



ASSET DETERIORATION – ASSESSMENT AND MEASUREMENT

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ASSESSMENT OF AN ASSET



Ability for an asset to fulfil its **function**

- Protection against flood and coastal erosion
- But also access, health and safety, and environmental functions



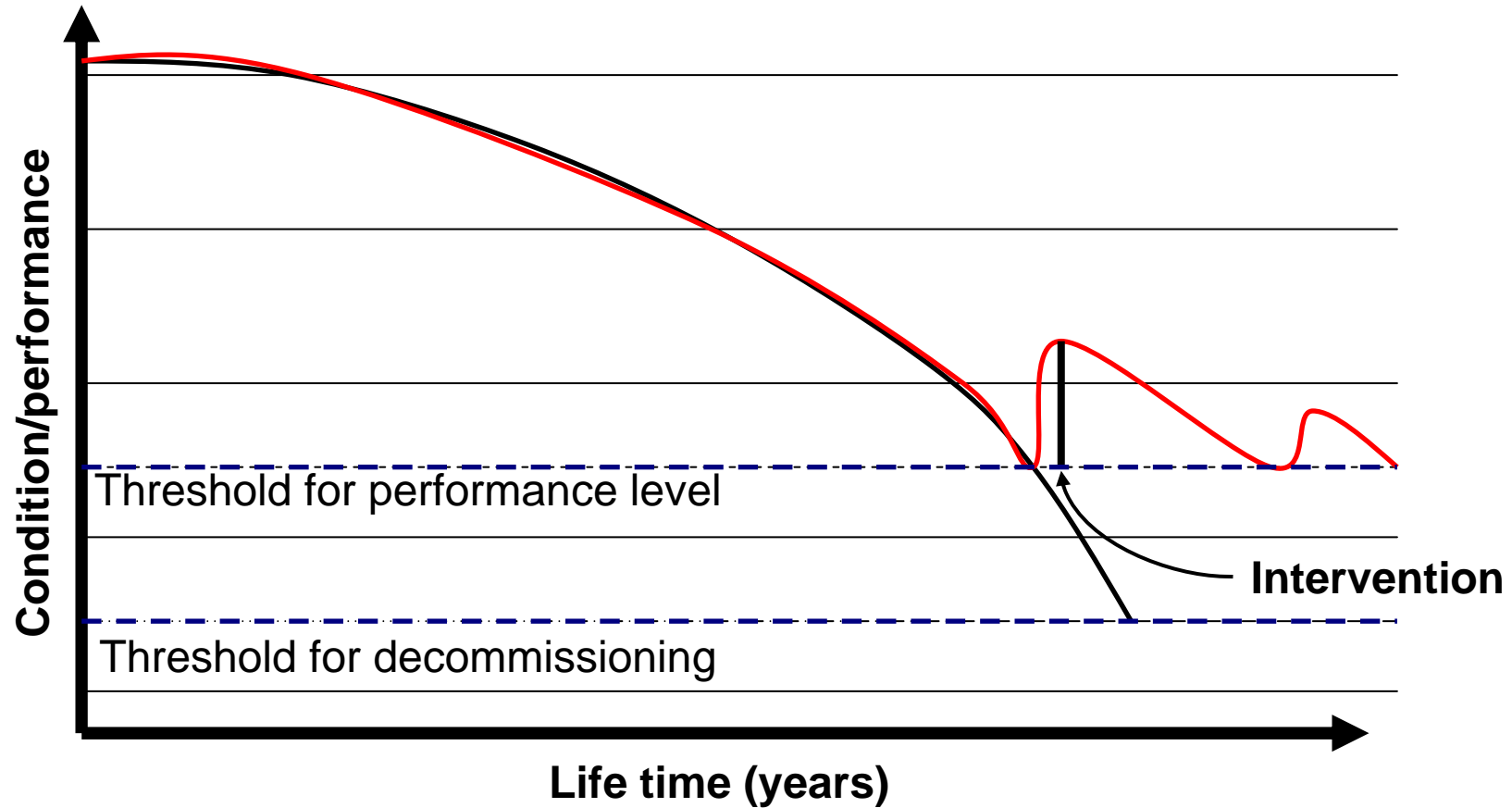
ASSESSMENT OF AN ASSET



Deterioration:

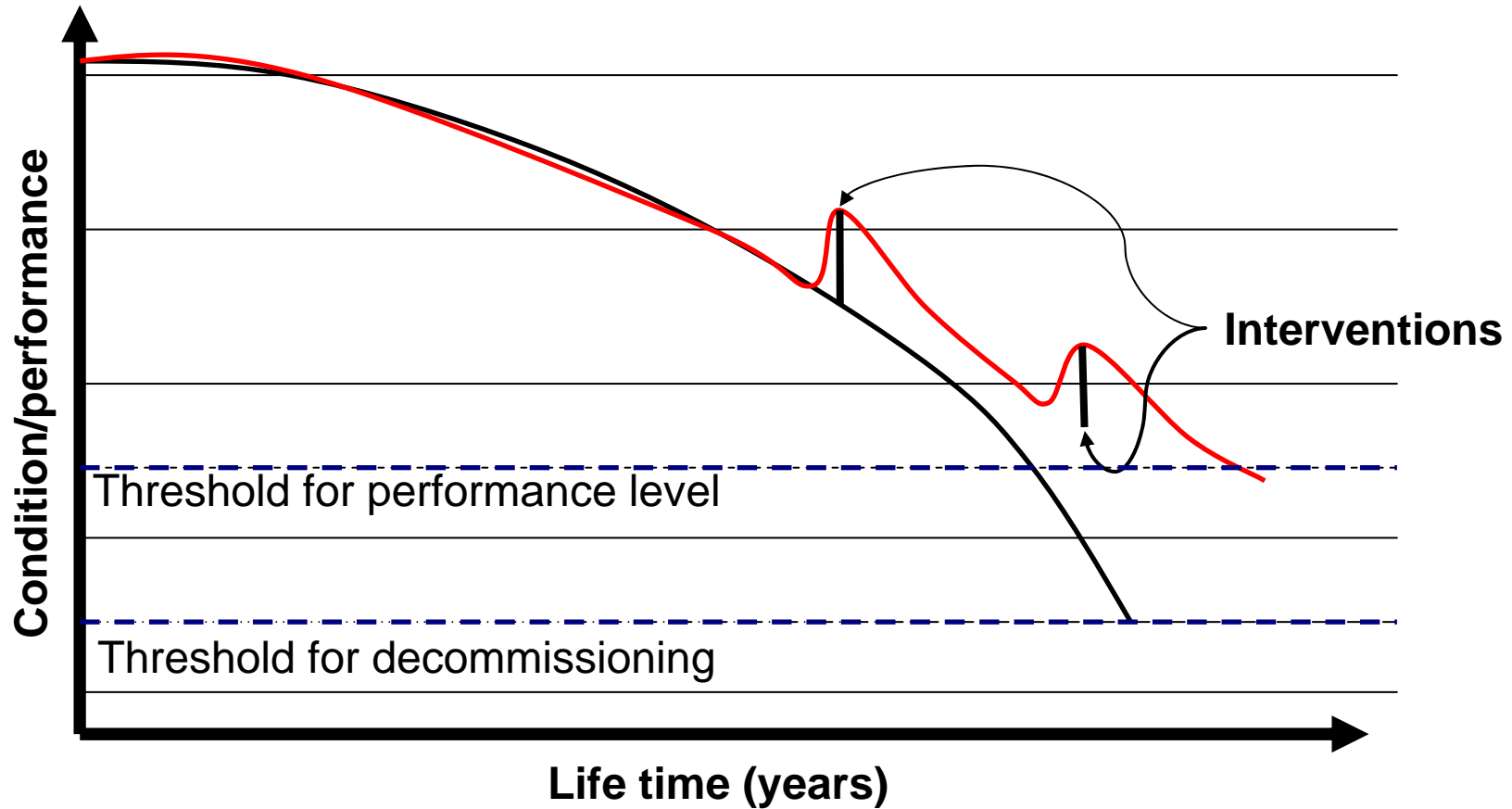
- has a negative effect on the overall performance of the structure
- is a time dependent process

Assessing performance



DETERIORATION CURVE

Assessing performance



DETERIORATION CURVE

ASSESSMENT AND MEASUREMENT OF ASSET DETERIORATION INCLUDING WHOLE LIFE COSTING

- **Phase 1 (2007-2009)**
 - Building on past experience, initial user guidance
- **Phase 2 (2009 – 2012)**
 - Detailed monitoring of **actual** deterioration under different maintenance regimes
 - Developing and testing **practical methods/tools** for predicting **future** deterioration and WLC
 - **Improved practical guidance** for different maintenance regimes

Project Governance

- EA Project Executive: Lindsay Hensman
- EA Project Manager: Stefan Laeger
- R&D Theme Manager: Dr Geoff Baxter
- Contractor:
 - Phase 1: HR Wallingford, Royal Haskoning, Peter Lawton
 - Phase 2: Halcrow

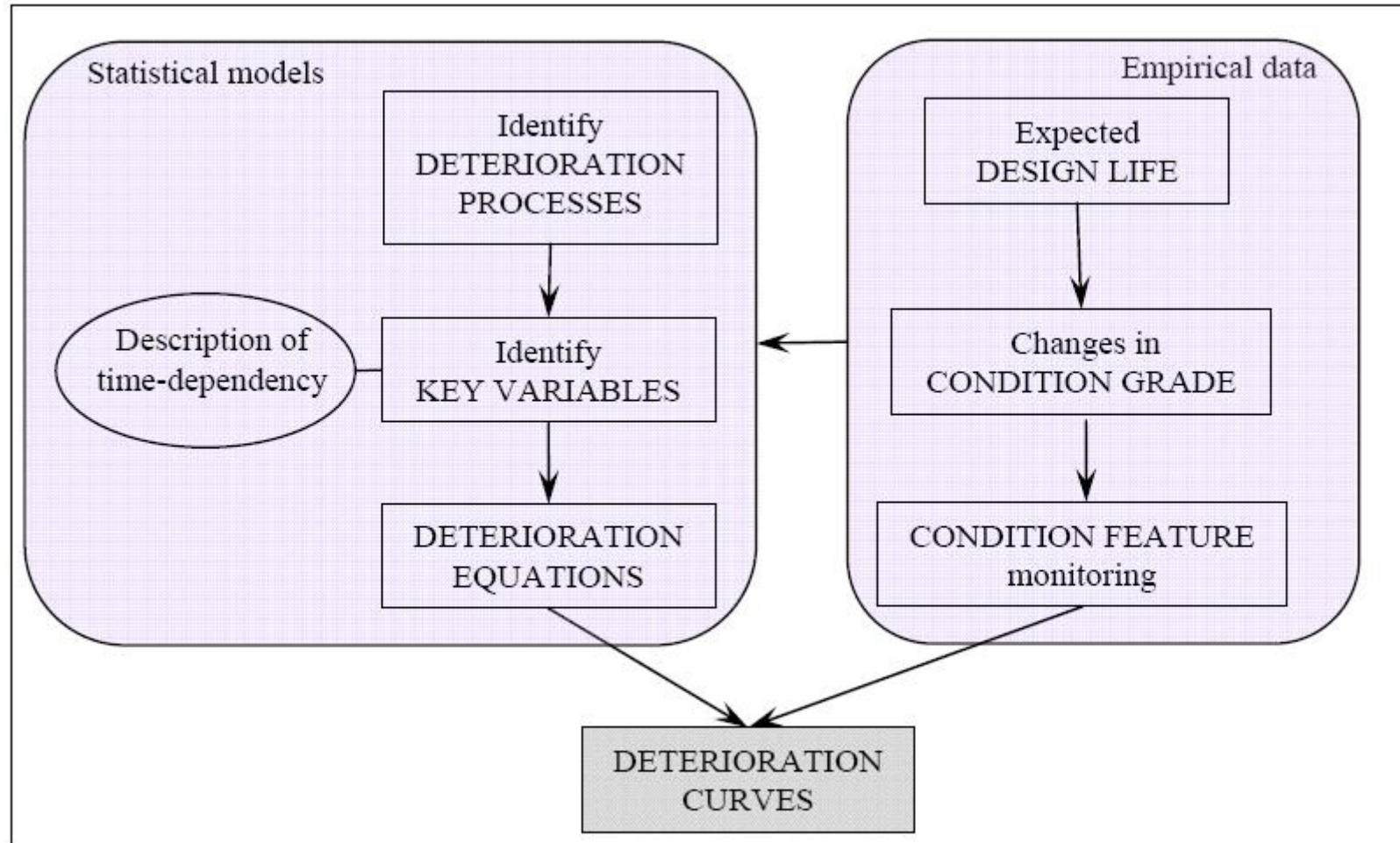
Outcomes and benefits

- **Improved understanding** of asset deterioration and how it links to performance
- Improving **the way we manage** our flood defence assets
- Intervening at the **best time** within an asset's life cycle
- **Optimising whole life costs**

Phase 1: final outputs

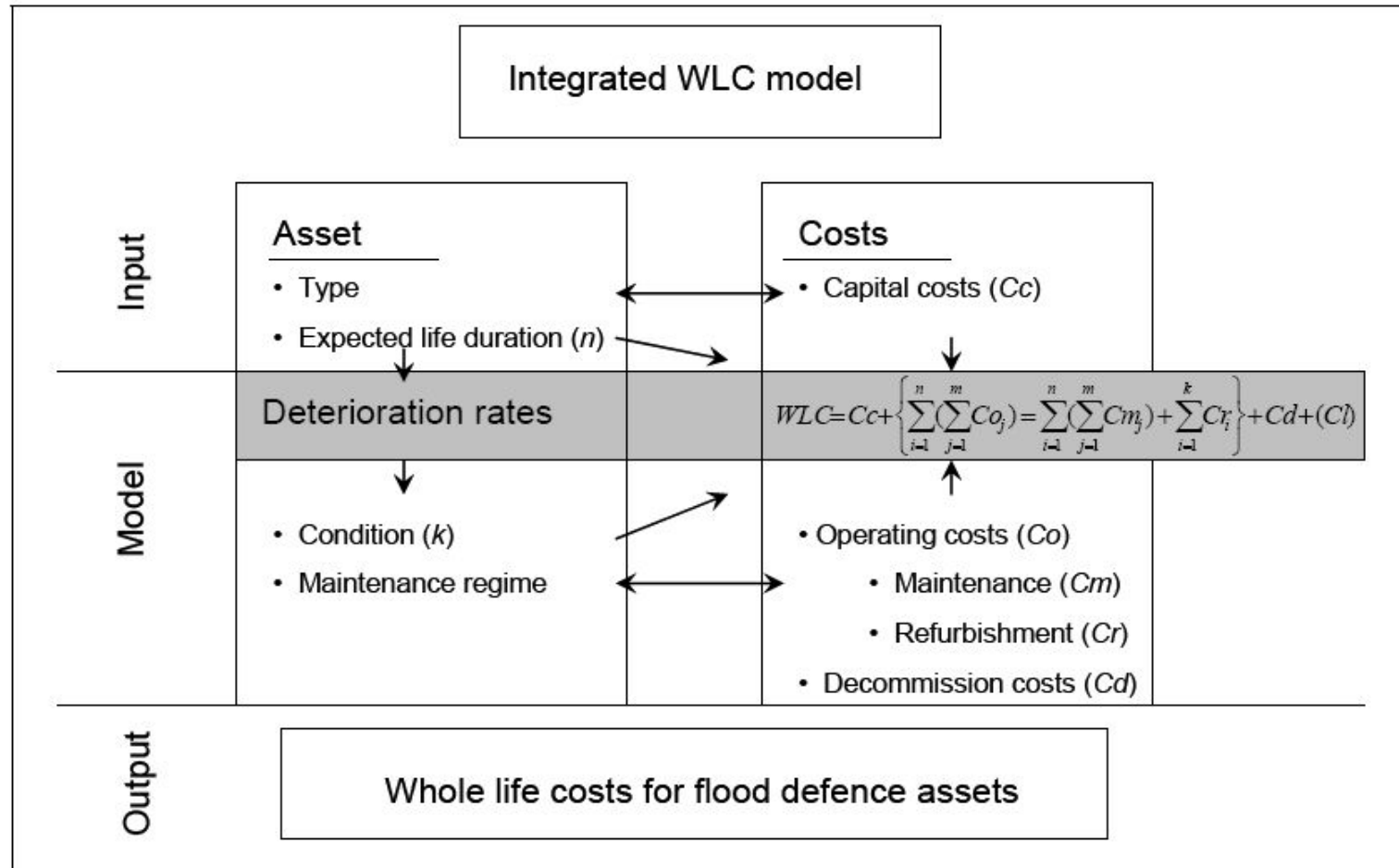
1. Background information
2. Conceptual framework
3. Collation of available knowledge
4. Practical guidance on deterioration curves
5. Approach to Phase 2

Conceptual framework



Conceptual framework for deterioration curves

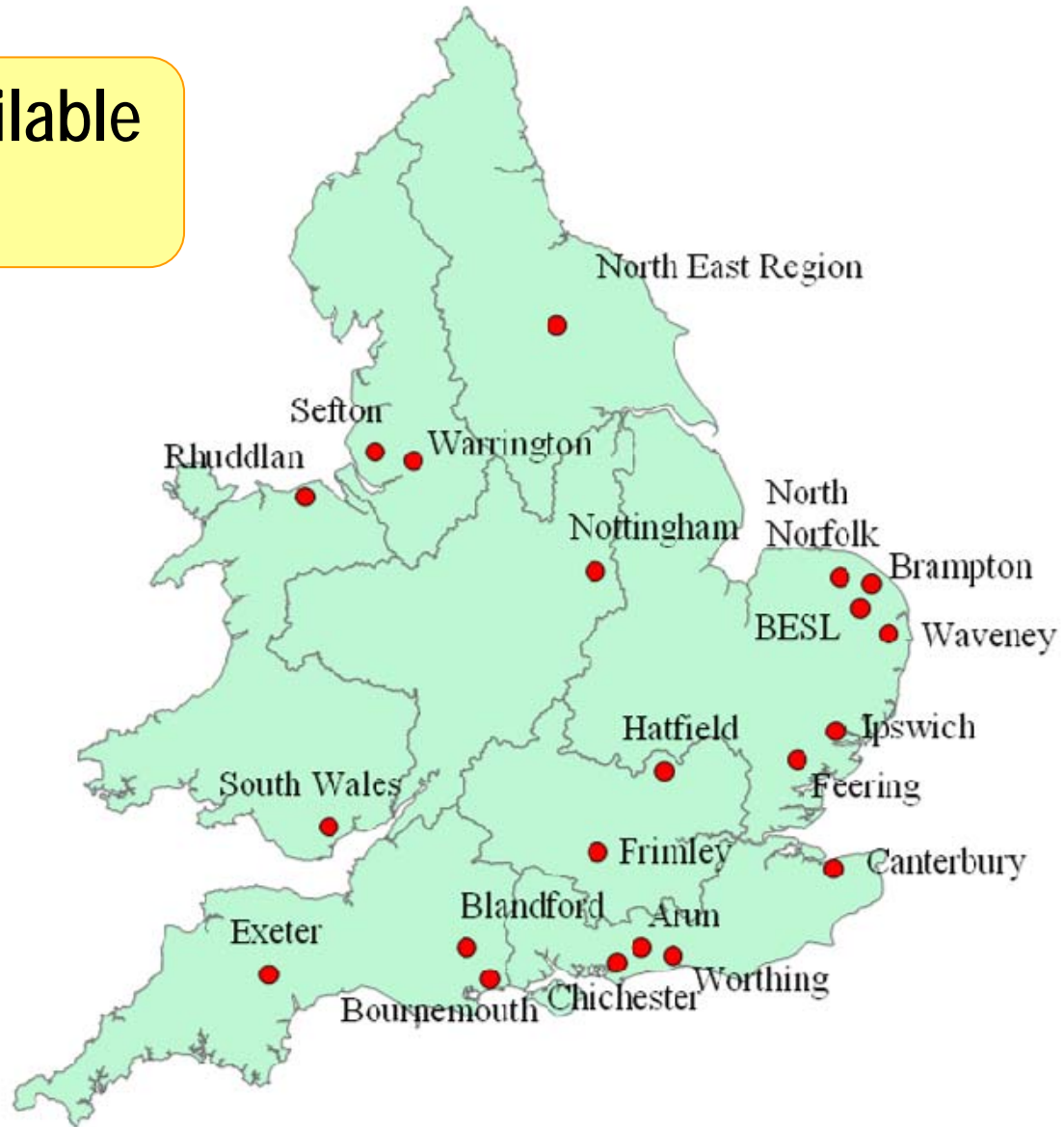
Conceptual framework



Relation between deterioration rates and whole life costing

Collation of available knowledge

Asset managers from EA and maritime Local Authorities



CONSULTATION FINDINGS

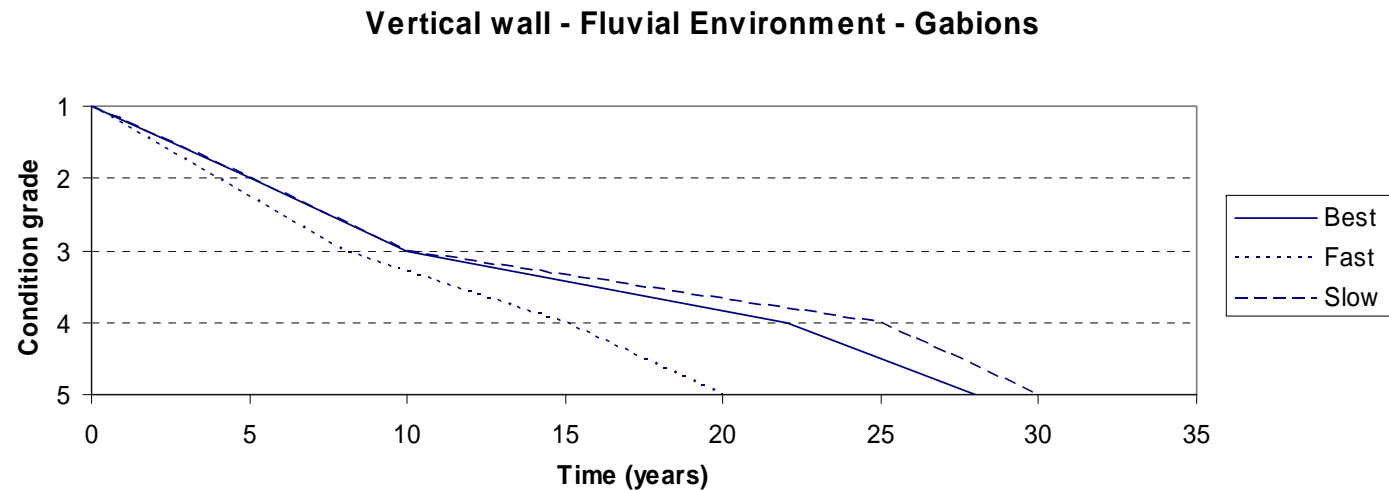
1. Significant **variations in the life of assets** around the country (initial quality, aggressiveness of loadings, degree and quality of maintenance)
2. Three main factors:
 - deterioration of material,
 - instabilities of asset foundations,
 - loadings
3. Deterioration and maintenance of **culverts and channels** is as important as defences.

CONSULTATION FINDINGS

4. Hard defence maintenance is restricted to minor repairs (e.g. repointing of brickwork, resealing of joints)
5. Significant expenditure on assets for **non flood risk management** requirements, such as health and safety (e.g. maintaining handrailing)
6. Importance to carry out the characterization of asset performance at a **system** level

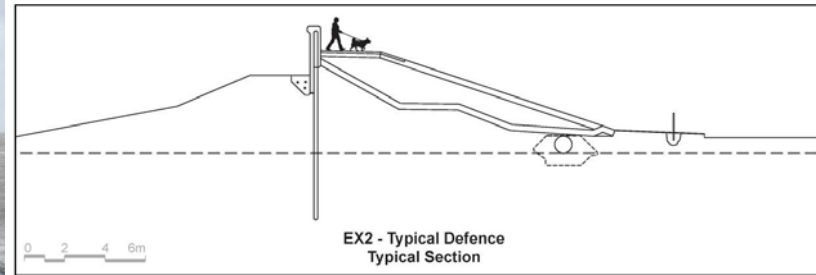
Practical Guidance

Deterioration curves and guidance on how to use them



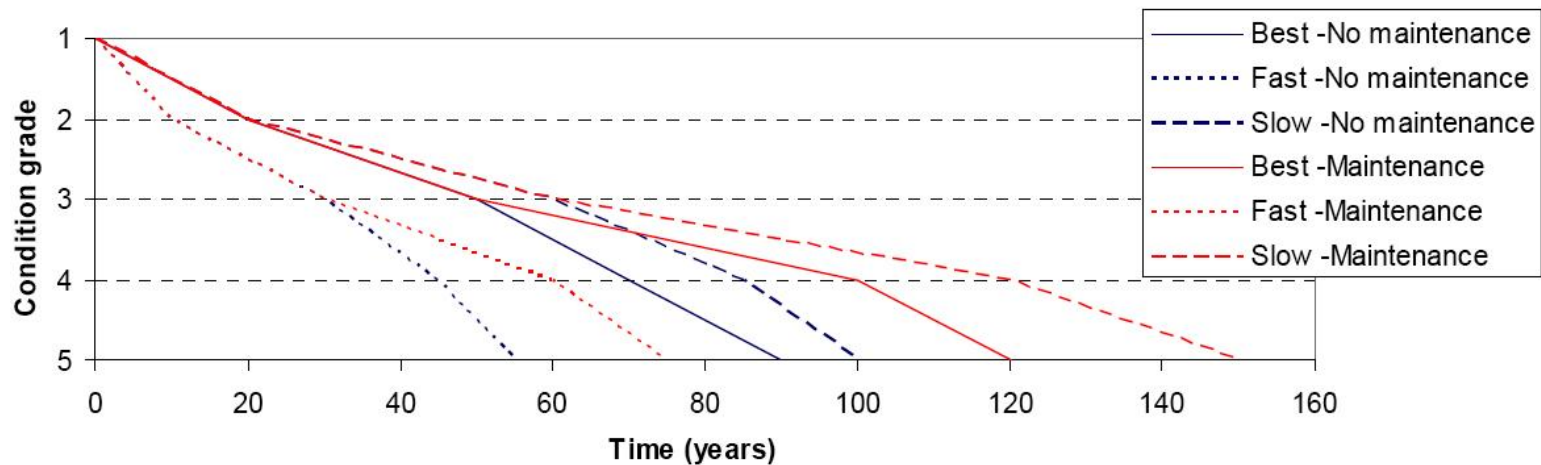
- Covers vertical walls, embankments, culverts, dunes, shingle beaches
- Allows to quantify **residual life** of different types of assets

- Allows for assessment of composite assets



- Maintenance or no maintenance
- Best, fastest and slowest estimate

Vertical wall - Fluvial Environment - Brick&Masonry/Concrete



- Includes step by step guide and worked examples

Type	Environment	Material	Narrow / Wide	Maintenance	Rear protection	<i>Best estimate (m)</i>				
						1	2	3	4	5
Vertical wall	Fluvial	Gabion	Both	No differences		0	5	10	22	28
		Brick&Masonry / Concrete	Both	No		0	20	50	70	90
				Yes		0	20	50	100	120
	Sheet Piles	Both	No differences		0	20	80	120	140	
	Coastal	Brick&Masonry	Both	No differences		0	15	45	75	90
				No		0	10	30	60	75
		Concrete	Both	Yes		0	10	30	65	80
				No		0	8	30	43	50
		Sheet Piles	Both	Yes		0	8	30	53	60

But beware

- Values are for guidance **only**
- Essential to use **engineering judgement** and practical experience

Operational use

- **Additional resource** for local asset managers
- Supports the preparation of **SAMPs**
- Can also support **national and regional assessments** of investment needs
- Does not make decisions but provide asset managers with the **ability to assess different options**
- Available from **EA publications catalogue** (search for ‘asset deterioration’)

Phase 2

3 years research project to be completed by summer 2012

- Series of pilot studies being **monitored** for deterioration and maintenance as well as **historic back analysis** of other sites
- **New deterioration curves** being developed for 3 levels of maintenance and 3 levels of exposure
- **Whole life cost model** being developed based on costs of maintenance, refurbishment and renewal



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THANKS!