Aim / Hypothesis / Theory

To investigate the changing characteristics of the Seaton Burn as you travel downstream.

The **Bradshaw model** describes how depth & velocity increase downstream.

Fieldwork Location

North Tyneside - start in Holywell following the Seaton Burn to its mouth in Seaton Sluice.

Accessibility – only 20 min drive from school / **safe**, short walk along **public footpath** from car park & toilets / plenty of **flat land** either side of the river – good for group work / site offered safe opportunity to measure depth & velocity / access to secondary data from member of staff who works for the Environment Agency.

Risks (and how to minimise them)

- *The **river** itself – slipping / drowning – not entering the river or only doing so with correct footwear / on site risk assessment by staff.*
- *Changing **weather** conditions – cold & wet – parental letter / wearing appropriate warm & waterproof clothing.*
- ***Uneven ground** – large rocks – injury – sensible footwear / staff – student ratio / carrying 1st aid kits.*

Primary Data Collection

Site 1 – Holywell (site chosen randomly)

Depth – ranging pole marked – every metre across the river – viewed / recorded from bank

Velocity – measured out 10m downstream & recorded the velocity by dropping something in river (6 times to get average)

Depth & velocity measurements – systematic sampling.

Justification:

- *All simple methods*
- *Safe and reliable*
- *Possibility of human error?*

Secondary Data

Mr Murray & Mr Rayson visited all sites before our visit & recorded the data for site 2 (at the mouth). This was part of the risk assessment ensuring we (students) wouldn't enter the river at this site. Quantitative data requested from the Environment Agency.

Data Presentation

Depth measurements from both sites presented on a **cross section** clearly showing increase in average depth downstream.

Justification:

- *Clearly shows depth visually*
- *Allows easy comparison between sites*
- *Easy to spot any patterns across the width of the river.*

Data Analysis

We calculated **percentage increase** in average depth & velocity downstream.

e.g. velocity – calculated difference between site 1 & 2. Divided the difference by the width of site 1. Multiplied by 100.

Justification:

- *Mathematical **calculation** of the changes to the river (objective)*
- *Not just opinion (subjective)*

Findings and Conclusions

We found that all of depth & velocity did indeed increase downstream (between sites 1 & 2) in line with the Bradshaw Model.

Include your **own results** for percentage increase in velocity & depth here **OR**

Velocity: Site 1 = 0.2m/s Site 2 = 0.27m/s
Percentage increase **35%**

Depth: Site 1 = 9.2cm Site 2 = 39.9cm
Percentage increase **331%**

Anomalies: - Site 1 – small waterfalls with pools between may impact velocity and depth. Site 2 - Tidal near the mouth – impacts velocity and depth. Measurements all taken in summer – likely drier than usual. Site 2 more open – impact of wind & friction on velocity.

Evaluation

All 3 methods had **limitations** (problems) that leads us to question the **accuracy of our results** & in turn the **validity of our conclusion.**

Random sampling as point to measure the river. Clearly the river varies quite a bit over a small area due to rocks / width changes.

Velocity – effect of wind when dropping the orange / friction with the air not taken into account / very easy to lose sight of the orange making timing guess work.

Depth – ranging poles marked every 10cm but still difficult to read the depth at site 2 due to the turbulence of the water.

However, I do believe that even taken into account alternative methods my conclusion would be the same.