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Coastal evolution in Suffolk: an evaluation of geomorphological and habitat change

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Introduction

England's coast supports an abundance of wildlife habitats and physical features. These special places depend on the interactions between wind, waves, tides, sediments and geology to shape and sustain their nature conservation interest. Over time coastal habitats and features change so their effective conservation involves providing sufficient space to allow them to move and evolve in response to the action of the sea. This report contains the results of a series of commissioned studies to enhance the scientific understanding of a Site of Special Scientific Interest (SSSI) in the Suffolk Coast and Heaths Natural Area, with particular regard to coastal evolution and predictions of future change. The Suffolk coast is rapidly eroding along much of its length. Cliffs are retreating inland by several metres each year, and saltmarshes are steadily shrinking. The great shingle structures of Orfordness and Benacre Ness are actively moving, through the continual erosion and deposition of shingle. Benacre Ness is slowly moving northwards, as new material accretes on its northern side and shingle erodes from its southern side. As well as their great geomorphological significance, the shingle structures support rare undisturbed vegetation communities

What was done

These studies, from 2003 to 2004, were carried out by specialist contractors, using both field survey and literature reviews, and drawing on other current specialist studies. There are two main sections; a study of the shingle vegetation and changes since 1988, and analysis and predictions of coastal evolution for both the cliffs and the shingle structure. The studies included a vegetation survey of the shingle at Benacre Ness and evaluation of the likely coastal evolution of the shingle structure and the cliff line. The vegetation studies confirmed that the shingle vegetation had changed since it was last surveyed in 1988, with a range of vegetation communities represented at the site. The distribution and extent of these communities has changed in response to the re-working of the sediment and the northward migration of the shingle.

The coastal evolution studies were based on a review of current coastal studies and data about the historic changes that have taken place. Using modelling techniques, these provided a prediction of future change for both the northward migration of Benacre Ness and the likely recession rates for the cliff sections of the site. The impact of climate change and sediment budgets are uncertainties that need to be taken account of in future. A simple probabilistic model has been used to generate predictions of the cliff top position in 50 years time.

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Results and conclusions

The survey in 2004 confirmed the presence of a series of shingle communities recorded in 1988, as well as others not recorded in the 1988 survey. The site is of importance for this type of vegetation, which is nationally scarce. A simple probabilistic model has been used to generate predictions of the cliff top position in 50 years time. The model takes account of uncertainty in the rate of future sea-level rise and the variability of the recorded recession rates along each cliffline. The results are expressed as a probability distribution for the 50-year recession. These rangefrom 225m to 425m inland of the current cliff position, depending on the section of cliff. A conceptual model has been developed to provide a prediction of the migration rate of Benacre Ness over the next 50 years. This model considers ness migration as involving a combination of long periods of gradual change (13.3m/year) together with short periods of rapid change (100m/year) during rare storm events. Ness migration of up to 1500m is predicted for this period. However, it must be stressed that rising sea levels may limit the long-term reliability of this model.

English Nature's viewpoint

The studies have not only provided good information that will be used in the renotification of the SSSI, but have also contributed to an increasing body of knowledge about coastal change, and the link between geomorphological processes at the coast and the habitats of shingle structures.

Selected references

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