

Cathance River Invertebrate Sampling

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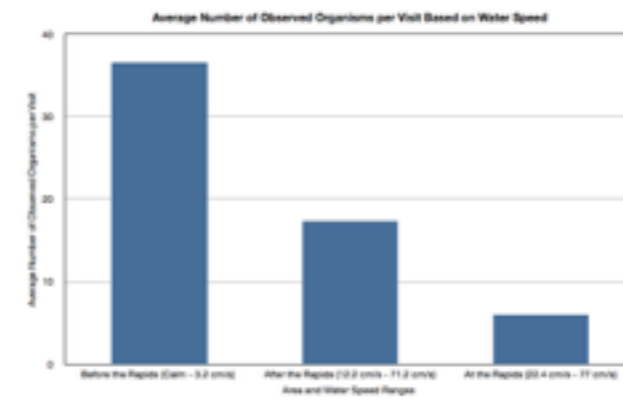
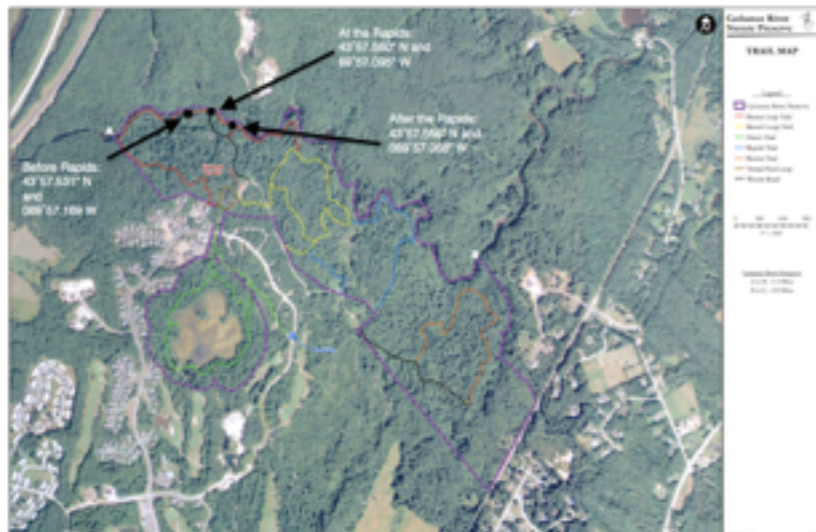
Purpose: Determine how many types of aquatic invertebrates live in the Cathance River. Determine if the speed of water affects the number of organisms and the types found in different areas of the river.

Hypothesis: The greatest number of and diversity of aquatic invertebrates will be present at the slow-moving area before the rapids, than in and after the rapids.

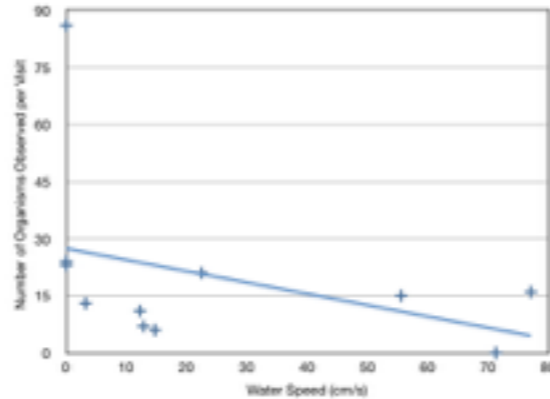
Procedure:

- 1) Obtain a pair of waders for each researcher, put them on upon arrival at each testing spot. (Ideally check all three spots each week, but if there's not enough time pick two spots and alternate each week.)
- 2) Obtain two 2 gallon white buckets. These buckets can be used at each spot, just make sure to rinse them out after putting organisms back in water. Smaller pans can be used for additional water separation.
- 3) Obtain two plastic spoons for separating invertebrates.
- 4) Obtain meter stick and stopwatch for calculating the water speed.
- 5) Obtain one cloth net to scoop the river to find invertebrates, net size of at least 20 cm by 30 cm to be able to scoop many items on the river.
- 6) Visit these three areas that have a GPS coordinate of: 43°57.531" N and 069°57.169 W for before the rapids. At the rapids have a GPS coordinate of 43°57.560" N and 69°57.095" W. After the rapids have a GPS coordinate of 43°57.556" N and 069°57.068" W. (Refer to map below called: Cathance River Nature Preserve: Trail Map Including GPS Sampling Site Locations.)
- 7) Take four scoops in each section of the river with the net. Gently scrape the very surface of the bottom. Turn net inside out in bucket to insure all invertebrates are collected.
- 8) Put what is collected from the nets into the two gallon buckets.
- 9) Scoop invertebrates out using plastic spoons and separate into the smaller pans and use Pond Life Book to identify the invertebrates.
- 10) Record findings in appropriate table.
- 11) Clean up and place samples back in water where found.
- 12) Take meter stick and place on the top of the water. Use a small twig about 10 cm long and hold at the top of the meter stick. Use stopwatch to record how long it takes for the twig to reach the end of meter stick.
- 13) Repeat steps for all three areas mentioned in step 6.

Cathance River Nature Preserve: Trail Map Including GPS Sampling Site Locations



Number of Organisms Observed per Visit Compared with Water Speed



River Invertebrate Sensitivity Comparison

	Number of Visits	Group 1 (Sensitive)	Group 2 (Somewhat Sensitive)	Group 3 (Tolerant)	Water Quality Rank
Before Rapids (Slow)	4	1 Rare: Mayfly nymphs	3 Rare: Fingernail clams - Stoneflies nymphs - Damselfly nymphs 3 Common: Mussels - Scuds	2 Rare: Midge larvae - Orb snails	Somewhat sensitive
At Rapids (Fast)	3	2 Rare: Hellgrammites - Riffle beetles 1 Common: Stonefly nymphs	3 Rare: Fingernail clams - Scuds - Not spinning caddisfly larvae	1 Rare: Midge larvae	Somewhat sensitive
After Rapids (Medium)	4	2 Rare: Mayfly nymphs - Non-spinning caddisfly larvae	3 Rare: Fingernail clams - Scuds - Not spinning caddisfly larvae	None Found	Somewhat sensitive

Number of Organisms Found at Each Spot

Date	Number of Organisms Found Before Rapids	Number of Organisms Found At Rapids	Number of Organisms Found After Rapids
9/13/14	23	X	X
9/18/14	66	21	X
9/25/14	X	16	6
10/3/14	24	X	11
10/10/14	X	15	7
10/16/14	X	X	X
10/24/14	13	N/A	0
Average # of Organisms Found Per Visit	36.5	17.33	6
Total # of Organisms in Area	146	52	24
Total # of Species found in Areas	11	10	11
Average Water Speed	Calm	51.63	27.725

Data Table Key:
 X = The site was not visited on this day, therefore no information could be recorded.
 N/A = The site was visited, yet due to conditions, the water was not safe for entry, and so no information was recorded.



Stonefly



Caddisfly Larvae

Conclusions:

- The rapids (slow moving water had the greatest diversity (number of types and numbers of organisms). More river invertebrates were found before the rapids than anywhere else tested.
- The hypothesis (seen above) was mostly proven correct.
- 11 different types of invertebrates found before the rapids (slow moving water)
- 10 different types of invertebrates found at the rapids (fast moving water)
- 11 different types of invertebrates found after the rapids. (medium-speed water)
- Before the rapids: species included, 91 scuds, 2 flatworms, 3 damselflies, 1 midge larvae, 5 fingernail clams, 7 orb snails, 25 freshwater pearl mussels, 1 mayfly, 7 water striders, 2 flat-headed mayflies, and 2 dragonfly nymphs.
- At the rapids: species included, 26 stoneflies, 2 snipe fly larvae, 3 midge larvae, 2 hellgrammites (dobsonfly larvae), 2 fingernail clams, 1 dragonfly nymph, 8 net spinning caddisfly larvae, 1 flat-headed mayfly, 5 scuds, and 1 riffle beetle.
- After the rapids: species included, 6 scuds, 2 fingernail clams, 1 mayfly nymph, 1 free-living caddisfly larvae, 1 case-making caddisfly larvae, 1 rocky-making caddisfly larvae, 1 flat-headed mayfly, 2 flat-headed mayfly larvae, 7 whirligigs, 2 hellgrammites, and 1 planaria flatworm.
- Total invertebrates found before the rapids: 146
- Total invertebrates found at the rapids: 52
- Total invertebrates found after the rapids: 24
- Based on the invertebrates found, overall the river's water quality is considered good because the bulk of the invertebrates were "somewhat sensitive" to pollution and most of the other invertebrates were in the "sensitive" to poor water quality. These determinations are based on the *Volunteer Stream Monitoring: A Methods Manual* book published in 1997.

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