Candidate 4 evidence

National 5 Geography Assignment

This investigation is too see if the Keltney Burn follow the bradshaw model.

Methods

Speed of river

To calculate the speed of the river you will need 4 people, a piece of wood, a tape measure and a stopwatch. Firstly you streatch a 2 meter tape measure across the river bank. Get a person to stand at the start and end of the tape. The another persan stands a bit back from the start of the tape measure, so when the wood comes down, its going at the speed of the river. When the wood goes past the start of the tape, shout go and the person on the bank will start the timer. Then try to keep it to the area you are measuring the speed for (far, near or middle bank) and when the float of wood gets to the end, shout stop so the timer can record how long it took. Repeat 3 times for the far, near and middle parts of the river, then take an average to eliminate sources of error. Then take an overall average for each site for reliable results.

Bedload

To calculate the bedload you will need a tape measure, a meter stick and a ruler. Firstly,

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you stretch the measuring tape from 1 side of the river to the other. Then, at regular intervals (eg. every 20cm) place your meter stick in the water, then the first stone you hit, pick it up and place on the river bank. Then once you have 10, measure the x, Y and Z axis for each rock and record. Then calculate an average for each rock, and multiply them together to get an overall average volume of rocks for each site.

Results

Depth.

According to the bradshaw model, the depth of the river should increase as you go further downstream. This is because there will be more water going into the river, with more tributarys going in. Because there is more water, it will cause more erosion to happen, such as corrasion and lateral erosion, making the river deeper. From my results I can see that from sites 0-2 this is the case, but sites 3 and 4 are not, as site 3 is deeper than site 4. This could be down to pools and riffles. They are naturally occouring in rivers, and cause areas of shallower and deeper water. It could just be that site 3 is in a pool section, and site 4 in a riffle area. Based on

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this, I would say that the depth does follow the bradshaw model. For results, see Fig 1.

Width.

According to the bradshaw model, the width of the river ~~see~~ should increase as you go further downstream. This is because there will be more tributarys going into the river, which means more water, causing more erosion. From my results I can see that sites 0, 3 and 4 all follow this trend, but there is a slight difference between sites 1 and 2. As its only a small difference, this could be down to ~~inaccuracy~~ faults in our measurements, or there could be a ~~bolder~~ bolder at site 2, meaning it is difficult to erode past it causing site 1 to be wider. As there is only a small difference, the width also follows the bradshaw model. See Fig 1 (cross section) for results.

Discharge

'further downstream'

According to the bradshaw model, the discharge of the river should increase*. This is because there will be more water in the river, due to there being more tributarys, and smoother river ~~beds~~ banks due to more erosion. These two things combined means overall a larger discharge. From my results I can see that this is the case, as the discharge steadily increase from site 0 to site 4.

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this means that the discharge follows the bradshaw model. See fig 1 for results

Volume of rocks. (Bedload)

According to the bradshaw model, the volume of rocks should decrease as you go further downstream. This is because there will be more erosion as you go further downstream, so the rocks will become smaller. From my results I can see that from sites 0-2 this is the case, and sites 3 and 4 dont follow this trend. This could be because there is a tributary near site 3, and the rocks coming in from the tributary are not as eroded as ones from the main river, meaning it pushes the average up. This means the volume of rocks dose follow the bradshaw model. For results see fig 3.

Average speed

According to the bradshaw model the speed of the river should increase as you go further downstream. This is because as there will be less big rocks and smoother river beds, allowing the water to flow faster. From my results I can see that sites 0 and 1 follow this trend, but sites 2-4 are a bit all over the place! This is because our method for measuring the

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speed was highly inaccurate, as the wood didnt always stay where it needed to be, or it would get caught by the bank ect. For this reason I cannot say that the speed follows the bradshaw model. For results see fig 4.

Average Angularity

According to the bradshaw model, the angularity of rocks should decrease as you go further downstream. This is because there will be more erosion, such as attrition, causing the rocks to break up into smaller pieces. From my results I can see that this is the case, and from sites 0-4 the angularity decreases. ~~For results see fig 5.~~ This means the angularity does follow the bradshaw model. See fig 5 for my results.

Efficiency

According to the bradshaw model the efficiency of the river should increase as you go further downstream. This is because smoother ~~River~~ beds and less rocks allow water to flow faster, and wider, deeper rivers allow it to carry more water, meaning the river is more efficient. From my results I can see that from sites 0-2 it follows this trend, and sites 3 and 4 do not. This could also be down to inaccuracys in our speed measurment

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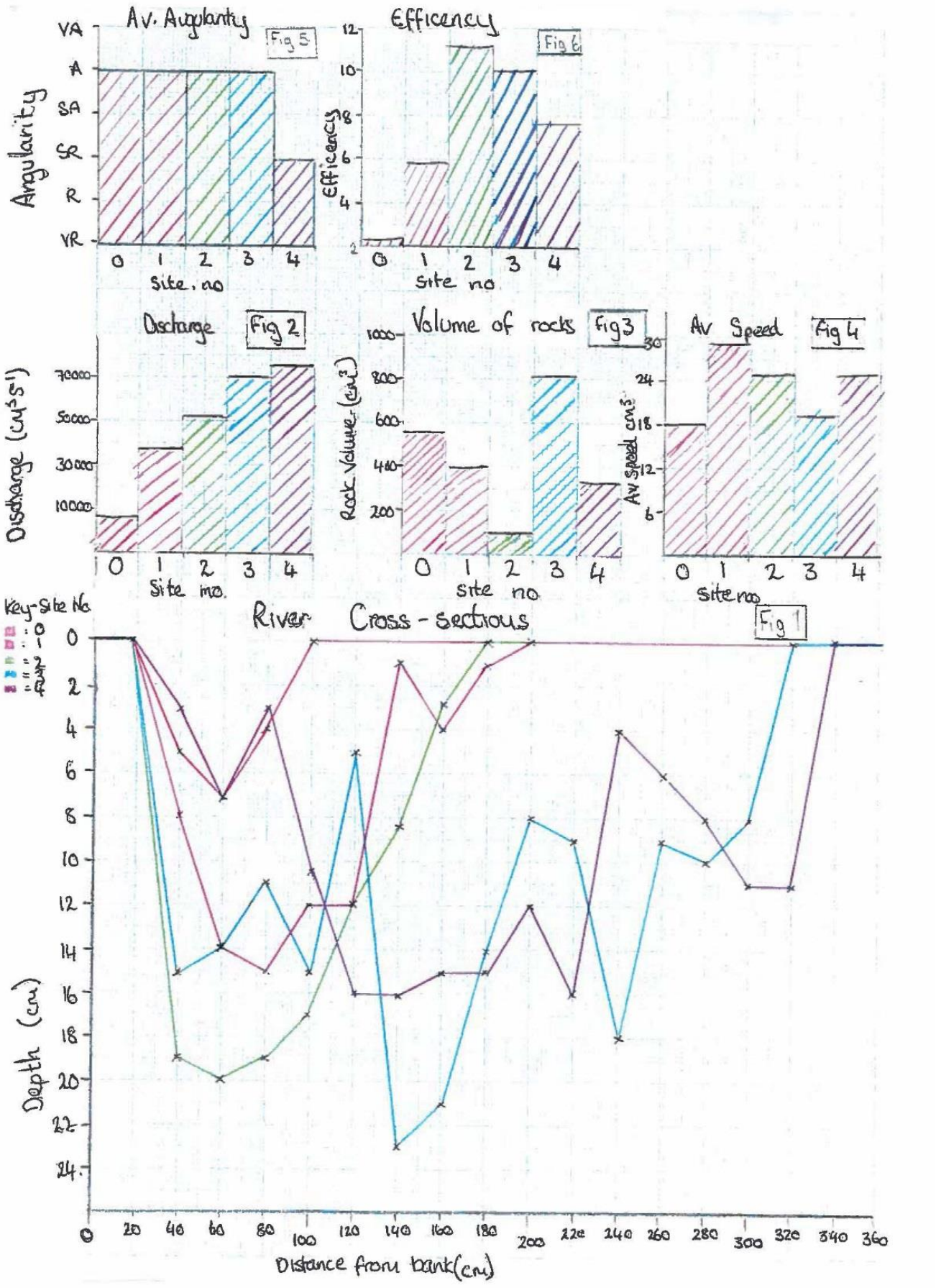
upsetting on my results. For that reason I cannot say that the efficiency of the river follows the bradshaw model. For results see fig 6.

Conclusion

To conclude, the majority of the Keltneyburn does follow the Bradshaw model. The width, depth, discharge, bedload, and angularity all follow the bradshaw model, however the Average speed and Efficency do not.

Improvements

If I was to do this investagation again I would make a few changes Firstly I would ~~by~~ use a flowmeter to calculate the speed, as the method we used was highly inaccurate. ~~This would make my results more accurate~~. I would also do the survey on a larger section of the river, as it would give me a better overview of the whole of the Keltneyburn.


Av. Angularity
Fig 5
Angularity
VA
A
SA
SR
R
VR
0 1 2 3 4
site. no
Efficency
Fig 6
Efficency
12
10
8
6
4
2
0 1 2 3 4
site no
Discharge
Fig 2
Discharge (cu³s⁻¹)
70000
50000
30000
10000
0 1 2 3 4
Site no.
Volume of rocks
Fig 3
Rock Volume (cm³)
1000
800
600
400
200
0 1 2 3 4
site no
Av Speed
Fig 4
Av Speed cm/s
30
24
18
12
6
0 1 2 3 4
site no
River Cross-Sections
Fig 1
Key-Site No
0
1
2
Depth (cm)
0 2 4 6 8 10 12 14 16 18 20 22 24
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
Distance from bank(cm)