
# Measuring Sustainability in Theory and in Practice:

# Sectoral Interactions in the Coastal Zone

Laura Booth & Fraser Milne

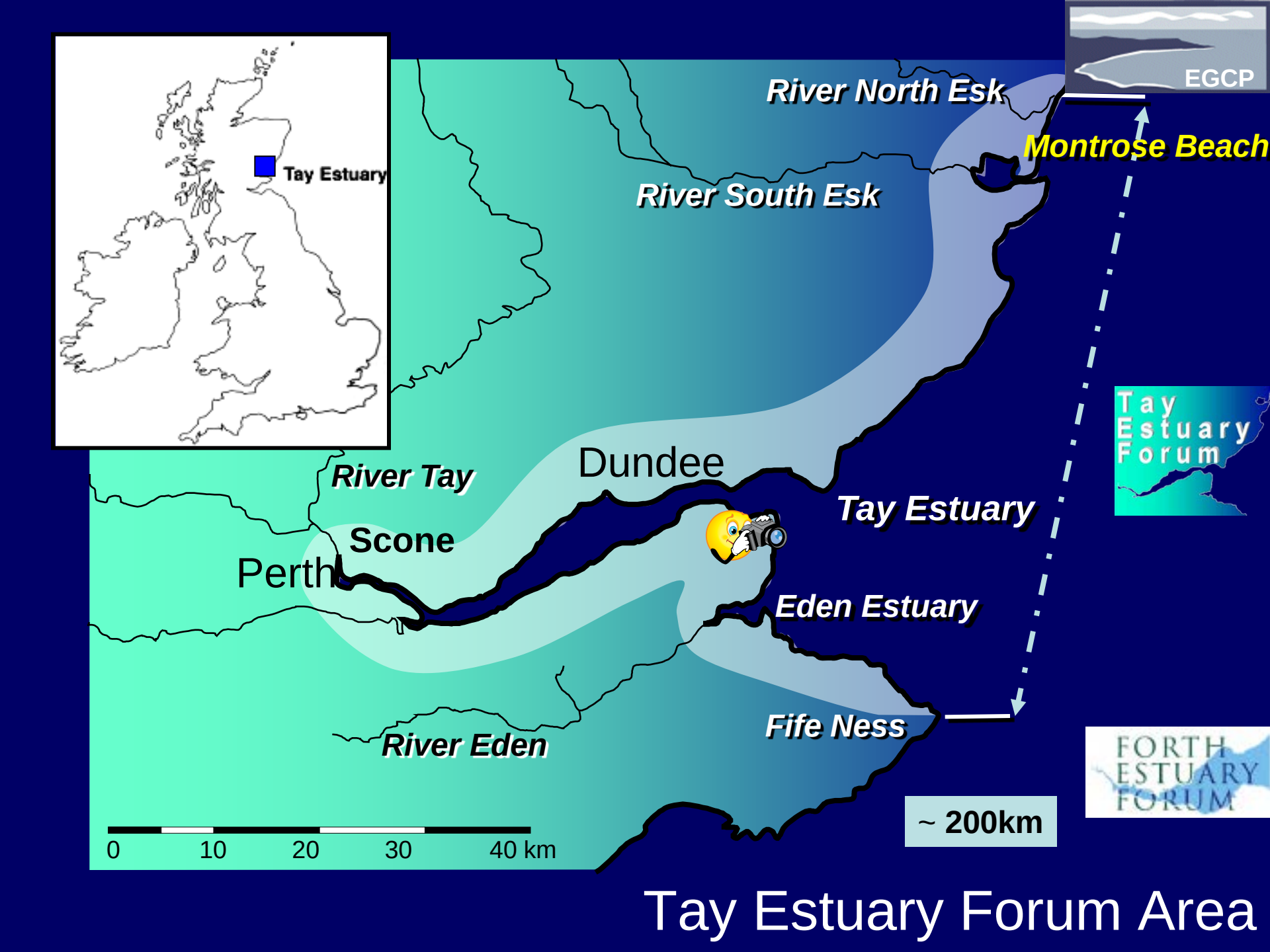
Tay Estuary Forum

University of Dundee

# Sectoral Interactions Matrix (SIM) Background

- **2008:** Clyde Forum's SSMEI Pilot (Scottish Sustainable Marine Environment Initiative) trialled technique of assigning interaction types to a colour-coded matrix.

- **2009-2012:** Marine Scotland extended project across Scotland asking other Local Coastal Partnerships to carry out SIMs in their own areas to **help inform future marine planning.**



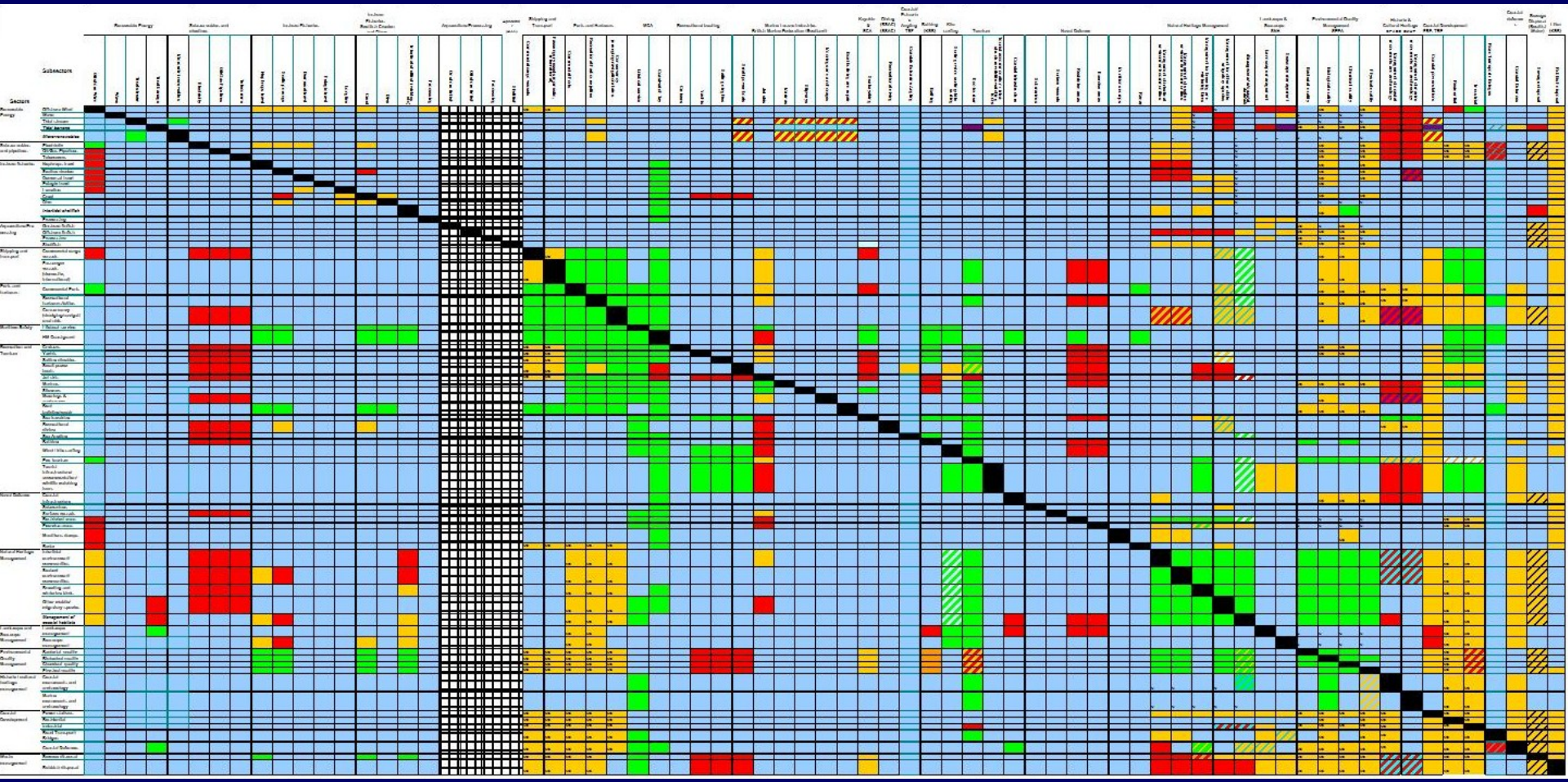

# Tay Estuary Forum Area

# SIM: A 'Snap shot' Assessment of Regional Stakeholder Interactions

# SIM Key Activity Sectors

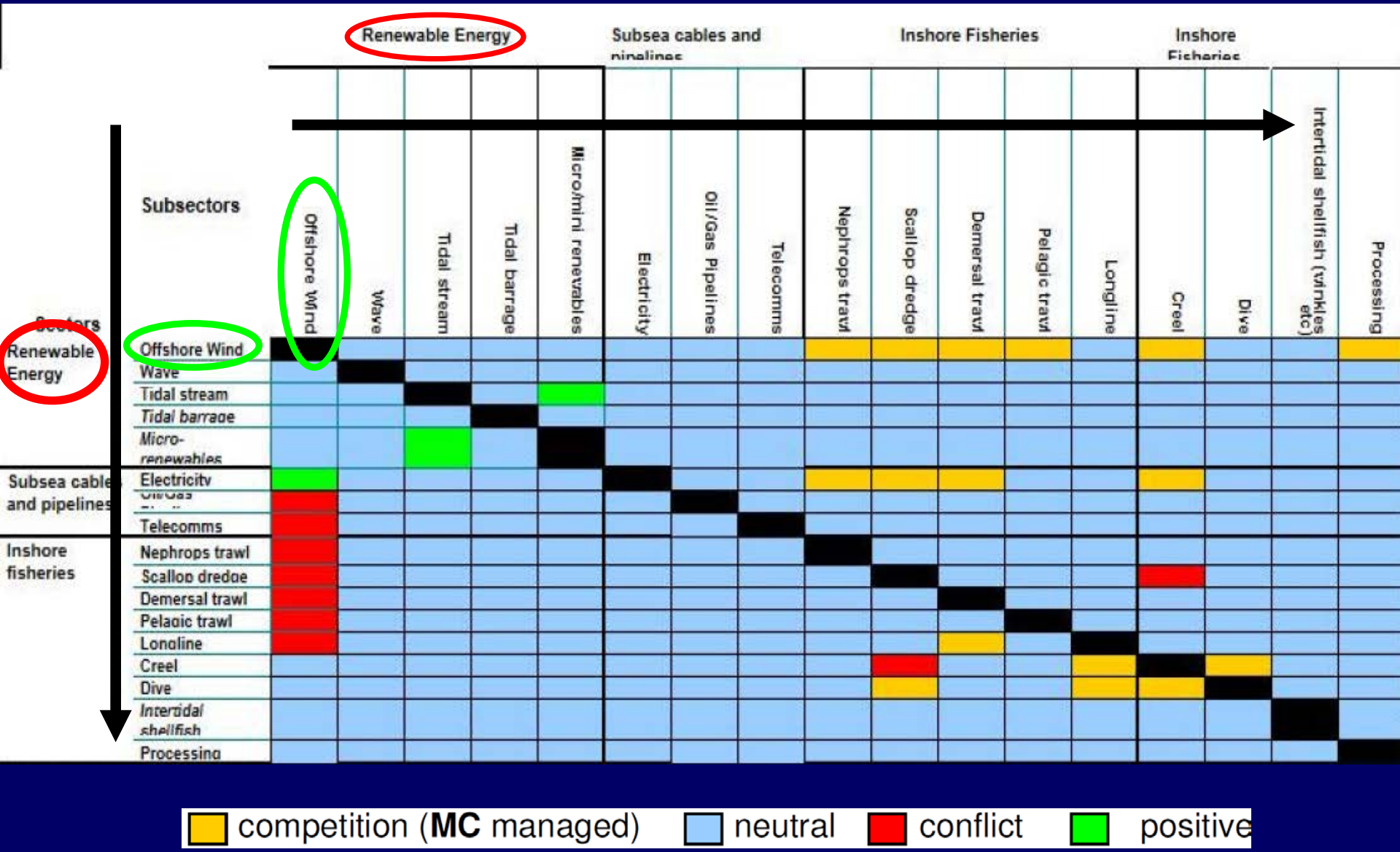

1. Renewable Energy
2. Subsea cables and pipelines
3. Inshore Fisheries
4. Aquaculture/Processing
5. Shipping and Transport
6. Ports and Harbours
7. Maritime Safety
8. Recreation and Tourism
9. Naval defence
10. Natural Heritage management
11. Landscape and seascape management
12. Environmental Quality Management
13. Historic and cultural heritage management
14. Coastal development
15. Waste management

# Tay Estuary Forum SIM



competition (**MC** managed) neutral conflict positive

# Tay Estuary Forum SIM Extract



# SIM Review

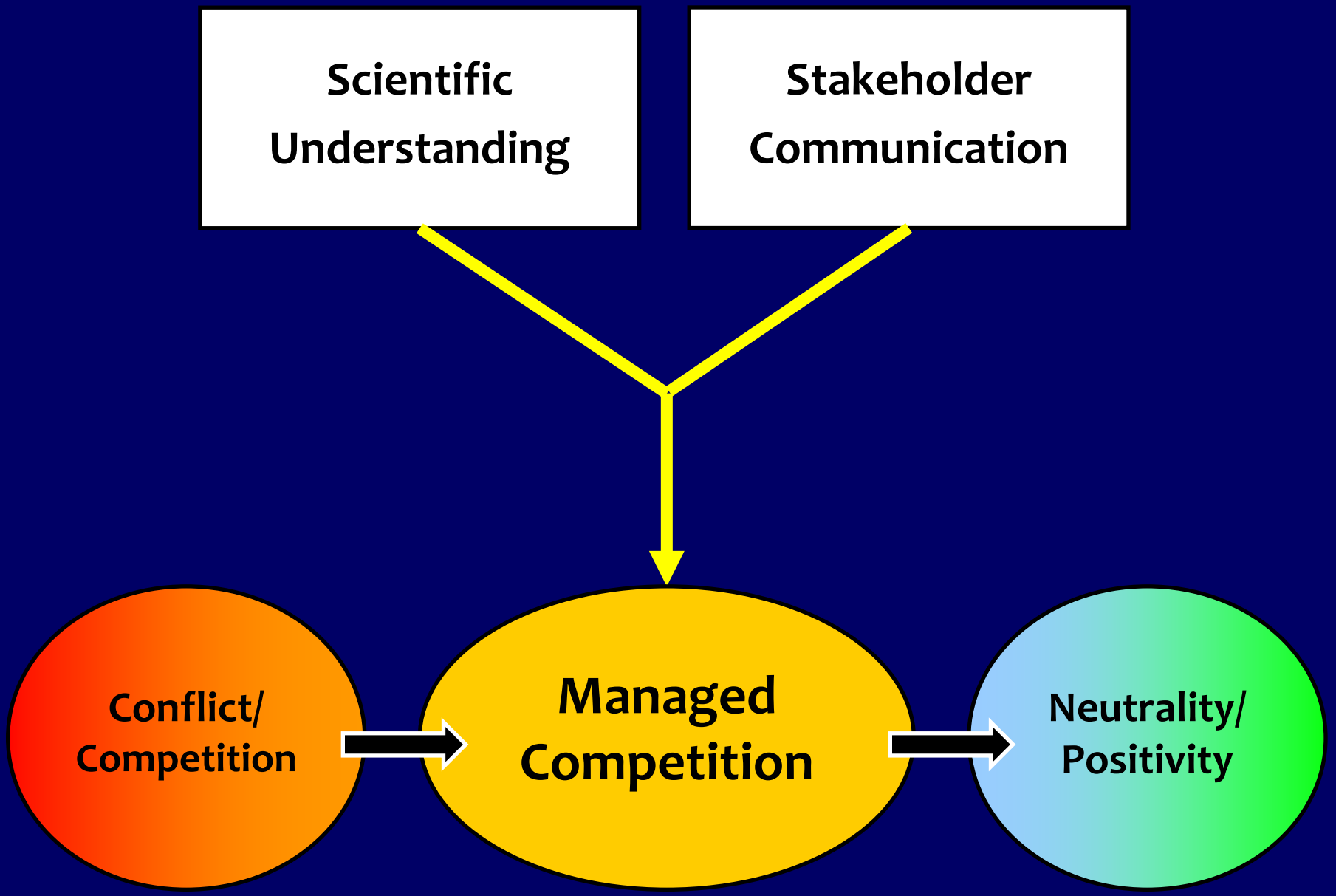
- Useful in recording interactions at regional scale.
- Future consistency in collecting, recording and displaying data by Local Coastal Partnerships.
- Filtering of perceived versus actual interactions.
- Identifies ‘hotspots’ requiring focussed future marine spatial planning.
- GIS component to be explored improving data quality.
- SIMs help ‘define the questions that need to be asked in the marine planning process’

(SIM Review, Oct 2012)

# Managed Competition

A balanced or neutral state, achieved between sectors (either by voluntary or statutory measures) which may otherwise compete or even conflict with each other.

MC ensures optimal balance between interests of coastal stakeholders can be met & sustained, through mutual communication, and firm scientific understanding of the physical and human processes involved.


Scientific Understanding
Stakeholder Communication
Conflict/ Competition
Managed Competition
Neutrality/ Positivity

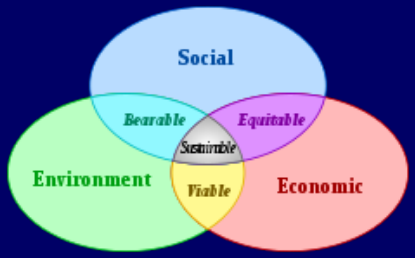
# Managed Competition:
# A Method for Achieving Sustainability

- MC facilitates a progression from competitive/ conflicting interactions to neutral/ positive interactions

- Successive SIMs provide a tool to monitor changing Sectoral Interactions, and can measure the effectiveness of MC and thus sustainability at the coast.

## Managed Competition in Practice: Montrose Bay, Scotland

MC



# Montrose Bay, Scotland

- **9km** long, sandy beach-dune system
- Bay enclosed by rocky headlands: essentially a **closed system**
- The rivers **North Esk** and **South Esk** meet the Sea at the bay
- Town of **Montrose** is located at Southern end of Bay
- **Various sectoral interactions**

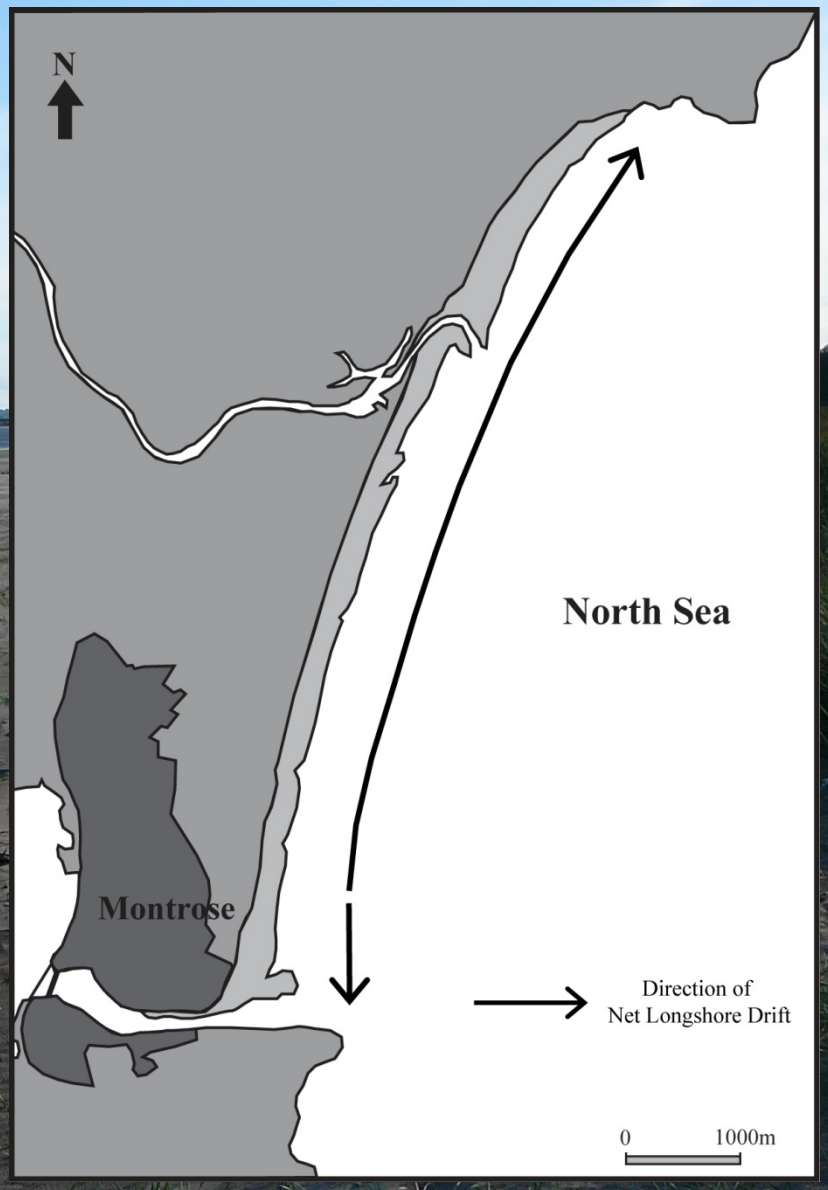
# Erosion at Montrose Bay

- Serious erosion in dune system fronting golf course
- Dune retreat at golf course frontage commenced around the late **1980s**
- Since 1988 there has been up to **60m** of dune retreat at the southern golf course frontage (Beedie, 2010).
- There has been contemporaneous accretion at St Cyrus towards northern end of bay.

Reference: Beedie, L. 2010. *Quantifying the Erosion of Montrose Beach using TLS and Photogrammetry*. Undergraduate Dissertation. University of Glasgow.

# Causes of Erosion: Sediment Transport

- Dominant **northern longshore drift** along most of bay
- **Short length of updrift beach** and a **positive littoral drift gradient** results in **natural sediment deficit** at golf course
- Triggered by **change in wave climate** during the 1980s
- **Superimposed on these natural drivers are anthropogenic factors**

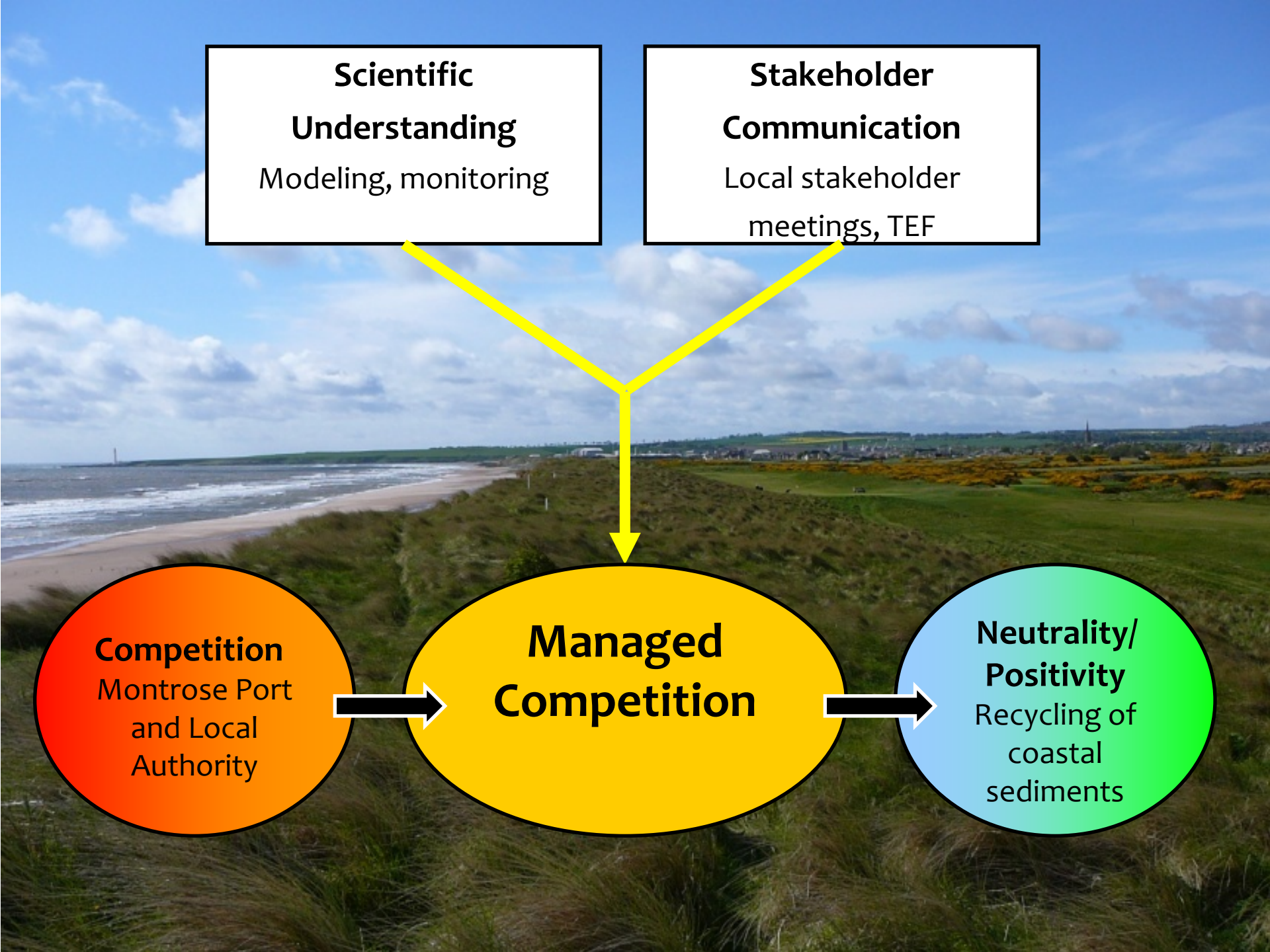


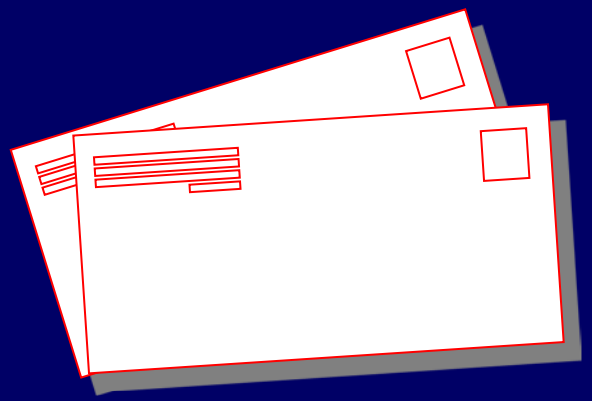
# Anthropogenic Factors

- Annual dredging of South Esk channel **is essential** to maintain access harbour due to infilling from beach
- Average of **52,556 $m^3$** removed per annum
- Dredged sediment is dumped offshore and lost to the coastal system
- The Montrose Bay coastal system has limited natural inputs and outputs of sediment.
- Thus, removal of dredged material results in an **anthropogenically induced negative sediment budget**

# Recommended Coastal Management

- Sediment dredged from the South Esk channel should be retained in coastal system
- **Shoreface recharge** (bottom-dumping dredged sediment in littoral zone)
- Establish a *sediment management protocol* based on the principle of **working with natural coastal processes**
- **However, Port Authority concerned that sediment will transit back from recharge zone directly to navigation channel requiring further dredging**


Scientific Understanding
Modeling, monitoring
Stakeholder Communication
Local stakeholder meetings, TEF
Competition
Montrose Port and Local Authority
Managed Competition
Neutrality/ Positivity
Recycling of coastal sediments

**Please Contact:**

**TEF Project Officer: Laura Booth**

**Room G35, Tower Building**

**University of Dundee**

**Dundee**

**DD1 4HN**

**01382 384933**

**TayEstuaryForum@dundee.ac.uk**

**http://www.dundee.ac.uk/TEF/**