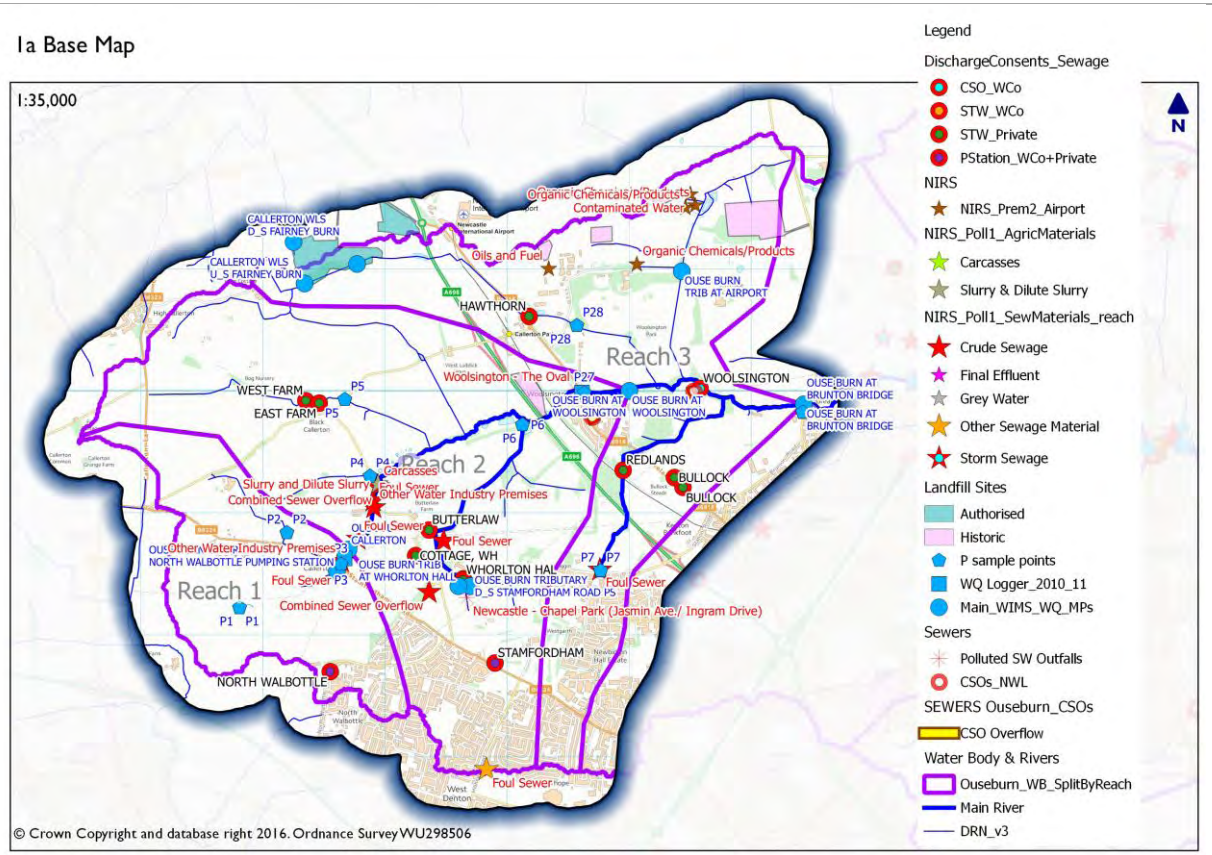
Ouseburn - examples of data in the Ouseburn evidence pack

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
1.	A local issues map - the reach in close-up with a lot more of the GIS layers printed. An example of the base map. The local sewer mapping was included at the workshops but it cannot be shared publicly, so has been removed here. Source of original data: Environment Agency, Northumbrian Water & Natural England	*No call out boxes on this map*	

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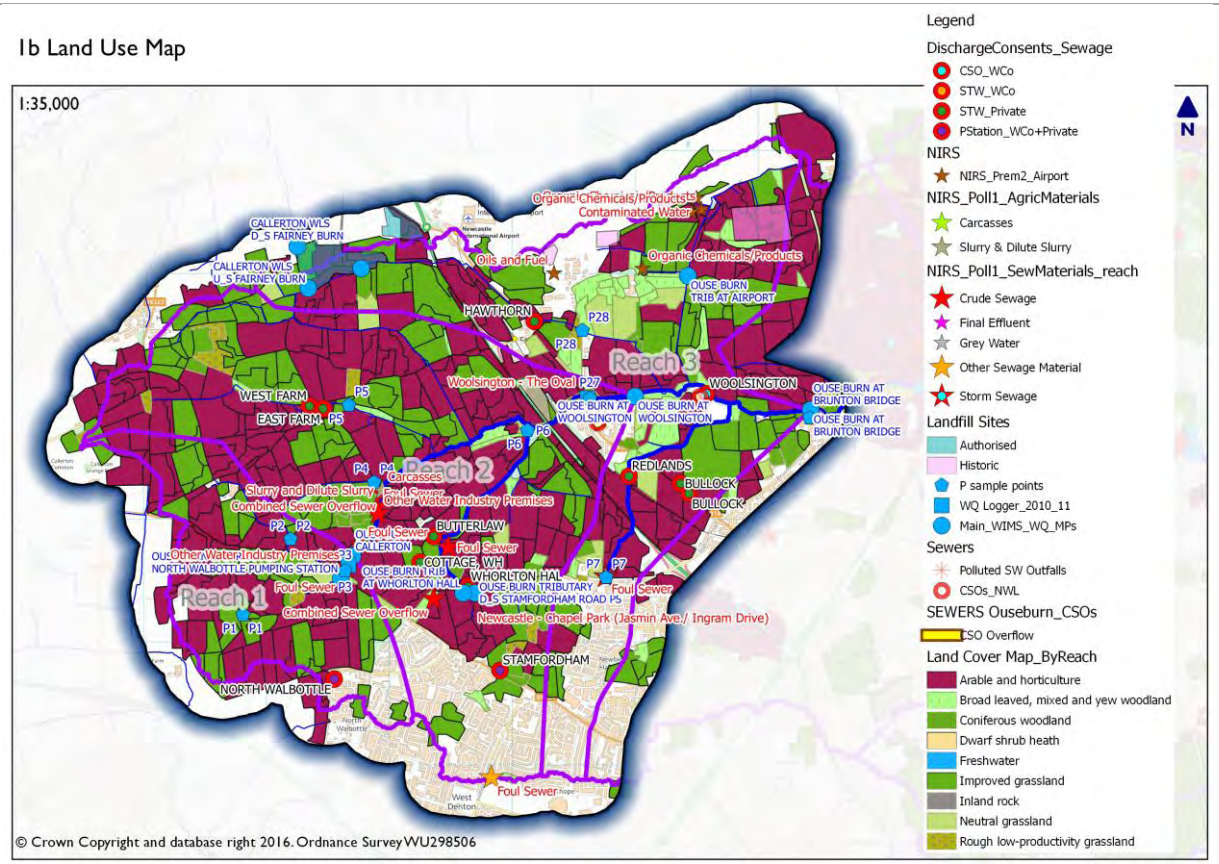
2.	A land use map - based on information from Land Cover Mapping. An example of the land use map. The local sewer mapping was included at the workshops but it cannot be shared publicly, so has been removed here. Source of original data: Environment Agency, Northumbrian Water, Natural England & CaBA GIS	*"88% of the land in this reach is agricultural. This is the most rural out of all the reaches"* *"This reach has the following main land uses: 55% arable and horticultural; 25% improved grassland; 15% urban"*	

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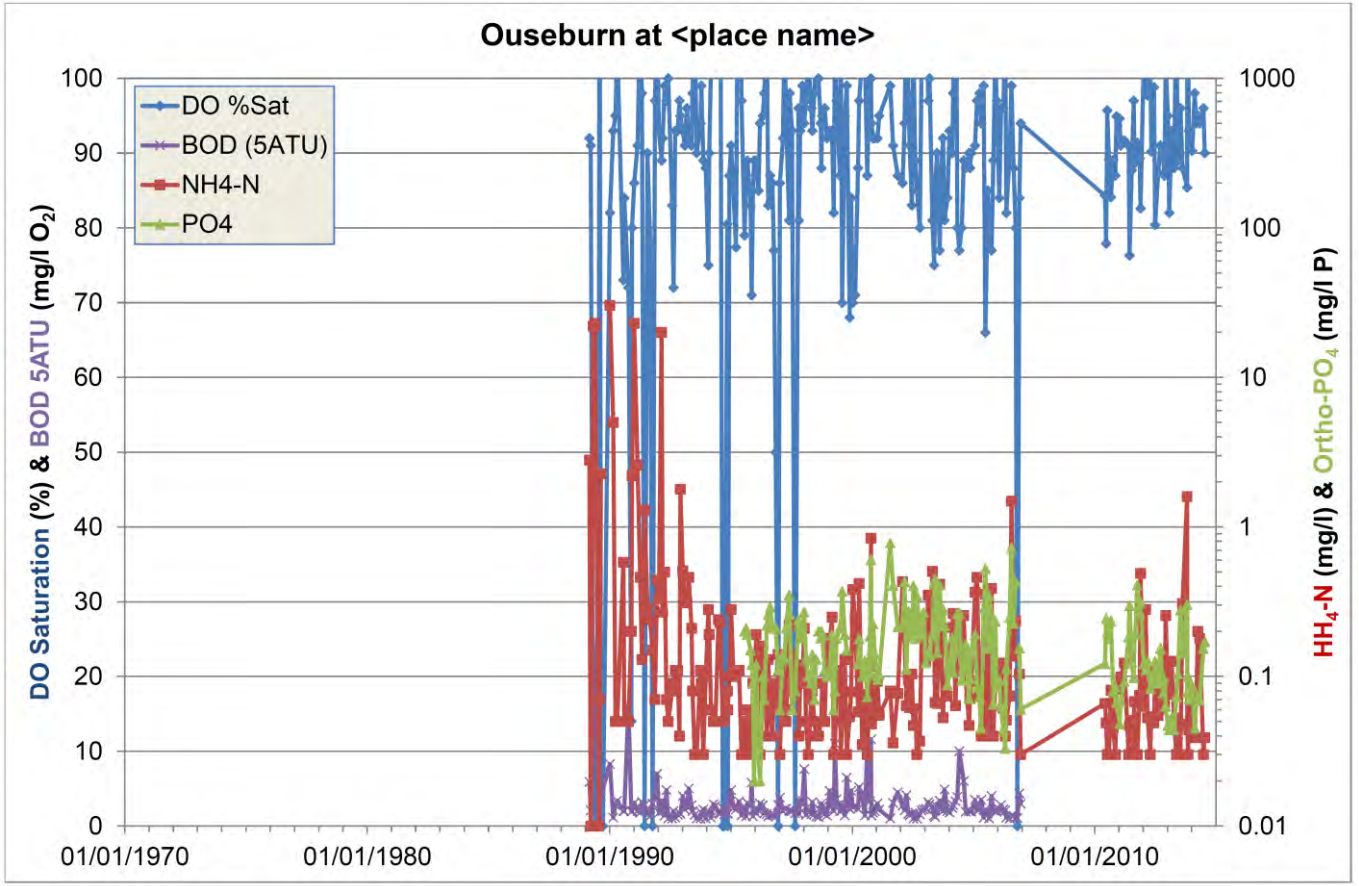
3.	A chart of concentrations of 4 pieces of water quality data: Dissolved Oxygen saturation, Biochemical Oxygen Demand, Ammonia and Annual Average Orthophosphate, plotted over time. This topic was actually split down into two graphs, the second one restricting itself to just the last 5 years which is likely to be of more interest to the stakeholders. Source of original data: Environment Agency	*"There have been some improvements since the 1990s but this could be either improvements in agricultural inputs and / or urban or sewage sources"* or, *"Significant reduction in ammonia in the 1990s related to improvements at the airport mean the contribution from the airport to downstream reaches is no longer a threat."*	

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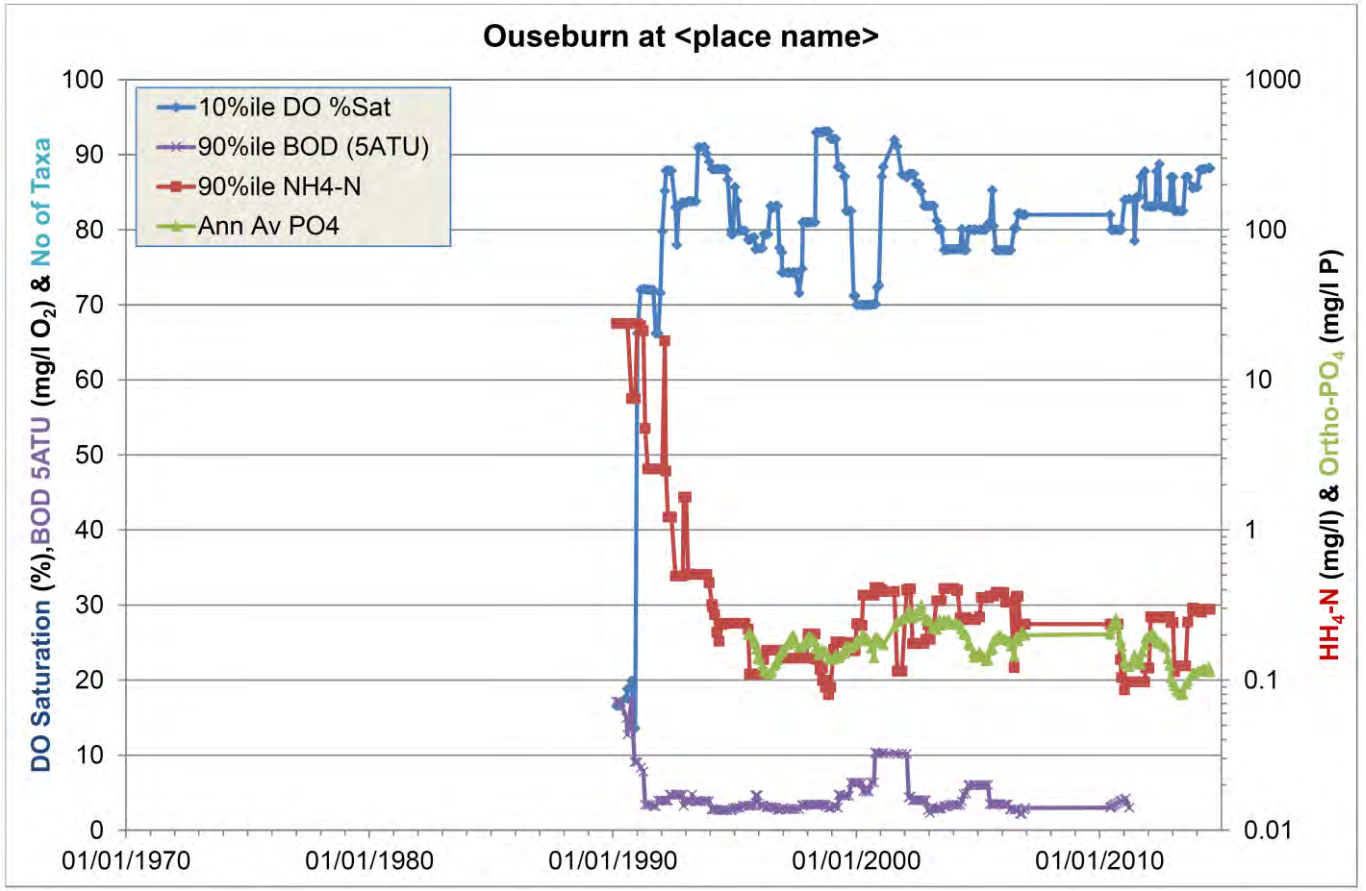
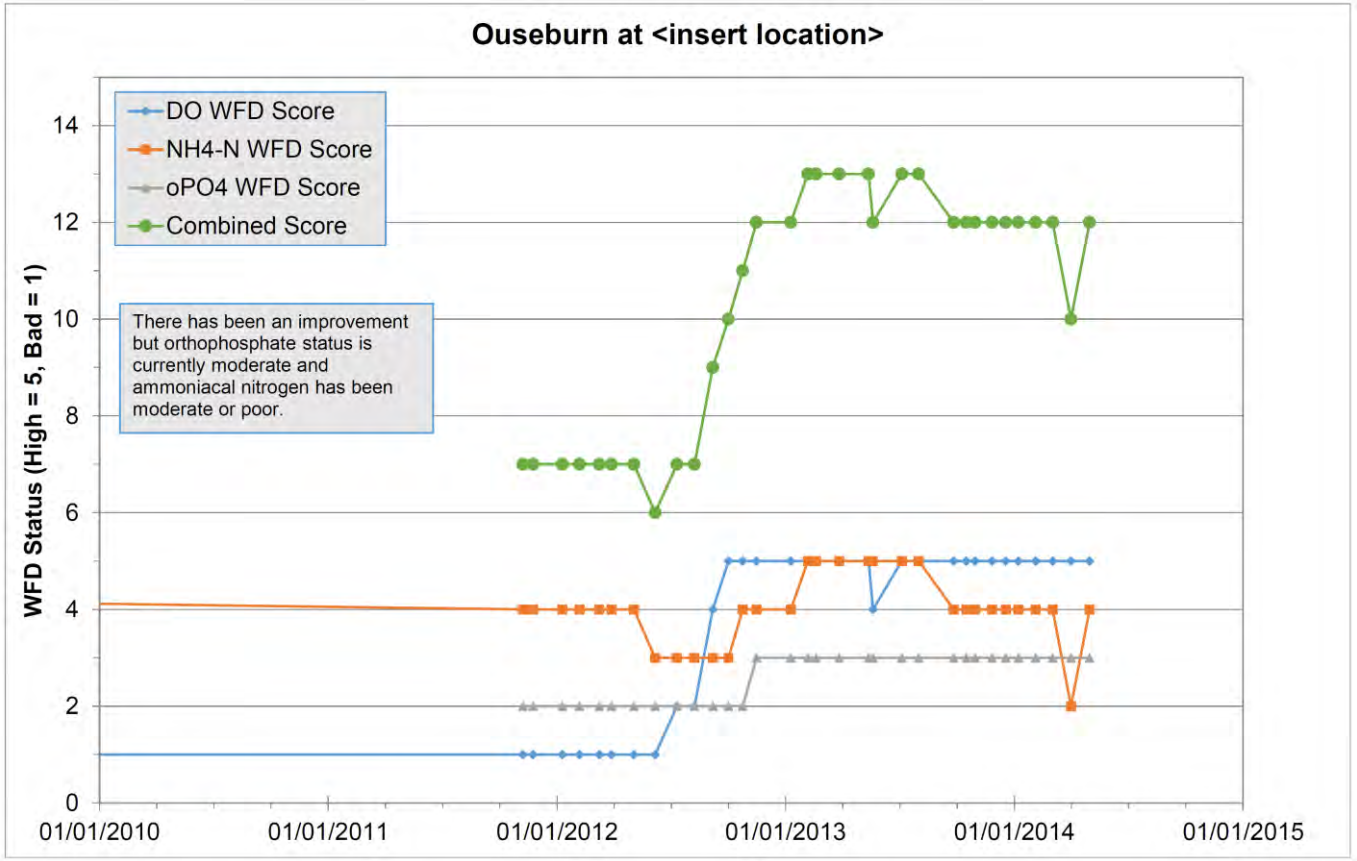
4.	The same 4 pieces of water quality data, but this time expressed as either - A percentile of the previous 12 months or - A rolling annual average Source of original data: Environment Agency (but processed by project team)	*"Significant reduction in ammonia in the 1990s related to improvements at the airport. This means that the contribution from the airport to the downstream reaches is no longer a threat", or, "orthophosphate has decreased slightly in concentration since ~2010"*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
5.	Three data sources matched to WFD status over time. The data sources are: Dissolved Oxygen, Ammoniacal Nitrogen and Orthophosphate. Some reaches also included a fourth data source: number of taxa (invertebrates). Levels were scored 1-5 according to WFD status (1=bad, 5=high). A fourth line on the graph is the combined score of the 3 water quality parameters.	*There has been an improvement but orthophosphate status is currently moderate and ammoniacal nitrogen has been moderate or poor"* or, *"Since the airport improvements, the main problem is poor-moderate status orthophosphate."*	
Source of original data: Environment Agency (but processed by project team)			

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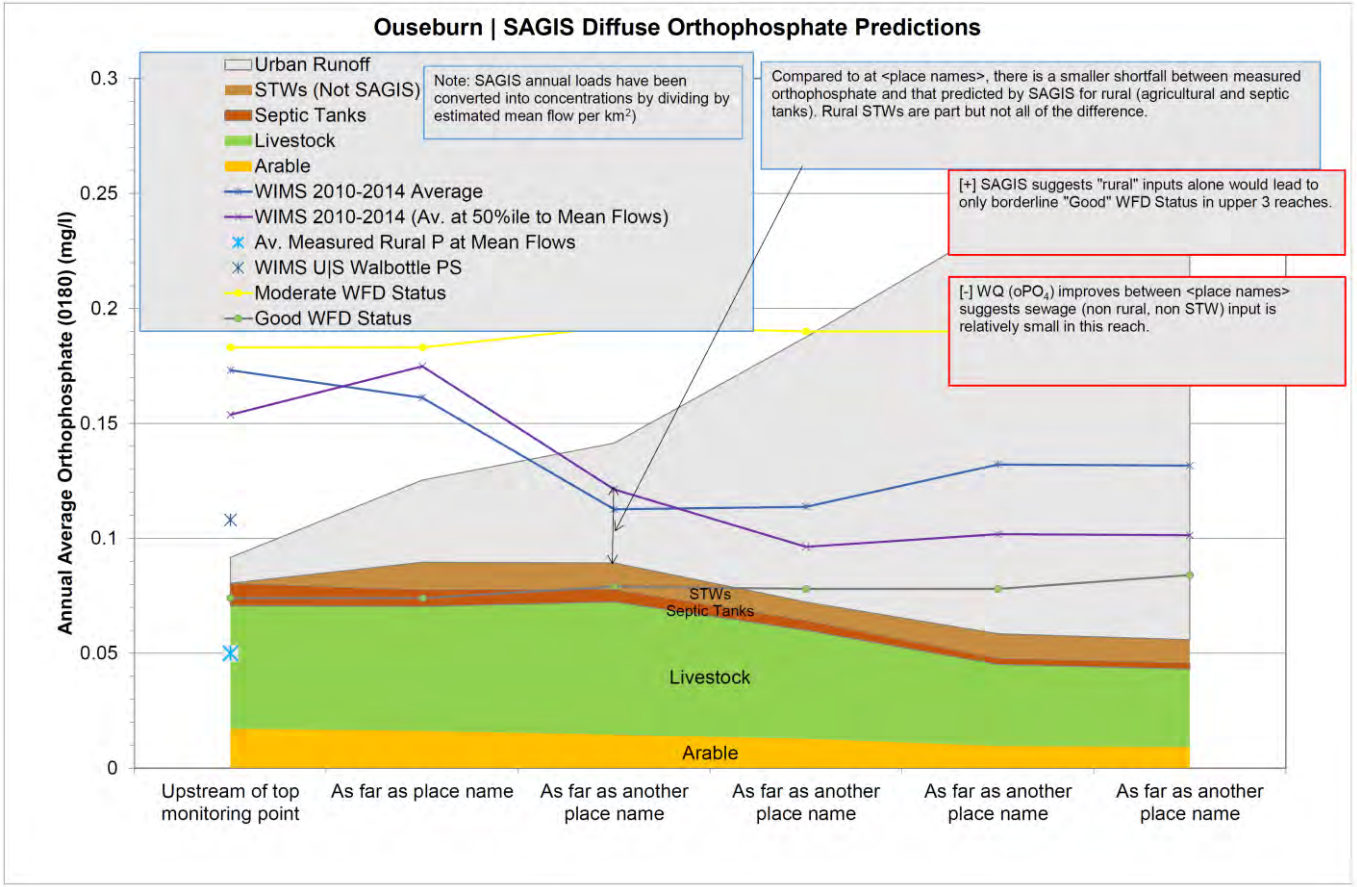
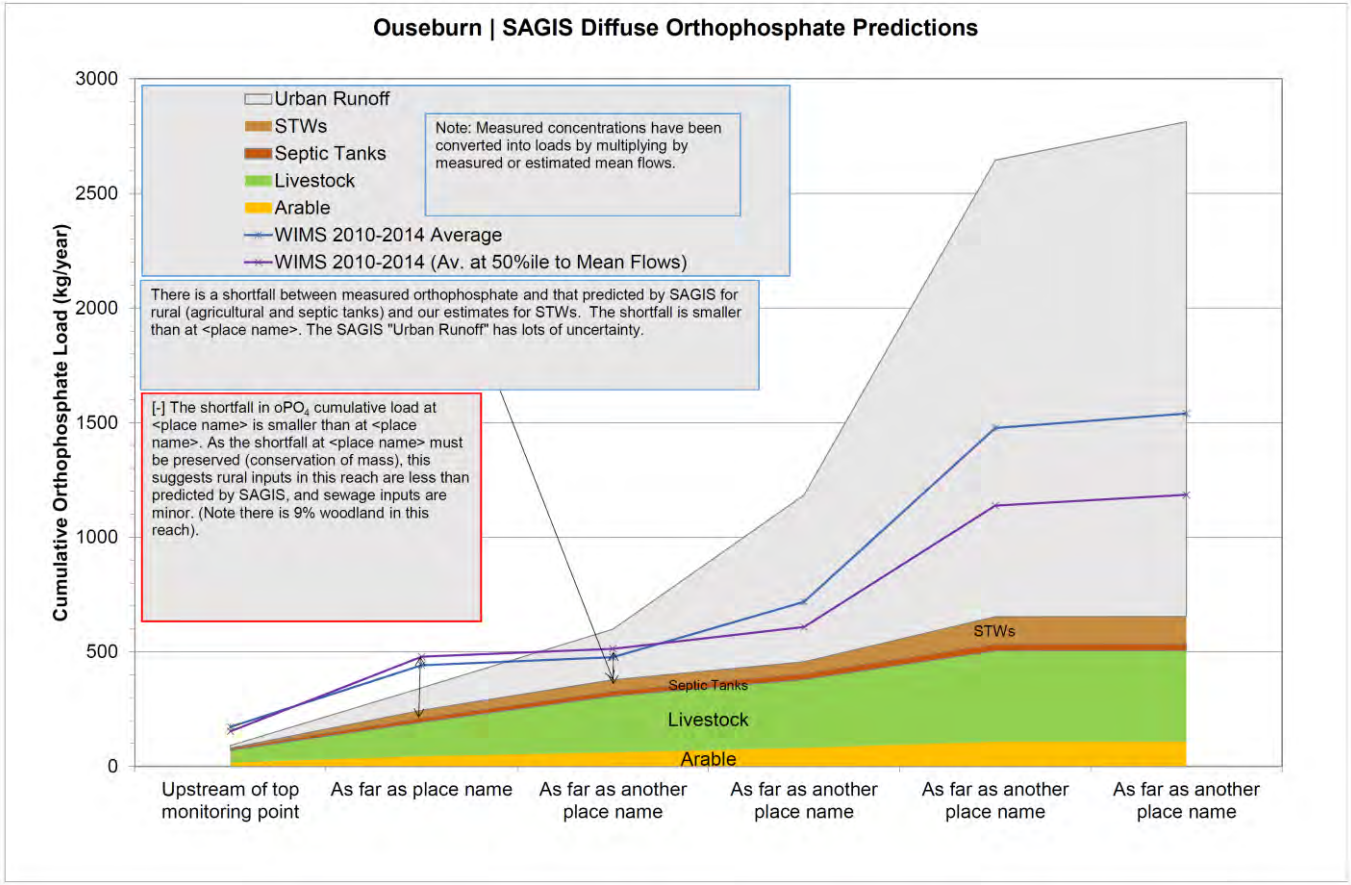
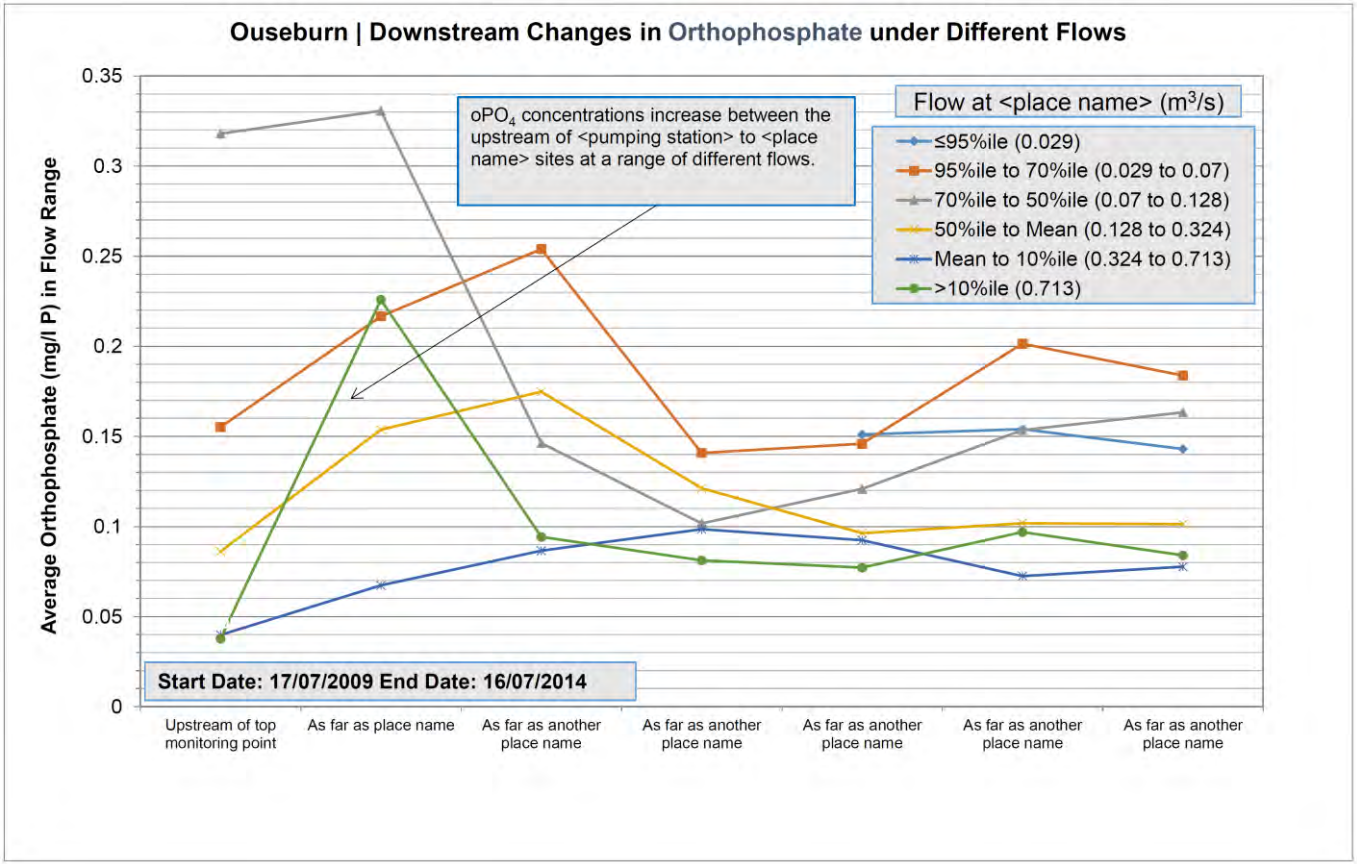
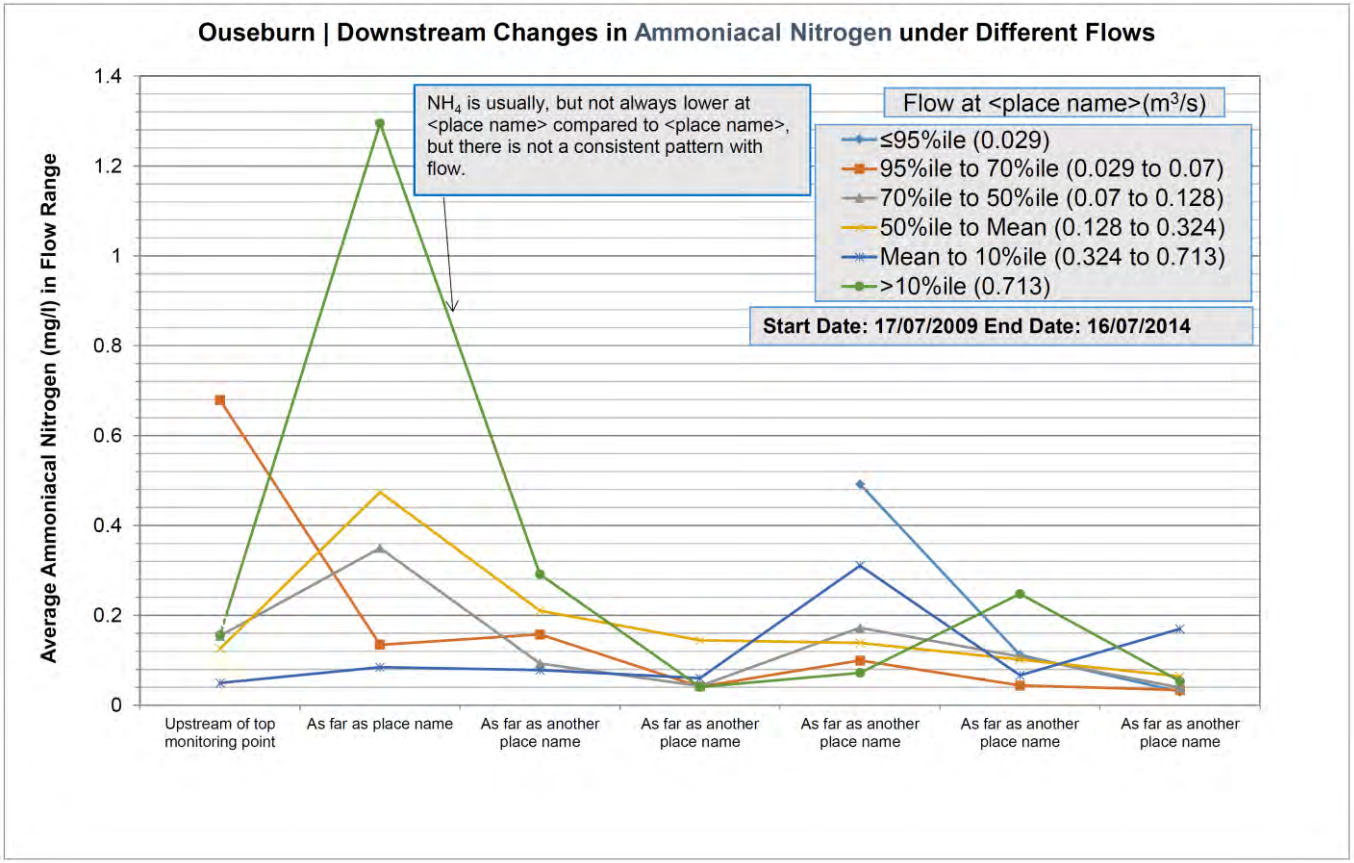
6.	A SAGIS 'stacked' chart, for all the reaches. SAGIS annual loads were converted into concentrations by dividing by estimated mean flow for that reach / location. The graph also includes average measured phosphate at mean flows, and other WIMS data at two different flow conditions. Source of original data: Environment Agency (but processed by project team)	*"There is a large shortfall between measured orthophosphate and the SAGIS predictions."* *Also, "SAGIS suggests that rural inputs alone would only lead to borderline 'good' WFD status in the upper reaches".*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
7.	Another SAGIS 'stacked' chart for all the reaches, but this one cumulative load instead of annual average orthophosphate concentration. The 'measured' orthophosphate load is the product of the measured concentration and the estimated flow for that location when sampling took place Source of original data: Environment Agency (but processed by project team)	*The shortfall between predicted and 'measured' orthophosphate is 70-90kg/yr. The most likely other source is sewage. This equates to sewage from approx 75 properties"* or, *"in terms of loading, the data at this location point towards extra sewage loading in this reach."*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
8.	A graph of downstream changes in orthophosphate concentration under different flows, for all the reaches. The orthophosphate readings at 6 different flow rate percentiles are plotted, concentrating on the last 5-6 years. Source of original data: Environment Agency (but processed by project team)	*"Orthophosphate concentrations increase between these two locations at a range of flows"* or, *"concentrations increase at mid/low at very high flows at this location, but this does not indicate the source of those inputs."*	
This kind of chart tells us whether water quality at different places is better or worse at low flows or high flows. It helps us work out the possible source e.g. misconnections (a low flow problem), storm sewer overflow capacity or agricultural runoff (a high flow problem)			

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
9.	The same graph, but this time for ammoniacal nitrogen. Source of original data: Environment Agency (but processed by project team)	*"Ammoniacal nitrogen concentrations increase upstream from this location at a range of different flows apart from at low flows."*	

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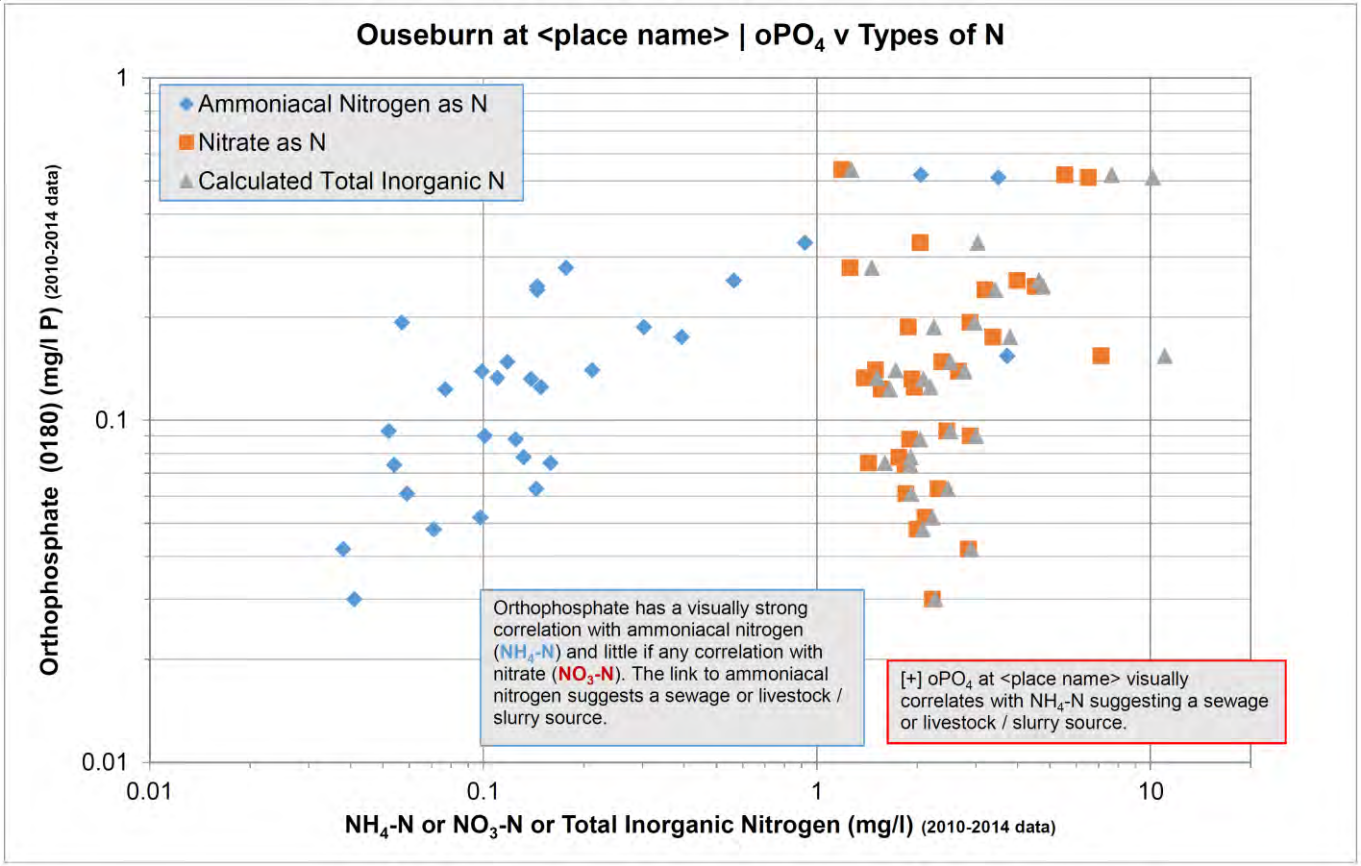
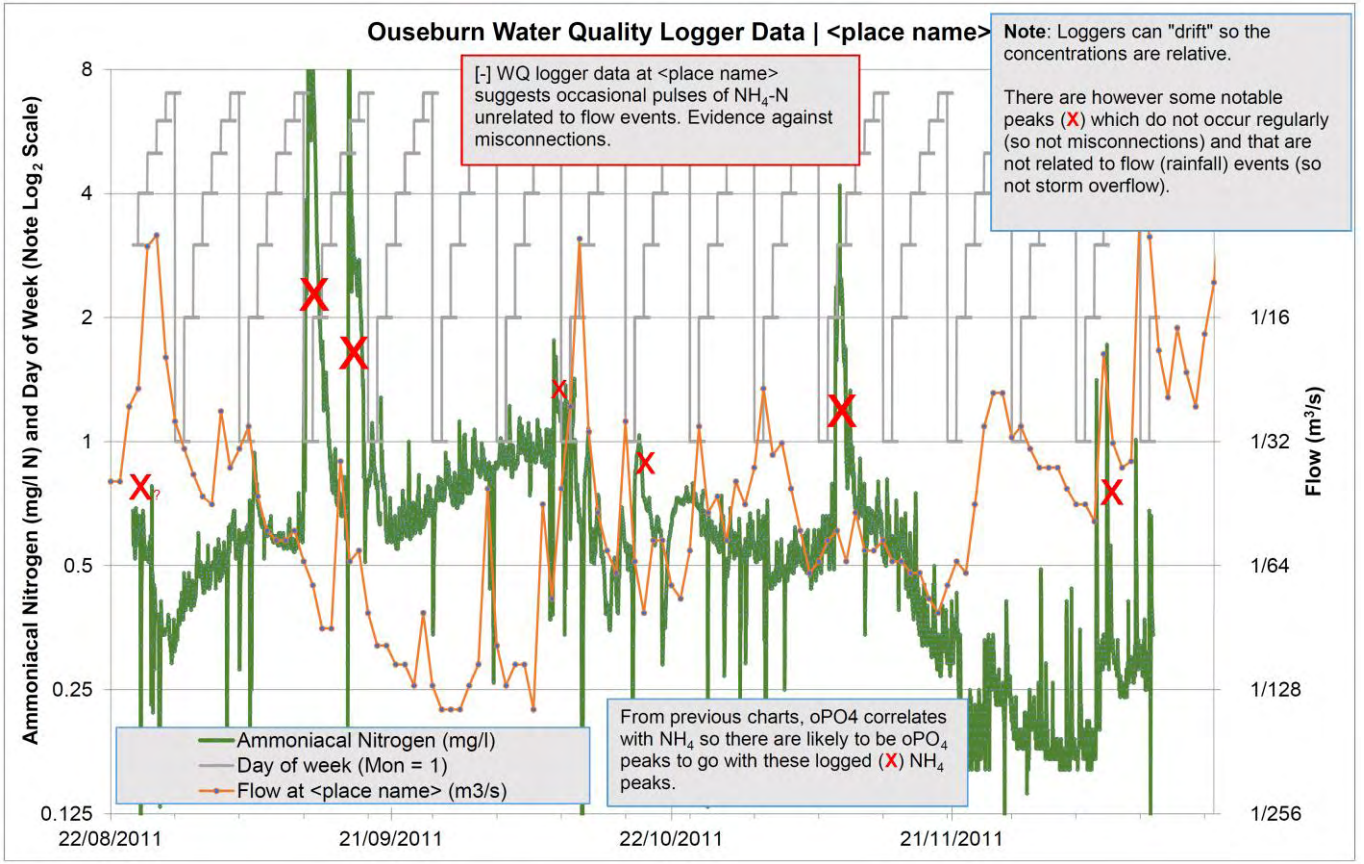
10.	A logarithmic scattergram plotting all the orthophosphate data against type of nitrogen (ammoniacal nitrogen as N and nitrate as N and calculated total inorganic nitrogen). Note - not all the reaches had this scattergram. Source of original data: Environment Agency (but processed by project team)	*"Orthophosphate has a visually strong correlation with ammoniacal nitrogen but little if any correlation with nitrate. This suggests a sewage or livestock / slurry source."*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
11.	Water quality logger data (for 3-4 months in 2011 when one was in place) for ammoniacal nitrogen. This chart also included days of the week (looking for a possible 'wrong connections' pattern linked to weekday / weekends differences) and flow. Source of original data: Environment Agency (but processed by project team)	*"There are some notable peaks marked with a red cross which do not occur regularly (so not misconnections) and that are not related to flow (rainfall) events (so are not storm overflow"* *or, "notable peaks do not occur regularly and are not linked to rainfall events / storm overflow."*	
	Note – some reaches had an additional graph to follow this one, to zoom into a time period if relevant, to investigate frequent spikes.		

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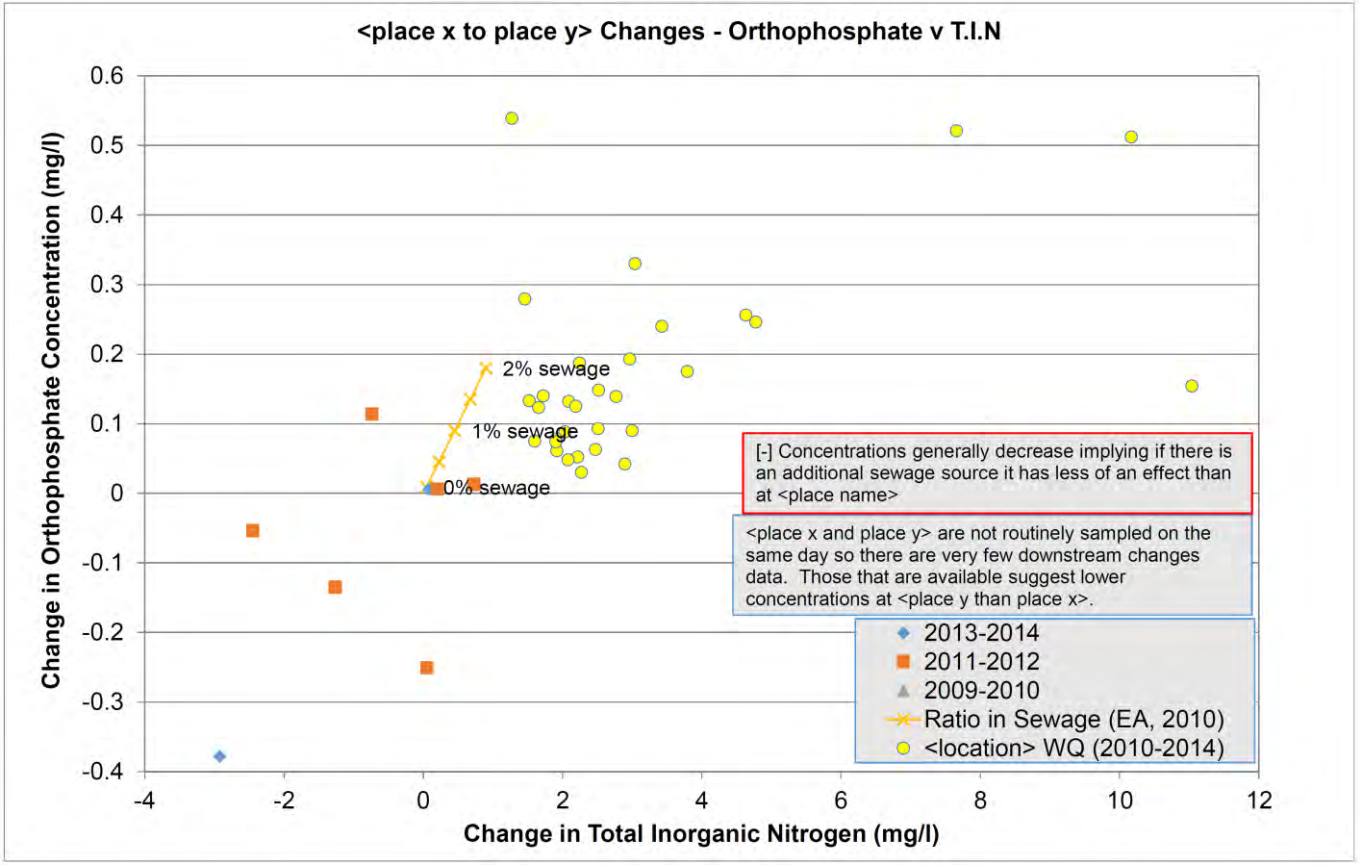
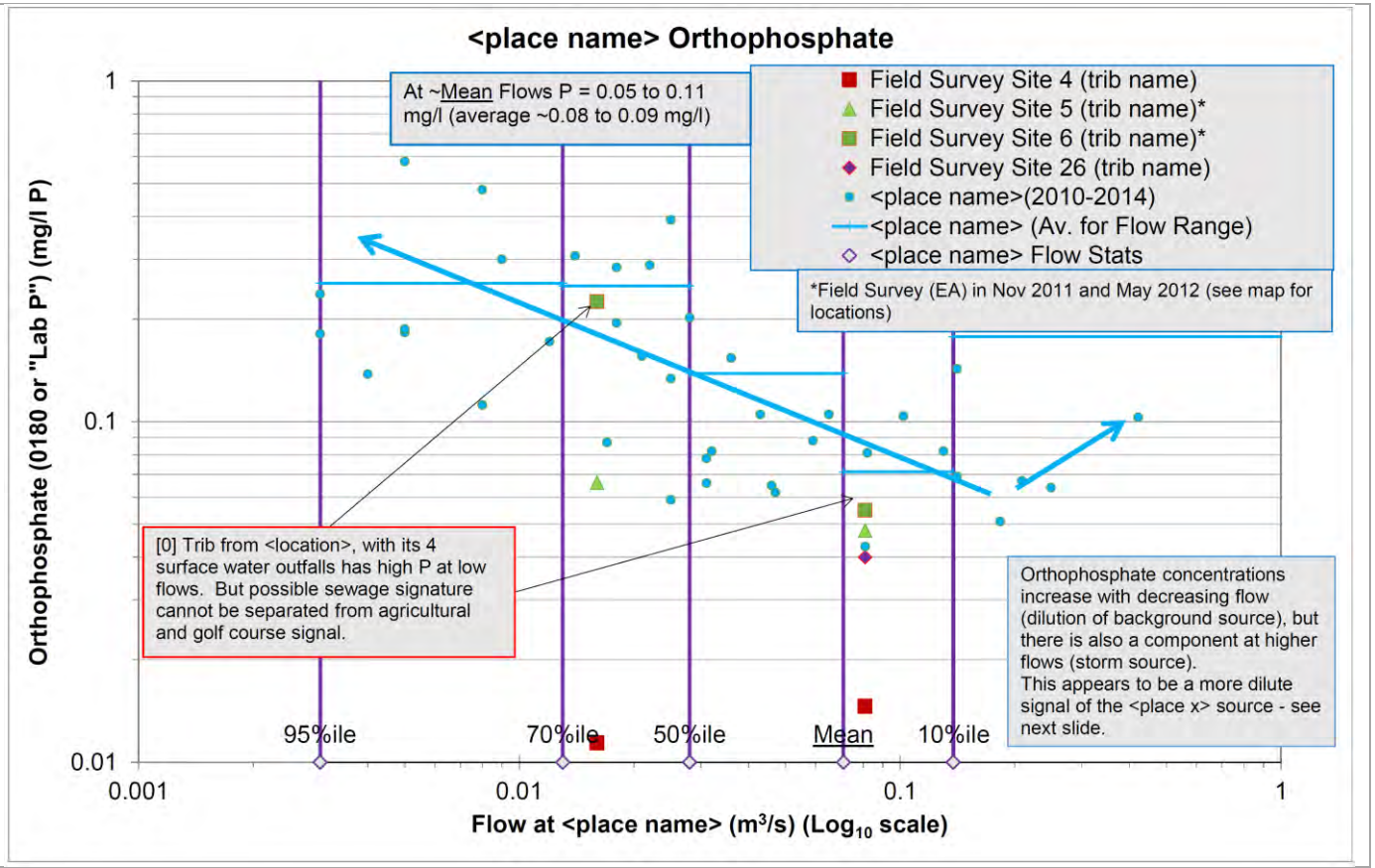
12.	A scattergram to look at concentrations of orthophosphate compared with a change in Total Inorganic Nitrogen between two locations. Source of original data: Environment Agency (but processed by project team)	*"Concentrations generally decrease implying if there is an additional sewage source it has less of an effect that at <other place>"*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
13.	A logarithmic scattergram comparing orthophosphate and flow. Source of original data: Environment Agency (but processed by project team)	*"Orthophosphate concentrations increase with decreasing flow (dilution of background source) – but – there is also a component at higher flows (storm source)."* - these two trends are highlighted on the graph with blue arrows	
Note – some reaches followed this with a similar logarithimic scattergram for Ammoniacal Nitrogen against flow – which could illustrate evidence for partially blocked sewers which don't discharge under very flow flows and are flushed at high flows			

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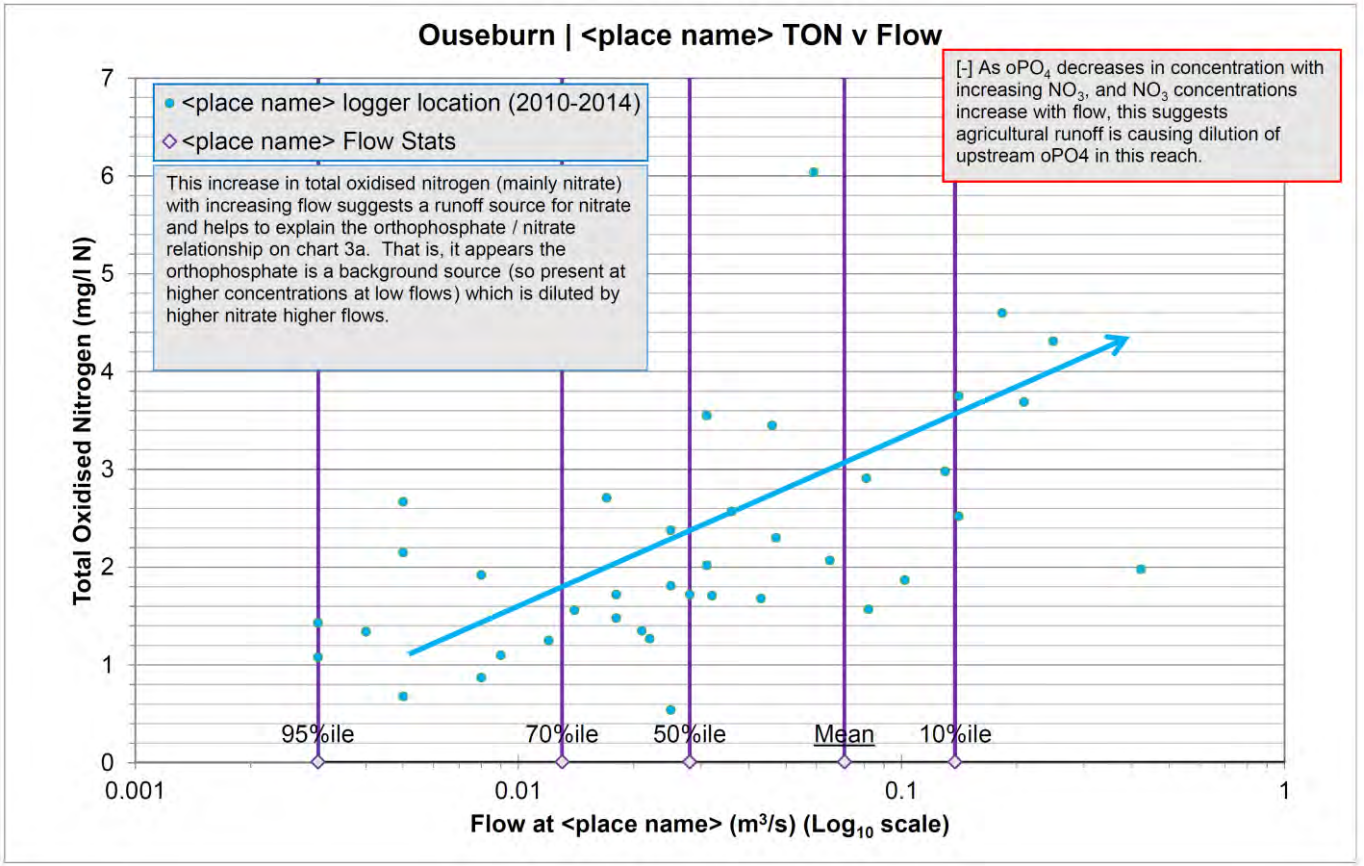
14.	A logarithmic scattergram to compare Total Oxidised Nitrogen with flow. Source of original data: Environment Agency (but processed by project team)	*"There is an increase in total oxidised nitrogen with increasing flow. This suggests a runoff source for nitrate. It appears the orthophosphate is a background source (present at higher concentrations at low flows) which is being diluted by higher nitrate flows" and, "as orthophosphate decreases in concentration with increasing nitrogen concentration increase with flow, this suggests agricultural runoff is causing dilution of upstream orthophosphate in this reach"*	

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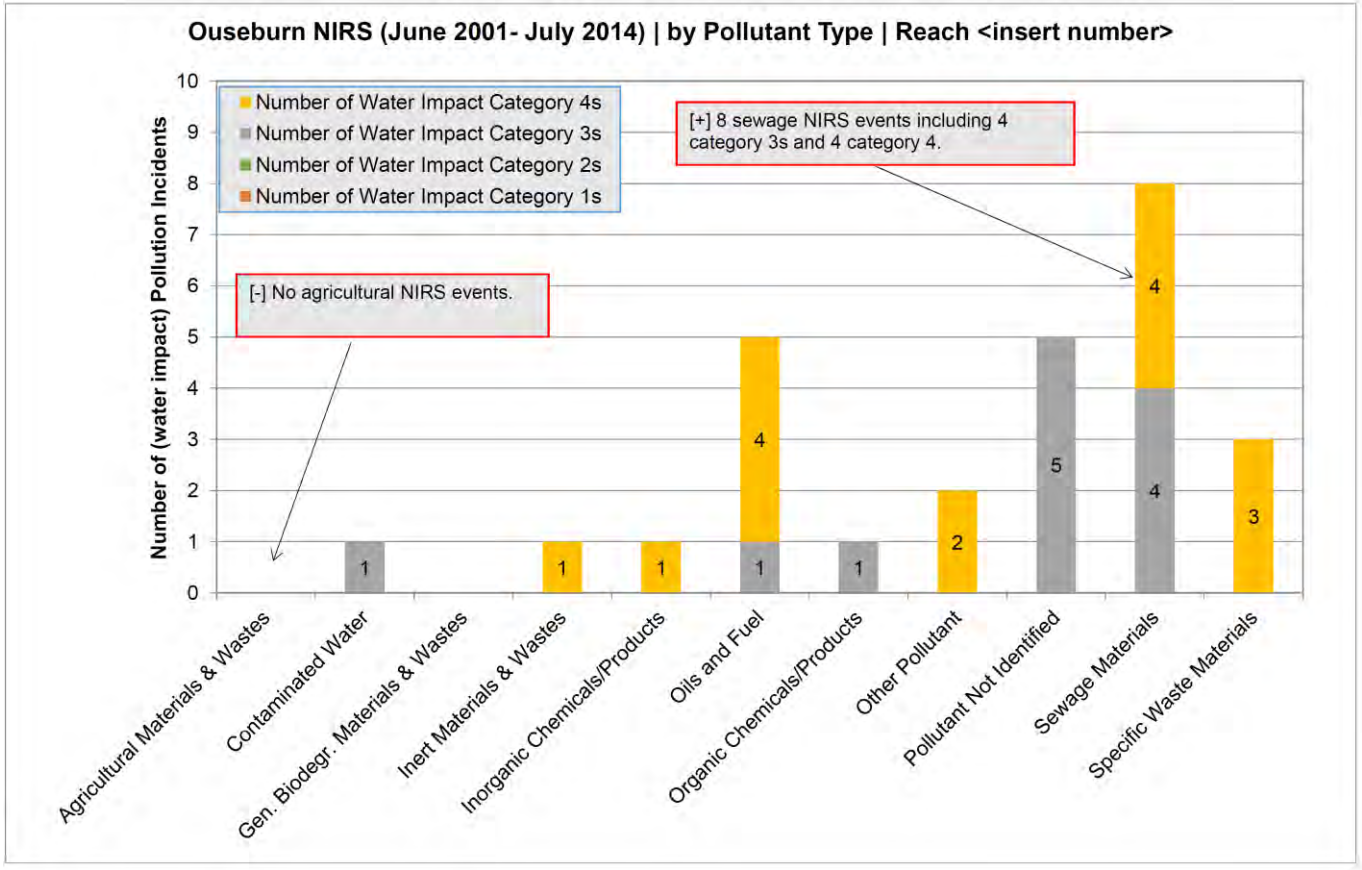
15.	NIRS data - by category and number of water impact incidents - for each reach. Source of original data: Environment Agency (but processed by project team)	*"8 sewage NIRS events, half were category 3 and half were category 4."*	

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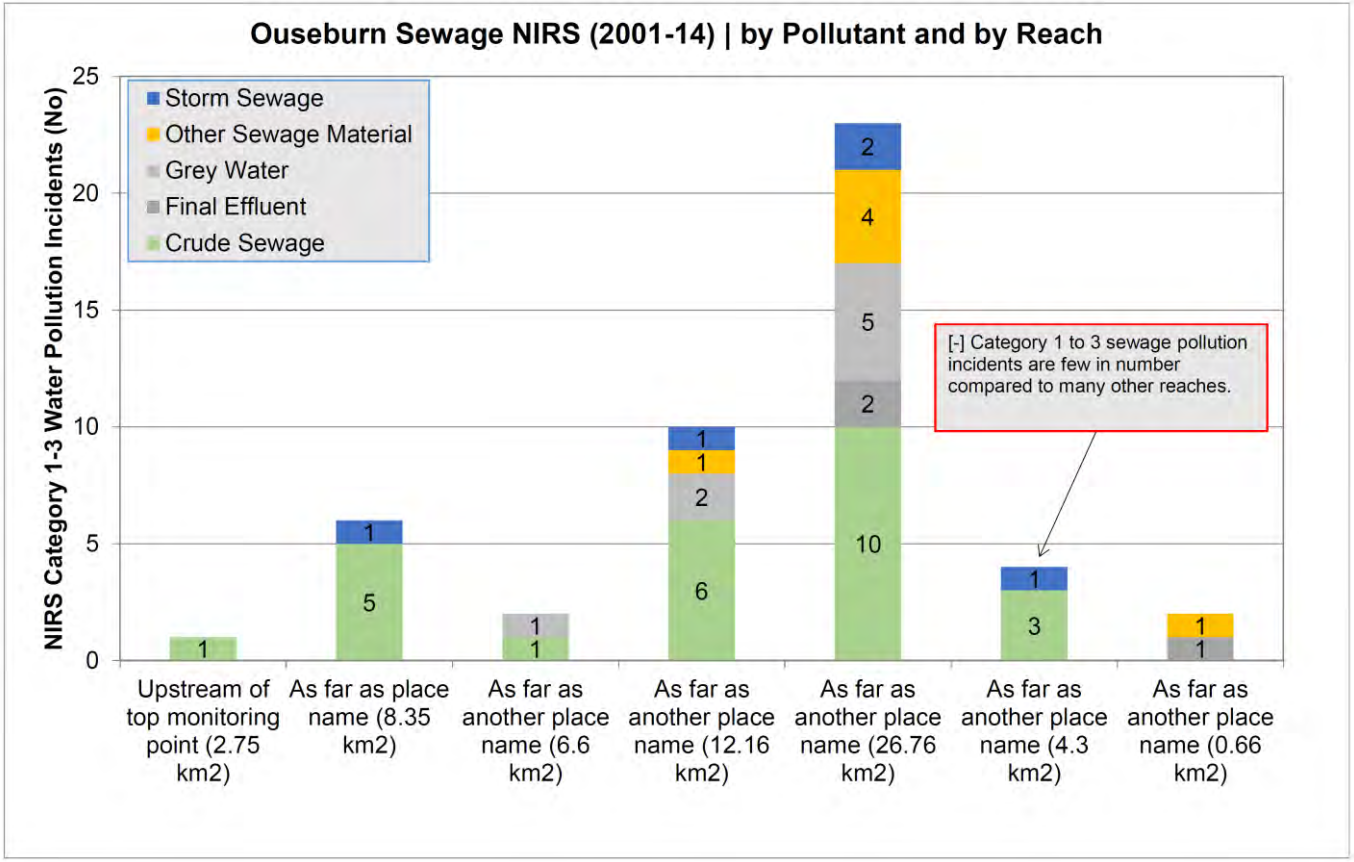
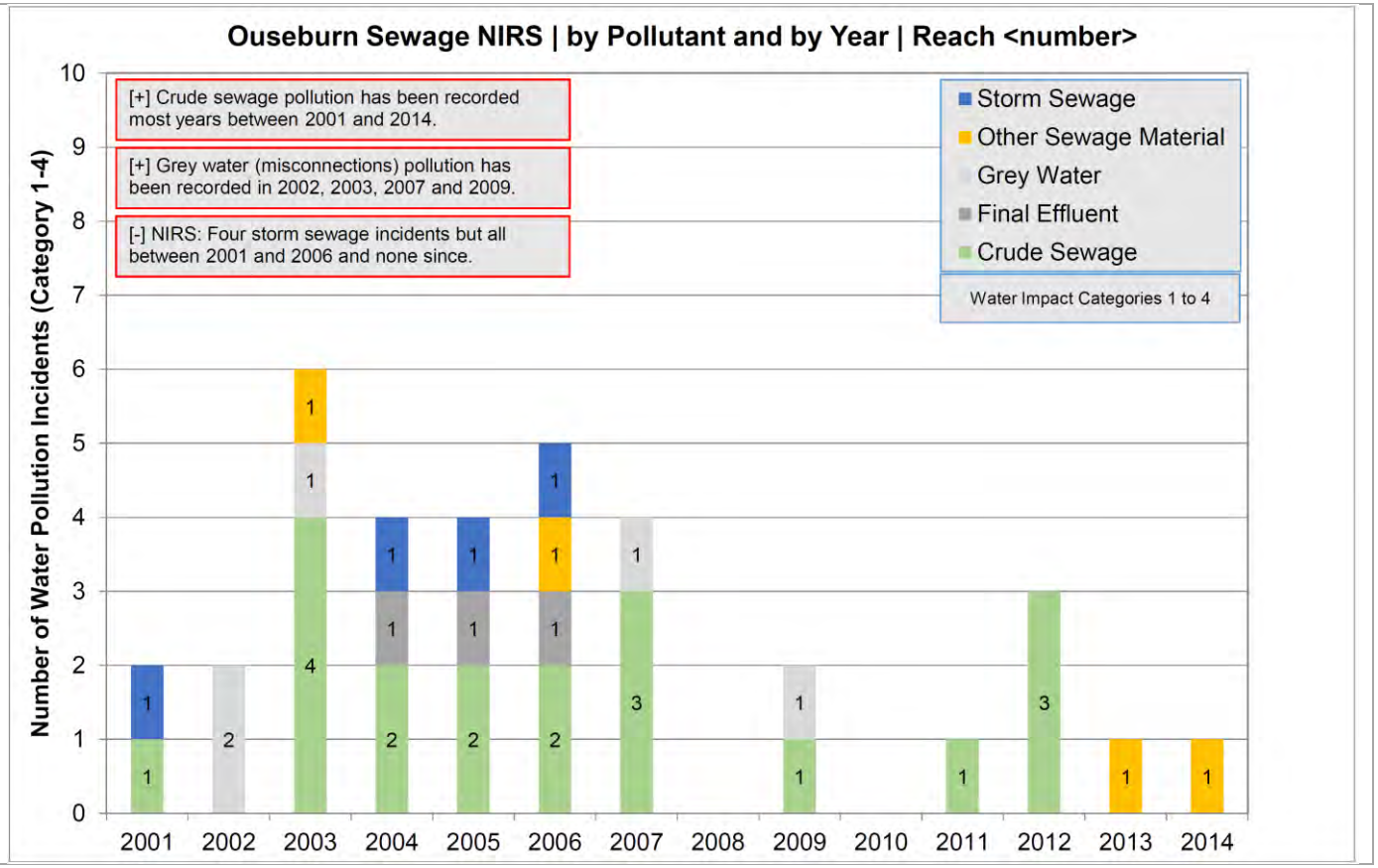
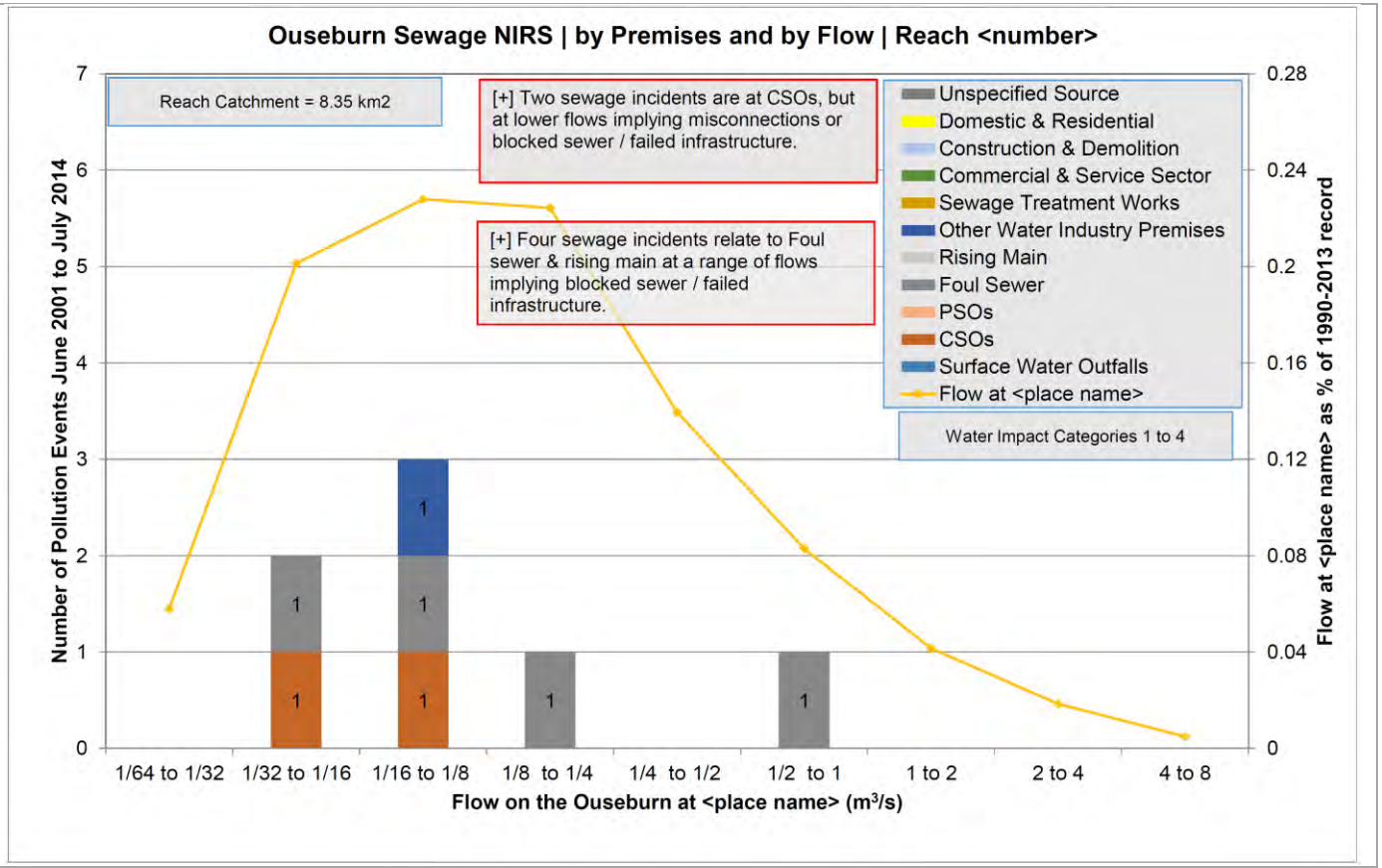
16.	More NIRS data – this time by pollutant and by reach. This is for the number NIRS category 1-3 incidents. Not every reach had this graph printed in the pack Source of original data: Environment Agency (but processed by project team)	*"The incident here relates to crude sewage rather than grey water", or "compared to other reaches there have been a moderate number of sewage events in this reach", or "category 1-3 incidents are few in number compared to many other reaches"*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
17.	More NIRS data but this time by year instead of by category. Source of original data: Environment Agency (but processed by project team)	*"Crude sewage pollution is an intermittent but ongoing problem" or, "Grey water pollution has been recorded here in 2002, 2003 and 2007."*	

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
18.	A closer look at sewage NIRS - compared to flow conditions. Source of original data: Environment Agency (but processed by project team)	*"Two sewage incidents are at CSOs, but at lower flows, implying misconnections or a blocked sewer or failed infrastructure" and "Four sewage incidents relate to foul sewer and rising main at a range of flows, implying blocked sewer or failed infrastructure"*	

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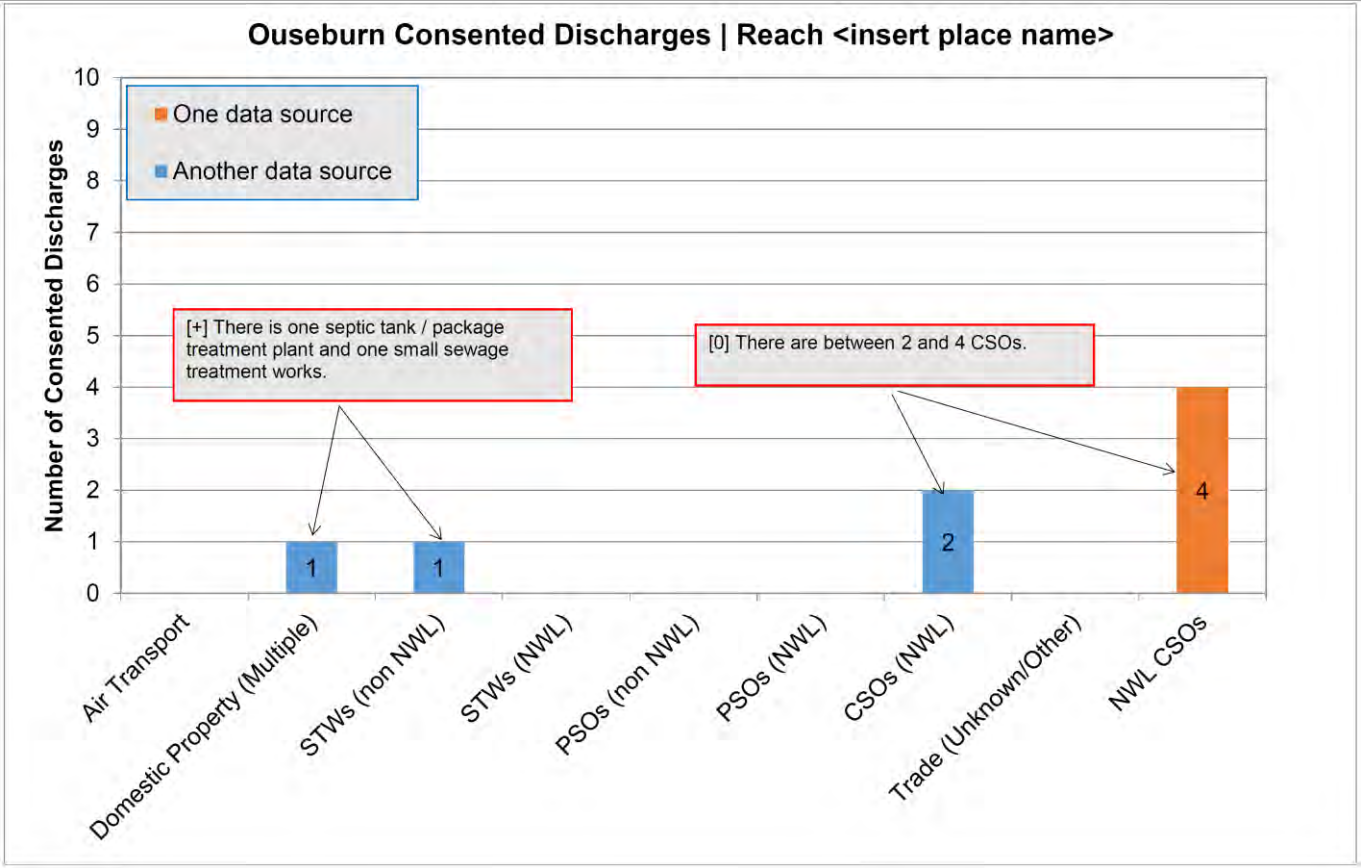
19.	Consents. Number of consented discharges by type, combining data from the Environment Agency and the Water Company. Source of original data: Environment Agency (but processed by project team)		

	Graph or chart description	Examples of "call-out box" conclusions that chart illustrates	Illustration
20.	Estimated phosphate loading from small Sewage Treatment Works - again combining data - for all the reaches. This graph also had a line indicating cumulative loading. Source of original data: Environment Agency (but processed by project team)	*"The sewage treatment works add a reasonably significant orthophosphate load, but this is already accounted for in the shortfall noted on the SAGIS plots"*