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EUROPEAN UNION
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Channel Payments for Ecosystem Services

European Regional Development Fund



Case Study: Western Rother by Southern Water

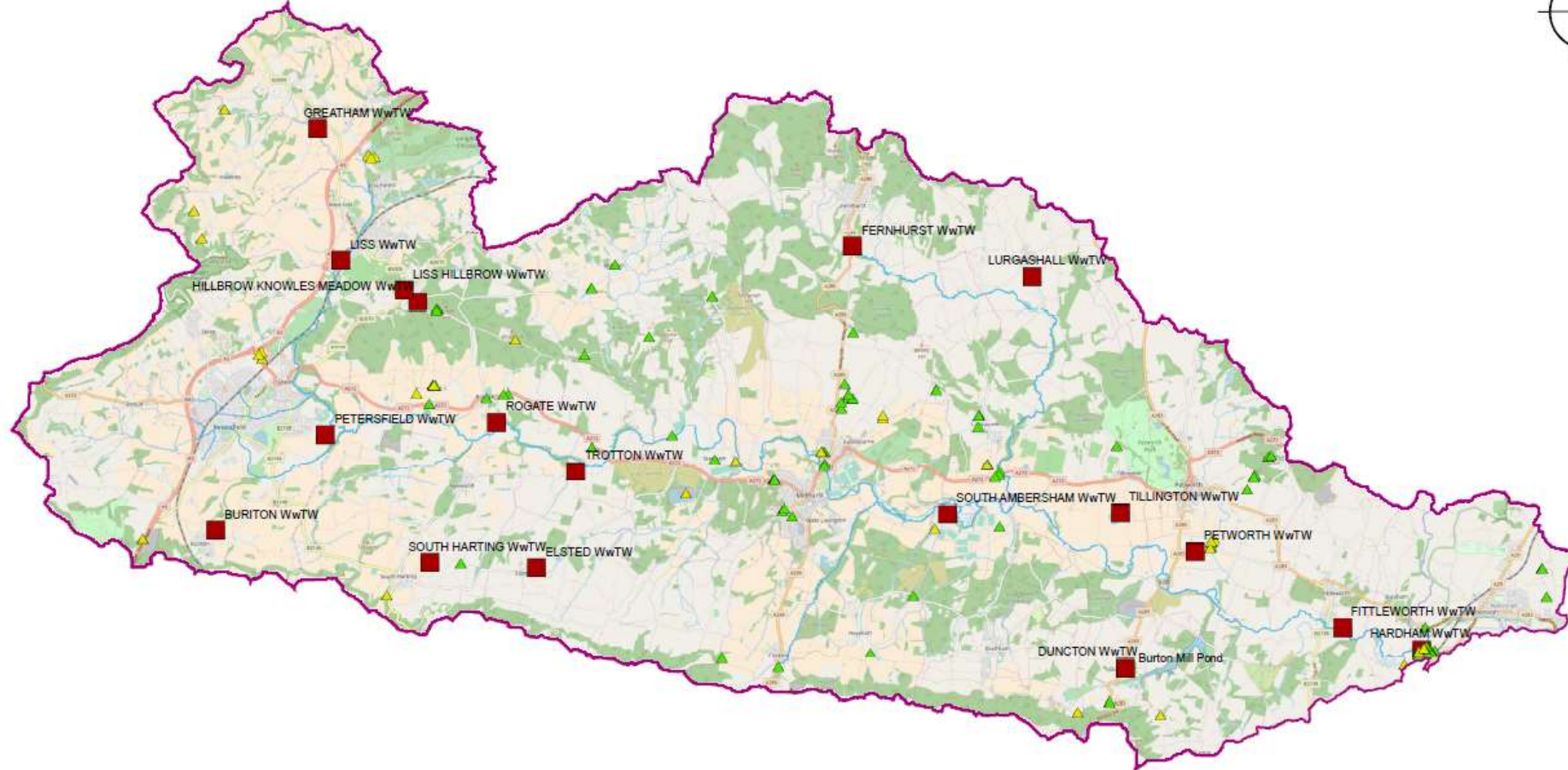




1

GEOGRAPHIC
SCOPE

Western Rother



Stakeholder Analysis

Engagement Approach	Stakeholders	Communication objectives	Communication methods	Responsibility	Timing and frequency of communications
Manage - regular contact	Agronomists	Enable them to be informed intermediaries between farmers/ SWS	Workshops, 1:1, published material, website, phone calls, emails, newsletter, farm walks/demos	SW/ SDNPA, UoC, EA	Milestones, monthly
	ARRT	Enable them to be informed intermediaries between farmers/ SWS	As above	SW – Strategic Environment Panel & Sussex stakeholder Panel comms	As needed/milestones
	Environment Agency	Ensure objectives meet expectations- share of data	As above	SW – Senior management meetings with regulators and key stakeholder meetings	
	DWI	Ensure objectives meet expectations	As above		
	Land Agents	Buy in and support	As above		
	NFU	Enable them to be informed intermediaries between farmers/ SWS	As above		
	Natural England/CSF	Ensure objectives meet expectations	As above		
	Ofwat	Ensure objectives meet expectations	As above		
	Other farmers (in SWS catchment areas)	Buy in and participation in the scheme	As above		
	Rother Valley Farmers Group	Buy in and participation in the scheme	As above		
	South Downs National Park Authority	Ensure objectives meet expectations- share of data	As above		
	Environment Agency	Ensure objectives meet expectations- share of data	As above		
	Sussex/Hants-IoW Wildlife Trusts	Ensure objectives meet expectations	As above		

Stakeholder Analysis

Engagement Approach	Stakeholders	Communication objectives	Communication methods	Responsibility	Timing and frequency of communications
Manage - when needed	CLA	Ensure objectives meet expectations	Workshops, 1:1, published material, website, newsletter		
	Defra	Ensure objectives meet expectations	As above		
	Rural Payments Agency	Enable them to be informed intermediaries between farmers/ SWS	As above		
	West Sussex co-operative	Enable them to be informed intermediaries between farmers/ SWS	As above		
	West Sussex County Council	Buy in and support	As above		
	WWF	Ensure objectives meet expectations	As above		
	General public		As above		
	Hampshire County Council		As above		
	Southern Water CCG		As above		
	RSPB		As above		
	Southern IFCA		As above		
	Sussex IFCA		As above		

Stakeholder Analysis

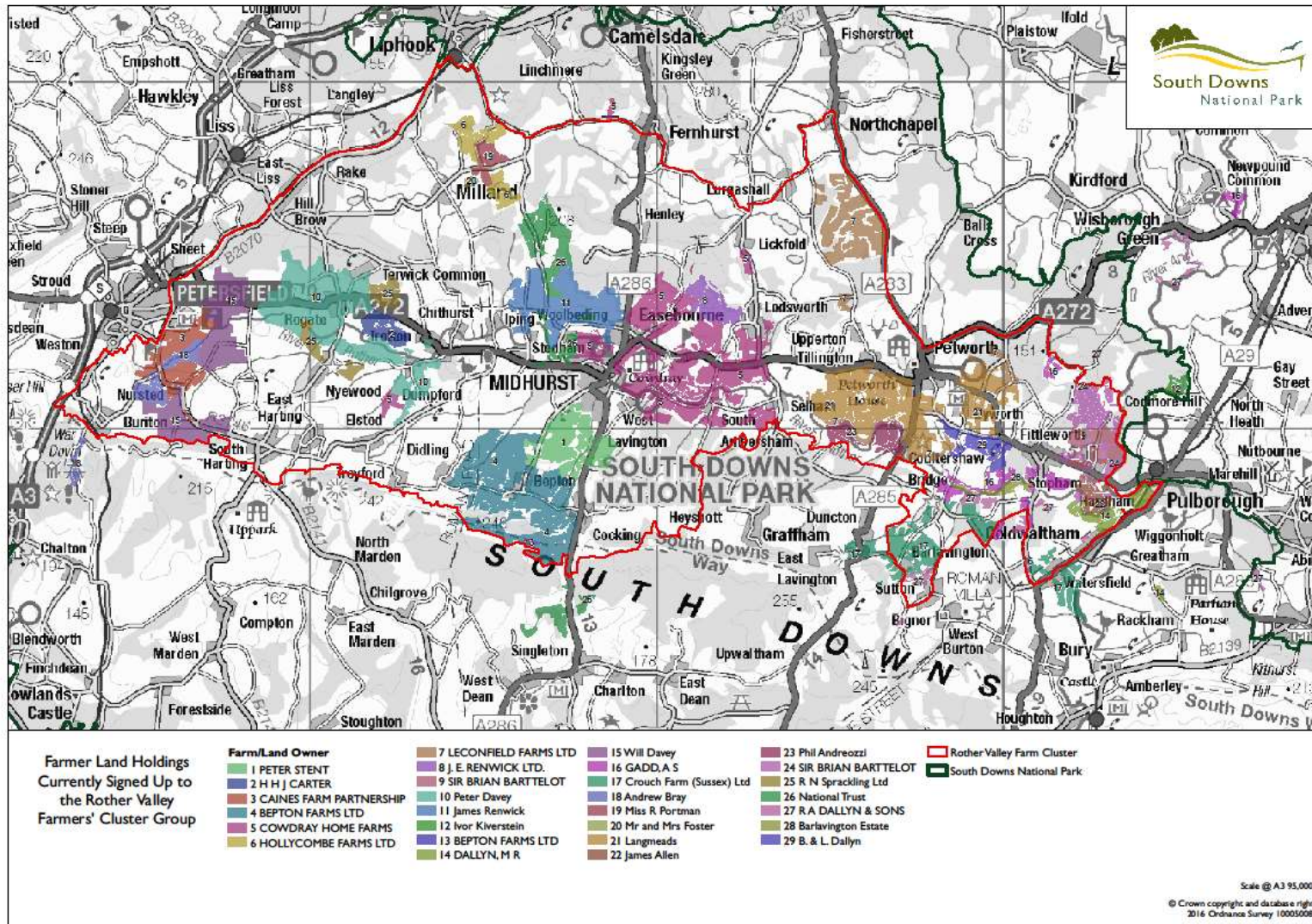
Engagement Approach	Stakeholders	Communication objectives	Communication methods	Responsibility	Timing and frequency of communications
Contact	CPRE	Inform projects aims and objectives and invitation to support/participate(?)	As above	SW/ SDNPA, UoC , EA	Start up and milestones
	Horsham District Council		As above		
	National Flood Forum		As above		
	Sussex Chamber of Commerce		As above		

Stakeholder Analysis

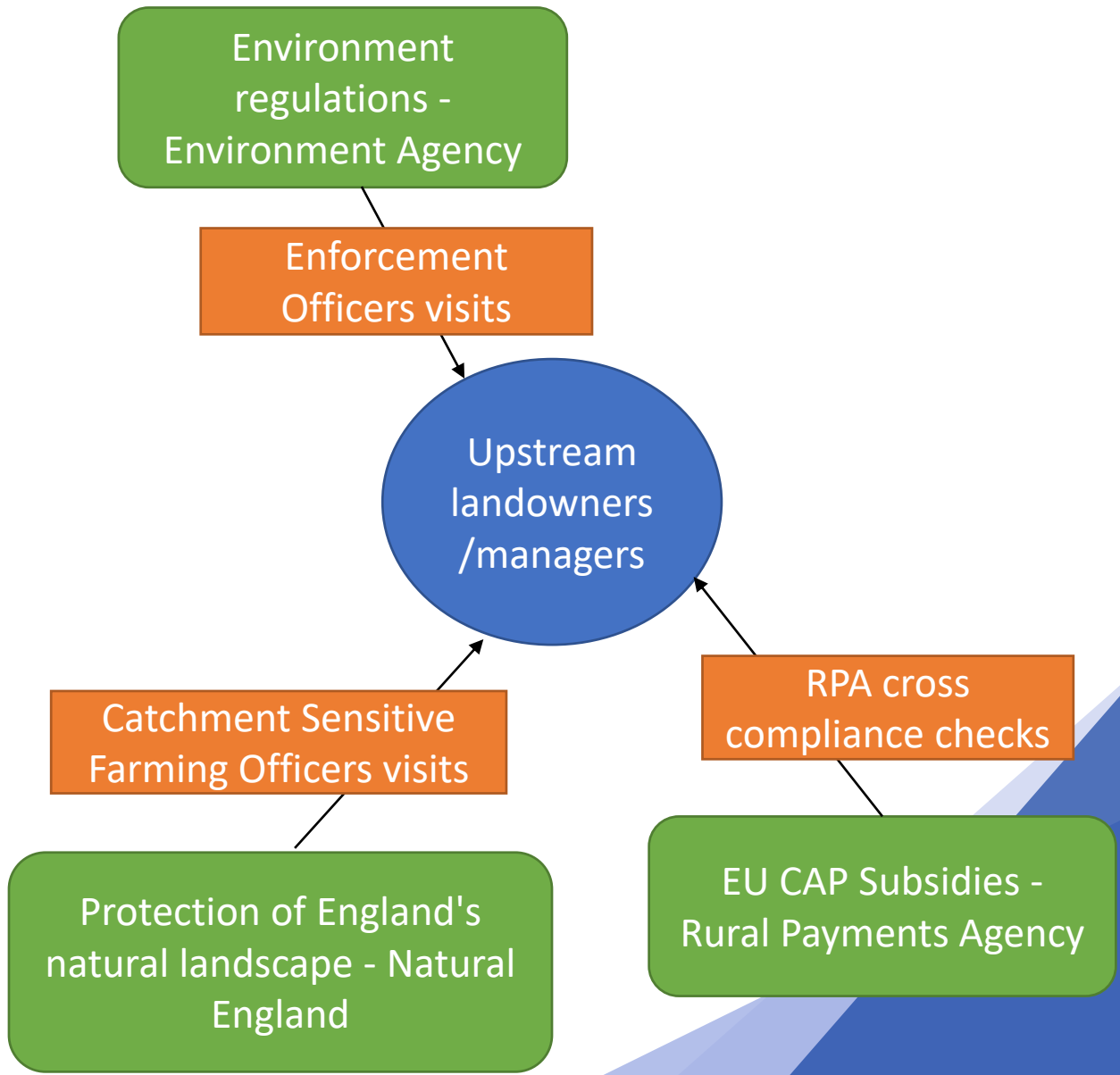
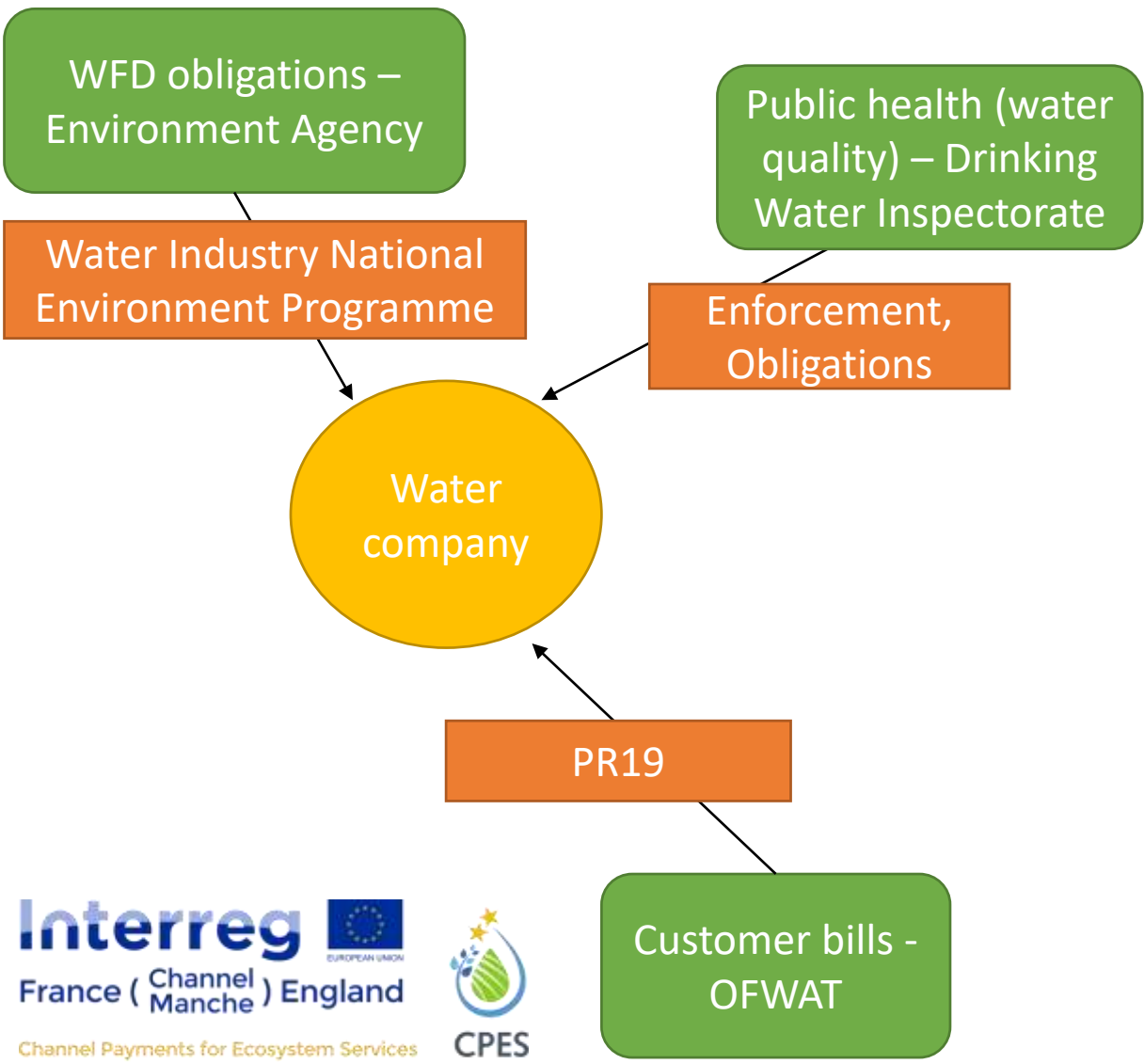
Engagement Approach	Stakeholders	Communication objectives	Communication methods	Responsibility	Timing and frequency of communications
Anticipate	Local Councillors	Inform projects aims and objectives and invitation to support/ participate(?)	Newsletter	SW/ SDNPA, UoC , EA	Start up and milestones
	Local MPs		As above		
	MEPs		As above		
	Parish Councillors		As above		
	Water UK/ other water Companies		As above		
	West Sussex Growers		As above		

Rother Valley Farmers Group

- SWS funded 1 year (March 2017 – March 2018)
- Defra funded for 3 years (Jan 2018 - March 2021)
 - Facilitation costs (independent agri-consultant + River Trust)
 - Training (e.g. soil health, biodiversity etc)
 - Events (e.g. farm walks, workshops etc)
- 32 out of 60 farmers signed up (8750ha covered)
- Objectives:
 - Soils and water quality
 - Priority habitats & species



Existing regulatory & economic framework



Cost of Inaction

Southern Water		Landowners/ managers	
On site desilting activities – energy, chemical and labour costs	£	Short term business costs such as higher fertiliser use to replace losses in run-off	£
Periodic (1 in 20 yr) dredging of river upstream from Hardham weir	£	Long term business cost –degraded soil both in volume and health	£
Drought cost- through loss of supply to customers, imposition of restrictions or cost of developing alternative supply source.	£		

Economic Impact of Intervention

Southern Water		Landowners/ managers	
Reduce need for on site desilting activities – energy, chemical and labour costs	£	Eliminate short term business costs such as increased fertiliser use to replace losses from run-off	£
Eliminate the need to dredge river upstream from Hardham weir	£	Reduce long term business costs such as degraded soil health and volume	£
Reduce drought cost - through loss of supply to customers, imposition of restrictions or cost of developing alternative supply sources	£	Direct income from PES scheme	£
Wider benefits - improved natural and social capital	£		

Ecosystem Service mapping:
 Sussex EcoServe – SDNPA model
 Natural Capital & ES investment opportunities – Sussex Local Nature Partnership

Cabinet Office 4Rs

Plans should consider:

- A full set of mitigating actions and interventions that consider all of the components of resilience;
- Explicitly consider options that involve cooperation and collaboration with other companies at a regional or even national level; and
- The best value solutions for customers in the long term, which may involve long run solutions.



Resistance

Providing the strength or protection to resist a hazard or its primary impact, e.g. the design on an asset to an appropriate standard or expected level of service



Reliability

Ensuring that assets are maintained so that they continue to operate in the range that they are designed for



Redundancy

Designing and building capacity in the network or asset system, through duplication, interconnectivity or applying ecosystem-thinking



Response & Recovery

Enabling a fast and effective response to and recovery from disruptive events, through efforts to plan, prepare and exercise contingency plans in advance of events

Totex Solution Hierarchy

	Resistance	Reliability	Redundancy	Response & Recovery
 Eliminate Remove the root-cause of the principal threat or pressure		No need to desilt as sedimentation levels reduced		
 Collaborate Partner with stakeholders to develop mutually beneficial (and funded) solutions	Improved drought resistance due to lower sediment levels			
 Operate Operate and maintain assets and systems differently	Increased resistance to rainfall events –less need to fertilise/improve soil health			
 Reinvigorate Leverage existing asset capabilities or enhance headroom	Reduced need to dredge			
 Fabricate Construct new assets, on a 'designed to operate' basis, using efficient construction approaches	Construction of sediment schemes to prevent run off			

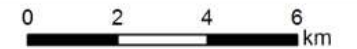
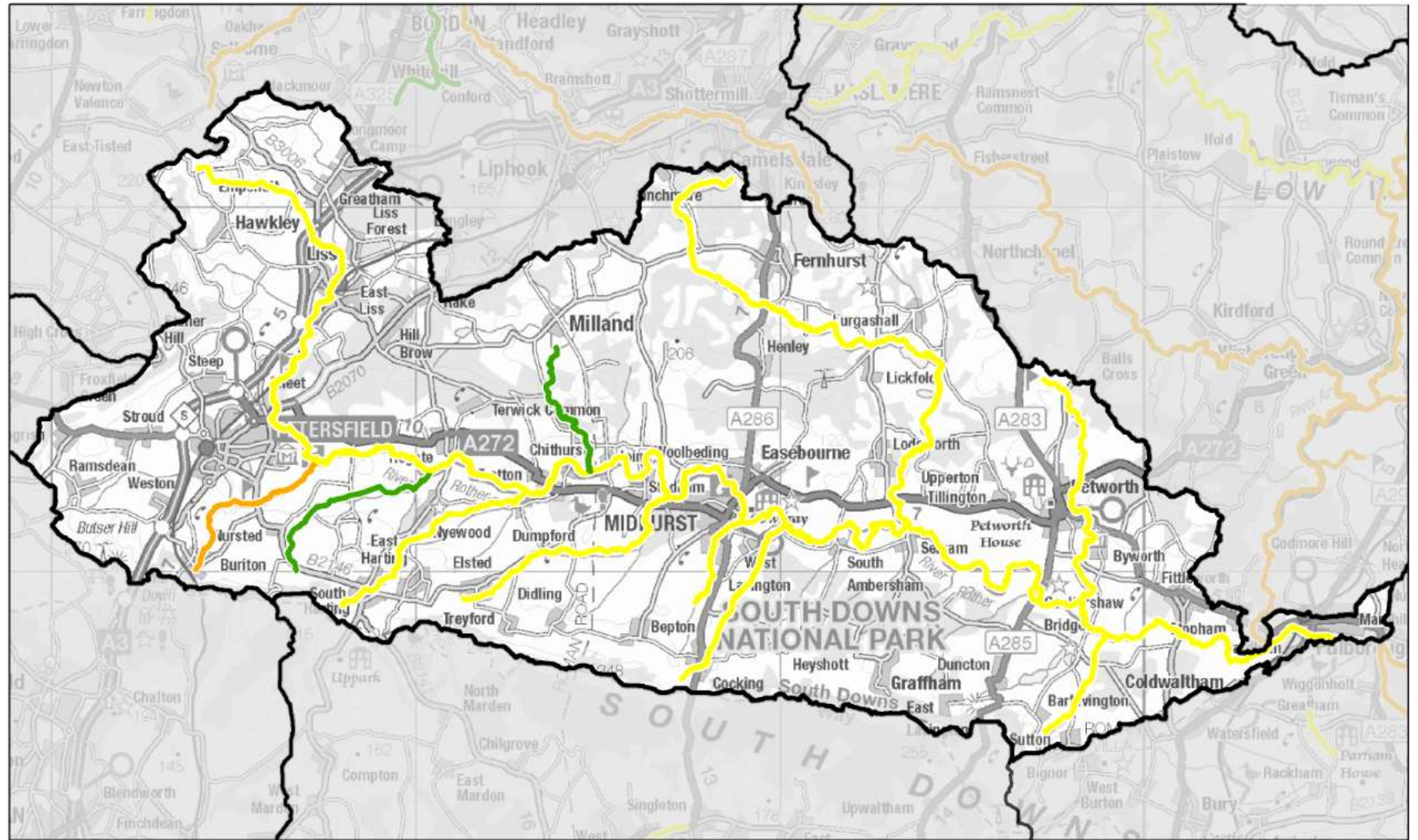


2

STATE OF THE ENVIRONMENT

WFD status

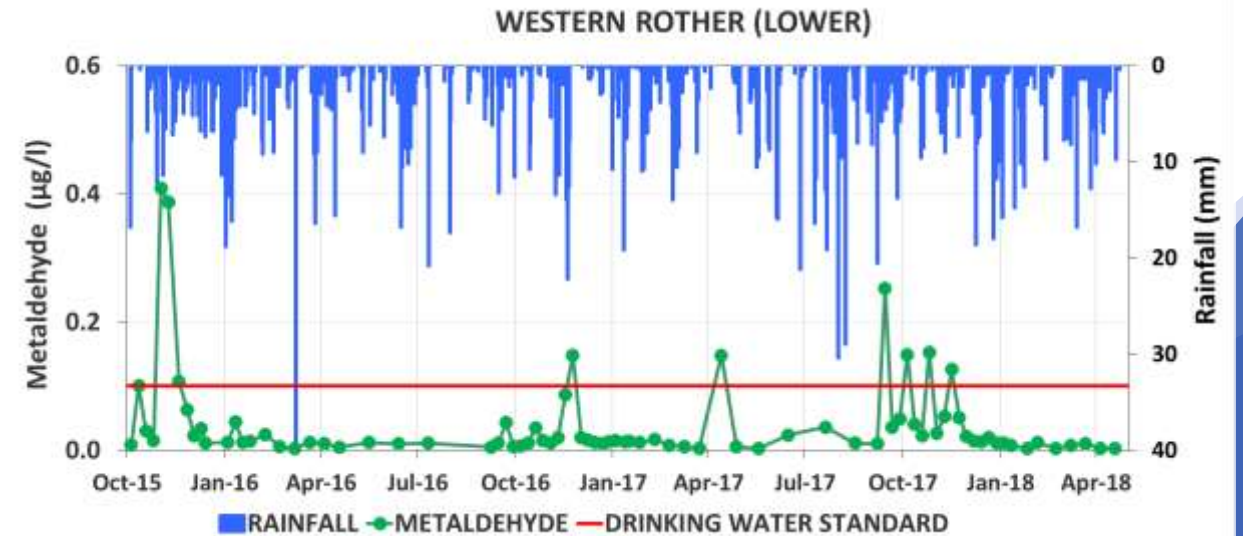
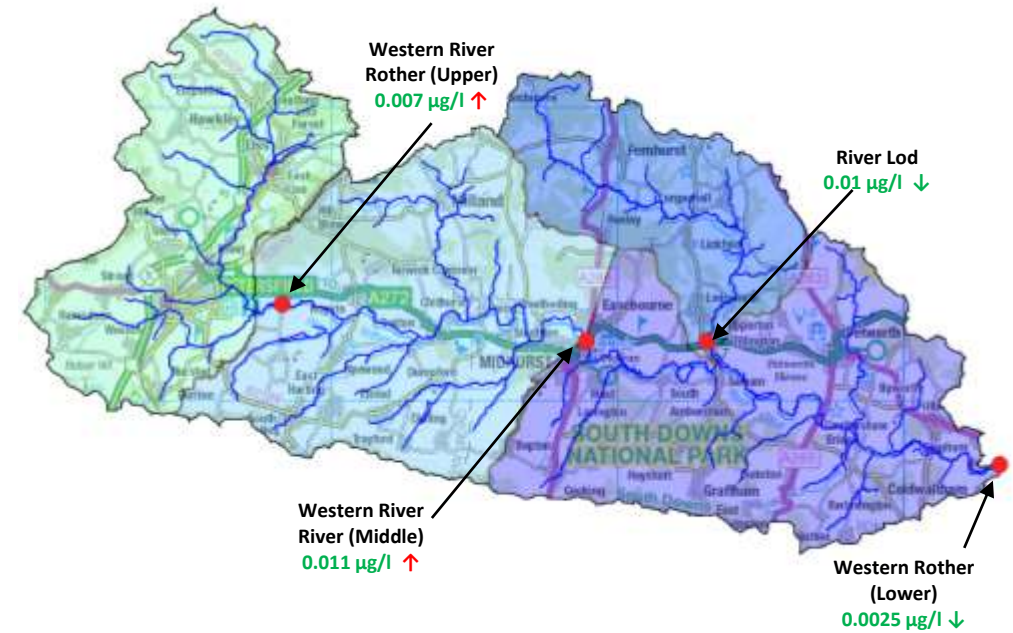
WFD Operational Catchment: Western Rother Cycle 2 Phosphate Status 2016 (based on monitoring data to Dec 2015)



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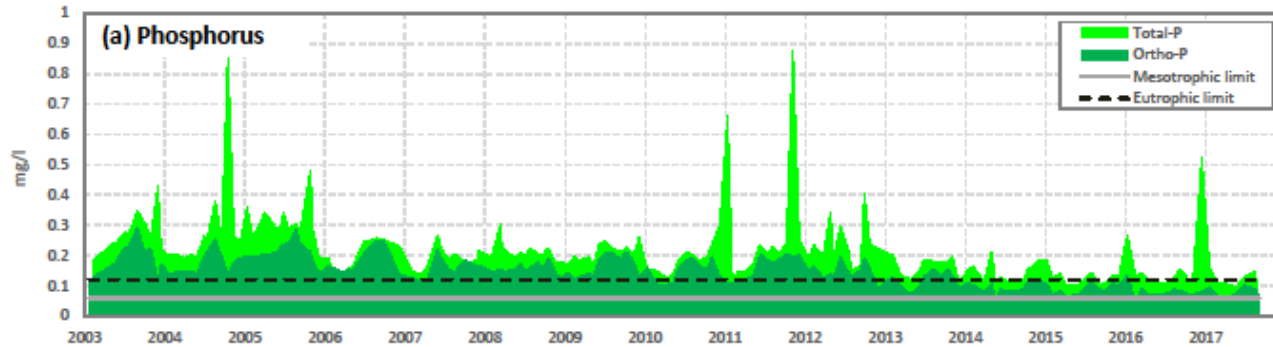
Rother metaldehyde

- Prohibitively costly to remove from drinking water
- Financial incentives to swap to alternative product
- Delivered through Catchment Sensitive Farming Officers

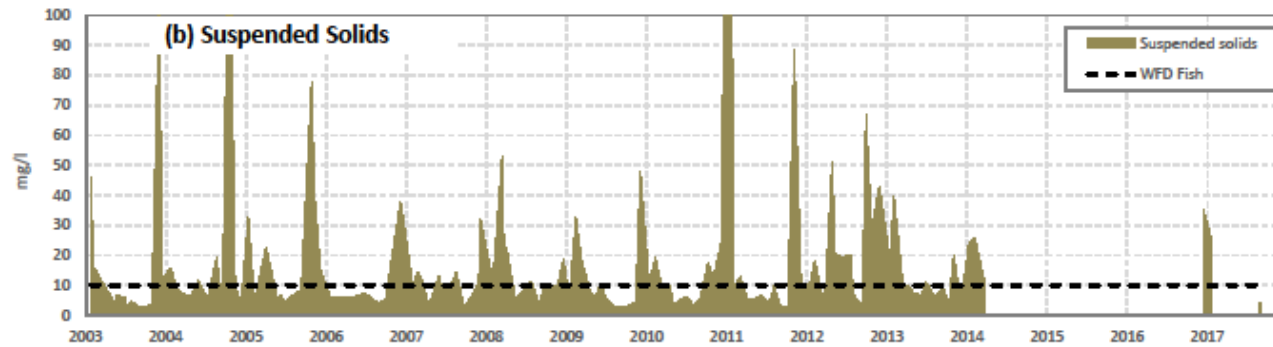


The River Rother at Hardham PS Intake, a lowland river in West Sussex

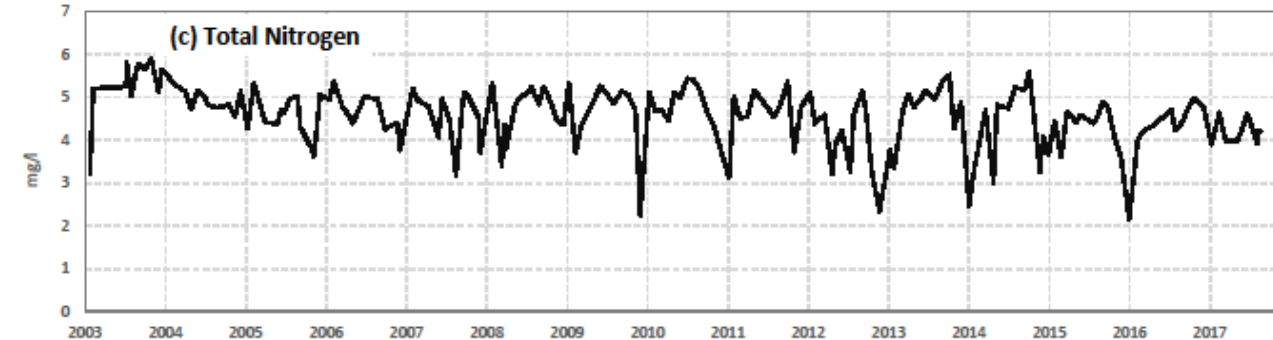
The charts below show the Environment Agency's open source water quality data interpreted to help determine future management strategies in the Arun catchment



Monthly levels of Phosphorus in the river between 2003 and 2017. These Environment Agency data provide the best-available open source data describing nutrient concentrations in our rivers. The dotted black line is the level above which phosphorus can start to affect the health of the river. By encouraging algal growth in a process known as eutrophication, phosphorus can reduce the oxygen in the river and the clarity of its water, with knock-on effects on biodiversity and ecosystem functions. On the River Rother, levels of dissolved phosphorus (or orthophosphate shown in dark green) have been generally declining since 2003 and are now mostly below the eutrophic limit. Indeed, concentrations are now approaching levels linked to a healthy lowland river (the pale grey line). However, when the portion of phosphorus attached to sediment is also included (shown in pale green), some winter exceedences above the eutrophication limit are evident.



Monthly suspended solids levels in the river between 2003 and 2017. These Environment Agency data provide the best-available open source data describing the turbidity of our rivers. The dotted black line is the turbidity limit (10 mg/l) above which we might expect effects on fish populations and their ability to spawn. On the River Rother, levels are on average below this target although this is punctuated by regular exceedences, usually in the autumn and winter months. Few data have been collected since 2014. In addition, these are only monthly measurements that may miss the larger events that happen over short periods of time; these data will always underestimate any sediment issues in the catchment. However, the correspondence in peaks in suspended solids with Total Phosphorus levels shown above illustrates the extent to which particulate phosphorus and its movement through the Rother catchment is determined by sediment movement.



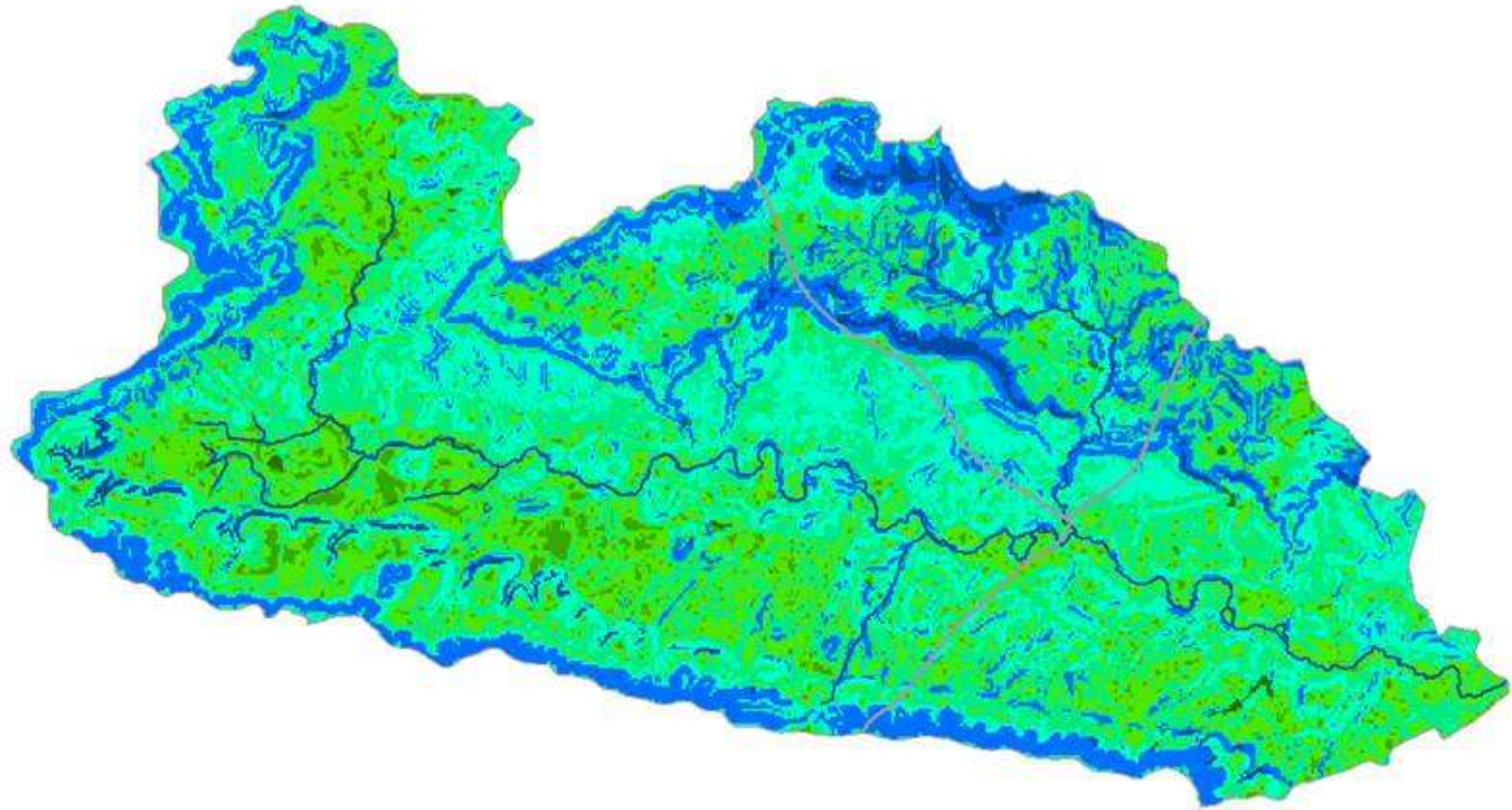
Monthly levels of Nitrogen in the river between 2003 and 2017. These Environment Agency data provide the best-available open source data describing nitrogen in our rivers. There are no established limits on the Nitrogen concentrations in our rivers. However, in lakes a level of more than 1.4 mg/l is thought to influence the growth of aquatic plants. The interplay between nitrogen and phosphorus is also thought to be an important trigger for algal growth. On the River Rother, levels are generally above this tentative level of 1.4 mg/l.

Rother run-off hotspot map

KEY:

Green = low risk

Blue = high risk



Problem

- Suspended sediment affecting drinking water quality
- Link with multiple pollutants (phosphate, pesticides etc)
- Associated costs with managing impacts (SWS & others)
- Historic issue

1700's Lord Egremont (Petworth Park) warned locals not to drink from the river due to high levels of suspended sediment

- Historic/previous solutions not managed/maintained

Source

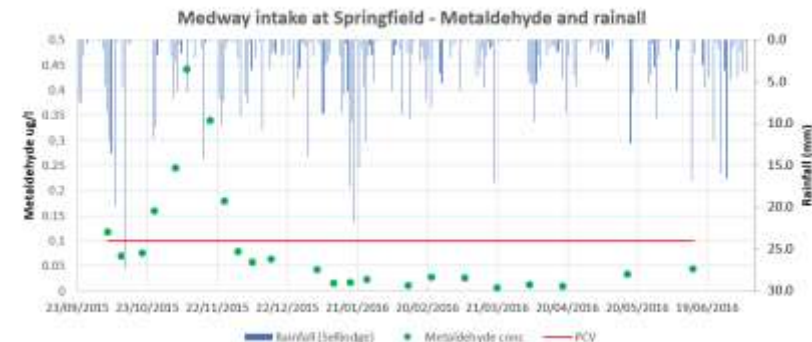
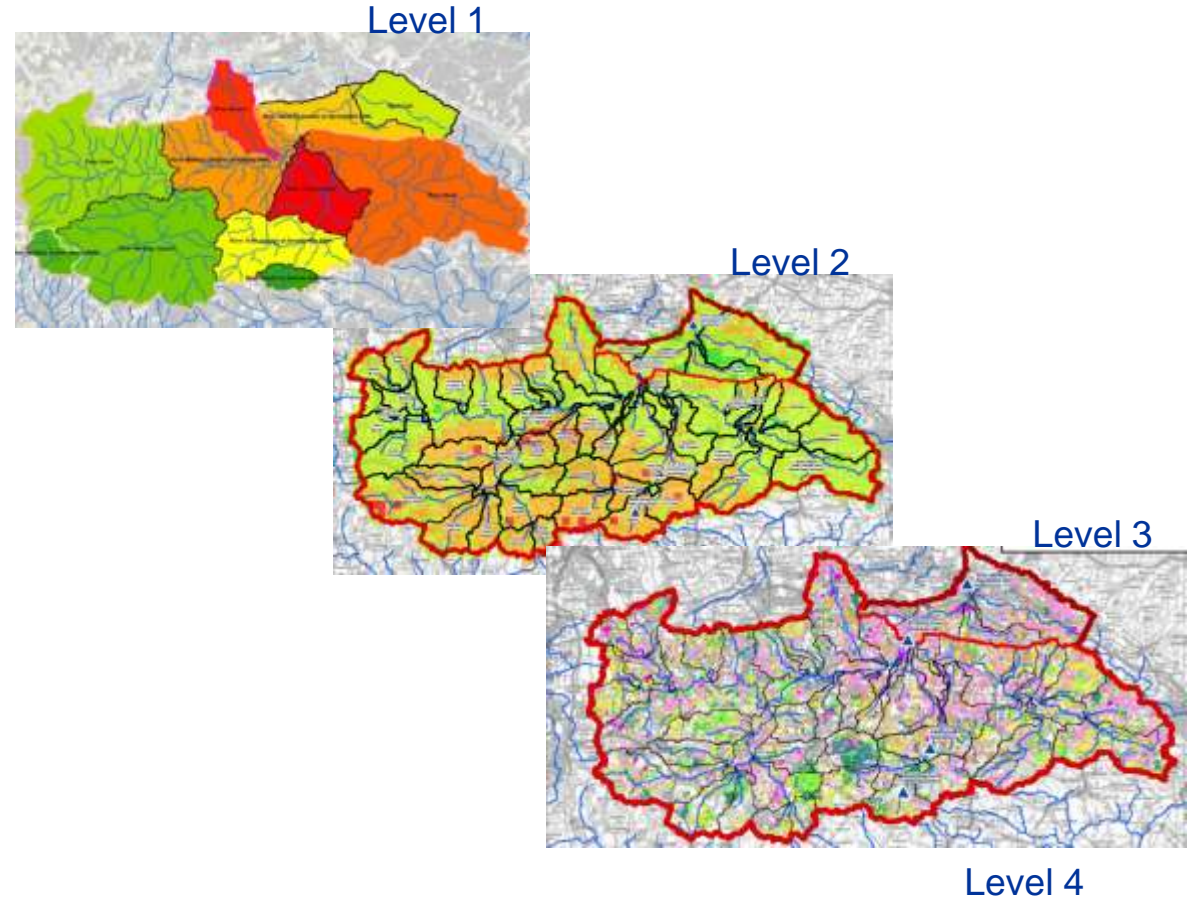
- Arable fields (SMART project)
 - highly erodible soils (Greensands)
 - often on slopes
 - connected to river
 - growing crops vulnerable to erosion
 - post-harvest land management
 - rainfall over 30mm trigger
- Bed & banks of the Western Rother and its tributaries (ASTAR project)
 - channel modifications
 - bank erosion



SWS understanding risk – surface waters

Mosaic of approaches
Iterative & adaptive
& ongoing

- **Level 1** – landscape risk at sub-catchment level
- **Level 2** - landscape + land use risk 5km level
- **Level 3** – crop risk field scale
- **Level 4** – Water Quality spikes

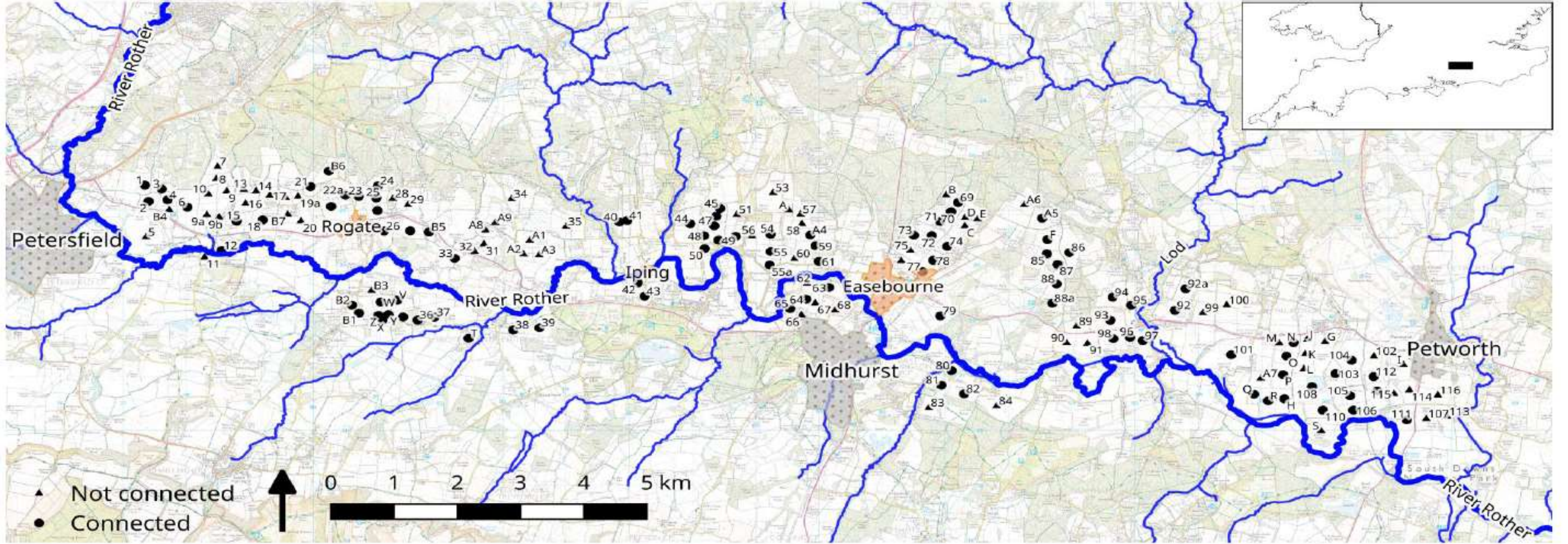


Pathway

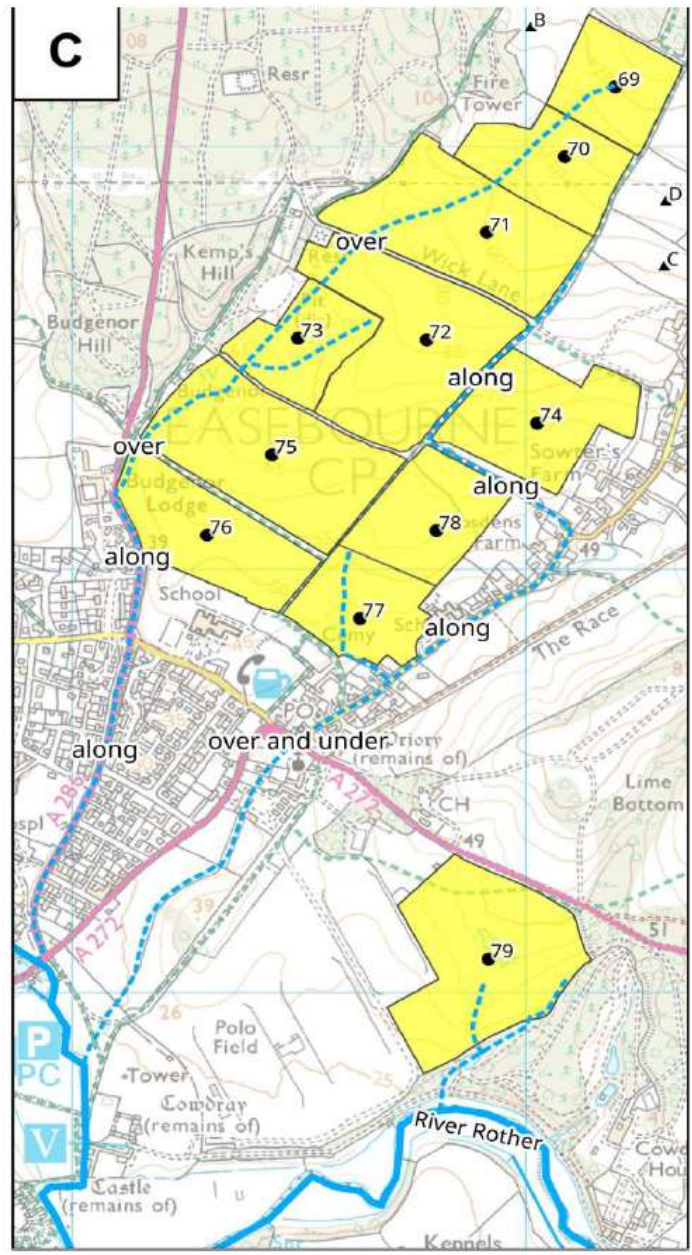
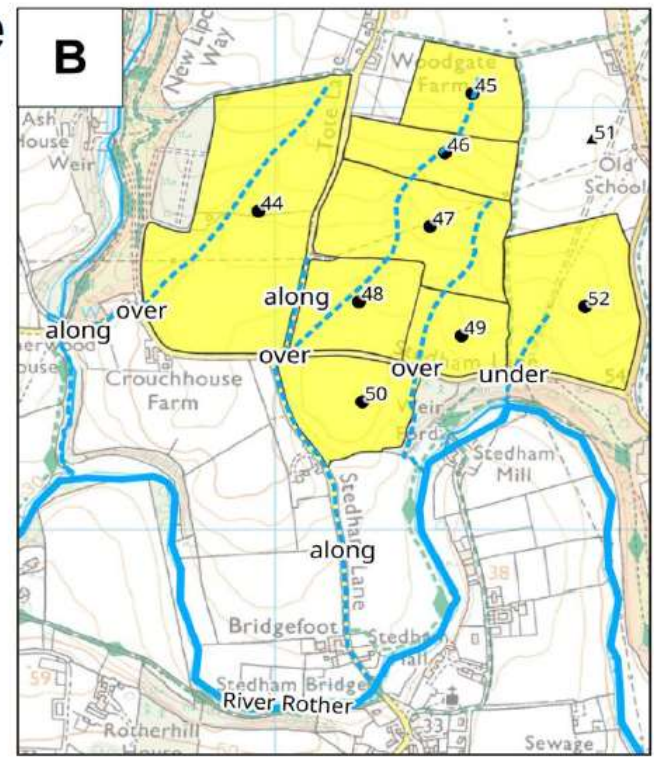
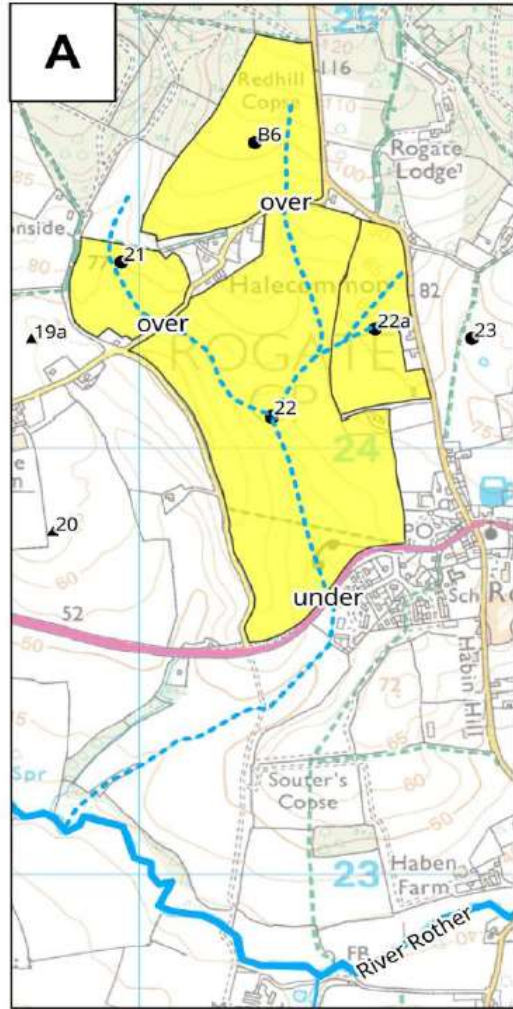
- Fields connected to river
 - of 165 fields with a history of erosion, 106 potentially connected to river (SMART project)
- Connection via roads, sunken lanes, ditches, drains and other fields
- Along river and tributaries

Other sources of sediment to the river?
Landslide on bank of sunken lane, Stedham, Feb. 2014





How does soil reach the River Rother? Evidence from sample areas



- ▲ Fields: not connected
- Fields: connected
- Boundaries of connected fields

Receptor

- SWS water treatment works at Hardham
- Weir at Hardham (abstraction & gauging structure)
- Riverine environment (WFD status)



Impact

- Water treatment costs (cost passed onto SWS customers)
- Costs associated with desilting Hardham weir (SWS/EA)
- Costs to farmers (loss of asset & operational costs)
- Environmental costs (WFD failures)
- Wider costs (e.g. localised flooding, silt removal – roads, ditches, fisheries, landscape etc)



3

POLICY FRAMEWORK

Policy Framework

Interreg 
France (Channel
Manche) England

Channel Payments for Ecosystem Services
European Regional Development Fund

