Geography

GCSE 2012

Geography B

Exemplar Candidate Work
Coasts

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OCR

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Fieldwork Focus Coastal title:

Why is there a need to protect the coast in your chosen area?

Centre title:

Why is there a need to protect the coast at Mudeford Spit?

Why is there a need to protect the coast at Mudeford Spit (Hengistbury)?

Introduction

To investigate this question we travelled to Weymouth (see study area maps), Dorset to collect primary data at Mudeford Spit. Weymouth is a popular tourist destination within Dorset during the summer as it has a beautiful coastline and view of the sea. The sea also brings many rare species of birds attracting people interested in wildlife.

The coast between Weymouth to Mudeford Spit is widely used by both locals and tourists for recreational activities. We think this makes it a valued coast.

Mudeford Spit was formed by the deposition of sediment at a point where the coast abruptly changes direction at the eastern end of Hengistbury Head (see sediment transport map). The sediment was transported and deposited via the process of longshore drift; we were trying to find out if this process was still occurring and if so at what rate. (More detail in key processes)

Key Processes

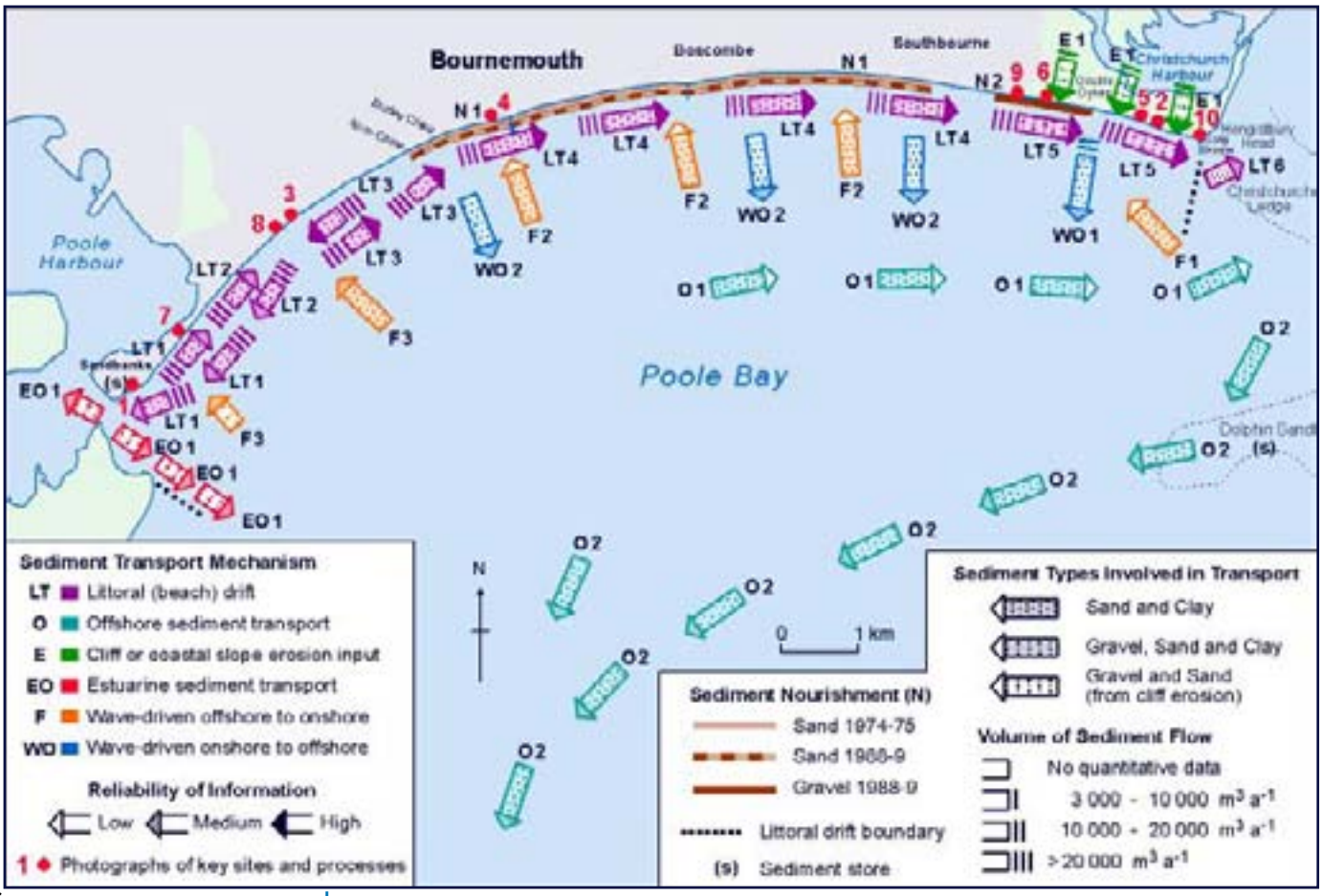
Longshore Drift	
(from the South)	Longshore Drift is the transportation and deposition of sediment along coastlines due to waves and wind. The sediment is carried along to build up or reduce other beaches. This method of transportation of sediment normally occurs in a diagonal motion.
Formation of a Spit	Beaches are formed by deposition. Constructive waves deposit material like sand and shingle. Spits are regular beaches that stick out into the sea; Mudeford Spit is an example of this. The Spit forms at sharp bends in a coastline like at a river mouth and longshore drift transports sand past the bend and deposits it into the sea. Strong winds and waves curve the end of the Spit, the sheltered area behind the Spit is therefore protected from the waves and, over time, material accumulates in this area. This means plants can grow there. Over time spits develop into salt marshes.

The current government policy on coastal defence is that most areas should not be defended. The local council in the area has removed the funding for the maintenance of the sea defences along Mudeford Spit, but is maintaining the defences at Boscombe Bay. If this is upheld it will result in the erosion of the spit as it will not receive sediment from the bay and its beaches will be exposed to destructive waves when the groynes breakdown.

Source: www.google.co.uk/images/ukmaps

The maps above show the location of the study area. Weymouth is on the south coast of England in the English Channel. It is in the county of Dorset and is part of the UNESCO world heritage Jurassic Coast.

Poole Harbour Entrance to Hengistbury Head (Poole Bay): Sediment Transport



Source: www.scopac.org.uk
(Source John Browne, local historian – personal communication)

The map shows how complicated the direction of movement of sediment along the stretch of coastline being studied. The movement onshore is from the West (Weymouth) to East (Hengistbury head). Offshore the movement is from East (Dolphin Sand) to South West, this forms a cell. We know the prominent wind direction is from the South West and the coast faces south and this leads to the sediment being transported by longshore drift in an easterly direction. In contrast the mid Wales coast faces west and the south westerly winds cause longshore drift to be in a northerly direction. We studied Blakeney Point in North Norfolk, where the coast faces north and the prevailing wind is NE and as a result longshore drift is in a westerly direction. Coastlines throughout Britain and around the world face sea level rise, erosion, transportation and deposition of sediments.

Expected outcomes

1. I think longshore drift is an active/ongoing process occurring at Mudeford Spit due to the strong destructive waves. Longshore drift can take away large amount of sediment over time and so, if not protected, Mudeford Spit would no longer remain and will be eroded.
2. The cost of protecting Mudeford Spit is outweighed by the value of the beach property. Mudeford Spit is quite popular with locals and tourists so it is natural for people to buy property on the Spit or behind it. The amount of properties or the value of the property surely outweighs the cost of sea protection.
3. I think there would be strong public opinion for protecting the coastline. People who use the Spit for recreational activities, must want the Spit to remain in the future.

Methods	**Processes Undergone**	**Limitations**	**Why?**
Measurement of width and height of groynes on both sides.	To measure the height of width of the groynes, ranging poles were used to give an estimate of the measurements. The drop and length of beach was measured. Measuring tape was also used to give the measurement of the beach from the groynes.	The stormy weather limited full access towards the groynes. This also limited the accuracy of the measurements and so they were deemed as only estimates.	This was to help identify whether long shore is an occurring and active process along the Mudeford spit. The measurements indicate the amount of the beach eroded or taken away on both sides and the build up of the beach on a certain side. This shows the travelling of the sediment.
Questionnaire asking the public views of Mudeford Spit.	Asked relevant questions about recreational activities and how much the coast actually means to them.	Quite simple questions and not many people were willing to do the questionnaire on the day as it was very wet and windy. Only taken in the Mudeford Spit area and so views might be slightly biased.	To show the social views and values and what people think about the coastal defences. This adds to the theory that people might actually want the coast to be protected for different reasons.
Arial photographs, past photographs and internet sales values.	Secondary data sources on the value of houses and huts on the coast. This was counted and averages were taken.	Secondary data might not be as accurate.	Working out a cost-benefit analysis of the housing values and the sea defence values.

Expected outcome 1 – longshore drift is an active/ongoing process

Analysis of Photographs – past and present

At Boscombe, one of the main sources of sediment of Mudeford Spit, there are now hard engineering sea defences called groynes. These groynes reduce the amount of sediment being eroded and therefore also stop large amounts of sediment being transported to Mudeford Spit, meaning Mudeford Spit will not receive enough sediment causing it to be eroded and destroyed. The photos support the hypothesis that longshore drift is an active process because there are distinct differences in the beach and cliffs in the photo without sea defences (old photo) and the recent photo with sea defences.

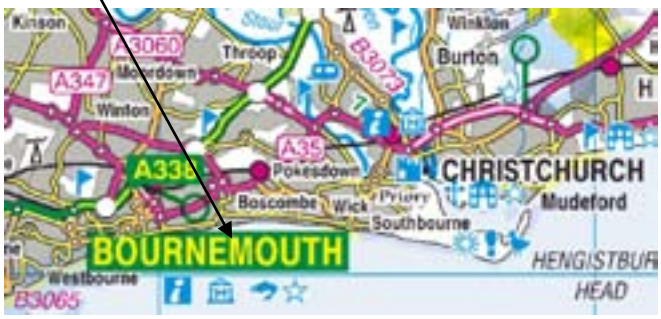
The beach is very small in size (narrow) and the waves are very small. This may be due to the time of year. There are no defences such as groynes.

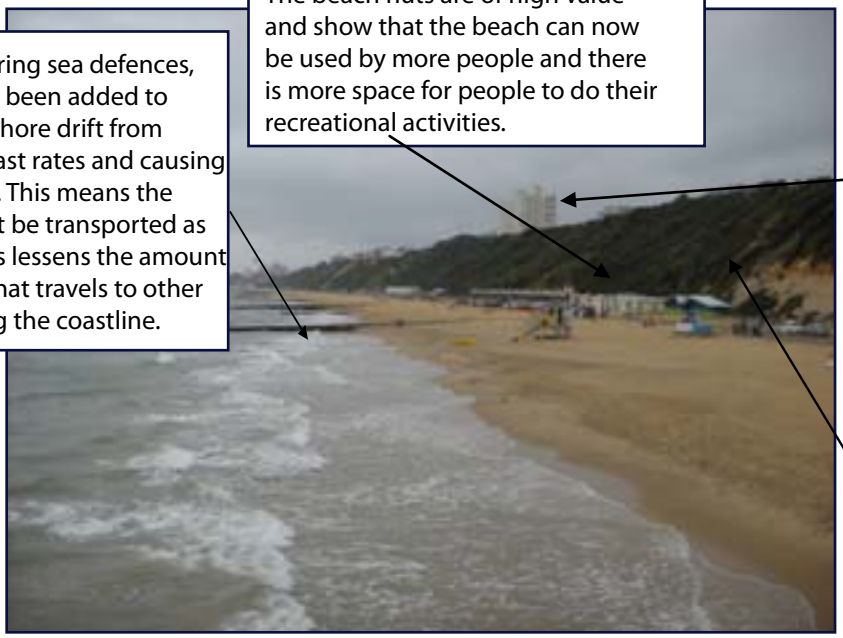
No vegetation on the cliff shows that longshore drift is occurring and that the cliff is still being eroded by rain and the waves.

The sight is very popular meaning that it is used for many different recreational activities.

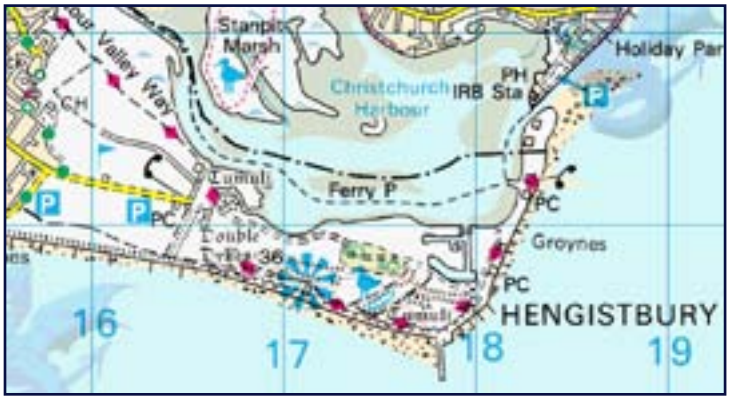
Source - Dorset Field Stduies Centre

Location of Boscombe Bay in photo



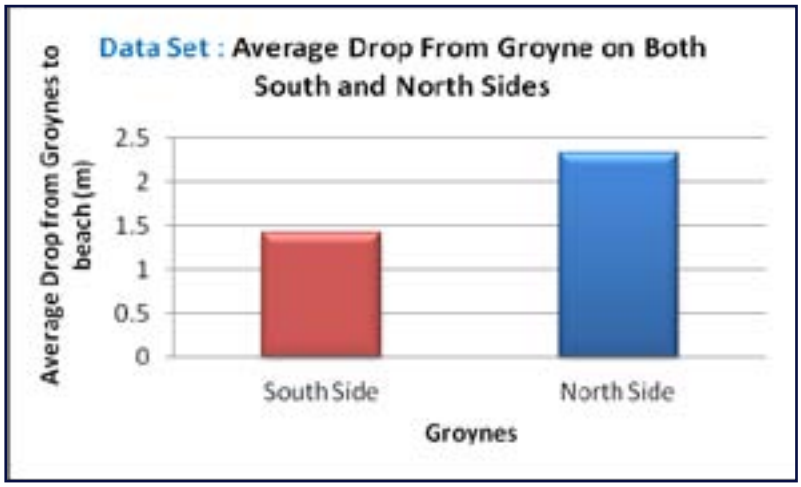


The above photos show Boscombe Bay facing Westwards - Grid Ref: SZ11191
The wider beach and more stable cliffs shown in the photo above show that longshore drift here has been minimised which will stop the sediment being transported along the coast to Mudeford Spit and will lead to the erosion of the spit shown in the photo below

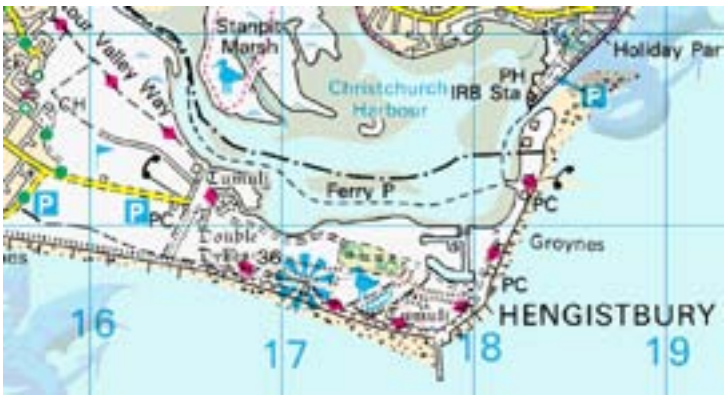


The aerial photograph above shows clearly that the groynes are trapping sediment, forming beaches. The beaches are wider on the south western side of the groynes. This is also shown at the largest groyne or breakwater at Hengistbury Head where the beach on the western side is almost three times as wide.

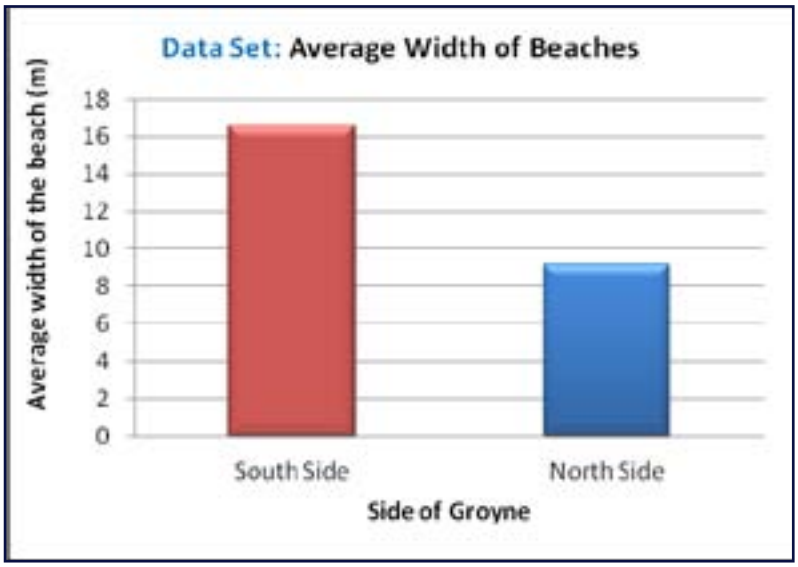
Analysis of beach height and width at groynes



The average drop shows the build up of the beach and also shows the average drop of all the groynes we measured. This measurement could have a degree of error as a result of inaccuracies using a ranging pole, but is still reliable to give an indication of whether longshore drift is occurring at a fast rate or not. On the south side the average drop was 1.4m and on the north side it was 2.3m. A difference of 0.9m shows there is a build up of the beach on the south side and the groynes are trapping sediment and preventing longshore drift from occurring at a fast rate.



The average width of the beach on the south side is 17m and so that means the beach is being built up as not much of it is being eroded and travelling to other destinations. The north side, which is being hit strongest by the destructive waves causing high erosion rates which is then transported by longshore drift, is smaller in width at 9m, 8 m narrower. This is because of the groynes preventing longshore drift from occurring at a rapid rate. This further supports my expected outcome that longshore drift is an active process.



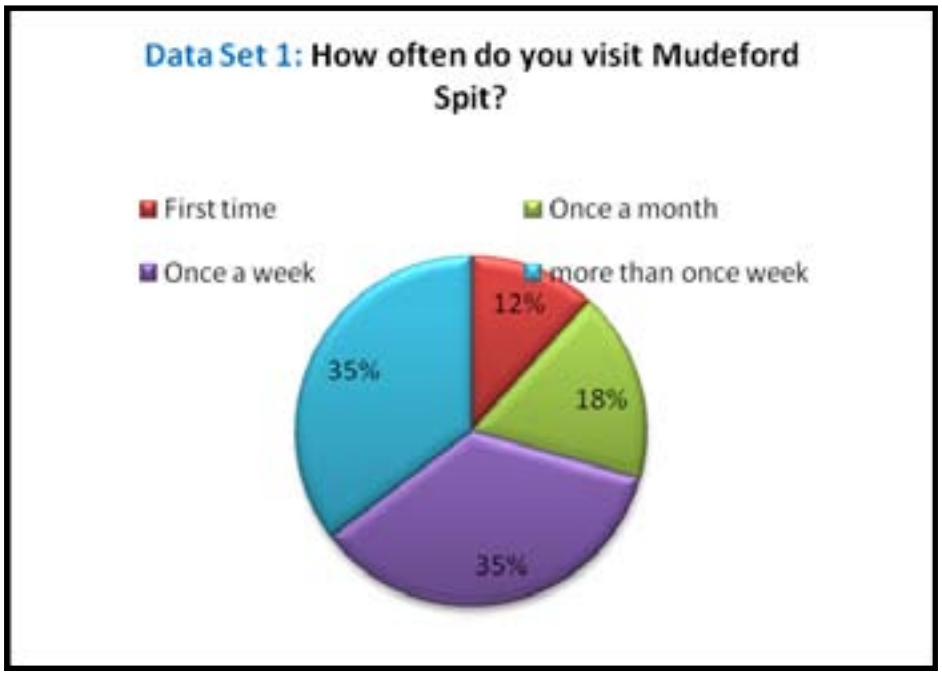
Expected outcome 2 - The cost of protecting the spit is outweighed by the value of the beach property

Using local estate agents where there were several beach huts for sale we were able to estimate the average value for the total number of beach huts along Mudeford Spit. We counted the number of huts present while collecting our other data.

Estimate of beach property behind the Spit:	400 Beach huts.	
Average Price of beach hut:	£145,000	Over £40 million in total.
Average Price of groyne:	£100,000 (17 groynes at present)	£1.7 million

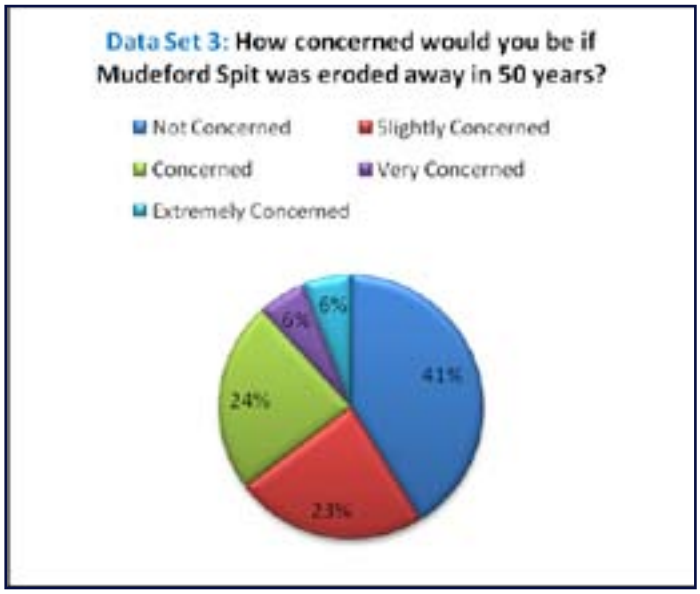
The cost of the beach hut properties of £40 million is much higher than the £1.7 million of building 17 groynes which are at present on the spit. This also shows how popular the area is if a beach hut is worth the price of a house! There are also properties other than the huts which would be vulnerable so the economic cost of the loss of properties outweighs the cost of protecting the spit.

Expected outcome 3 – There is strong public opinion for protecting the coastline



How often do you visit Mudeford Spit?
After conducting the questionnaire we found that 35% of the people we asked visited the spit more than once a week. Another 35% visited weekly. It is very likely that these people live locally. It is also likely that the 18% who come once a month are local people. The remaining 12% on their first visit are likely to be tourists visiting the area. This shows that it is an important local amenity used on a regular basis.

What recreational activities do you participate in at Mudeford Spit?
64% of people use the Spit for walking mostly their dog or themselves. The dog walkers are more likely to be locals. The other activities could be locals or tourists and some are likely to be done on a less regular basis as they are dependent on the weather.



How concerned would you be if Mudeford Spit was not here in 50 years?
I was surprised to see that 41% of the people questioned said they did not have any concerns for the possible future of Mudeford spit and whether it would still be there or not in 50 years. This could be that they are from other areas, local or further away, which are protected from the sea. The other 59% stated that they would be concerned to some extent. This outweighs the people who weren't concerned and so the spit, in the eyes of the majority questioned is still worth protecting.

Conclusion

Expected outcome 1 - The differences in the height of the beach either side of the groynes of 0.9 m (between N and S sides) and the width of the beach of 8m shows that longshore drift is an active process at Mudeford spit. If the defences were not maintained then longshore drift rates would be greater and the beach would erode and eventually the spit would possibly disappear.
Expected outcome 2 - The cost of the beach huts of £42.5 million and other properties at risk would outweigh the cost of 17 groynes of £1.7 million. This would suggest that there is an economic case for protecting the spit.
Expected outcome 3 – Our short questionnaire showed that Mudeford spit is a popular site with 70% visiting at least once or more a week, these I think are locals. The majority 64% also walked their dog, or walked themselves. The dog walkers would most likely be locals. Some of the activities would be weather dependant such as kite flying and the beach. I was surprised that only 41% were very concerned about the spit being eroded away.

Overall I think my outcomes suggest that there is a need to protect the coast at Mudeford spit

Evaluation

I think that my enquiry has been a success as we collected data to the best of our ability. However, the bad weather did make measurements of beach height and width difficult and could have affected our accuracy. We could have measured the beach profile between the groynes and wave frequency and height to see if they were that of destructive waves.

The questionnaire was random, but the number of people we interviewed was small because of the weather conditions and we only conducted the survey on the spit. We could have asked more people. We only asked 3 questions and should have asked more such as age, gender and where they lived.

Geographers investigating longshore drift might find our results useful and stakeholders concerned with protecting the coast could use the results to help aid their decision and keep on holding the line with sea defences.

Comments on this controlled assessment Fieldwork Focus based upon the 2012-14 new assessment criteria:

AO2 Application of knowledge and understanding in familiar and unfamiliar contexts

- They have described the enquiry question in a range and variety of contexts with reference to other coasts and to the local coastal cell. L2
- They have discussed the title and have suggested in detail expected outcomes with justifications. This just meets the level 3 statement. L3
- They have given some background to the study area and included maps to show its location at different scales. They could have given more place detail. They could have also included more annotated photographs. This only just meets the level 2 statement. L2
- They have described and explained their evidence in a detailed way. Their descriptions made reference to their data and they gave explanations throughout. L3

Overall 18/24

AO3 Selection and use of a variety of skills, techniques and technologies to investigate, analyse and evaluate questions and issues:
Selection, investigation and presentation

- They have suggested a variety of techniques including the measurement of beach drop and width and a questionnaire. They should have taken photographs to illustrate their methods. They have justified their techniques, but needed to give details of location, frequency of sampling. They did include an old photograph, but could have also obtained old maps. More information could have been provided about the questionnaire such as the number of respondents and the perceived reliability of the sample. L2
- They have collected appropriate evidence from a range of sources, mainly fieldwork. The data collected should have been put into tables to show the measurement results on which the graphs are based. They have used the internet and textbooks to obtain further evidence. L2
- They have presented their data in a range of appropriate maps, graphs and diagrams. They have only drawn bar and pie charts. They have drawn maps to show the study area location, but not where data was collected. A limited number of annotated photographs have been drawn. L2
- Their written work is legible and spelling, grammar and punctuation are accurate. They communicated well. L3
- They have written with some precision and succinctness and within the 2000 word limit. However, it could be argued that the use of so many text boxes contravene the word limit. This needs to be justified by the teacher and taken into account when marking. L2

Overall 12/18

AO3 Selection and use of a variety of skills, techniques and technologies to investigate, analyse and evaluate questions and issues:
Analysis and evaluation.

- They have critically analysed and interpreted some of their evidence. Their analysis of their data included a comparison to their expected outcomes and just meets the level 3 statements. L2/3
- They made reference to their graphs and data to make substantiated conclusions.
- It needed more reasoning. It only just meets the level 3 statement. L2/3
- They made an overall evaluation of the success of their enquiry. They did suggest that their findings might be useful to schools or stakeholders, but did not explain why. L2
- They recognised some limitations to their enquiry, but needed to give more detail for their methods and the range of data collected. Why did they not ask gender, age and where people lived questions in their questionnaire? This just meets level 2. L2
- They made some suggestions of how to improve their enquiry. This needed to be justified in more detail. They did suggest why the beach profile and wave frequency and height would have been useful. However they did not say why gender, age and where people lived might have allowed greater analysis. It convincingly meets the L2 statement. L2

Overall 13/18

Overall 43/60

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