Suitability criteria for habitat creation

Technical Summary: FD1917

Joint Defra / EA Flood and Coastal Erosion Risk Management R&D programme

Background to R&D project

The relationship between the success of created habitat (in terms of establishment and continuing health) and the physical, chemical and ecological conditions at the site before the habitat creation is a key concern of estuary and coastal managers.

The establishment of managed realignment areas is a viable and cost effective option for flood and coastal defence and habitat creation. However, past outcomes of such schemes have not always been as expected. There is a clear need for a framework to make the site selection and decision process more structured, with better prediction capabilities of the type of habitat that will emerge.

This research project brings together the present scientific understanding of the physical, chemical and ecological factors controlling habitat (saltmarsh, intertidal mudflat and eelgrass beds - *Zostera Marina*) creation at coastal and estuarine realignment sites. It also provides tools for engineers and managers to facilitate the selection of suitable sites within a given estuary or coastal location.

Results of R&D project

The specific purpose of this project was to produce electronic decision tools for users to assess the potential of specific sites for habitat creation schemes. These tools are focused:
- At an estuary scale (screening tool - site selection) using a Geographical Information System (GIS);
- At a local scale (site suitability) using an influence diagram tool.

The necessary site selection criteria and associated thresholds for different habitats were determined by:
- A review of the existing selection procedure and criteria for sites appropriate for habitat creation.
- A review of existing knowledge and understanding of the processes and parameters that influence the growth and functioning of natural saltmarsh and intertidal habitats.

The project outputs are two reports and an associated influence diagram file. Both of the reviews appear in **Report I (Reviews of present practise and scientific literature relevant to site selection criteria)** and facilitated the identification of parameters (criteria) and relevant limits, describing potential realignment sites with regard to habitat creation. **Report II (Tools to Aid Site Selection for Habitat Creation)** integrates the main controlling criteria and thresholds for habitat creation into a screening tool and a tool for examining suitability on a site-by-site basis.

This approach also provides a transparent audit trail for policy makers and managers concerned with managed realignment and habitat creation or restoration.

One of the main practical uses is to lead the end-user or site selector through the range of issues to consider. This includes highlighting the factors amenable to predictive assessment and those that may be important but where the scientific understanding is not yet sufficient to allow incorporation into the tools. The tools are designed to be applied in succession, with the initial screening at the larger scale and then an application of the influence diagram tool to the resultant short list on a site-by-site basis.

R&D Outputs and their Use

The reviews provide a comprehensive assessment of scientific understanding of how habitat creation is related to site criteria. However, there are limitations in the present understanding of the complex processes that interact to produce a given habitat. The outputs of this project will not provide predictions of the quality of the habitat created, or the overall success or failure of a scheme, as these will vary depending on the site purpose and stakeholder priorities. The reviews and decision tools do provide a procedure and auditable pathway to transparent site selection.

Future research of habitat creation sites, focusing on site characteristics and controls of habitat establishment with time, will lead to improved understanding of the cause and effect pathways, responses and outcomes relevant to site selection. This will enable improvement and development of tools such as these.

This project is complementary to FD1918: Habitat Quality Measure and Monitoring Protocols and also with FD2413: Guidance On Design and Implementation of Managed Realignment and the recent English Nature/Living with the Sea project: Coastal Habitat Restoration Guide (http://www.english-nature.org.uk/livingwiththesea /project_details/good_practice_guide/habitatcrr/ENRestore/Habitats/Index.htm

Environment Agency

defra
Department for Environment
Food and Rural Affairs