Getting plant health management wrong: what does it mean?

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What is success in plant health?
When something bad does not happen or …….

when something worse could have happened

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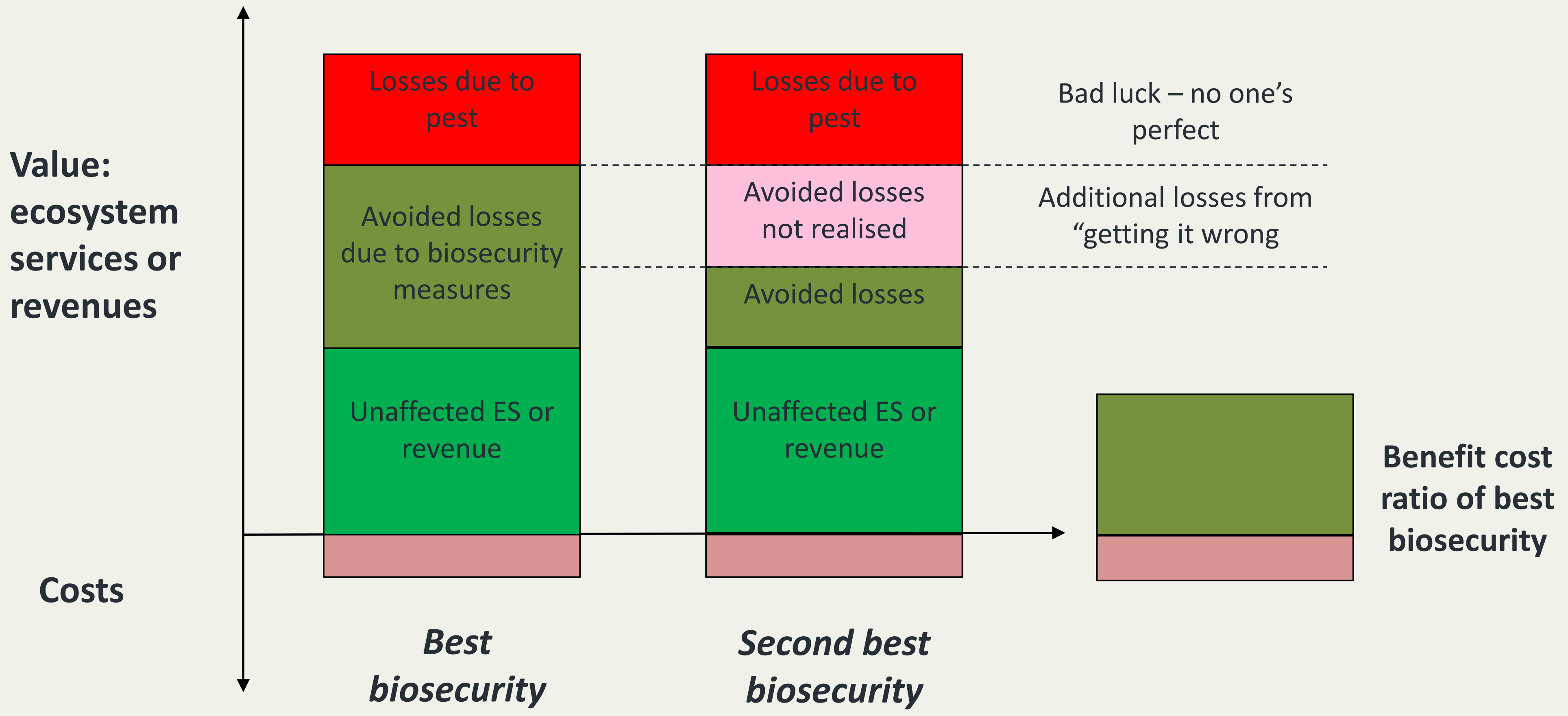
An economist eye view

- Trees produce a flow of services to society not priced in markets
- These services are public goods that have two characteristics
  - My consumption does not reduce your consumption
  - I cannot prevent your consumption
- Plant health/biosecurity is a weakest link public good
- Private decisions will ignore the shared benefits of biosecurity

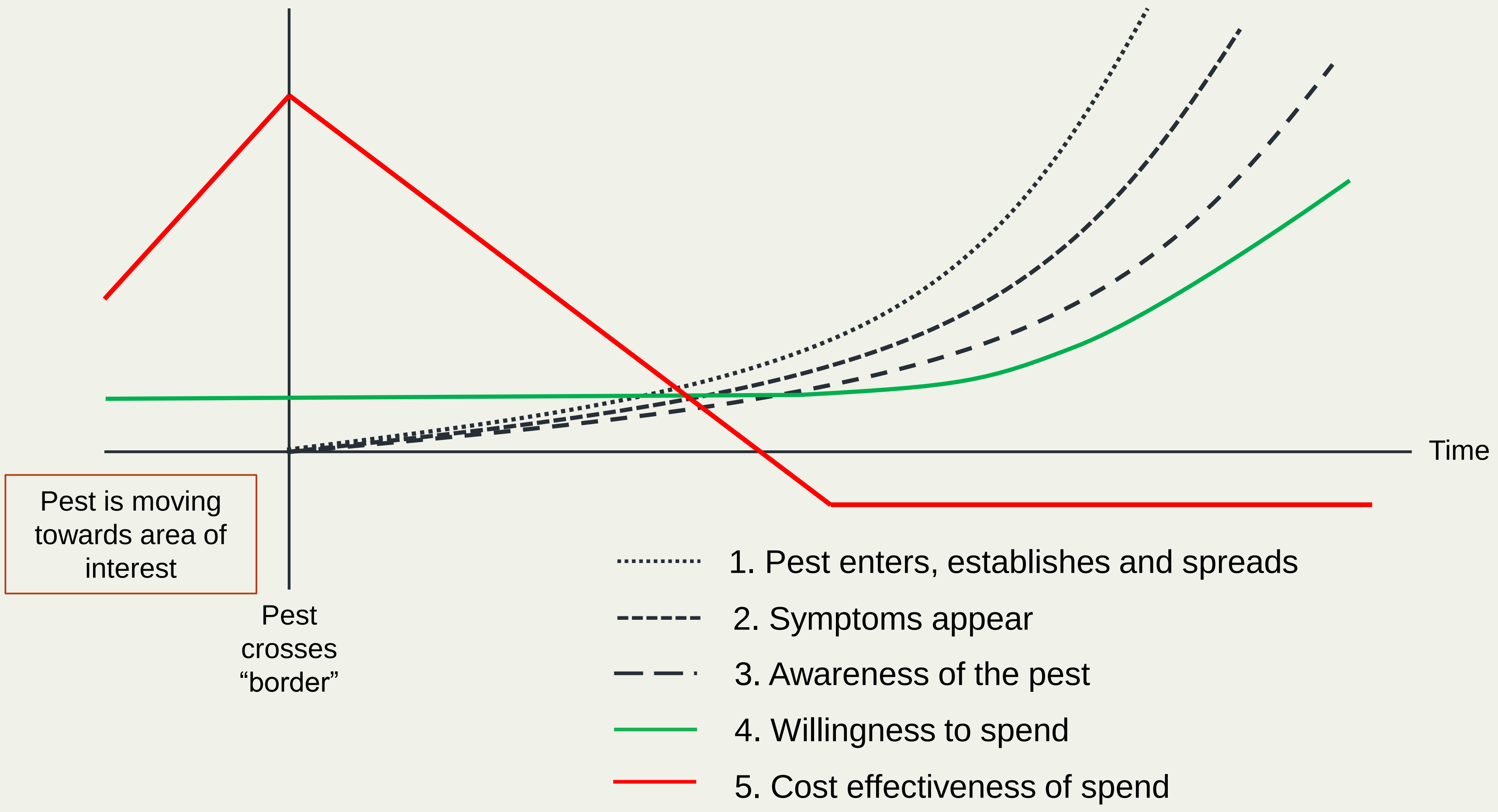
Market failure: biosecurity will be undersupplied by the market - requires public intervention

Conceptualisation of biosecurity and “getting it wrong”



What does “going wrong” mean?

Practitioners view: getting it wrong by default?



Source: Ward, M (2016). Action against pest spread—the case for retrospective analysis with a focus on timing. Food Security 8, pp77–81

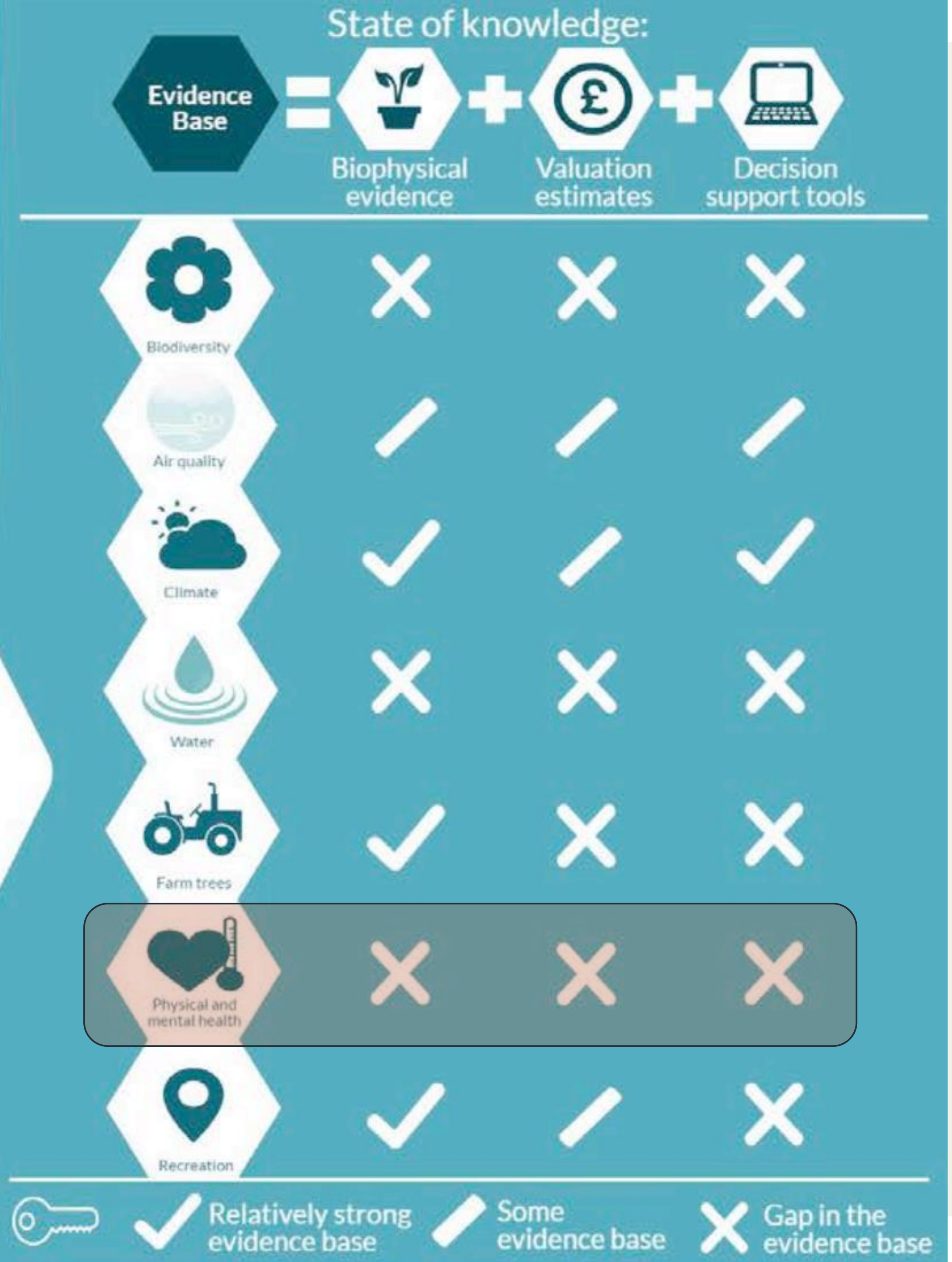
What goes "wrong"?

1. Allocate too little resource to plant health
2. Allocate poorly within plant health budgets (what and when)
3. Impossible (inefficient?) to be 100% secure

Who: National and local politicians, scientists ….economists ….. businesses, public (?)

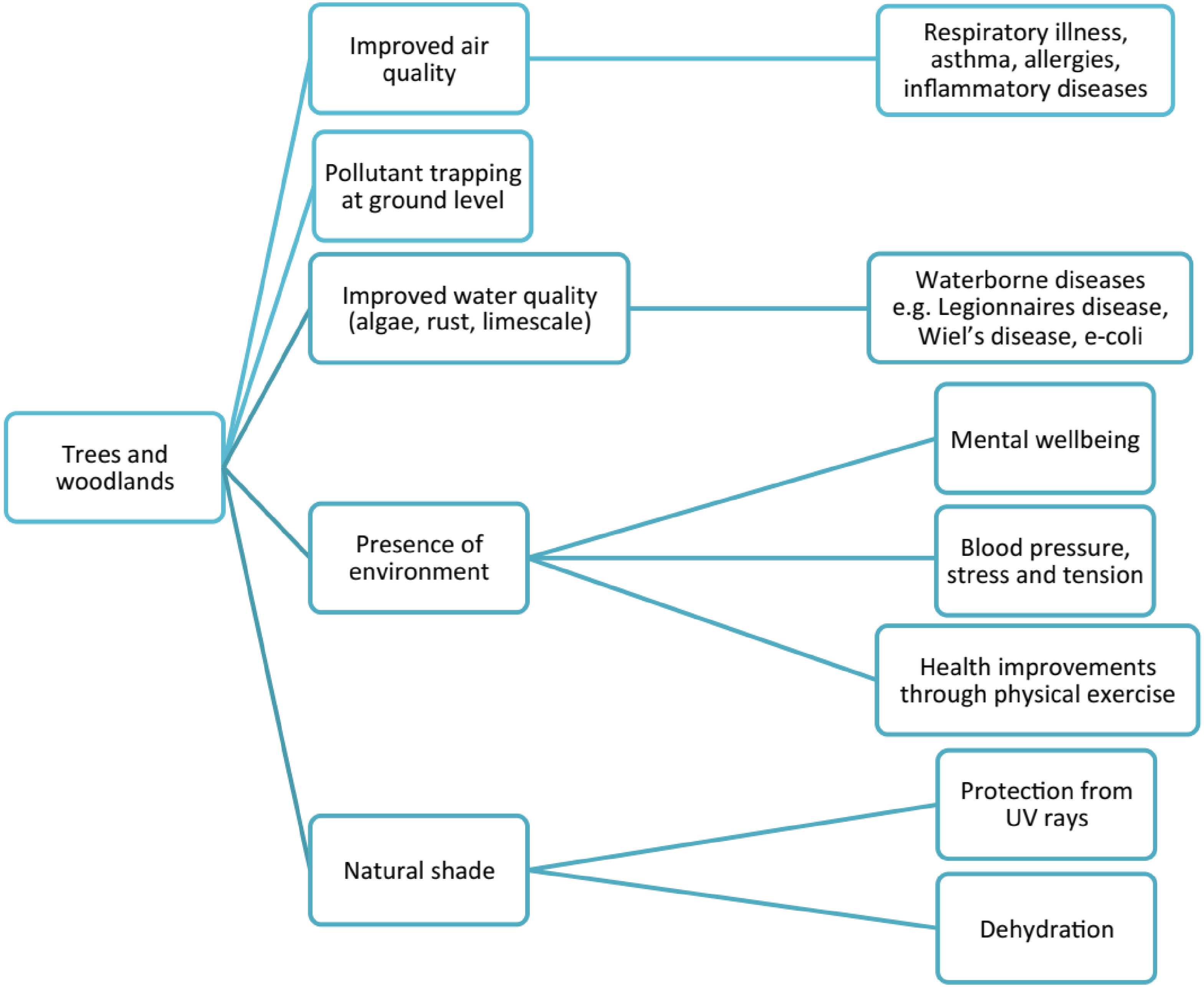
Why does it go wrong?

- Gaps in knowledge
- Slow and less tangible impact
- Low priority - public and private



The state of knowledge – trees to values to decisions …… significant gaps

Source: Binner, A., Smith, G., Bateman, I., Day, B., Agarwala, M. and Harwood, A. (2017). Valuing the social and environmental contribution of woodlands and trees in England, Scotland and Wales. Forestry Commission Research Report



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Health and well-being

Impacts private & public health budgets, quality of life, house values etc

But not included directly in decision making

Values in UK decision making

25 Year Environment Plan (2018) states that:

"the value from healthy trees and plants contribute to the UK economy, society and environment, is estimated at ***£8 billion per year****"*

- £3 billion crop and horticulture,
- **£1 billion forestry and logging**,
- **£4 billion of social/environmental value**

Excludes many elements that cannot easily be monetised - water quality/availability, noise, flood and heat reduction, physical and mental wellbeing, and cultural, symbolic education benefits.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673492/25-year-environment-plan-annex1.pdf

Is £8bn a big number?

- Tends to be big enough to justify a response to most pests …
  - BCR of typical tree health response around 2 or 3:1
  - Spending for flood defence – 8:1 +
- But only 0.4% of GDP …… or 0% when rounded

Tree health as a priority

Change in UK priorities

Within 18 months:

- Plant health goes from low priority in Government, little media coverage to ….
- heightened priority to tree & plant biosecurity, expert panels, import bans, COBR and mobilisation of resources

Why?

- Not due to an increase in the probability of the occurrence of the hazard … nor a change in the consequences…
- Rather it is due to a change in social and institutional dynamics - the **social amplification of risk**

UK media headlines

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Mighty oaks will fall

Ash trees 'cannot be saved from deadly fungus'

The Government is in conflict with the natural world.

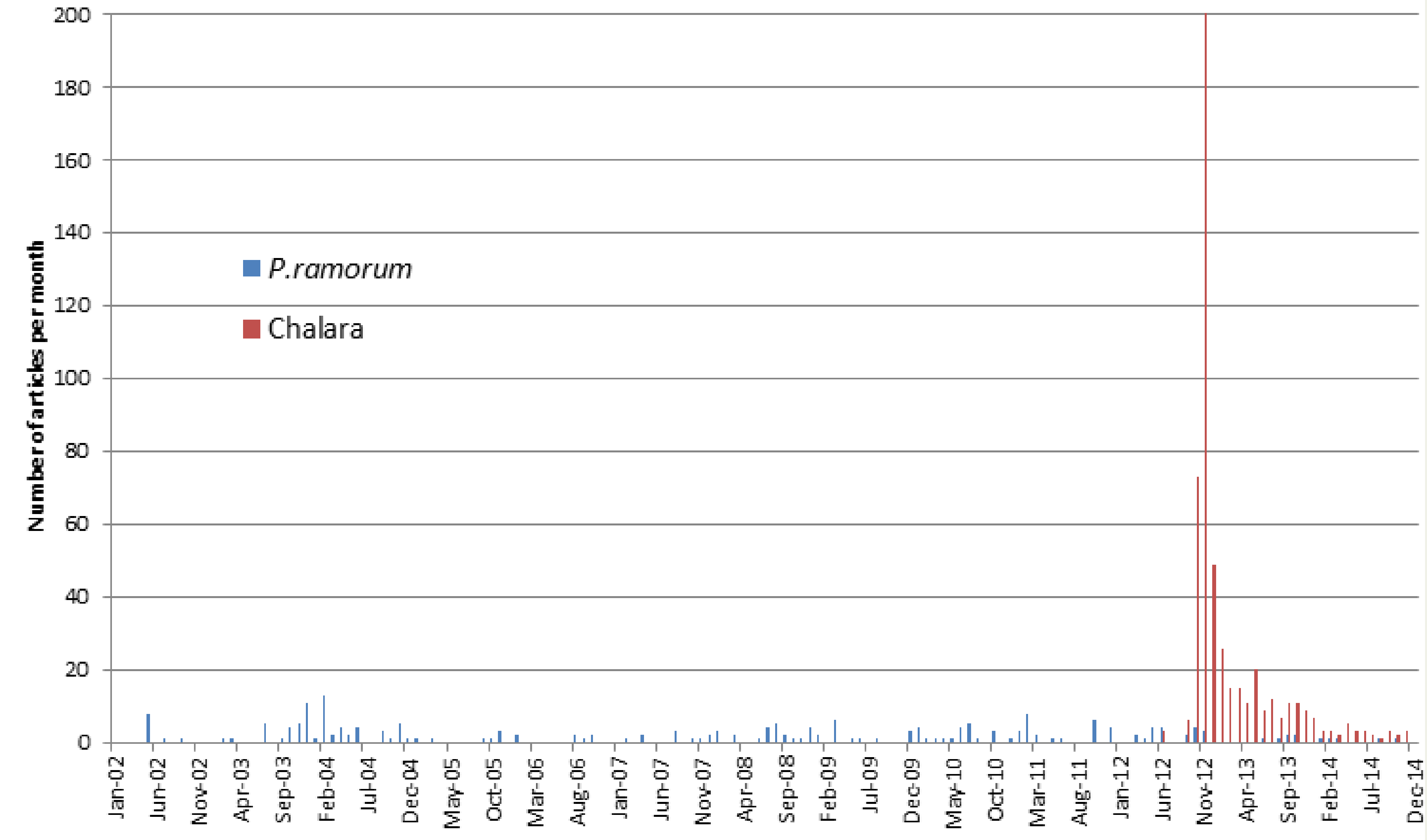
If we lose the ash tree, we'll lose culture as well as nature

Telly Al 'a muppet'

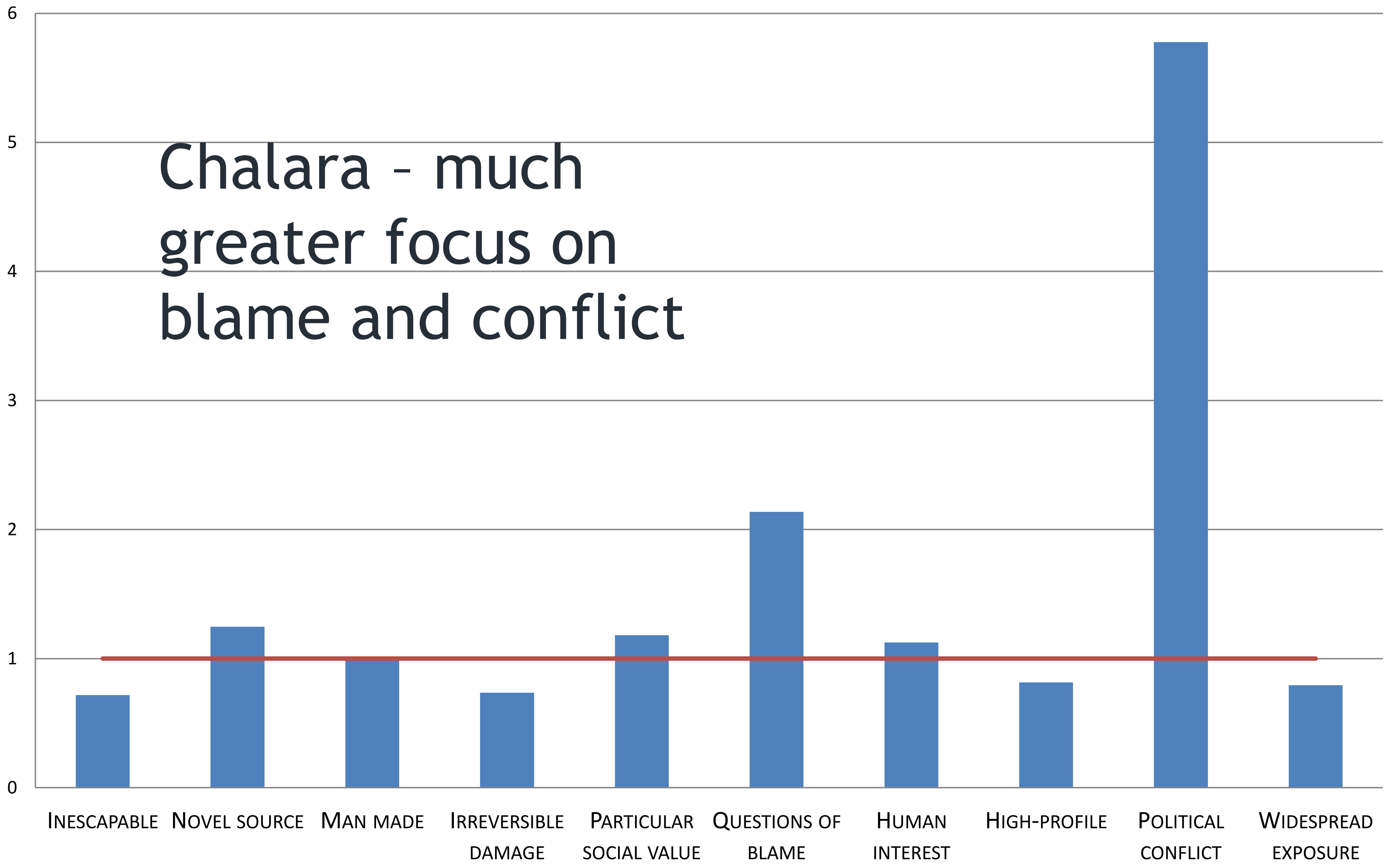
CATASHTROPHE!

ASHMAGEDDON!

Number of newspaper articles



Relative Chalara/*P.ramorum* per article intensity of **individual** Fright factors and media triggers



National priorities v local

National manager articulated risks

- Risks to tree health
- Risks to human health
- Risks to ecosystem services

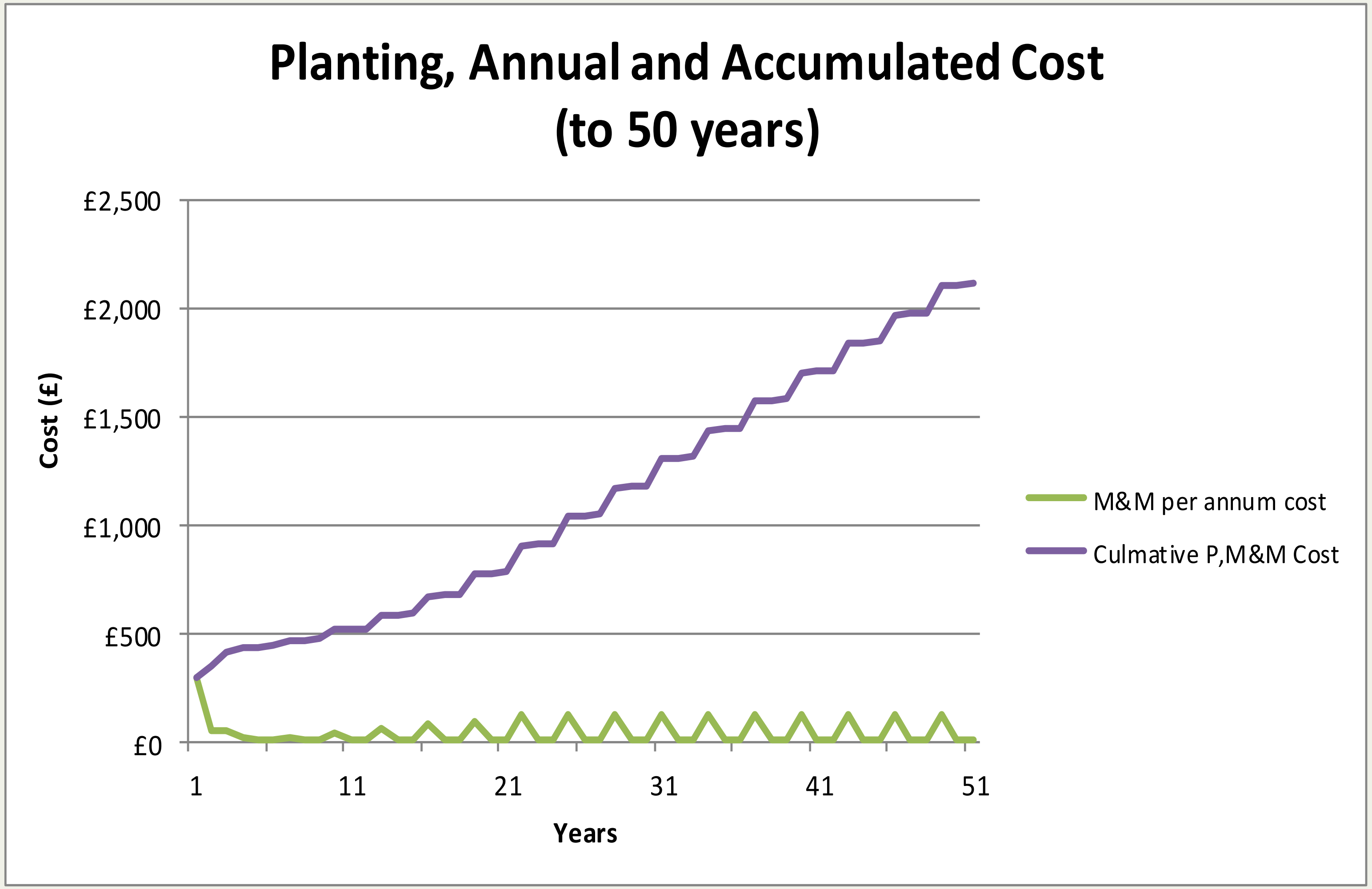
Local manager articulated risks

- Risks to finance
- Risks to reputation
- Political/Public Perception

Trees as assets or liabilities? UK managers of urban trees

	Trees as: Assets	Trees as: Liabilities
Statutory requirements	None	Have to deal with risks to health & safety
Who is responsible?	Lower level managers with very limited budgets – scavenge for small pots	Directors of service – environment, planning, transport
Risk	Not on an 'Asset' register	Chalara entering risk registers
Value from trees	Not (easily) tangible?	Tangible – Health &Safety (negative value)
Problem	Difficult to demonstrate 'asset value' and justify budget	As new trees create potential future costs - therefore 'cheaper' to ensure trees are not replaced

What a local manager sees – real money



12-14cm planted highway tree.

Assumes:

- £300 planting
- Set annual management fee
- Three-yearly maintenance

(Figures from Jake Tibbetts LB of Islington)

BC ratios get big with other values included

	Cost	NPV (Benefit)		B/C ratio
		CAVAT (**Amenity)** Value	£46,359	
Street Tree	£4,333			
Cost NPV	£2,778	CAVAT NPV	£18,235	6.56
		C-Stored and C-Seq NPV	£4,070	1.46
		Nox Rem. NPV	£131,607	47.37
		Sox Rem. NPV	£7,791	2.80
		Air pollution removal NPV	£139,398	50.18
		Rainfall interception NPV	£165	0.06

Amenity and air pollution impacts affect different budgets …
but not necessarily linked to tree management

- Rent and property values
- Quality of life – attract businesses etc

2015/16 survey: More prepared for historic disease than future pest ….

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Pests and diseases	Plan	%
Ash Dieback (Hymenoscyphus fraxineus)	36	31
Oak processionary moth (Thaumetopoea processionea)	22	19
Dutch elm disease (Ophiostoma ulmi)	21	18
Sudden oak death (Phytophthora ramorum)	16	13
Massaria/London Plane disease (Splanchnonema platani)	14	12
Acute oak decline	10	8
Oriental sweet chestnut gall wasp (Dryocosmus kuriphilus)	5	4
Asian longhorn beetle (Anoplophora glabripennis)	2	1
Emerald ash borer (Agrilus planipennis)	2	1

2/3rd no plan for chalara, half who had one hadn't considered cost

Getting local action

- Two municipalities committing long term funding for managing chalara by framing trees as liabilities …..
  - Is this a good idea?
    - If no replacement …. No
    - If replacing e.g. elm with ash …. No that clever
    - If replacing with diverse range …. Yes

Consequences

Sheffield – outsourcing street management contract

- Contains target to remove 17,500 of 36,000 street trees – no criteria for removal
- Focus new saplings as suitable replacements with key consideration to 'minimise future maintenance requirements and nuisance'
- National outcry after dozens of police officers and private security guards were sent out to support operations
- Council have spent £413,000 on legal proceedings against tree felling protesters

<u>So treating trees as a liability is ….. a liability</u>

Sheffield's tree massacre: How locals battled to protect Europe's greenest city

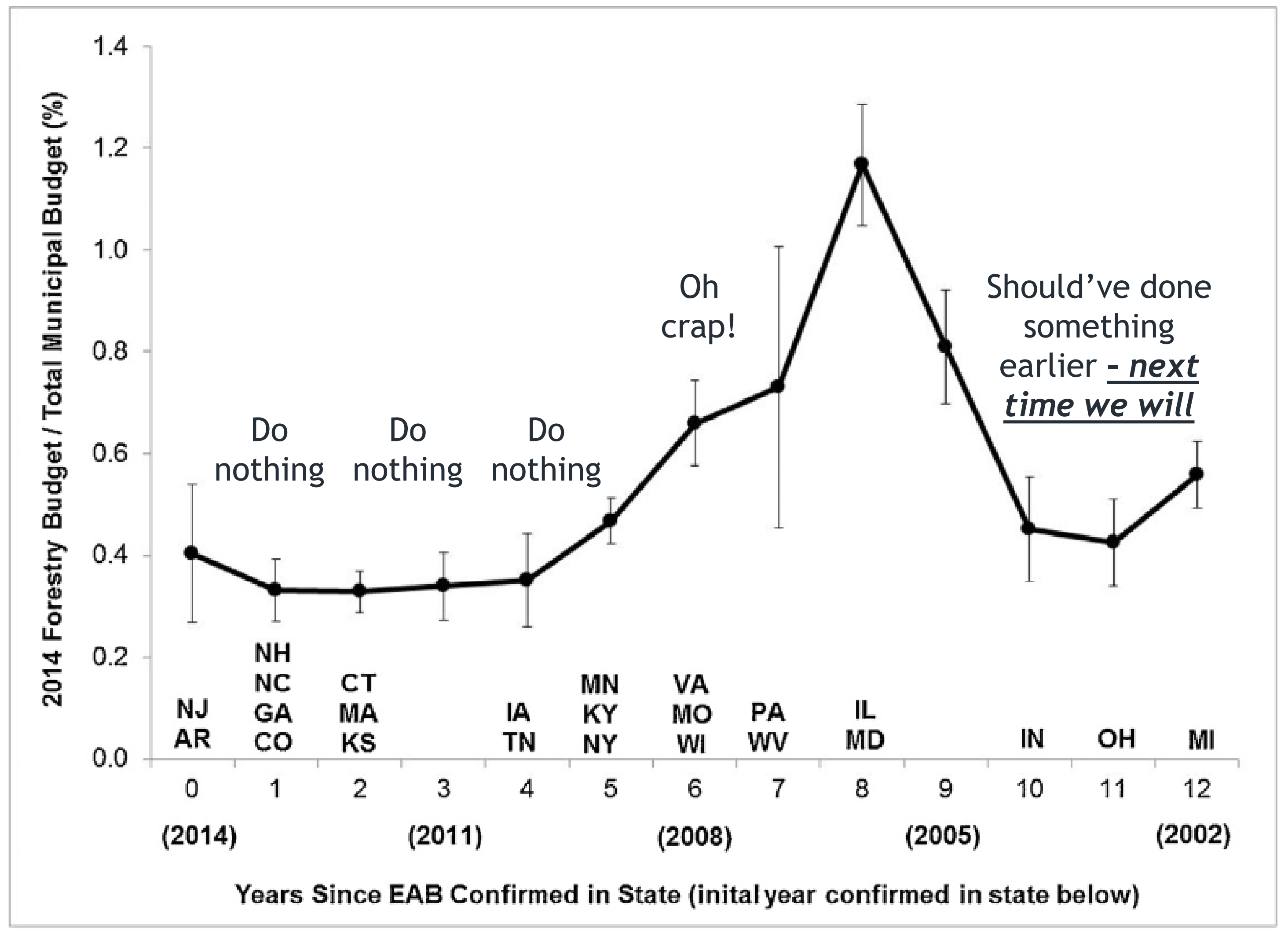
Some EAB quotes from US municipalities ….

"It has completely warped our programme"

"An interesting political experience"

"An awful opportunity"

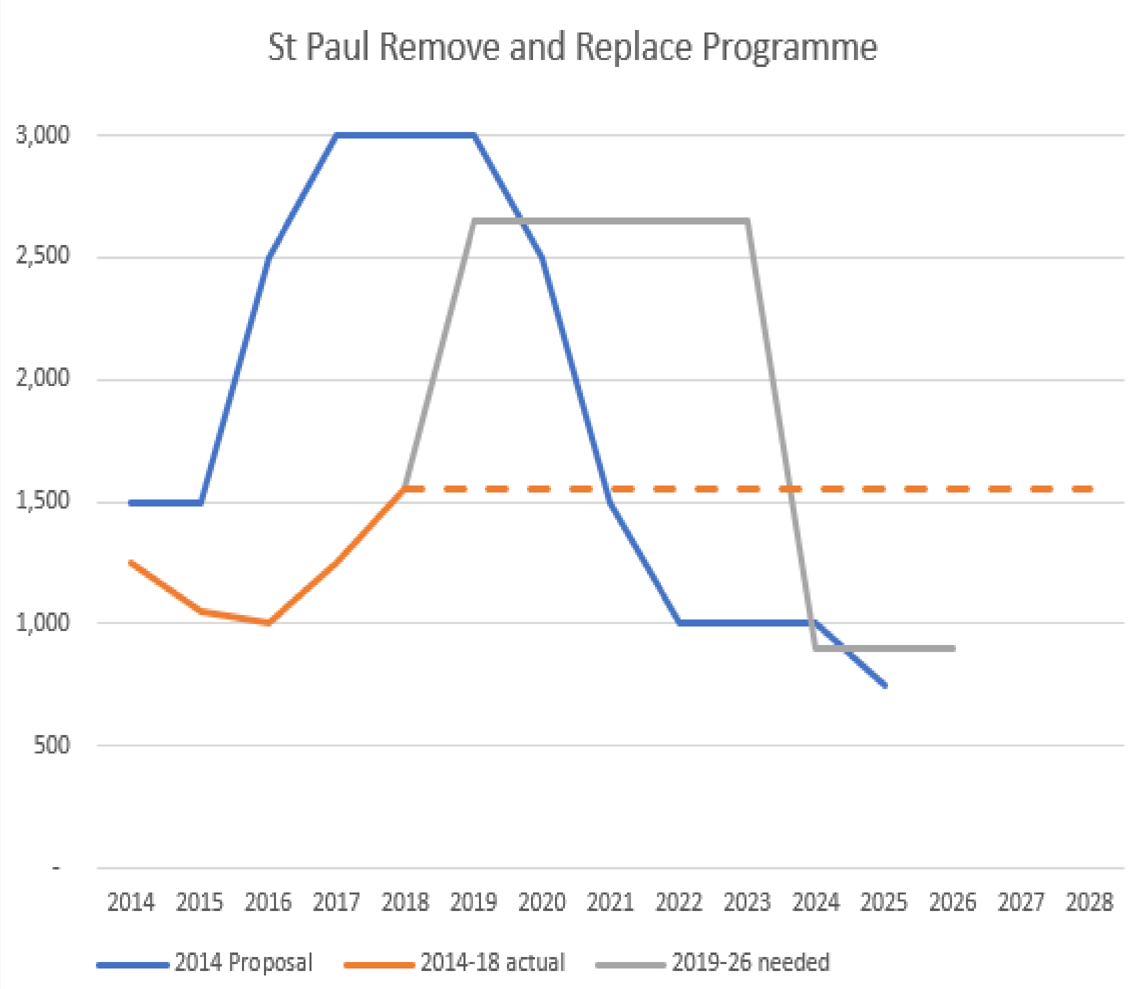
The propensity to delay spending



US states wait several years after confirmation before increasing budgets

Source: Hauer, R. & Paterson, W. (2017). Effects of emerald ash borer on municipal forestry budgets. Landscape and Urban Planning, 157, pp98-105

Consequence of delay ….



- Total cost increase
- Problem lasts for longer
- Knock-on effects

(increased rotation for managing other trees)

The cost of chalara to the UK

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Impact	
1. Safety felling (roadside, lineside, urban, RoW)	2
2. Replanting (large/small woods, hedgerows, roadside, urban, individual)	
3. Loss of profits (forestry, nurseries)	
4. Public funding (research/surveys)	
5. Lost ecosystem services (woodlands)	3
6. Lost ecosystem services (non-woodland)	1
7. Human health and well-being – no estimate provided	

- Top 3 = 95% of total
- Estimate is more than 2 times larger than the 2003 foot & mouth outbreak

Conclusions

- Very difficult to prove success
- Even more difficult to quantify success
- Plant health is undervalued – probably by a lot!
- Reactive boom and bust funding cycle – poster pests
- Can we move to a proactive system?
  - How would this change research programmes?

Questions?