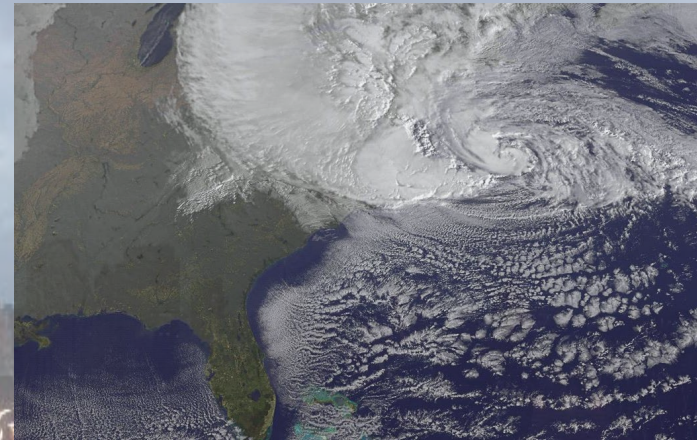


Building Community Expertise: The NY/NJ USACE HATS Teach-In

Session 3: Functionality of the proposed flood measures, multi-hazard and multi-benefits design, and examples from other cities

By
Dr Luce Bassetti



Setting a baseline

What is Engineering With Nature

The intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaboration.

What is Multiple lines of defense strategies

Multiple solutions within a strategy to potentially obtain a unifying vision for the coast: embracing environmental habitat restoration as well as engineered flood protection.

What are Risk Reduction Features

Risk Reduction Features are land-based or in-water features that can reduce residual coastal storm flooding prior to closure of a storm surge barrier, and to address risk behind a storm surge barrier due to interior drainage or other hydrodynamics. They are used in concert with Storm Surge Barriers and are not a stand-alone measure.

What is a coastal system?

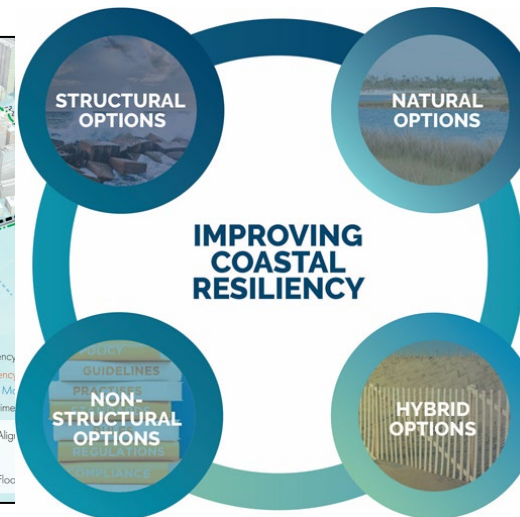
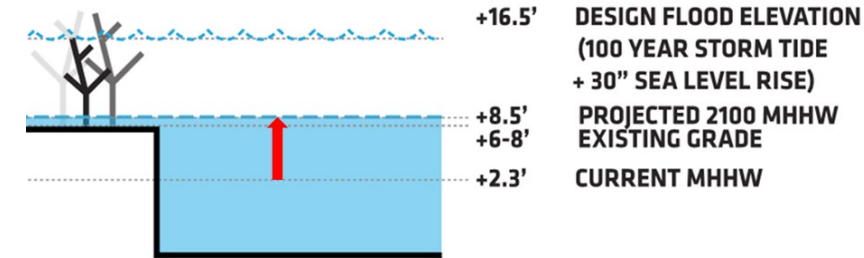
A system is a set of interrelated processes that are connected together to form a unit or a whole. Storms, human interventions and sea level rise can disturb the equilibrium of the system. The coastal system is a dynamic system that responds to disturbance.

Coastal flood risk design options and considerations

- Who do we protect?
 - Regional-based
 - Neighborhood/Community-based
 - Site-based
- What do we protect from?
 - Extreme flooding vs nuisance flooding
- How do we protect?
 - Passive vs Active measures
- When do we protect?
- How do we maintain our protection?



<http://w12thrd.blogspot.com/2013/10/thursday-10102013-tidal-flooding-on.html>

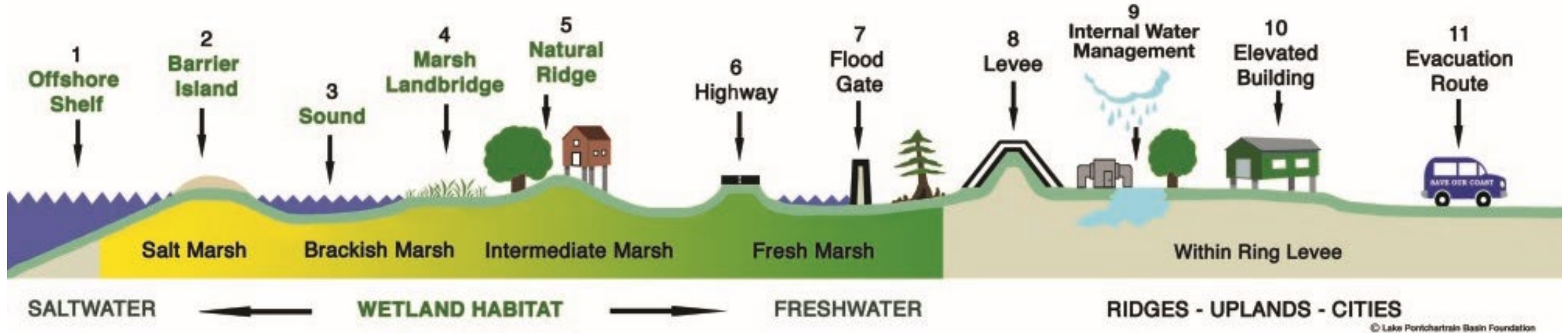


Possible strategies to be considered to mitigate coastal flood risk include:

- Structural options
- Nature-based options
- Hybrid options
- Flood proofing
- Elevating
- Relocation

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Multiple Line of Defenses – Example of Lake Pontchartrain Louisiana



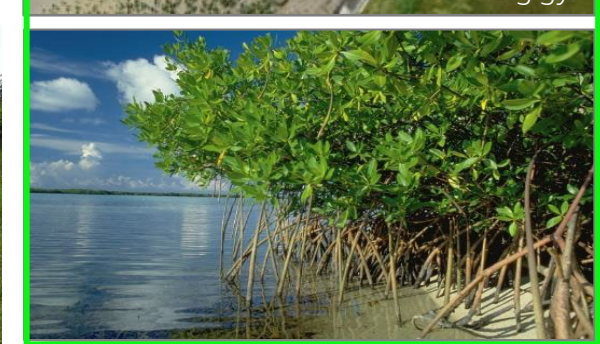
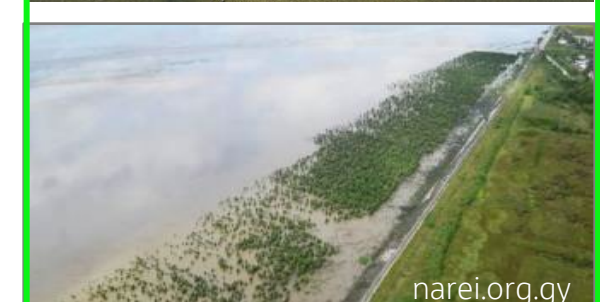
- 11 lines of defense that help to reduce risk and protect communities from storm surges.
- 5 -natural
- 6 – man-made

Maintain

Revive, Enhance and create

Preserve and restore

Nature Positive



Grey-Green Spectrum



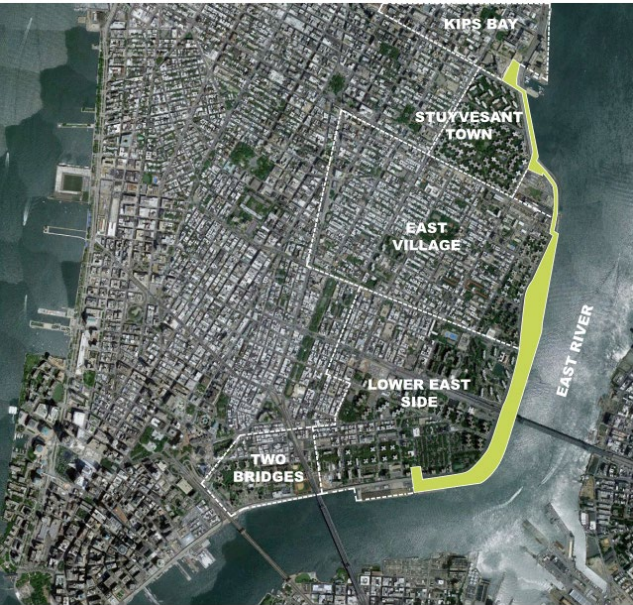
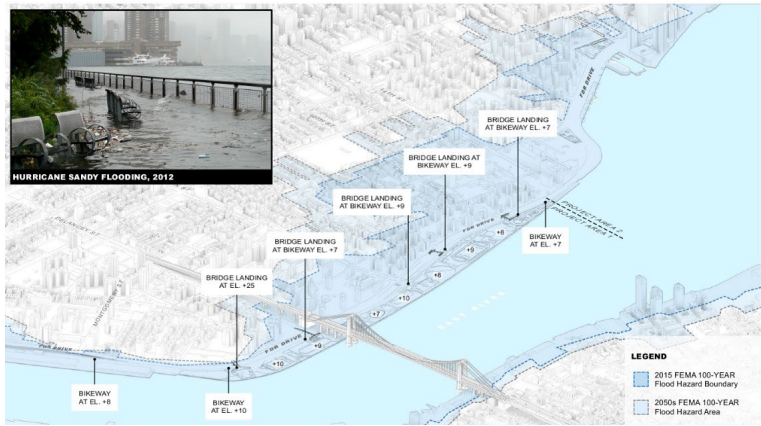
Grey-Green Spectrum

Lines
of
Defense

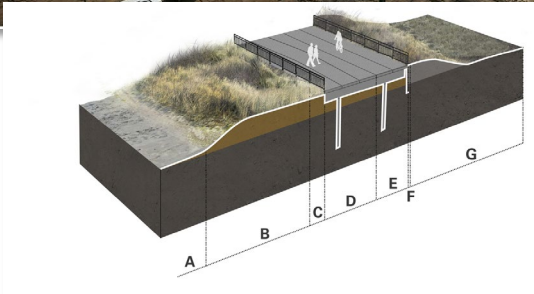
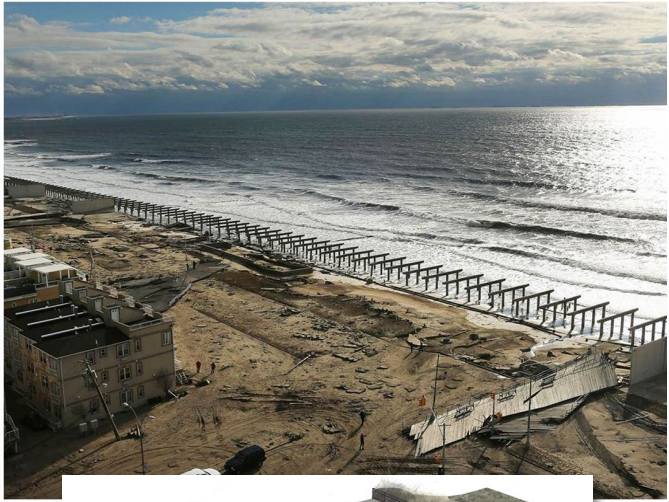
Funding
and
Policies

Communities
Stakeholders

East Side Coastal Resilience



Rockaway Boardwalk



Hunters Point Shoreline Stabilization Queens NY

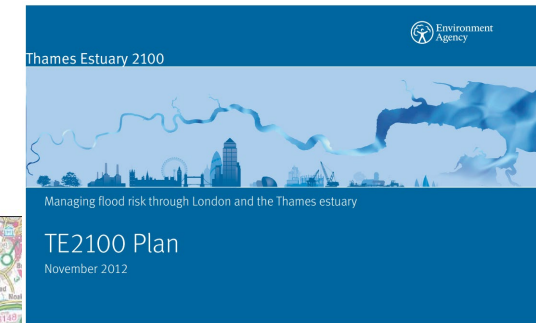
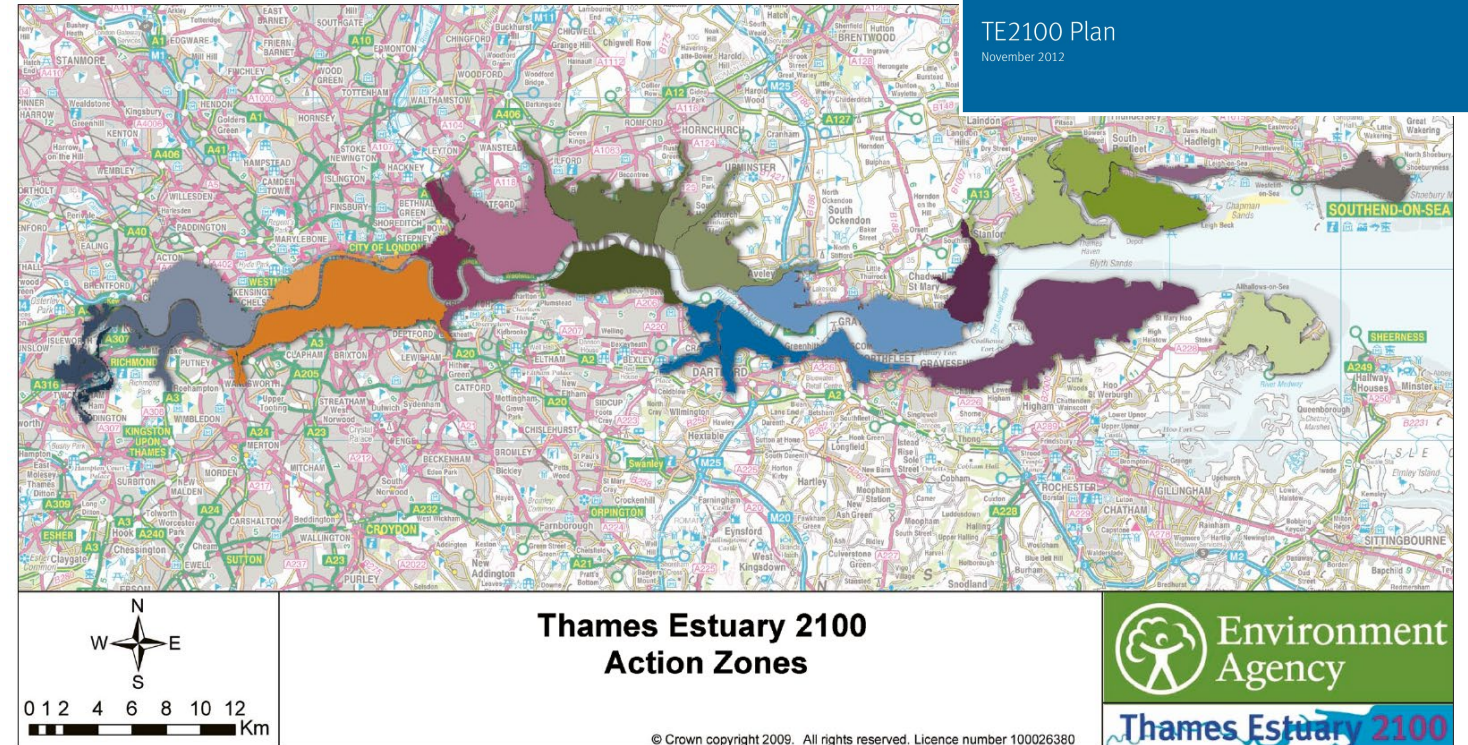


Why Thames Estuary Climate Adaptation?

- The estuary is changing: rising sea level, more development and people in the floodplain, and aging flood defenses.
- Flood risk to:
 - 1.4 million residents
 - 40,000 commercial properties
 - approximately \$400B property value
 - A global financial center

Thames Estuary 2100 Plan. London, UK

- Adaptive flood protection strategy
- 9 Barrier systems, 200+ miles of structures, drainage/pumps
- Nature-based solutions
- Spatial and emergency planning
- Community engagement
- Live plan

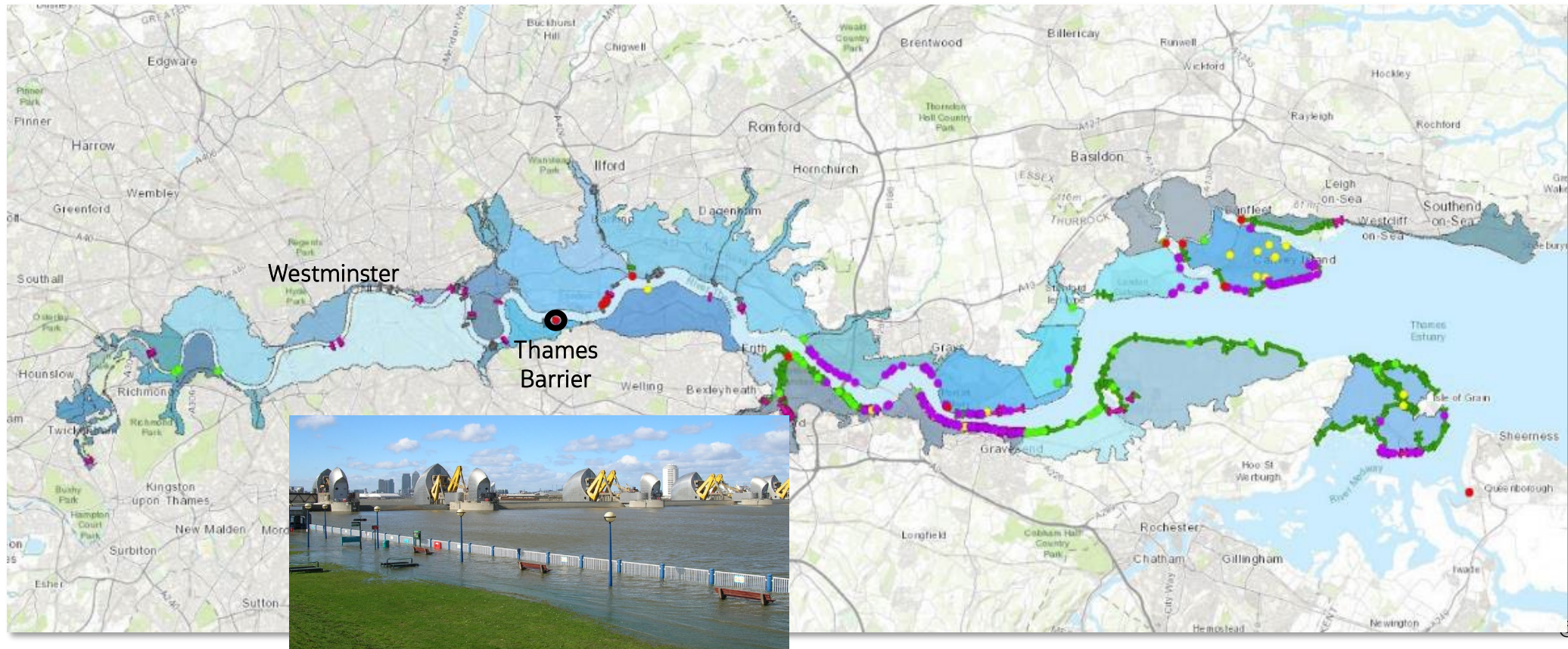


Complex Flood Protection System

➤ Hard infrastructure system:

- 9 Major Tidal Barriers
- 104 Pumping Stations
- 218 miles linear defences
- 290 Outfalls
- 300+ active structures

- Intertidal habitat enhancement
- Spatial planning
- Community engagement

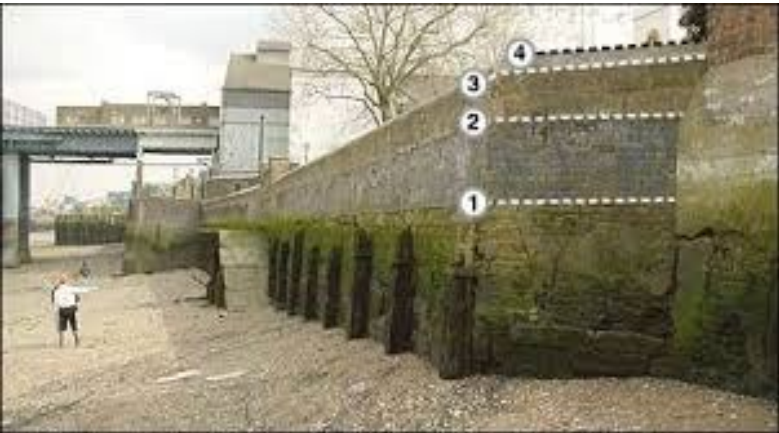
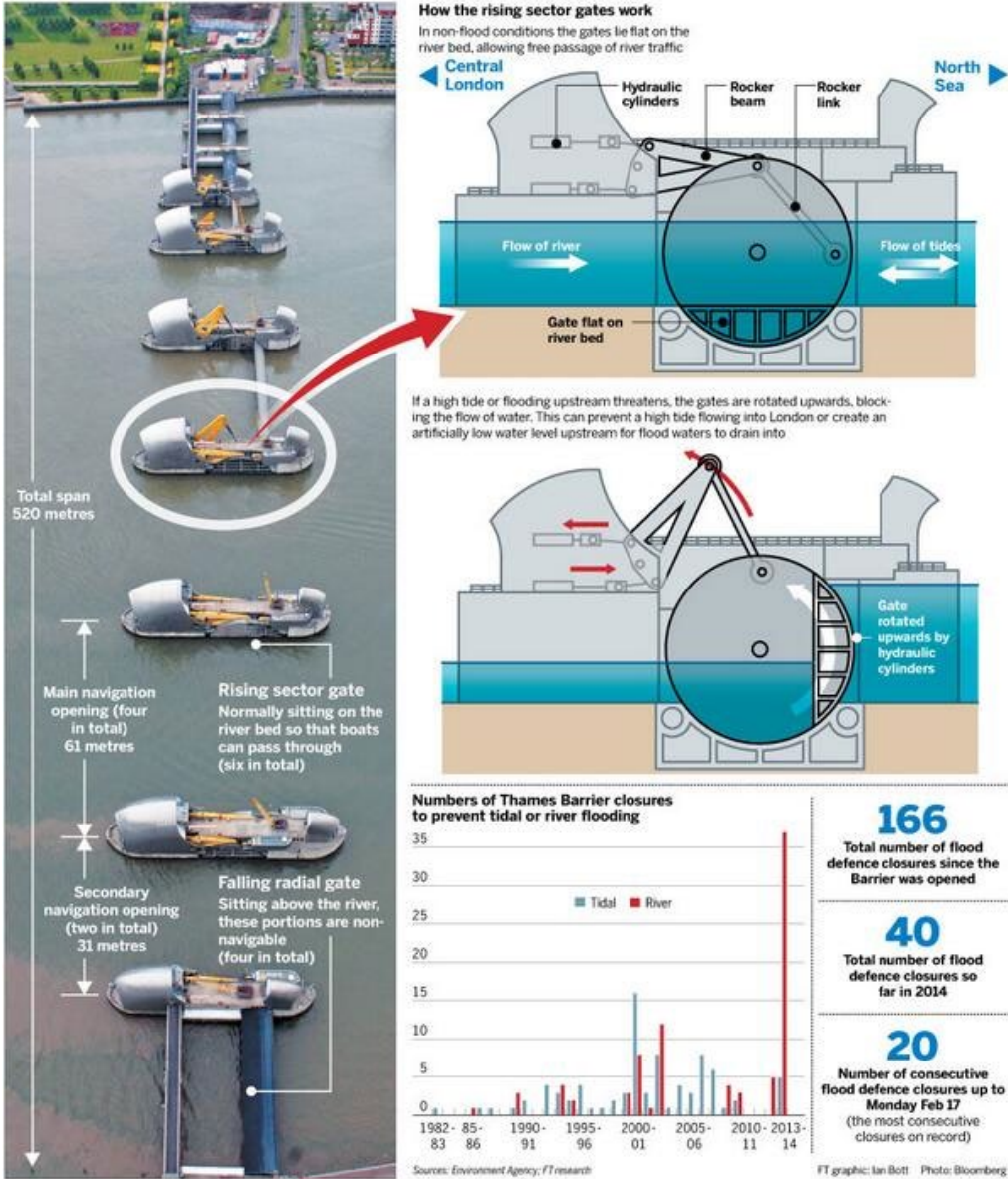


Major Barriers

Largest Programme Since Original Construction



Opened in 1982, the Thames Barrier spans 520 metres across the river at Woolwich. It consists of 10 gates that can be raised to block the flow of water and protect 125 square kilometres of central London



Greenwich Peninsula

Location: Thames Estuary, UK

Objective: Replace sheet piled bulkhead

Solution: Set back defences, vegetated platform

Alternative to: Online replacement of piled wall

Additional benefit: Vegetated habitat

Cost: Lower

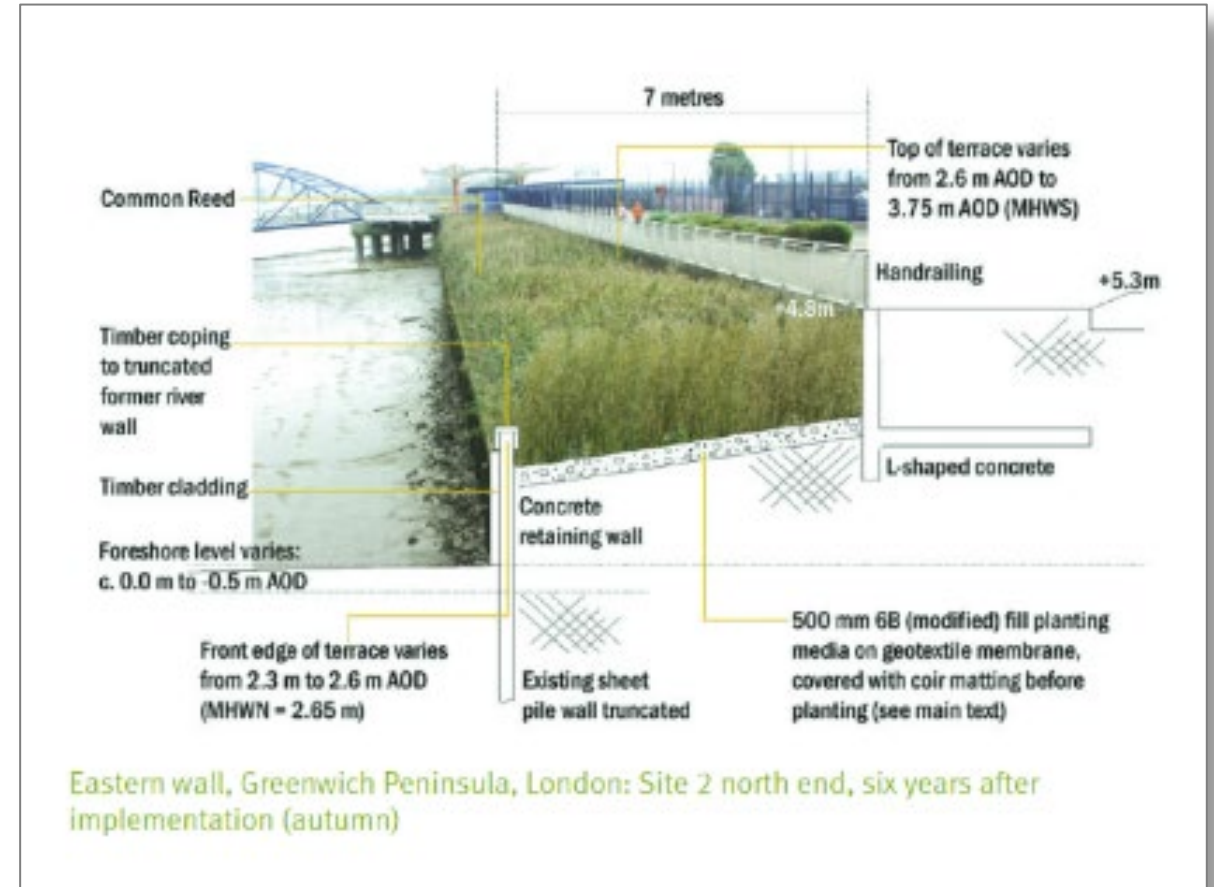
Self-maintaining? Period renourishment




Hybrid


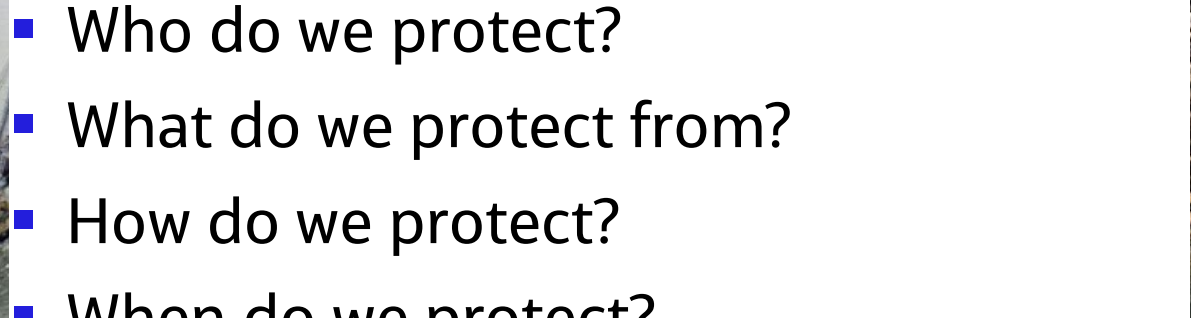
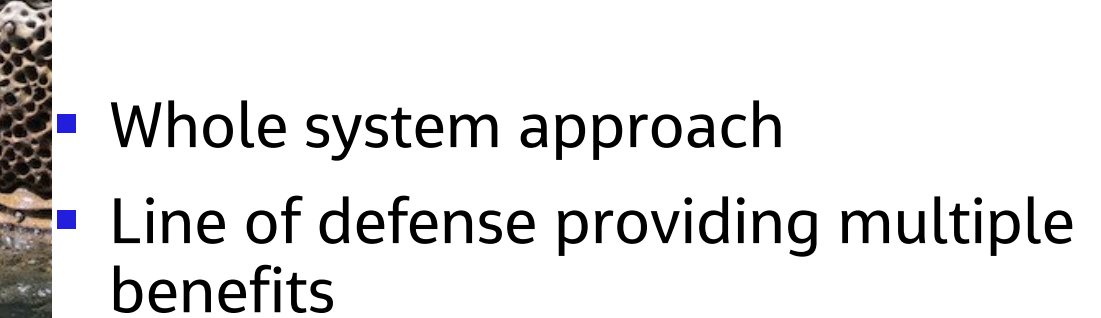

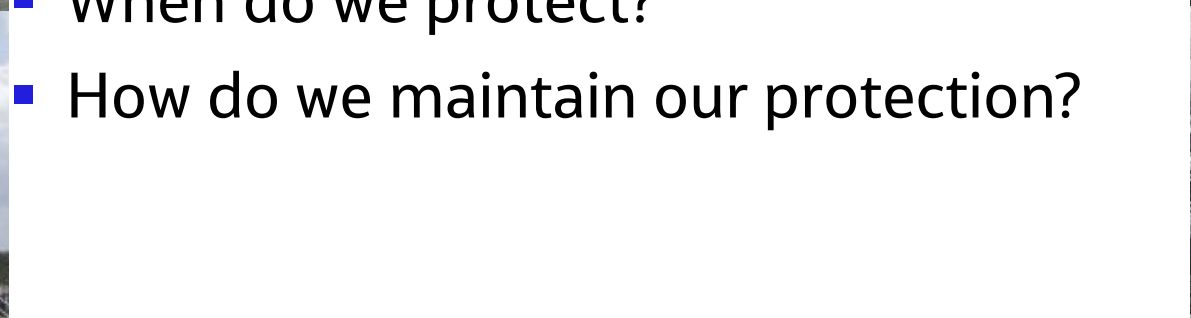
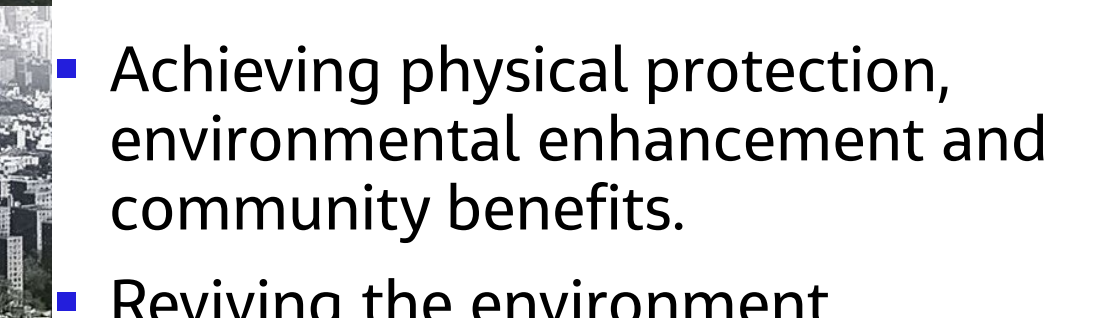

Enhancement

Small space

Estuary



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- Who do we protect?
 - What do we protect from?
 - How do we protect?
 - When do we protect?
 - How do we maintain our protection?

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- Whole system approach
 - Line of defense providing multiple benefits
 - Achieving physical protection, environmental enhancement and community benefits.
 - Reviving the environment

Thanks

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