



Assessing the carbon benefit of saltmarsh restoration

Benjamin Taylor (1), David Paterson (1), and Nicholas Hanley (2)

(1) Sediment Ecology Research Group, University of St Andrews, St Andrews, Scotland, (2) Geography and Sustainable Development, University of St Andrews, Scotland

The quantification of carbon sequestration rates in coastal ecosystems is required to better realise their potential role in climate change mitigation. Through accurate valuation this service can be fully appreciated and perhaps help facilitate efforts to restore vulnerable ecosystems such as saltmarshes.

Vegetated coastal ecosystems are suggested to account for approximately 50% of oceanic sedimentary carbon despite their 2% areal extent. Saltmarshes, conservatively estimated to store 430 ± 30 Tg C in surface sediment deposits, have experienced extensive decline in the recent past; through processes such as land use change and coastal squeeze. Saltmarsh habitats offer a range of services that benefit society and the natural world, making their conservation meaningful and beneficial. The associated costs of restoration projects could, in part, be subsidised through payment for ecosystem services, specifically Blue carbon. Additional storage is generated through the (re)vegetation of mudflat areas leading to an altered ecosystem state and function; providing similar benefits to natural saltmarsh areas.

The Eden Estuary, Fife, Scotland has been a site of saltmarsh restoration since 2000; providing a temporal and spatial scale to evaluate these additional benefits. The study is being conducted to quantify the carbon benefit of restoration efforts and provide an insight into the evolution of this benefit through sites of different ages. Seasonal sediment deposition and settlement rates are measured across the estuary in: mudflat, young planted saltmarsh, old planted saltmarsh and extant high marsh areas. Carbon values being derived from loss on ignition organic content values. Samples are taken across a tidal cycle on a seasonal basis; providing data on tidal influence, vegetation condition effects and climatic factors on sedimentation and carbon sequestration rates.

These data will inform on the annual characteristics of sedimentary processes in the estuary and be used in concert with further data of vertical accretion, vegetation structure and vegetation carbon storage; facilitating the estimation of the total additionality offered by restoration and so its potential value as a subsidy.