



adaptive urbanism: the waterfront

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University of Virginia

Rising Tides | Portland, Maine | May 2011

adaptive urbanism:

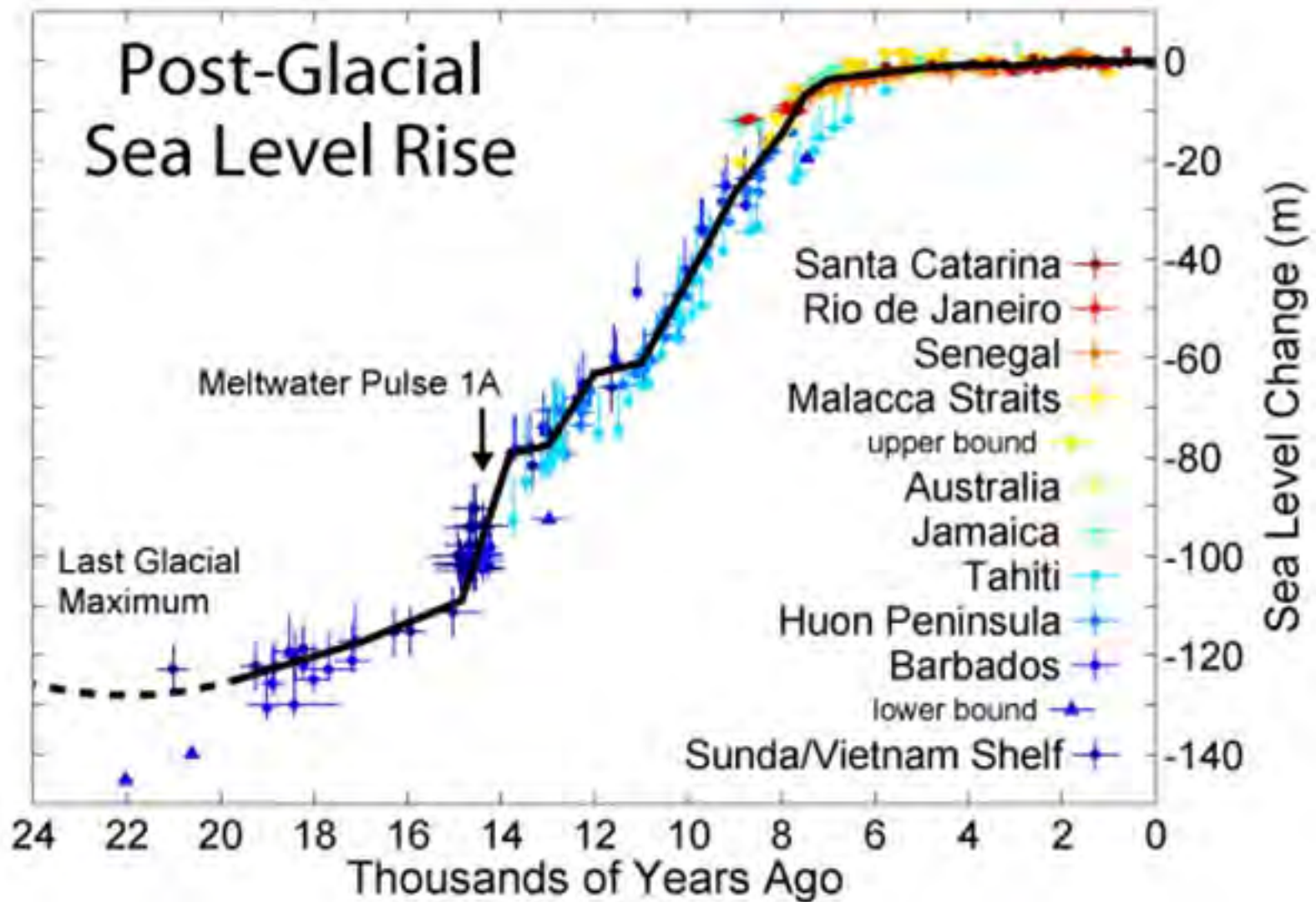
contexts (geography, culture, materials)

challenges (magnitude, rate)

strategies (functional and meaningful)

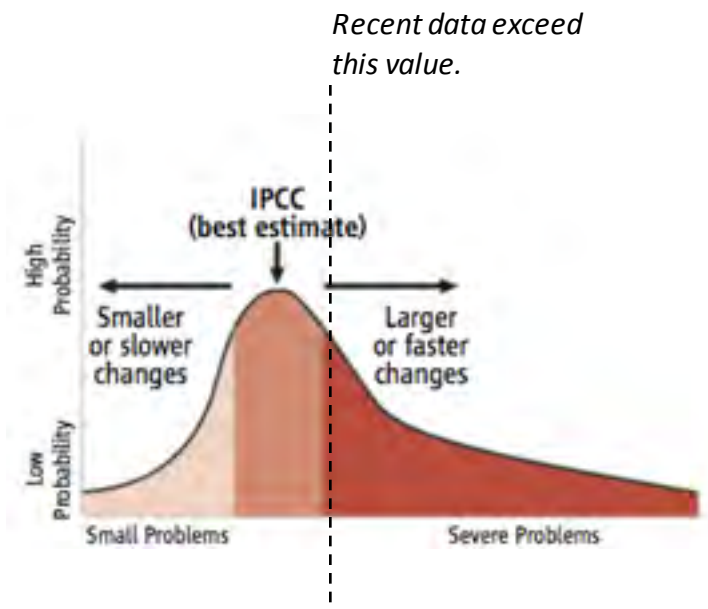
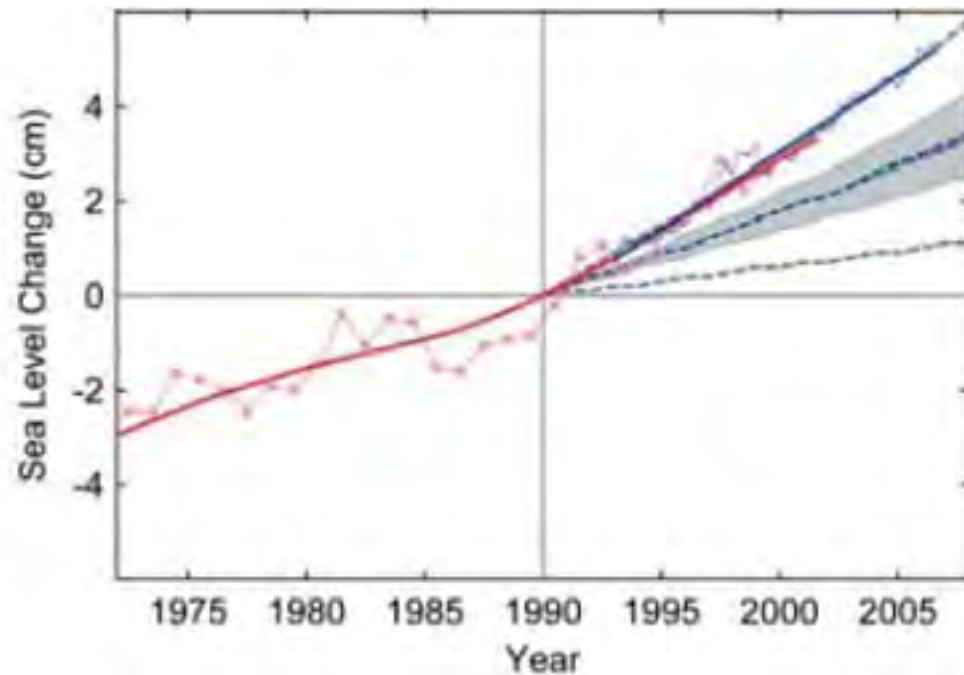
timing (\$, politics, partners)

challenges



Graph courtesy of Dr. Robert Dolan, UVa

The rate of sea level rise is increasing faster than predicted.



Recent measurements of ice sheet melting reveal trends that exceed “most probable” IPCC model predictions. (Rahmstorf et al, Science, 2007)

NOAA, 2008

“Weather and Climate
Extremes in a Changing Climate,”
Final Report

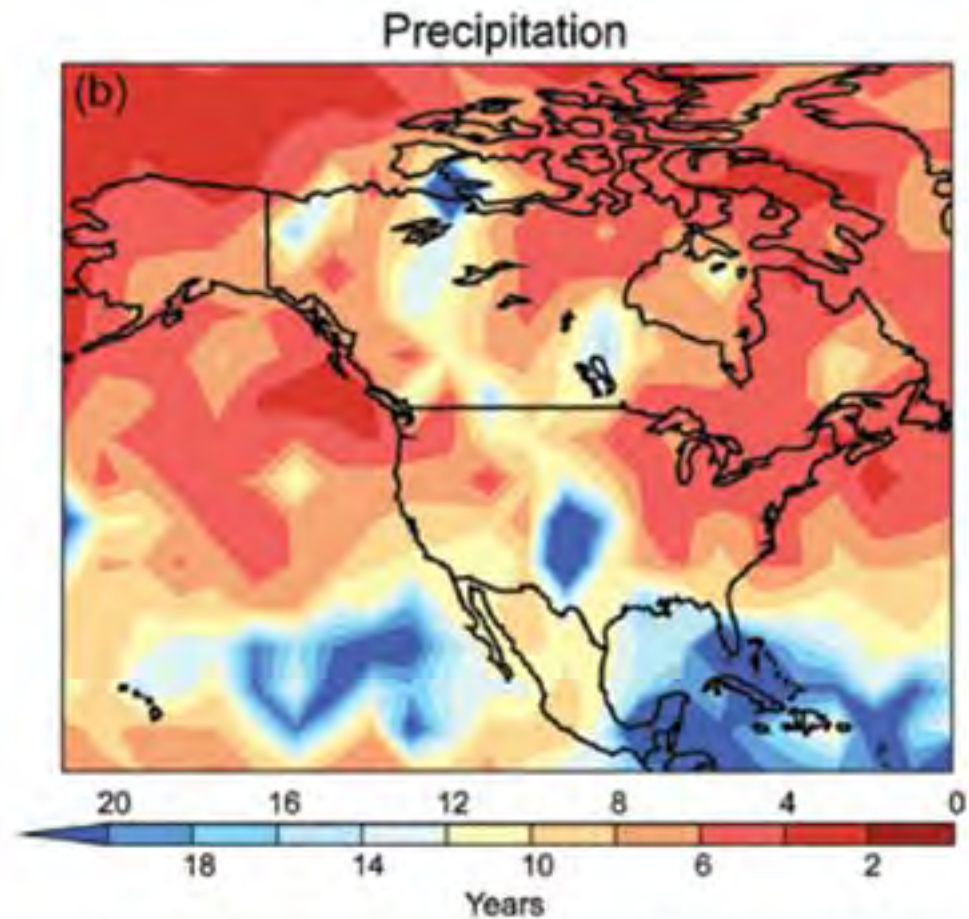


Figure 3.5 Simulations for 2090-2099 indicating how currently rare extremes (a 1-in-20-year event) are projected to become more commonplace. a) A day so hot that it is currently experienced once every 20 years would occur every other year or more by the end of the century. b) Daily total precipitation events that occur on average every 20 years in the present climate would, for example, occur once every 4-6 years for Northeast North America. These results are based on a multi-model ensemble of global climate models.



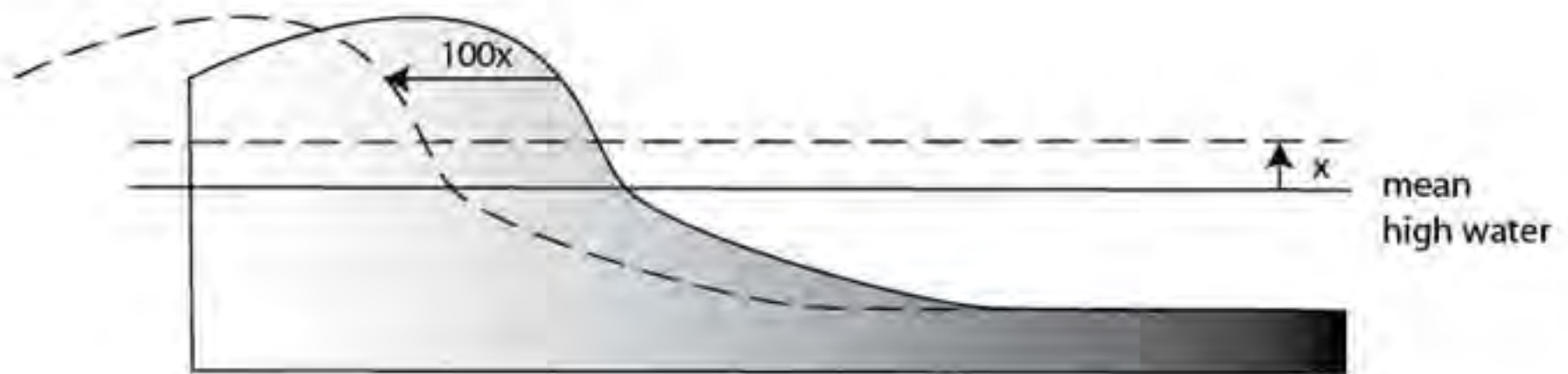
Water coming from 4 sides

GROUNDWATER

RIVER

RISE IN SEALEVEL

RAIN



Bruun's Rule: each increment of vertical sea level rise (x) produces a landward retreat of the beach profile at a ratio of 1:100 (100 times x). One foot of sea level rise produces a 100-foot landward retreat of the beach profile.

strategies:

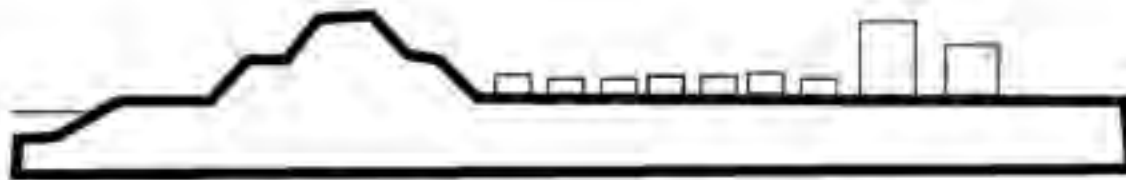
functional and meaningful



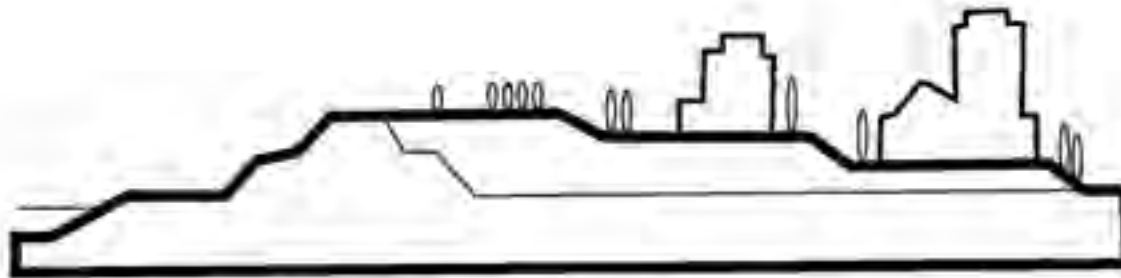


“going big” ...

the japanese superdike



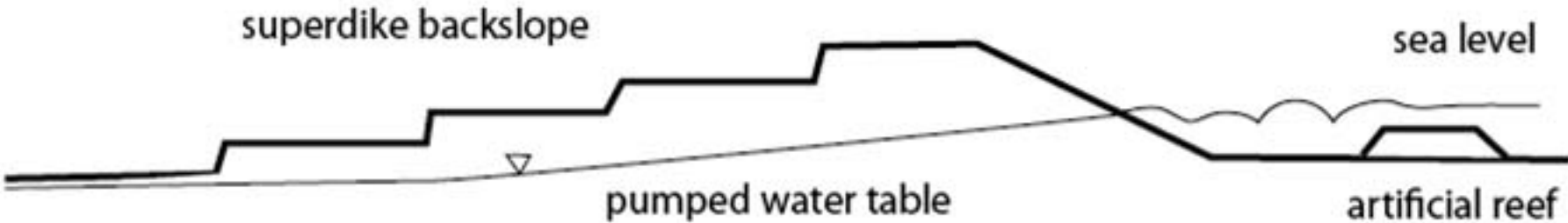
previous dike structure (approx. 400' wide)



new superdike (approx. 1200' wide)

Yodo River, Tokyo, Japan





movable barriers

+

“void” buffer systems



Floodwalls with removable aluminum or steel gates. Cologne, Germany (Rhine).



Floodwall with removable gates, Cologne, Germany.



Temporary aluminum floodwall, upper Midwest, US.

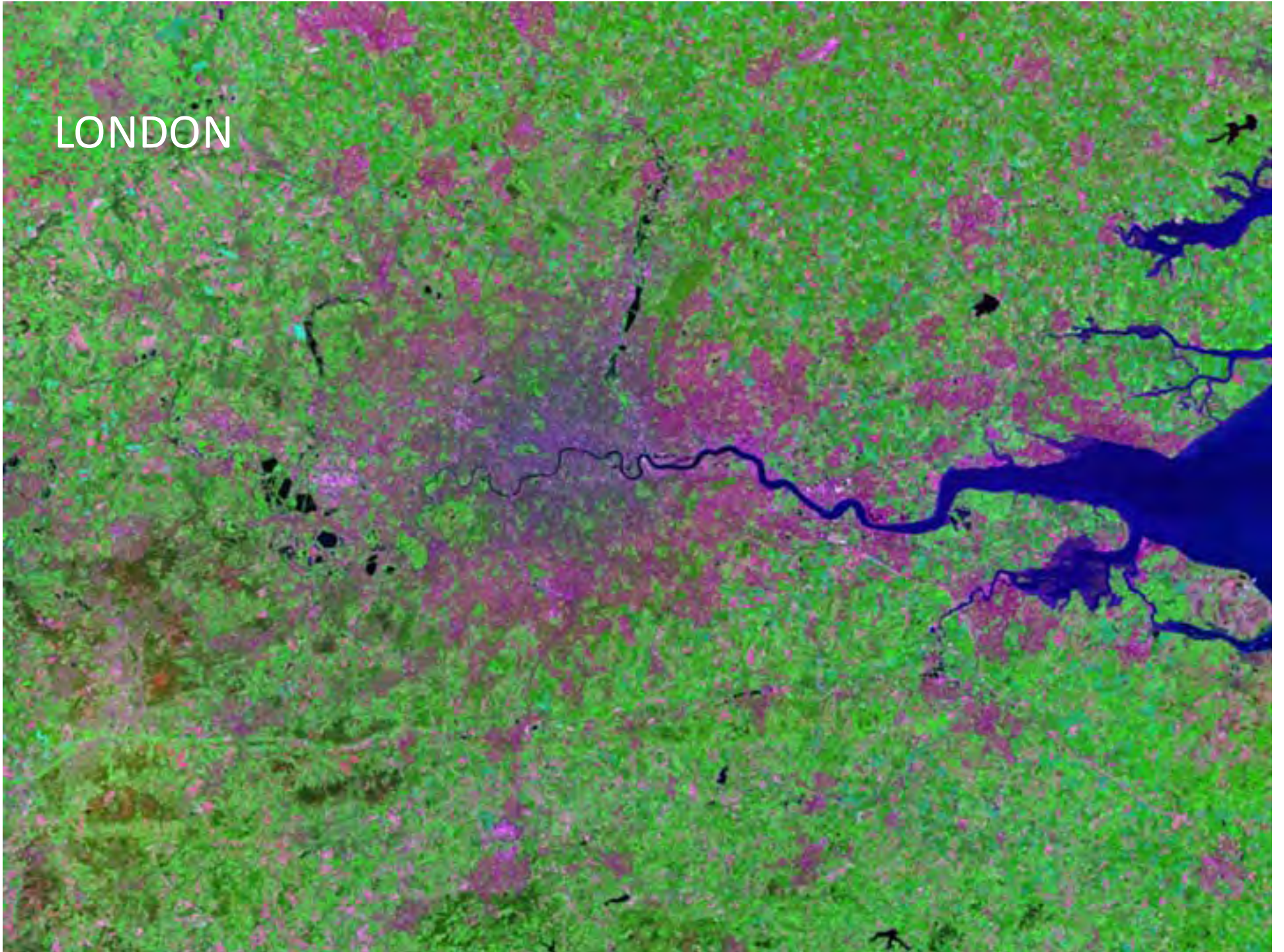


Temporary aluminum flood barriers at building openings. Washington State.



Permanent floodwall with gates, Richmond, VA.

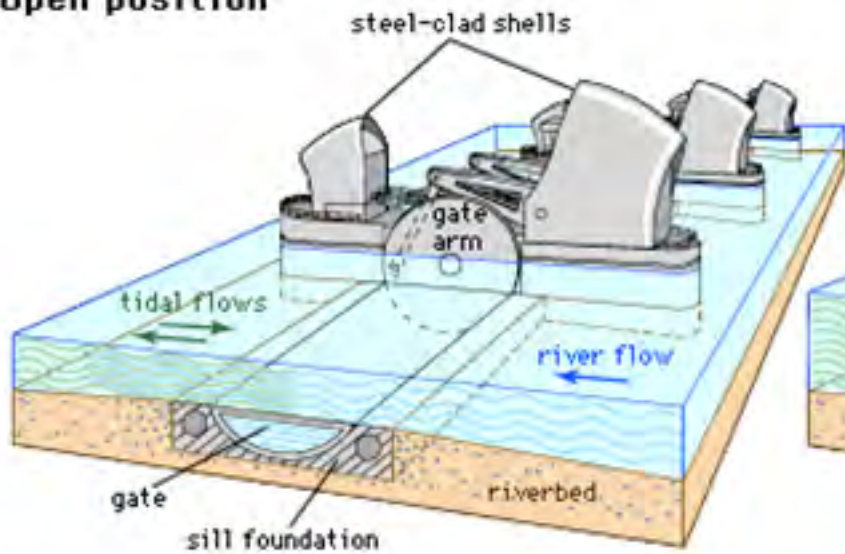
LONDON



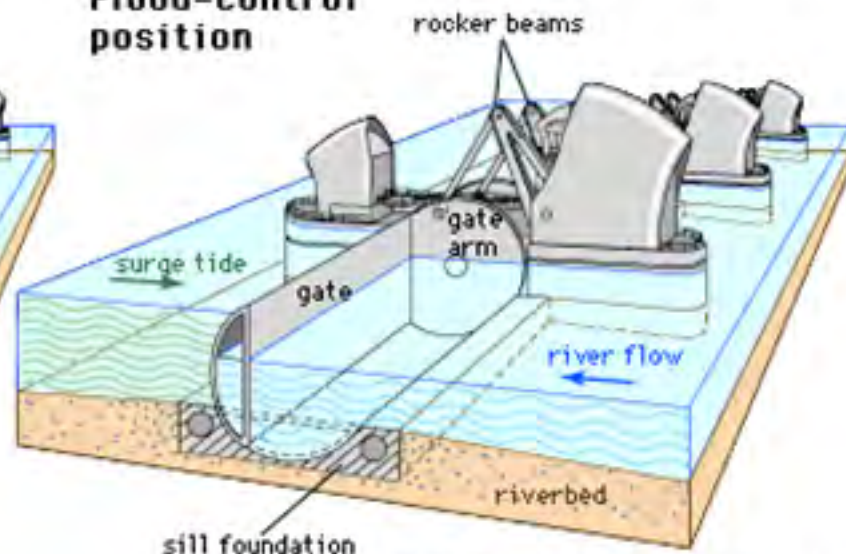




Open position



Flood-control position



©1999 Encyclopaedia Britannica, Inc.

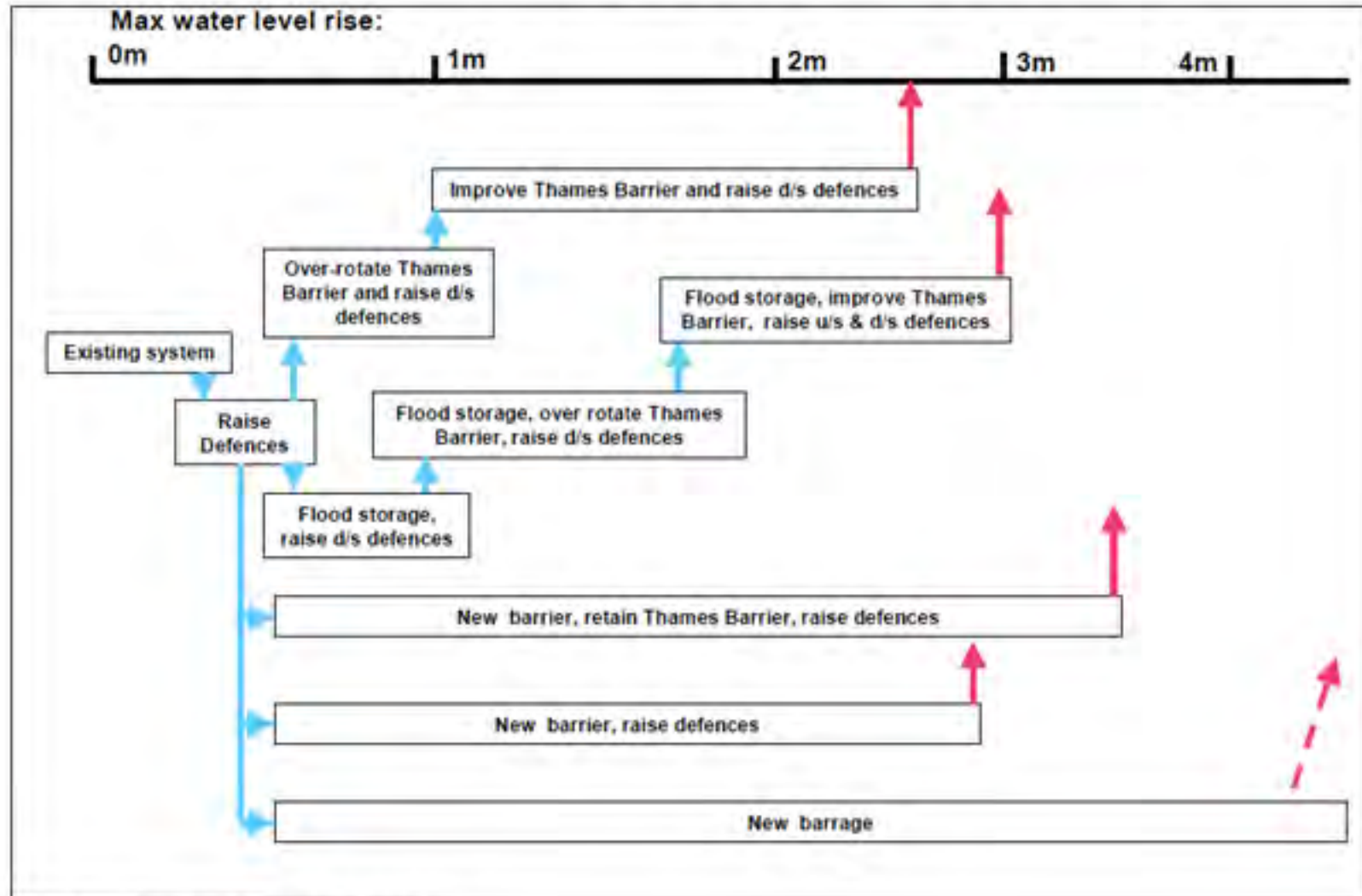
Disaster in 1953, funds committed in 1960's, begun in 1973 and completed in 1984.



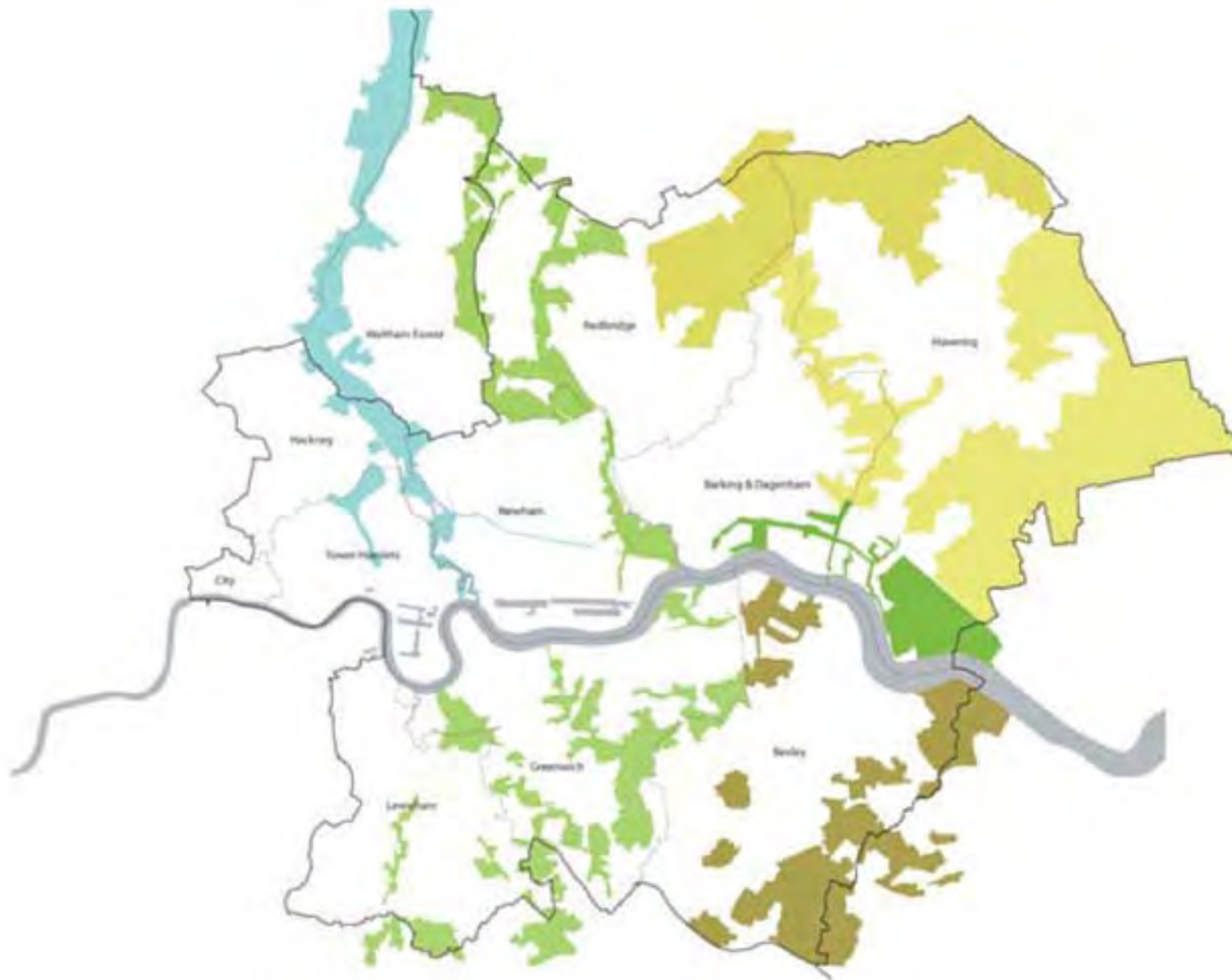




Figure 2.7 TE2100 'decisions pathway' (u/s = upstream, d/s = downstream)



Source: Environment Agency



East London Green Grid Plan

receiving the floods



North Sea

Hamburg

140 km





Georg Hoff 2007
zackenschaf.de



Buildings have a “hardened” 1st story along a wide pedestrian walkway.

Urban design strategy: Hamburg, city on the water

Level of buildings: 7.5 m



Level of harbour: 5.3 m



Low tide: - 1,53 m

Urban design strategy: Hamburg, city on the water

Level of buildings: 7.5 m



Level of harbour: 5.3 m



High tide: + 2,09 m

(slides courtesy of Antje Stokman)

Urban design strategy: Hamburg, city on the water

Level of buildings: 7.5 m



Level of harbour: 5.3 m



Storm flood: + 6,45 m



Floating structures and harbour



Level of emergency route: 7.5 m

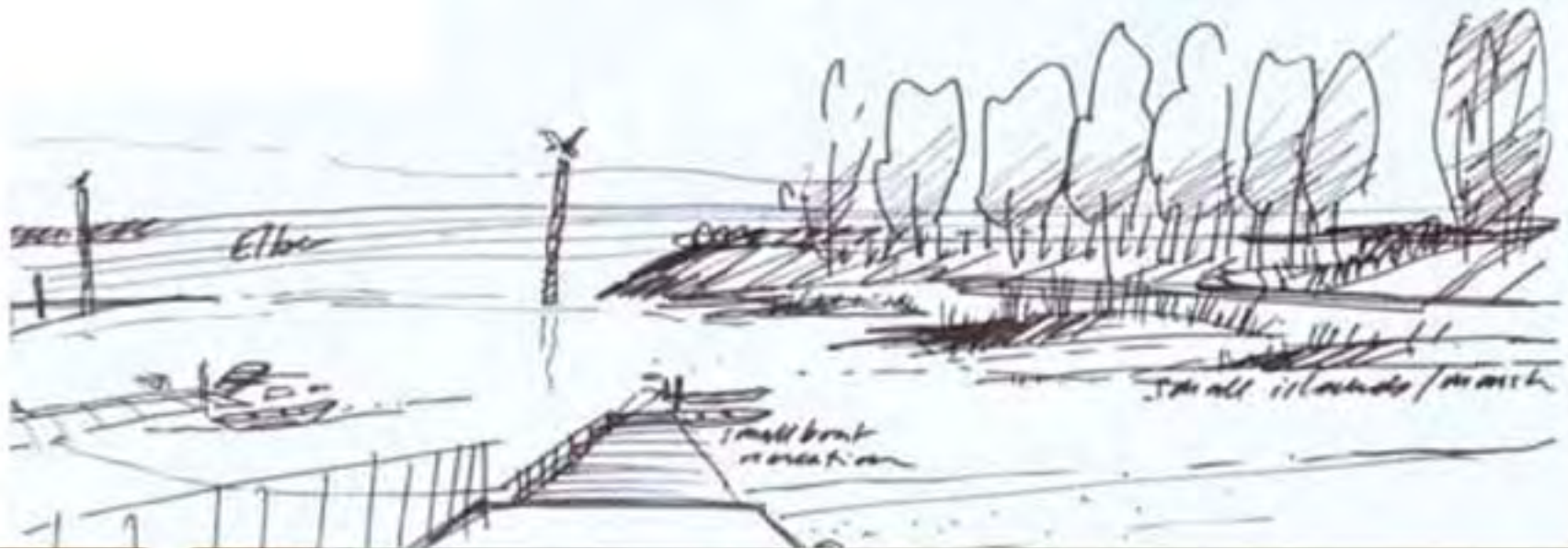
Level of harbour: 5.3 m

Emergency routes





The Elbphilharmonie, a new symphony hall with luxury housing above.





**Small scale strategy:
New synergies and landscape experiences within pilot projects**



building movable / living edges
as cyclical buffer systems

“sand engine”









Aanleg: een haak, wijzend naar het noorden
Golven, wind en zeestroming verplaatsen het zand. Het schiereiland verandert geleidelijk van vorm.



5 jaar later: de haakvorm verdwijnt
Met de jaren zal het zand zich noord- en zuidwaarts verspreiden. De precieze vorm en de diepte van het duinmeer of de lagune zijn afhankelijk van het weer.



10 jaar later: het zand vindt zijn eigen weg.

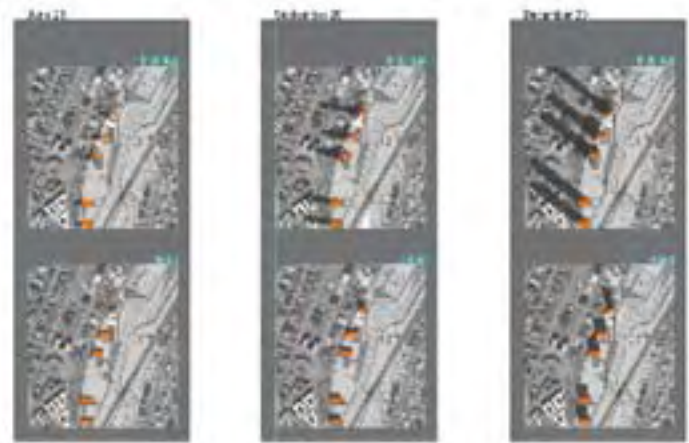


20 jaar: de Zandmotor is volledig opgegaan in een breder strand en nieuwe duinen.

“surge parks”



1 model of green roof systems that merge seamlessly with park landscape (A. Lin)



2 diagrams of sun / shade generated by proposed residential towers

3 stormwater flow diagrams in relation to the Bronx River



proposal by H. Dowell



Occupation of the New Marsh Edge

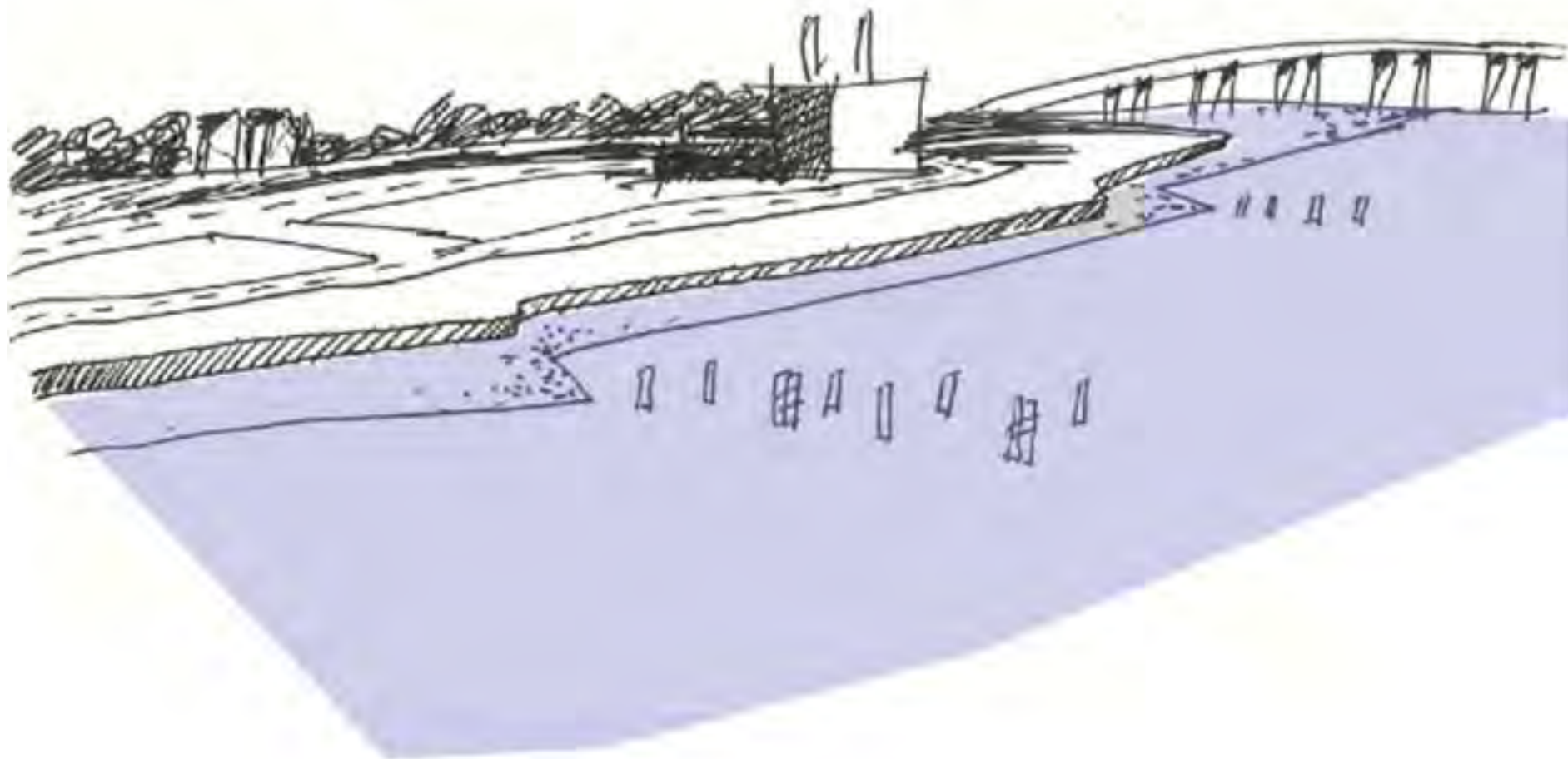
Project by Claudia Saladin

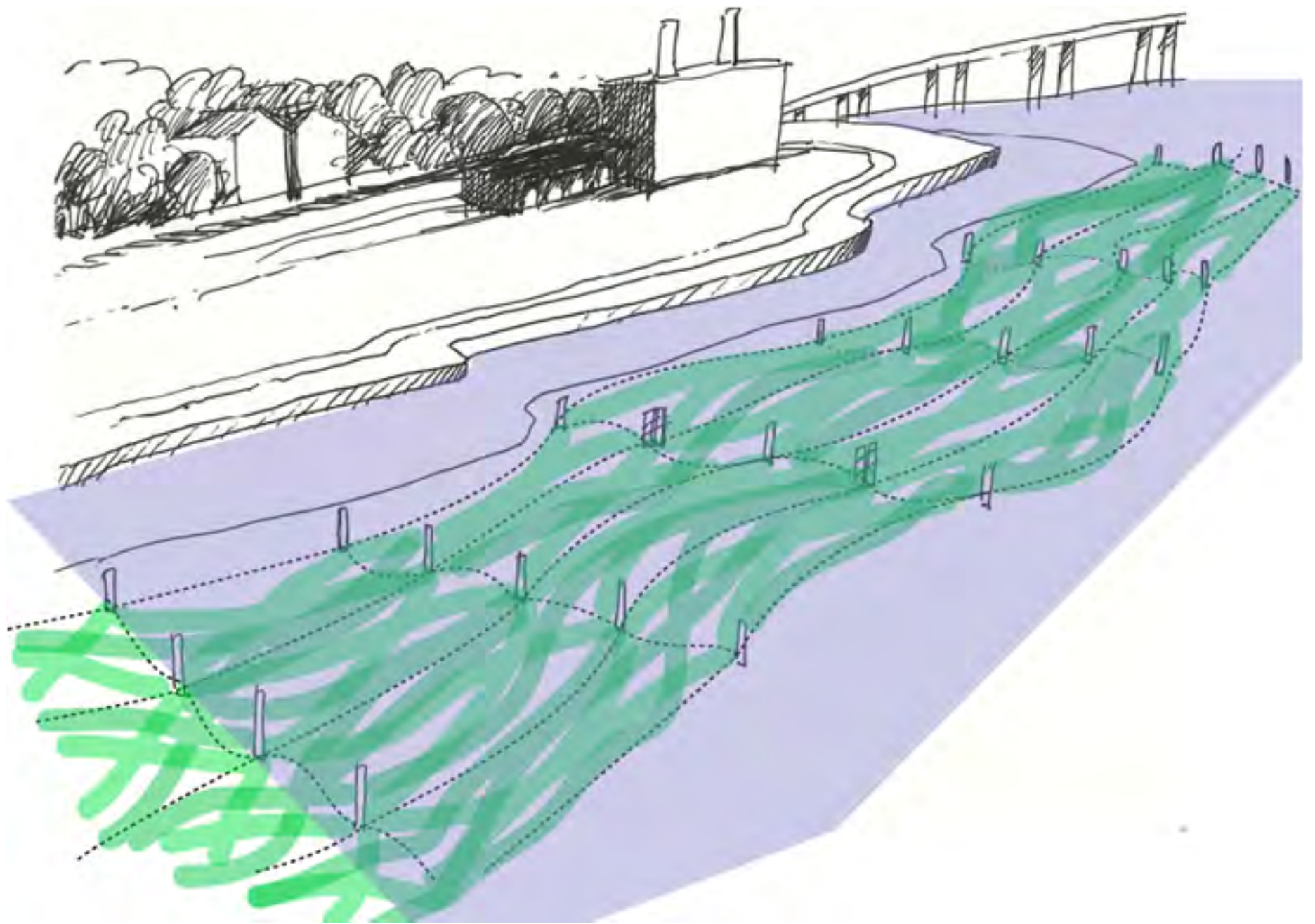


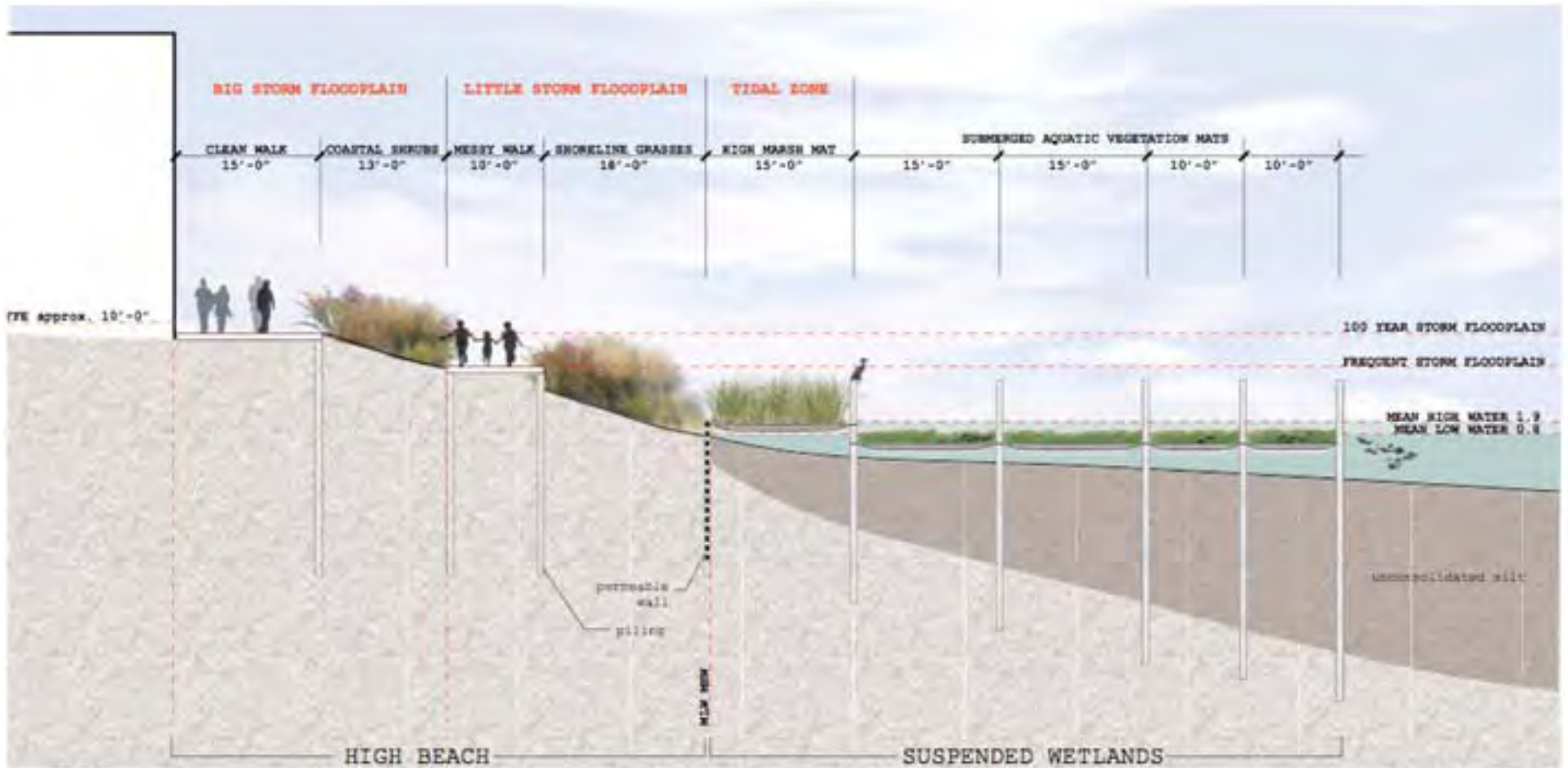
Perspectives of Terrestrial Restoration:
Training/Harvest on Swann Park Site

“seagrass skirts”

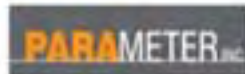








SUSPENDED WETLANDS SECTION
 WESTPORT DEVELOPMENT, BALTIMORE
 17 January 2008



Kristina
 Hill

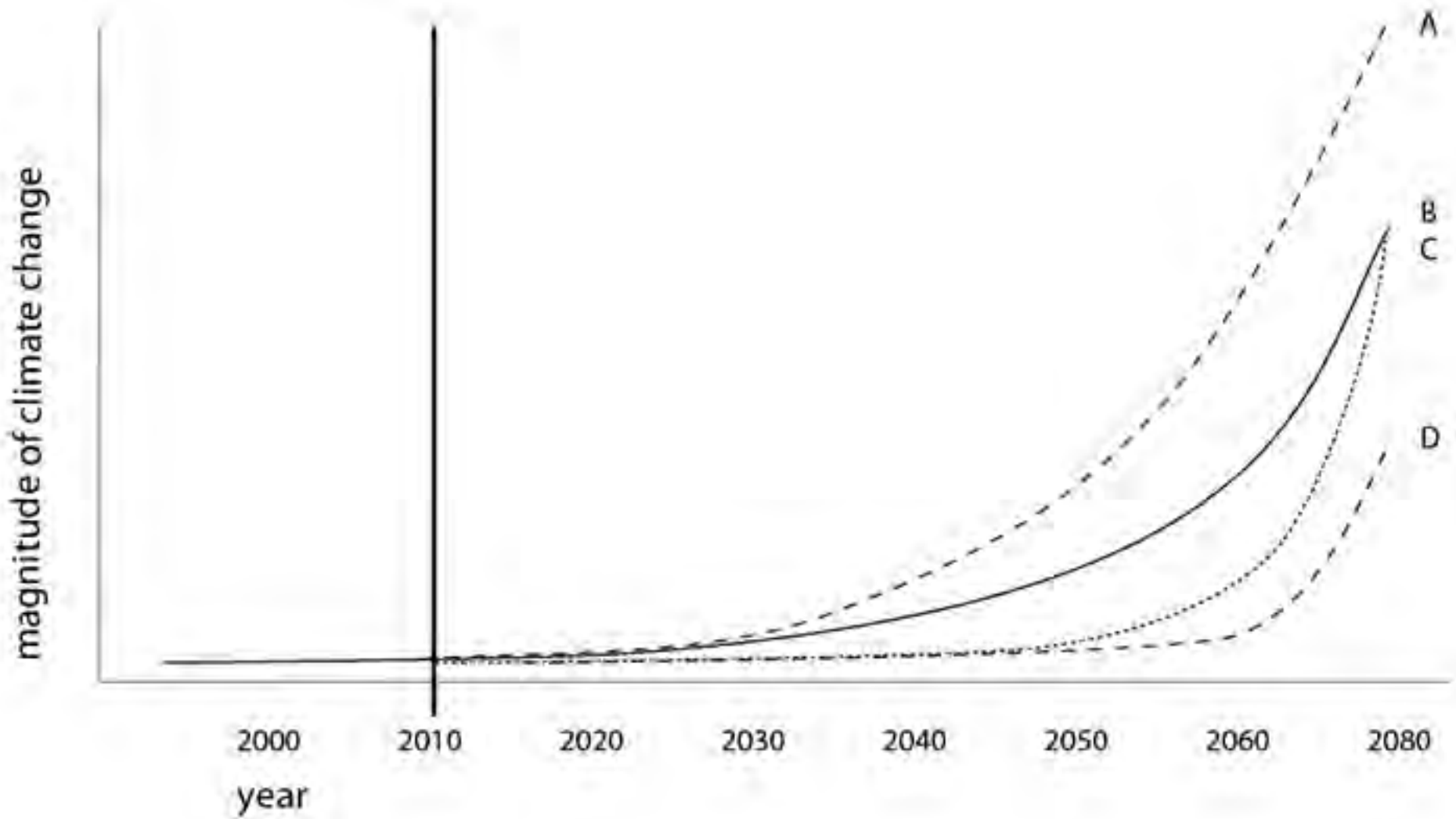


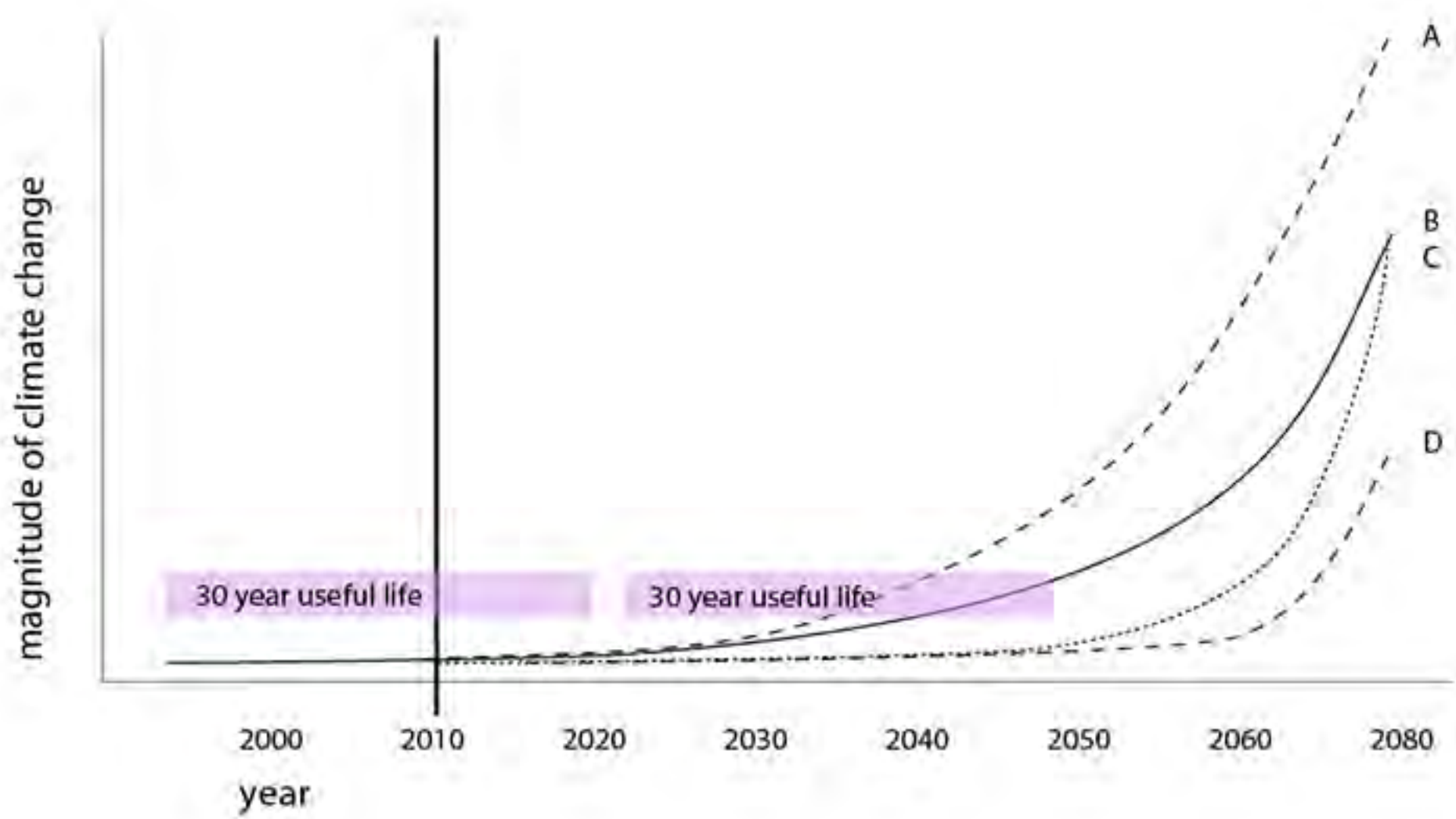
D. T. V. HUBER
 700 Barrie Street, #104
 Chantersville, VA 22020
 804.427.6200

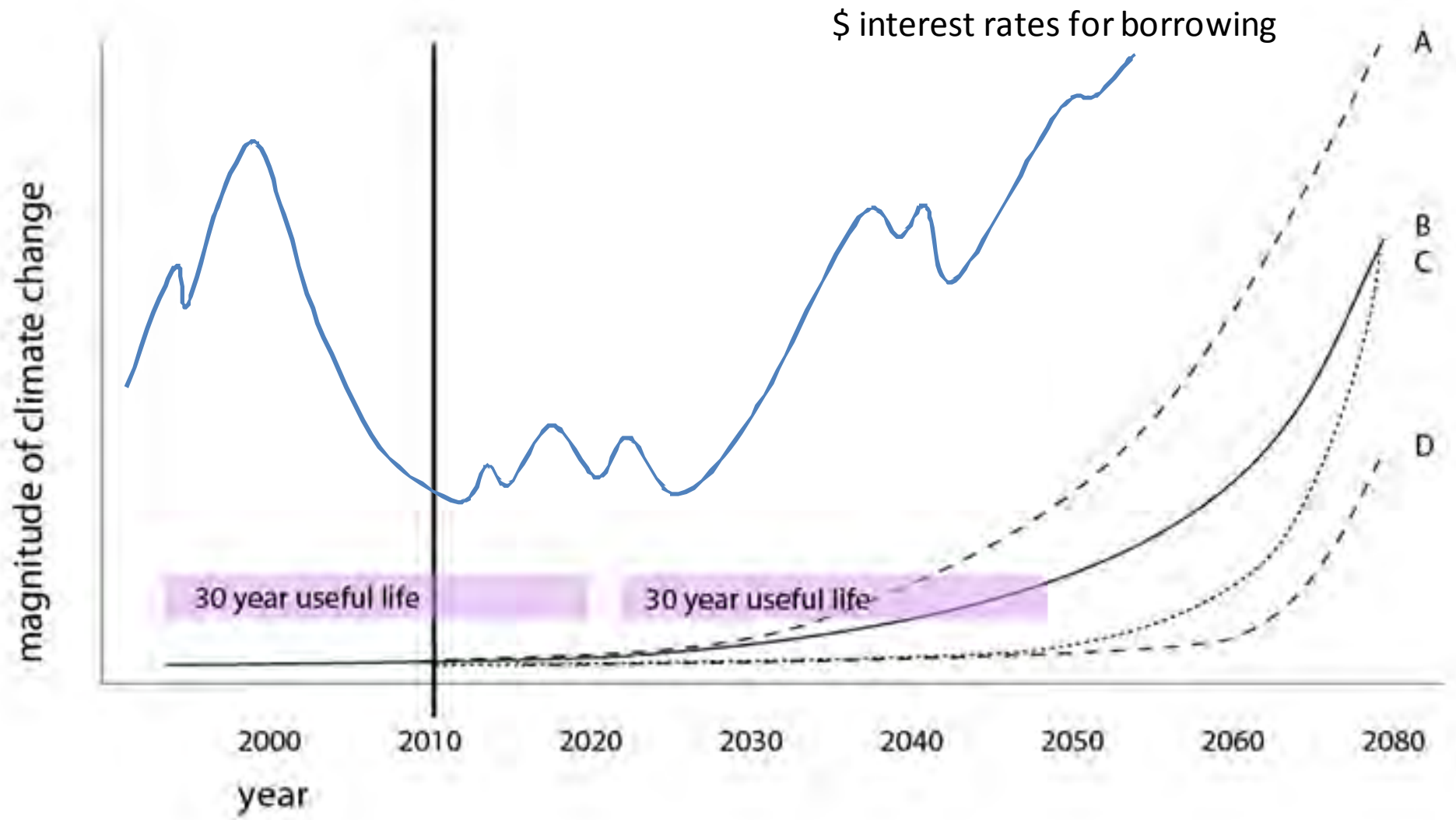


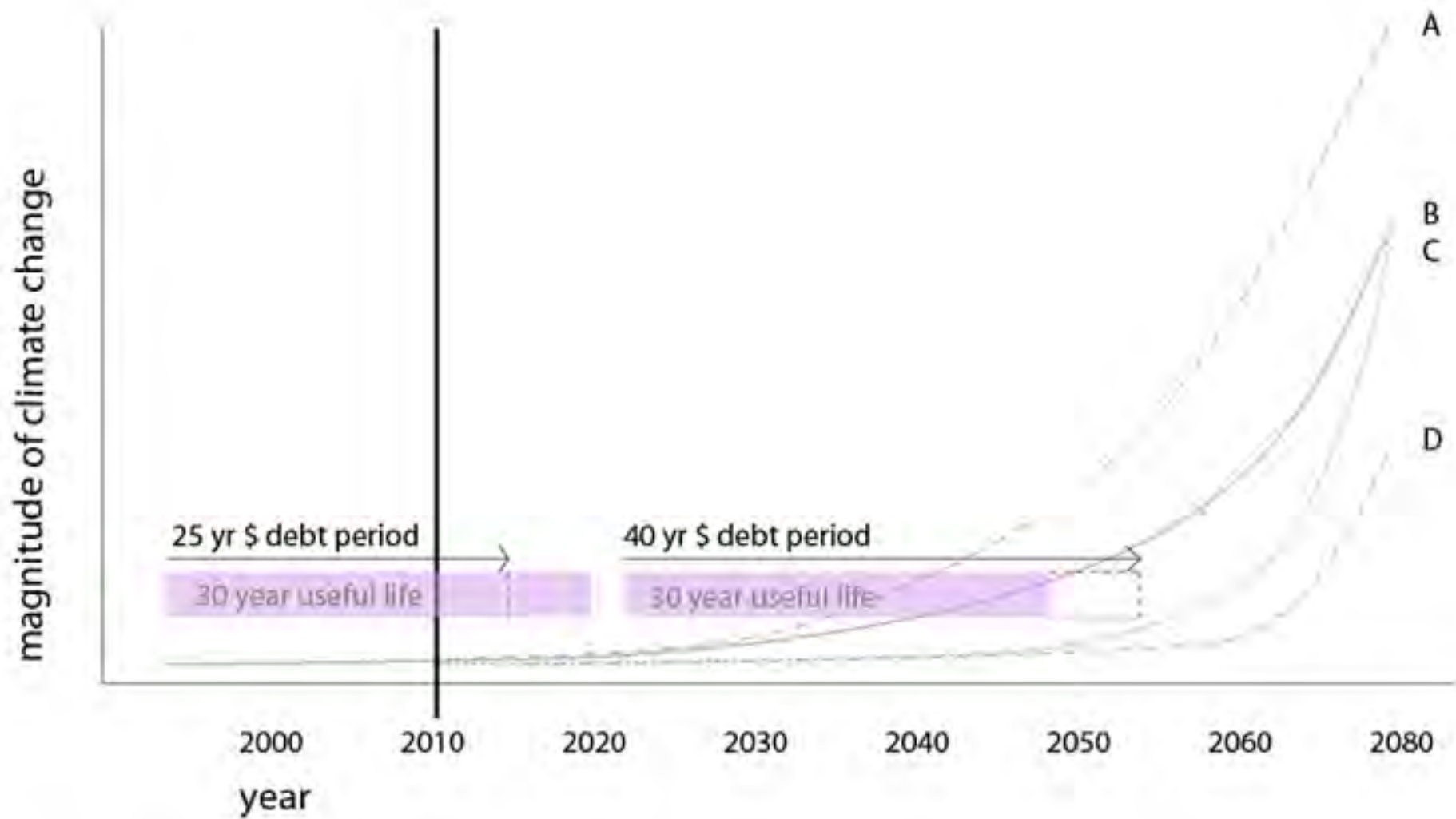
Philadelphia Navy Yard, Urban Outfitters HQ (Julie Bargmann).

timing

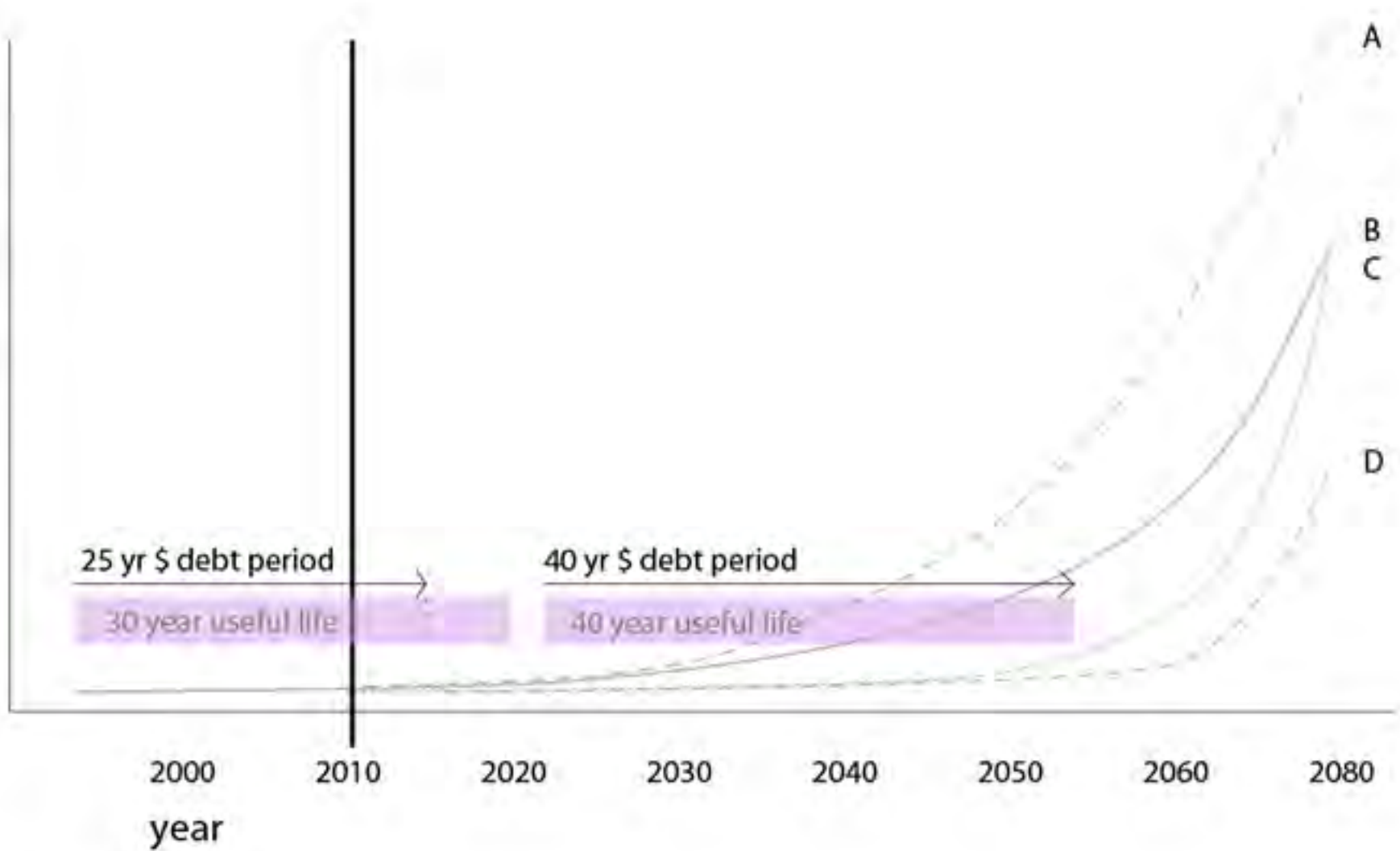








magnitude of climate change





Thank you for listening.