Cattaraugus Creek Characteristics

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This lab assignment is given the week after a field trip that includes several stops along Cattaraugus Creek. The assignment could easily be adapted for any local stream.

GES 307: Lab #4 **Name: _____**
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Introduction

On the field trip, we were able to see several different streams and a couple drainage divides. We also saw glacial deposits and followed Cattaraugus Creek to see how it changes and/or stays the same along its course. In this lab, you will calculate gradient and construct hydrographs for Cattaraugus Creek.

Gradient

Use the topographic maps to calculate the gradient of Cattaraugus Creek from where it passes under Rt. 16/39 in Yorkshire (on the Arcade sheet) near its headwaters to where it passes under Rt. 20 in Silver Creek near its mouth.

1. Use a string to measure distance (in km):

2. What is the change in elevation (in meters)?

3. What is the gradient (in m/km)?

4. Is the gradient fairly consistent along the distance you measured, or does it vary a lot in different parts of the stream? Explain your answer.

Stream Discharge

Discharge measurements for Cattaraugus Creek have been collected near Gowanda for more than 50 years. Using data on the next page, construct annual hydrographs using average numbers for the 1950s, 1970s, and 1990s. Be sure to label your axes.

5. Discuss any general similarities or major differences between these three hydrographs.

Decade averages of monthly discharge for Cattaraugus Creek at Gowanda (cfs)
USGS 04213500

	Jan	Feb	March	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec
1940s	728	800	1743	1700	888	607	279	183	204	356	534	810
1950s	1031	974	1653	1522	716	386	247	186	255	303	573	1003
1960s	784	842	1539	1444	627	394	224	183	208	234	621	824
1970s	836	981	1825	1458	747	525	329	338	577	538	802	1123
1980s	606	999	1378	1116	690	642	359	302	293	514	902	985
1990s	1162	1071	1443	1498	809	385	321	258	368	488	908	990
1962	744	554	1212	1338	675	329	124	107	134	294	463	380
1977	261	733	2254	1477	581	272	659	1225	2423	914	1387	1977
2005	1558	1029	1259	1854	437	232	183	168	294	404	887	896

6. How does the average discharge in 1962 compare to the decadal average discharges? Was this a dry year or a wet year?

7. How does the average discharge in 1977 compare to the decadal average discharges? Was this a dry year or a wet year?

8. The Cattaraugus Creek drainage basin has an area of 551 square miles. Make the following assumptions:

- Discharges measured near Gowanda represent the entire basin
- All discharge is the result of precipitation
- All precipitation exits the basin as surface flow at the stream monitoring station
- The amount of precipitation was consistent across the basin

→ Calculate the total amount of rainfall (in inches) received in the area in 2005.

Hints: Use 5280 feet per mile for your conversions. Remember that you need to calculate the total volume passing the monitor station over a year. Show all of your work (use a separate sheet of paper for this)

Optional Extra Credit (to be added to the next exam grade):

Construct a longitudinal profile of Cattaraugus Creek from where it passes under Rt. 16/39 to Lake Erie. Measure points every 2 km. You should use similar methods as those you would use in constructing a topographic cross section. Be sure to calculate and state any vertical exaggeration.