Department for Environment Food & Rural Affairs

Llywodraeth Cymru Welsh Government

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Environment Agency

Flood and Coastal Erosion Risk Management Research Programme

Sediment budget analysis: practitioner guide

Project Summary SC150011/S

The Environment Agency in collaboration with ABPmer have developed a practitioner's guide on sediment budgets. The guide's main aim is to support flood and coastal erosion risk management practitioners by explaining the need for sediment budget analysis and developing best practice in its application. Use of the guide will provide consistency in the execution and interpretation of sediment budget analysis. It will also help to improve the transparency of decision-making, as the consistent approach will mean stakeholders have greater understanding in the supporting evidence used to calculate a sediment budget.

What is a sediment budget?

A sediment budget summarises the balance of inputs and outputs for a defined system (such as an estuary or coastal embayment) and time period. This helps determine if a system has an overall surplus (accretion) or deficit (erosion) of material. If the accretion and erosion figures are equal, then the system is considered to be in balance/equilibrium.

Why are sediment budgets used?

Sediment budgets are of central importance when managing the coast. They are often developed at the planning stage to help determine whether specific policies or coastal defence will increase or decrease sediment movement. Once a sediment budget has been developed, values can also be altered to explore possible erosional or accretionary aspects if an engineering project is proposed within a sediment cell. The concept of sediment budgets will become increasingly important as we seek to understand how our coasts respond and evolve under a changing climate.

Sediment budgets are useful in coastal management, especially when there is a need to gain a quick and relatively inexpensive characterisation and quantification of sediment transport. They also have value in shoreline planning, such as for helping to explain the wider benefits of existing or planned changes to management policies.

The practitioner's problem

Sediment budgets are often developed in isolation, using a variety of supporting methods. These supporting methods are dependent on many factors including resource/budget availability, the data available, sediment type, geographic scale, and the level of detail and accuracy required from the results. There is no consistent approach to the development of a sediment budget and the presentation of results, despite being central to understanding coastal processes.

The guidance

The guide sets out the appropriate use of sediment budget analysis as a technique. It is structured around the following topics:

- what is a sediment budget
- when should sediment budget analysis be used
- how to apply sediment budget analysis
- using data to solve the sediment budget equation
- managing uncertainty

The compilation of an overall sediment budget brings together a variety of data types for the different elements making up the sediment budget. Some of these data can be drawn directly from monitoring surveys, while other data may require some form of derivation or deduction.

Understanding the potential limitations of these data is critical to enable users to understand the reliability of values within the budget. This is in terms of their accuracy to characterise variability within a location and time period.

Target audience

This guide is appropriate to all organisations that have a strategic role in managing the coast of the UK. The guide will also be useful for operational teams involved with planning new coastal flood defence schemes to understand the impacts of sediment movement. It provides guidance to help understand and interpret reports on sediment budgets.

This applies to coastal management or marine development, consultancies undertaking the work, or regulators who need to comment on the specification and review the outcomes.

How will the findings be used?

This guide will be used to support planning decisions along the coast by helping to determine whether specific

policies or coastal defence options will cause bypassing, interruption, reduction or cessation of sediment movement. It will also be used to provide a high level assessment of whether options such as beach replenishment are viable in that particular sediment cell.

This summary relates to information from project SC150011, reported in detail in the following output(s):

Report: SC150011/R

Title: Sediment budget analysis: practitioner guide

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