Working to protect wild fish

Chalk streams and SmartRivers monitoring

Dr Sam Green
Senior Freshwater Ecologist
WildFish

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Science you can trust, powered by people who care.

Want to establish professional-grade monitoring on your river?

SmartRivers is our scientifically robust citizen science toolkit.

It empowers local communities to take action to protect wild fish and their habitats.

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Invertebrate fingerprinting

- This entails the collection of invertebrate samples in spring and autumn annually.
- Samples are collected using the industry standard methodology (three-minute kick-sweep and one-minute hand search method).
- Each sample is preserved to enable the sample to be analysed, where possible, to species-level.

Water quality ‘scorecards’

Diversity and abundance profiles

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Data streams

SmartRivers invertebrate fingerprinting data falls into one of the three categories below:

1

Professional

Collected and analysed by professional consultants.

2

Hybrid

Volunteer collected but professionally analysed. This is what we call the ‘sample & send’ pathway.

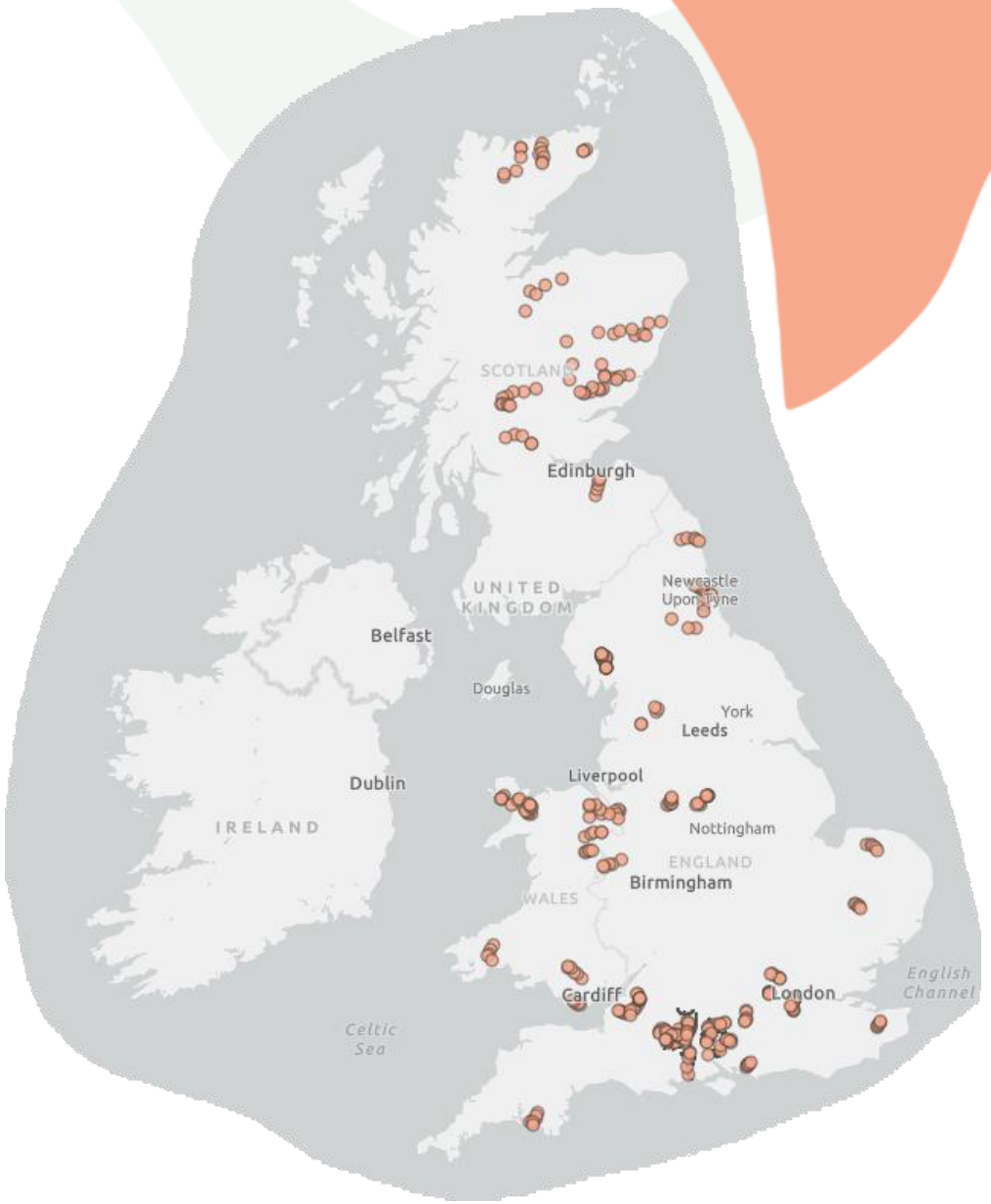
3

Volunteer

Volunteer collected and analysed using SmartRivers ID resources. Quality control is included.

Coverage

- **120+ rivers** covered by the project to date.
- **6000+ hours** of training undertaken by volunteers to date.
- **40+ organisation** have signed up to host groups.
- Monitoring active on **18 chalk streams** covering **90 sites**.
- **Piscatorial Society** monitoring on the Avon, Wylye, Itchen, Arle, and Anton.



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10 years of invertebrate monitoring on the Hampshire Avon

- SmartRivers monitoring in collaboration with Wiltshire Fisheries Association and Piscatorial Society.

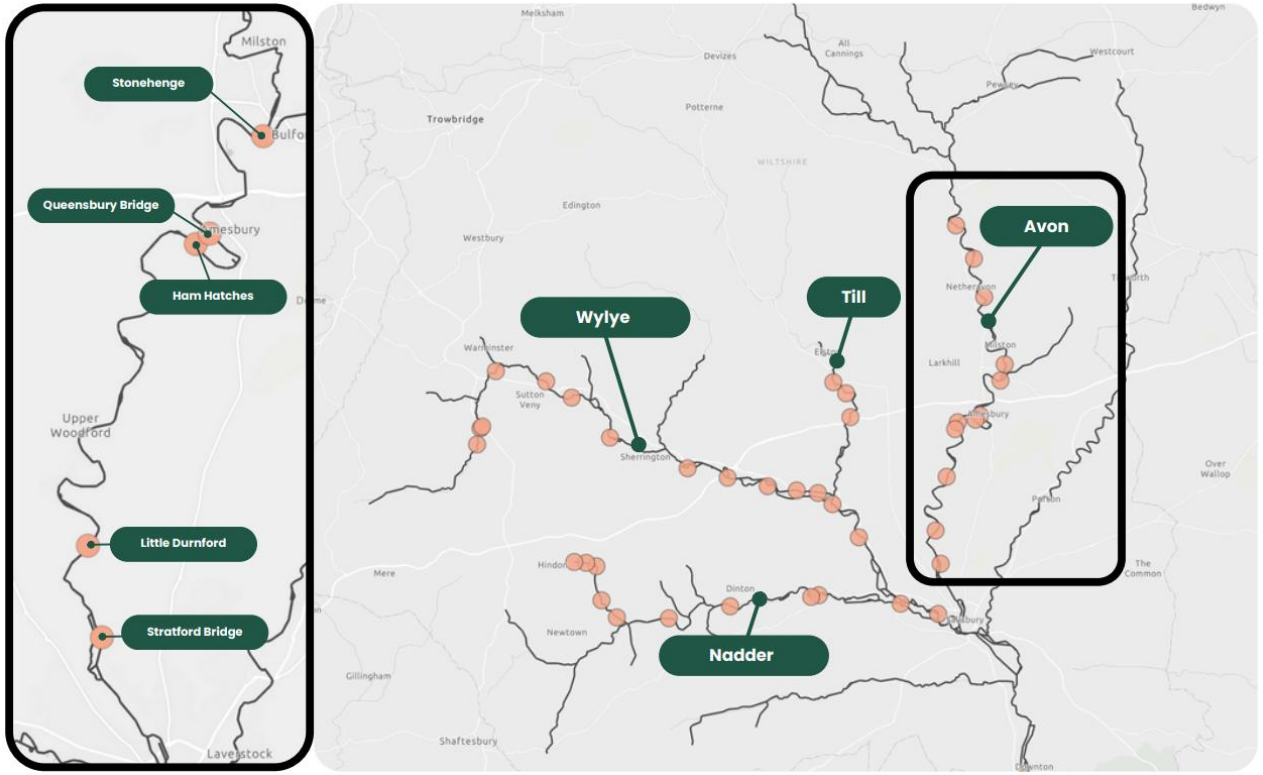
  Avon = 12 sites

  Nadder = 6 sites

  Till = 3 sites

  Wylye = 14

- Five of the sites on along the upper Avon have been continuously monitored in spring and autumn since 2015.
- What does this data tell us about the aquatic invertebrate populations?



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One clear trend…

- Strong evidence of declining biodiversity in terms of both the number of species and the abundance of invertebrates being found.
- **Diversity**

  Total Community = -17%

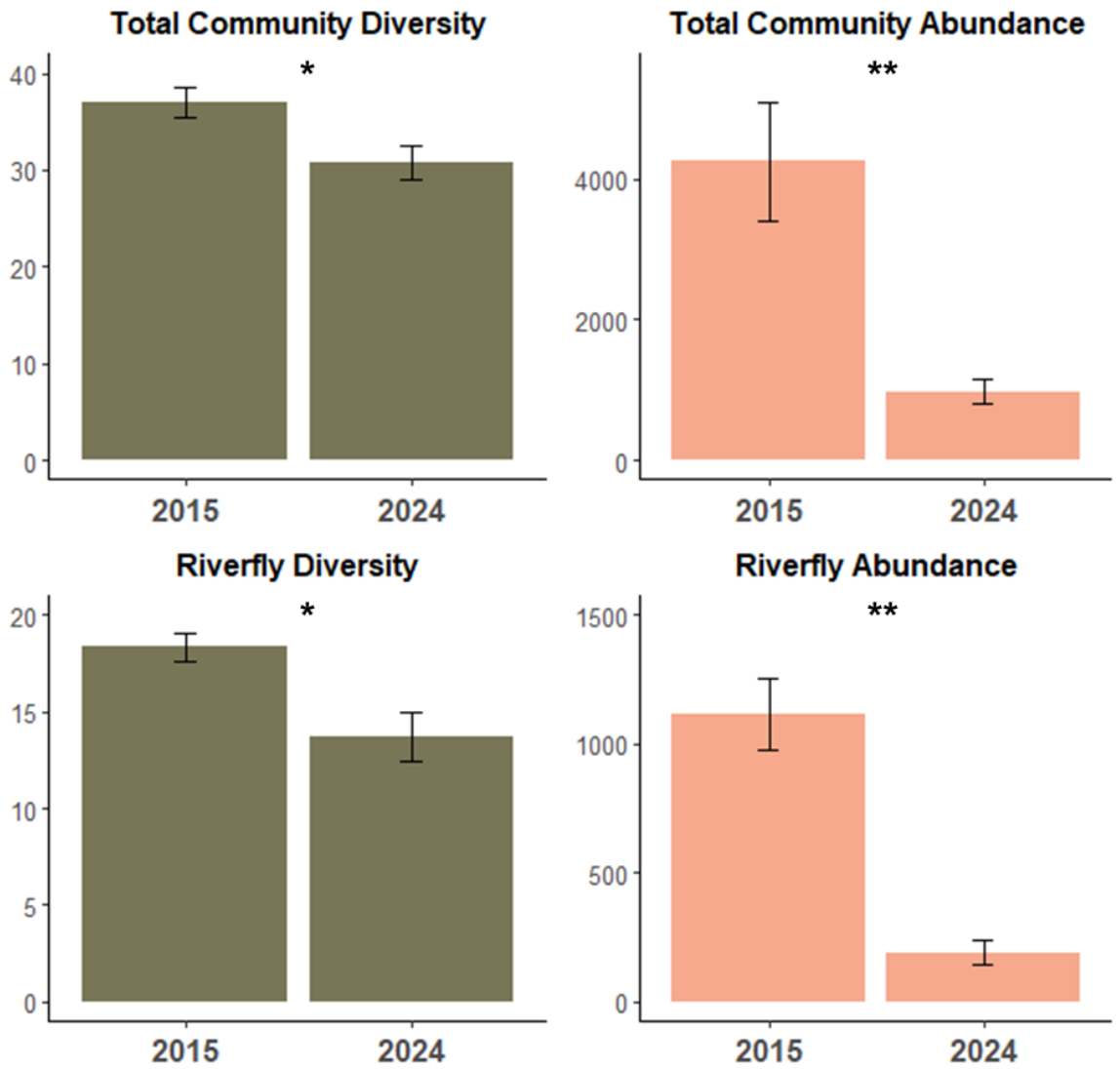
  Riverflies = -25%
- **Abundance**

  Total Community = -77%

  Riverflies = -83%

- Declines in abundance **particularly stark**.

- Declines in sensitive riverfly species **more apparent**.



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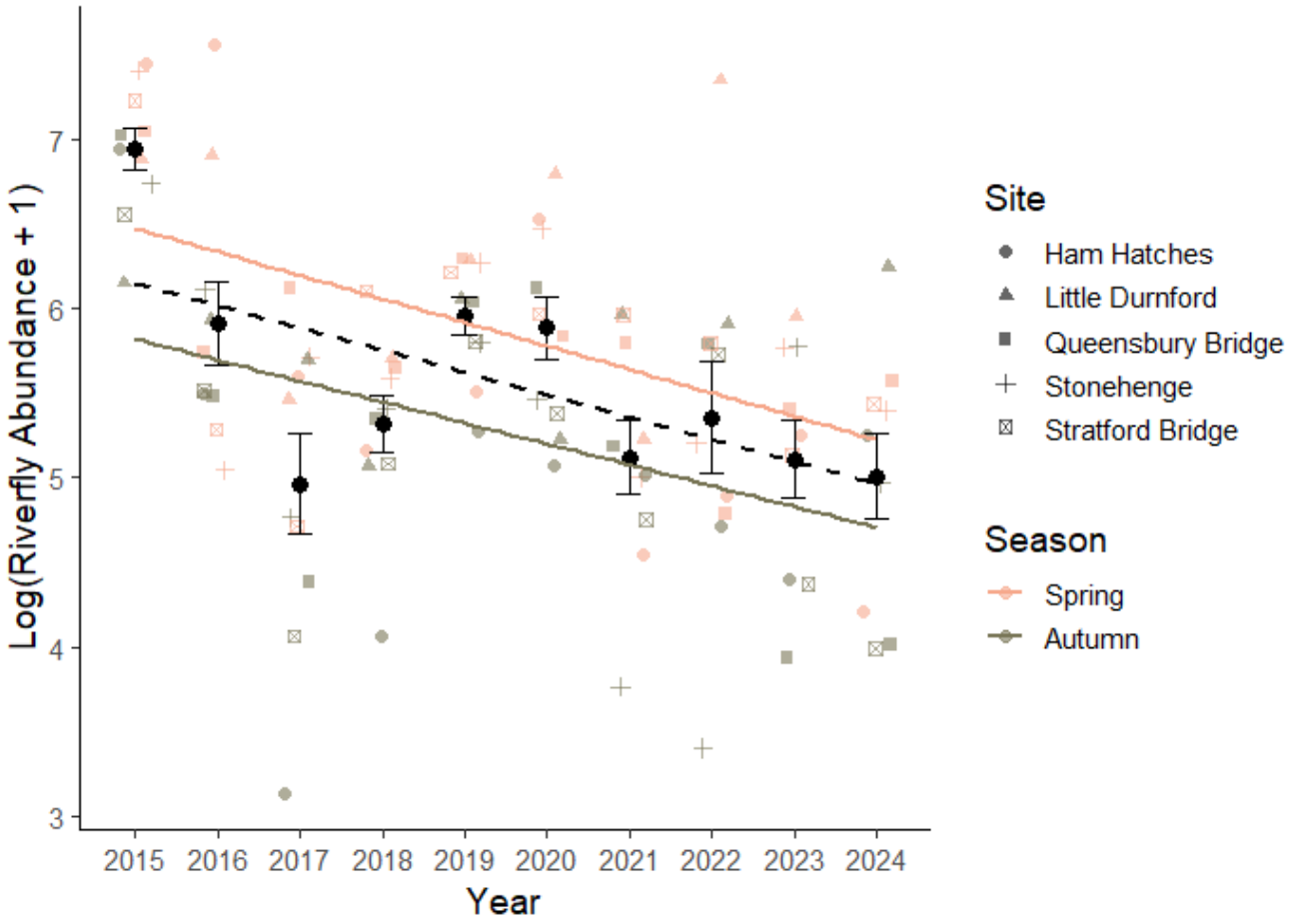
Diving deeper…

- Full dataset shows considerably more variation, but trends remain consistent.
- Diversity significantly declined for all invertebrates in all seasons, other than with the total community in spring.
- Abundance significantly declined for invertebrate communities across both seasons.
- Again, declines in sensitive riverflies were steeper than those of the total invertebrate community.
- Strong declines in the average abundance of mayflies in spring surveys between 2015 and 2024 including: olives (-95%), blue winged olives (-71%), and green drakes (-42%).
- Clear declines in average *Gammarus* numbers (-85%) in the autumn surveys.



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WFD Classifications

- Invertebrate data is used to calculate classifications in line with the water framework directive (WFD).
- Despite the sharp declines we have highlighted in our analysis classifications still show sites as in ‘high’ or ‘good’ condition!
- Are these classifications fit for purpose in chalkstreams?
- The Avon is already a Special Area of Conservation (SAC)… what about all the other chalk rivers?

Dataset	RICT Analysis	Year	Site	Spring Sample	Autumn Sample	EQR ASPT	ASPT Class (Probability)	EQR NTAXA	NTAXA Class (Probability)	MINTA Overall Class
SR	Model 44	2015	Stonehenge	01-May	01-Sep	1.16	High (99.98)	1.14	High (100)	High
			Queensbury Bridge	01-May	01-Sep	1.10	High (99.39)	1.07	High (99.95)	High
			Ham Hatches	01-May	01-Sep	1.12	High (99.88)	1.02	High (99.71)	High
			Little Durnford	01-May	01-Sep	1.12	High (99.94)	1.00	High (99.51)	High
			Stratford Bridge	01-May	01-Sep	1.12	High (99.91)	0.90	High (89.96)	High
		2024	Stonehenge	10-May	26-Oct	1.13	High (99.93)	0.87	High (82.63)	High
			Queensbury Bridge	08-May	26-Oct	1.04	High (90.72)	0.99	High (98.86)	High
			Ham Hatches	08-May	26-Oct	1.06	High (96.70)	0.78	Good (53.42)	Good
			Little Durnford	*NA*	26-Oct	*NA*	*NA*	*NA*	*NA*	*NA*
			Stratford Bridge	08-May	26-Oct	1.19	High (100)	0.71	Good (54.94)	Good
EA	Model 1	2015	9112	24-Apr	22-Oct	1.17	High (100)	1.39	High (100)	High
		2024	9112	09-May	31-Oct	1.17	High (99.99)	1.35	High (100)	High

Next Steps for the Avon

- **Meeting with MPs** in the catchment

  - Numerous responses.

- Continue to build up momentum.

  - Report got **51** pieces of local ad national media coverage!

- **Supporting WFA** and liaising with local regulator teams.

- Continue high resolution monitoring.

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Chemicals in chalk streams

- Unseen threat
- Biocides – pesticides and herbicides
  - Agricultural practices
  - Veterinary medicines
- Human products
  - Pharmaceuticals
  - Personal care products
  - Household products
- Forever chemicals
- Road runoff
- Cocktail effects
- Legacy aquifer contamination

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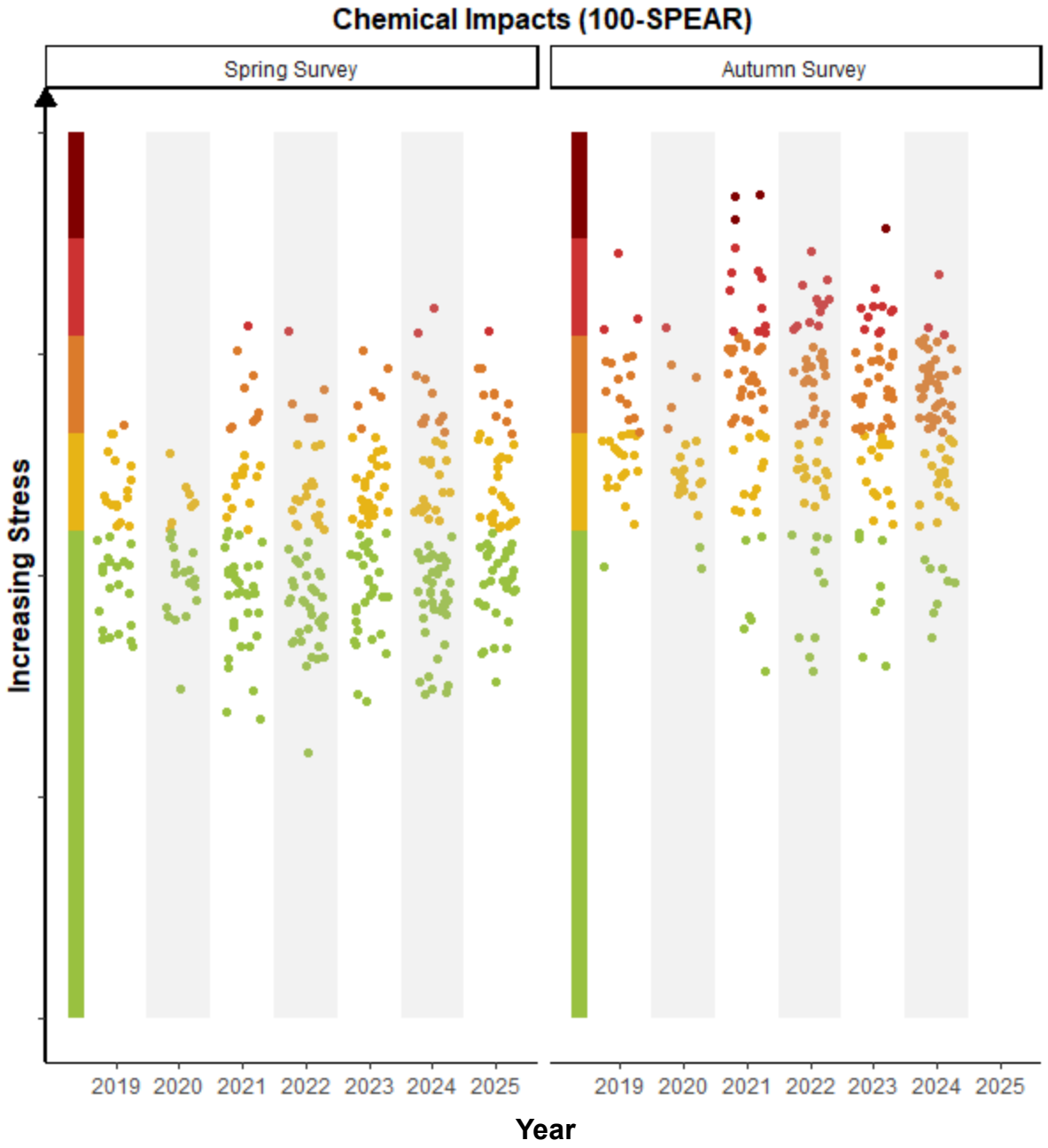
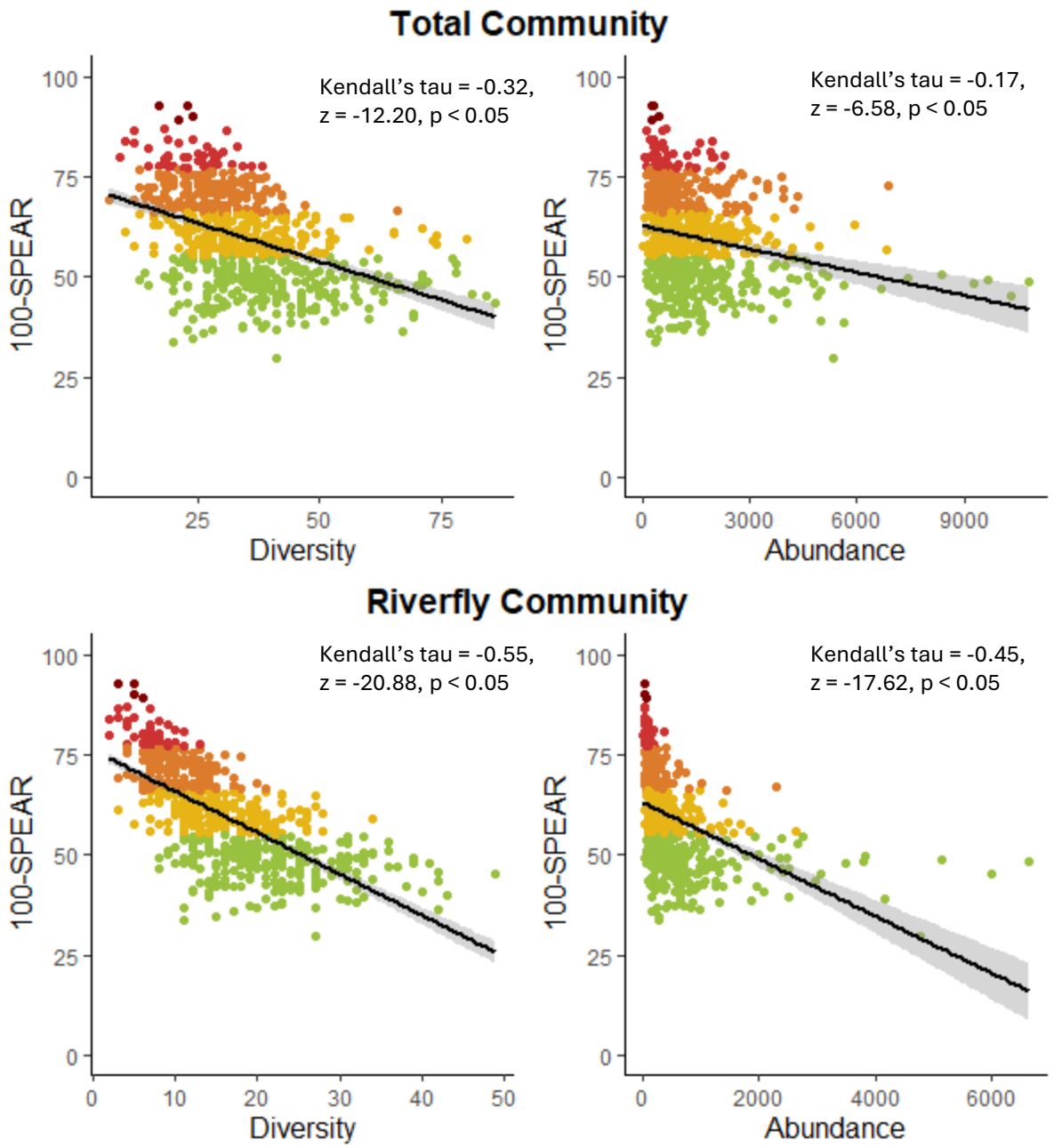


What impact scores do we see?

- SPEAR impact scores at SmartRivers chalk stream sites between 2019 and 2025.
- More concerning scores seen in the autumn surveys.
  - 2021 = ~70% of sites impacted
  - 2022-2024 = ~60% of sites impacted
- Looking for sites that repeatedly show impacted scores.

Bad
Poor
Moderate
Good
Unimpacted



How do these scores relate to invertebrates?

- Combined SPEAR scores for SmartRivers chalk stream sites plotted against invertebrate biodiversity.
- Coarse comparisons but strong relationships across metrics. With higher SPEAR impact scores correlated with lower diversity and abundance.
- Stronger correlations for the sensitive riverfly communities.
- Not the only pressure!

Bad
Poor
Moderate
Good
Unimpacted

Citizen science for winterbourne streams

What should we be doing?

- Focussing on/adding to records of specialist indicator species?
- Dry season invertebrate monitoring?
- Bespoke sampling protocols.
  - Timing from first flow.
  - Additional data, e.g. temperature and flow.
- Local communities can be pioneers and powerful resource for monitoring temporary streams.
  - Observe flow dynamics
  - Access challenges

Scarce Purple Dun
Paraleptophlebia werneri

Winterbourne Stonefly
Nemoura lacustris

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Specialist species

Hunting for a specialist mayfly on the River Till

- Scarce purple dun (*Paraleptophlebia werneri*) is a rare species indicator of winterbourne habitat. First identified in the UK in the Till and the Allen in 1939.
  (Macadam, Stubbington, and Wallace, 2021)

- Concerns about water quality. Absent from spring 2024 SmartRivers surveys.

- Focussed bankside hunt for the species April 2025.

- Scarce purple dun found at the lower sites with the winterbourne stonefly also being identified.

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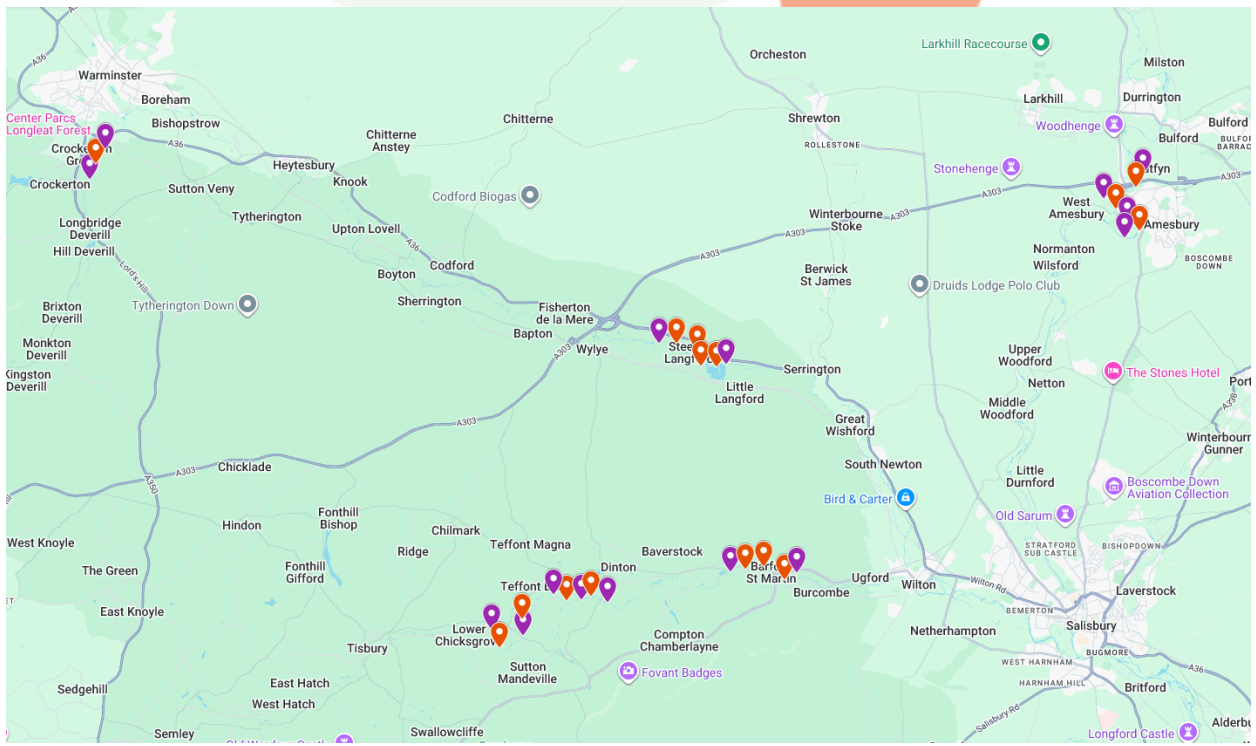
eDNA and the Avon Catchment

- Genetic information shed into the environment by both terrestrial and aquatic organisms living in and interacting with the river.
- 15 sites across the Avon, Nadder, and Wylye
- Sampled in spring and autumn 2025.
- Collecting data on:
  - ‘Tree of Life’ (33 taxonomic groups from bacteria to birds)
  - Diatom biofilms
- Exploring how these modern methods can complement our existing work and citizen science.
- Improve awareness of pros and cons.



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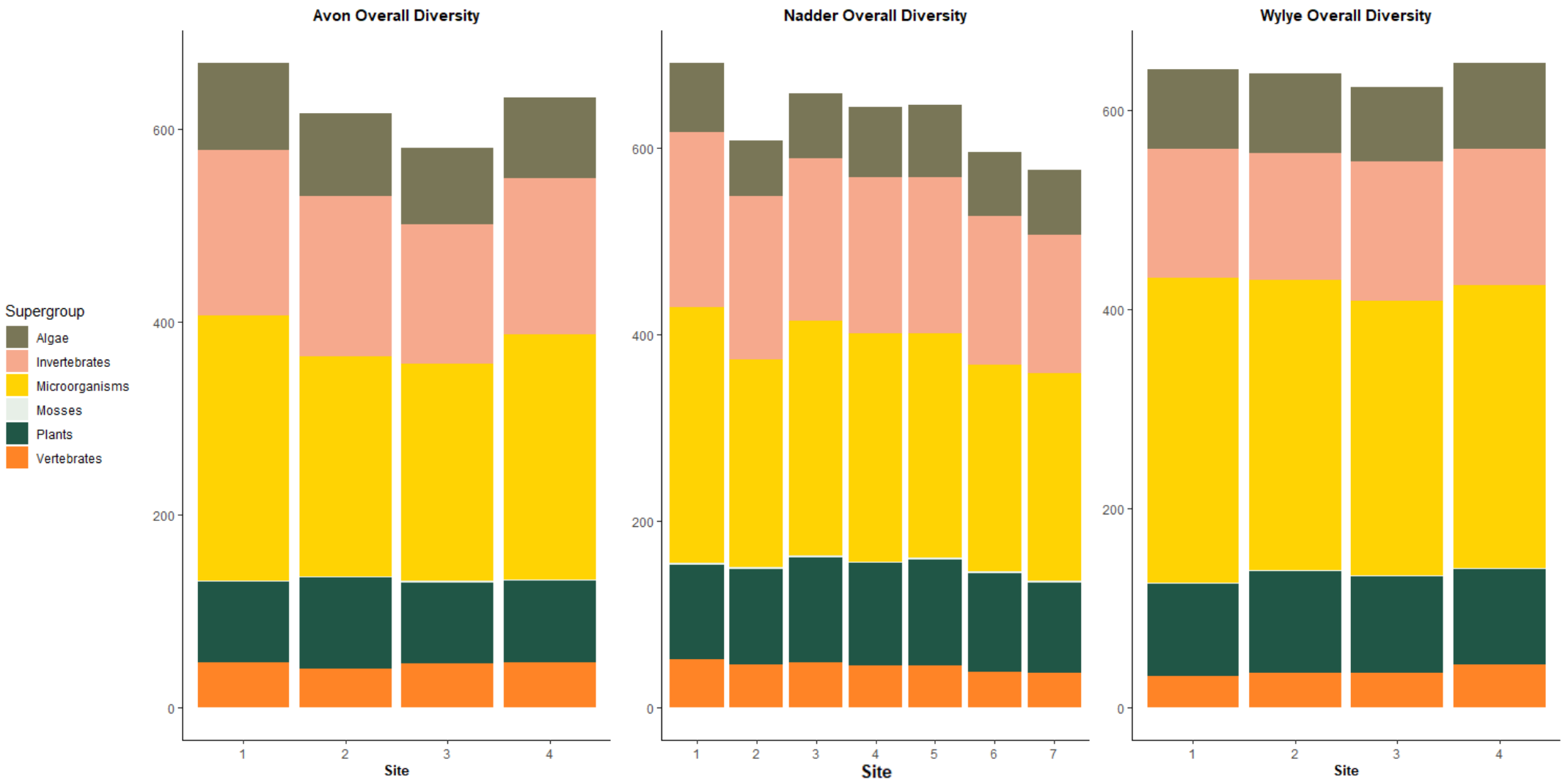

Huge amount of diversity data from spring alone

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Lots of fish data

- Presence/absence of species across sites and rivers.
- High eDNA read counts not necessarily reflective of large populations.
  - Need to control for volume of water.
- Reliance on the quality of reference libraries for accuracy.
- From first look some interesting tales….

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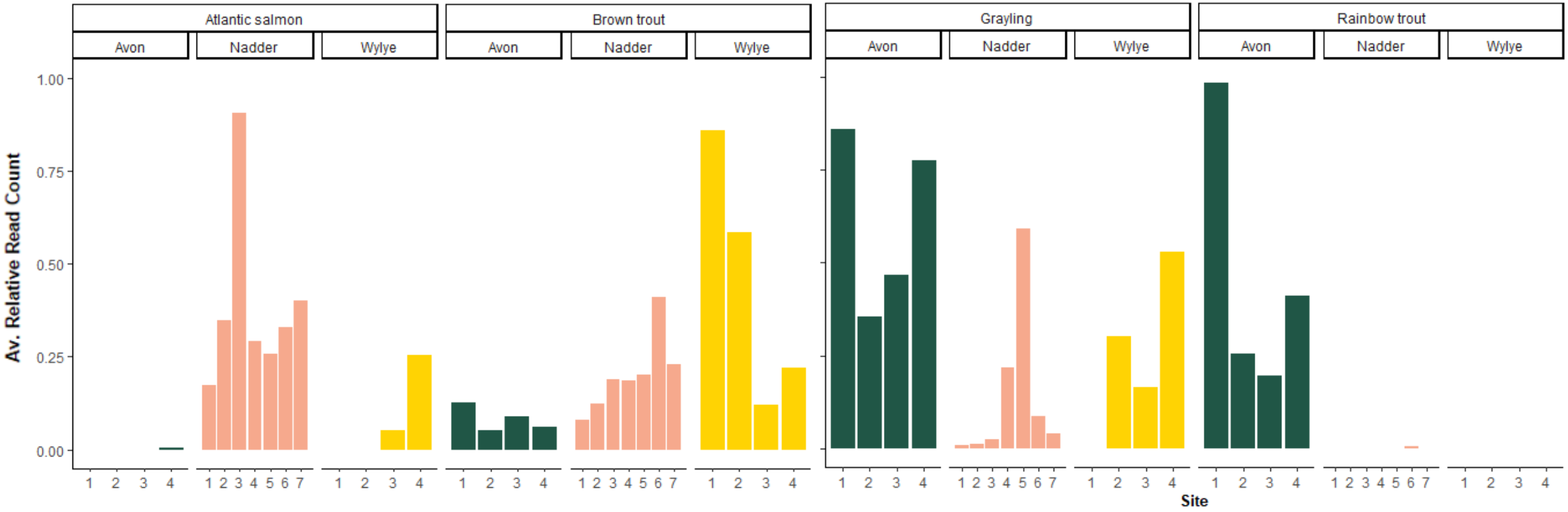
Salmonids



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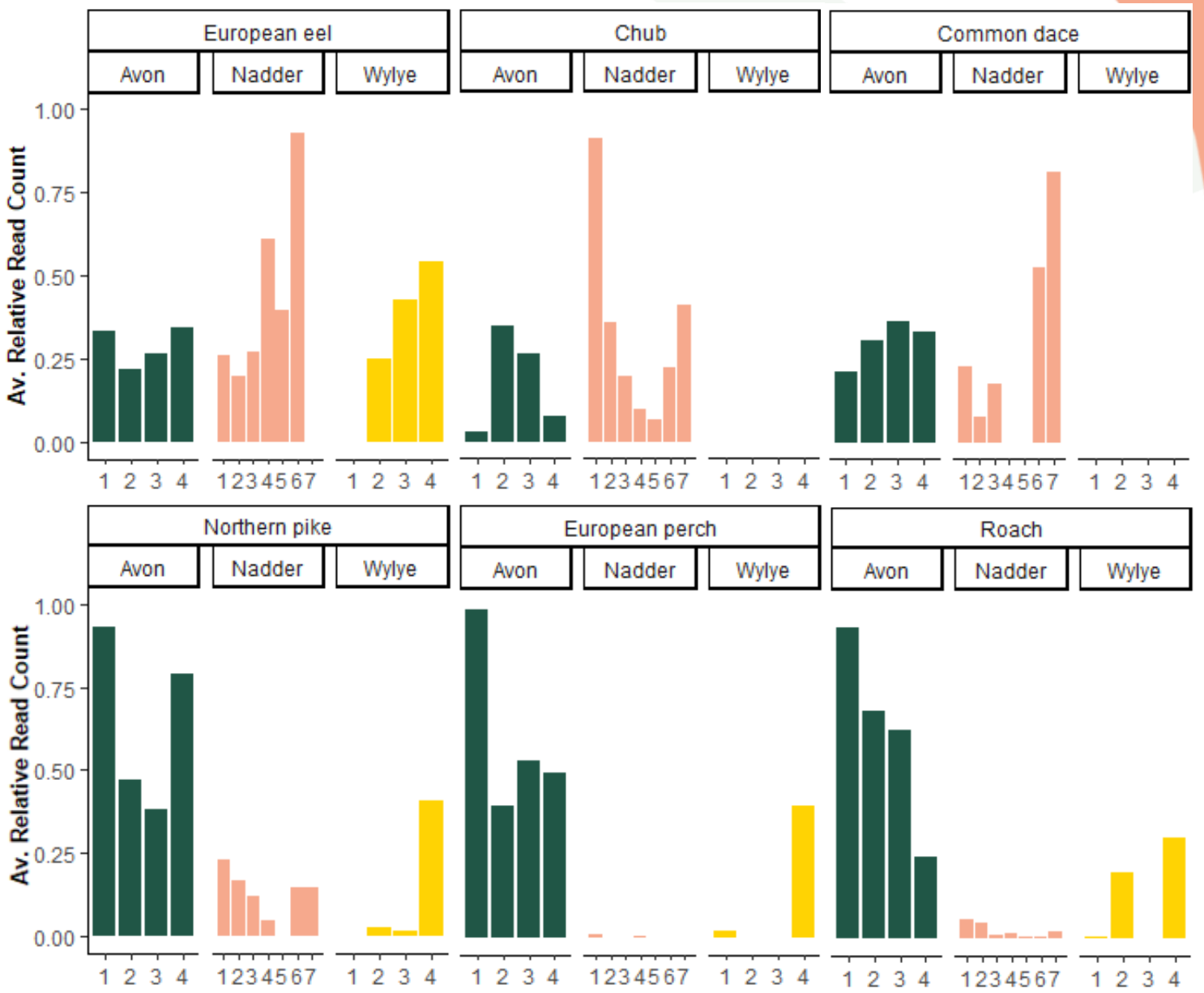
Coarse fish (15 species)



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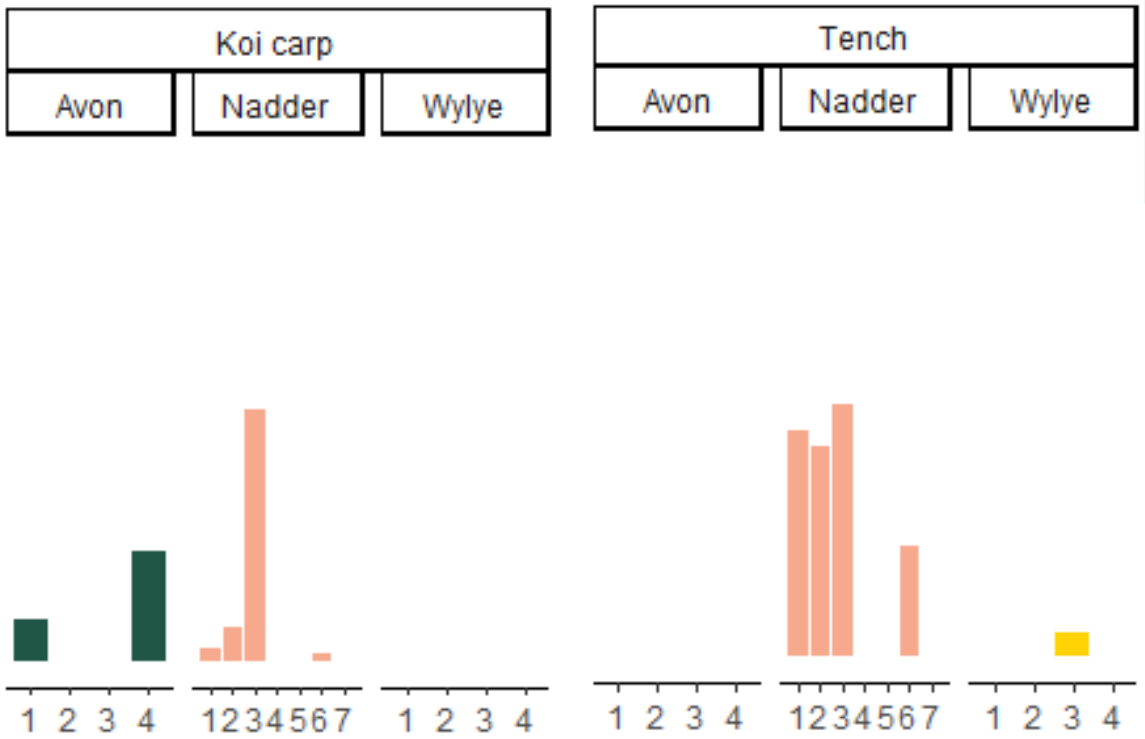
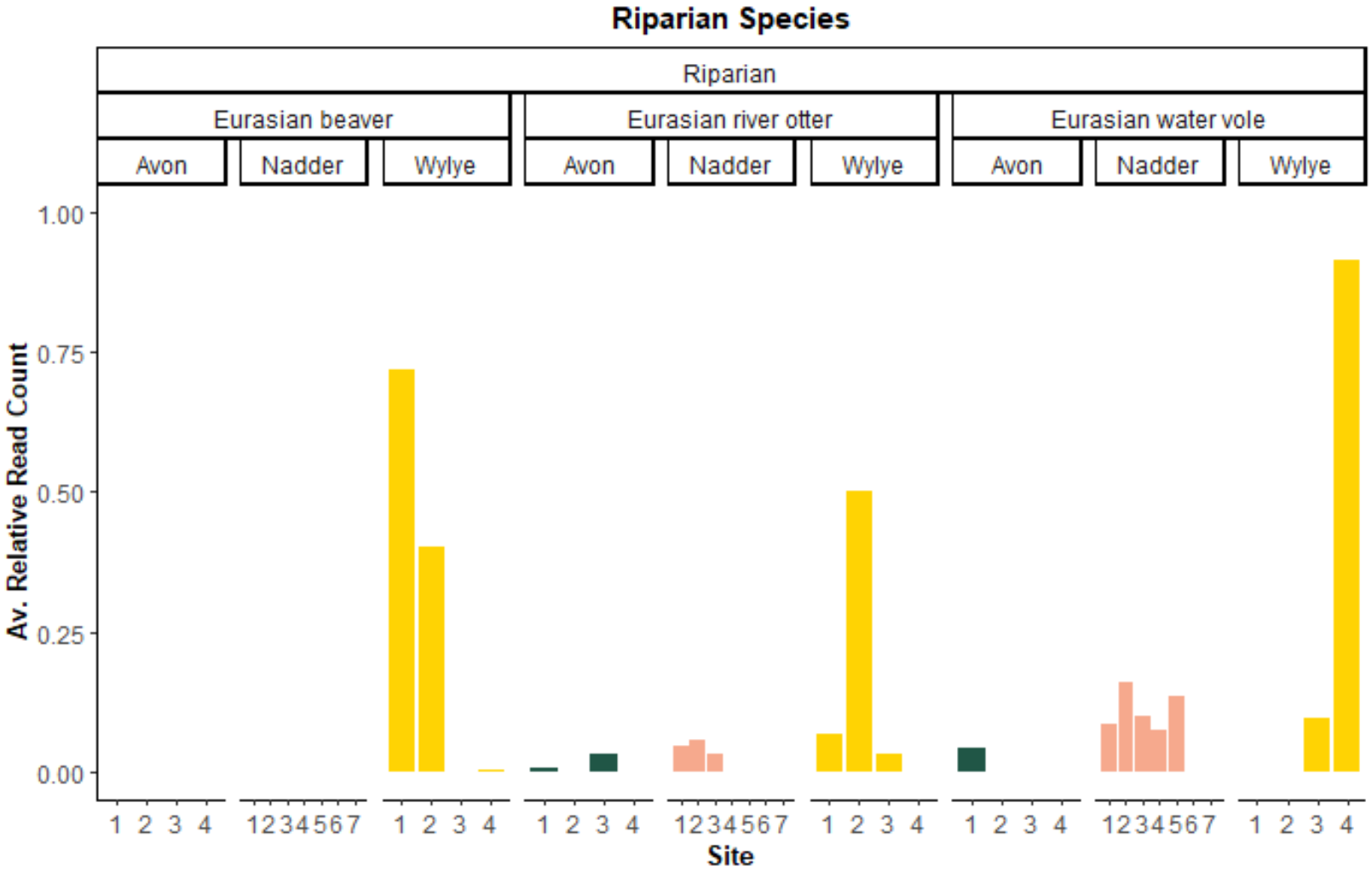


Some unusual suspects...



Insight into other vertebrate distributions in the catchments.

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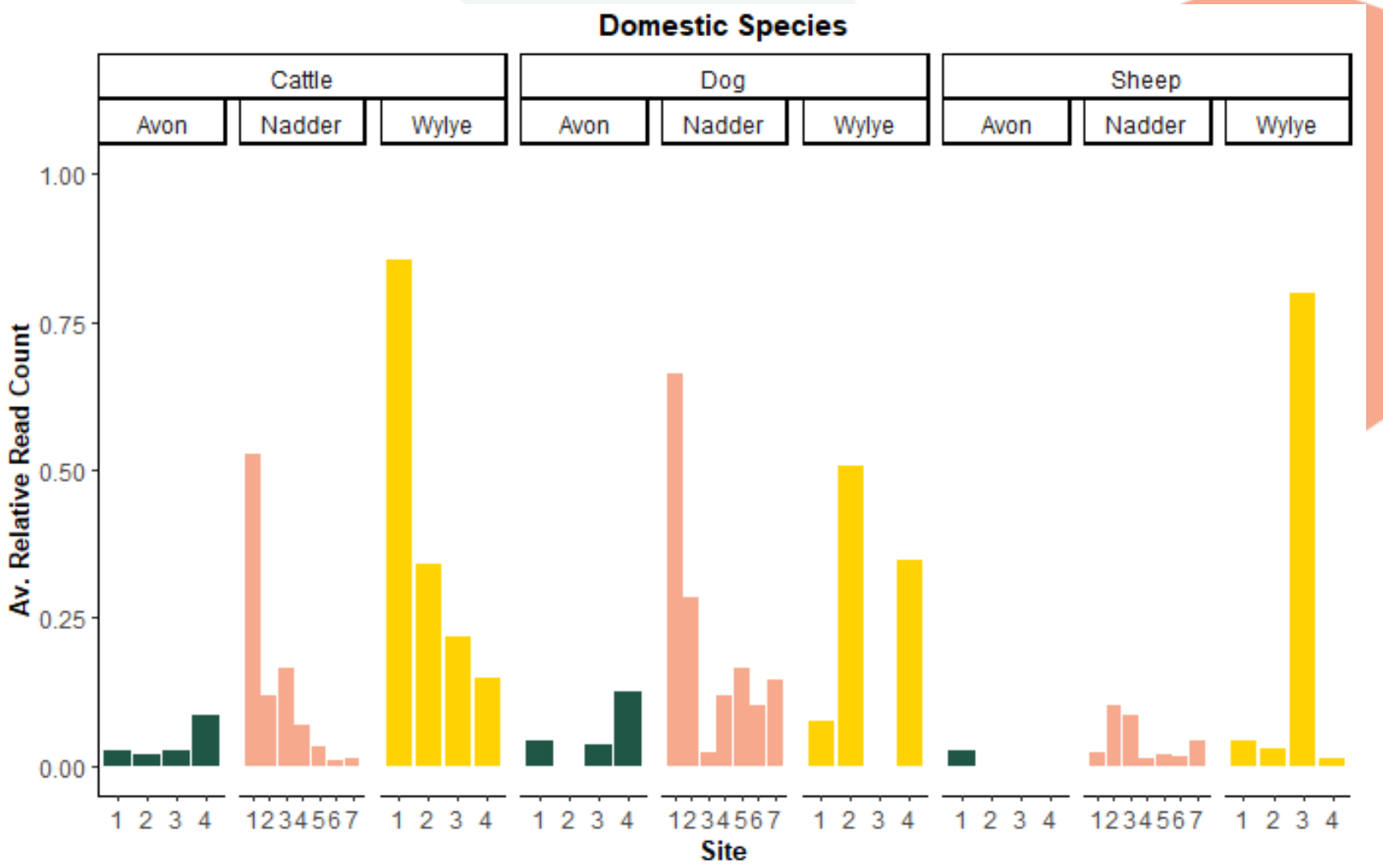

Insight into how domestic species may be interacting with the rivers.

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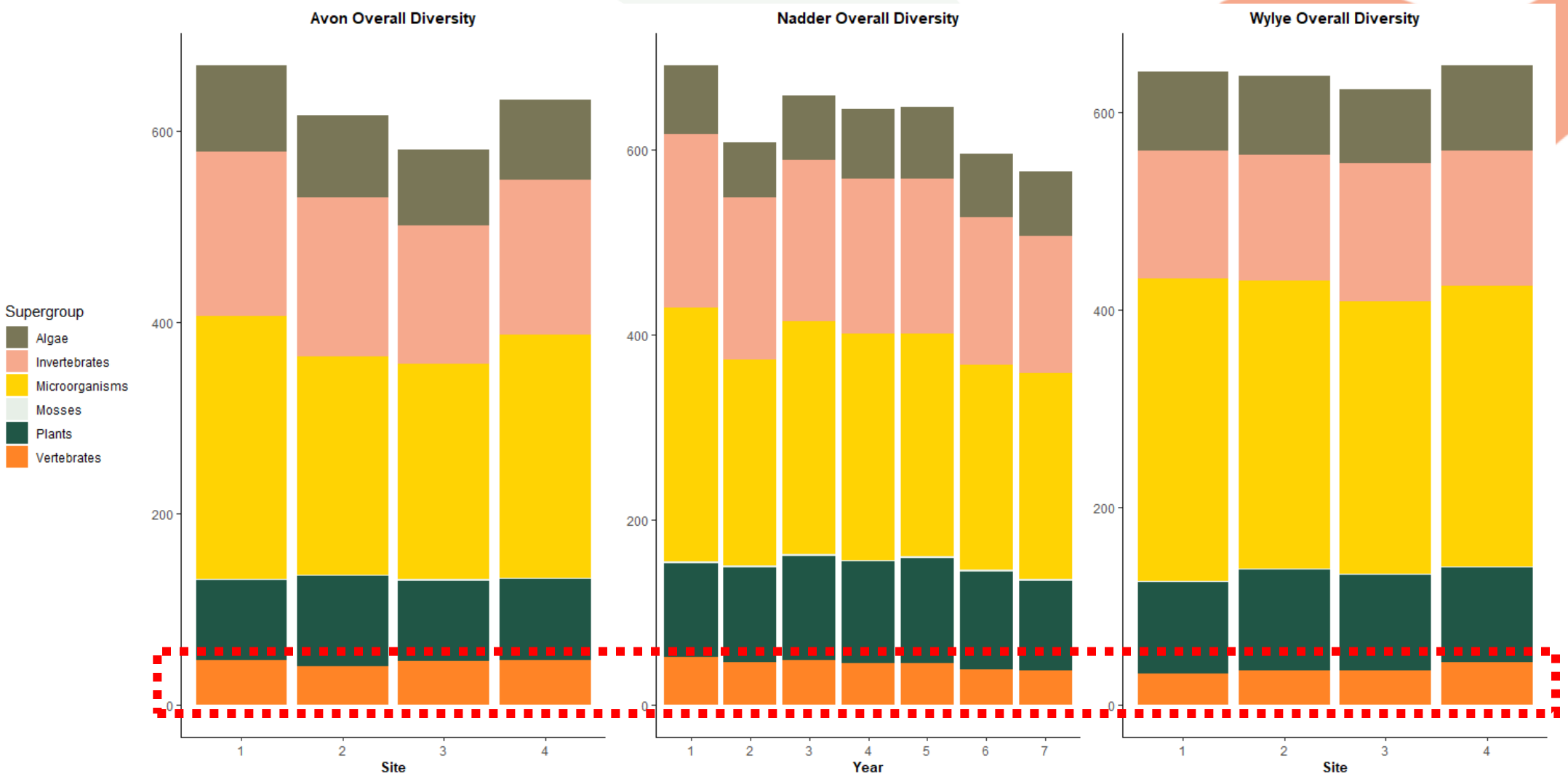

A lot more diversity data to unpack...

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What about the Test and Itchen?

- Watch this space!
- Project looking at invertebrate monitoring data and WFD classifications in the works to better understand the challenges within the catchments.

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Thank you for listening.

Join our SmartRivers community today!

You will need:

- A host organisation
- A group lead/coordinator
- Around 10 volunteers

Get in touch: **smartrivers@wildfish.org**

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