

# THE GAYWOOD RIVER

once a source of  
crystal-clear  
water

now the water  
quality is poor

wildlife in the  
river and nearby is  
absent

and there are  
few if any  
positives

why?

# QUICK INTRODUCTION



For the past 25 years I have been using and developing GIS and other spatial technology, but chalk rivers and the wider water environment a focus since 2010



PhD researched how spatial technology (GIS, AR, VR, digital hubs and citizen science) can contribute to managing landscapes at a catchment scale.



Practical geographer too - experienced with API, river geomorphology, NFM, fixed point photography and MorPH condition surveys, and peat restoration



The research which spanned four years and was funded by the ESRC developed apps for use in real world projects with local rivers trusts, specialised in lowland chalk river systems, ecosystem services and ecological network mapping



Lots of different roles! Such as project support & management for catchment partnerships and the EA, Green spaces mapping for UEA and peatland restoration opportunities.



Volunteer for Norfolk Rivers Trust as a data manager on the Wensum and Lark CasTCO project, a three-year pilot demonstrating the value of water quality monitoring by citizen scientists.





# CHALK STREAMS



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The world has fewer than 300 chalk streams - and England has most of them. These streams occur only where chalk bedrock meets the Earth's surface, making them globally rare.

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Their stable, cool, nutrient-rich waters allow chalk streams to support an exceptionally high number of species - so much so that these habitats are sometimes described as "England's rainforests".

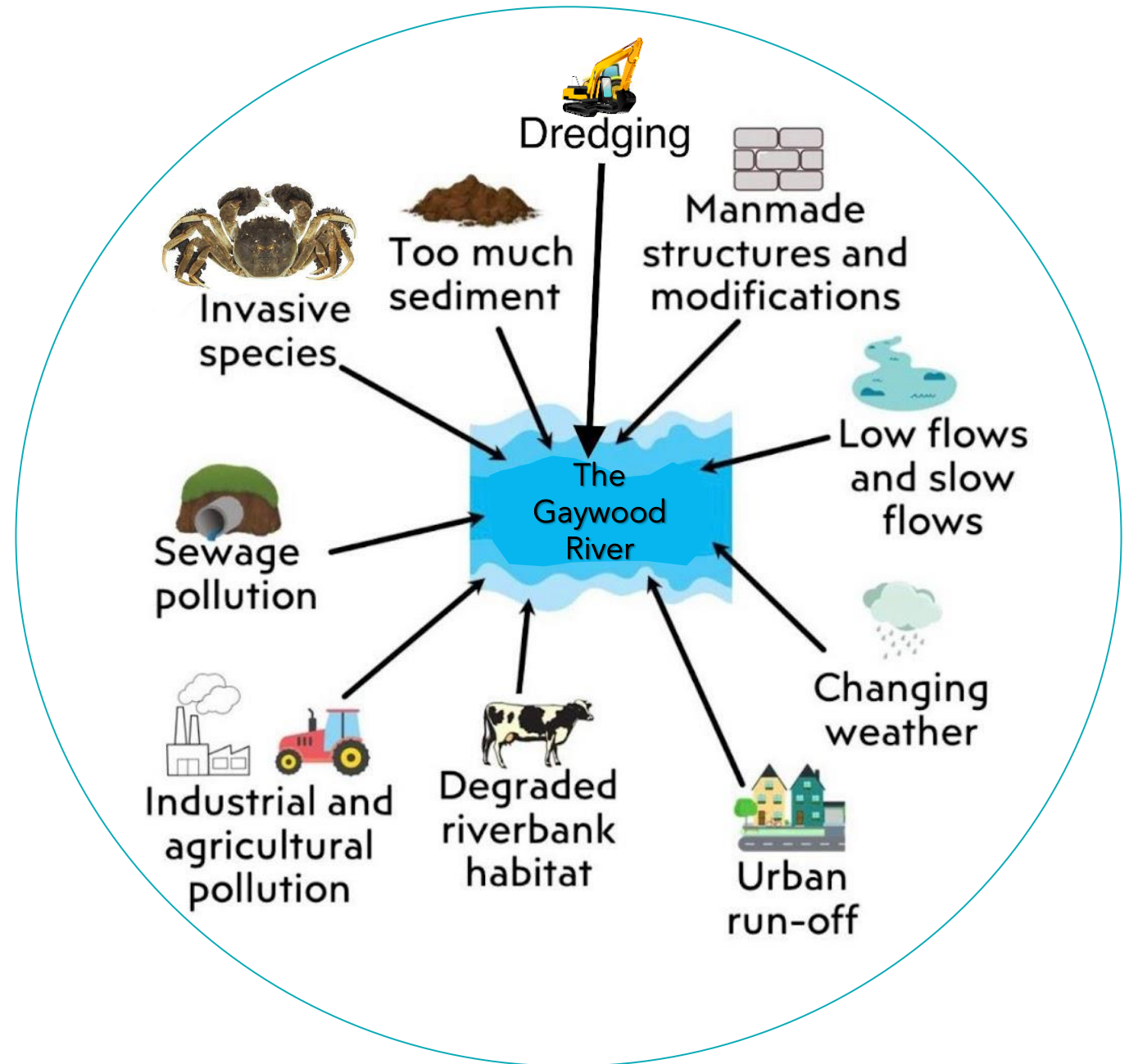
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Sadly, although some teem with life, the health of England's chalk streams is threatened by a wide range of human activities. As a result, many of the country's - and thus the world's - chalk streams are not reaching their ecological potential.





# WHAT'S CAUSING THE ISSUES?



# WATER QUALITY – SEWAGE & ROAD RUNOFF

Infrastructure is overwhelmed easily by rain (and more flash events happening)

STW struggling to meet capacity, but more housing is planned

Septic tank point sources are harder to test due to access but should not be ignored

Road runoff also affects wildlife



11.0 P = 3.94mg/l  
BUT the WFD target for chalk rivers is 0.04mg/l





# CHANNEL MORPHOLOGY



Over straight and over wide channels remove the ability of the chalk stream to 'wobble' which cleans the gravel, oxygenates the water and allows silt to settle out of the system



Incised channels disconnect the river from its natural floodplain and increase the risk of flooding downstream - the aim should be to slow the flow across the whole catchment -







*Black anaerobic silt devoid of invertebrates*

## SEDIMENT

- Sediment generated through routine maintenance smothers gravels and turns the river (and swans) brown
- Over-wide and over-deep channel leads to slower flow - with no meandering channel the water is less oxygenated impacting fish
- The thick silt is heavily polluted with little life





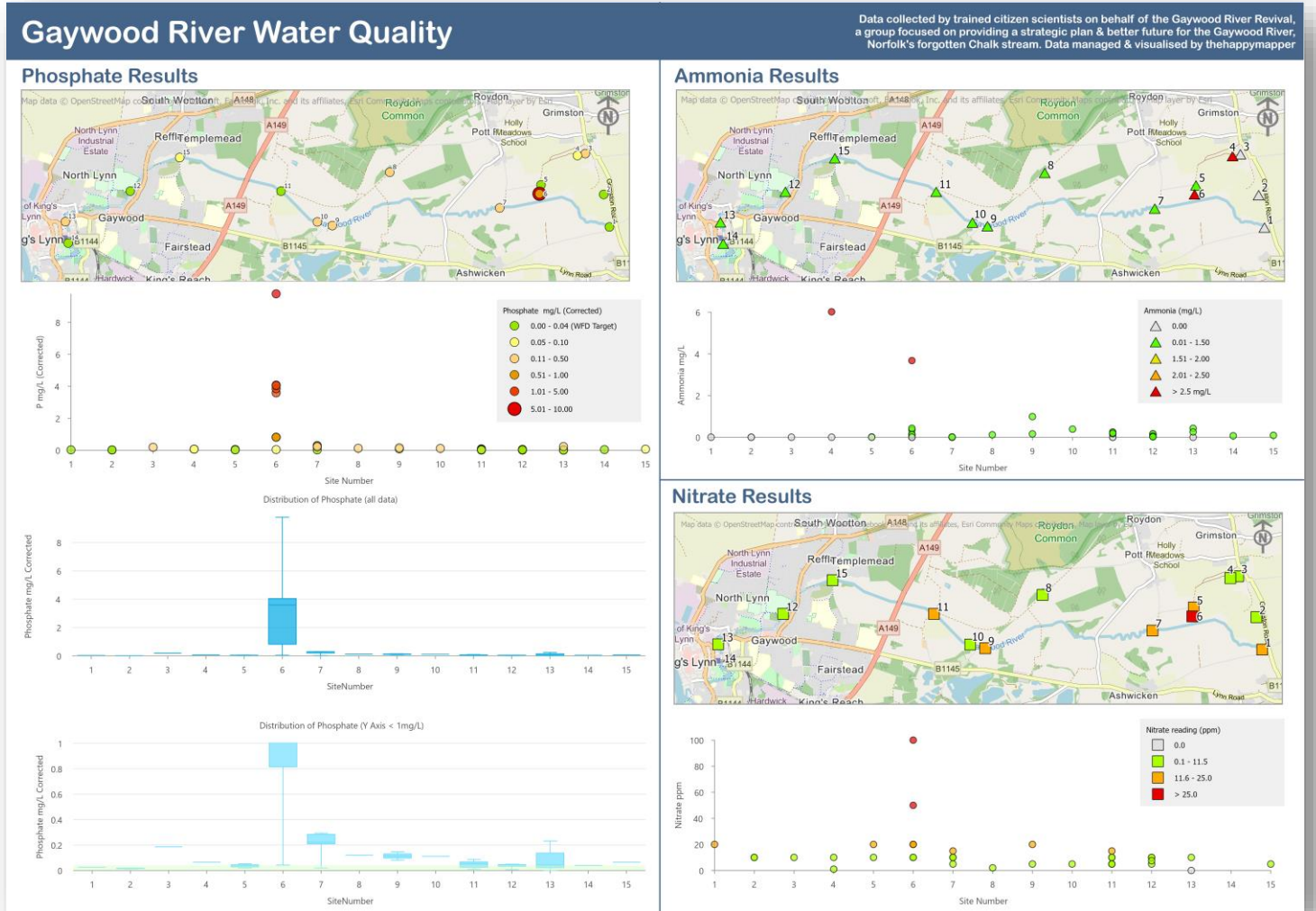


# CITIZEN SCIENCE

Over a year ago several committed citizen scientists began testing the water quality in the Gaywood.

The testing regime for Phosphate has been independently verified as correlating with the Environment Agency tests and the results are not good.

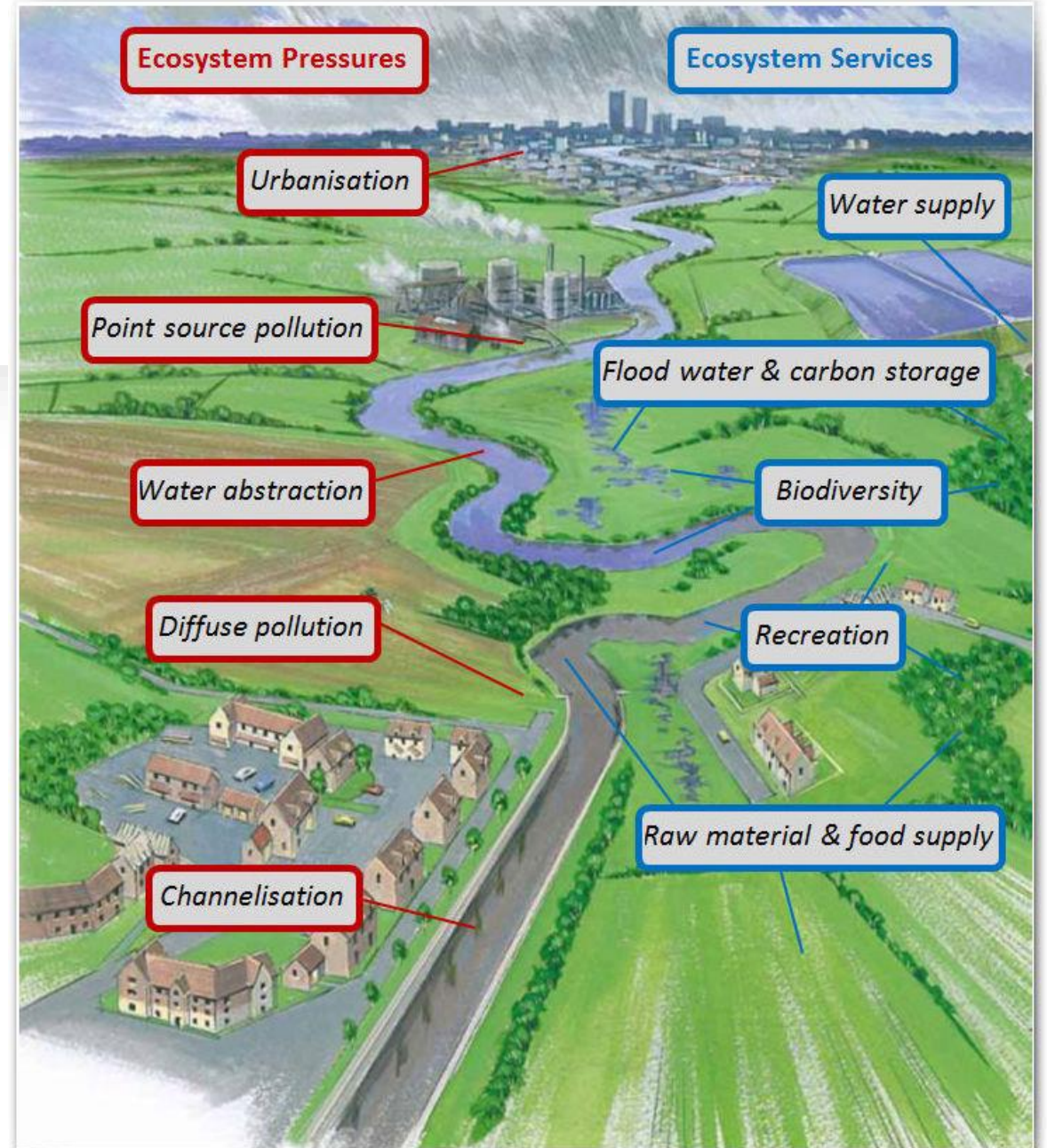
There are several point sources of Phosphate within the catchment affecting water quality and further investigation is critical





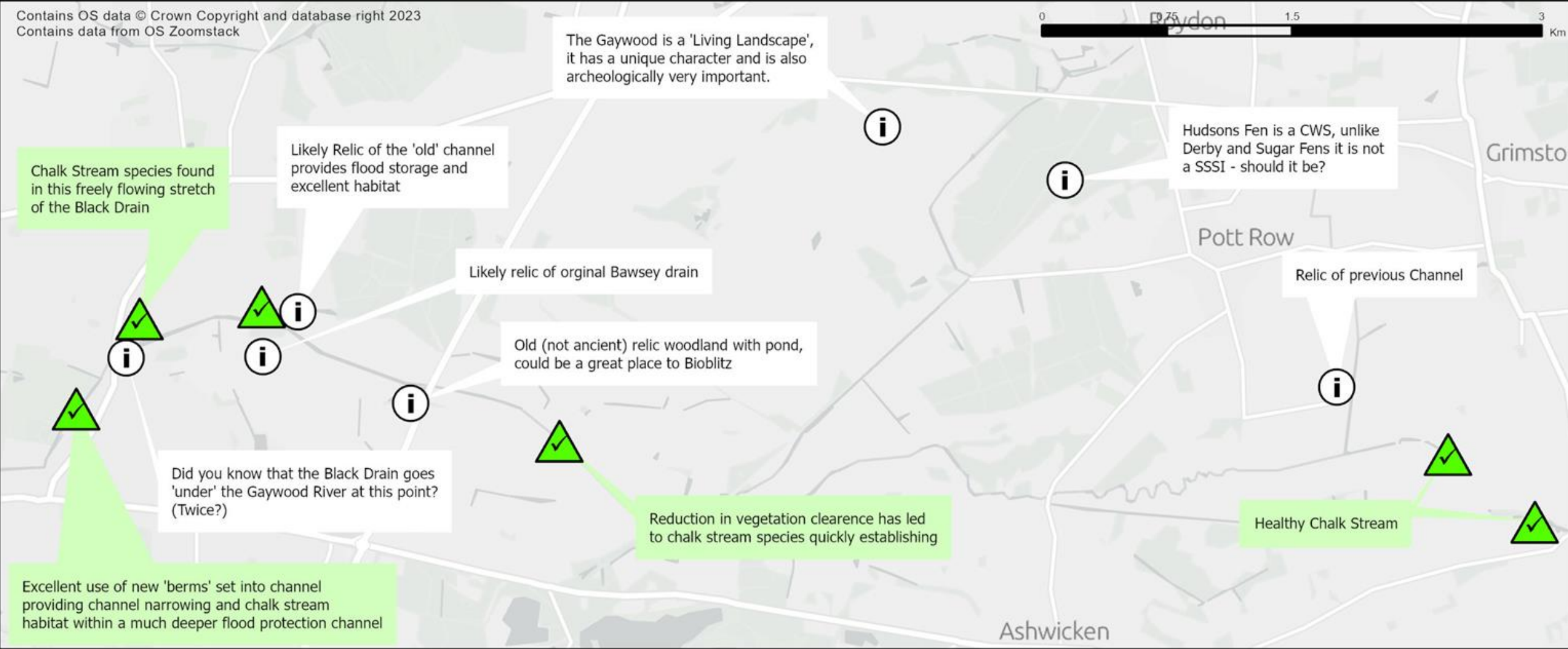
# THE GAYWOOD CATCHMENT DATABASE

- Created in 2011 to collate data on the ecosystem services in the rural and urban landscape.
- The datasets were used to assess stakeholder engagement with their surroundings, map paleochannels, and map ecological connectivity /within the landscape
- Using more advanced geospatial tools visualisations of future landscapes were also created with stakeholders
- Regularly updated with a wide range of data it is now a powerful tool containing information on habitat condition, water quality and opportunities for improvement





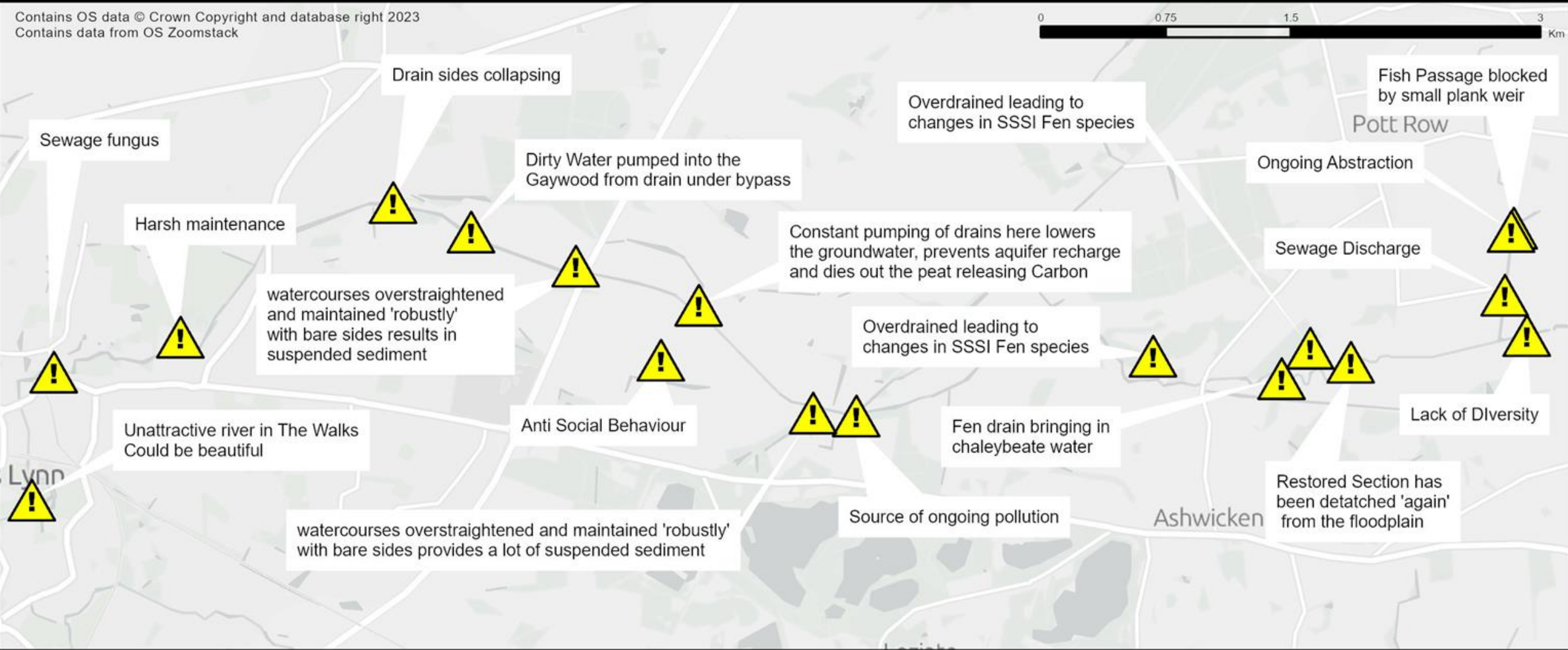
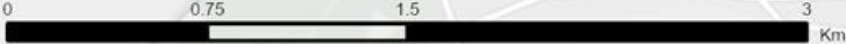
# NOT ALL OF THE CATCHMENT IS IN BAD CONDITION



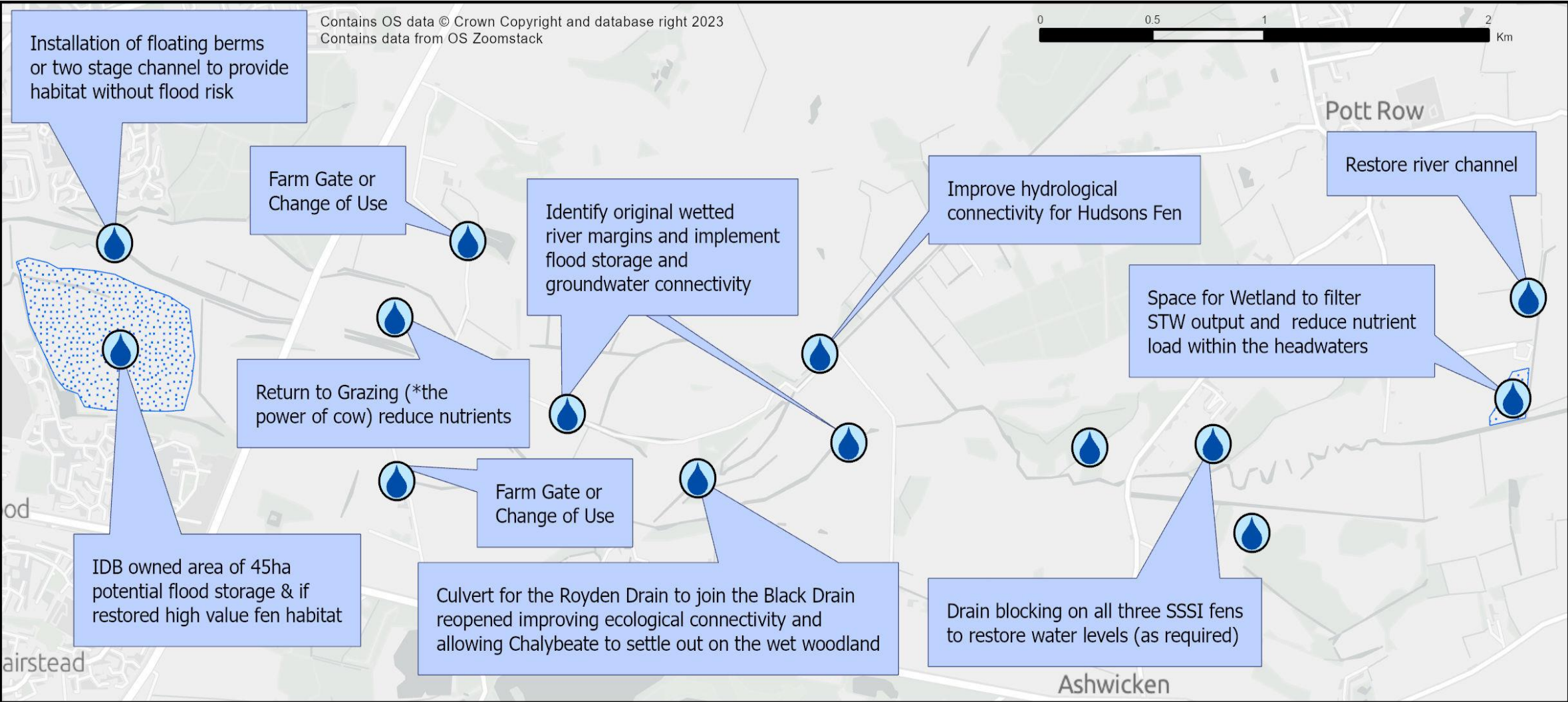


# SOME OF THE PROBLEMS

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Contains data from OS Zoomstack



# EXAMPLE - IDENTIFYING IMPROVEMENTS

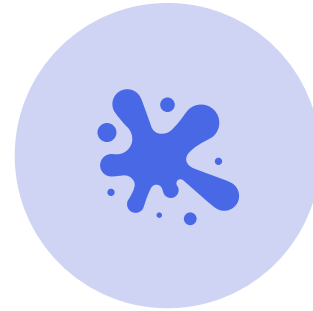




# THESE INTERVENTIONS COULD ACHIEVE THE FOLLOWING



- Improved biodiversity along the river corridors



- Improved water quality (colour and chemical)



- Greater resilience to ever-increasing rainfall events and reduced flood risk



- Improved benefits to the community





LOOKING  
FORWARD

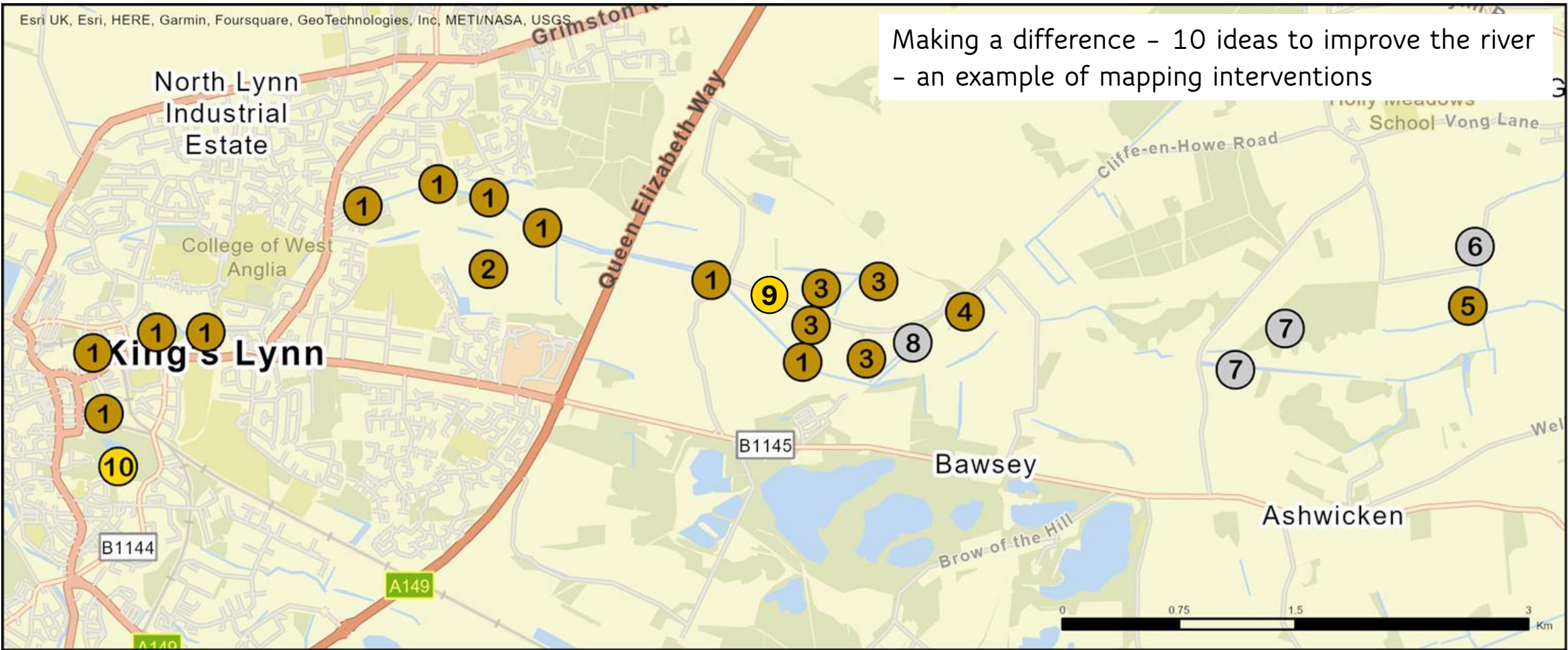




WHAT  
CAN  
KLWNBC  
DO?

1. Support the creation of a catchment group which involves all the stakeholders in the catchment, the issues and the possible solutions to create a short-, medium- and long-term plan for this unique landscape
2. A major barrier to river and habitat improvements has been the complexity of the catchment and the flood risk to Kings Lynn of changes to the river - flood modelling is a necessity and any assistance in funding this report would unlock opportunities
3. Fund additional citizen science water testing kits to collect better resolution data on the water health of the river
4. Support a catchment scale Bio Blitz to establish the presence of species within the area and assess habitat restoration locations

Making a difference - 10 ideas to improve the river - an example of mapping interventions



**Bronze:** 🏆

- 1. Change maintenance to allow chalk river to flow and floating berms to be placed in channel where river is impounded and no vegetation
- 2. Rewet the fens at springwood (flood storage)
- 3. Scrapes at Bawsey on fields to formalise the wetted areas (aquifer connectivity)
- 4. Silt traps on Roydon drain
- 5. Wetland below Sewage Treatment Works

**Silver** 🏆

- All of the above but with;
- 6. remeandered section above stw
- 7. additional drain blocking on sugar and Leziate fens with reconstruction of the hydrological regime and reintroduction of species
- 8. Roydon drain placed in culvert under bridge again and connected to black drain which will have its own habitat restoration of scrapes (flood storage)

**Gold** 🏆

- 9. All above but with channel reconstruction along entire length from Bawsey train line to the springwood cycle bridge. Below cycle bridge in channel two stage berms to allow for habitat and flood protection right down to the walks.
- 10. dipping platform in the walks and new display boards celebrating the return of iconic chalk stream species



Top L: The Wandle in London, Top R the Dour in Dover,  
Bottom L: The River Misbourne  
Bottom R The Great Stour in Canterbury,

THANK YOU  
FOR  
LISTENING

