

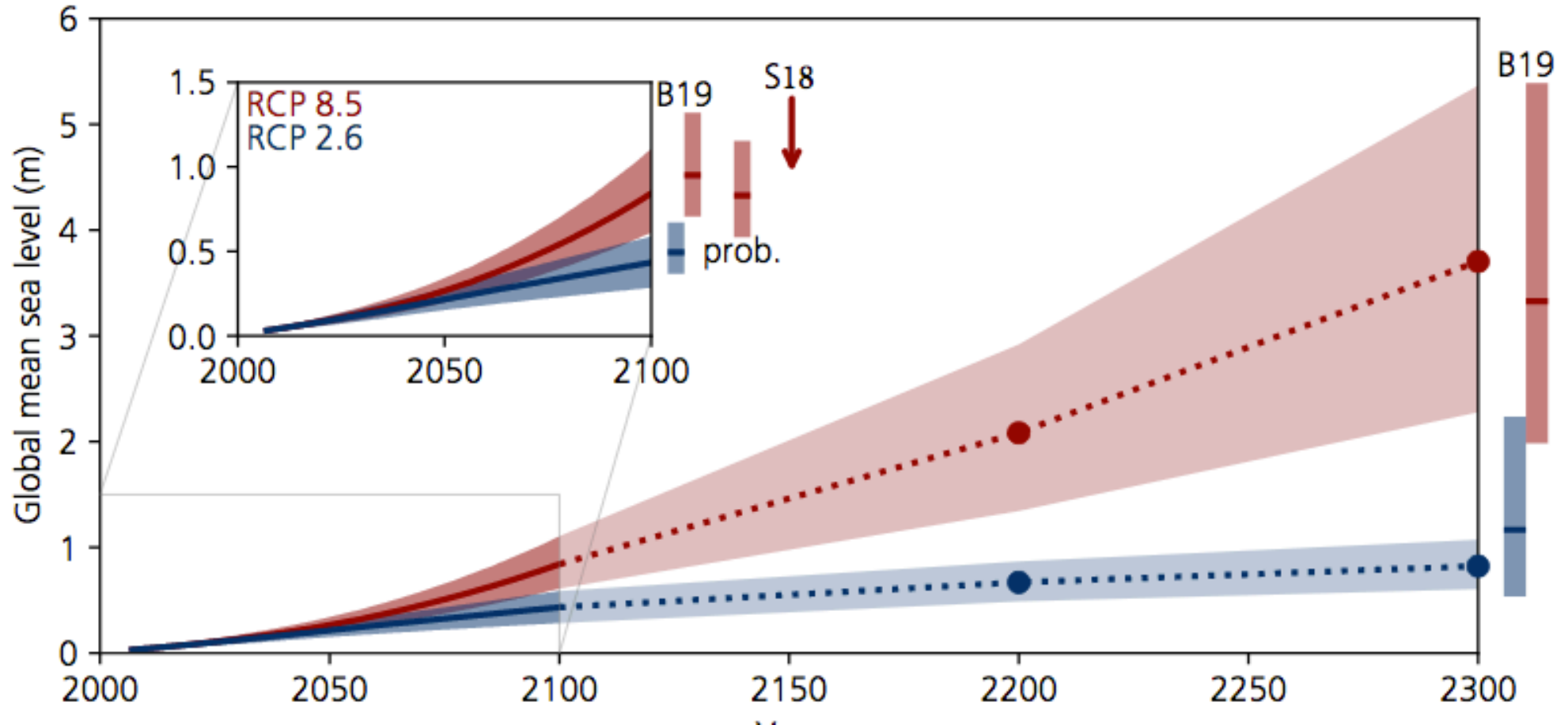
FINANCING ADAPTATION TO COASTAL FLOODING AND EROSION IN THE UK // FINANSIERING AV ANPASSNING TILL KUSTNÄRA ÖVERSVÄMNING OCH EROSION | UK



TALK OUTLINE

1. Sea Level Rise Risk and Defining Adaptation
2. Coastal Risk Management Governance in the UK
3. Current: How is coastal risk management usually approached?
4. More innovative adaptation funding/delivery options
5. Parting thoughts

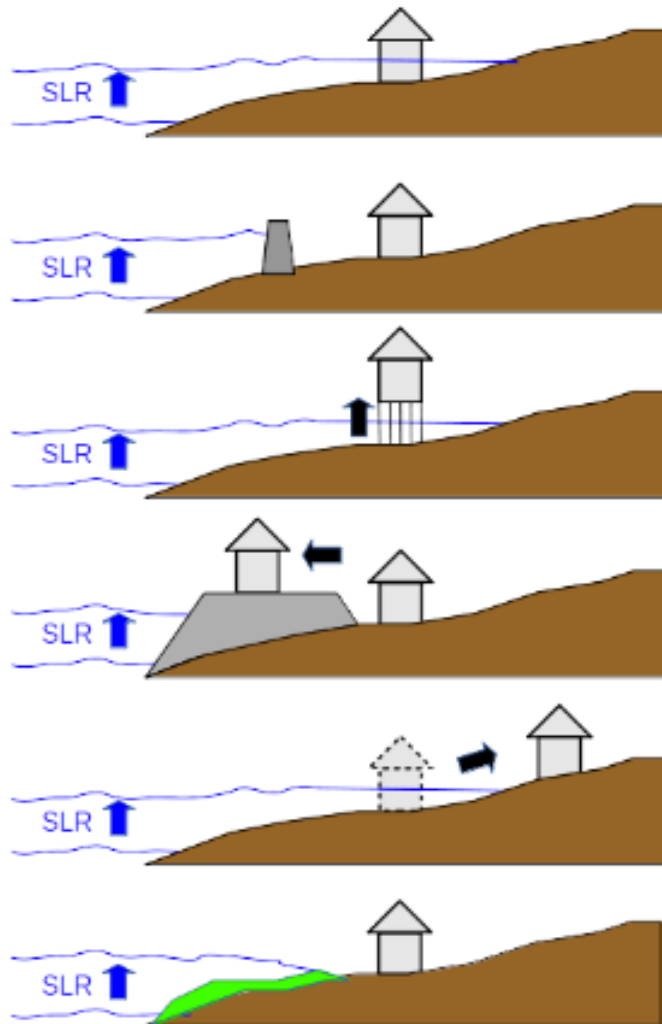
The scientific basis for adaptation



Source: 2019 IPCC SROCC Report,

https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_Chapter4.pdf

IPCC Responses to Sea Level Rise (SLR)



No response

Protect

Accommodate

Advance

Retreat

Ecosystem-based adaptation

In the UK these are called:

- No active intervention
- Hold the line
- Does not commonly exist
- Realign seaward
- Realign (landward)
- Working with natural processes

Box 4.3, Figure 1: Different types of responses to coastal risk and SLR

1. Defining Adaptation



Adaptation is the **process** by which **society** adapts to a **dynamic and changing coast**, to improve the **long-term socio-geomorphological (or social-ecological) resilience** of **communities, infrastructure and ecosystems**.

This often requires re-thinking the **land-sea interface**.

No response: Hurricane Imogen destroys new EU funded ferry terminal car park, Doolan, Ireland



Protect: four types of protection



Four types:

- Hard
- Sediment-based
- Nature-based
- Hybrid



Accommodate

- Houses on stilts? Floating Houses?
- *“Accommodation measures for erosion and flooding include building codes, raising house elevation(e.g., on stilts), lifting valuables to higher floors, and floating houses and gardens (Trang, 2016). Accommodation measures for salinity intrusion include ...changes to salt tolerant crop varieties. Institutional accommodation responses include early warning systems, emergencyplanning, insurance schemes, and setback zones(Nurse et al., 2014; Wong et al., 2014).”*
- from 2019 IPCC SROCC Report,
https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_Chapter4.pdf

Advance: Vancouver Convention Centre, Canada



“Advance creates new land by building seaward..”

Ecosystem-based and Hybrid

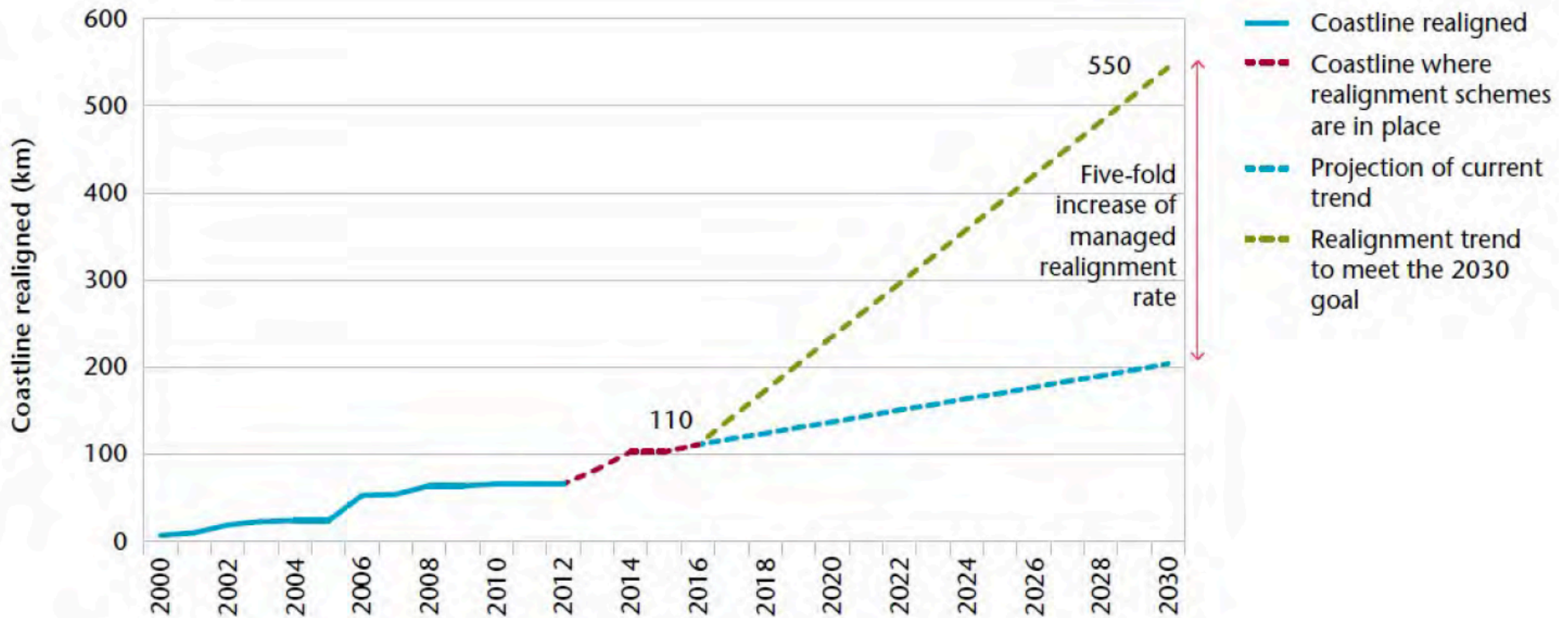
- Realignment to convert land to saltmarsh
- Hybrid or greening the grey solutions



Source: Environment Agency, and Naylor et al. 2017

Efforts to re-create saltmarsh fall far short of what is required

11



Source: CCC UK report 2018

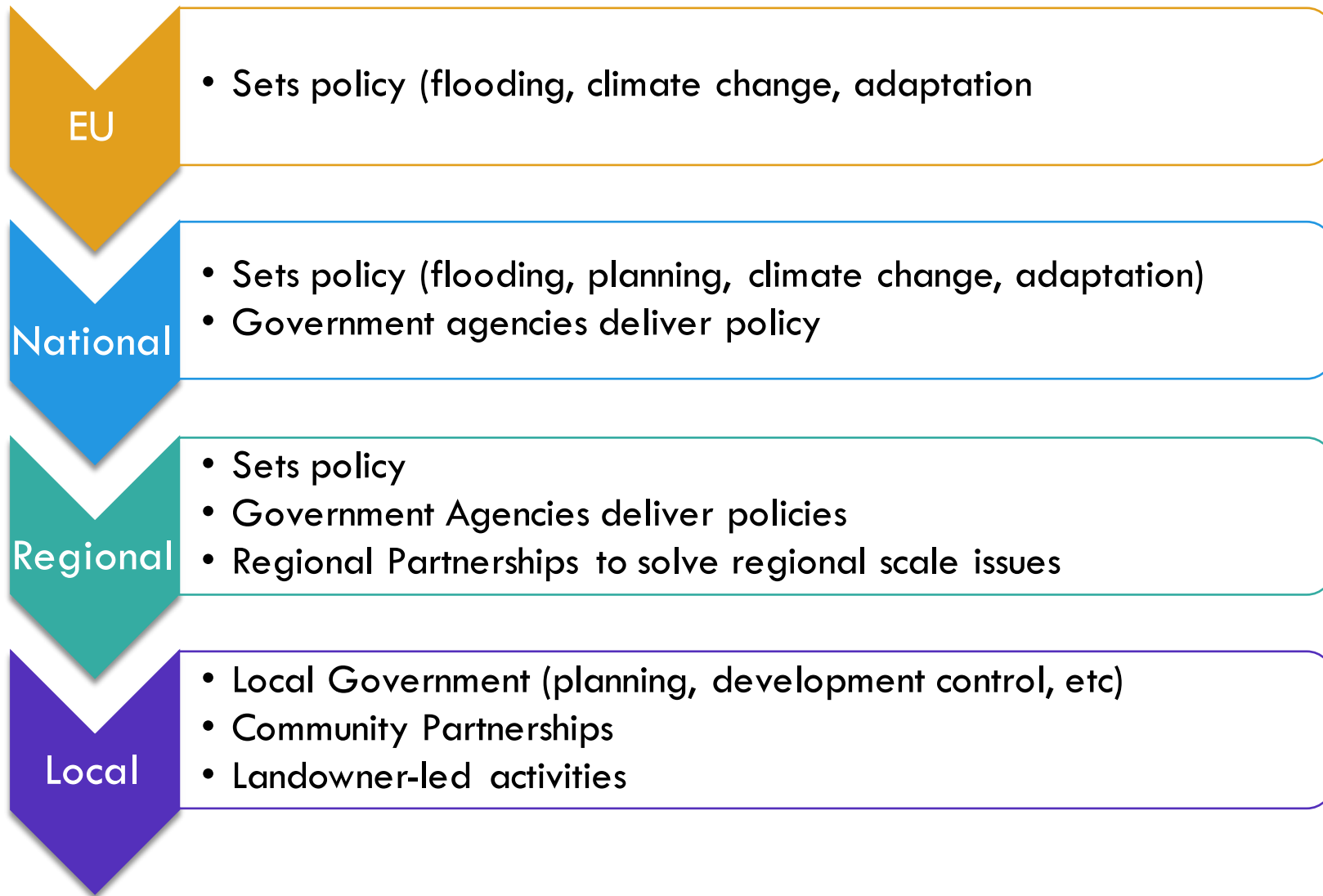
Retreat

- Three Types:
 - Migration
 - Displacement (forced to move due to erosion)
 - Relocation (or managed retreat of assets such as moving houses back)
- Retreat can be avoided by not developing now on places that are at risk of needing relocation!

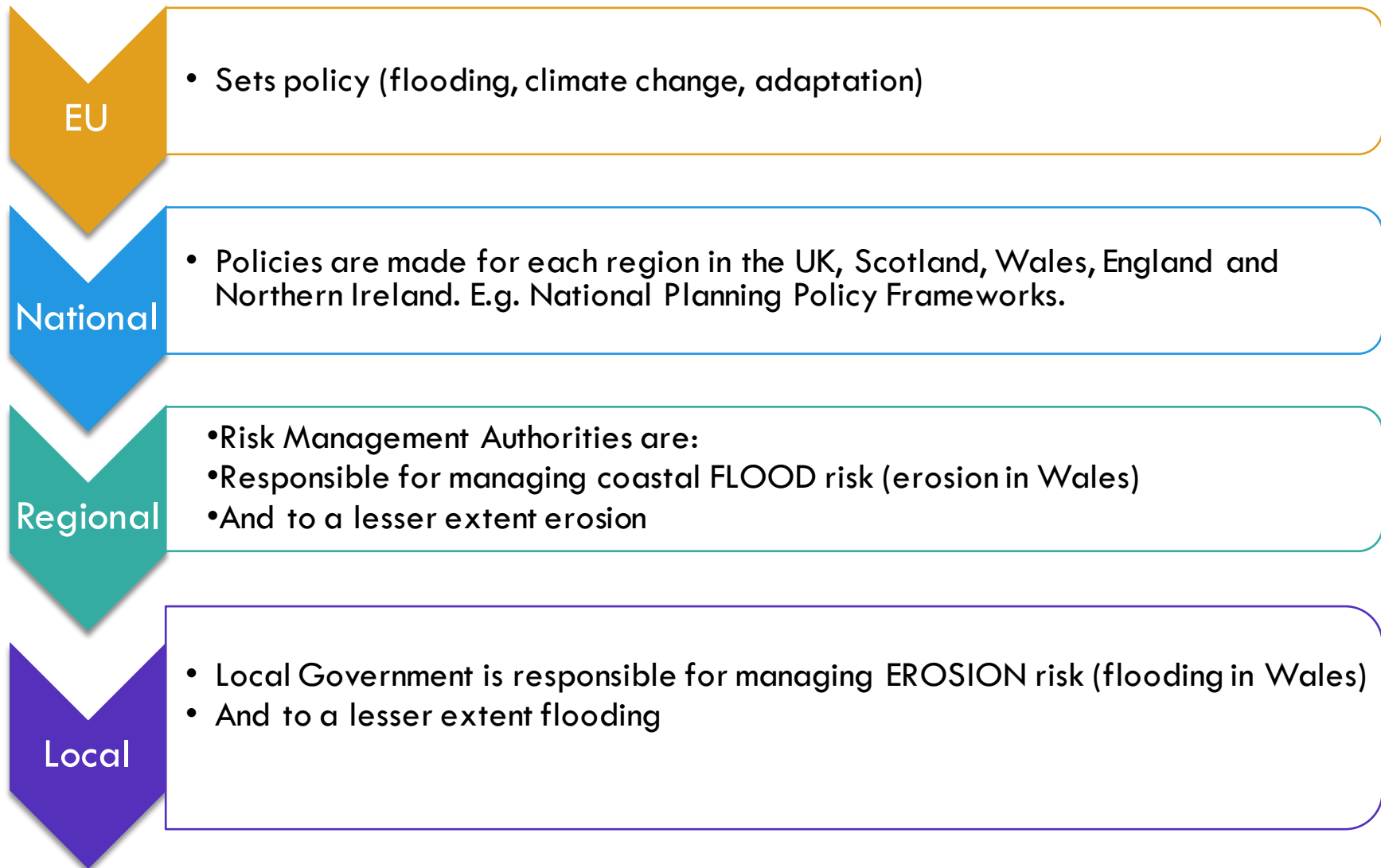
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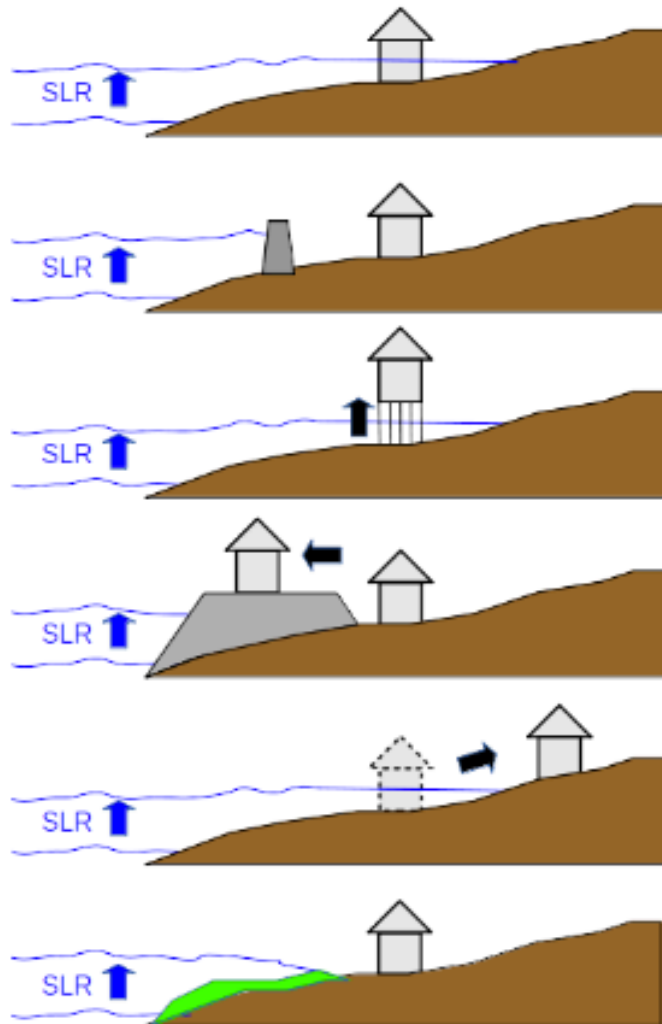
Current Flood & Erosion Management Governance in the UK



Current Flood & Erosion Management Governance in the UK



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Box 4.3, Figure 1: Different types of responses to coastal risk and SLR

Funding coastal erosion and flood risk management in England

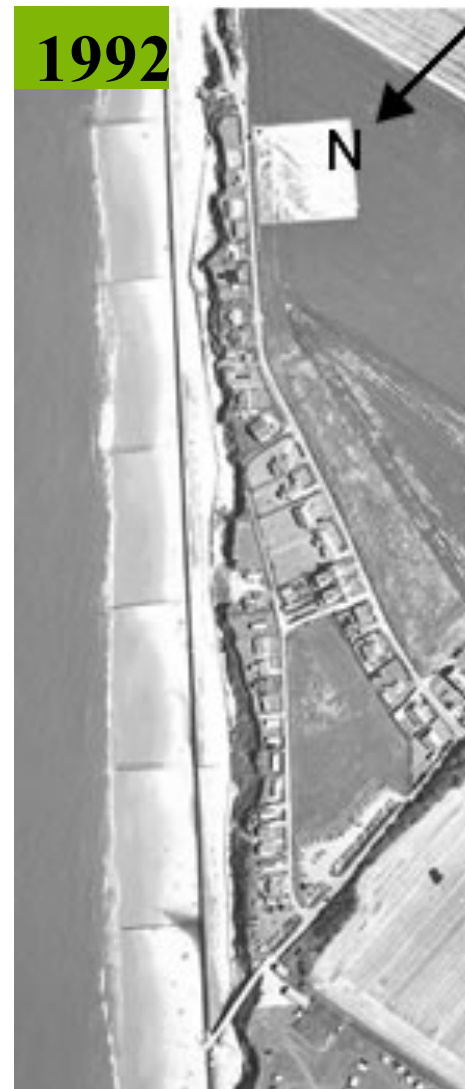
- We can finance these things and advance:



- But financing retreat is more challenging

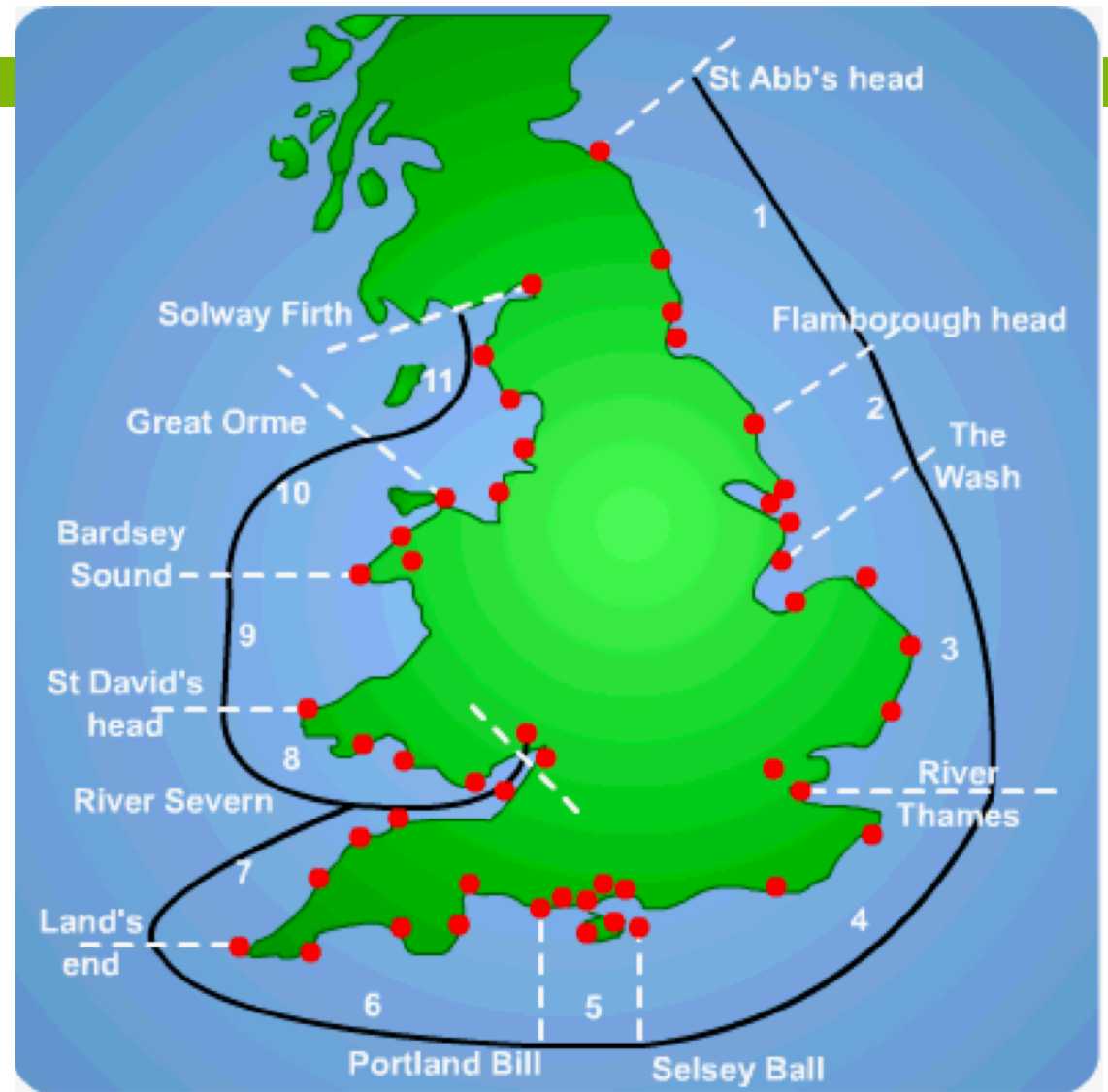
The dynamic and integrated coastal system

- Beaches are connected to each other and other landforms – they are a system
- We used to manage beaches individually
- This led to erosion problems along the coast.
- Shoreline Management Plans were created in England and Wales to solve this



Why is a systems approach useful?

- Beaches are connected to each other and other landforms – they are a system
- We used to manage beaches individually
- This led to erosion problems along the coast.
- We now manage the coast as a series of sediment cells
- And created shoreline management plans do this



Current Flood & Erosion Management

- ❑ Shoreline management plans (SMPs) are non-statutory
- ❑ They are temporal (2050s, 2080s) rather than event or threshold based
- ❑ Terms used are militaristic
 - ❑ Hold the line
 - ❑ Managed realignment (retreat)
 - ❑ No active intervention
- ❑ Hold the line tends to be in urban areas – but this is dependent on funds being available.



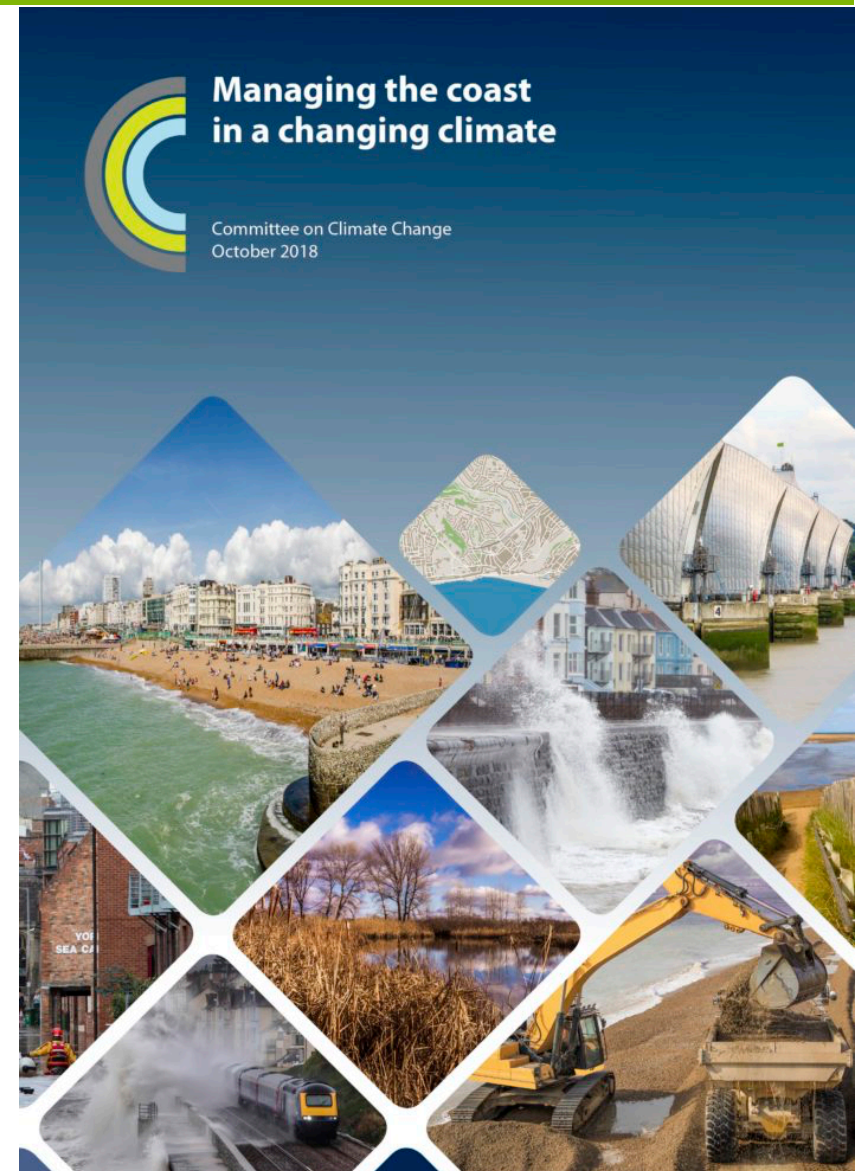
Local Scale: Links between risk management and planning

- SMPs are x-referred to in local plans but actual flood schemes are planned by coastal/engineering teams
- Coastal risk management schemes are typically planned separately from urban planning and place-shaping processes
- The funding process accounts for current asset value – in their current location.
- Areas with more assets get central government funding more readily; creates urban: rural inequity

Recent review

The “*current approach to protecting England’s coastal communities from flooding and erosion not fit for purpose as the climate changes,*” Committee on Climate Change 2018.

This report makes key recommendations for science, policy and engaging with communities to address these problems.



1. **Actions of Low/No Regret**
2. **Not making problems worse** by making L-T decisions now that increase our risk (avoid lock-ins)
3. **Prepare now** for L-T risks and impacts

“Development in the floodplain, along with ongoing increases in impermeable surfacing, is likely to be adding to long-term costs and risks due to weaknesses in how planning policy is being implemented.”

Scottish Climate Change Adaptation Programme: An independent assessment for the Scottish Parliament
| Committee on Climate Change, 2016.

Financing Landward Adaptation (Retreat)



- Current finance mechanisms through Regional and Local Government are not equipped to support coastal adaptation – do we need to change the formulas / rules or look elsewhere?
- Can other existing funds be accessed?
- What about new financing programmes?
- How are new funders / financiers part of the decision making process?

Alternatives to the current funding model?

‘...re-thinking the shoreline edge in ways that will enhance habitat and human connection while also responding to flooding and sea level rise. The idea of a less fixed, profoundly dynamic edge seems better suited to the current world and to a more integrative land–sea vision of blue biophilic cities.’ Prof. Beatley, 2017, 99.



1. Urban Parks and Planning Led: Dryline/Urban Green Infrastructure

- What if retreat in urban areas is called “green infrastructure” ?
- What funding and economic opportunities might this open up?
- NYC’s Dryline is a good example of this idea
- Photo on the right is a part in the heart of Vancouver, with expensive apartments behind it.



2. Post-industrial areas – a physical window of opportunity?



Types of windows of opportunity for proactive adaptation



Closed



Open



Reframed



Transform

Brown, Naylor, Quinn. 2017. Making Space for Proactive Adaptation of Rapidly Changing Coasts: A Windows of Opportunity Approach. *Sustainability* 2017, 9(8), 1408; doi:10.3390/su9081408

Source: <https://vaseawall.ca/routes/false-creek/mount-pleasant/>

2. Post-industrial areas – physical window of opportunity?

c. 1970s regeneration



c. 2005-10 regeneration



Ideas for re-framing regeneration

- Creating an urban park instead of houses to the edge?
- Land swaps to allow coastal land to be bought-back by the city and regeneration land less at risk to be sold and developed

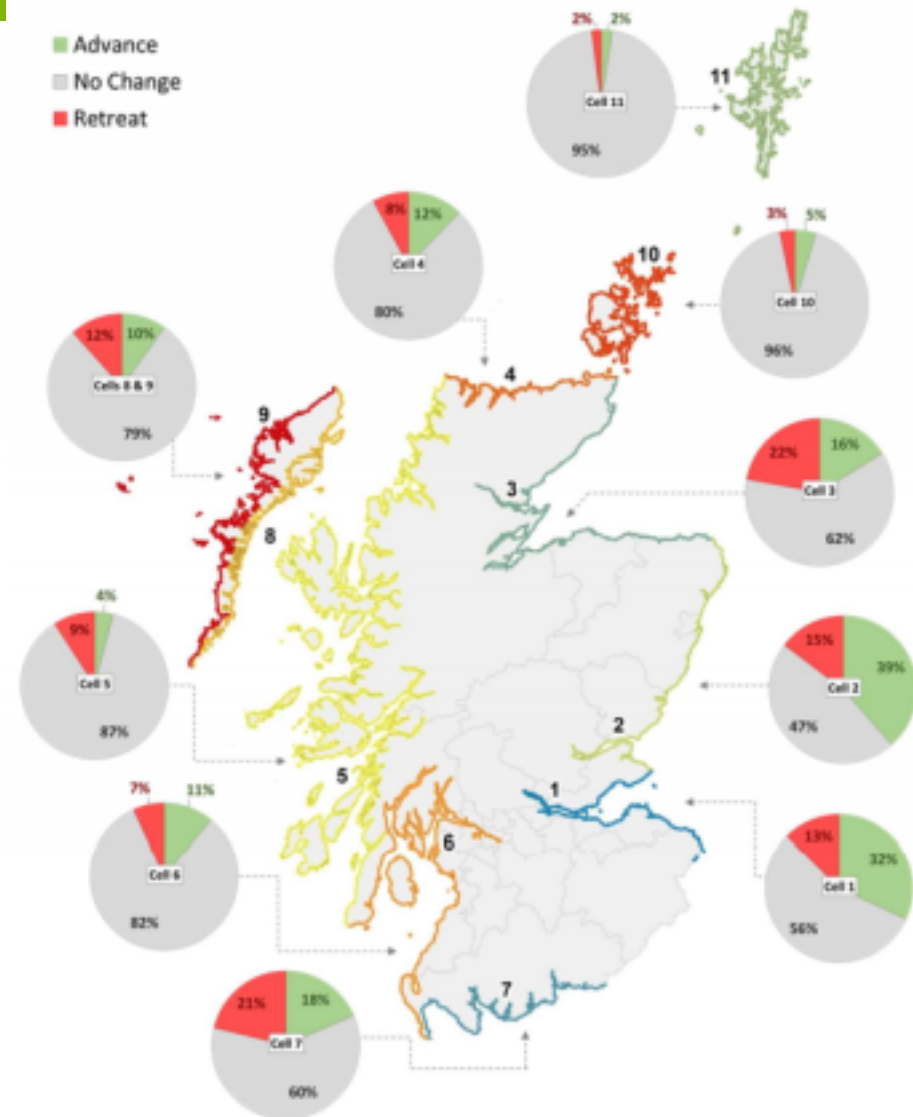


This is a park in the heart of West Vancouver, with expensive apartments behind it. It provides great amenity space and a sea level rise buffer at the same time.

3. Science-led: Using erosion data to change infrastructure and dredging licenses

30

- The planned location of on-shore connection of off-shore renewable energy was moved to make it more resilient to erosion
- Dredging licenses have been stopped to assess affects of dredging on coastal erosion



4. Need led: Houses are falling into the sea due to erosion, how do we manage this via retreat?

31

- DEFRA pathfinder project provided \$\$ to pilot retreat
- Rollback of assets is now in local-planning policy
 - ▣ Policy exists to allow and support retreat
 - ▣ Land is provided for development in-land at a cheaper cost



Source: Bill Parker

5. Business Led: Adapting design of holiday cottages and caravan parks to rollback

32

- Holiday parks are putting caravans on wheels to rollback as erosion continues
- New cottages are designed to be rolled back
 - ▣ Services above-ground
 - ▣ Cables run inland



K. Fisher and B. Parker

5. Insurance Led: the FloodRE programme

33

- Joint Government – Insurance scheme
- Levies on all insurance to create fund to support badly flood damaged areas
- Soon to be used to allow \$\$ to:
 - Move electrical sockets higher up in houses.
 - Adding house-level resilience measures to ‘live with flooding’
- Only for flooding not erosion

The logo for FLOODRE, featuring the word "FLOODRE" in a bold, dark blue sans-serif font. A light blue wavy line is positioned under the letters "RE".

<https://www.floodre.co.uk/>

We're helping insurers to help householders at risk of flooding.

Current responses to storm events

- “Command and Control”
- Focus on “rebuilding” rather than implementing proactive adaptation
- Non-statutory, longer term coastal change plans (i.e. shoreline management plans) are often over-ruled with ‘fixing’ short term disruption



Can we re-frame storm responses as catalysts for adaptation?

- Can we build adaptation planning into the local development and place-shaping processes?
- Can these plans be agreed before large events?
- Where events become catalysts to implement adaptation 'earlier than planned'?

Naylor, Brady, Brown, Quinn & Andries. 2019. A multiscale analysis of social-ecological system robustness and vulnerability in Cornwall, U.K. *Regional Environmental Change*.



Parting Thoughts



- Are the full benefits of retreat really understood?
- Coastal adaptation via retreat is not the traditional ‘protect’ approach – funding models need to include retreat alongside more traditional measures
- Working with business and members of the community, creating solutions to coastal flooding and erosion challenges, building funding packages to support this takes time, expertise and resources.

Parting Thought

- Are the full benefits of coastal adaptation v
- Coastal adaptation v 'protect' approach – retreat alongside mo
- Working with business community, creating s erosion challenges, bu support this takes time

'With risks of climate change come opportunities to re-explore Edinburgh's coast, and the benefits it can provide for nature and society. We can choose what we want our future to look like, and now is the time to act.'

Larissa Naylor, University of Glasgow, 2017

