Physical Geology
Basins, Divides, and Graded Streams

The Kaaterskill Creek drainage basin in the eastern Catskills reveals much about how stream systems work. In this lab you will analyze several aspects of the system in an effort to understand how and why systems change over time. Additionally, the maps and diagrams that you create will be used in class as we examine questions not directly addressed in this lab

PROCEDURE:
You need: Your lab manual or another suitable map of the Kaaterskill Creek area, a few colored pencils, a regular pencil, and graph paper or access to graphing software. You will likely need to refer to your Physical Geology text as well.

1. Using a different color for each order, trace the streams of the Kaaterskill basin above Palenville (600' contour) on the map on page 2. You will have to start with the first order streams in order to determine the order of the larger trunk streams in the system.
   Suggestions and hints:
   - A good place to start is at the top of the south flowing tributary of North Lake.
   - Be careful to find all the small tributaries that flow off Roundtop Mt. and High Point as well.
   - Look carefully at the stream junctions at elevation 1100' to 1200' in the gorge. There is an important short segment near the "*K*" in "*Kaaterskill*" .

   What order stream is Kaaterskill Creek?_____

2. Trace the divide of the entire Kaaterkill basin above the 600' contour on your map.
   Suggestions and hints:
   - Start on High Peak, tracing the divide east and west off the peak.
   - Be careful finding the divide just west of Haines Falls and up the flanks of the unnamed peak between Star Rock and Stoppel Point.

   The divide of the Kaaterskill basin is a _____order divide.

3. Study the map carefully, and list the names of the streams that drain, ultimately, off to the west.

   _____

4. List the names of the streams that drain, ultimately, to the east

   _____

5. Carefully trace the divide between the westward and eastward flowing streams on the map. (This divide will match the Kaaterskill divide along part of its length)

6. Scan the streams that flow on either side of the divide.

   On which side of the divide are the gradients steeper?_____

7. On which side of the divide (east or west) would expect stream erosion to progress more rapidly, and why?

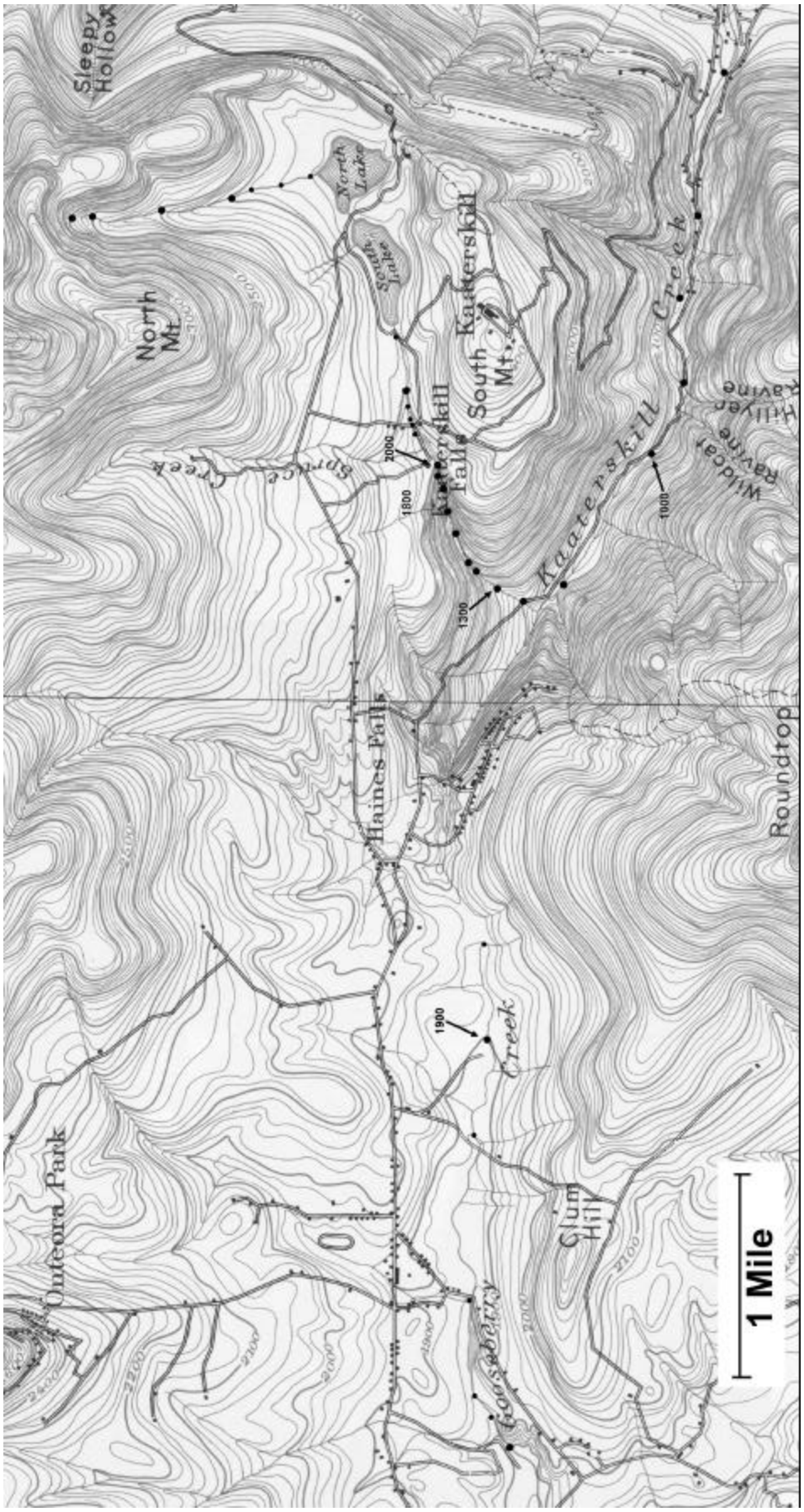
   On the _____because_____

   _____

   _____

FIGURE 8.3: Kaaterskill, New York

CI 20 ft 0 1 mile


Sleepy Hollow
North Mt
North Lake
South Lake
South Mt.
Kaaterskill Falls
Spruce Creek
Kaaterskill Creek
Wildcat Ravine
Hillyer Ravine
Haines Falls
Roundtop
Slum Hill
Gooseberry
Outcora Park
2000
1800
1900
1300
1000
1 Mile

8. Considering your answer to question 7, the divide you traced in question 5 will, over time

a. get higher b. get lower c. remain about the same height _____

AND

d. migrate to the east e. migrate to the west f. remain in essentially the same place _____

Explain your answers _____

_____

_____

_____

_____

9. Construct a detailed profile of the Kaaterskill, beginning at the top of the tributary that flows southward into North Lake (through Mary's Glen) (around 2400'), down through the lakes to the falls, over the falls and down into the gorge, and out to the 600' contour at the eastern end of the gorge. The map section on page 3 is provided with key contours marked with black dots, some of which are labeled. The more detail and care your profile reflects, the better!

Suggestions and hints:

- Your profile should be no higher than a third of its length. Set your y-axis accordingly.
- Follow the directions on page 5 carefully
- In the area around the lake (and especially between the lake and the falls), use every contour line - not just index contours - in your profile. That level of detail will help you understand the instability of the falls.

10. Is the profile you drew a profile of equilibrium (that is, is the Kaaterskill system graded)?_____

Do any parts of the system appear to be graded, and if so, where are they?_____

_____

11. Follow your instructor's directions to add the head of the westward flowing Gooseberry Creek to the profile.

12. Use a dotted line to lightly connect the Gooseberry profile you just drew with the Kaaterskill profile above 2000'.

What do you notice?

_____

_____

_____

13. Consider all the observations you've made in this lab to explain the geologic history of the stream drainage in this area.

Suggestion:

- Look up and read about stream piracy in your text.

_____

_____

_____

_____

_____

_____

Drawing a Profile

Suppose that you want to draw a profile of the stream mapped in Figure 1

1. Align a strip of paper parallel to the stream as shown in Figure 2 and make a mark on the strip where the 2400' index contour crosses the stream and label it.

   Since the contours between the 2400' and 2300' are relatively evenly spaced, you need not mark every one. Rather, just mark and label the place where the 2300' contour crosses the stream.

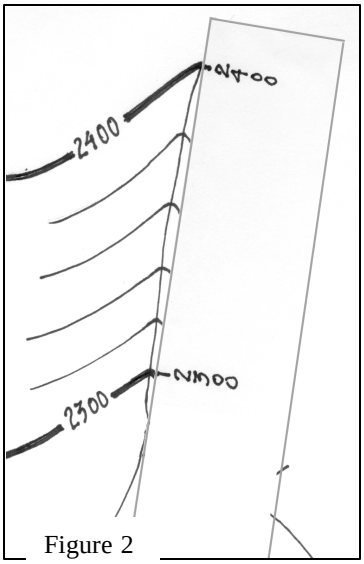


Figure 2

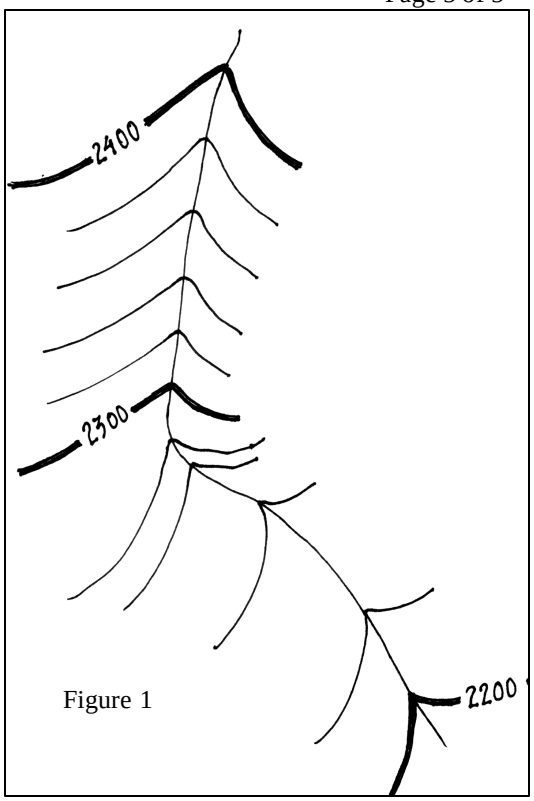


Figure 1

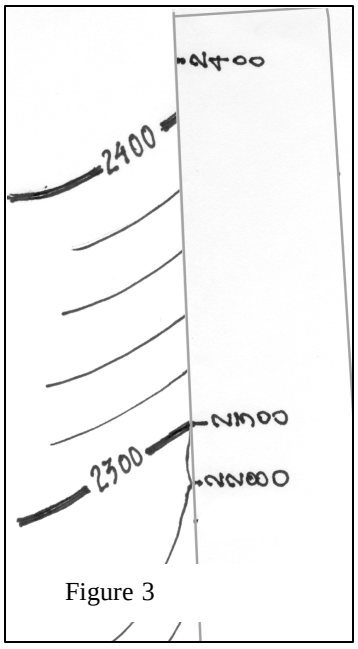
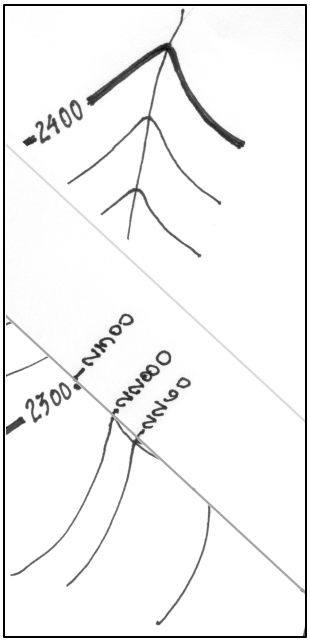


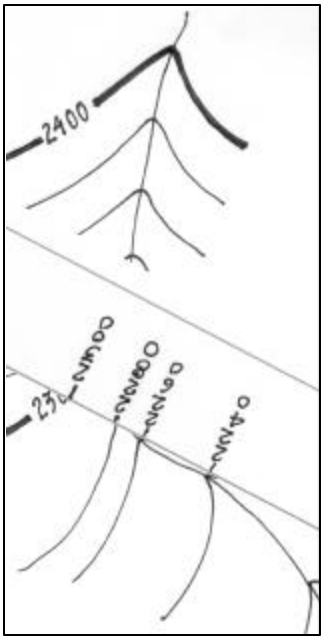
Figure 3

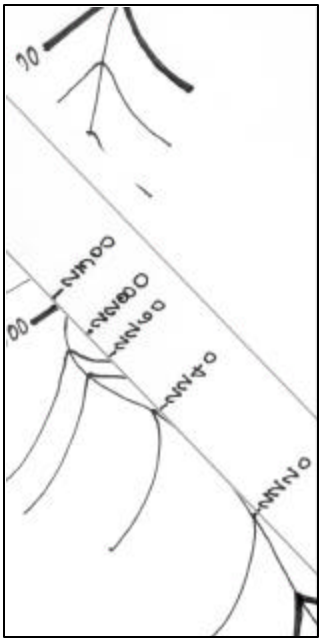
2. Notice that the contours between 2300 and 2200 are not evenly spaced. To ensure an accurate profile, it is necessary to mark each contour here.

   Rotate the strip of paper, keeping it aligned with the stream. Making sure the 2300 contour mark is still aligned with the map, mark and label the 2280 contour . See Figure 3.

3. Continue to rotate your strip of paper to follow the stream channel, carefully marking and labeling each contour/stream intersection as shown in the figures below:







4. The marks you've made on your strip of paper are distances on the x-axis of your profile. The elevations you've labeled are the y-values that correspond to those x values