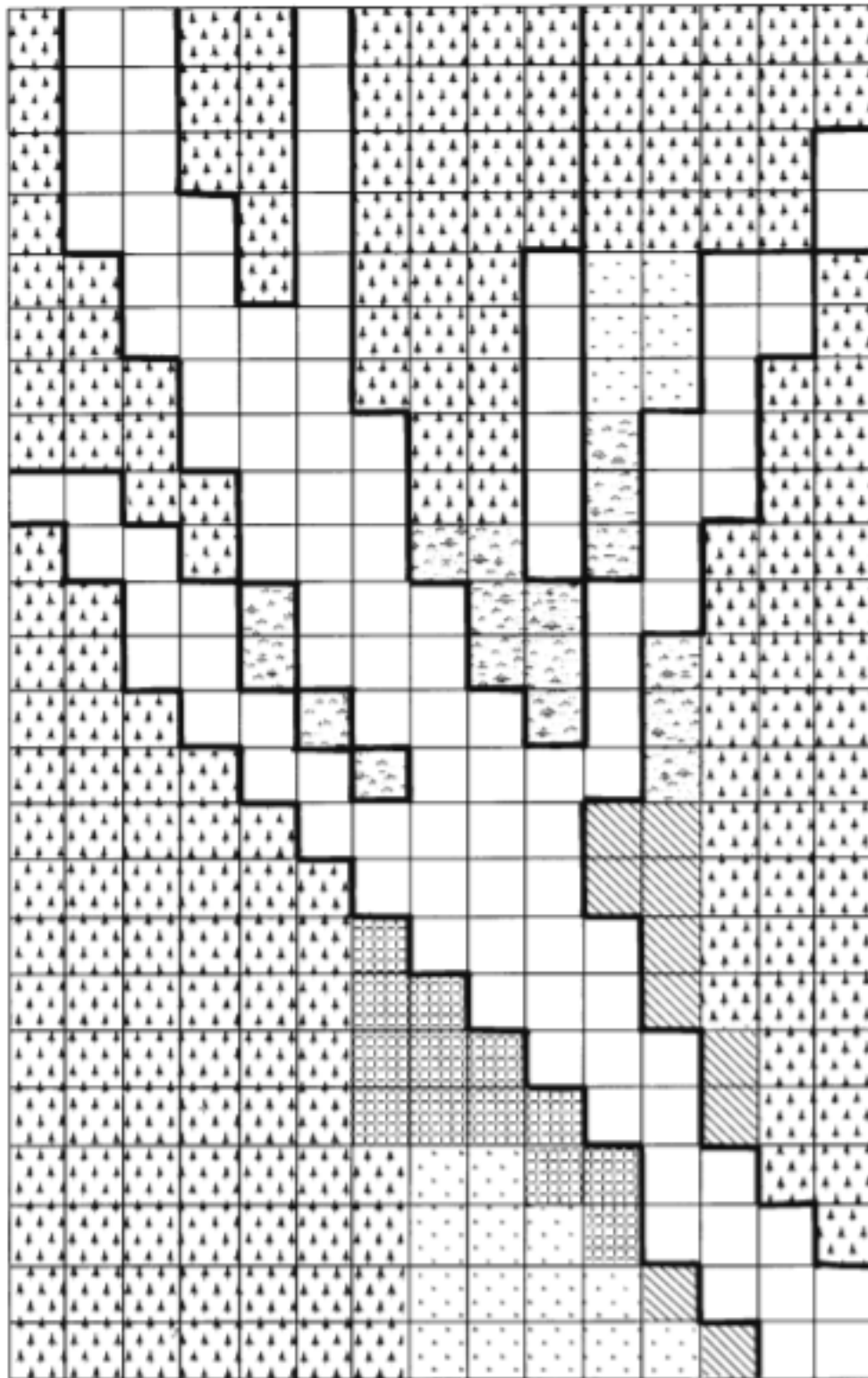
	Map A 100 years ago		Map B 50 years ago		Map C Present	
	volume m ³	runoff m ³	volume m ³	runoff m ³	volume m ³	runoff m ³
Land coverage and % runoff						
Forest 20% runoff						
Grasslands 10% runoff						
Wetlands 5% runoff						
Residential 90% runoff						
Agricultural 30% runoff						
Total runoffff						
Total runoff plus stream discharge (5,550,000 m³)						

Questions:

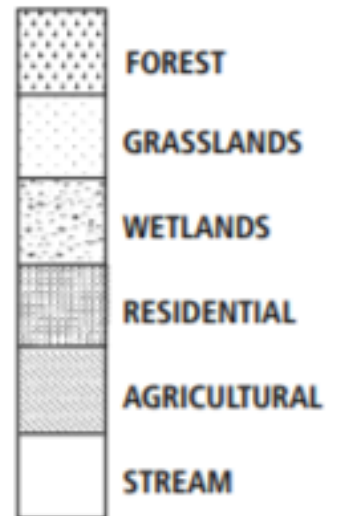
1. Which land coverage absorbs more water? WHY?
2. What problems may arise if water runs quickly over surface materials, rather than moving slow or soaking into the ground?
3. How might water quality be affected by changes in the watershed?
4. Which map represents the watershed able to capture and store the most water? WHY?
5. How might this knowledge be used in Wake County, NC?
6. Map D depicts the results of a fire in the watershed. Fires can either be natural or anthropogenic. List at least one natural cause AND at least one anthropogenic cause.
7. Calculate the percentage of the watershed affected by this burn.
8. How would this burned area affect the runoff in the watershed?
9. Identify the succession as either primary or secondary AND describe the changes that will occur.

Map A:

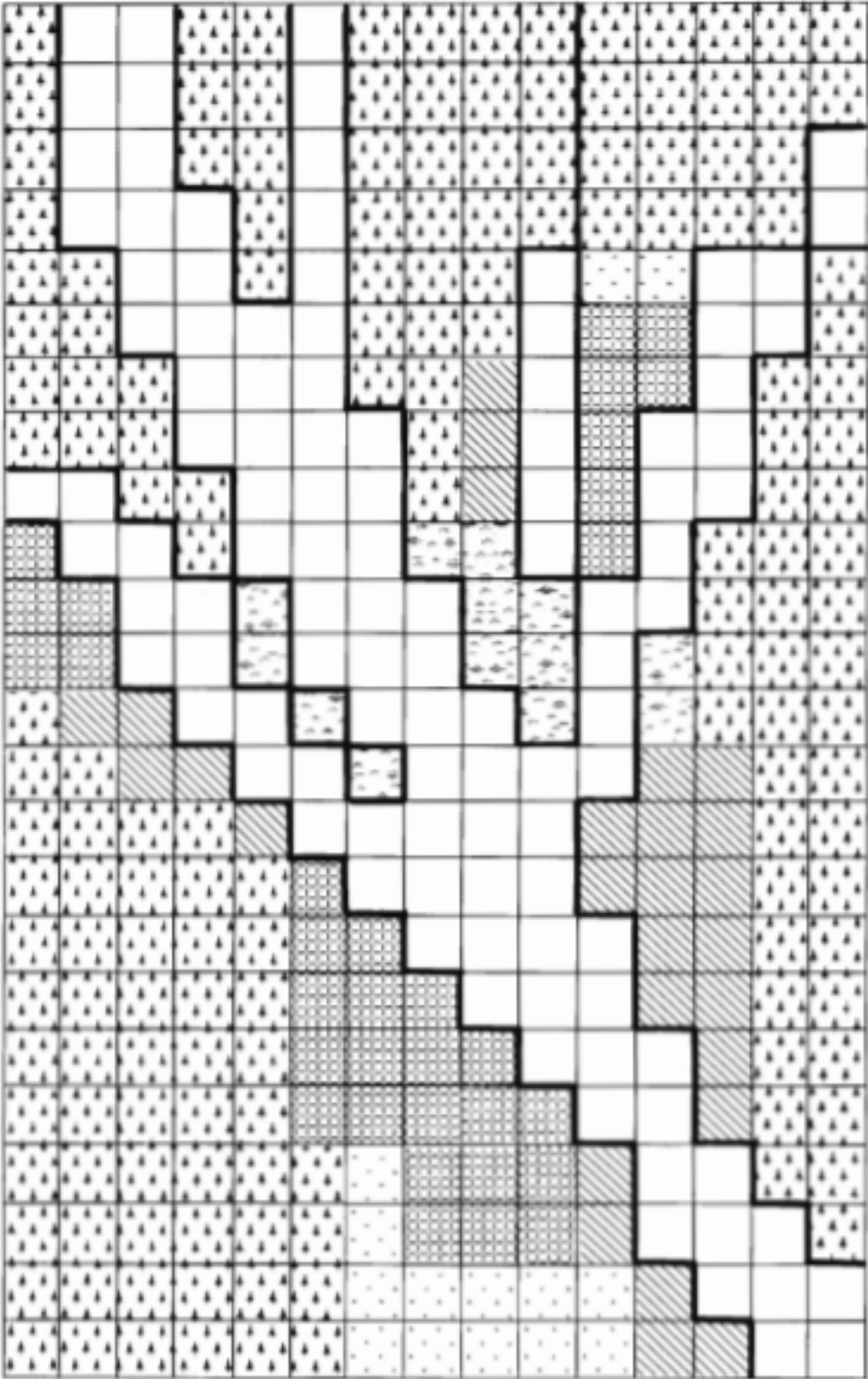
100 Years Ago









KEY



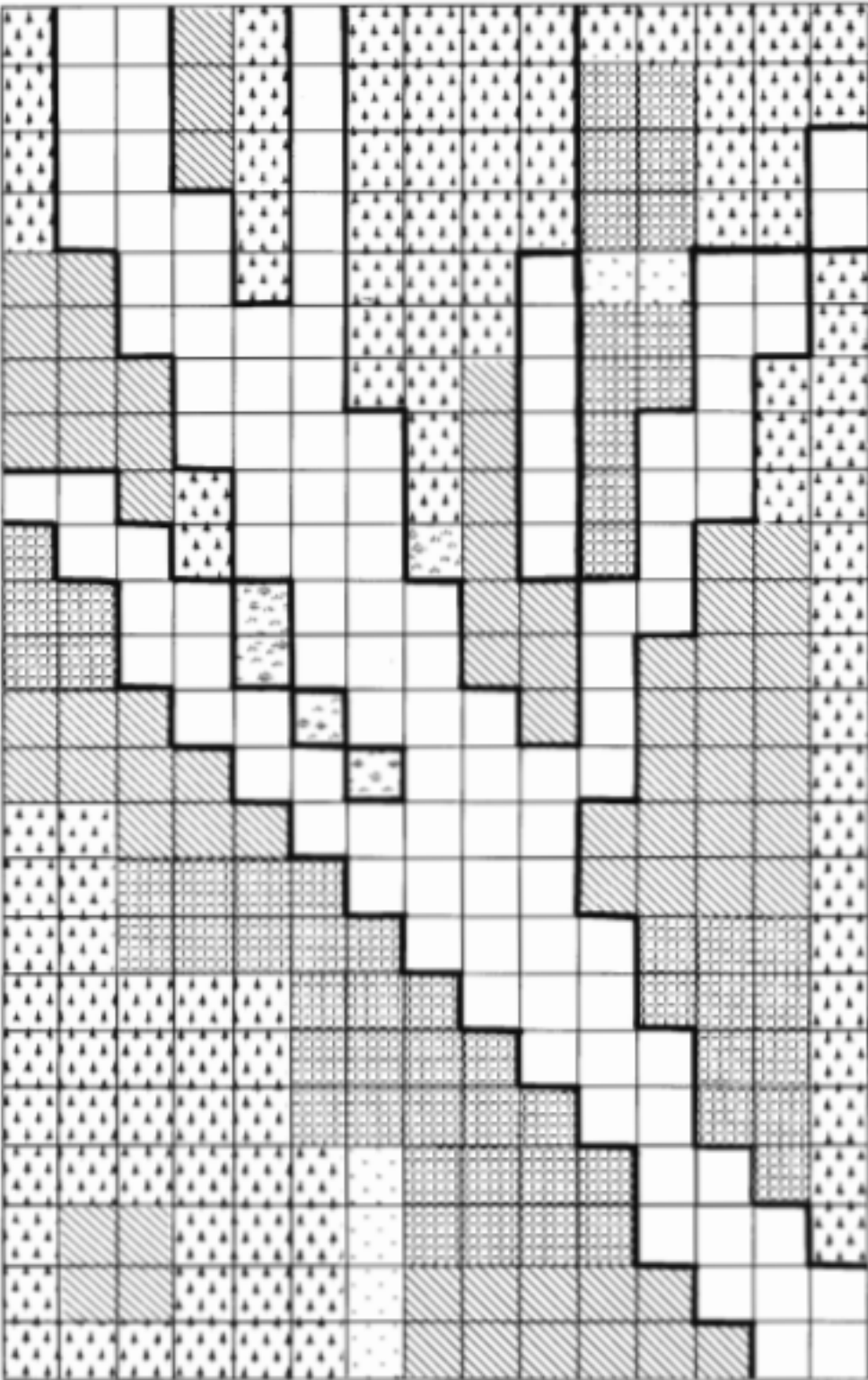
Map B:
50 Years Ago









KEY

-  FOREST
-  GRASSLANDS
-  WETLANDS
-  RESIDENTIAL
-  AGRICULTURAL
-  STREAM

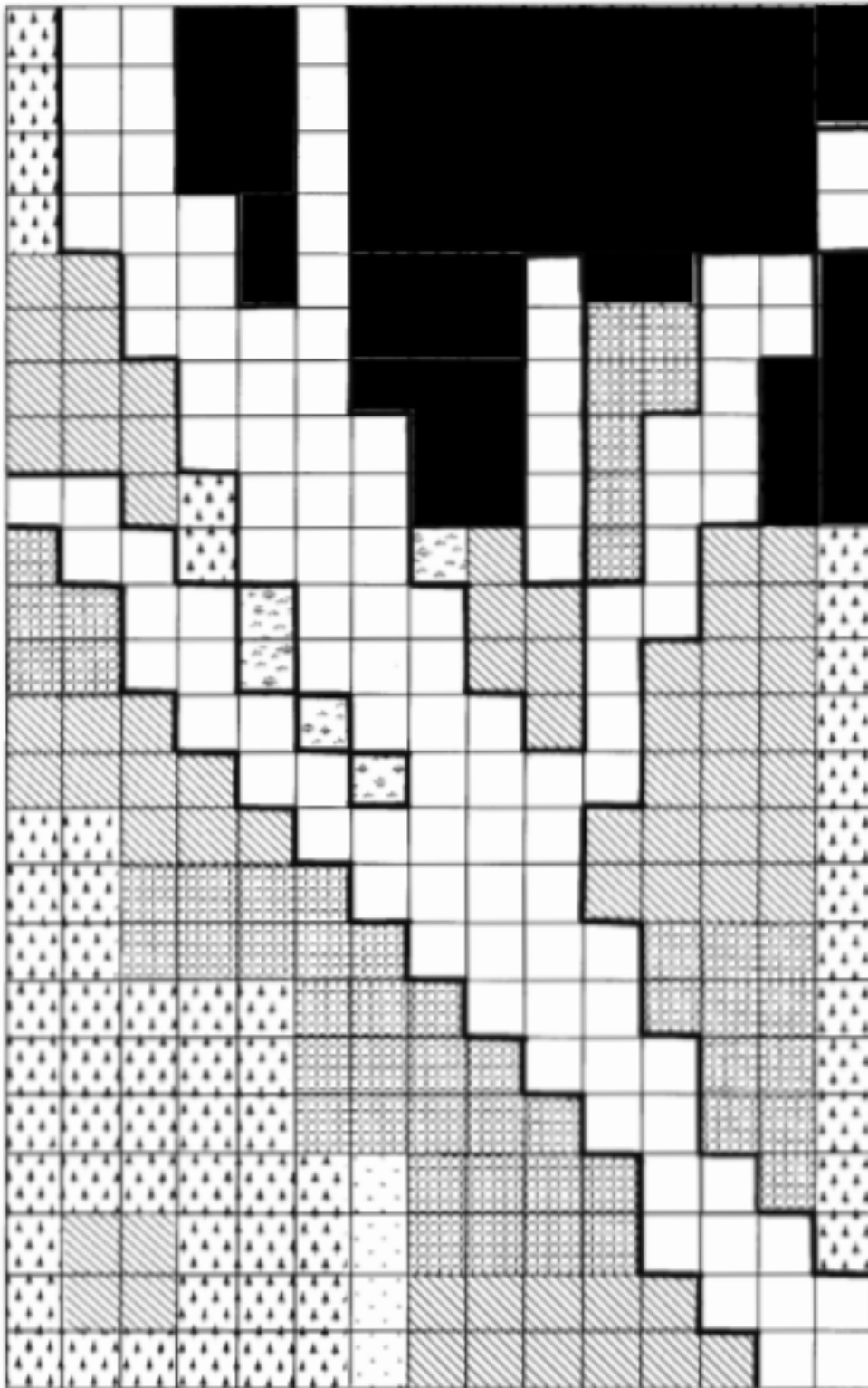
Map C:
Present









KEY

-  FOREST
-  GRASSLANDS
-  WETLANDS
-  RESIDENTIAL
-  AGRICULTURAL
-  STREAM

Map D: Burned Watershed



KEY

-  FOREST
-  GRASSLANDS
-  WETLANDS
-  RESIDENTIAL
-  AGRICULTURAL
-  STREAM