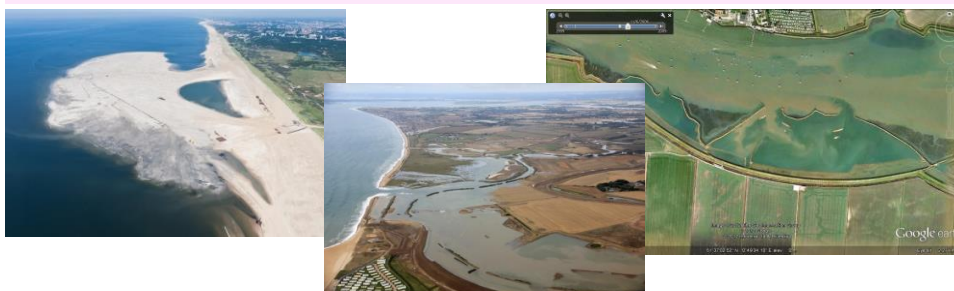


**CREATING SPACE FOR CHANGE:
MANAGED REALIGNMENT AND FLOOD RISK REDUCTION
IN LOW-LYING COASTAL AREAS**

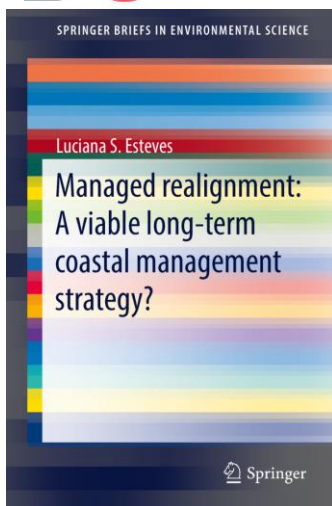


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DELTA IN TIMES OF CLIMATE CHANGE

Rotterdam, 24 Sep 2014

Thanks to my collaborators



Thorne Abbott, Coastal Planners, Hawaii, USA
Phil Dyke and **Tony Flux**, The National Trust, UK,
Nigel Pontee, CH2M HILL, UK
Karen Thomas, The Environment Agency, UK
Joost Stronkhorst and **Jan P. M. Mulder**, Deltares, Netherlands

John Akerman, UK
Olivier Beauchard, University of Antwerp, Belgium
Steve Burdett, Royal HaskoningDHV, UK
Olivia Burgess, Crown Estate, UK
Andy Coburn, Western Carolina University, USA
Katharina Jacob, IBA Hamburg
Texas General Land Office, USA
and many others that provided information/photos

<http://link.springer.com/book/10.1007%2F978-94-017-9029-1>

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Content



Managed Realignment (MR)

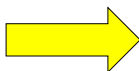
- Why are policies focusing on MR now?
- What is MR?
- Where has MR being implemented?
- How can MR reduce flood risk?
- Challenges
- The future

Paradigm shift in flood risk management

Hard
engineering era



Occupation of risk areas



Flood storage areas
Habitat creation
Multiple functions



Why are policies focusing on MR now?

- Predicted impacts of climate change
- Environmental concerns and legislation
- Social and economic **sustainability**



The ultimate consequence of climate change to society is that the environment around us is changing and we cannot continue living the way we do.

The need to change – **adaptation**

Alternatives that offer multiple benefits

Long-term sustainability – **natural adaptive capacity**

Benefiting from the provision of ecosystem services

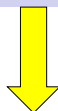
Policy-driven changes in the approach to erosion and flood risk management

EU Birds Directive + Habitats Directive + Floods Directive



National policies - Making Space for Water (2005) priorities:

1. to reduce the threat to people and property and
2. to enhance sustainability by adopting measures that deliver the greatest environmental and socio-economic benefits (i.e. ecosystem services).



Shoreline Management Plans

0-20 yrs 20-50 yrs 50-100 yrs

By 2030, managed realignment is envisaged along 550 km, resulting in the creation of over 6,200 ha of habitat

What is managed realignment?

...the deliberate process of realigning river, estuary and/or coastal defences

- retreating to higher ground,
- constructing a set-back line of defence,
- reducing wall or embankment heights or
- widening a river flood plain.

(Defra, 2002)



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Confusing/Inconsistent use of terminology

Regional preferences - changes through time - spelling

- managed realignment
- coastal realignment
- managed retreat
- set back
- de-embankment
- depoldering
- controlled embankment retreat
- regulated tide exchange (RTE)
- controlled reduced tide (CRT)



Defining *managed realignment*

- It is a soft engineering approach aiming to promote (socio-economic, environmental and legal) **sustainability of coastal erosion and flood risk management** by creating opportunities for the realisation of the **wider benefits** provided by the **natural adaptive capacity** of coastlines that are allowed to **respond more dynamically** to environmental change.
- '**managed**' refers to take purposefully actions, to plan, implement and monitor projects.
- '**realignment**' refers to the position of the shoreline and/or the line of defences.

(Esteves, 2014)

Types of managed realignment

Removal, breach or realignment of existing defences (UK)

Controlled tidal restoration

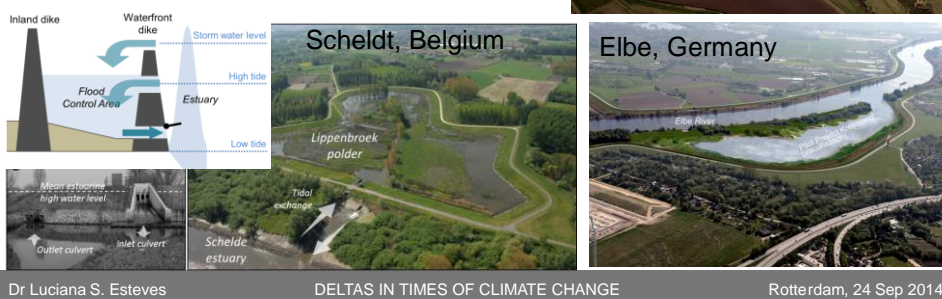
a) *Regulated tidal exchange*: tidal flow into embanked areas is controlled through culverts and sluices (UK, Germany, France).

b) *Controlled reduced tide*: linked to flood control areas (Belgium).

Managed retreat: relocation of structures and people at risk to areas of lower risk (USA, recent strategies in NZ, AU, France).

MR can reduce flood risk by creating space for

- flood storage areas
- the development of coastal habitats able to provide flood regulation and dissipation of wave energy
- Relocation of people/assets at risk



Managed realignment in Europe

Country	Projects	Type	Area (ha)
Belgium	15	CRT: 5; Realignment: 8 Breach: 1; Removal: 1	2743.6
Denmark	2	Breach: 2	206.0
France	4	RTE: 1; Retreat: 1 Breach: 1; Removal: 1	484.0
Germany	29	RTE: 3; Realignment: 1 Breach: 12; Removal: 13	5066.7
Netherlands	11	CRT: 1; Realignment: 3 Breach: 7	1086.0
Spain	1	Removal: 1	23.0
UK	54	RTE: 18; Realignment: 19 Breach: 15; Removal: 2	2275.6
total	116		11,884.9

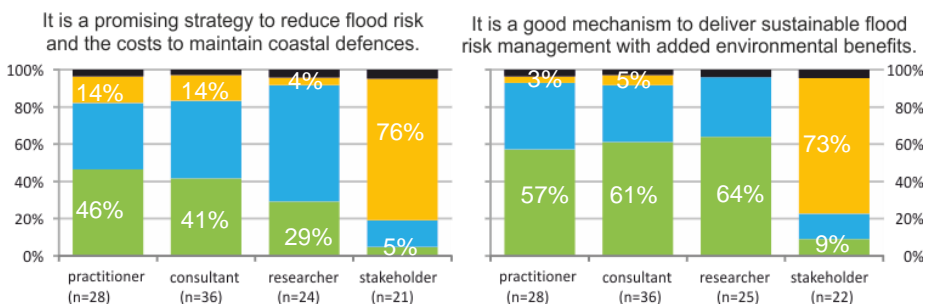


Challenges



- Finding space – land availability
- Creating viable long-term plans
- Public perception
- Providing evidence of benefits acquired

- don't know
- don't agree
- partially agree
- agree



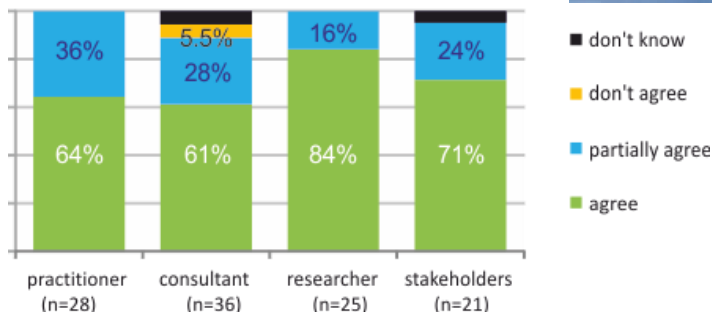
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Challenges



Better understanding about long-term evolution of the sites is needed.



Reduction of flood risk depends on:

- Sediment accretion patterns/rates
- Development of habitats
- Changes in the volume capacity of flood storage

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The future

There is no need to gamble with uncertainties.

The only safe climate-proof response at all temporal and spatial scales is to reduce the number of people and assets at risk

Removal, breach or realignment of existing defences + managed retreat

- Education (behavioural change)
- Long-term planning (political willingness)
- Building with nature (paradigm change)
- More efficient use of resources
- Creation of green/blue areas
- Benefiting from ecosystem services provision

Thank you!

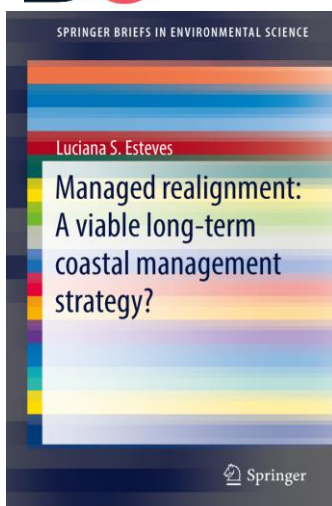


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