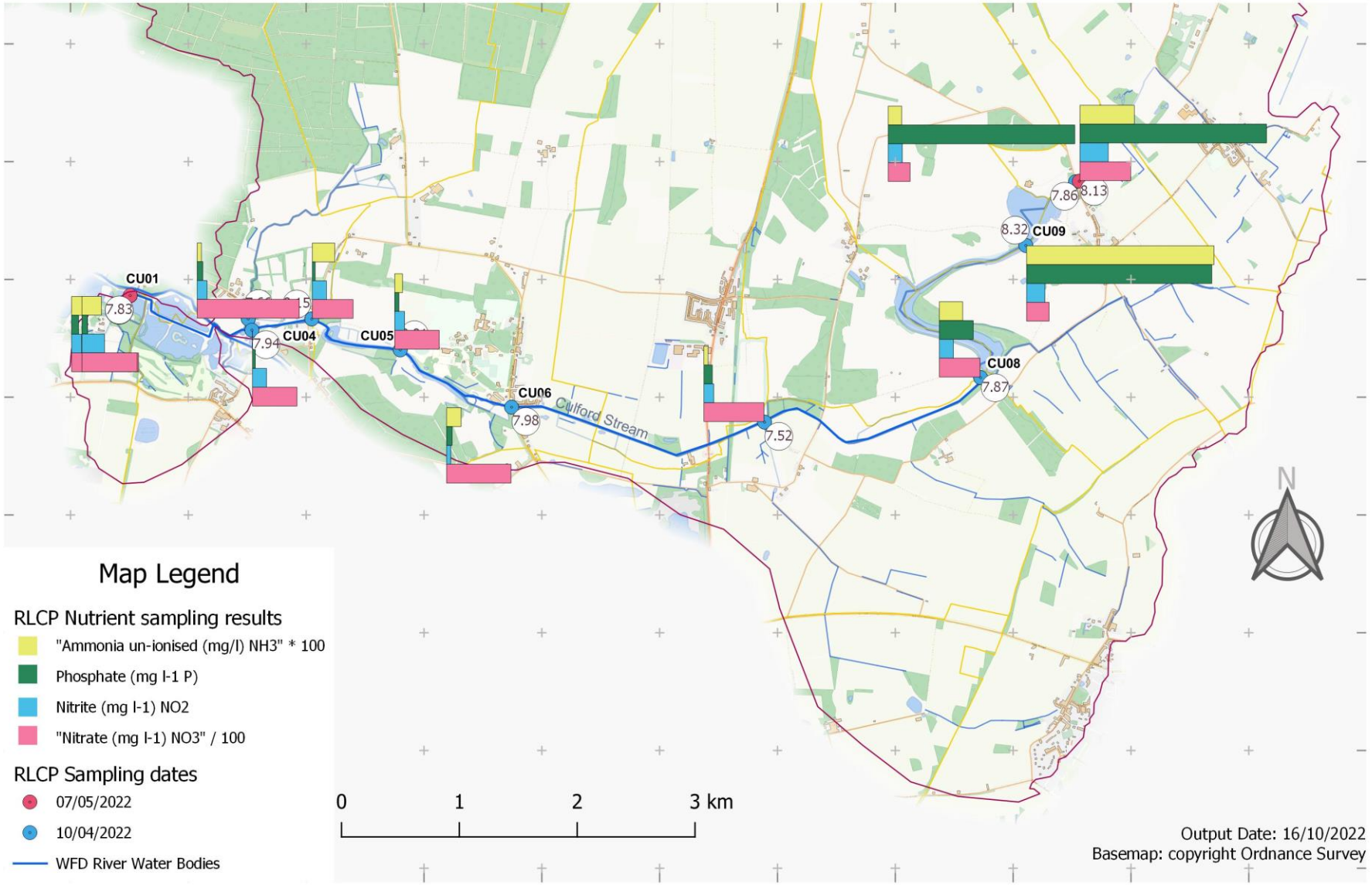
Culford Stream Sampling Points - Nutrient Results



Results analysis

Ammonia The high values measured at Ampton Upstream are not seen either at the source or at the confluence of the Culford Stream.

Nitrates The nitrate levels are at the lower end of the overall tributary measurements so far.

Phosphates very high at source. Revised sampling point even higher values than on previous occasion (previous headwater see CU10)

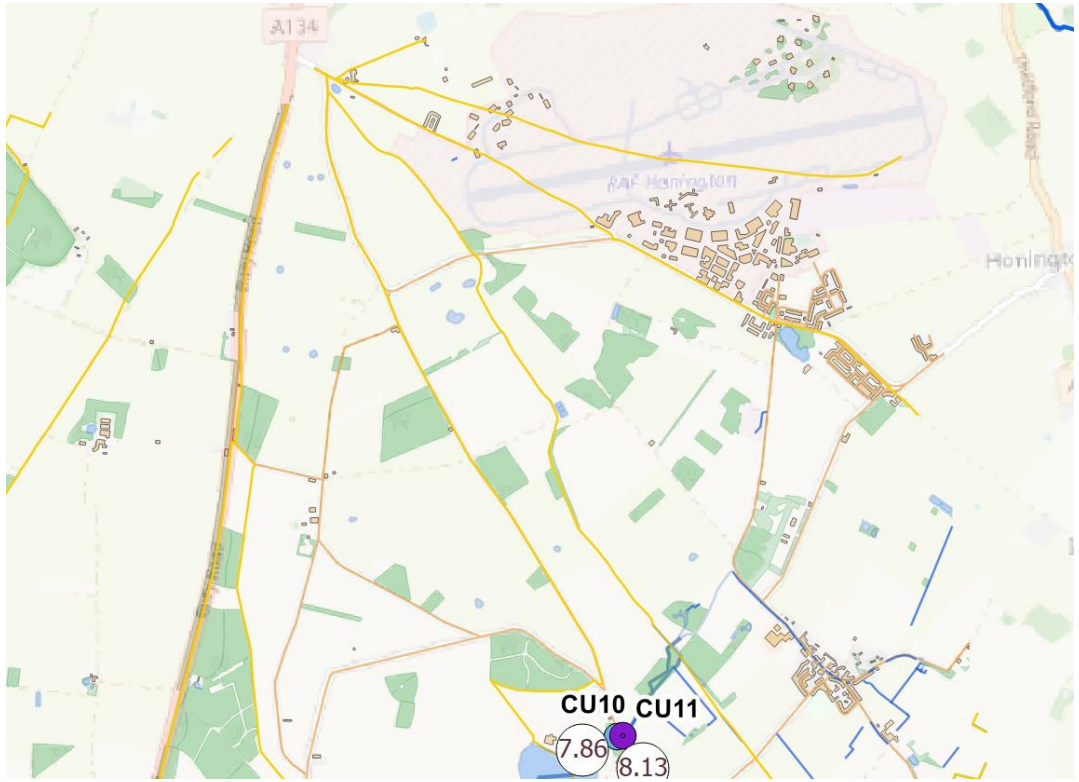
Results have been shared with the Environment Agency who have suggested RLCP follow-up action in the relevant part of the sub-catchment. Most of the target area is agricultural but there are several villages and RAF Honington

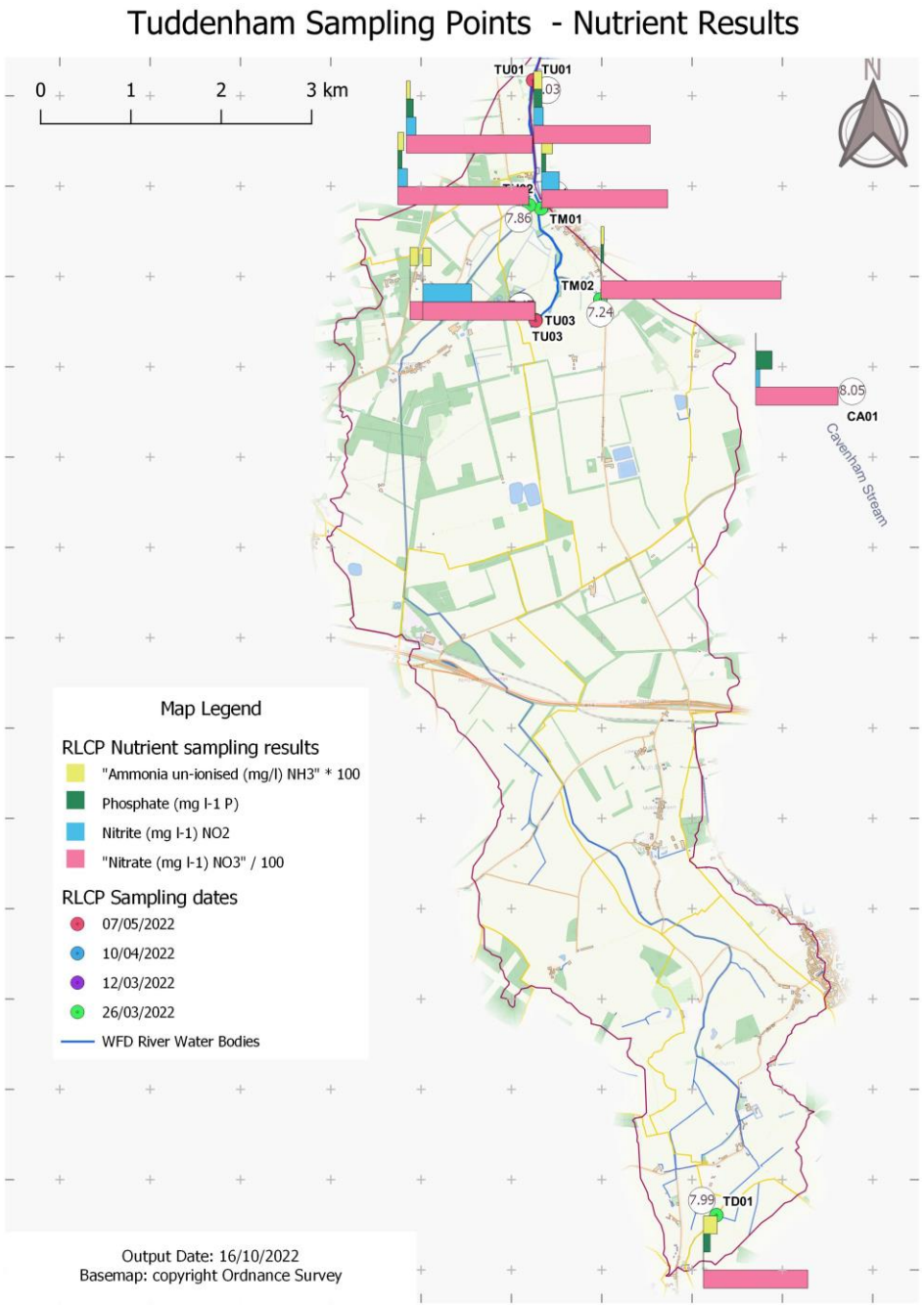
Sample Point	Name	Date	pH	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
CU01	Culford Stream (Fullers Mill)	12.03.2022	8.18	0.00079	0.0387	10.7	47.401	0.02	0.0658	0.14	0.0462
CU02	Culford Stream (West Stow Pumping Sn)	10.04.2022	7.66	0.0003	0.0516	16.3	72.209	0.02	0.0658	0.13	0.0429
CU03	Culford Stream (Larkwood Lakes)	10.04.2022	7.94	not recorded	<0.0258	7.1	31.453	0.03	0.0987	0.07	0.0231
CU04	Culford Stream (West Stow)	10.04.2022	8.15	0.00159	0.0774	6.5	28.795	0.03	0.0987	0.05	0.0165
CU05	Culford Stream (Iron Bridge)	10.04.2022	8.01	0.00056	0.0387	7.1	31.453	0.02	0.0658	0.1	0.033
CU06	Culford Stream (Culford Village)	10.04.2022	7.98	0.00103	0.0903	10.3	45.629	0.01	0.0329	0.12	0.0396
CU07	Culford Stream (Timworth Church)	10.04.2022	7.52	0.00029	0.0645	9.6	42.528	0.02	0.0658	0.17	0.0561
CU08	Culford Stream (Ampton Downstream)	10.04.2022	7.87	0.00165	0.1677	6.5	28.795	0.03	0.0987	0.72	0.2376
CU09	Culford Stream (Ampton Upstream)	10.04.2022	8.32	0.01326	0.4386	3.6	15.948	0.04	0.1316	3.98	1.3134
CU10	Culford Stream (Gt Livermere)	10.04.2022	7.86	0.00096	0.0903	3.5	15.505	0.03	0.0987	>4	>1.32
CU01	Culford Stream (Fullers Mill)	07.05.2022	7.83	0.00138	0.1032	8.8	38.984	0.05	0.1645	0.12	0.0396
CU11	Culford Stream (Gt Livermere)	07.05.2022	8.13	0.00385	0.1032	8.1	35.883	0.06	0.1974	>4	>1.32

Follow-up : Ampton

RLCP has made contact with the landowner at Ampton who is very interested in the results. Two possible causes for the higher ammonia readings at CU09 were discussed. There are a large number of wildfowl resident at Broadwater attracted by gamekeeper's supplementary feeds. There are also a large number of gulls that roost on the lake at night.

Recent work within the BFER (Brecks and Fen Edge and Rivers Heritage project) The eDNA survey results from the testing the waters do confirm both possible causes. The results from the volume of DNA detected show Highest being Wildfowl species and 2nd highest being Gull species on Broadwater, whereas gulls are not detected further downstream of the A134 on the Culford Stream. In conclusion the ammonia present would be from naturally from all types of birds using the mere together with additional nutrient as a consequence of supplementary wildfowl feeds.





Results analysis

Ammonia In range of other tributary ammonia measurements

Nitrates Measurements at Mitchell head close to the source show high nitrate values as did measurements at the Tuddenham STW

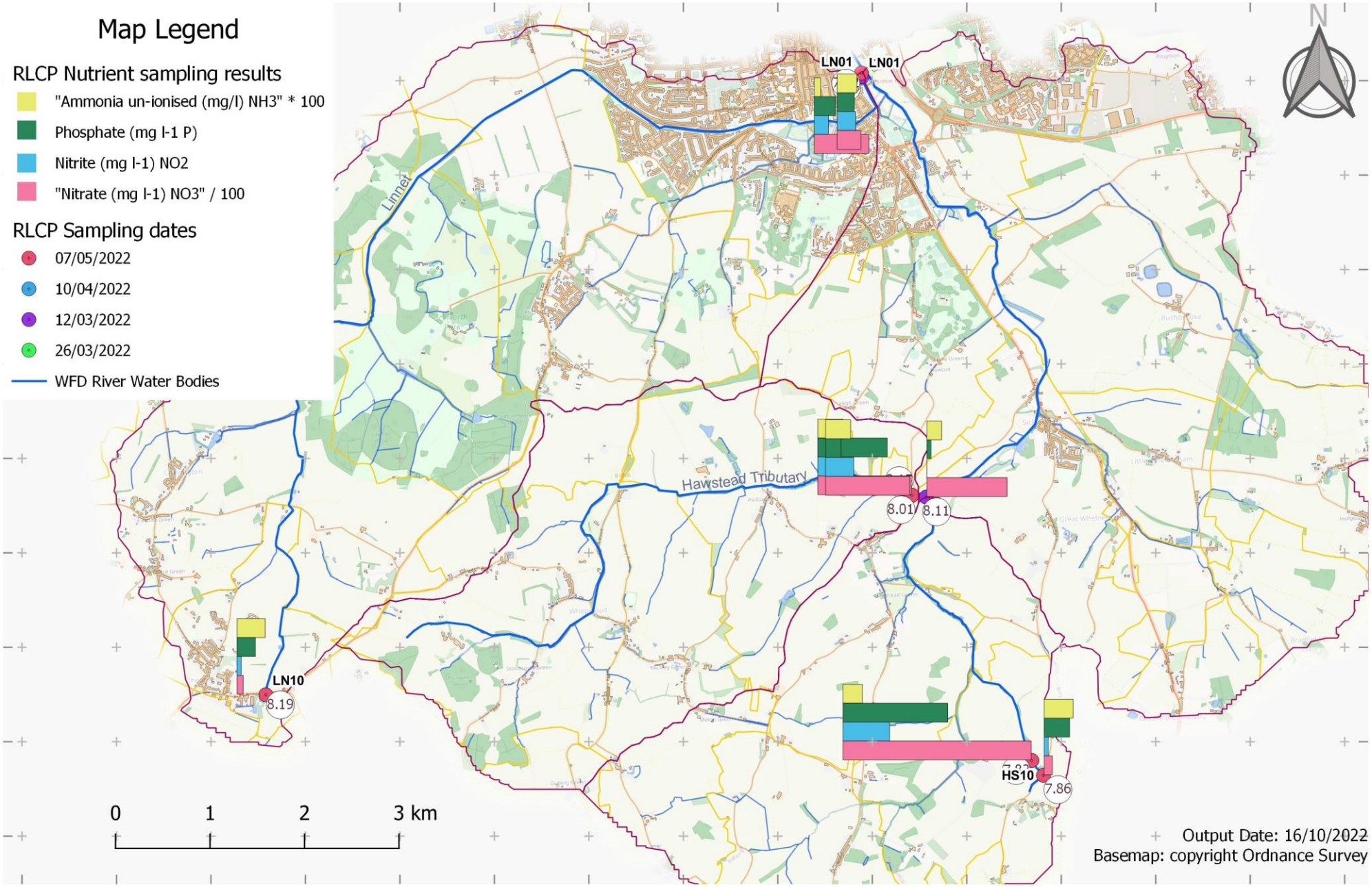
Phosphates Low in relation to general tributary measurements so far. The contribution of the Tuddenham STW appears small. This does not correlate with the fact that the Tuddenham STW is due an AW investment to reduce phosphate by 0.5 mg/litre by 2024.

Supplementary information

Loss of EA sampling points 2015-2022 The Tuddenham Mill stream sampling point has been discontinued as part of a 30% EA reduction on the Lark.

Sample Point	Name	Date	pH	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
TU01	Tuddenham Stream	12.03.2022	7.72	0.0006031	0.0774	19.4	85.942	0.02	0.0658	0.17	0.0561
TM01	Tuddenham Stream (Mill Pond)	26.03.2022	7.94	0.0007958	0.0645	21	93.03	0.04	0.1316	0.1	0.033
TU02	Tuddenham Stream (Road Bridge)	26.03.2022	7.86	0.0004382	0.0387	21.8	96.574	0.02	0.0658	0.1	0.033
TM02	Tuddenham Stream (STW)	26.03.2022	7.24	0.000219	0.0774	>30	>132.90	<0.01	<0.0329	0.07	0.0231
TU03	Tuddenham Stream (Mitchell Head)	26.03.2022	7.57	0.0006212	0.1161	20.9	92.587	<0.01	<0.0329	<0.05	<0.0165
TD01	Tuddenham Stream (Dunstall Green)	26.03.2022	7.99	0.0010233	0.0774	17.4	77.082	<0.01	<0.0329	0.16	0.0528
TU01	Tuddenham Stream	07.05.2022	7.03	0.0002834	0.1419	21	93.03	0.02	0.0658	0.16	0.0528
TU03	Tuddenham Stream (Mitchell Head)	07.05.2022	7.47	0.0005953	0.1032	18.7	82.841	0.11	0.3619	<0.05	<0.0165

Hawstead and Linnet Sampling Points - Nutrient Results



Hawstead Stream

Analysis of Results

Ammonia in range of other tributary ammonia measurements.

Nitrates A high contribution by the Hawstead STW seems likely. EA standard measurement of treated wastewater at the point of releasing into rivers do not include nitrate measurement, nor are there nitrate limits in permits.

Phosphates High at treatment works but significant dilution as measured at confluence.

Supporting information

Loss of EA sampling points 2015-2022 - Hawstead Hall, Pinford Road End

The Hawstead STW is located near the headwaters of the Hawstead Stream.

It is due for an upgrade to reduce phosphate by 0.4 mg/litre shortly.

River Linnet

Analysis of Results

Ammonia Levels higher than all measurements so far other than Ampton Upstream

Nitrates One of the lowest levels of nitrates recorded so far. More information needed on the level of nitrates in the land and whether fertiliser use is less.

The STW is quite small - permit details on permitted flow are however not yet available.

Phosphates High at source and slightly lower at the confluence. Limited dilution and no additional phosphate run-off. Again STW contribution limited by size

Suspended solids Higher than elsewhere, no obvious explanation but numbers of urban inlets upstream of the confluence may make a contribution.

Sample Point	Name	Date	pH	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
HW01	Hawstead Tributary	12.03.2022	8.15	0.001780472	0.1032	13.4	59.362	0.06	0.1974	0.34	0.1122
HS01	Lark US Hawstead	12.03.2022	8.11	0.001039409	0.0645	12.8	56.704	<0.01	<0.0329	0.09	0.0297
HS10	Lark US Hawstead (Stanningfield)	07.05.2022	7.86	0.002058503	0.1677	1.3	5.759	0.01	0.0329	0.54	0.1782
HS09	Lark US Hawstead (Sewage Works)	07.05.2022	7.82	0.001369776	0.1032	>30	>132.90	0.1	0.329	2.25	0.7425
HW01	Lark Hawstead (Confluence)	07.05.2022	8.01	0.001790763	0.1032	14.9	66.007	0.03	0.0987	1.48	0.4884

Sample Point	Name	Date	pH	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
LN01	Linnet	12.03.2022	7.58	0.000448956	0.0903	8.7	38.541	0.03	0.0987	0.44	0.1452
LN10	Linnet (Chedburgh)	07.05.2022	8.19	0.001995278	0.0774	1	4.43	0.01	0.0329	0.4	0.132
LN01	Linnet (Abbey Gardens)	07.05.2022	7.52	0.001386856	0.2193	3.8	16.834	0.04	0.1316	0.35	0.1155

Supporting information on the Linnet

Loss of EA sampling points 2015 - 2022: Church Street , Chedburgh, Chevington Bridge, Raingate Street

The RLCP-selected headwater sampling point now appears to be the same as the discontinued EA Church Street Chedburgh sampling point.

Linnet in Ickworth Estate The Linnet enters from the south-west to a point in the middle of the estate TL 80699 61330 before going northwards downstream towards Bury. This is the point where the flow from the Estate lakes, one by the walled garden and the other upstream lake called the Fairy Lake join the Linnet. The Linnet is dry in summer. The weir on the Ickworth Estate lake is set to release water below a certain level in order to keep the lake at a standard minimum level.

The Linnet is due for a substantial water augmentation as follows before the end of 2024:

Anglian Water to discharge water into the river to ensure flows met the EFI (Environmental Flow Indicator) to protect the ecology. For planning purposes a maximum discharge of 1.6Ml/day is estimated to be needed but this is subject to further investigation.

[AW state augmentation location now Westley not the perennial head]

At maximum this will add around 6% to the flow measured downstream of Fornham. Using a value of 0.323 cubic metres/second equivalent to 28 million litres/day. at Fornham. This process can be googled as "groundwater compensation"

Downstream of Ickworth the Linnet disappears underground causing the lack of any water in the remaining length of the Linnet in the summer.

There is no record of raw sewage discharges/storm water overflows on the Linnet

The **Stanningfield STW** is not on the list of STWs for phosphorus reduction as it appears to be already emitting low phosphorus. It also has iron limits included in its permit recognising that iron-based reagents are used .

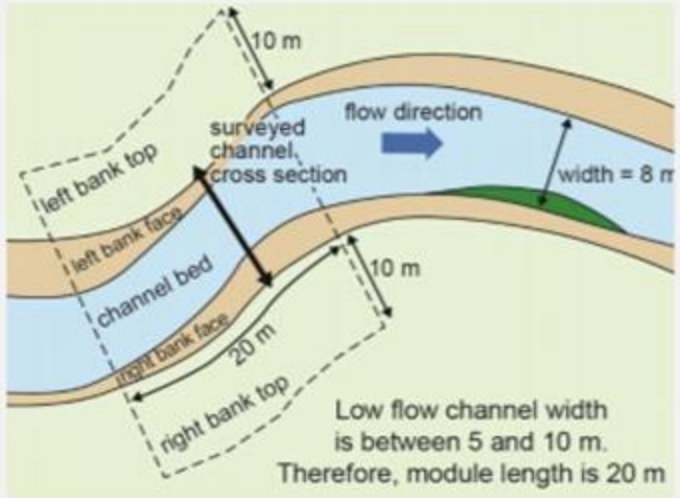
The effluent does have a dilution effect.

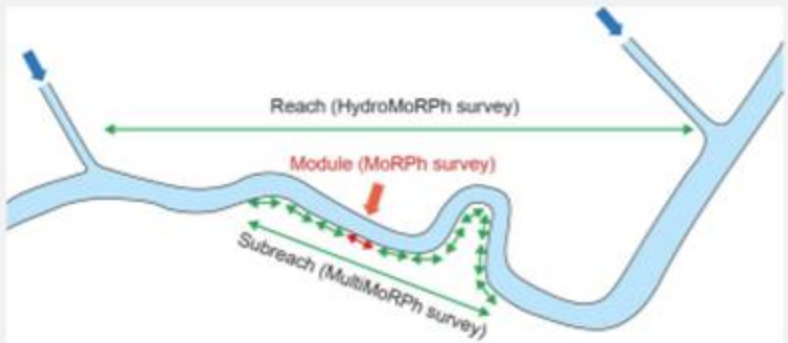
The **Chedburgh STW** now has an EDM with no storm discharges registered for 2021 . The Linnet is classed as ephemeral by the EA and therefore AW not planning an EDM at this point.

The **Chevington TPS** is scheduled for an EDM next year 2023

Modular River Survey:

MoRPh > MultiMoRPh > HydroMoRPh





Want to know more?

Go to

www.modularriversurvey.org

MoRPh Indicators:

Some Results from Chalk Streams

River Channel Characteristics

INDEX 1: Number of flow types

INDEX 2: Highest energy extensive flow type

INDEX 3: Number of bed material types

INDEX 4: Coarsest extensive bed material particle size

INDEX 5: Average bed material size

INDEX 6: Average bed material particle size class

INDEX 7: Extent of bed siltation

INDEX 8: Channel physical habitat complexity

INDEX 9: Number of aquatic vegetation morphotypes

Riparian characteristics

INDEX 10: Riparian physical habitat complexity

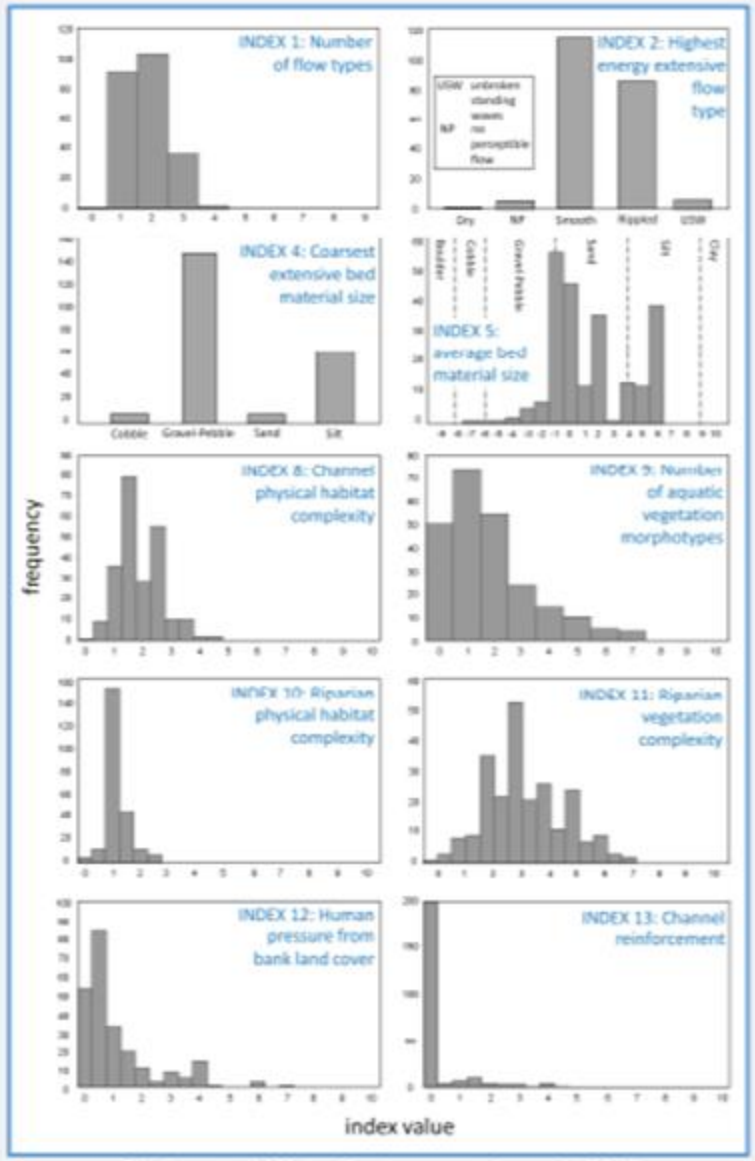
INDEX 11: Riparian vegetation complexity

Human pressures and impacts

INDEX 12: Degree of human pressure imposed by land cover on the bank tops

INDEX 13: Channel reinforcement

INDEX 14: Extent of non-native invasive plants



Shuker et al, Water Environment Journal, 2017

The River Lark
Catchment Partnership

SmartRivers Training
with Richard and Matt
from
WildFish.

Ten RLCP volunteers attended the first of two days of SmartRivers training in October. SmartRivers is a nationwide citizen science scheme helping to fill the monitoring gap through the collection and analysis of aquatic invertebrates.

The invertebrate records produced allow us to assess changes in invertebrate diversity and abundance, to highlight areas at risk. As the foundation of the food web, changes to invertebrate communities alter the natural balance of river systems. This has implications for wildlife, like fish, that rely on invertebrates as a food source.

The species found at each site are input into a database, which generates a water quality 'scorecard' identifying the impact of organic pollution, nutrient enrichment, sediment, chemicals and flow stress. This provides invaluable insight into the condition of the habitats wild fish populations depend on.

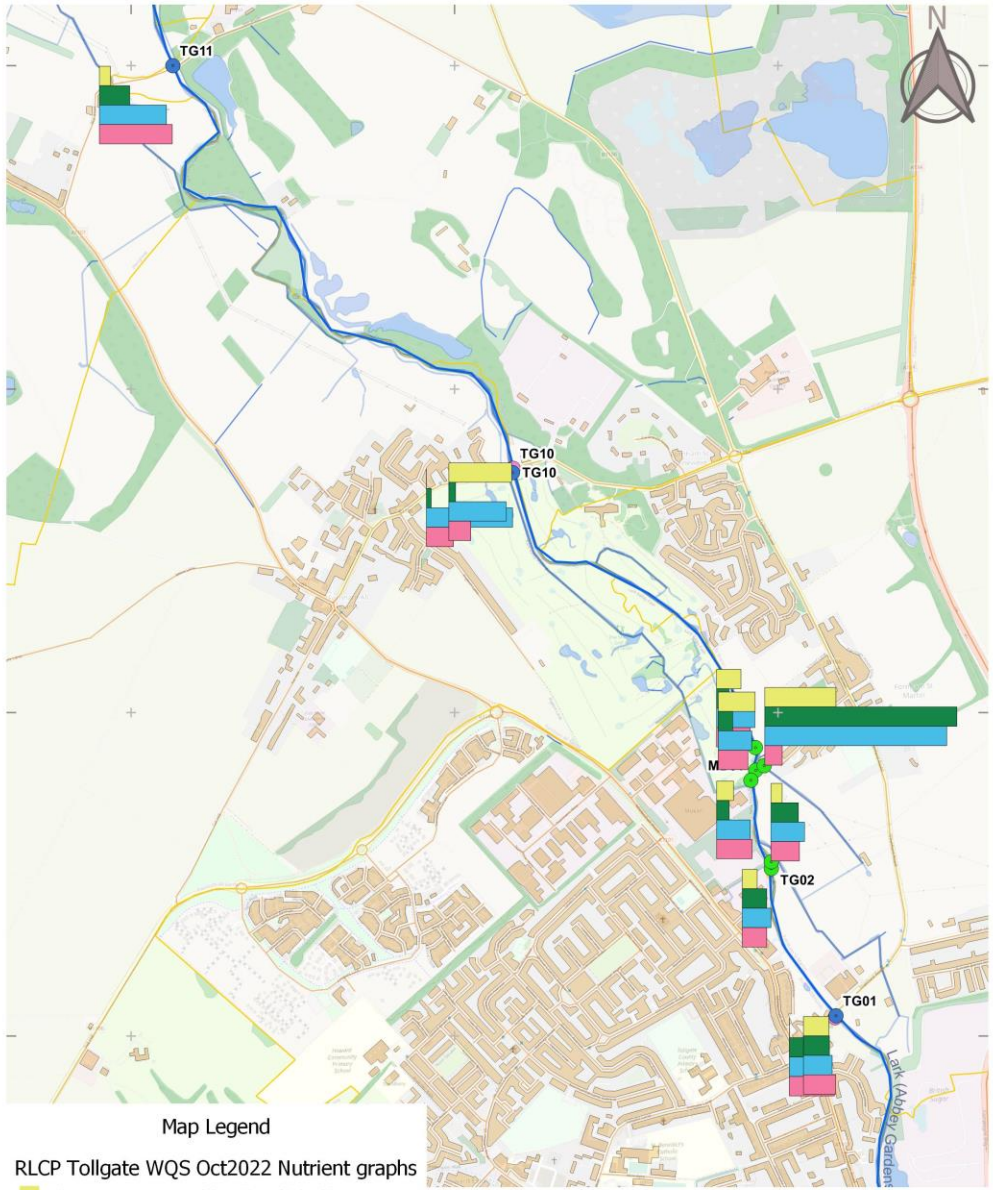
Our volunteers detect invasive species, providing better insight into their distributions. Finding certain invertebrate species can also be indicative of climate change pressure. Both climate change and the presence of invasives can change ecosystem functioning which impacts wild fish.

The second day of training will be held in Spring 2023.

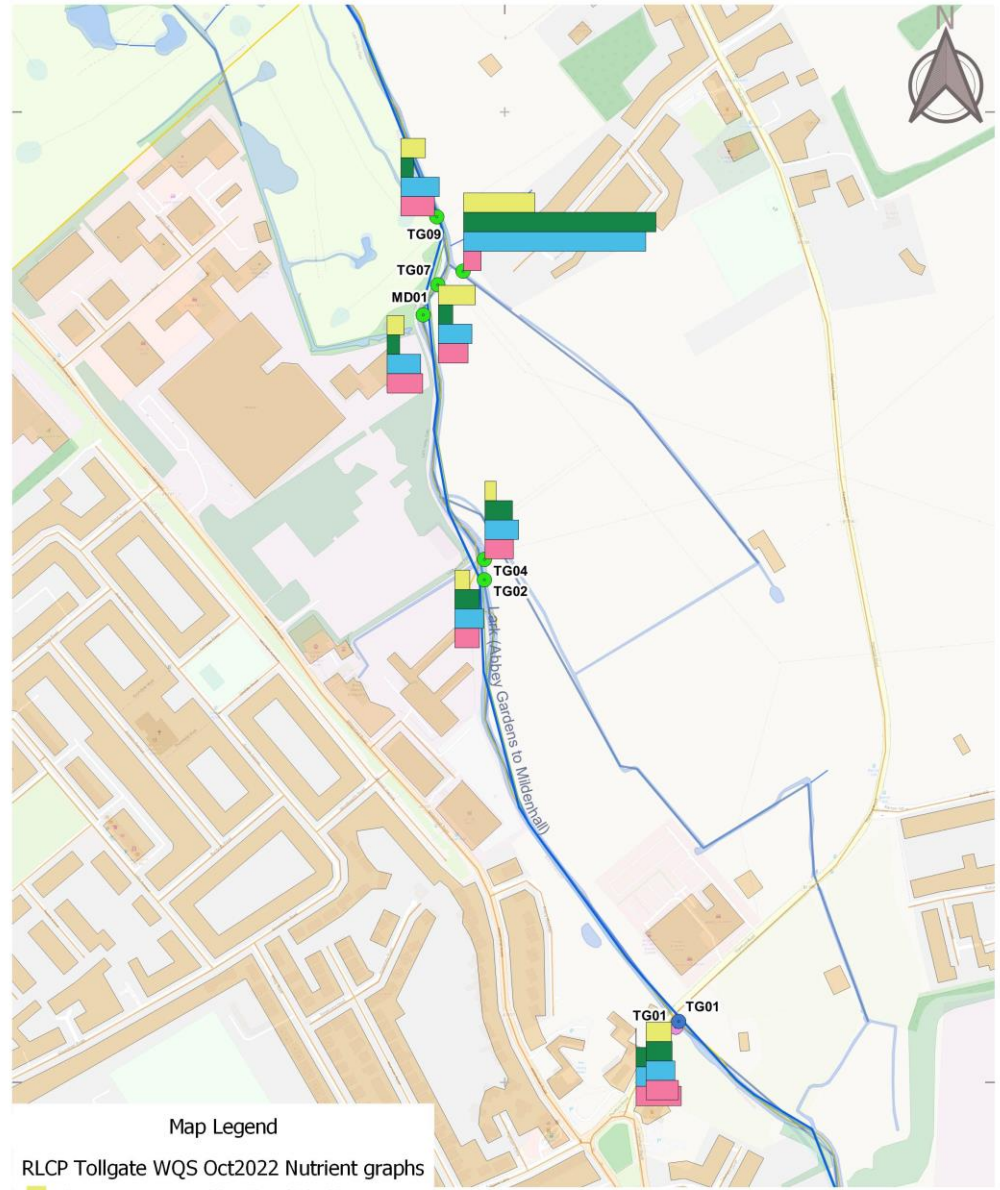
Water Quality Testing
15th September 2022
10 ml
10 ml

Water Quality Testing
10th October 2022

Tollgate Project Sampling Points - Nutrient Results

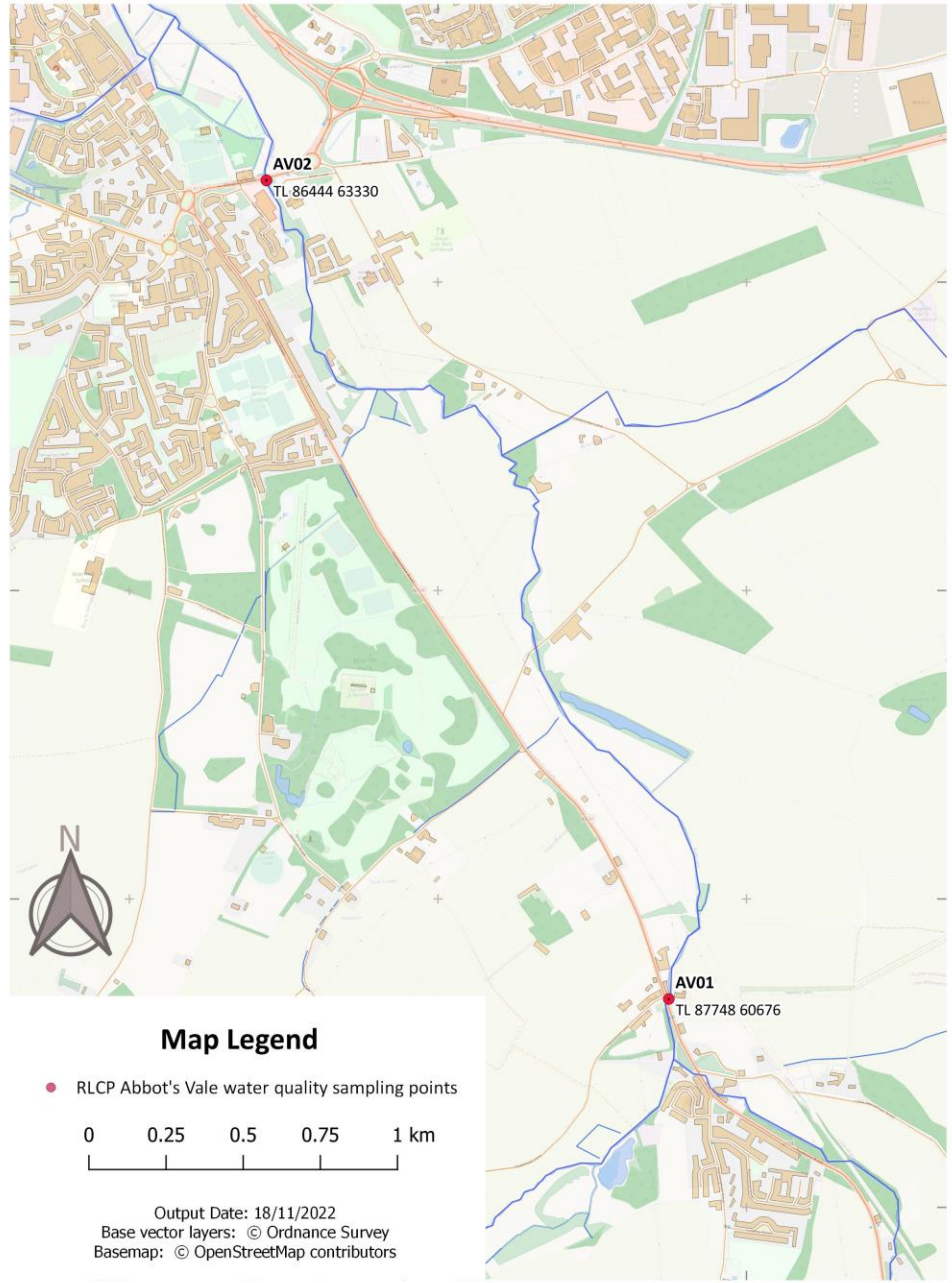


Tollgate Project Sampling Points TG01 - TG09 - Nutrient Results



Sample Point	Name	Date	pH	Ammonia (mg l-1) N	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
TG01	Tollgate Bridge	16.09.22	7.57	0.14	not recorded	0.1806	7	31.01	0.07	0.2303	0.35	0.1155
TG01	Tollgate Bridge	10.10.22	7.5	0.27	0.001749	0.3483	5	22.15	0.06	0.1974	0.54	0.1782
TG02	UPS Footpath upstream	15.09.22	7.67	0.08	0.001026	0.1032	3.8	16.834	0.06	0.1974	0.51	0.1683
TG03	UPS ditch											
TG04	UPS Footpath downstream	15.09.22	7.54	0.08	0.000763	0.1032	4.4	19.492	0.07	0.2303	0.57	0.1881
TG05	Field ditch FSM											
TG06	Upstream of field ditch FSM											
TG07	Start of golf course upstream	15.09.22	7.8	0.14	0.002539	0.1806	4.6	20.378	0.07	0.2303	0.3	0.099
TG08	Field ditch start of golf course FSM	15.09.22	7.52	0.54	0.004886	0.6966	2.7	11.961	0.38	1.2502	>4	>1.32
TG09	Start of golf course downstream	15.09.22	7.59	0.15	0.001676	0.1935	5.2	23.036	0.08	0.2632	0.26	0.0858
TG10	Fornham Bridge	16.09.22	7.44	>1	not recorded	>1.29	4.2	18.606	0.18	0.5922	0.1	0.033
TG10	Fornham Bridge	10.10.22	7.32	>1	>0.004320	>1.29	3.4	15.062	0.12	0.3948	0.14	0.0462
TG11	Mill Rd Bridge (Hengrave)	10.10.22	7.49	0.12	0.000765	0.1548	11.3	50.059	0.14	0.4606	0.63	0.2079

RLCP Abbot's Vale Sampling Points



Sample Point	Name	Date	pH	Ammonia (mg l-1) N	Ammonia un-ionised (mg/l) NH3	Ammonium (mg/l) NH4	Nitrate (mg l-1) N	Nitrate (mg l^{-1}) NO_3	Nitrite (mg l-) N	Nitrite (mg l^{-1}) NO_2	Phosphate (mg l^{-1}) PO_4	Phosphate (mg l-1) P
AV02	Southgate Bridge	10.10.2022	7.62	0.76	0.006013	0.9804	<1	<4.43	<0.01	<0.0329	0.86	0.2838
AV01	Rushbrooke Arms	11.11.2022	7.58	0.08	0.000650	0.1032	13.1	58.033	0.1	0.329	0.55	0.1815
AV02	Southgate Bridge	11.11.2022	7.65	0.11	0.001057	0.1419	12.3	54.489	0.21	0.6909	0.38	0.1254

RLCP Citizen Science Project

Linnet at Ickworth Estate

2022/2023

The River Lark Catchment Partnership

National Trust

Interreg France (Channel Manche) England
Water For Tomorrow
European Regional Development Fund

Water FOR TOMORROW

Environment Agency

Memorandum of Understanding between RLCP and National Trust, Ickworth

In October 2022, an agreement was signed between RLCP and National Trust, Ickworth to govern a working relationship between the two partner organisations.

The National Trust was founded in 1895 to care for places of historic interest or natural beauty. These places include stretches of coastline, woods, farms, habitats for wildlife, ancient stone circles, cotton mills, gardens, villages, castles, country houses, works of art and libraries. It was founded to allow the community to access and enjoy our heritage 'forever for everyone'.

The River Lark Catchment Partnership registered as a Charitable Incorporated Organisation (CIO) in 2018 (charity number 1177318). The river Lark is one of only 200 chalk rivers, a globally rare habitat that is capable of supporting an array of iconic species such as brown trout, kingfisher and water vole. What makes chalk rivers so special is the exceptional quality, temperature and consistent flow that supports a unique aquatic ecosystem. It is the historically clean and plentiful water stored in the chalk that gives life to the Lark, its people and its economy.

Objectives of RLCP

'To conserve, preserve and improve the River Lark and its catchment area for the benefit the public, in particular but not exclusively by:

1. Improving access and encouraging the appropriate use of the River and its environs by members of the public.
2. Educating the public about the River and its environs
3. Facilitating community involvement in the conservation of the River
4. Monitoring the River and its catchment and reporting any issues or concerns to the appropriate bodies having statutory responsibility.'

Activities and Outcomes of the Project

The RLCP Tributaries Water Quality Monitoring Project will carry out testing on the Linnet and its ditches for the standard Environment Agency measures for river quality, aligned with the EU Water Framework Directive (WFD).

Regular testing will be carried out to monitor flow, pH, temperature, suspended solids, ammonia, nitrates and phosphates. Monitoring for invertebrates as a measure of river health will also be beneficial. All results collated will be shared with the National Trust and relevant riparian land owners. RLCP volunteers will adhere to the RLCP Tributaries Water Quality Monitoring Project Guidance Notes and will always inform the National Trust Ranger department prior to visiting the site.

Martin Gilbert from National Trust, Ickworth and Andrew Hinchley from RLCP signing the MOU on 3rd October 2022 at Ickworth Park

We are very grateful to the following councillors for funding this project from their locality budgets, enabling us to buy the Lovibond colorimeters, pipettes, sampling equipment and reagents:

Cllr Susan Glossop (West Suffolk)
Cllr Rebecca Hopfensperger (West Suffolk)
Cllr Brian Harvey (West Suffolk)
Cllr Rebecca Hopfensperger (Suffolk County Council)
Cllr Colin Nobel (Suffolk County Council)

We are also grateful to the Environment Agency for funding some training for our volunteers to deliver this project.

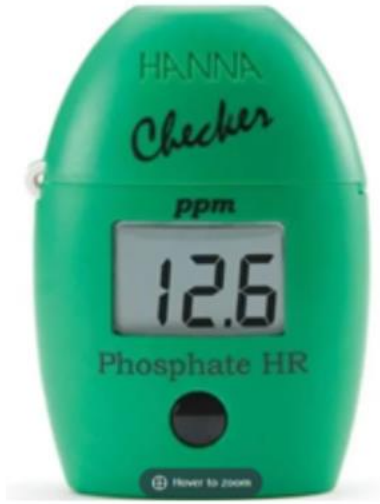
West Suffolk Council

Environment Agency

Water FOR TOMORROW

Suffolk County Council

We are very grateful to Cllr Whittingham for funding some handheld monitoring equipment with his Locality Budget.



BURY ST EDMUNDS TOWN COUNCIL

Plan for future Citizen Science Work moving forward

- River Lark Water Quality Monitoring
  - Tollgate Project (pre-project, post-project)
  - Abbot's Vale (pre-development, monthly during development, post-development)
- Tributaries Water Quality Monitoring
  - Linnet
  - Tuddenham Stream
  - Culford Stream
  - Revisit of confluence points with the Lark
- SmartRivers invertebrate monitoring (second day of training March 2023)
- MoRPh habitat surveys
  - Tollgate (pre-project, then every 6 months)
  - Cavenham/Lackford
  - Linnet
- Flow monitoring
  - Linnet

The River Lark Catchment Partnership