

MEASURING SUSTAINABILITY IN THEORY AND IN PRACTICE: SECTORAL INTERACTIONS IN THE COASTAL ZONE.

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Major legislative change is taking place in Scotland within the sphere of marine and coastal management, with Scotland's Marine Act (2010) and creation of Marine Scotland as the overarching governing body for Scotland's Seas. Management of Scotland's marine (and coastal) environment will take on new dimensions over the coming years, with emergence of marine spatial planning identified as a powerful tool for managing the marine environment. One of its key uses is its perceived potential to identify and deliver options for the sustainable management of interactions (positive or negative) amongst sectors operating in the marine environment.

A recent survey carried out by the Local Coastal Partnerships in Scotland, on behalf of Marine Scotland, has compiled data on categorising interactions between sectors operating within the coastal regions. The Tay Estuary Forum (TEF) has acquired information on the nature, extent and intensity of perceived interactions among sectors and subsectors within the Tay Estuary and coastline of east-central Scotland, from the River North Esk to Fife Ness, including the Tay Estuary to its tidal limit at Scone and 12 nm seawards of the baseline (Figure 1). Interviews have been carried out with 26 coastal stakeholders from a range of key sectors. The result is a Sectoral Interactions Matrix (SIM), which assigns a colour-coded interaction between two sub-sectors, populating an intersecting grid pattern, based on a template developed during the Clyde Pilot Scottish Sustainable Marine Environment Initiative (SSMEI) in 2008. This allows respondents to gain a mutual, two-way understanding of each other's activities, highlighting areas of overlap, both in terms of competition or conflict, but also opportunities for partnership working. The exercise forces local coastal stakeholders to re-evaluate their inter-sectoral relationships, past, present and future. Thus, the importance of inter-sectoral communication is promoted, further highlighting the essential role currently played by the Local Coastal Partnerships in providing a neutral and inclusive platform for discussion open to all coastal stakeholders (Booth & Duck, 2010).

The term 'managed competition' has emerged as a key phrase from the Sectoral Interactions work. We define this here as "a balanced or neutral state, achieved between sectors (either by voluntary or statutory measures) which may otherwise compete or even conflict with each other". An example of managed competition in practice is described from the northern extremity of the TEF region at Montrose Bay (Figure 1), a 9km long sandy beach-dune system with significant development in the coastal hinterland at its southern end associated with the port town of Montrose (population: 10,845 in 2001 census). Activities at Montrose are used to illustrate some of the issues faced when sectors compete for the same resources, but more importantly, how these challenges can be overcome by providing a foundation of scientific understanding derived from coastal process analyses, modelling and monitoring (Milne *et al.*, 2012) to demonstrate the likely impacts of current and proposed activities at the coast and through fostering a culture of stakeholder communication. Thus, 'managed competition' can be utilized to achieve sustainability where two (or more) competing interests meet within the coastal or marine zone. This facilitates evolution from competitive/conflicting interactions to neutral or even positive interactions over time to ensure an optimal balance between the interests of coastal stakeholders can be met and sustained (Figure 2).

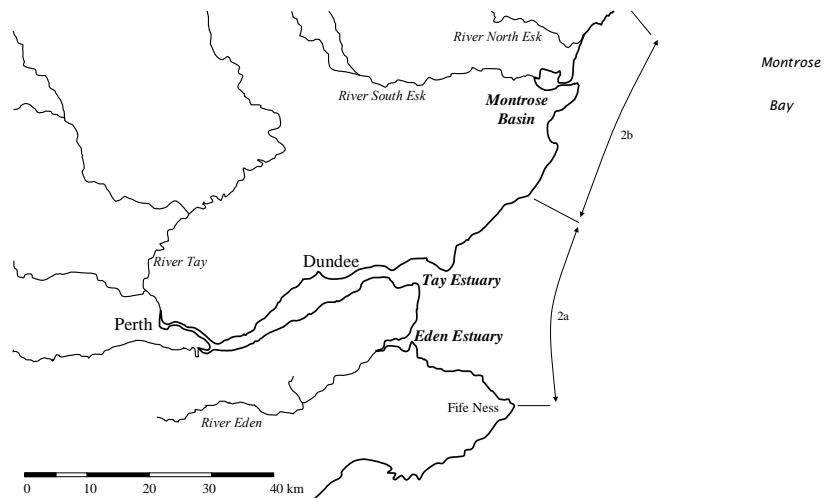


Figure 1: Map of the area covered by the Tay Estuary Forum. The coastline is coincident with Sediment Cells 2a and 2b of HR Wallingford (1997)

Sectoral Interactions Matrices provide a tool by which to monitor changing states of sectoral conflict/competition. It is suggested that changes in the number of neutral or positive interactions in the coastal zone evident in successive SIM exercises represents a powerful measure of the effectiveness of managed competition and thus sustainability at the coast.

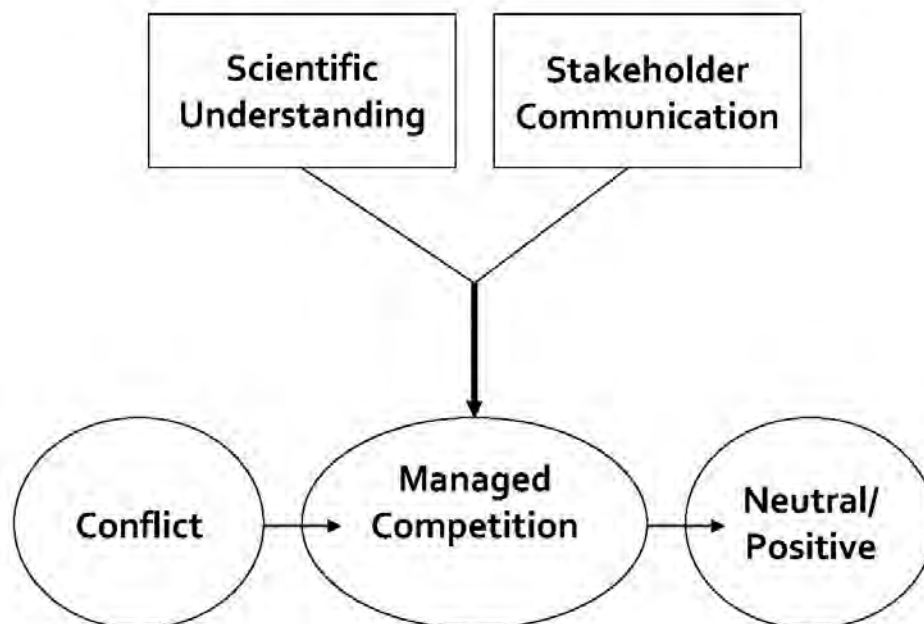


Figure 2: Managed competition as a method to achieve sustainable use of the coast through scientific understanding and stakeholder communication.

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