



# Boulder transport dynamics: *Project background, January 2011*



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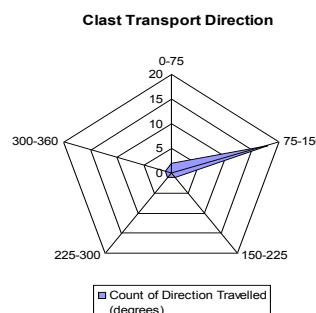
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Left: Positioning rocks (DGPS)  
Centre: Relocating tagged rocks  
Right: Tagged and labelled test rock

## Boulder transport pathways and Rates are unknown

There are limited studies of coarse sediment (cobbles or larger) transport, rates and deposits compared to sandy beaches, globally. These sediments represent an important source of material for coastal landforms of value to society such as spits, bars, barriers and ridges, which often serve to reduce flood risk. The study will be located in Bideford Bay, North Devon (part of a UNESCO Biosphere Reserve), where there is a pressing management issue – the pebble ridge comprised of cobbles to fine boulders is retreating landwards. *This project therefore aims to quantify the nature and rate of coarse sediment transport in Bideford Bay, Devon, to understand responses to wave climate and storms.*

**Pilot Study** – A pilot study was conducted between March and April 2010 where the Radio Frequency Radio Frequency Integrated Transponder (RFID) tagging



methods were successfully tested. 79% of cobbles were relocated (n = 23) and of those, 96% moved during a one month period under moderate waves. *The furthest distance moved was*

*81.8 (+/- 0.36) metres.* Rocks were predominately moving west to east, towards the retreating pebble ridge (diagram above) with a few moving seawards in boulder traps.

## Implications and future work:

- RFID can be used to measure transport pathways and rates.
- Transport rates appear to be very high, demonstrating the need for more intensive research.





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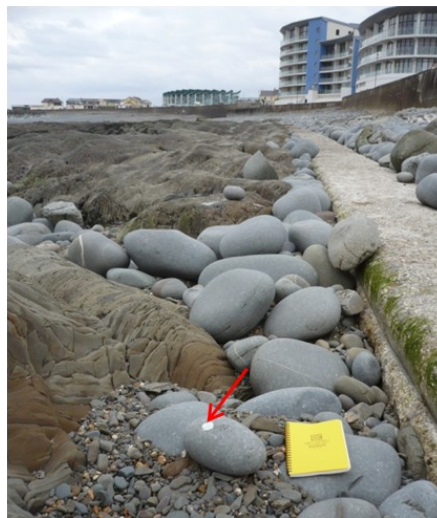
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**Our research**

We are using a combination of field experiments, repeat monitoring surveys and lab-based numerical computations to monitor movement of boulders in the inter-tidal zone of Bideford Bay, Devon. This will enable us to gain the first quantitative measurements of the supply rate and identify the key pathways of boulders to Northam Pebble ridge. Linking this information to regional and intertidal zone wave data will enable us to obtain an understanding of the relationship between the local wave condition and boulder dynamics. This research is novel, as there are no coastal field experiments to date using RFID technology on clasts coarser than fine cobbles, and those studies using RFID on finer clasts have not used the movement data to help refine existing sediment transport equations. Our re-search seeks to address these two gaps in our global understanding of coarse beach systems.

This project will also address local research needs including understanding path-ways and rates of sediment supply to Northam pebble ridge – for which there is currently no quantitative data. By monitoring boulder transport in Bideford Bay we aim to gain valuable information which will be used to inform future coastal man-agement decisions.



*Left and Right : Red arrow is pointing to a tagged rock. A5 notebook for scale.*

**How can you get involved?**

Our research involves considerable field research and needs to be respon-sive to local events, such as storms. We therefore are keen to get local peo-ple involved in the research effort to help with:

- Repeat fixed point photography, to capture changes when we're not there.
- Assistance with fieldwork – a good opportunity to gain practical experience to boost your CV.
- Local knowledge of historic events or change in the area
- A secure place in Westward Ho! to store equipment whilst in the field.