

A generalisable integrated natural capital methodology for investments in saltmarsh

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Where are priority areas for
managed realignment of
saltmarsh: maximise
ecosystem services &
minimise costs?

Previously claimed
intertidal habitats are
recreated



Pollution

Sea level
rise

Saltmarsh

- Heavily exploited, threatened ecosystem
- 50% lost worldwide (Barbier et al 2011)
- 76% loss in North Devon

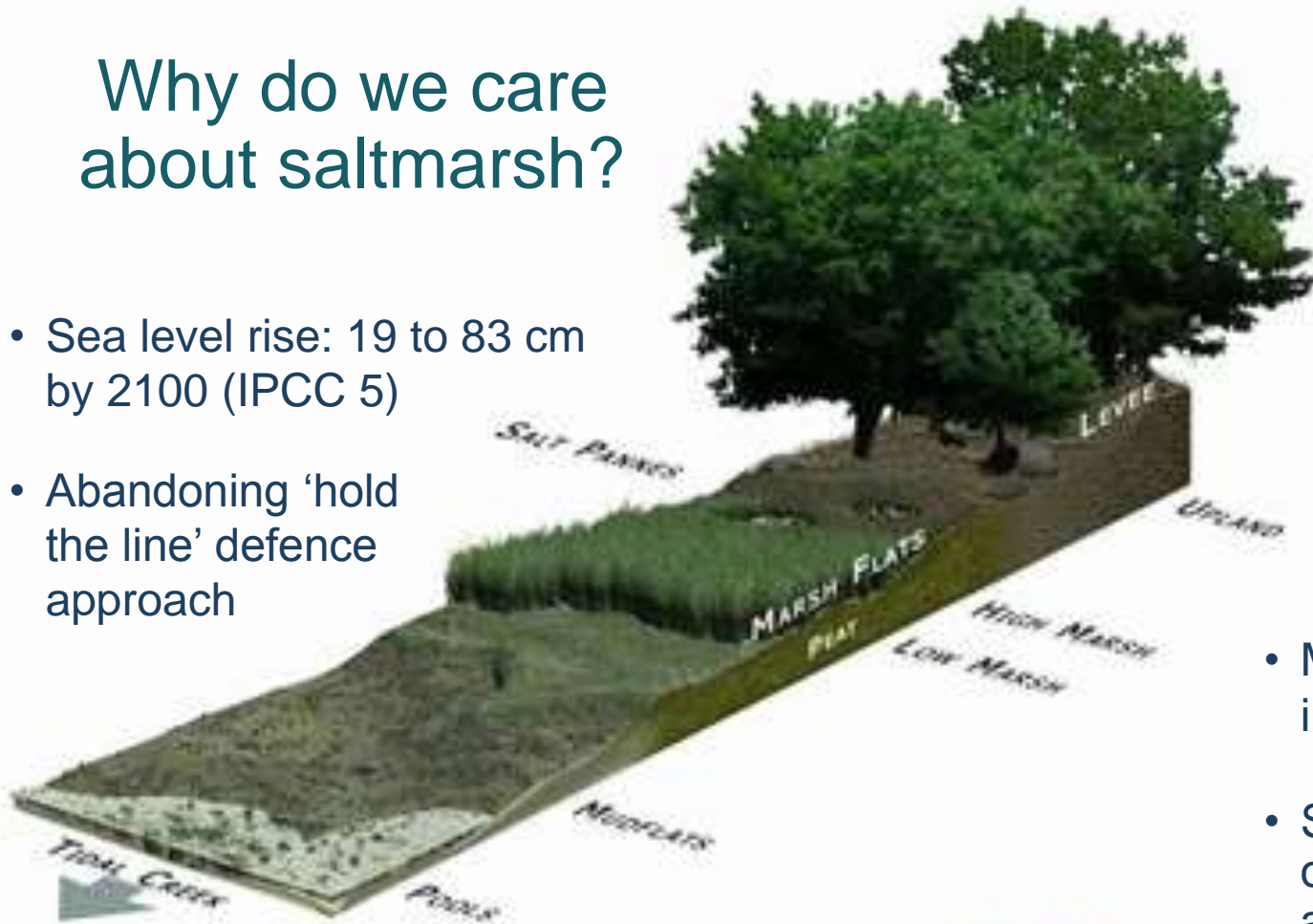
Land
conversion

Land
reclamation

Agricultural
runoff

Why do we care about saltmarsh?

- Sea level rise: 19 to 83 cm by 2100 (IPCC 5)
- Abandoning 'hold the line' defence approach

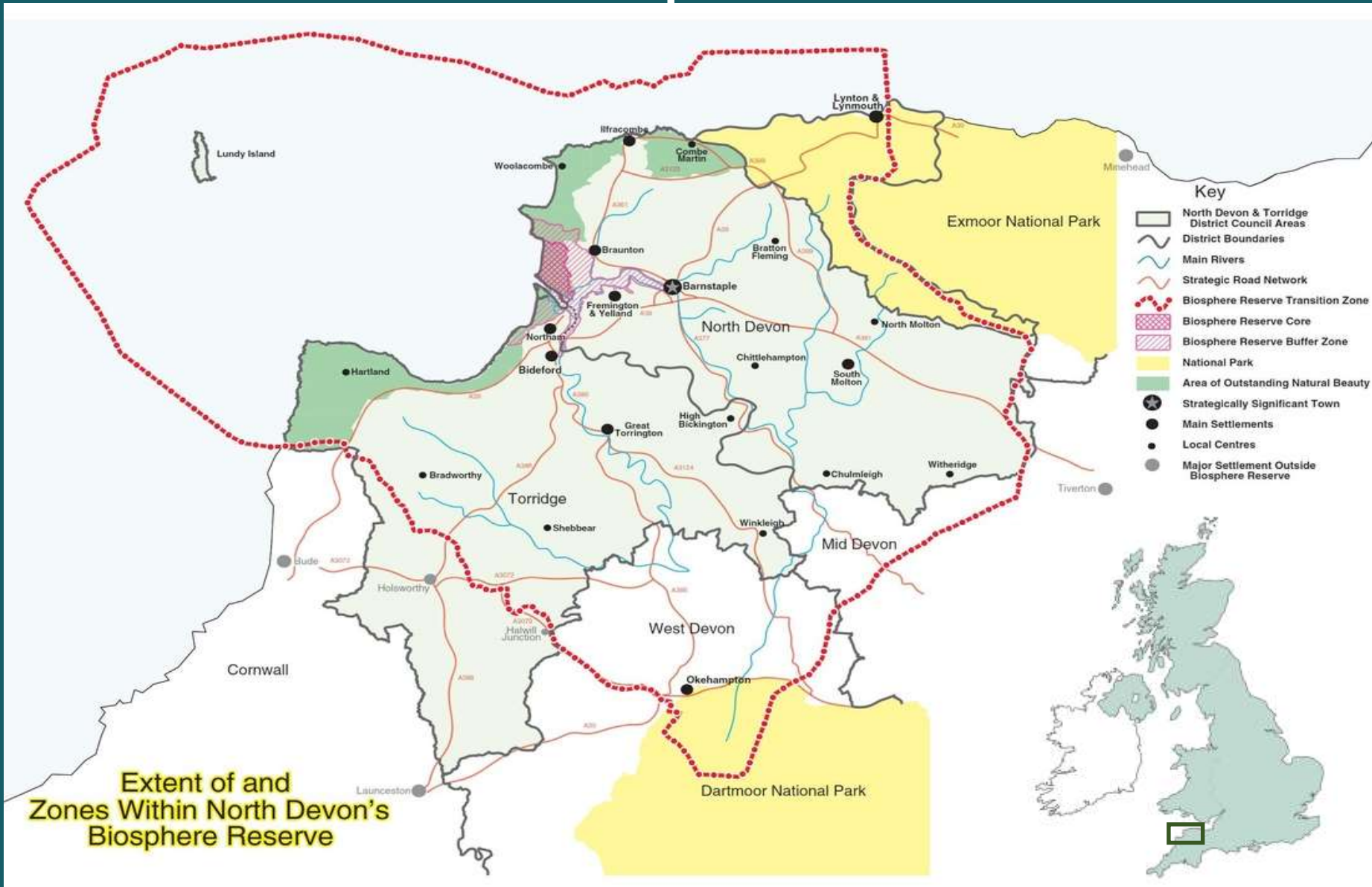


- Maintain or expand intertidal habitats
- Selective protection of 'high value' assets

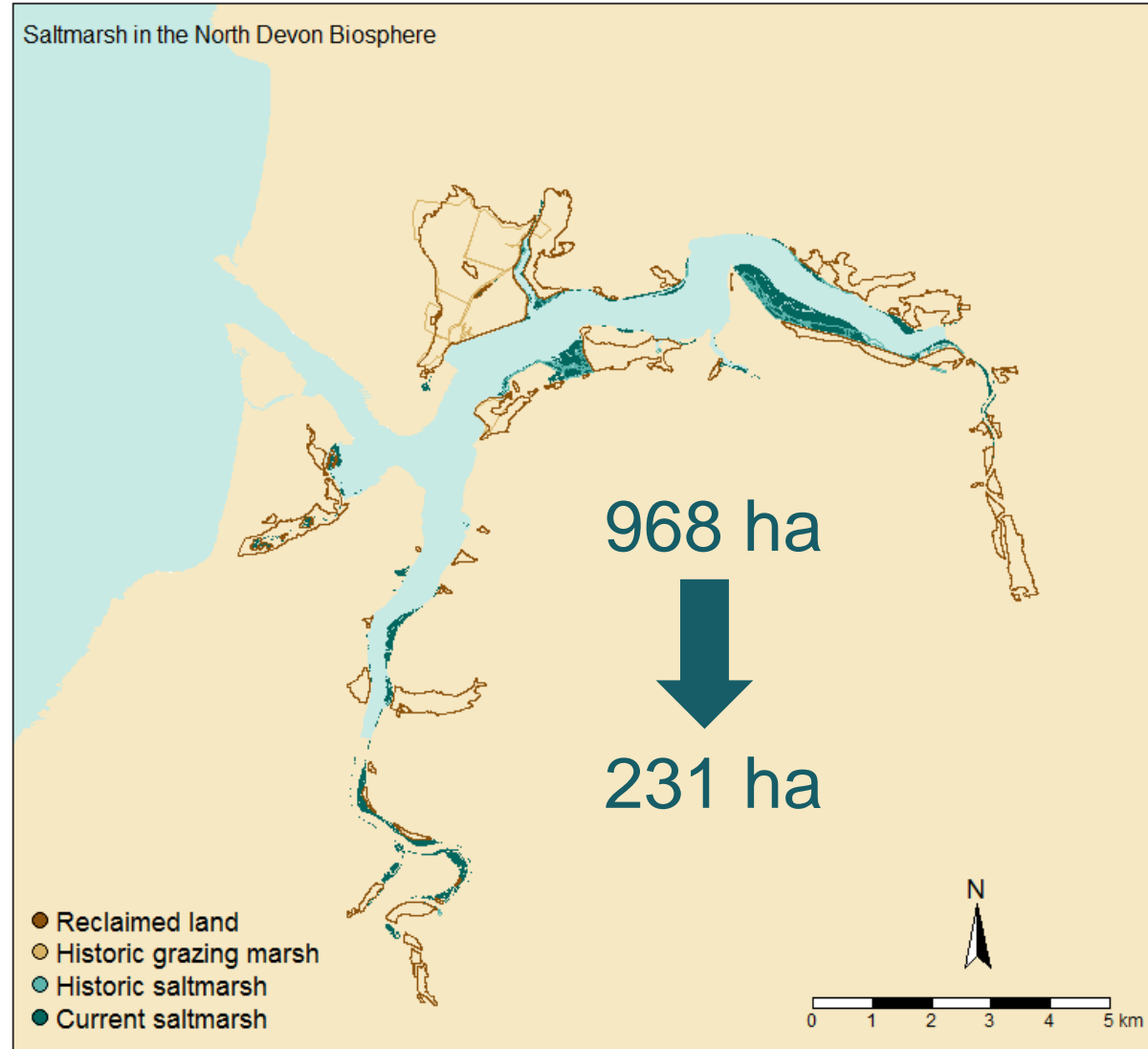




Case study: North Devon Biosphere



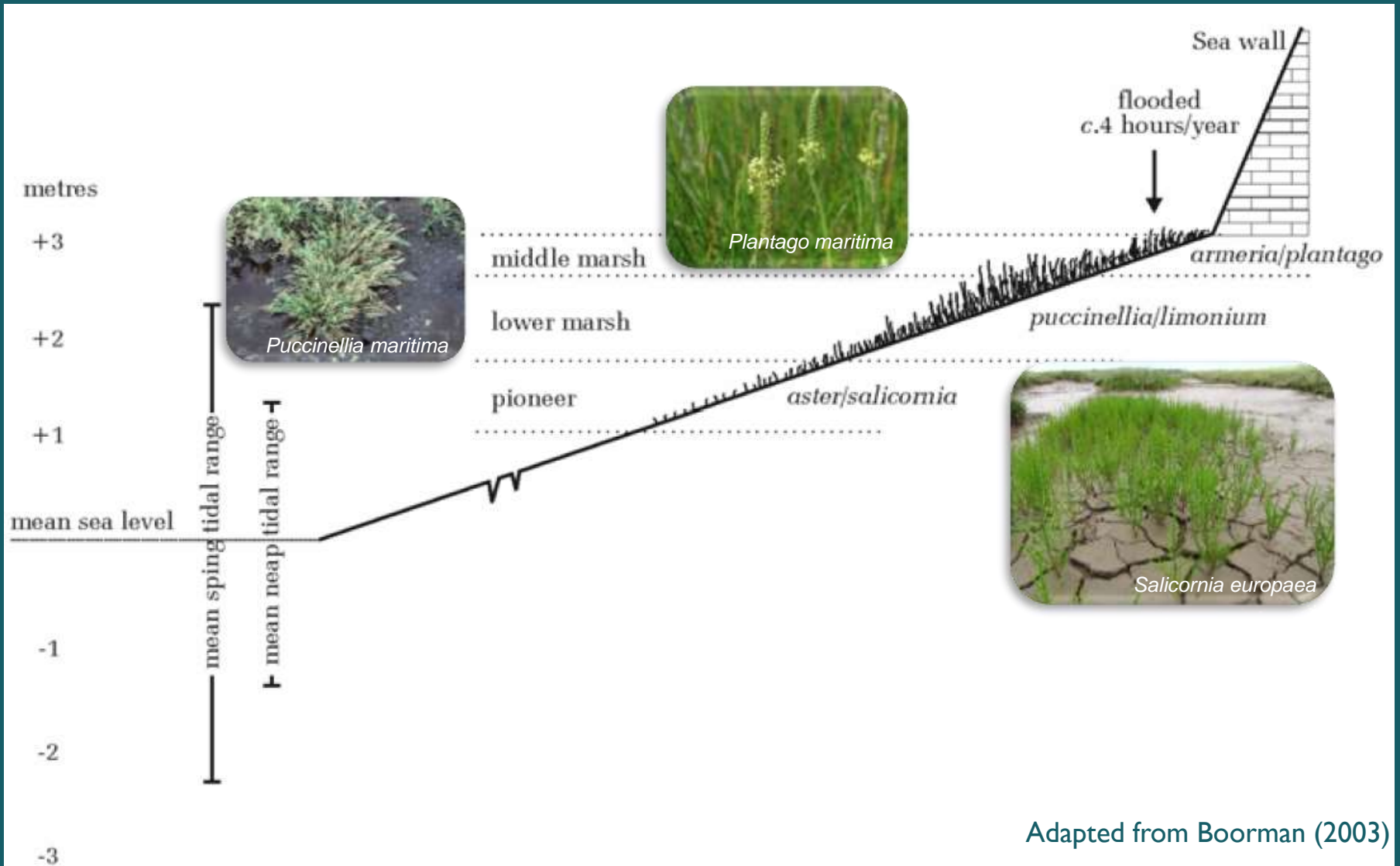
Current & historic saltmarsh extent in North Devon Biosphere Reserve



What we did

1. Identify potential managed realignment saltmarsh areas based on LIDAR
2. Estimate opportunity cost for agriculture
3. Estimate environmental benefits
4. Identify priority areas for managed realignment

Identifying potential saltmarsh sites



Adapted from Boorman (2003)

Costs

Opportunity
 i, j, t

Benefits

Biodiversity/
habitat
 i, j

Flood
prevention
 i, j, t

Fisheries
nursery
 z

Still in development

i = spatial quantity (e.g. m^2)

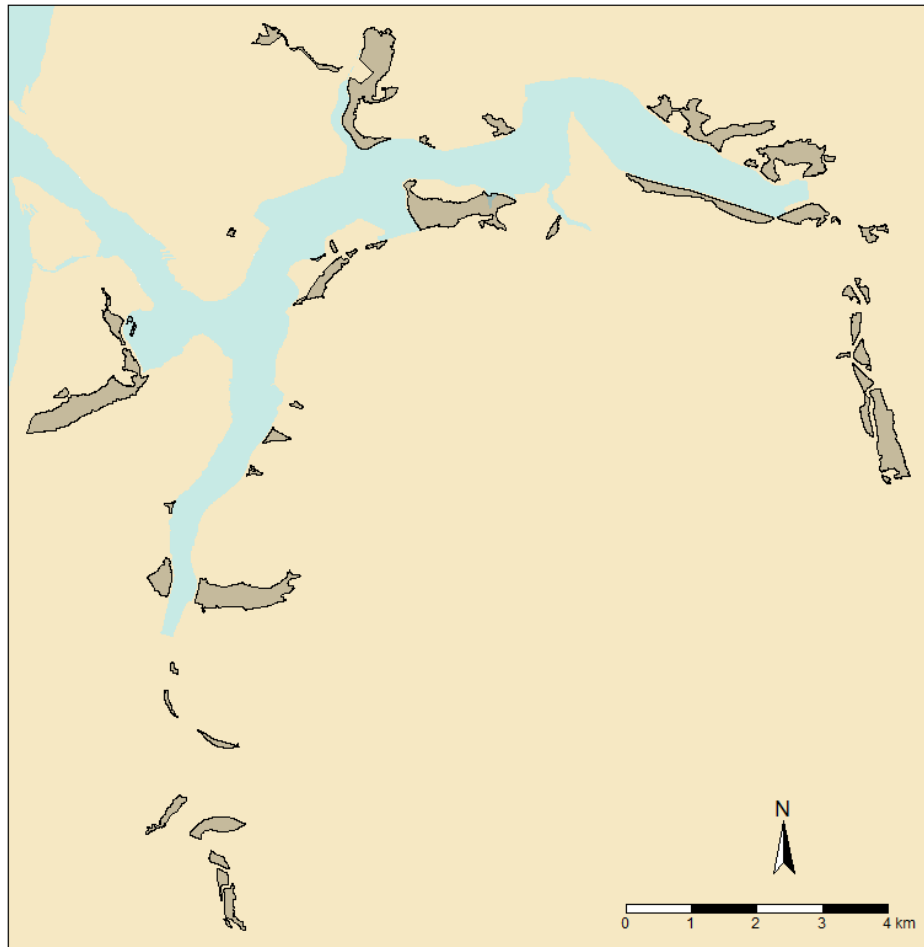
j = spatial characteristics (e.g. proximity to populated areas)

z = saltmarsh zone

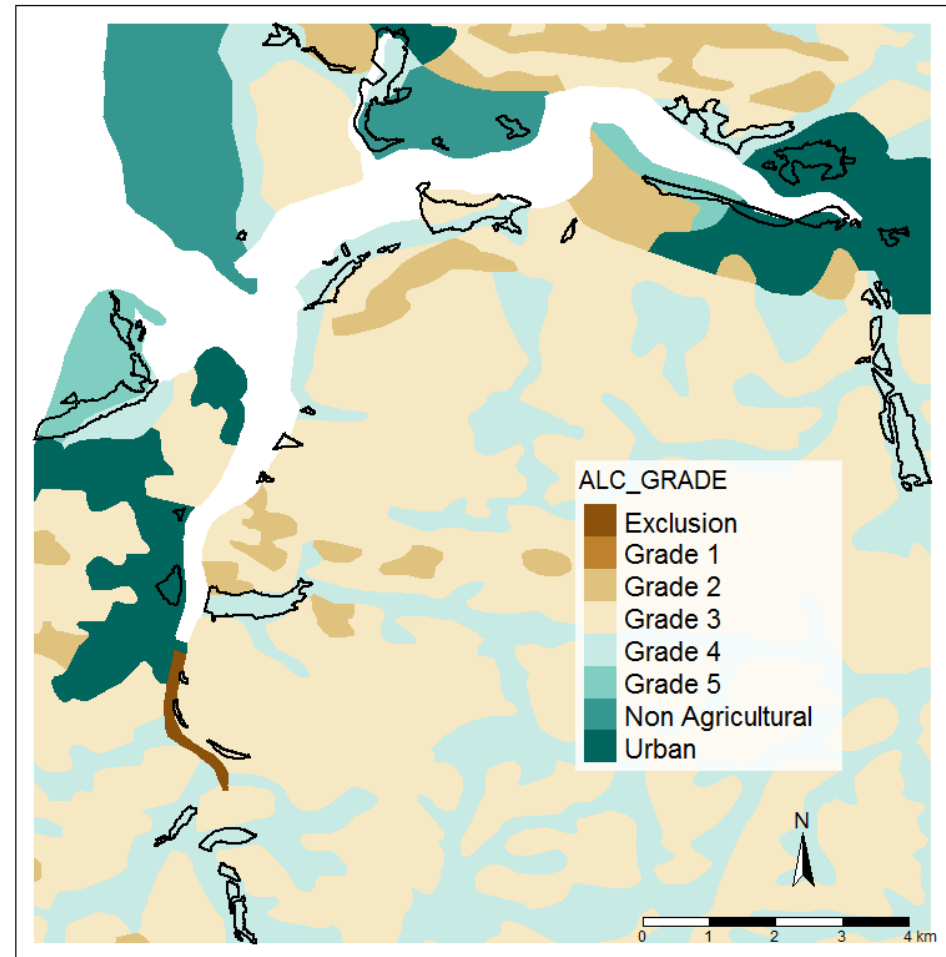
t = time

Potential managed realignment sites

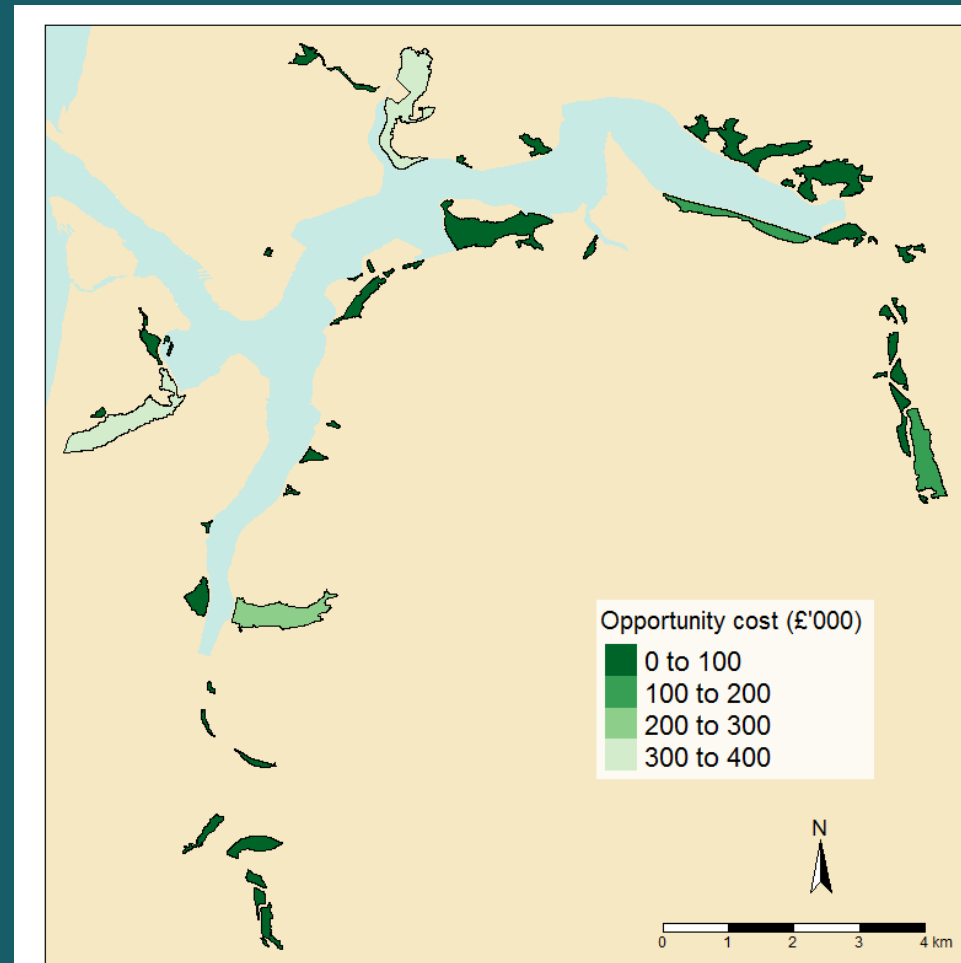
Number	50
Average (ha)	10.5
Median (ha)	3.5
Min (ha)	0.5
Max (ha)	60.0



Agricultural Land Classification

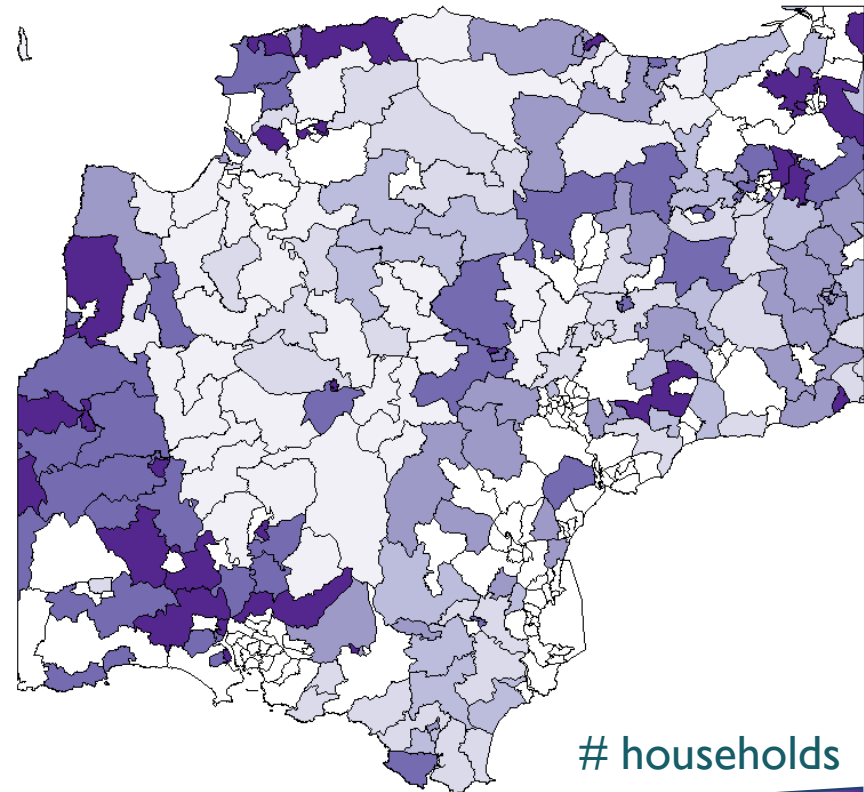


Opportunity cost to agriculture

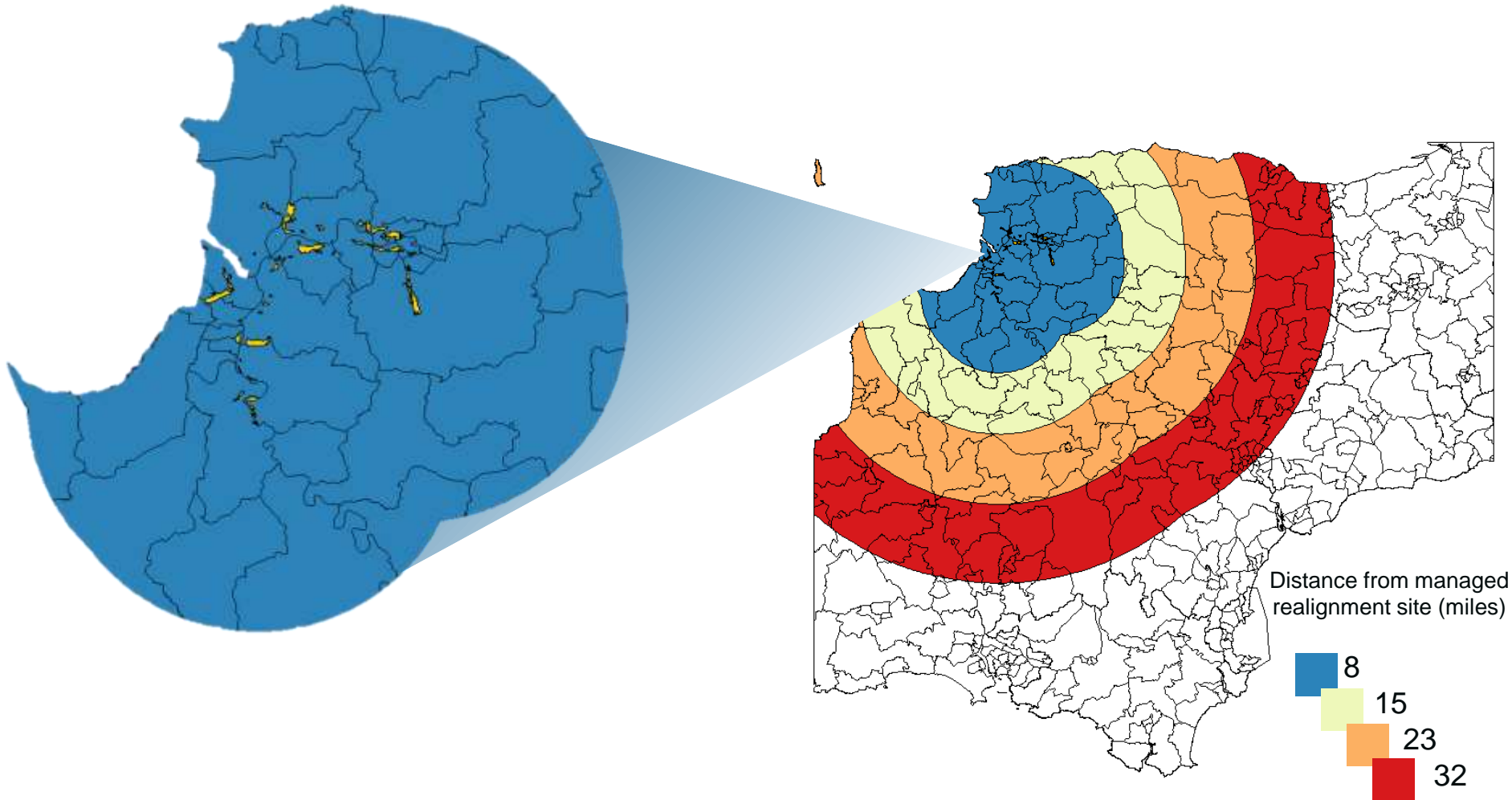


Environmental benefits: amenity & recreation

- Willingness to pay for managed realignment (Luisetti et al 2011)
 - $\log(\text{Area})$
 - Distance
 - Environmental quality
 - Access
 - Cost



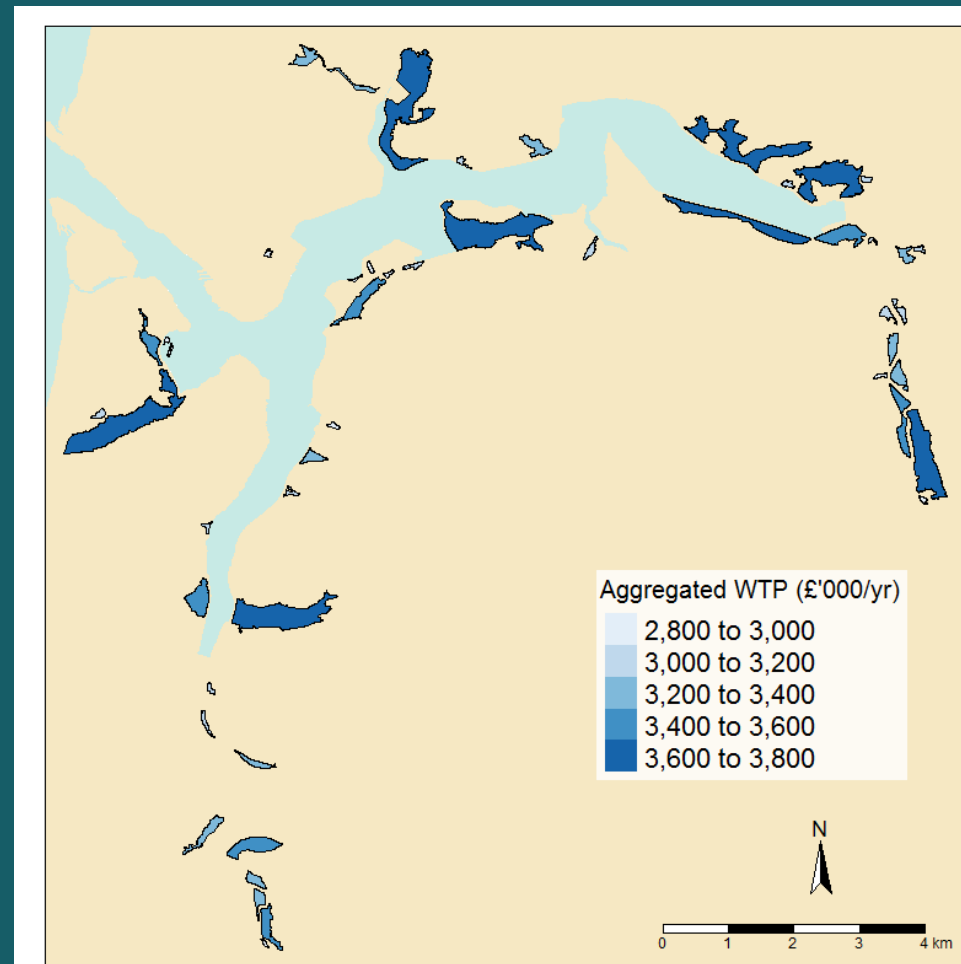
Spatial heterogeneity in WTP



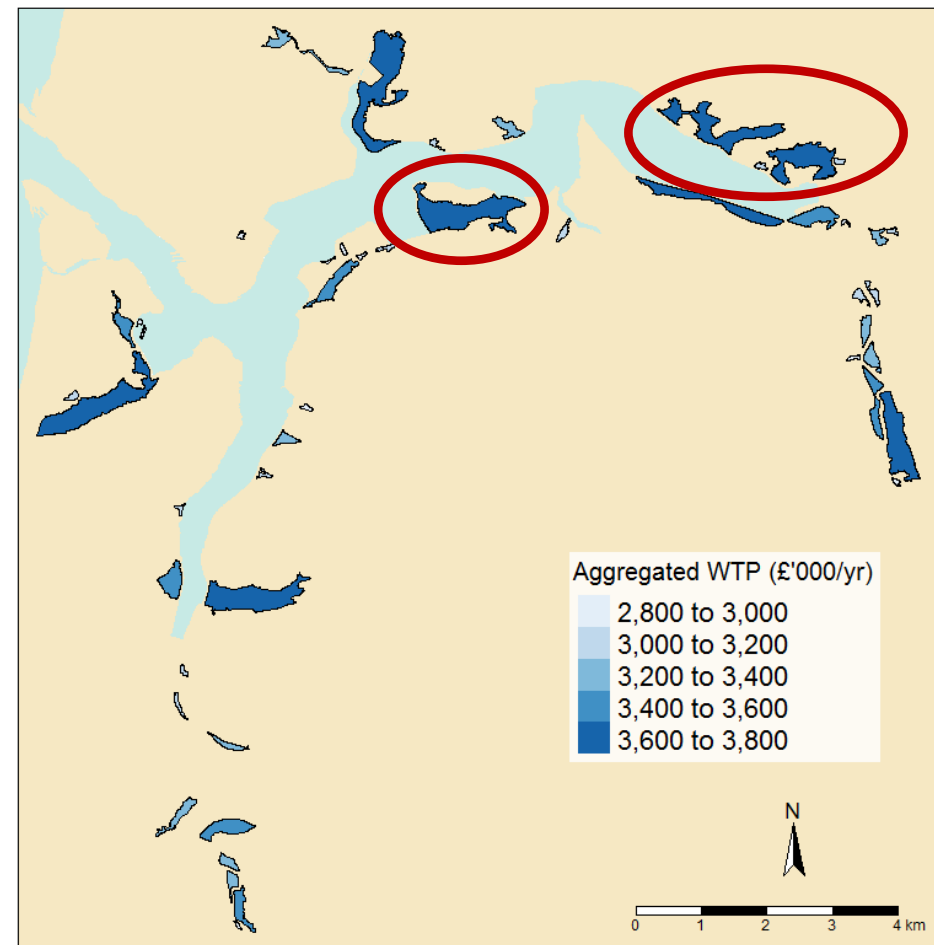
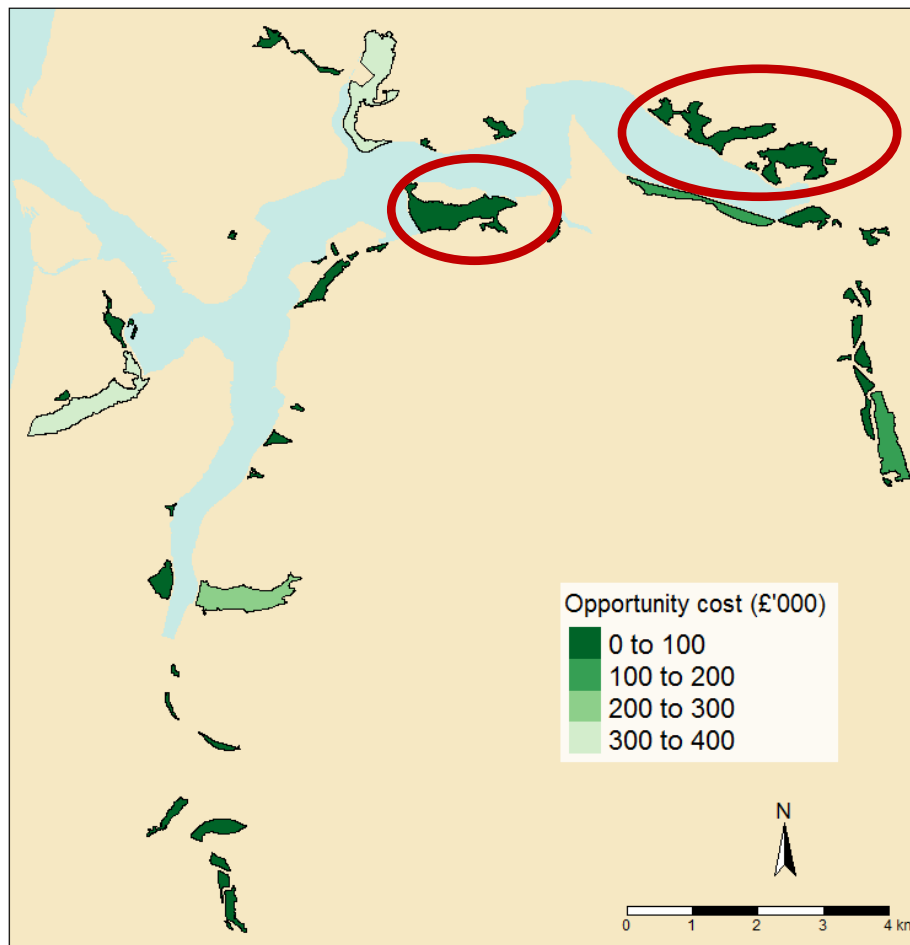
Aggregated willingness to pay for managed realignment sites

Use & non-use values

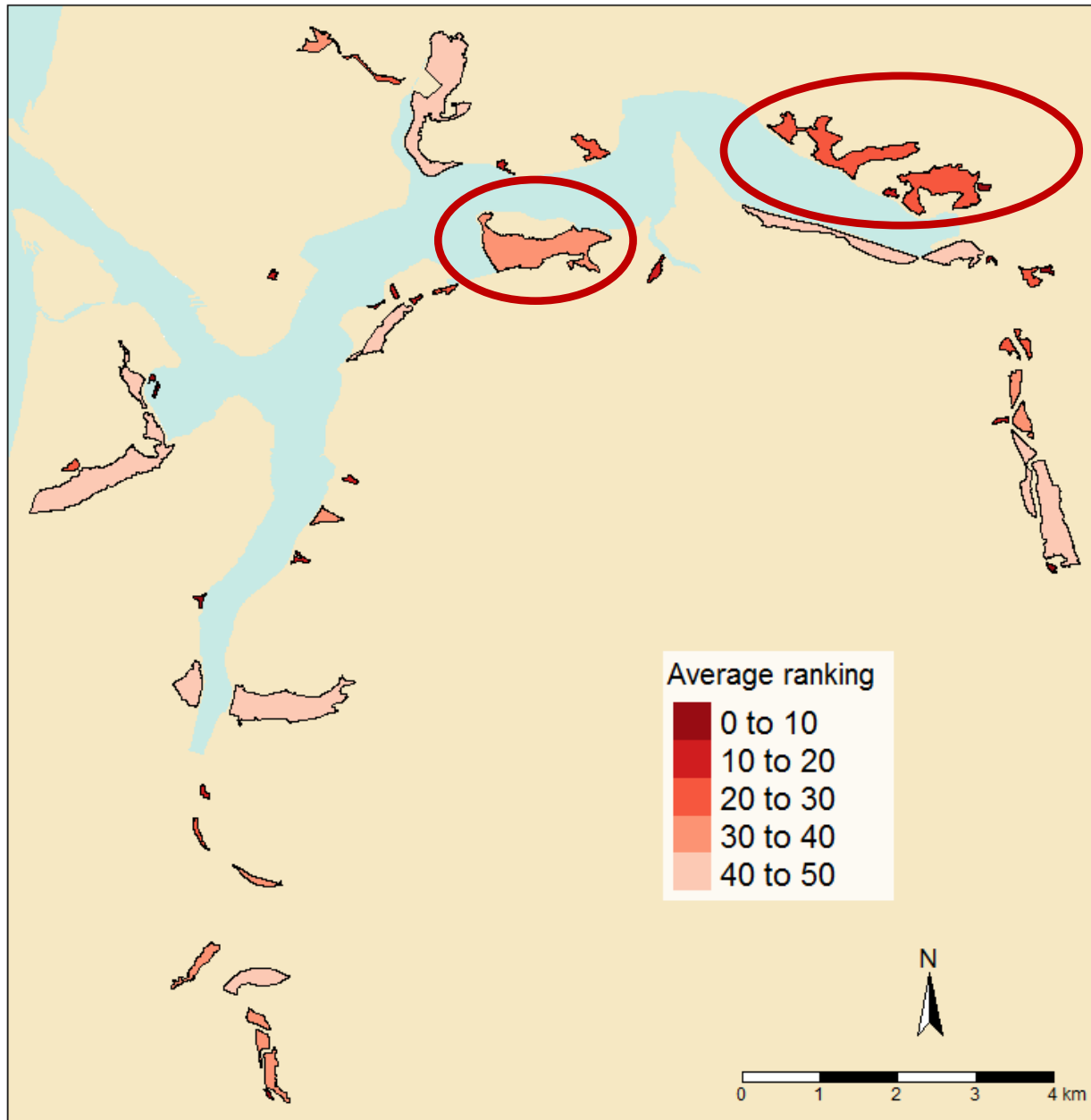
- $\log(\text{Area})$
- Distance
- Environmental quality
- Access
- Cost



Comparing opportunity cost and environmental benefits



Priorities for realignment



Findings

- Spatially heterogeneous benefits & costs
- Non-linear dynamics
- Future: regime model
- Insurance against a changing future

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Thank you

