



RIVERFLY CENSUS RESULTS

Wales



USK - CLWYD - E.CLEDDAU



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The Riverfly Census was created to collect much needed high-resolution, scientifically robust data about the state of our rivers and the pressures facing them. We frequently talk about missing flylife and lack of fish compared to the 'good old days', but anecdotal evidence like this has little weight in environmental decision making.

“Without data you're just another person with an opinion”

W. Edwards Deming

River insects spend the majority of their lives in the water as nymphs, making them brilliant indicators of river health. Their continuous exposure to water makes examining them much more informative than spot chemical samples. Every invertebrate is unique, and each requires a specific set of conditions to thrive.

The Riverfly Census utilises the invertebrate assemblage: presence, absence and abundance of certain invertebrates, to indicate the types of stress our rivers are experiencing. The composition of the invertebrate community in the sample allows a biometric score to be calculated, which provides a surrogate, or direct scale, of physical chemical impact. Below are the biometrics used and the type of stress they indicate.

BIOMETRIC GLOSSARY

PSI

Proportion of Sediment-sensitive Invertebrates

A measure of stress caused by excess fine sediment on the invertebrate community

TRPI

Total Reactive Phosphorus Index

A relatively new metric developed to indicate pressure from phosphorus pollution

SPEAR

SPEcies At Risk

A measure to assess the impact of exposure to pesticides, herbicides and complex chemical toxicants on the invertebrate community

LIFE

Lotic-invertebrate Index for Flow Evaluation

A metric to assess the impact of flow related stress on invertebrate communities which live in flowing water

SI

Saprobic Index

A measure to indicate stress on the invertebrate community caused by organic pollution

WHAT WE'VE DONE

Census Method

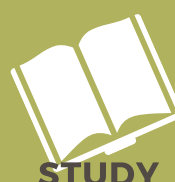
The Riverfly Census has spanned three years. It began in 2015, initially with 12 rivers across England. Three Welsh rivers were added in 2016. Multiple sample sites were carefully selected on each river.



Kick-sweep sampling was completed in spring and autumn to EA guidelines, at all sample sites. Sampling and species-level identification were carried out by professional external consultants, Aquascience Consultancy Ltd.



Species presence/absence data was inputted into Aquascience's biometric calculator to obtain scores against key stress types. The data was then evaluated in a whole catchment context to pinpoint likely suspects contributing to river deterioration.



The data was compiled, and is being reported to stakeholders and policy makers, to improve management and conservation of our rivers.



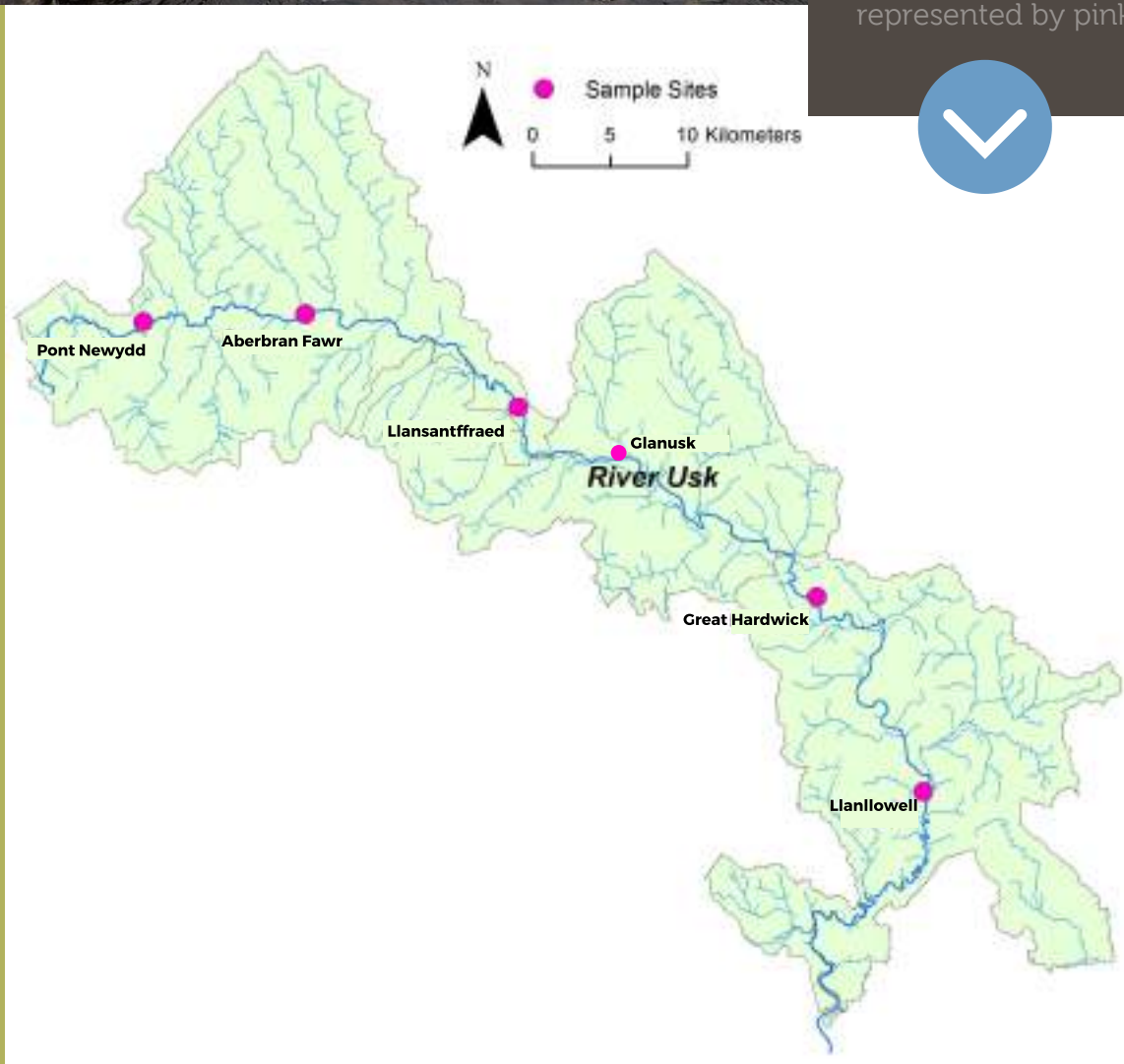
WHAT WE'VE FOUND

River Usk



Riverfly Census sampling on the Usk began in autumn 2016 and continued for three years on 6 sites: Llanllowell, Great Hardwick, Glanusk, Llansantffraed, Aberbran Fawr and Pont Newydd.

The locations of our sample sites are shown on the map, represented by pink circles.



1

WHAT WE'VE FOUND

Llanllowell

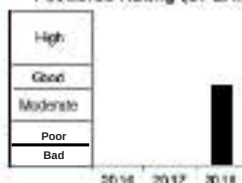
Llanllowell was the furthest downstream site sampled. The invertebrate community did not exhibit any considerable stress from organic enrichment, excess fine sediment or nutrients.

Llanllowell was the only Usk site where failure against the SPEAR chemical Water Framework Directive (WFD) target (proposed by Beketov et al., 2009) was recorded in spring 2018.



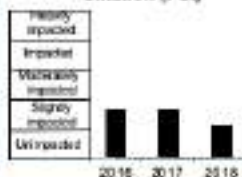
AUTUMN BIOMETRICS

Pesticide Rating (SPEAR)

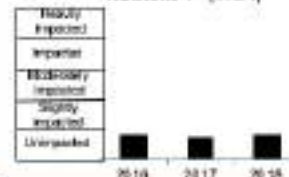


	2016	2017	2018
BMWP	118	112	163
ASPT	5.52	5.33	6.52
Annual Mayfly sp. Richness	NA	6	7
Total Abundance	2980	7117	NA
EPT	18	10	17
CCI	3.74	8.25	17.94
LIFE	8.15	7.96	8.26
PSI	67.12	65.67	77.27
SPEAR	NA	NA	24.73
TRPI	83.33	85.71	83.33
Saprobic	1.87	1.89	1.89

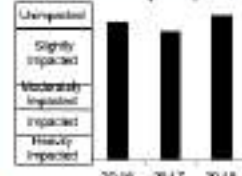
Siltation (PSI)



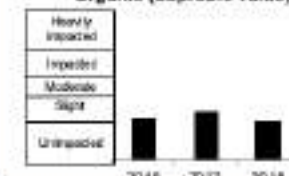
Nutrient 'P' (TRPI)



Flow (LIFE)



Organic (Saprobic value)



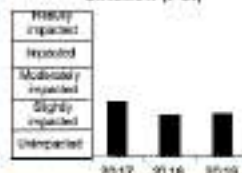
SPRING BIOMETRICS

Pesticide Rating (SPEAR)

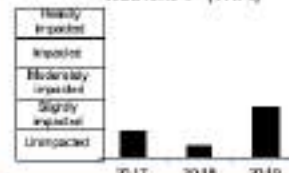


	2017	2018	2019
BMWP	71	120	154
ASPT	4.73	5.57	6.70
Annual Mayfly sp. Richness	5	7	NA
Total Abundance	1696	NA	NA
EPT	5	14	17
CCI	5.44	8.18	16.69
LIFE	7.78	8.17	7.80
PSI	62.50	71.62	69.70
SPEAR	NA	27.38	36.18
TRPI	81.25	91.30	65.22
Saprobic	2.04	1.94	1.95

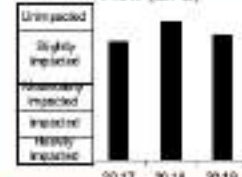
Siltation (PSI)



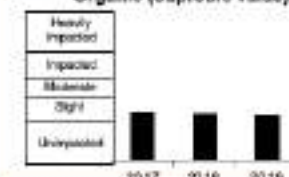
Nutrient 'P' (TRPI)



Flow (LIFE)



Organic (Saprobic value)



2

WHAT WE'VE FOUND

Great Hardwick

Due to unfavourable sampling conditions, Great Hardwick was not sampled in spring 2018.

Overall, this site was indicated by the invertebrate community to be in healthy condition. No concerning stress was indicated by any of the biometrics throughout the survey period.

A rare species, the Brown May Dun (*Heptagenia fuscogrisea*) was found at Great Hardwick.



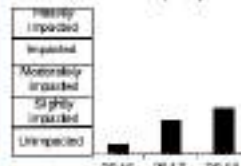
AUTUMN BIOMETRICS

Pesticide Rating (SPEAR)

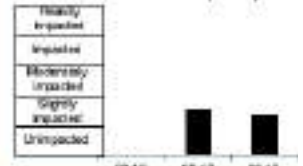


	2016	2017	2018
BMWP	87	154	177
ASPT	5.80	5.92	5.71
Annual Mayfly sp. Richness	NA	10	NA
Total Abundance	1274	1896	NA
EPT	13	18	18
CCI	6.23	15.46	13.72
LIFE	9.85	8.13	7.94
PSI	92.45	76.81	68.57
SPEAR	NA	NA	37.14
TRPI	106.99	70.80	73.33
Saprobic	1.50	1.70	1.81

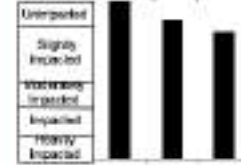
Siltation (PSI)



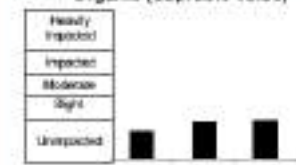
Nutrient 'P' (TRPI)



Flow (LIFE)



Organic (Saprobic value)



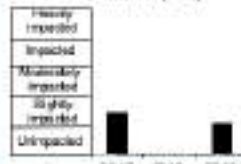
SPRING BIOMETRICS

Pesticide Rating (SPEAR)

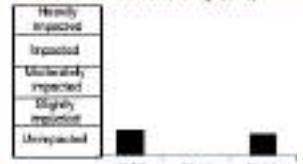


	2017	2018	2019
BMWP	103	+	89
ASPT	6.06	+	5.93
Annual Mayfly sp. Richness	10	+	NA
Total Abundance	419	+	NA
EPT	12	+	11
CCI	11.43	+	11.76
LIFE	8.10	+	8.42
PSI	71.11	+	78.38
SPEAR	NA	+	37.68
TRPI	82.35	+	85.71
Saprobic	1.79	+	1.94

Siltation (PSI)



Nutrient 'P' (TRPI)



Flow (LIFE)



Organic (Saprobic value)



3

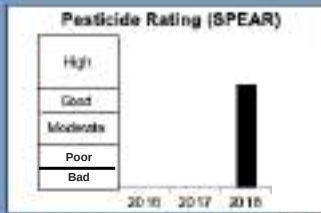
WHAT WE'VE FOUND Glanusk

The invertebrate community at Glanusk did exhibit moderate stress from excess fine sediment, but this was only once in autumn 2018.

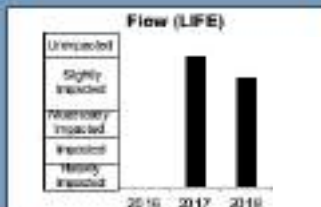
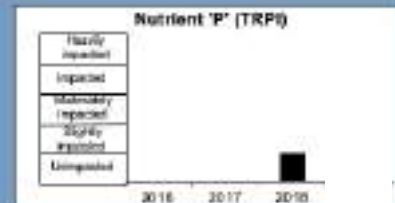
Concerning stress from organic enrichment, chemicals and excess nutrients was not indicated at this site.



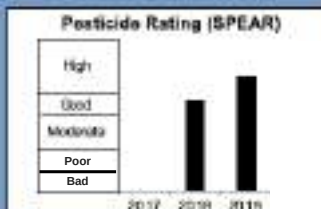
AUTUMN BIOMETRICS



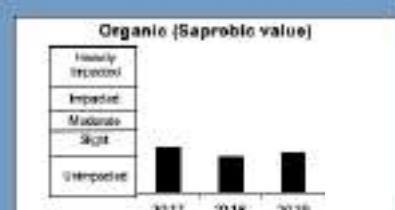
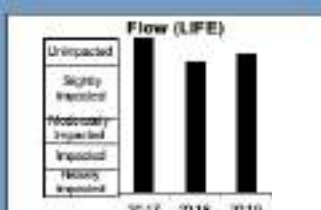
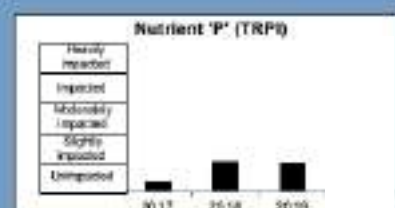
	2016	2017	2018
BRWP	+	184	149
ASPT	+	6.31	5.96
Annual Mayfly sp. Richness	+	8	9
Total Abundance	+	5432	NA
EPT	+	19	15
CCI	+	12.79	10.65
LIFE	+	6.06	7.62
PSI	+	71.25	54.84
SPEAR	+	NA	47.29
TRPI	+	100.00	80.00
Saprobic	+	1.91	1.76



SPRING BIOMETRICS



	2017	2018	2019
BRWP	129	159	122
ASPT	6.78	6.12	6.42
Annual Mayfly sp. Richness	8	9	NA
Total Abundance	2384	NA	NA
EPT	14	17	15
CCI	10.33	13.74	11.56
LIFE	8.71	8.06	8.19
PSI	86.27	71.67	81.40
SPEAR	NA	41.29	52.27
TRPI	92.86	79.17	80.00
Saprobic	1.36	1.76	1.88



4

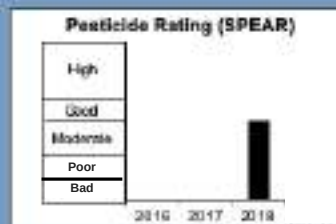
WHAT WE'VE FOUND Llansantffraed

The invertebrate community at Llansantffraed indicated minimal stress from chemicals, organic enrichment or excess nutrients throughout the survey period.

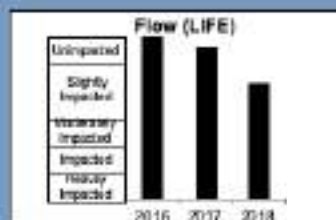
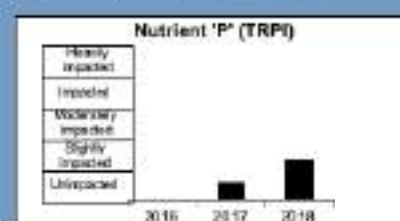
There was a slight peak in sediment stress in autumn 2018, but it was still below moderate impact.



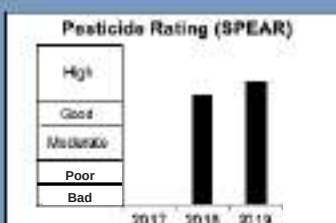
AUTUMN BIOMETRICS



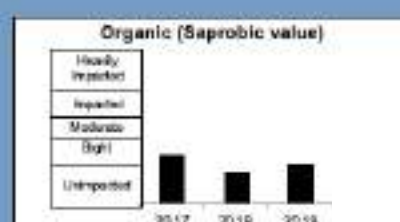
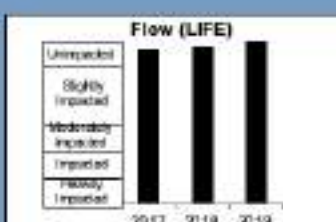
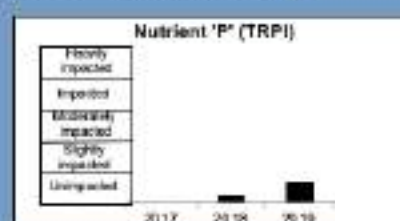
	2016	2017	2018
BMWP	112	119	174
ASPT	5.89	6.25	6.90
Annual Mayfly sp. Richness	NA	7	8
Total Abundance	3408	5408	NA
EPT	13	14	17
CCI	9.33	13.65	13.71
LIFE	8.83	8.32	7.47
PSI	84.21	79.37	62.69
SPEAR	NA	NA	35.25
TRPI	109.09	87.50	72.73
Saprobic	1.33	1.75	1.92



SPRING BIOMETRICS



	2017	2018	2019
BMWP	113	153	140
ASPT	6.28	5.78	6.67
Annual Mayfly sp. Richness	7	8	NA
Total Abundance	4571	NA	NA
EPT	11	15	20
CCI	8.89	8.25	11.67
LIFE	8.36	8.38	8.53
PSI	80.06	77.59	93.44
SPEAR	NA	47.70	53.46
TRPI	100.09	95.45	86.98
Saprobic	1.98	1.86	1.81



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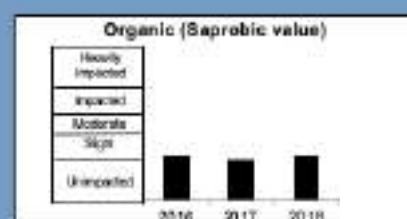
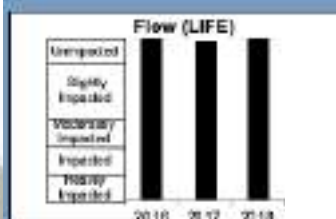
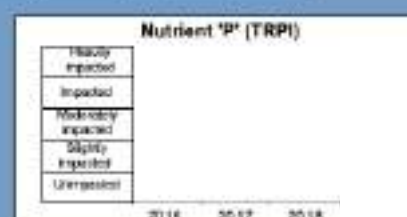
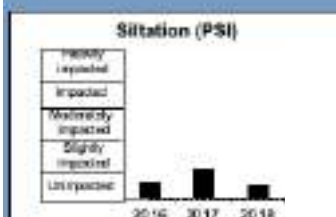
WHAT WE'VE FOUND Aberbran Fawr

Aberbran Fawr was a consistently healthy site, Concerning stress from organic enrichment, chemicals and excess nutrients was not indicated throughout the survey.

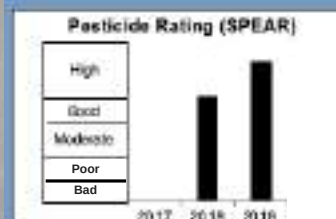
AUTUMN BIOMETRICS



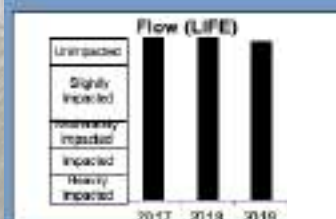
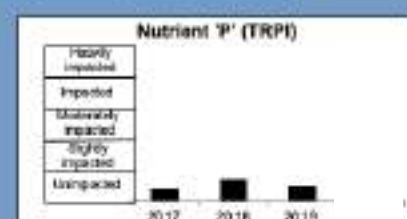
	2016	2017	2018
BMWP	124	143	92
ASPT	6.29	6.22	6.13
Annual Mayfly sp. Richness	NA	8	9
Total Abundance	1265	2101	NA
EPT	13	16	13
CCI	9.69	8.16	6.40
LIFE	8.82	8.46	8.65
PSI	88.89	80.38	91.11
SPEAR	NA	NA	40.45
TRPI	100.00	100.00	100.00
Saprobic	1.87	1.80	1.88



SPRING BIOMETRICS



	2017	2018	2019
BMWP	139	146	83
ASPT	7.32	6.64	7.56
Annual Mayfly sp. Richness	8	9	NA
Total Abundance	1579	NA	NA
EPT	17	18	12
CCI	10.94	8.89	11.38
LIFE	8.74	8.63	8.46
PSI	84.48	79.60	95.65
SPEAR	NA	45.32	68.33
TRPI	82.00	85.91	90.00
Saprobic	1.87	1.86	1.58



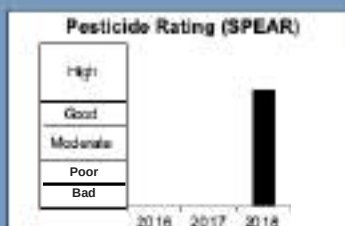
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WHAT WE'VE FOUND Pont Newydd

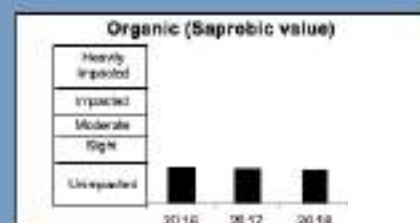
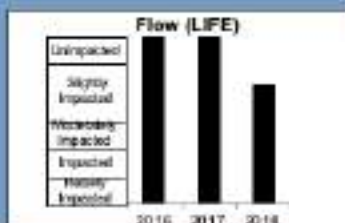
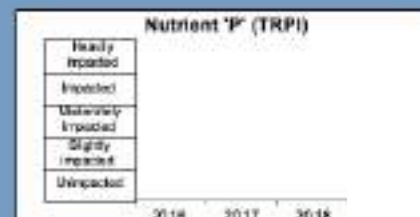
Pont Newydd was a healthy site, with minimal sediment, nutrient, organic and nutrient stress indicated by the invertebrate community.



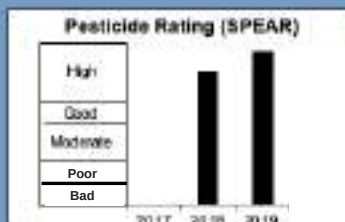
AUTUMN BIOMETRICS



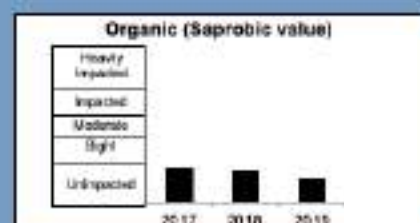
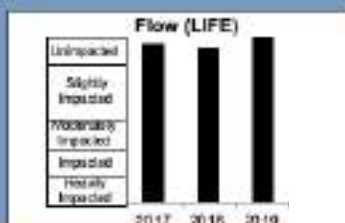
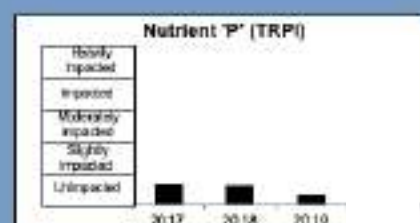
	2016	2017	2018
BMWP	143	111	146
ASPT	6.50	5.55	6.35
Annual Mayfly sp. Richness	NA	6	7
Total Abundance	892	1076	NA
EPT	20	9	15
CCI	16.85	9.64	7.63
LIFE	8.80	8.62	7.65
PSI	52.63	80.00	72.52
SPEAR	NA	NA	49.65
TRPI	100.00	100.00	100.00
Saprobic	1.71	1.69	1.64



SPRING BIOMETRICS



	2017	2018	2019
BMWP	147	155	144
ASPT	6.36	6.46	7.20
Annual Mayfly sp. Richness	6	7	NA
Total Abundance	483	NA	NA
EPT	19	20	19
CCI	17.15	16.80	11.30
LIFE	8.37	8.31	8.75
PSI	76.27	78.57	86.79
SPEAR	NA	57.11	66.29
TRPI	96.67	88.24	93.75
Saprobic	1.71	1.66	1.69



WHAT WE'VE FOUND

River Clwyd



Riverfly Census sampling on the Clwyd began in autumn 2016 and continued for three years on 5 sites: Dwyddog, Llanfair Dyffyn, Clywedog, Brookhouse Mill and Wheeler.



The locations of our sample sites are shown on the map, represented by pink circles.



1

WHAT WE'VE FOUND

Dwr lal

Considerable stress from excess fine sediment was indicated at Dwr lal, with moderate stress in autumn 2017, spring 2018 and spring 2019.

Nutrient stress on the invertebrate community was minimal.

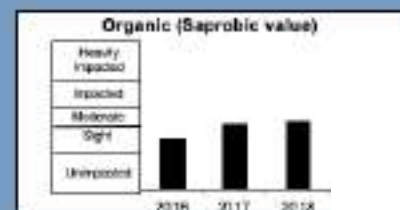
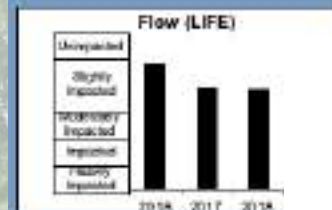
Organic enrichment stress was pronounced in autumn 2017, autumn 2018 and spring 2019.



AUTUMN BIOMETRICS



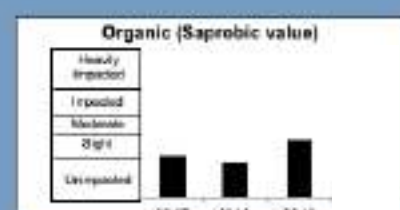
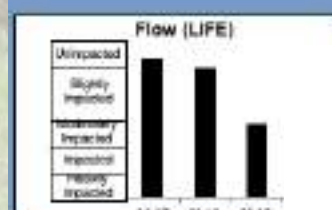
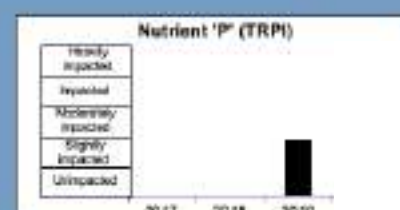
	2016	2017	2018
BMWP	66	59	78
ASPT	4.29	4.21	4.38
Annual Mayfly sp. richness	NA	1	1
Total Abundance	354	124	NA
EPT	4	4	4
CCI	3.67	4.13	11.90
LIFE	7.92	7.46	7.43
PSI	65.63	50.09	60.71
SPEAR	NA	NA	4.19
TRPI	75.00	70.05	100.00
Saprobic	2.06	2.34	2.42



SPRING BIOMETRICS



	2017	2018	2019
BMWP	52	57	53
ASPT	4.73	4.97	4.08
Annual Mayfly sp. richness	1	1	NA
Total Abundance	174	NA	NA
EPT	6	5	4
CCI	18.38	15.17	13.36
LIFE	6.57	6.90	6.92
PSI	82.61	56.67	34.48
SPEAR	NA	17.30	3.09
TRPI	100.00	100.00	62.50
Saprobic	1.88	1.74	2.18



2

WHAT WE'VE FOUND Llanfair Dyffyn

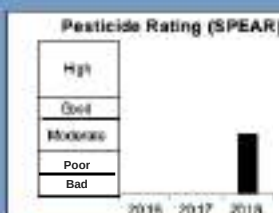
Due to unfavourable sampling conditions, this site was not sampled in spring 2019.

The invertebrate community at Llanfair Dyffyn did not exhibit any considerable stress from organic enrichment, excess fine sediment or nutrients.

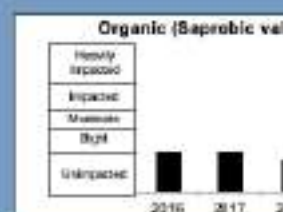
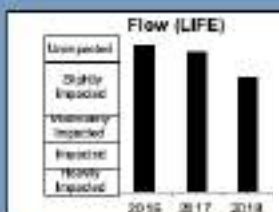
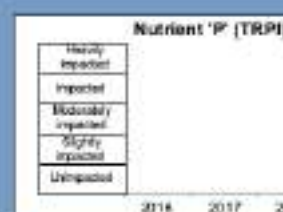
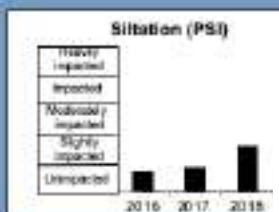
Chemical stress was indicated, with failure against the proposed WFD standard occurring in autumn 2018.



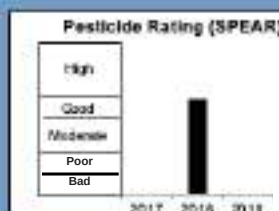
AUTUMN BIOMETRICS



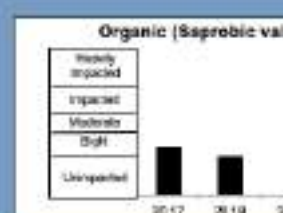
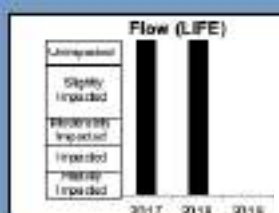
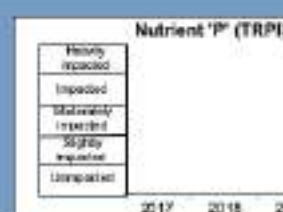
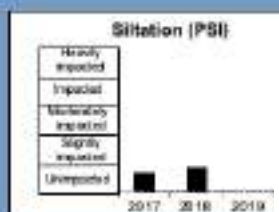
	2016	2017	2018
BMWP	132	93	111
ASPT	6.00	6.20	5.55
Annual Mayfly sp. Richness	NA	5	4
Total Abundance	1986	854	NA
EPT	14	8	7
CCI	8.16	4.71	8.64
LIFE	8.32	8.20	7.71
PSI	86.00	82.76	89.44
SPEAR	NA	NA	27.81
TRPI	193.99	109.09	180.90
Saprobic	1.83	1.83	1.83



SPRING BIOMETRICS



	2017	2018	2019
BMWP	105	123	-
ASPT	6.18	6.47	-
Annual Mayfly sp. Richness	5	4	-
Total Abundance	5740	NA	-
EPT	14	12	-
CCI	7.14	8.75	-
LIFE	8.55	8.67	-
PSI	86.67	82.96	-
SPEAR	NA	43.76	-
TRPI	166.99	109.09	-
Saprobic	1.90	1.82	-



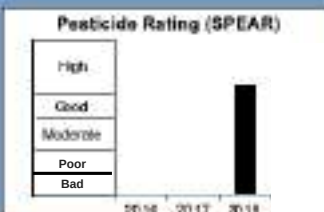
3

WHAT WE'VE FOUND Clywedog

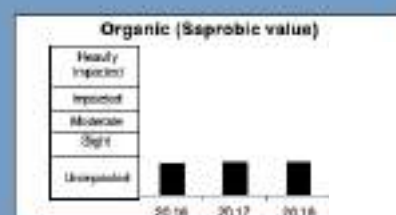
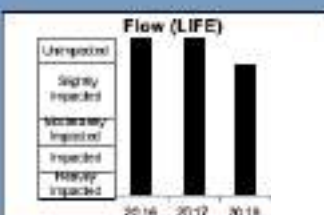
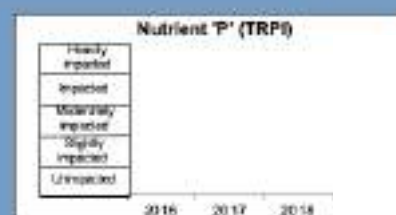
Clywedog was a healthy site, with minimal sediment, nutrient, organic and nutrient stress indicated by the invertebrate community.



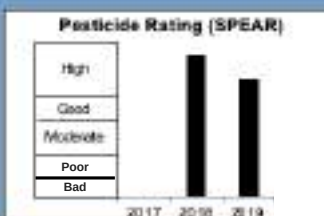
AUTUMN BIOMETRICS



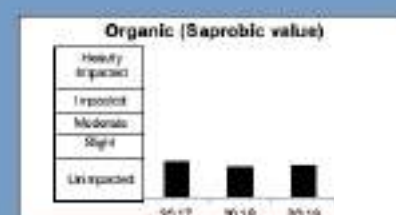
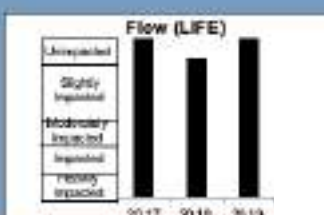
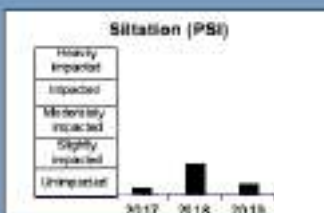
	2016	2017	2018
BMWP	151	149	132
ASPT	6.57	7.90	6.29
Number Mayfly spp. Richness	NA	5	6
Total Abundance	756	402	NA
EPT	17	16	12
CCI	13.61	10.00	10.26
LIFE	8.72	8.57	8.90
PSI	87.72	90.31	76.74
SPEAR	NA	NA	49.09
TRPI	100.00	100.00	100.00
Saprobic	1.67	1.71	1.71



SPRING BIOMETRICS



	2017	2018	2019
BMWP	130	97	143
ASPT	6.50	6.47	7.15
Number Mayfly spp. Richness	5	6	NA
Total Abundance	656	NA	NA
EPT	18	18	17
CCI	9.47	5.33	9.17
LIFE	8.96	8.14	8.61
PSI	95.16	78.57	91.30
SPEAR	NA	63.89	53.68
TRPI	100.00	100.00	100.00
Saprobic	1.74	1.66	1.69



4

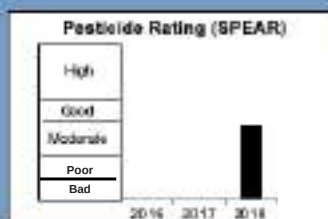
WHAT WE'VE FOUND Brookhouse Mill

Chemical stress was indicated at Brookhouse Mill, with failure against the proposed WFD standard occurring in autumn 2018.

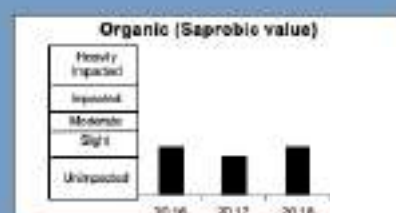
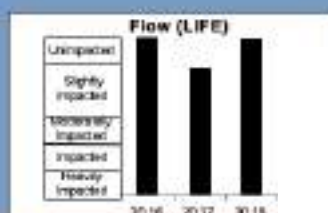
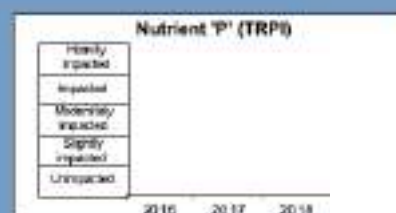
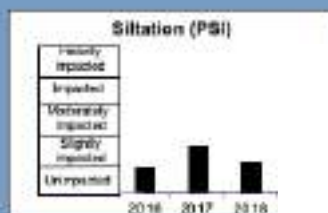
Nutrient, sediment and organic stress on the invertebrate community was minimal.



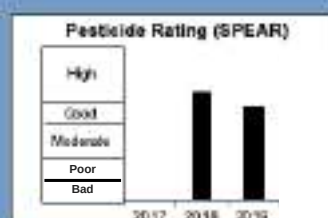
AUTUMN BIOMETRICS



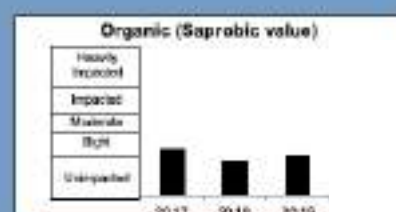
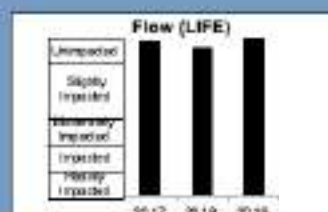
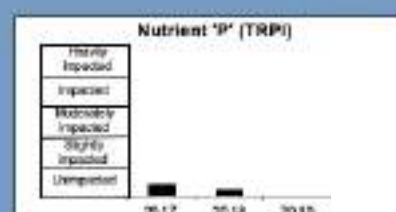
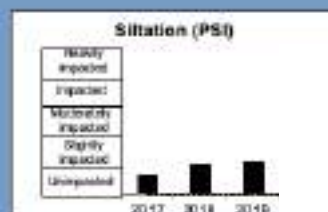
	2016	2017	2018
BMWP	85	115	88
ASPT	5.59	5.48	5.50
Annual Mayfly sp. Richness	NA	6	4
Total Abundance	4902	403	NA
EPT	9	16	10
CCI	4.64	8.67	14.06
LIFE	8.56	7.32	8.46
PSI	82.50	48.29	78.72
SPEAR	NA	NA	32.83
TRPI	100.00	100.00	100.00
Saprobic	1.09	1.82	1.99



SPRING BIOMETRICS



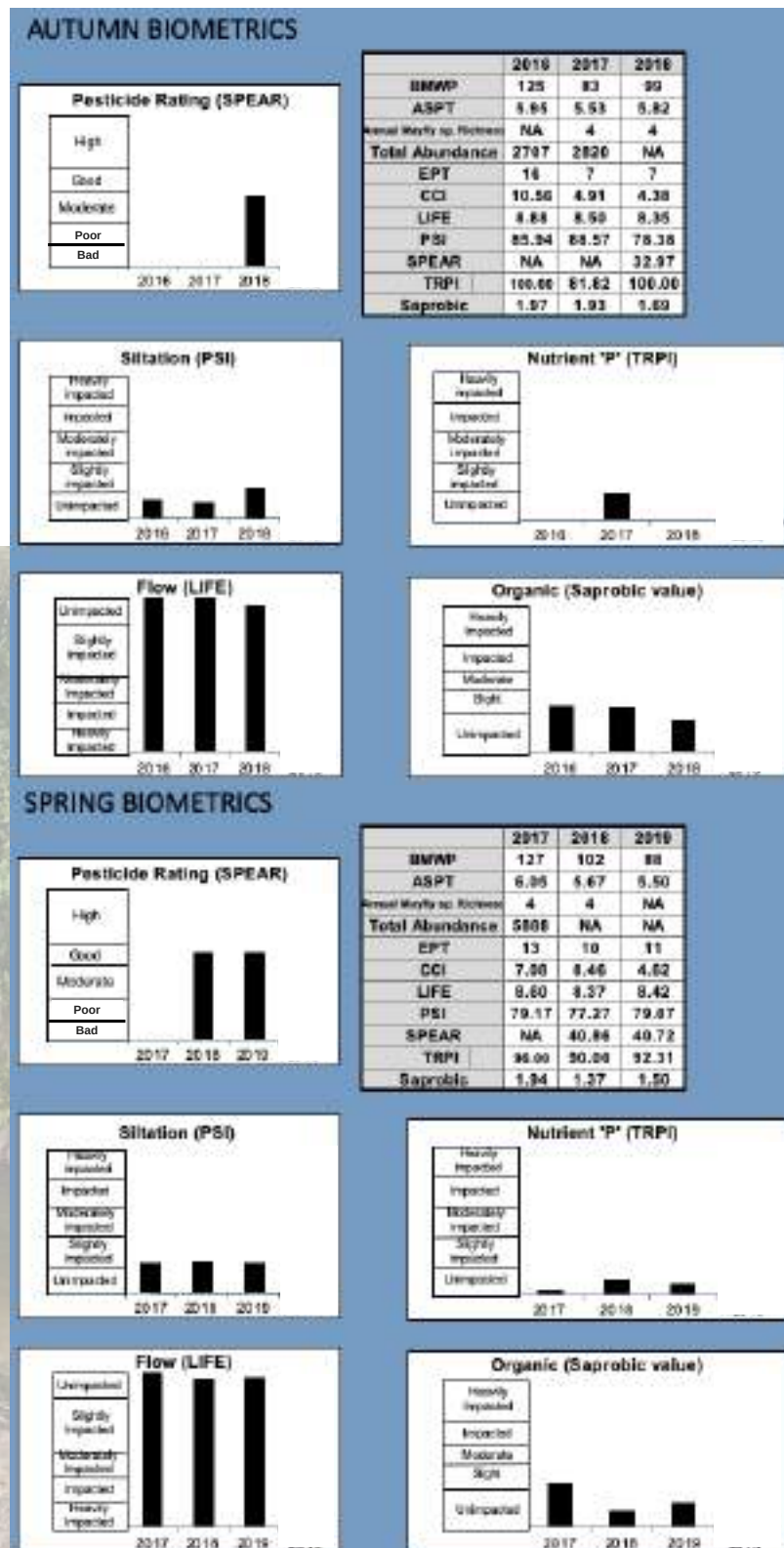
	2017	2018	2019
BMWP	113	124	90
ASPT	6.65	5.99	6.80
Annual Mayfly sp. Richness	6	4	NA
Total Abundance	4861	NA	NA
EPT	16	17	11
CCI	14.06	19.38	4.50
LIFE	8.46	8.32	8.56
PSI	86.67	78.95	77.78
SPEAR	NA	49.29	42.79
TRPI	91.67	84.74	100.00
Saprobic	1.37	1.74	1.83



5

WHAT WE'VE FOUND Wheeler

Apart from a failure against the proposed WFD chemical standard for SPEAR in autumn 2018, Wheeler was indicated to be a healthy site. Stress from excess nutrients, fine sediment or organic enrichment was minimal.



WHAT WE'VE FOUND

E. Cleddau



Riverfly Census sampling on tributaries of the Eastern Cleddau river began in autumn 2016 and continued for three years on 5 sites: Longford Brook, Pont Shan, Narberth Brook, Churchill Brook and Deepford Brook.

The locations of our sample sites are shown on the map, represented by pink circles.

1

WHAT WE'VE FOUND Longford Brook

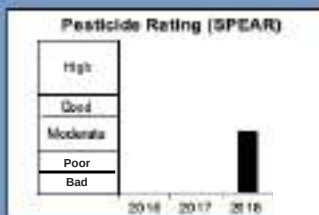
Seasonal stress was exhibited at Longford Brook, with considerable stress being indicated by the invertebrate community in autumn. Sediment stress was an issue, with moderate PSI signatures in autumn 2017 and autumn 2018.

Moderate stress from organic enrichment was exhibited in autumn 2016.

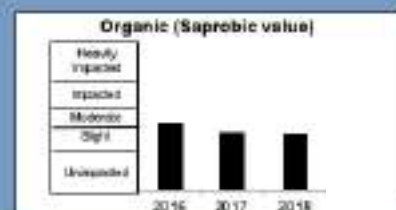
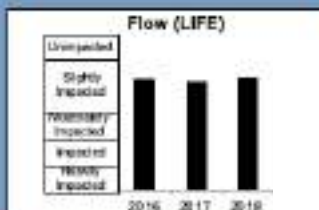
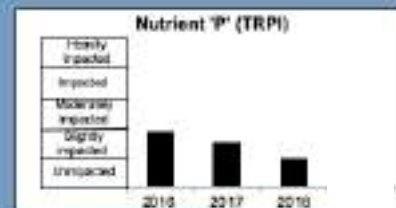
The proposed chemical WFD standard for SPEAR was failed in autumn 2018.



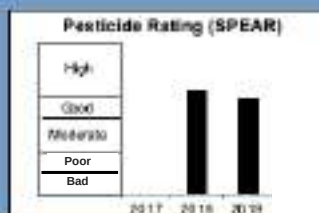
AUTUMN BIOMETRICS



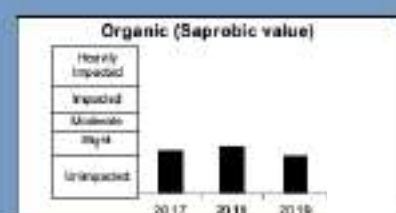
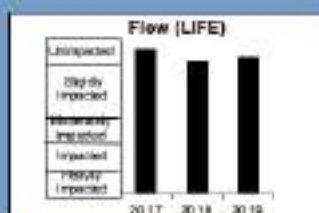
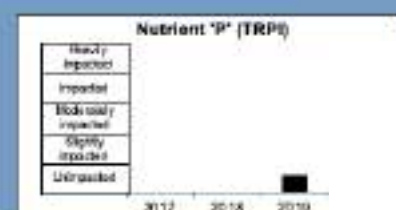
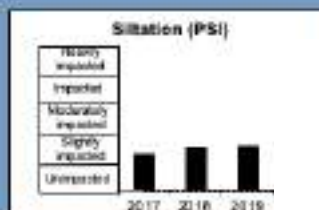
	2016	2017	2018
BWFP	80	158	145
ASPT	5.00	6.01	5.50
Annual Mayfly sp. Richness	NA	6	5
Total Abundance	818	455	NA
EPT	4	13	12
CCI	7.27	9.86	7.00
LIFE	7.67	7.53	7.69
PSI	66.67	59.26	56.18
SPEAR	NA	NA	28.34
TRPI	62.56	70.60	80.09
Saprobic	2.60	2.19	2.15



SPRING BIOMETRICS



	2017	2018	2019
BWFP	129	135	136
ASPT	6.79	6.43	6.18
Annual Mayfly sp. Richness	6	5	NA
Total Abundance	594	NA	NA
EPT	14	16	14
CCI	14.33	8.95	7.50
LIFE	8.29	8.09	8.13
PSI	75.00	70.00	66.75
SPEAR	NA	47.24	43.63
TRPI	100.00	100.00	88.24
Saprobic	1.90	2.01	1.82



2

WHAT WE'VE FOUND Pont Shan

Nutrient stress was minimal throughout the survey period at Pont Shan, but seasonal stress was indicated by all the other biometrics.

A notable organic enrichment peak occurred in autumn 2018. Sediment pressure was also moderate in autumn 2017 and autumn 2018.

In autumn 2018 the proposed WFD SPEAR chemical standard was failed with an extremely low score.



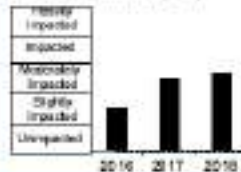
AUTUMN BIOMETRICS

Pesticide Rating (SPEAR)

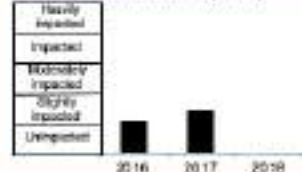


	2016	2017	2018
BMWP	120	97	76
ASPT	5.43	4.65	4.65
Percent Mayfly sp. Success	NA	7	4
Total Abundance	325	924	NA
EPT	10	9	5
CCI	0.42	4.59	4.09
LIFE	7.95	7.62	7.53
PSI	69.77	51.11	66.67
SPEAR	NA	NA	19.82
TRPI	77.78	71.43	100.00
Saprobic	1.31	2.01	2.38

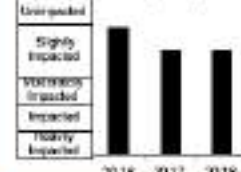
Siltation (PSI)



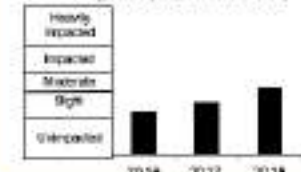
Nutrient 'P' (TRPI)



Flow (LIFE)

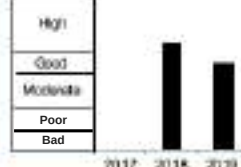


Organic (Saprobic value)



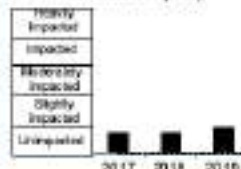
SPRING BIOMETRICS

Pesticide Rating (SPEAR)



	2017	2018	2019
BMWP	141	149	149
ASPT	6.41	7.10	6.43
Percent Mayfly sp. Success	7	4	NA
Total Abundance	552	NA	NA
EPT	17	14	16
CCI	12.09	14.39	13.30
LIFE	8.29	8.54	8.33
PSI	85.19	85.71	82.35
SPEAR	NA	48.73	39.39
TRPI	100.00	92.86	92.86
Saprobic	1.74	1.66	1.64

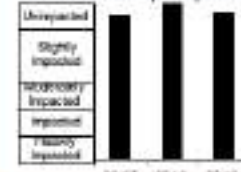
Siltation (PSI)



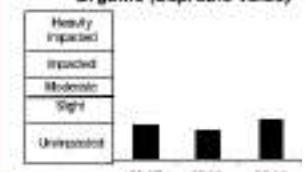
Nutrient 'P' (TRPI)



Flow (LIFE)



Organic (Saprobic value)



3

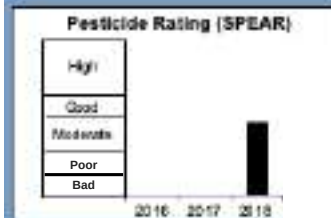
WHAT WE'VE FOUND

Narberth Brook

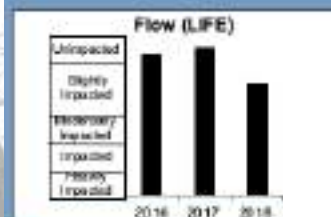
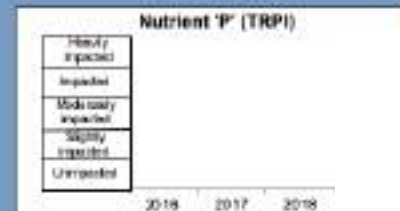
Apart from a borderline moderate impact PSI score exhibited in autumn 2018, the invertebrate community indicated that Narberth Brook was a relatively healthy site throughout our survey.



AUTUMN BIOMETRICS



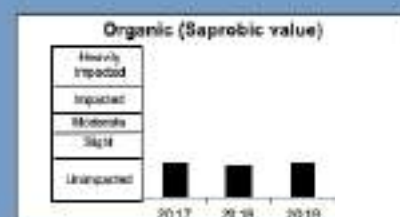
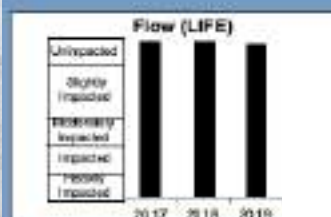
	2016	2017	2018
BMWP	151	151	141
ASPT	6.04	6.57	5.88
Number Mayfly sp. Richness	NA	6	7
Total Abundance	714	863	NA
EPT	19	15	10
CCI	12.33	12.06	8.75
LIFE	6.18	5.30	7.64
PSI	79.10	67.89	68.67
SPEAR	NA	NA	33.12
TRPI	106.96	100.09	100.00
Saprobic	1.77	1.86	1.76



SPRING BIOMETRICS



	2017	2018	2019
BMWP	140	134	146
ASPT	6.35	6.38	6.44
Number Mayfly sp. Richness	6	7	NA
Total Abundance	548	NA	NA
EPT	18	17	18
CCI	15.40	15.06	8.57
LIFE	8.43	8.46	8.37
PSI	97.27	88.27	88.89
SPEAR	NA	47.17	51.12
TRPI	106.66	106.09	93.75
Saprobic	1.71	1.63	1.70



4

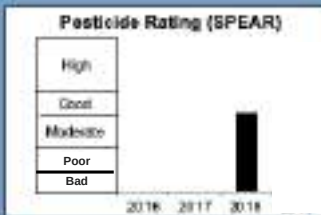
WHAT WE'VE FOUND Churchill Brook

The invertebrate community at Churchill Brook indicated minimal stress from chemicals, organic enrichment or excess nutrients throughout the survey period.

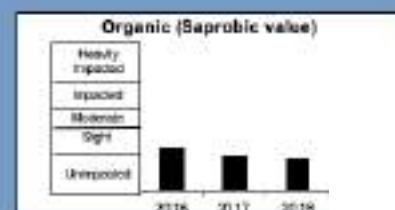
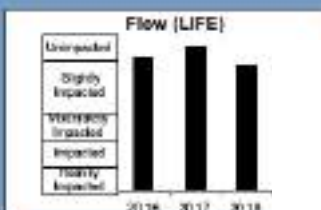
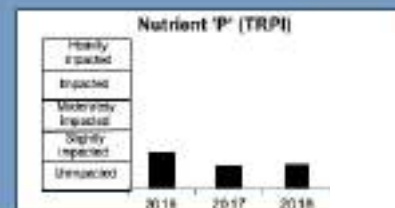
There was a slight peak in sediment stress in autumn 2018, but it was still below moderate impact.



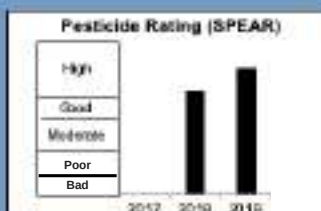
AUTUMN BIOMETRICS



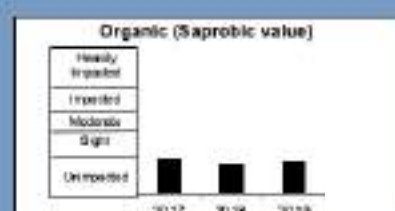
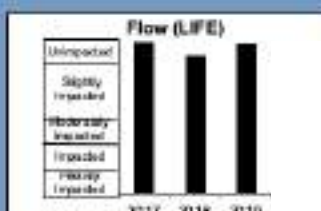
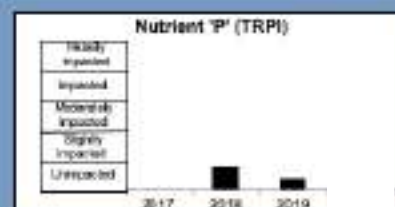
	2016	2017	2018
BWIP	128	129	165
ASPT	6.10	5.86	5.69
Percent Mayfly sp. Richness	NA	8	7
Total Abundance	466	929	NA
EPT	10	12	13
CCI	7.86	6.88	11.00
LIFE	8.08	8.30	7.64
PSI	71.74	72.73	61.19
SPEAR	NA	NA	35.84
TRPI	75.00	84.62	83.33
Saprobic	1.89	1.75	1.68



SPRING BIOMETRICS



	2017	2018	2019
BWIP	183	101	140
ASPT	6.52	6.71	6.67
Percent Mayfly sp. Richness	8	7	NA
Total Abundance	731	NA	NA
EPT	15	19	14
CCI	14.00	14.00	8.24
LIFE	8.44	8.18	8.41
PSI	84.48	80.00	83.72
SPEAR	NA	47.46	57.33
TRPI	106.66	85.00	91.67
Saprobic	1.74	1.66	1.72



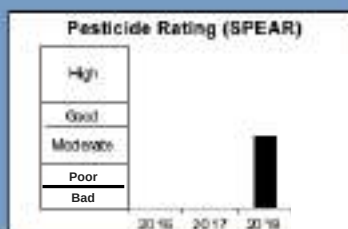
5

WHAT WE'VE FOUND Deepford Brook

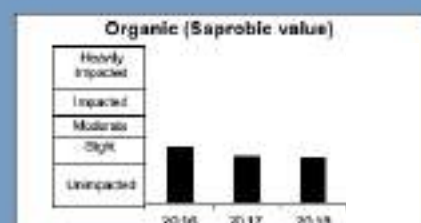
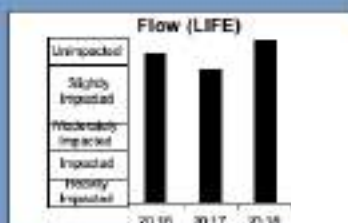
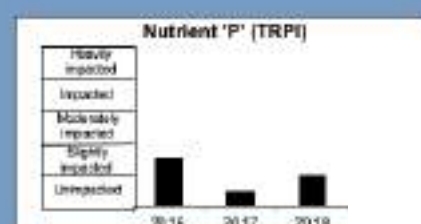
Deepford Brook was a healthy site, with minimal sediment, nutrient, organic and nutrient stress indicated by the invertebrate community.



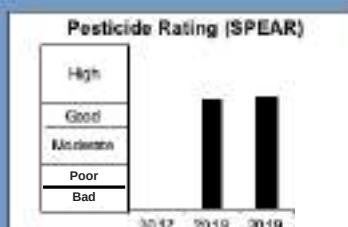
AUTUMN BIOMETRICS



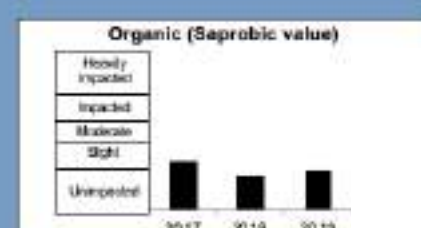
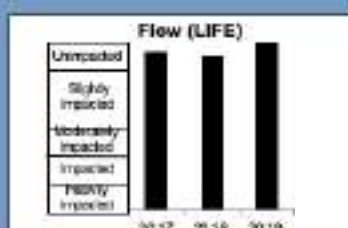
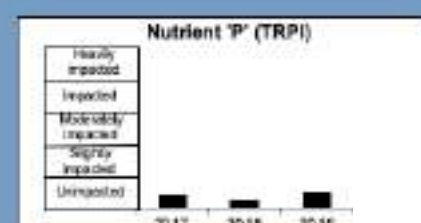
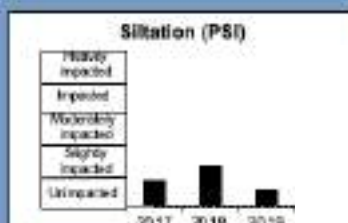
	2016	2017	2018
BMWP	133	162	145
ASPT	6.05	6.23	5.88
Annual Mayfly sp. Richness	NA	8	4
Total Abundance	751	869	NA
EPT	12	15	11
CCI	9.69	10.98	8.57
LIFE	8.21	7.93	8.46
PSI	81.63	64.81	71.19
SPEAR	NA	NA	30.80
TRPI	70.00	90.00	80.00
Saprobic	2.11	1.92	1.89



SPRING BIOMETRICS



	2017	2018	2019
BMWP	144	157	135
ASPT	6.09	6.04	6.43
Annual Mayfly sp. Richness	8	4	NA
Total Abundance	627	NA	NA
EPT	17	19	21
CCI	14.09	14.84	9.40
LIFE	8.32	8.27	8.53
PSI	82.76	73.53	89.06
SPEAR	NA	46.24	48.15
TRPI	99.48	94.74	90.00
Saprobic	1.93	1.69	1.76



FINAL WORD

Many of our rivers lack historical reference points, making it difficult to know exactly what optimal conditions in our rivers should look like. It is only with a reliable 'benchmark' of health that we can properly quantify deterioration or recovery, and only with robust long term monitoring can we truly understand the changes occurring in our freshwater systems.

Our Riverfly Census data has highlighted the subtle but lethal pressures facing UK rivers, but we need help to extend species level invertebrate analysis to many more. Our new project, SmartRivers, will enable volunteers to monitor the water quality in their rivers to a near-professional standard. SmartRivers compliments existing Riverfly Partnership monitoring but provides more information. The high-resolution nature of the data also means that S&TC is able to work with the Environment Agency and others to address the causes of poor water quality and drive forward positive change.

REFERENCES

Beketov MA, Foit K, Schäfer, RB. (2009). SPEAR indicates pesticide effects in streams—comparative use of species-and family-level biomonitoring data. *Environmental Pollution*: 157(6) pp. 1841-1848.

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