

How can we construct sustainable coastlines: An assessment from an implementation theory perspective



SWANSEA METROPOLITAN UNIVERSITY

PRIFYSGOL FETROPOLITAN ABERTAWE



KEF Sustainable
Constructed Environments



CONSORTIA FOR INDUSTRIAL
TRAINING

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Structure

- *Introduction*
- *Demographics*
- *Activities and construction*
- *Coastal Management*
- *Examples of construction and the coast*
- *Wales and CZM*
- *Theoretical Frameworks*
- *Considerations*
- *Conclusion*



Southerdown, 2002 Nick Thomas South Wales, UK



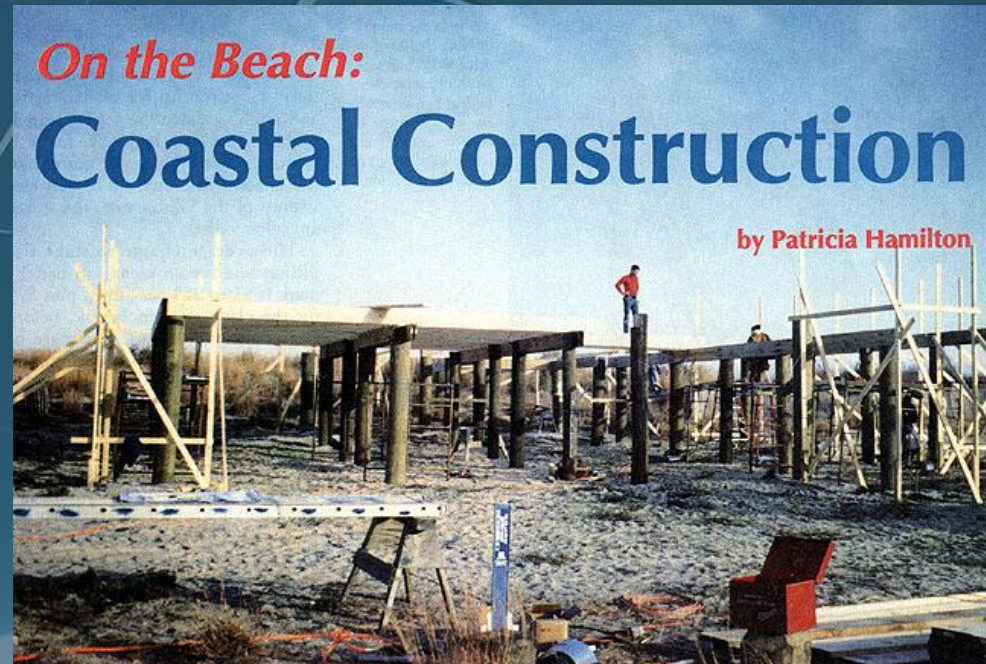
‘The Opposition’ of land and sea (Venice)
Trevisan (1715) (Lasserre & Marzollo (2000)



Fundamental considerations

- Coasts are temporary structures and subject to rapid change
- The shape of the coast is a product of many processes
- Human interference in the coastal processes rarely increases the long-term stability of a coast

(UAE University, 2008)



Why important for construction?

- Increasing coastal zone migration means planning needs careful considerations.
- 66% of the Worlds mega-cities are located on the coast
 - NY, LA, Mexico, Tokyo, Bombay, London etc
- The CCSR (2006) report predicted that between 1995 and 2025 there will be a global 35% increase in population living within 60 miles of the coast

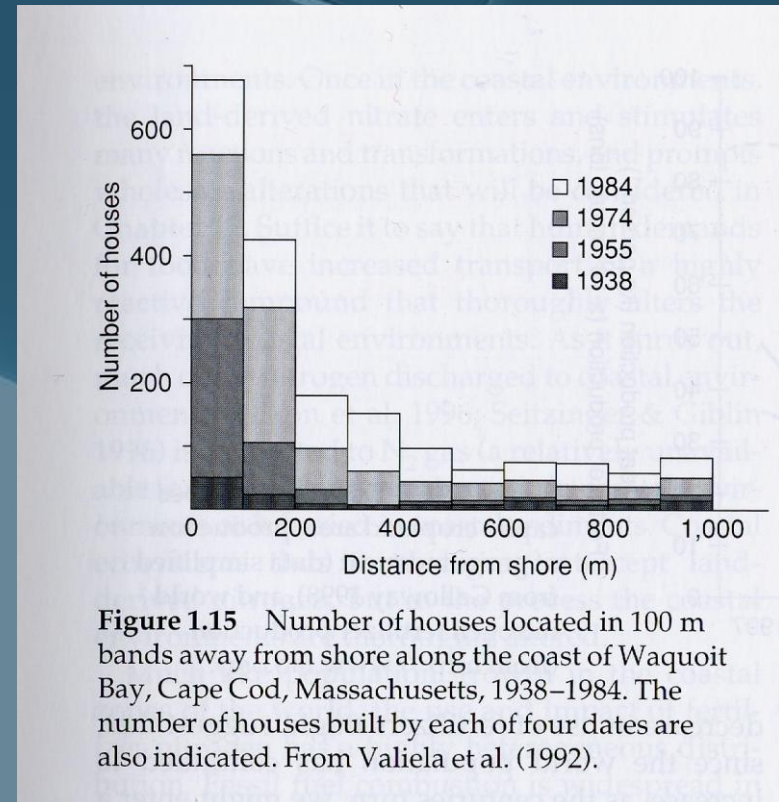
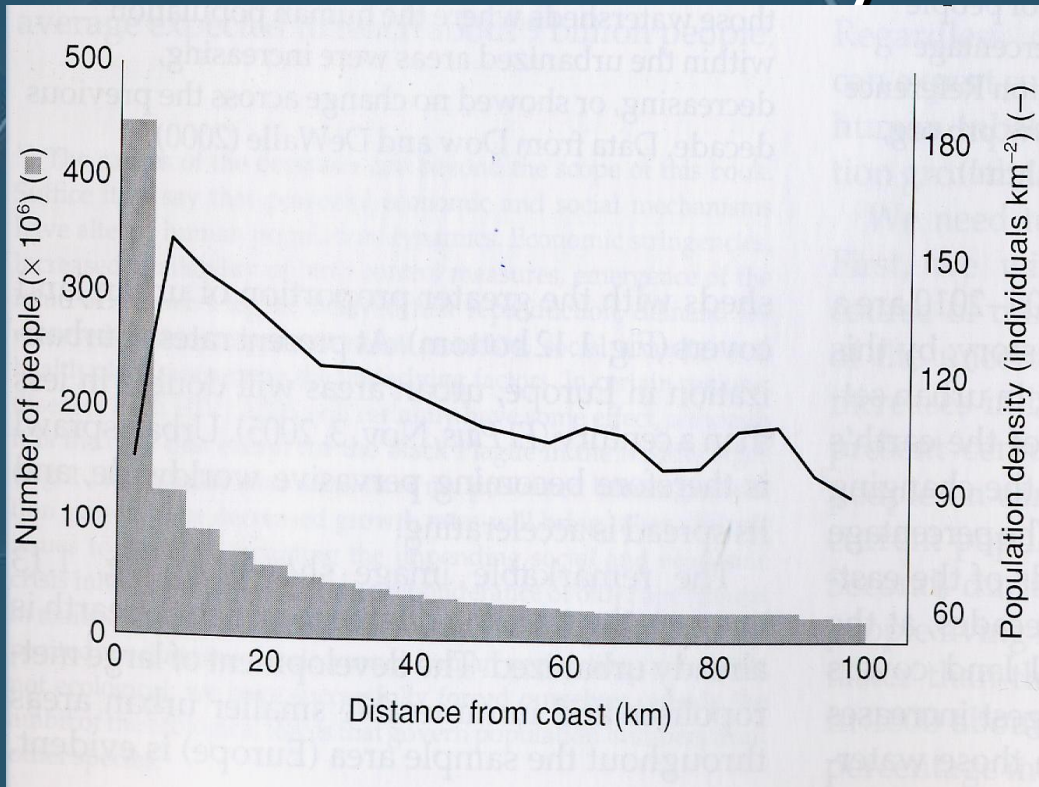
Katwijk Lagoon' NL





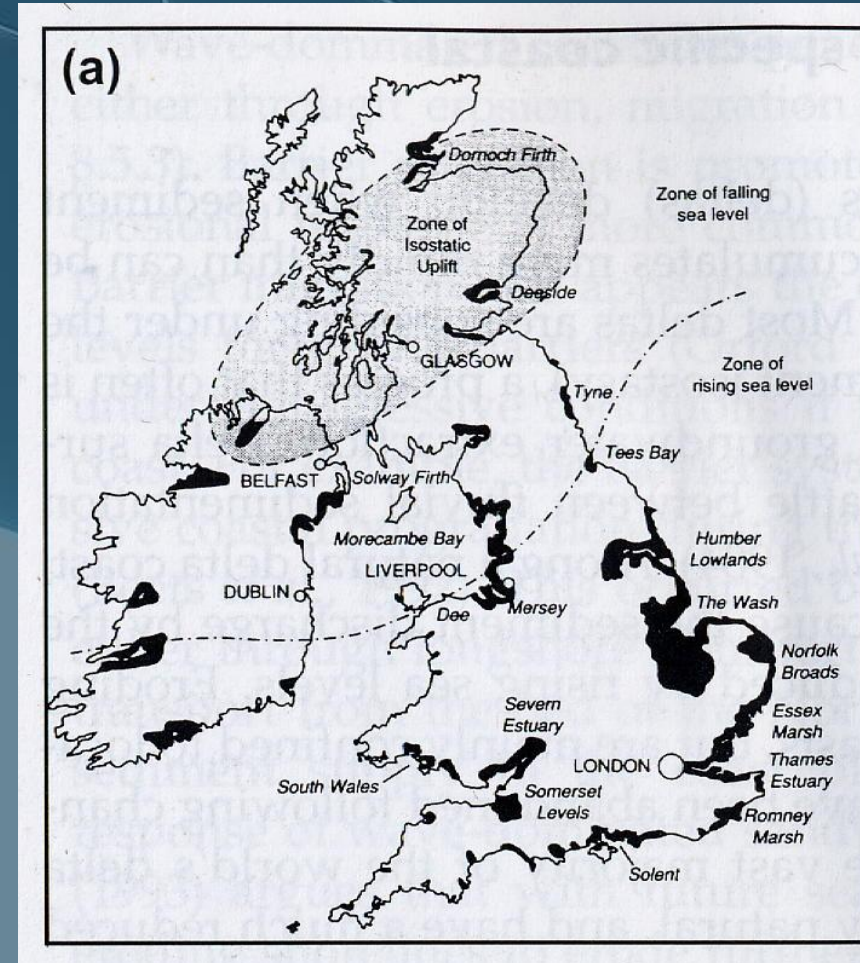
Demographics

- Demographics is the guiding force behind the construction industry



Implications


- This population increase will not be distributed equally due to various factors such as topography and proximity to the sea (Carter, 1988; Small & Nicholls, 2003).
- Hence increasing impacts on coastal resources (Leatherman, 2001).
- Socio-economic deprivation and prosperity
- Reasons: historical, trade, politics, climate, fertile soil, fish stocks, construction, aesthetics and recreation (Carter, 1988)
- Yet 70% sandy coasts are in retreat (Bird, 1985)
 - Sea level rise
 - Sustainability





Activities and construction

- Coast is a resource and a natural environment
- Multiple uses / conflict
 - Tourism
 - Residential
 - Recreation
 - Industry & Commerce
 - Constructed defences
 - Resource extraction (Dredging)
 - Agriculture
 - Infrastructure
 - Waste disposal
 - Aquaculture & fishing
 - Conservation
 - Military



All influenced by
and influencing the
construction industry.



Implications

- Pollution, Habitat loss, Changes in sediment movement etc.



- < resource value of the land/£

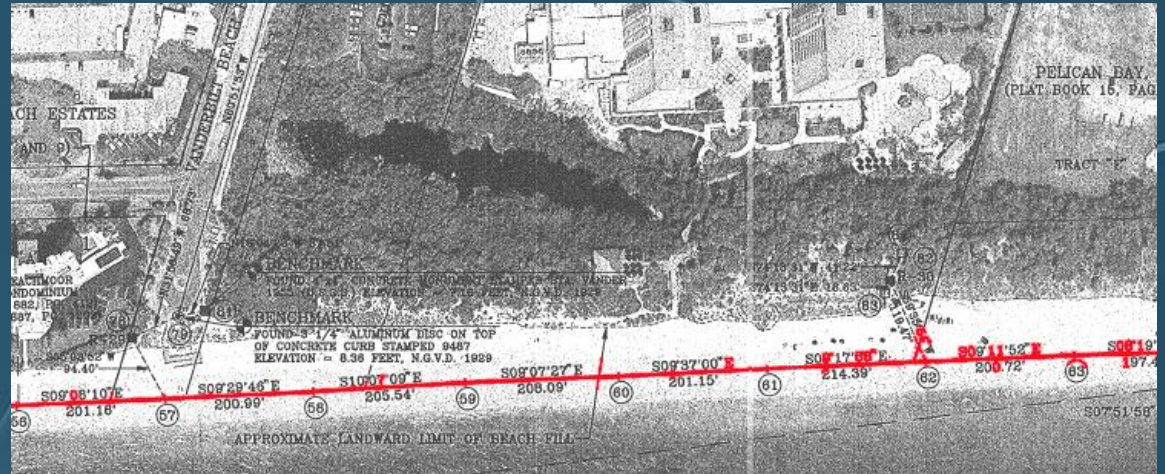


- Need for sustainable management



Coastal Management

- Policy
- Planning
- Implementation
- Past
 - Small scale limited number of authorities
- Now: Integrated (Cicin-Sain & Knecht, 1998)
 - More complex
 - Spatial & temporal scales
 - Industry, administrative authorities, public



Cardiff





ICM

- Coordinated strategy implemented for the allocation of resources to achieve the conservation and sustainable use of the coast (Bijlsma et al, 1996)
- Integrated
 - Economic development
 - Sectors →
 - Admin. Responsibilities
 - Built environment →
 - Resources
 - Disciplines →
 - Governance



Sustainable
Constructed
Coastline



Sustainable Construction

- Needs of the present (**profit**) without compromising the ability of future generations to meet their own needs. (WCED, 1987)
 - Time horizons
 - Holistic
 - Cells (Haslett , 2000)
- 'way of thinking'

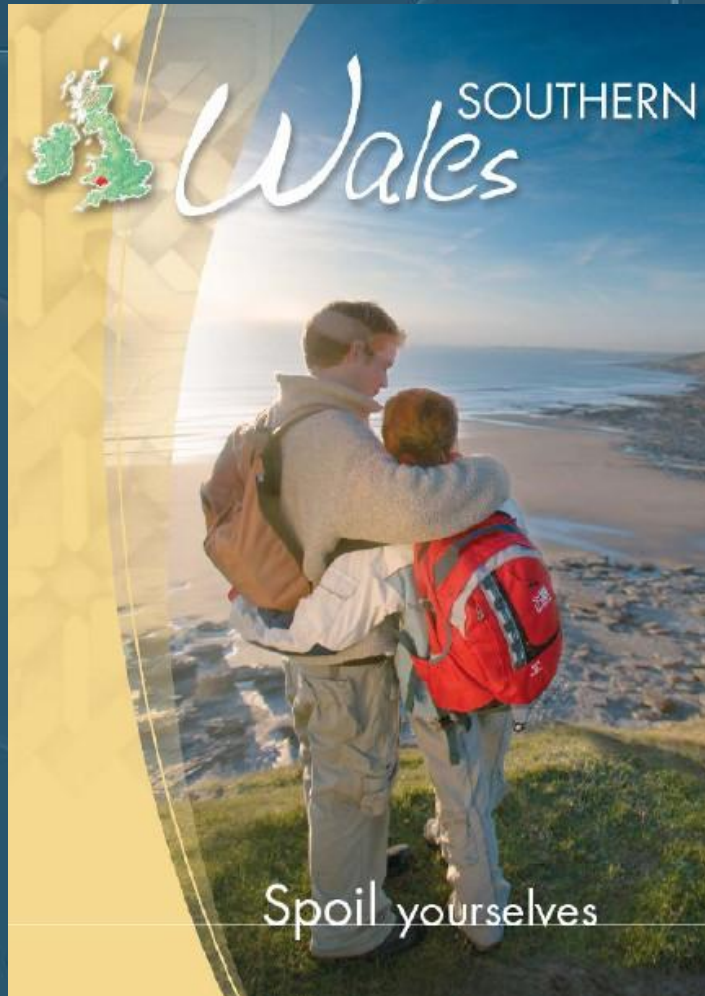


ICM UK



- **Severn Estuary Partnership**
- **SCOPAC** (Standing Conference On Problems Associated With The Coastline) south Coast
- **Aims**
 - (a) A co-ordinated coastal approach between neighbouring authorities in engineering
 - (b) To eliminate the risk of engineering works carried out by one authority adversely affecting the coastline of a neighbouring authority.
 - (c) To provide a forum for the exchange of information
 - (d) To establish a close liaison with Government and other bodies
 - (e) To identify further research

Implementation theory and constructed coastlines



Visit Cardiff Brochure, 2007)

- "If the study of theory and the study of fact do not fertilise each other, both will be barren." (Glazer, 1955: 56)
- Implementation of CZM is inherently complex Van der Meulen (2006) across time and space (Goggin 1990).
- Long and non linear process Van der Meulen (2005)
 - Time horizons (Sabatier, 1990)
 - 8-15 years (Pickaver et al (2004)
- Traditionally sectoral in nature

Implementation: Some examples

- Shift from fixed to restoration

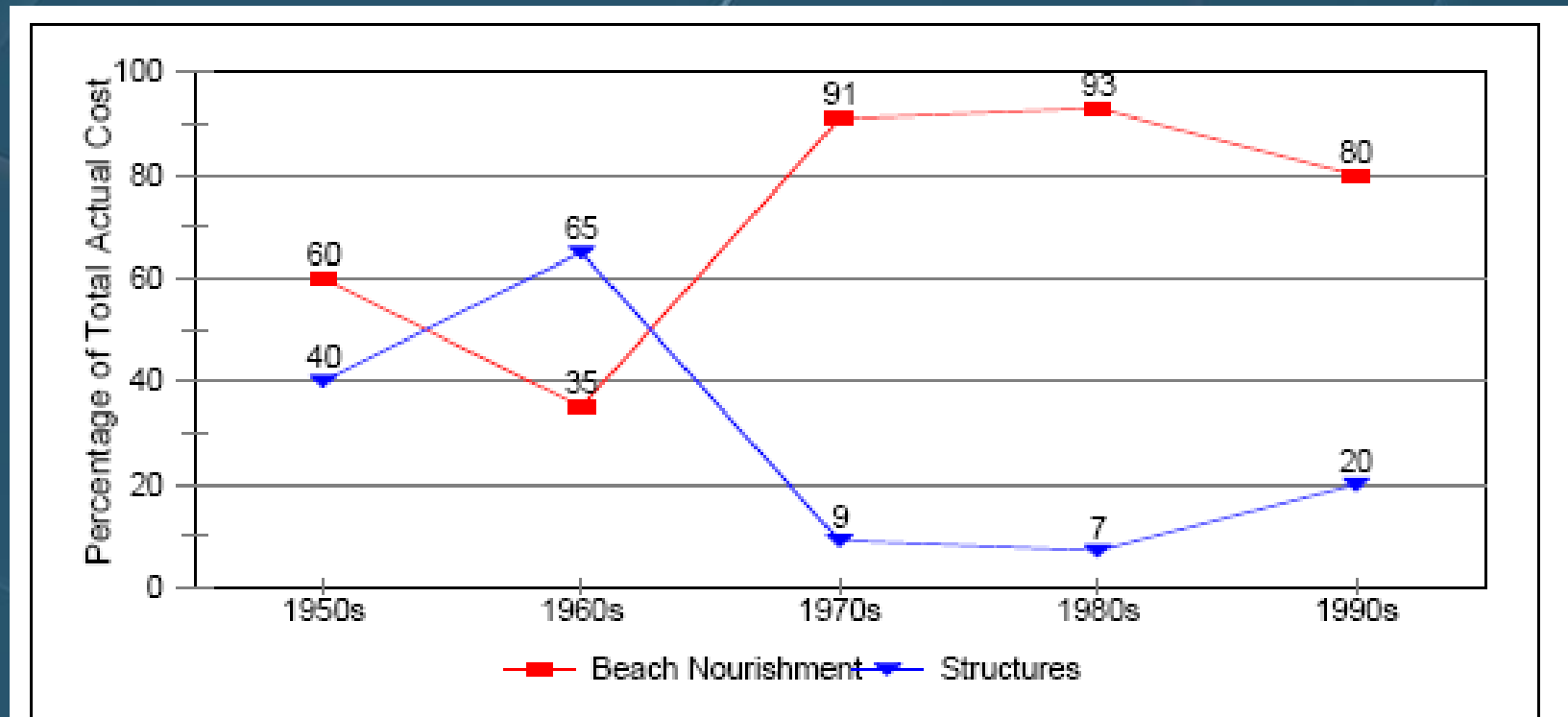


Figure I-3-13. The shift from fixed structures to beach restoration and nourishment (from Hillyer 1996)



Construction of the massive, concrete seawall to protect Galveston, Texas, against overflows from the sea began in 1902, in the aftermath of the major hurricane of September 1900. Over 6,000 (16 percent) of the citizens lost their lives. An original construction photo (top) and chronology of seawall and embankment (dike) cross-section development (bottom) are shown in Figure V-3-5 (from Davis 1961). Major features are the wood piles, a sheet-pile cut-off wall, riprap toe protection, and the curved face to deflect wave runup. Modification and extension occurred in 1909, 1915, 1926, and the last extension to the west completed in 1963. In the almost 100 years of existence, many lives and millions of dollars of property damage have been saved by this project (Davis 1961).

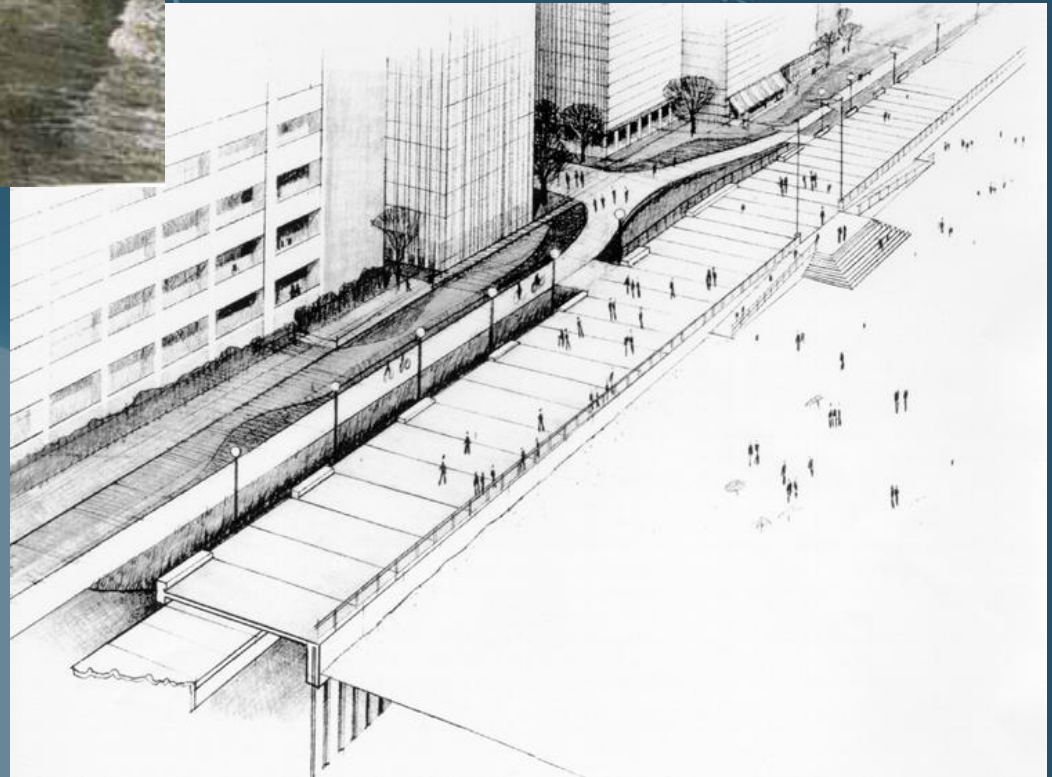
**Galveston, Texas,
seawall (CERC, 2003)**



Figure I-3-12. Workers planting grass on a beach restoration project. The date and location of this image were not recorded, but the scene is likely the Outer Banks. Many dune and beach restoration efforts, sponsored by the National Park Service and other agencies during the late 1930s, also served as work relief efforts for a nation trying to recover from the Great Depression. Photograph from the Beach Erosion Board Archives



**Virginia Beach
seawall/boardwalk, 1997
(courtesy City of Virginia
Beach, VA)**





a. Aerial view



b. Moveable gates

Statutory:
Dynamic
Preservation
Strategy, NL
1991

Legally maintain
coast at 1990
position. (Koster
& Hillen, 1995)

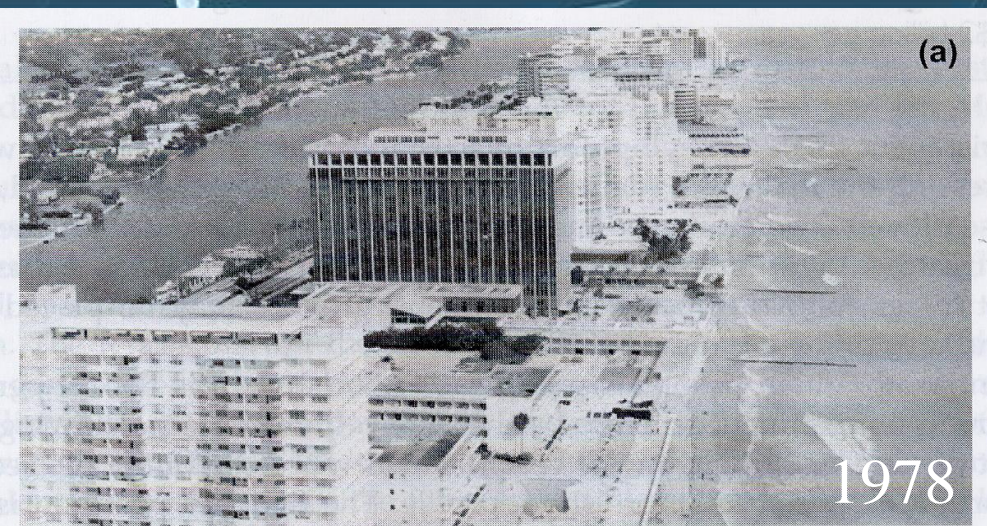
Miami

- Barrier Is.: Naturally changes
- 1920's unplanned construction vs erosion
- Private ownership limited integration
- 1965-1976 critical
 - Loss beach (recreation)
 - Steepening foreshore
 - Pollution (Carter, 1988)
 - Real estate \$
- Beach nourishment from 1976





Policy response



- 1976-1981 nourishment \$60 million
- 13 million m³ of dredged sand (from offshore)
- 16km coast
- Result 56 m wide beach 3m above MLW
- Costs \$3 million per a.
- Tourists \$2 billion yr.



Sustainable development?

- **Surfers Paradise, Australia**



Research and ICZM in South Wales

- Stocktaking exercise ICZM (Defra, 2004)
- Evaluation of implementation and application (Defra, 2006)
- Wales devolution: own solutions in the CZ
 - Assembly: ICZM part of the SD strategy
- 'Involvement of all parties'
- Local Government and Coastal Partnerships
- Severn Estuary Forum (Barker & Benson 2006)
- Local action



Image: Leigh Perry
Sydney, Australia
Breakwater Noosa in Queensland



The need for theoretical frameworks in ICZM

- “A policy, once it is soundly based theoretically and clearly defined objective, requires the additional elements of institutional structures, policy strategies and policy actors” (Wells, 1998: 17)
- “A policy which is soundly based theoretically and that occurs within clearly identifiable institutional structures requires the additional element of strategies or policy instruments.” (Hanf, 2003: 45)
- Definition: ‘Mould through which decisions are cast’
 - Where does formulation of coastal policy end and implementation begin?
 - ICZM agreement is difficult without acceptable definitions





Implementation Theory

Top down

Bottom-up

- "It is manifest in the doctrine of separation of power, and lies at the heart of the liberal democratic constitution which sees the state as a neutral machine, a sleek Rolls Royce waiting with engine ticking over for the democratically elected chauffeur to take the wheel on behalf of the sovereign people. It underlies the constitutional belief that ministers take policies which officials execute like loyal lieutenants." (*Haigh and Morris (1990: 9)*)
- *Do political leaders set policy, and the construction industry implement it? This was once the prevailing theory of government.* (*Lindblom & Woodhouse, 1996*)
- "negotiating process in which individual actors pursue their disparate objectives employing multiple strategies. Compliance with central objectives is an inappropriate yardstick of success and failure."
Marsh and Rhodes (1992: 7).
- "a kind of bargaining activity between the objectives of the keepers of organisation resources and the perceptions of need by street level executants".
Dunsire (1995:18)



An Integrated Approach

Lavernock Point, South Wales



- Third generation Synthesis/integrated theory (Ryan, 1996, Thiel, 2004)
- For example:
 - Empirical studies of Malcolm Goggin *et al.*,
 - Integrated approach to implementation analysis by Soren Winter *et al*
 - Synthesis of implementation theory using advocacy coalition frameworks presented by Paul Sabatier *et al.*



Considerations 1

- The importance of past CZ policies for construction. Inertia
- **ICZM EU policies are statements and have no influence on physical processes or constructed environments until they are translated into action.**
- The significance of clearly defined, understood and achievable objectives from EU/UK
- **Symbolic objectives normally lead to failure**
 - **The fundamental objectives are often politically orientated and need to consider target groups and physical processes more effectively**
- The construction industry is constrained by socio-economic and cultural issues
- **Realistic resource allocation and legislative powers**
- ICZM and construction industry objectives evolve during the process but this inherently creates conflict



Considerations 2

- Need organisational/personnel stability/culture to develop networks and established/defined relationships (main reason for poor coordination, delay and inefficient use of resources)
- **Construction workers are constrained by organisational structure and history**
- Committee structure and membership influences outcomes and process
- **Limited number of 'personalities' great influence**
- Europeification and subsidiarity in construction
- **A need to monitor duplication of work between organisations**





Considerations 3

- Variability of implementation is linked to advocacy coalitions capacity and commitment
- **Dissemination and increased awareness of data/information especially from planning**
- ICZM can perform contrary to rules and aims due to the way these rules are perceived by the building regulators. Develop coping mechanisms to deal with uncertainties
- **Negotiation, bargaining, conflict (may imply dependency) and discretion points from planning to completion**
- Success often based on the preferences of the actors
- **Importance of assessing target groups and realising their needs/response** also evolve due to various tropisms
- **Outcomes need to be clearly assessed and facilitate re formulation.**
 - **Difficulty of empirical assessment.**
- Time spirals (past/future policy)



A Proposed Model



Monday, 11 September 2006
Rockscape at Llantwit Beach on the south
Wales coast. Christopher Sleight



Conclusion

- *"On the dry sand sat, in little groups, the older people, reading, sewing, sleeping, talking to one another, while on the wet sand the children, building their castles and digging their canals were far too absorbed and content to exchange more than spasmodic shouts to one another... the sand was lifted into some ideal region of everlasting holiday, where the burden of human toil and the weight of human responsibility no more lay heavy upon the heart" John Cowper Powys (1934: 462-463).*
- The groups in this modern classic quote have different ambitions, needs and conceptual lenses and yet they are 'family' utilising the same resource at the same time and are spatially juxtaposed.
- Construction industry, demographics and sustainability