

Numerical Modelling within Flood and Coastal Erosion Risk Management – Perspectives from the central south coast of England

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Overview



1. Who we are and our responsibilities
2. Background to LA coastal modelling
3. BCP model (a new approach)
4. Ambitions

Some Definitions....



Coastal Partners: partnership of Flood & Coastal teams from 5 Local Authorities (Havant, Portsmouth, Gosport, Fareham & Chichester)

BCP Council (Bournemouth, Christchurch & Poole): a Local Authority

SCG & SCOPAC: regional coastal group (develop research, best practice & resources)



Home of National Coastal Monitoring



BCP

Coastal Partners

Partnership approach allows us to diversify and specialize

SOUTHERN COASTAL GROUP AREA

648.21 km of coastline

SCOPAC AREA

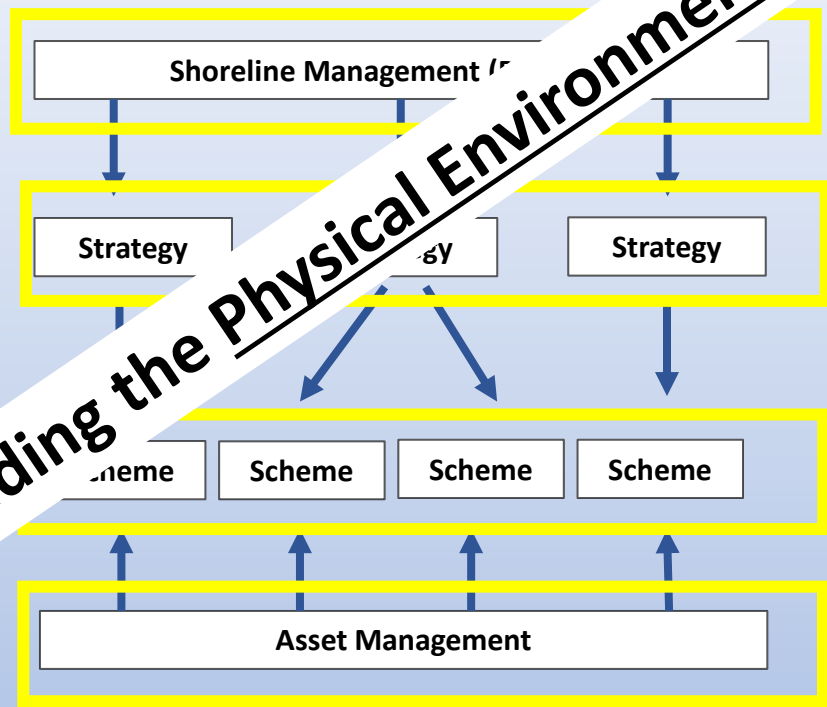
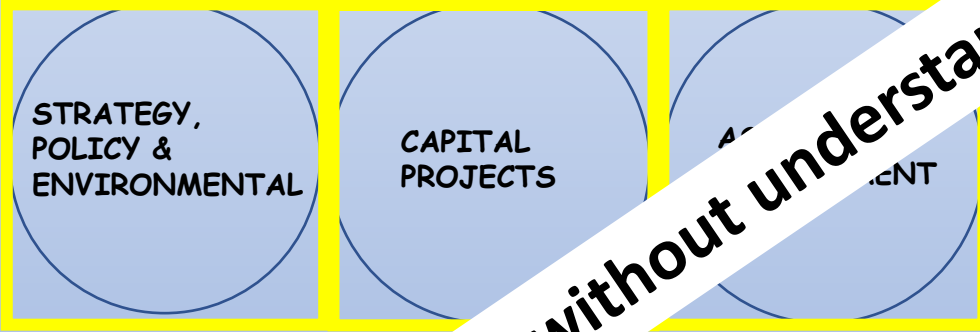
816.81 km of coastline

Flood & Coastal Erosion Risk Management ("FCERM")

BCP: 29 Staff
Coastal Partners: 50+ Staff

Driven by formal responsibilities to protect communities from flood & coastal erosion, along with the Environment Agency.

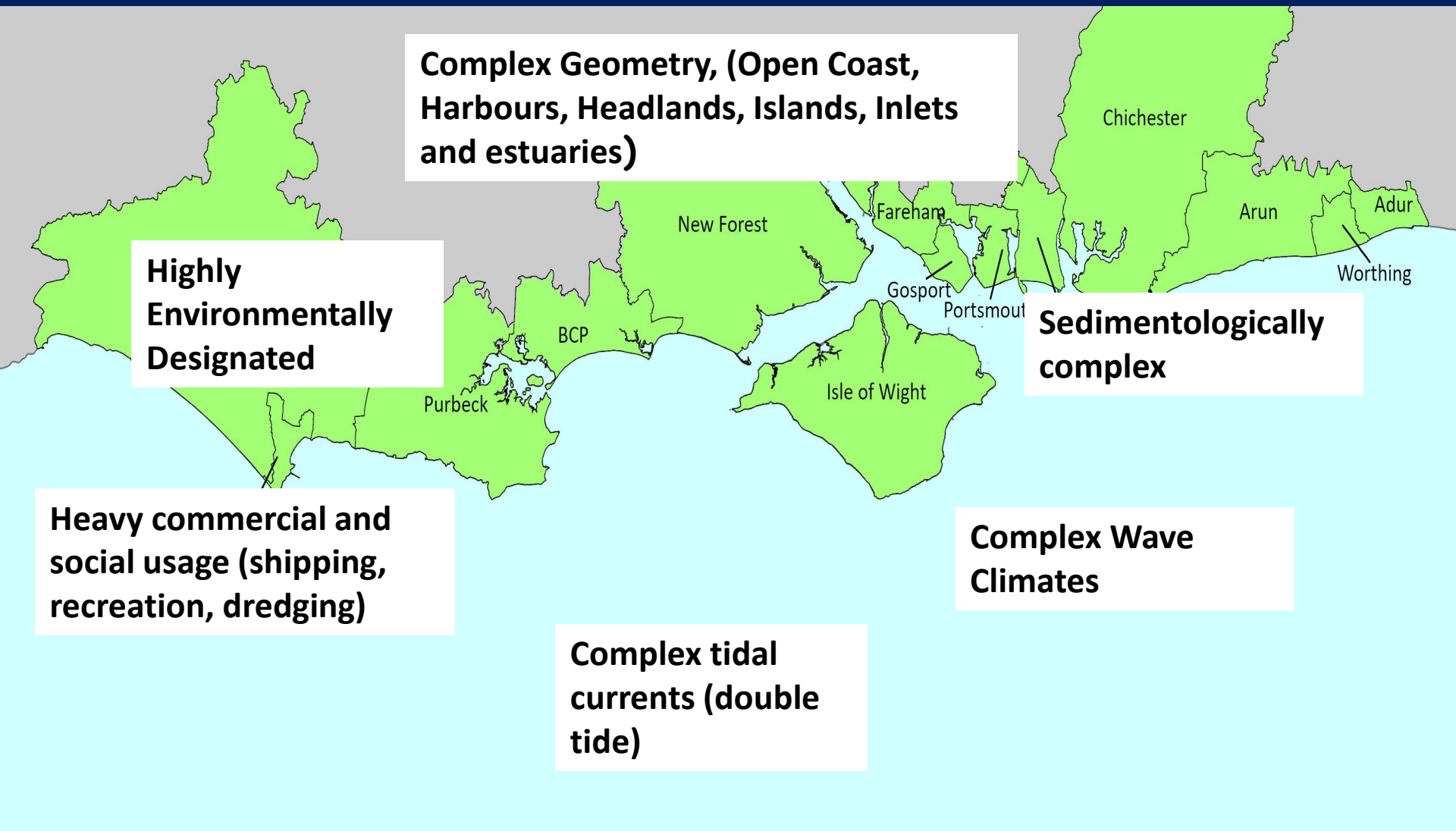
Civil/environmental engineers, scientists working on coastal & surface water risk management



Cant do any of this without understanding the Physical Environment

- Flood response – working with the Environment Agency services & Environment Agency
- Planning – advice on planning applications
- Research & monitoring – storm impacts, landfills, habitat restoration
- Survey – bathymetry
 - Monitoring & to support all FCERM projects

Complex Coastal System



Using various modelling packages can help us shed light on this complexity

What we use modelling for

Hydrodynamics, Waves Sea levels, Sediment Transport

- **Scheme appraisal and design**
- **Flood risk assessment – overtopping and inundation**
- **Erosion risk assessment (e.g. 1D beach scour, 2D sediment transport modelling & morphological change)**
- **Use in Environmental Impact Assessment (EIA) & consenting related work (“precautionary principle”)**
- **Identify sources & fate of beach replenishment materials**
- **Evidence to apply for dredging licences, CIA**
- **Modelled outputs good communication tools**

Historically don't do modelling in house but thanks to partnership approach to working it is now plausible to specialise in these things.

Local Authority Coastal Modelling

Numerical modelling of sediment transport and hydrodynamics has historically been undertaken;

- **By separate authorities or consultants on the basis of the individual requirements for separate schemes, strategies and projects**

resulting in

- **Repeated pay for similar modelling activities,**
- **Costly repeated set ups**
- **Minimal opportunities to share methods, data and results.**
- **Isolated outputs do not benefit a shared understanding**

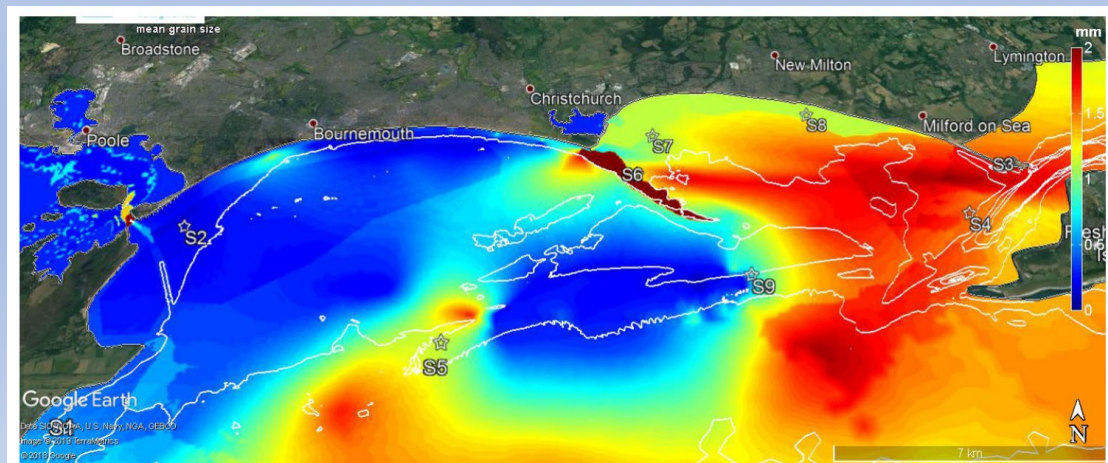
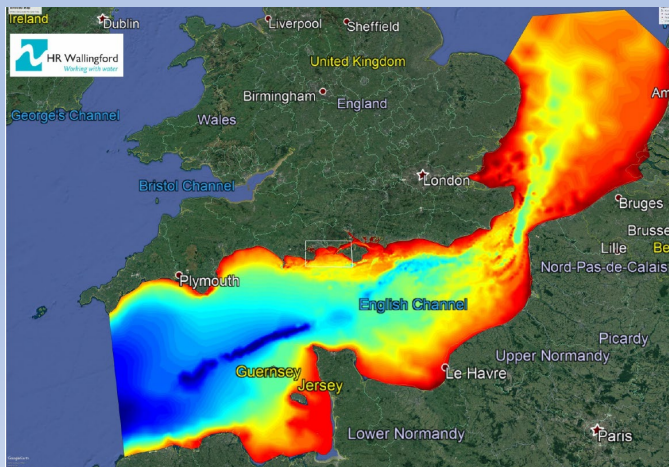
Aspiration to work towards a more centralized modelling approach

The BCP “regional” model

Initiative in 2015 by legacy authorities (led by Poole), the EA and Coastal Monitoring to investigate sustainable ways of managing sediment for beach management plans

- Coupled hydrodynamic-wave-sediment transport model
- Large domain – benefitted representation of the complex tides in this region.
- Regionally validated/calibrated via 9 x AWACS (each deployed for 1 month)
- Good performance/error statistics

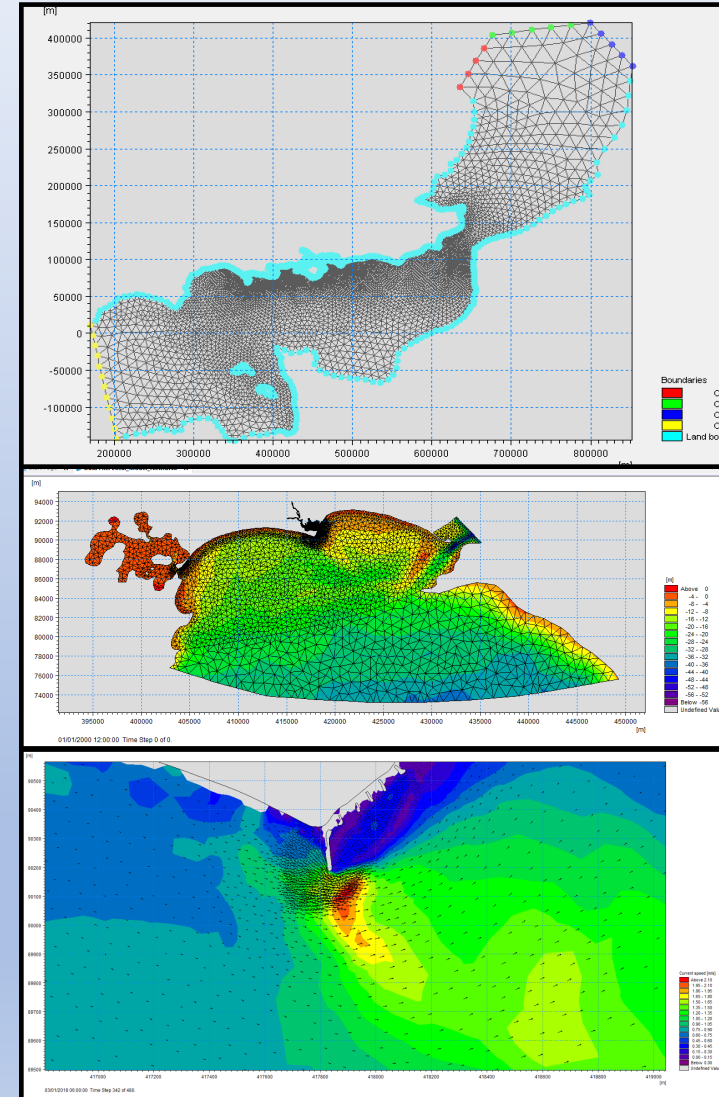
Has been used for modelling breach impacts in a Strategy, assessing sediment pathways stores and sinks, dredging impacts etc...



The BCP “regional” and “local” models

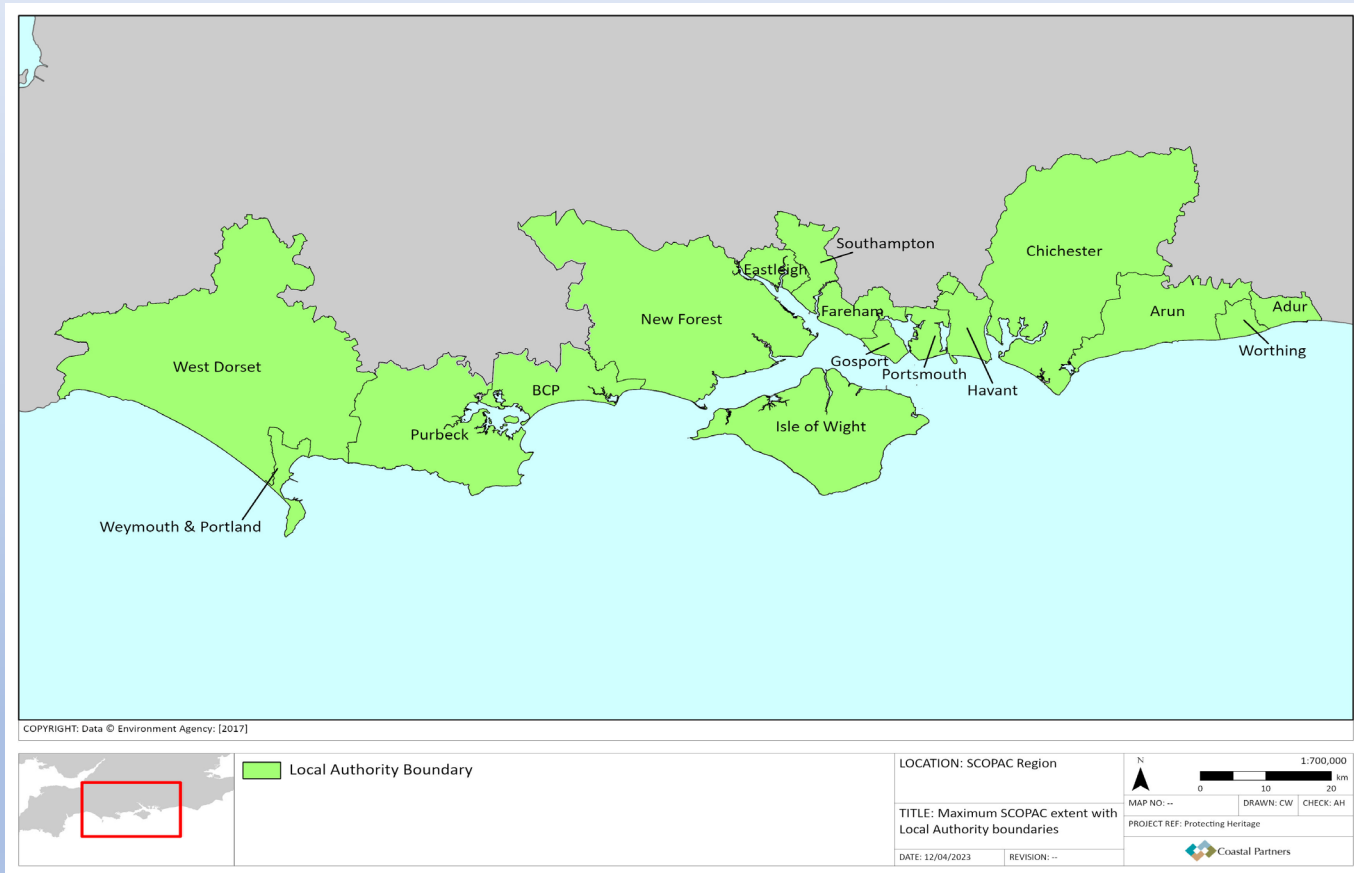
The MIKE version

- Previously developed as TELEMAC-TOMAWAC-SISIPHYE
- Challenges around run times configuring the model (specialist area) – colleagues were also using MIKE21 & the UI was appealing/practical.
- Model translated to MIKE where we could benefit from the Shoreline Morphology module and 1D tools (LITPACK etc.).



Whats Next?

There is interest in extending this across the SCOPAC/SCG region.



Centralization of regionwide modelling activities, accessible for all local authorities within the Southern Coastal Group (SCG)

Whats Next?

- **Reduce modelling expenditure to deliver projects, outcome measures, and strategic outputs of highly relevant local understanding (e.g. sediment system links, bimodal wave impacts).**
- **A more interlinked and joined up understanding of coastal processes across the region not previously possible,**
- **reduce the risk of key processes/issues being overlooked,**
- **Enable discussion over the regionally-shared coastal problems (e.g., loss of sediment stores or changes to transport pathways, problems associated with climate change)**

Whats Next?

Thankyou