Salisbury & District Angling Club

Centre for Riverfly Conservation

River Avon - Invertebrate Survey (2015 – 2019)

As the national news has recently been somewhat dominated by reports of declines in the water quality of our rivers due to increasing levels of phosphates, silt, pesticides, herbicides and even raw sewage, it's not surprising to find a similar decline in our river invertebrate populations. Up until 2015, the Hampshire Avon was head and shoulders above other chalk streams but since then we have seen a serious decline.

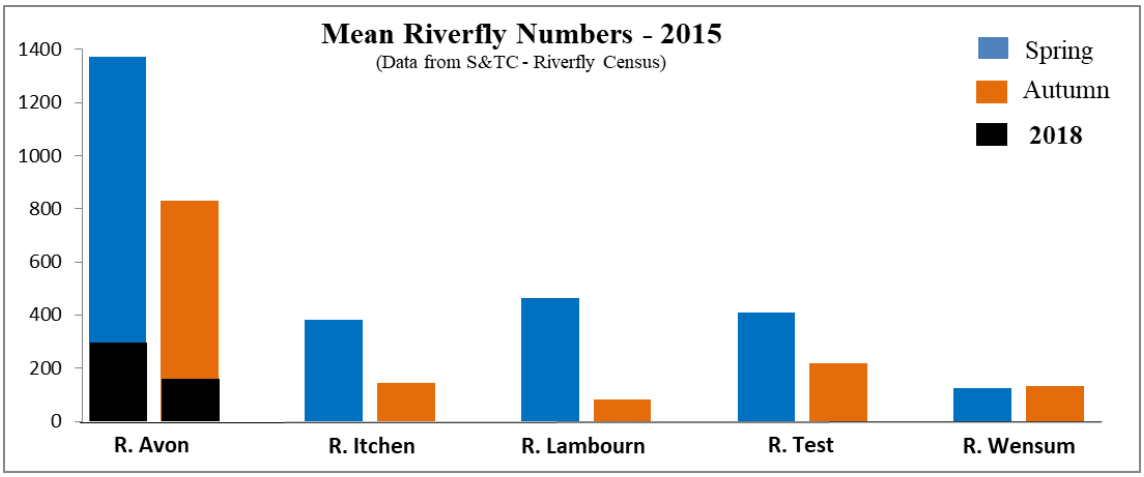


Fig. 1 – Chalk stream Riverfly populations

Full invertebrate (benchmark) samples have been taken at five sites (spring & autumn) over a five year period 2015 - 2019 by Aquascience Consultancy Ltd for Salmon & Trout Conservation and the Salisbury & District Angling Club. In 2018, two additional sites were sampled above and below Ratfyn STW (sites 3 & 4) and downstream of Amesbury STW at West Amesbury (Site 7); data from a private syndicate at Compton (Site 1) was also included.

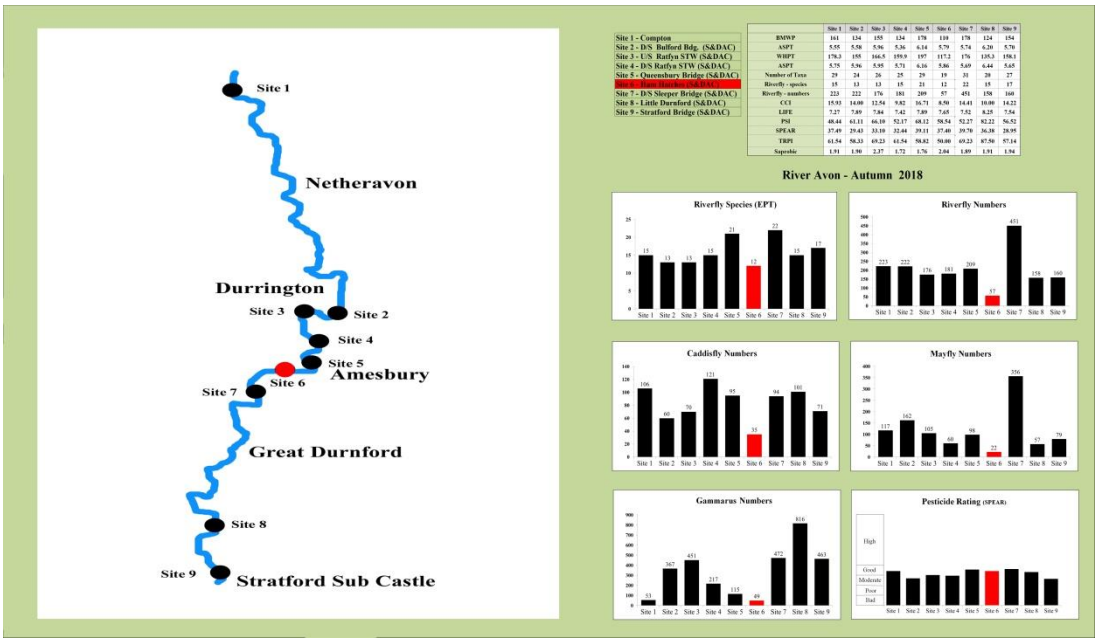


Fig 2. - River Avon sampling sites – Autumn 2018

Whilst declines in Riverfly populations were recorded at all sites, this was most pronounced at Ham Hatches (Site 6); therefore this report concentrates on this site, but full data for each site is appended.

Ham Hatches - Invertebrate data

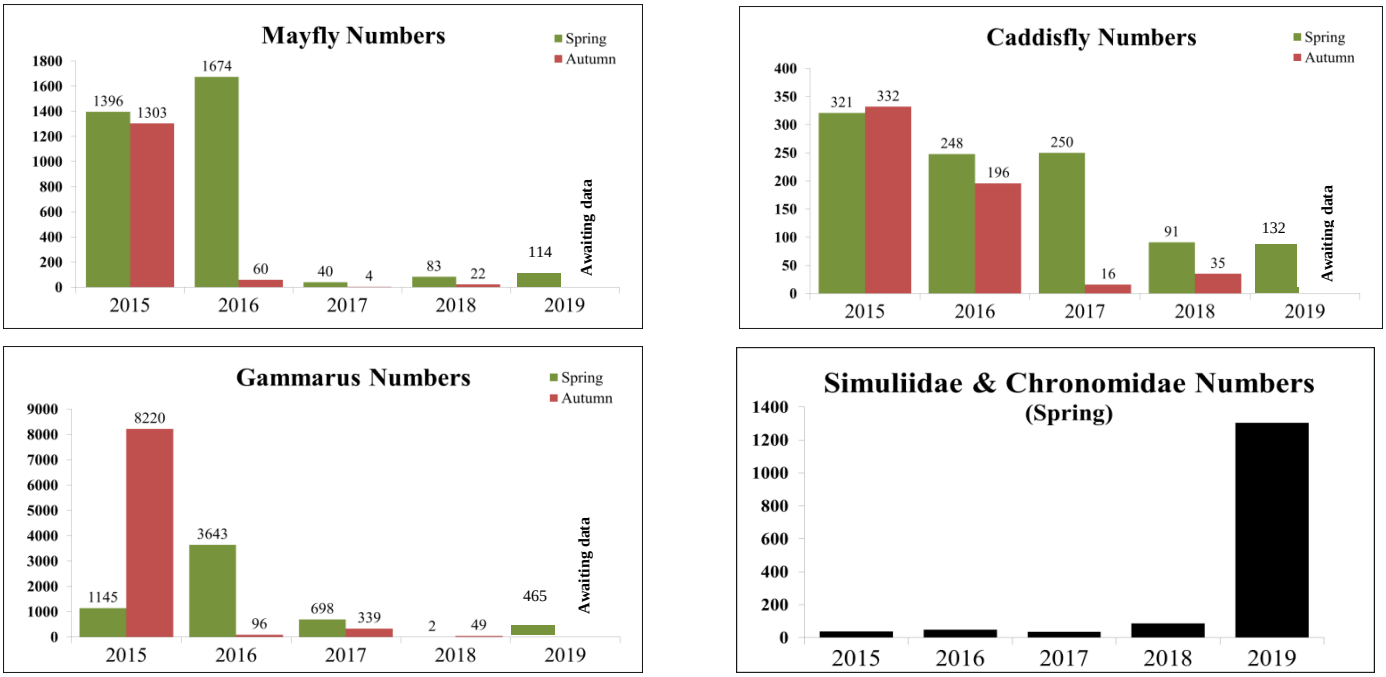


Fig. 3 – Spring & Autumn data at Ham Hatches. (Data from S&TC/Aquascience/S&DAC)

Both spring and autumn data show large reductions in pollution sensitive Mayflies, Caddisflies and Gammarus. An increase in pollution tolerant Simuliidae & Chronomidae in Spring 2019 correlates with increased saprobic and reduced ASPT values indicating an increase in organic pollution (Appendix 16), and a low pesticide (SPEAR) level was recorded in autumn 2017 (Appendix 18).

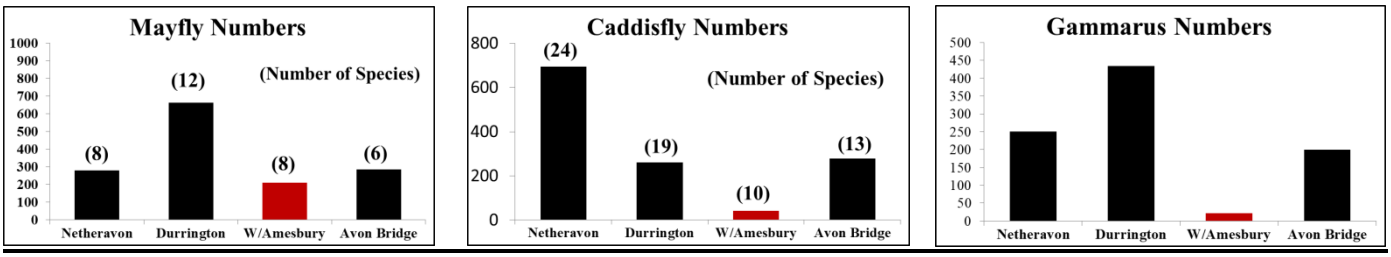


Fig. 4 - EA data (Spring 2018)

EA invertebrate data also shows lower numbers of Mayflies, Caddisflies & Gammarus at West Amesbury (Site 7 - downstream of Ham Hatches) when compared with upstream sites.

Summer Gammarus Survey

The large reductions in the Gammarus populations is of particular concern because this species is commonly used to investigate chemical stressors (review in Kunz et al., 2010). A significant number of dead Gammarus in a monthly AMI sample at Queensbury Bridge (Site 5) initiated a survey which showed low populations at Queensbury Bridge & Ham Hatches compared with a much larger population downstream at Stratford Bridge (Fig. 5).

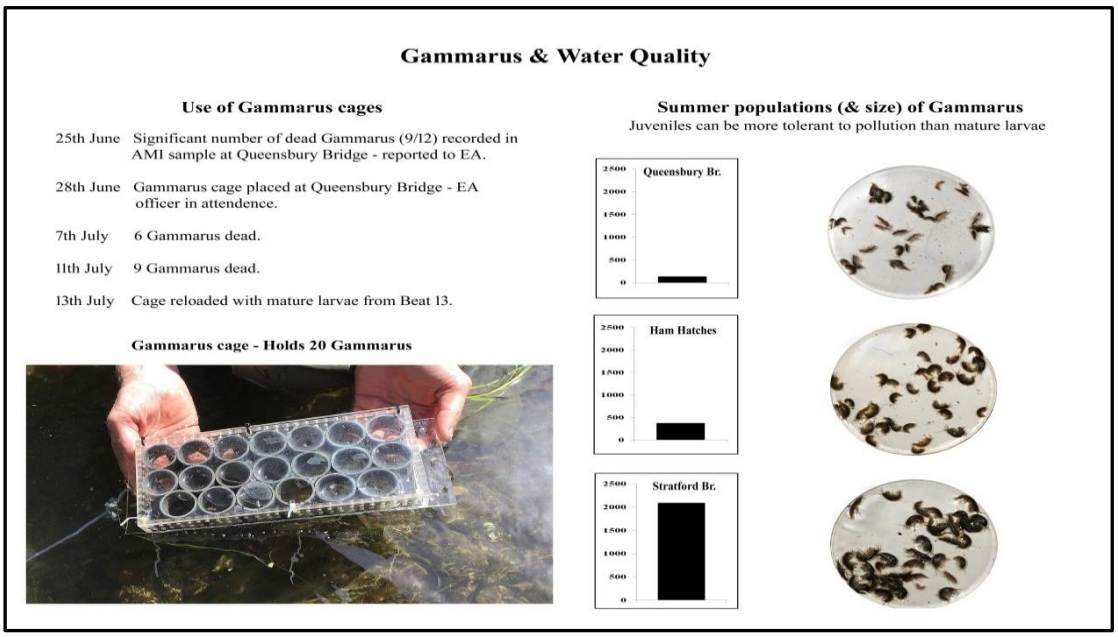


Fig. 5 – Summer survey of Gammarus

There was also an observed size difference in the larvae, with only small (juvenile) Gammarus at Queensbury Bridge whilst a full size range was present at Stratford Bridge. Juvenile Gammarus are more tolerant to pollution than mature larvae and therefore more able to survive the summer when pollution effects are at a maximum (Hobrough 1973). A Gammarus cage (Maltby 2002), placed at Queensbury Bridge loaded with mature larvae from Stratford Bridge showed losses within 9 days

Ham Hatches - Silt & Phosphate Levels

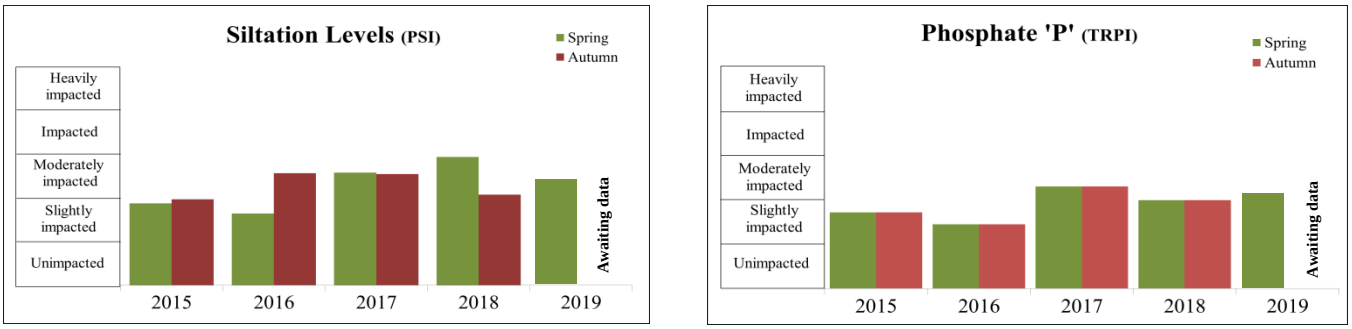


Fig. 6 – Autumn silt (PSI) and phosphate (TRPI) levels at Ham Hatches. (Data supplied by S&TC/Aquascience/S&DAC)

Both phosphates and fine sediments (silt) can impact on Riverfly populations (Everall et al 2017); phosphate levels in the river significantly exceed the 0.05 mg standard, and increase upstream. Silt levels are only monitored in the river at Stratford Bridge (Site 9) where high peaks have been recorded. Silt levels above 10 mg/l can deplete the eggs of the Blue Winged Olive, one of our commonest mayflies.

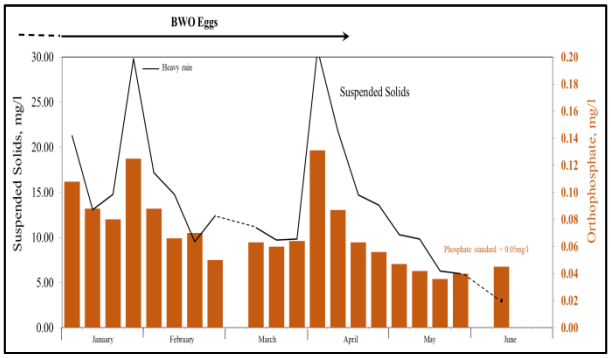


Fig 7a - 2018 Silt & phosphate levels at Stratford Bridge

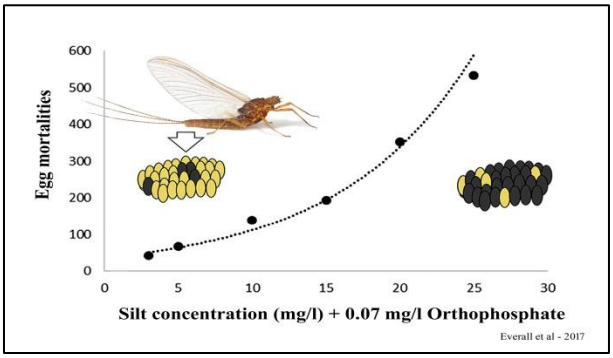


Fig. 7b - Blue Wing Olive egg losses at increasing silt levels

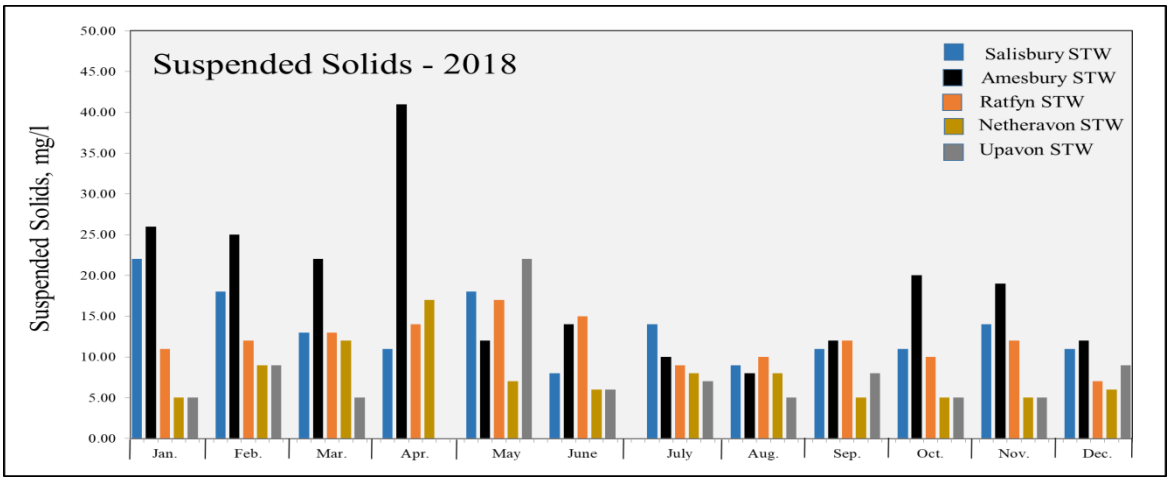


Fig. 8 – STW Suspended Solid (Silt) levels

Whilst suspended solids (silt) are not measured in the river at Site 6, levels measure at Amesbury STW greatly exceed other STW in the early and latter part of the year.

Summary

1. Serious decline in Riverfly populations:
   - Mayfly Numbers.
   - Caddisfly numbers.
   - Gammarus numbers.
2. Low pesticide (SPEAR) signature seen at some sites.
3. Increasing silt (PSI) and phosphate (TRPI) levels.
4. Phosphate levels in the river are significantly above the 0.05 mg/l 'standard' for the Avon and increase upstream reaching higher levels in the upper reaches.
5. We need to know that the STW's will be able to cope with the large (and increasing) developments in the Amesbury area without further depleting our Riverfly populations. Autumn samples will be taken at all five S&DAC sites by Aquascience Consultancy to complete the five year period

Dr Cyril Bennett MBE
August 2019

References:
Everall N. C., (2017). Sensitivity of the early life stages of a mayfly to fine sediment and orthophosphate levels. *Environmental Pollution* 1-11.

Hobrough J. E. (1973). The effects of pollution on *Gammarus pulex* (L) subsp, *pulex* (Schellenberg) in the inlet streams of Rostherne Mere, Cheshire. *Hydrobiologia*, **12**, pp 13-35.

Kunz P.Y., Kienle C., Gerhardt A. (2010). Gammarus spp. In Aquatic Ecotoxicology & Water Quality Assessment: Toward Integrated Multilevel Test. *Reviews of Environmental Contamination & Toxicology* **205**, pp 1-76.

Maltby L., Clayton S.A., Wood R.M., Mcloughlin N. (2002) Evaluation of the Gammarus pulex in situ feeding assay as a biomonitor; robustness, responsiveness, and relevance. *Environmental toxicology & Chemistry* **21** pp 361-368.

Appendix 1 - Monitoring Sites

Caddisflies	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Agapetus	0	26	35	42	16	0		13	19
Silo nigricornis	18	4	9	31	10	0	35	19	2
Goera pilosa							20		
Hydropsyche siltalai	0	8	0	3	9	1	3	3	8
Hydropsyche contubernalis	0	0	4	4	6	0		4	2
Hydropsyche pellucidula	23	16	5	13	19	4		7	16
Hydroptila	0	0	12	0	3	0	2	3	0
Ithytrichia lamellaris	1	0	0	0		0		0	0
Mystacides azurea	4	2	0	2	2	2	2	0	2
Athripsodes albifrons	0	0	0	2		0	2	0	0
Athripsodes cinereus	6	0	0	18	7	3		3	0
Drusus annulatus	0	1	0	0		0	1	0	0
Limnephilus flavicornis	2	0	0	0		0		0	0
Glyphotaelius pellucidus	11	0	0	0		0		0	0
Limnephilus	29	0	0	0		0		0	0
Odontocerum albicorne	0	0	0	0		0		0	0
Limnephilus lunatus	0	1	0	0		3	3	1	0
Brachycentrus subnubilus	0	0	0	0	1	2	8	0	5
Polycentropus flavomaculatus	0	0	0	3	3	1	14	3	0
Polycentropus	0	0	0	0		0		0	0
Plectrocnemia conspersa	1	0	0	0		0		0	0
Rhyacophila dorsalis	0	1	3		8	1	1	2	2
Sericostoma personatum	11	1	2	3	5	2	3	17	1
Goeridae	0	0	0	0		16		0	0
Cheumatopsyche lepida	0	0	0	0	15	0		26	19
Lype reduta	0	0	0	0	1	0		0	0
Molanna angustata	0	0	0	0		0		0	5

Damsels & Dragons	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Calopteryx splendens	3		1	1					
Sialis lutaris									1

Crustaceans	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Gammarus pulex	53	367	451	217	115	49	472	816	463
Asellus aquaticus	1	1		32	1		12		5
Asellus meridianus							2		

Beetles & Bugs	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Sigara	3		1						3
Nebrioporus		1							
Oreodytes sanmarkii	10								
Oulimnius tuberculatus	12	3	12	28	10		1		8
Limnius volckmari		7	23	61	41	8	132	38	47
Elmis aenea	74	49	147	165	101	22	113	10	32
Gyrinus			2	2	1				
Gyrinidae	3	3							
Haliplidae			1				27		
Haliplus lineolatus	1								
Hydraena	2			1					
Anacaena lutescens				1					
Nymphula stagnata			1						
Orectochilus villosus								3	

Leeches & Flatworms	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Erpobdella octoculata				2					
Glossiphonia complanata	1		1	2			8		3
Helobdella stagnalis			1		3				2
Theromyzon tessulatum	1								
Polycelis felina					1				

Mayflies	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Centroptilum luteolum	3	3	0	2	2	1		0	9
Baetis	0	0	0	0		21	298	0	0
Baetis rhodani	78	81	22	9	23	0	6	41	20
Baetis scambus/fuscipes	25	65	76	27	51	0	6	15	45
Serratella ignita	0	0	4	0	14	0	3	0	0
Ephemera danica	7	13	1	20	5	0	28	1	2
Heptagenia sulphurea	4		2	2	3	0	11	0	1
Baetis muticus	0	0	0	0		0		0	2
Baetis dipterum							3		
Caenis rivulorum							1		

Stoneflies	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Leuctra			1	1	6				
Leuctra geniculata									

Molluscs	Site 1	Site 5	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Ancylus fluviatilis	7	4	8		8		17		
Bithynia tentaculata				25	3	2	5	2	4
Potamopyrgus antipodarum	1	37	28	3	6	5			
Radix balthica	2	1	3	4	3	2	2		
Theodoxus fluviatilis	7	1	1		4	1	3	5	3
Physa fontinalis		1	3	7		1		0	3
Physa	12						3		
Anisus vortex	32	11	5	12	5	6	18	0	6
Gyraulus albus			9	26	5	0	1	0	0
Planorbis contortus									
Valvata piscinalis				5					
Planorbis									1
Sphaerium							1	1	
Sphaerium corneum									25
Valvata piscinalis						3	11		1
Pisidium							5		

True Flies	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Tanytarsini	3	4	6	36	39		28		15
Tanypodinae					3		3		2
Orthocladiinae	9	19	25	41	68			3	9
Dixa	11		3						
Lispe	1	1							
Dicranota		1	1						
Simulium				13	42		88		
Simulium ornatum group	45	78	4831			44		16	113
Tabanidae				1					
Hemerodromia					2				
Antocha					1			1	7
Chironomidae							1		

Worms	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Oligochaeta	1	5		9	36		23		4

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
BMWP	161	134	155	134	178	110	178	124	154
ASPT	5.55	5.58	5.96	5.36	6.14	5.79	5.74	6.20	5.70
WHPT	178.3	155	166.5	159.9	197	117.2	176	135.3	158.1
ASPT	5.75	5.96	5.95	5.71	6.16	5.86	5.69	6.44	5.65
Number of Taxa	29	24	26	25	29	19	31	20	27
Riverfly - species	15	13	13	15	21	12	22	15	17
Riverfly - numbers	223	222	176	181	209	57	451	158	160
CCI	15.93	14.00	12.54	9.82	16.71	8.50	14.41	10.00	14.22
LIFE	7.27	7.89	7.84	7.42	7.89	7.65	7.52	8.25	7.54
PSI	48.44	61.11	66.10	52.17	68.12	58.54	52.27	82.22	56.52
SPEAR	37.49	29.43	33.10	32.44	39.11	37.40	39.70	36.38	28.95
TRPI	61.54	58.33	69.23	61.54	58.82	50.00	69.23	87.50	57.14
Saprobic	1.91	1.90	2.37	1.72	1.76	2.04	1.89	1.91	1.94

River Avon - Autumn 2018

Site 1 - Compton
(SU14212 51827)

Site 2 - Stonehenge
(SU16220 43278)

Site 3 - U/S Ratfyn STW
(SU15533 43629)

Site 4 - D/S Ratfyn STW
(SU15224 4 20340)

Site 5 - Queensbury Bridge
(SU15121 41266)

Site 6 - Ham Hatches
(SU14845 41074)

Site 7 - D/S Sleeper Bridge
(SU13970 41079)

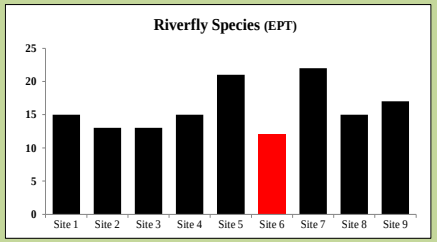
Site 8 - Beat 18
(SU12484 34696)

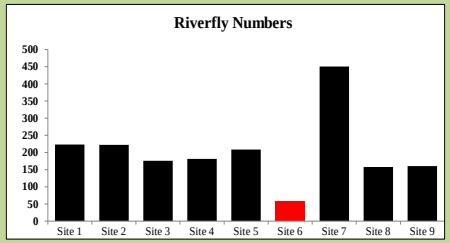
Site 9 - Stratford Bridge
(SU12903 32990)

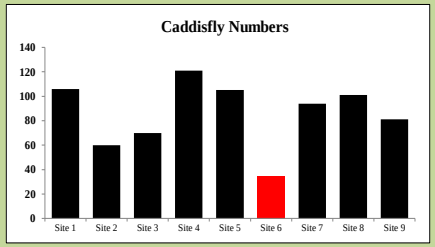
Appendix 2 - Site Monitoring Data

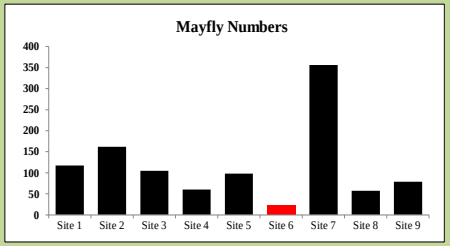
RiverAvon - Autumn 2018

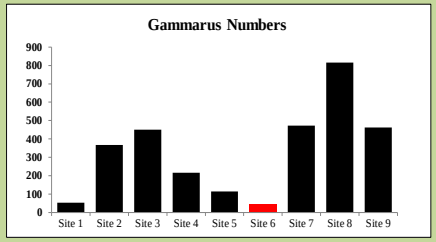
(Site 6 - Ham Hatches)

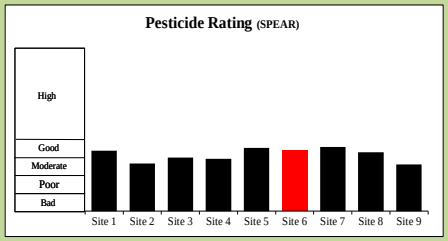


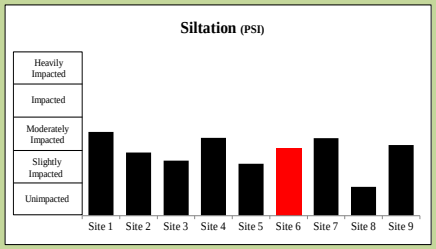


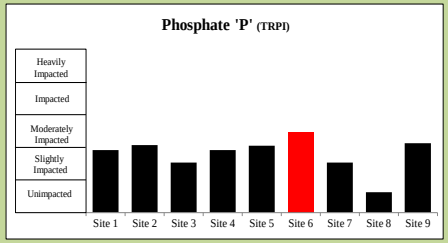


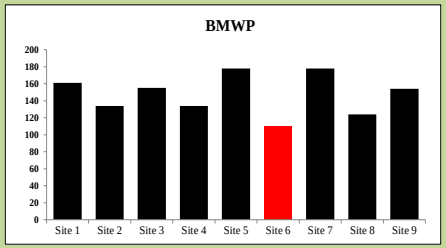


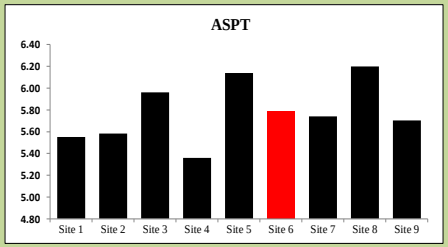


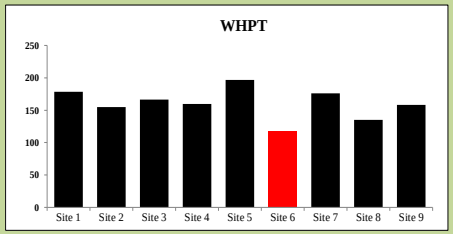


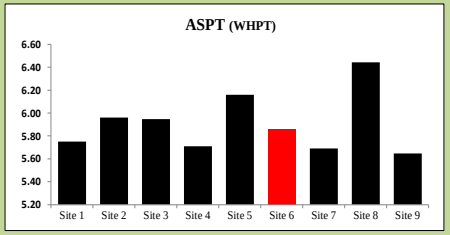


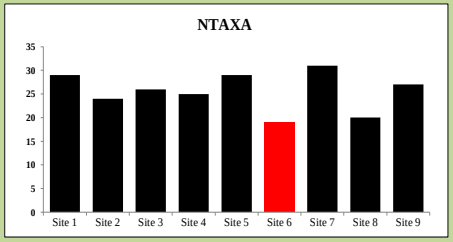


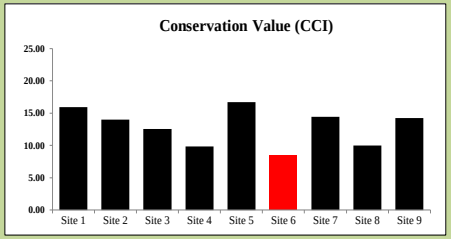


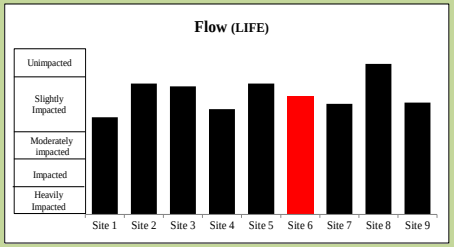


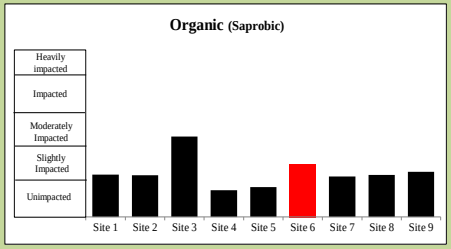












Appendix 3 - Site 2 (Spring Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	2	8	0	4	11
Potamophylax	0	0	0	0	5
Potamophylax latipennis	7	0	0	0	0
Potamophylax cingulatus	0	5	0	0	0
Athripsodes bilineatus	0	7	33	0	0
Athripsodes cinereus	0	0	0	2	4
Odontocerum albicorne	14	2	0	1	6
Mystacides azurea	6	0	0	1	7
Sericostoma personatum	86	53	21	9	29
Agapetus fuscipes	5	4	24	9	54
Chaetopteryx villosa	8	0	0	0	0
Halesus	0	0	0	1	4
Limnephilidae	0	0	0	1	0
Limnephilus lunatus	0	2	0	8	0
Limnephilus rhombicus	0	0	0	1	0
Lepidostoma hirtum	7	0	0	0	0
Hydroptila	6	0	18	9	10
Ithytrichia lamellaris	0	0	15	0	0
Anabolia nervosa	2	0	0	12	13
Drusus annulatus	2	0	0	0	0
Rhyacophila dorsalis	3	2	3	0	10
Hydropsyche pellucidula	7	12	21	0	18
Hydropsyche siltalai	10	0	0	11	11
Lype reducta	0	2	0	0	0
Melampophylax mucoreus	0	0	0	1	3
Cheumatopsyche lepida	0	0	0	0	2
Glyphotaelius pellucidus	0	0	0	0	2

Damsels & Dragons	2015	2016	2017	2018	2019

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	92	26	69	31	63
Baetis	1093	0	9	0	0
Baetis rhodani	0	8	0	77	78
Baetis scambus	0	0	0	0	106
Baetis muticus	0	0	0	1	0
Baetis niger	0	0	0	7	0
Baetis vernus	0	0	0	1	0
Serratella ignita	42	8	0	7	5
Heptagenia sulphurea	20	4	3	1	13
Ecdyonurus dispar	8	0	3	0	0
Caenis rivulorum	223	8	0	68	73
Caenis luctuosa	0	0	9	0	0
Paraleptophlebia submarginata	0	0	0	3	0

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	1	0	0	0	1
Nemoura cinerea	0	0	3	0	0

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	97	16	255	44	78
Oulimnius tuberculatus	0	1	36	2	1
Limnius volckmari	29	17	132	15	3
Orectochilus villosus	0	4	3	2	7
Scirtes	0	0	3	0	0
Brychius elevatus	0	0	3	0	0
Sigara	0	0	0	1	0

River Avon - Stonehenge

Spring

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	391	38	60	145	164
Chironomidae	9	32	15	0	0
Orthocladiinae	0	0	0	16	0
Dicranota	8	6	0	2	0
Tanytarsini	0	3	39	0	17
Tanypodinae	0	9	3	0	9
Oxycera pygmaea	0	1	0	0	0
Stratiomyidae	0	0	3	0	0
Ceratopogonidae	0	0	0	1	0
Antocha	0	0	0	1	7

Alderfly	2015	2016	2017	2018	2019
Sialis lutaria	0	0	3	0	

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	1723	710	356	76	153
Asellus aquaticus	0	0	0	0	18

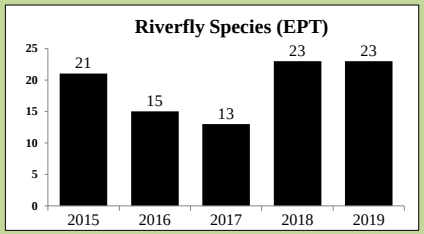
Biometrics	2015	2016	2017	2018	2019
BMWP	**180**	**149**	**141**	**165**	**180**
ASPT	**6.21**	**6.21**	**5.64**	**6.11**	**6.21**
WHPT	**193**	**161**	**155**	**174**	**198**
ASPT	**6.42**	**6.17**	**5.75**	**6.22**	**6.36**
Number of Taxa	**29**	**24**	**25**	**27**	**29**
Riverfly - species	**21**	**15**	**13**	**23**	**23**
Riverfly - numbers	**1644**	**151**	**231**	**266**	**528**
CCI	**13.25**	**15.3**	**7.75**	**14.47**	**14.19**
LIFE	**8.26**	**8**	**7.63**	**7.62**	**7.88**
PSI	**67.12**	**70**	**46.67**	**60.32**	**60.98**
SPEAR	**57.19**	**47.99**	**47.93**	**47.25**	**46.16**
TRPI	**78.26**	**76.92**	**66.67**	**76.19**	**60.00**
Saprobic	**2.01**	**1.91**	**1.76**	**1.98**	**1.86**

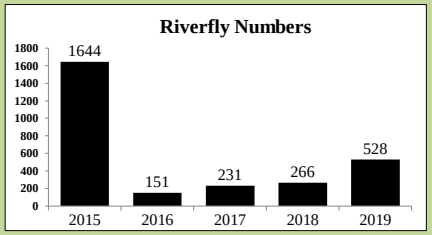
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	1	0	15	0	17
Lymnaea pereger	2	5	3	0	0
Potamopyrgus antipodarium	1	0	24	9	81
Gyraulus albus	0	0	21	0	7
Anisus vortex	6	0	78	3	13
Physa fontinalis	1	0	0	0	0
Ancylus fluviatilis	1	0	0	0	6
Sphaerium	0	0	6	5	0
Pisidium	6	0	0	0	18
Acroloxus lacustris	0	0	0	0	5

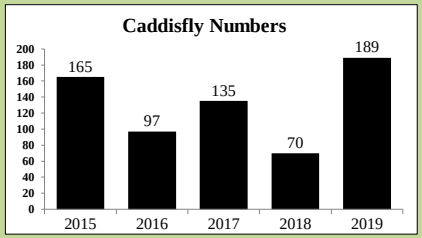
Leeches & Worms	2015	2016	2017	2018	2019
Helobdella stagnalis	0	1	0	3	0
Glossiphonia complanata	1	1	0	1	2
Theromyzon tessulatum	1	0	0	0	0
Erpobdella octoculata	0	1	0	3	0
Haplotaxis gordioides	0	0	0	0	1
Oligochaeta	16	10	0	3	2

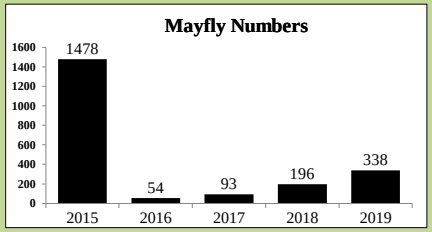
Appendix 4 - Site 2 (Spring Data)

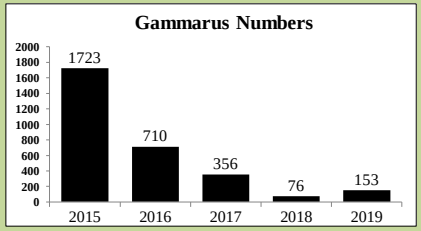
River Avon - Stonehenge
Spring

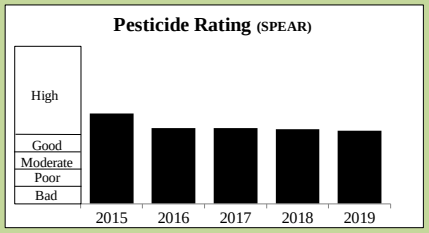


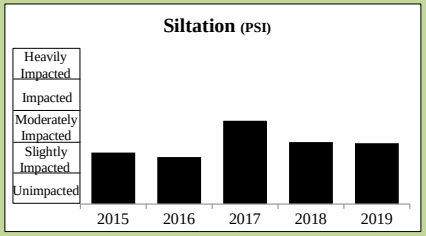


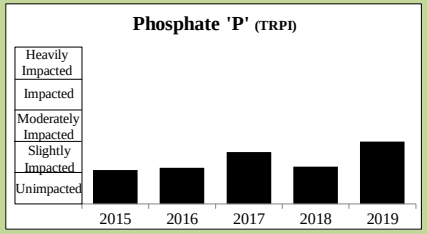


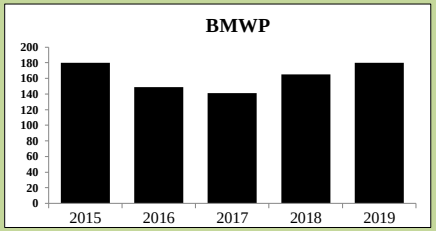


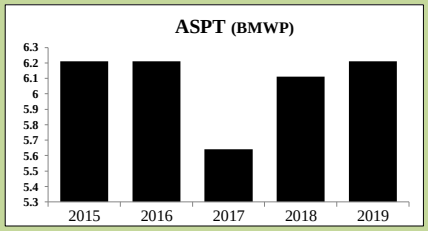


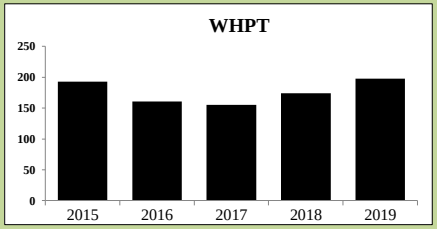


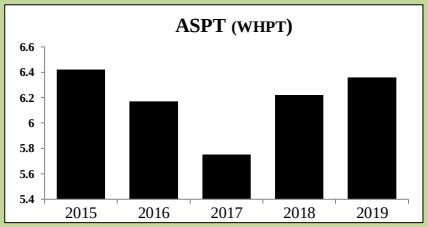


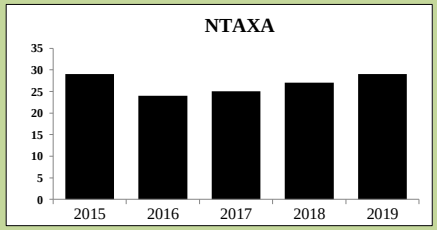


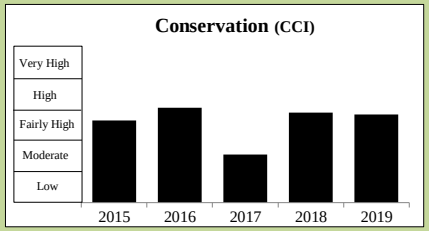


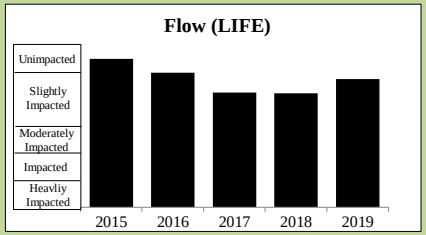


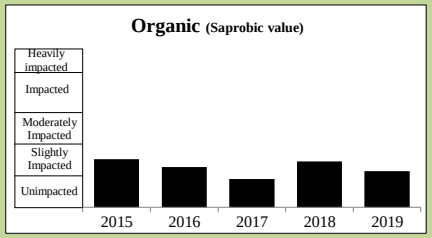












Appendix 5 - Site 2 (Autumn Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	9	5	0	4	
Goera pilosa	17	0	0	0	
Potamophylax	0	0	2	0	
Athripsodes cinereus	2	6	5	0	
Odontocerum albicorne	12	7	0	1	
Mystacides azurea	0	32	0	2	
Sericostoma personatum	33	27	5	1	
Agapetus fuscipes	9	73	0	26	
Limnephilidae	0	2	0	0	
Limnephilus rhombicus	1	0	0	0	
Lepidostoma hirtum	1	0	0	0	
Hydroptila	0	8	0	0	
Ithytrichia lamellaris	0	11	0	0	
Brachycentrus subnubilis	3	3	2	0	
Drusus annulatus	1	0	0	1	
Rhyacophila dorsalis	1	0	0	1	
Hydropsyche pellucidula	40	61	53	16	
Hydropsyche siltalai	0	0	0	8	
Polycentropus flavomaculatus	3	0	0	0	

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx	2	0	1	0	

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	62	48	15	13	
Baetis	601	0	0	0	
Baetis scambus	8	0	0	65	
Baetis rhodani	0	149	21	81	
Serratella ignita	15	14	4	0	
Heptagenia sulphurea	22	0	0	0	
Centroptilum luteolum	0	0	0	3	

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	1	2	9	0	

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	244	79	75	49	
Oulimnius tuberculatus	0	0	7	3	
Limnius volckmari	117	51	43	7	
Riolus subviolaceus	0	13	0	0	
Orectochilus villosus	8	0	3	0	
Haliplidae	2	2	0	0	
Dytiscidae	5	0	0	0	
Brychius elevatus	0	3	0	0	
Nebrioporus	0	0	0	1	
Gyrinidae	0	0	0	3	

River Avon - Stonehenge

Autumn

True Flies	2015	2016	2017	2018	2019
Simulium	246	38	4	78	
Chironomidae	49	36	5	0	
Dicranota	38	7	3	1	
Tanytarsini	0	0	13	4	
Orthocladinae	0	0	0	19	
Lispe	0	0	0	1	

Alderfly	2015	2016	2017	2018	2019
Sialis lutaria	0	5	0	0	

Crustaceans	2015	2016	2017	2018	2019
Gammarux pulex	2176	180	249	367	
Asellus aquaticus	1	0	8	1	

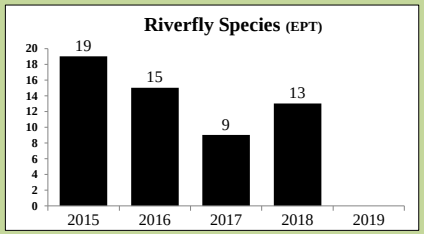
Biometrics	2015	2016	2017	2018	2019
BMWP	**217**	**171**	**138**	**134**	
ASPT	**6.03**	**5.9**	**6.00**	**5.58**	
WHPT	**236**	**176**	**139**	**155**	
ASPT	**6.21**	**5.88**	**6.02**	**5.96**	
Number of Taxa	**36**	**29**	**23**	**24**	
Riverfly - species	**19**	**15**	**9**	**13**	
Riverfly - numbers	**841**	**448**	**116**	**222**	
CCI	**19.7**	**13.72**	**8.25**	**14.00**	
LIFE	**7.93**	**7.81**	**7.46**	**7.89**	
PSI	**62.5**	**56.72**	**55.32**	**61.11**	
SPEAR	**40.61**	**40**	**25.57**	**29.43**	
TRPI	**76.92**	**100**	**72.73**	**58.33**	
Saprobic	**1.98**	**1.71**	**1.91**	**1.90**	

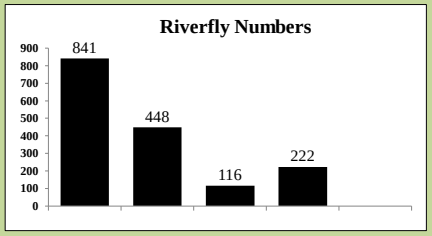
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	2	0	5	1	
Bithynia tentaculata	1	7	0	0	
Lymnaea peregra	1	13	0	1	
Potamopyrgus antipodarium	139	55	15	37	
Gyraulus albus	0	0	4	0	
Anisus vortex	36	37	18	11	
Valvata piscinalis	2	5	0	0	
Physa fontinalis	5	19	0	1	
Ancylus fluviatilis	5	3	0	4	
Sphaerium	0	0	3	0	
Pisidium	39	0	0	0	

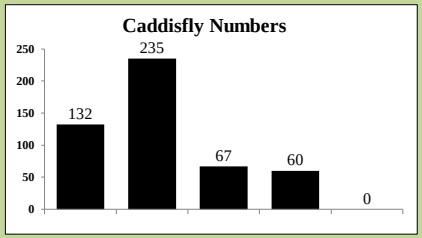
Leeches & Worms	2015	2016	2017	2018	2019
Helobdella stagnalis	4	0	12	0	
Glossiphonia complanata	7	5	17	0	
Theromyzon tessulatum	2	0	0	0	
Piscicola geometra	4	0	0	0	
Polycelis	0	4	3	0	
Oligochaeta	5	3	0	5	

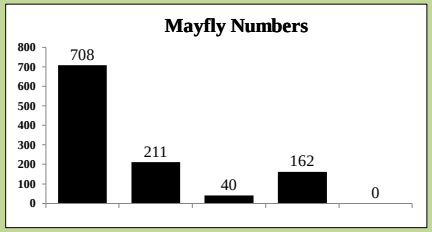
Appendix 6 - Site 2 (Autumn Data)

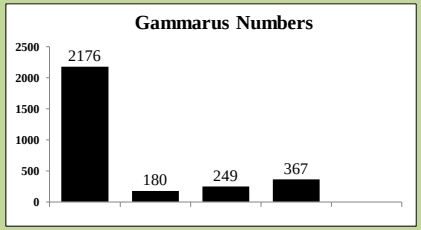
River Avon - Stonehenge
Autumn

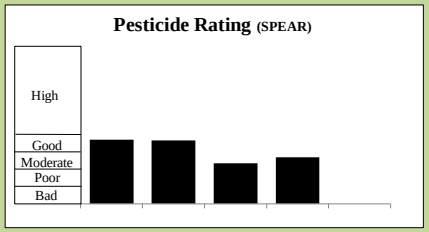


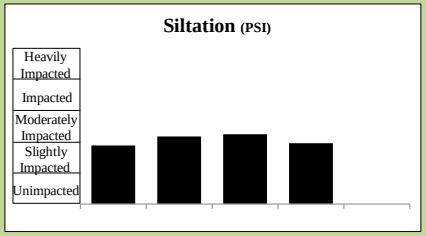


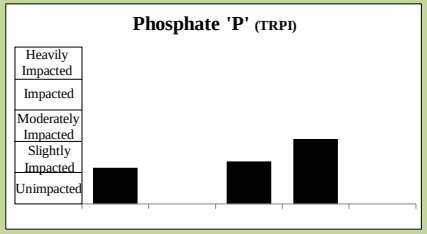


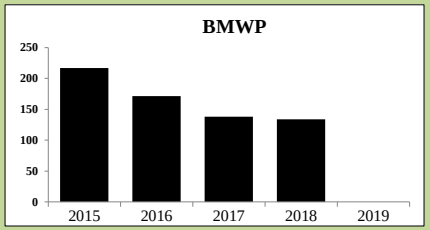


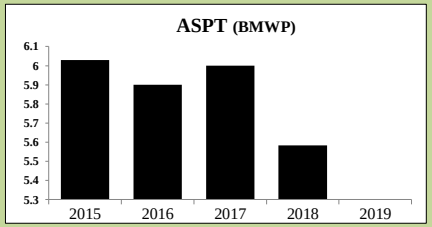


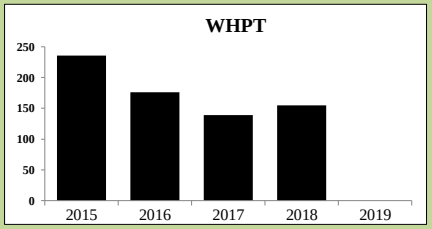


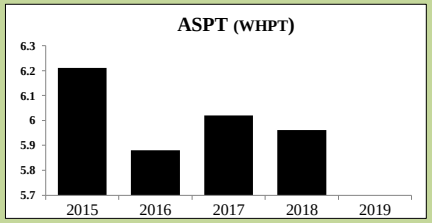


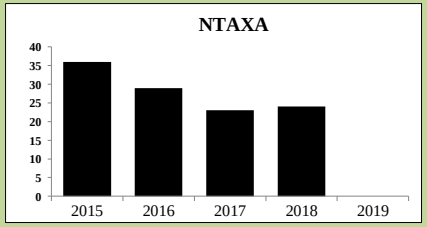


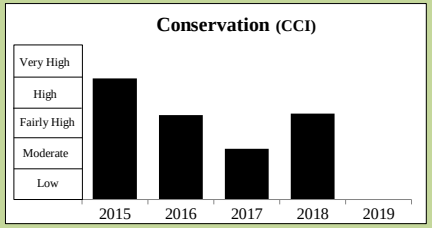


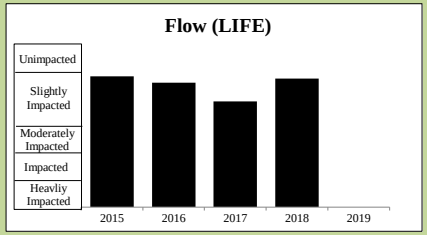


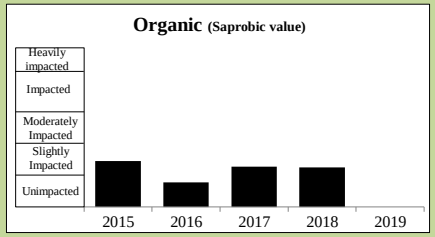












Appendix 7 - Site 3 (Spring & Autumn Inverts)

Caddisflies	Spring	Autumn
Silo nigricornis	2	9
Agapetus	7	35
Lepidostoma hirtum	4	0
Athripsodes cinereus	3	0
Sericostoma personatum	14	2
Halesus radiatus	1	0
Limnephilus lunatus	3	0
Melampophylax mucoreus	1	0
Potamophlax latipennis	5	0
Hydroptila	8	12
Anabolia nervosa	5	0
Hydropsyche siltalai	8	0
Hydropsyche pellucidula	2	5
Hydropsyche contubernalis	0	4
Rhyacophila dorsalis	0	3
Polycentropus flavomaculatus		
Psychomyia pusilla	3	0

Damsels & Dragons	Spring	Autumn
Calopteryx splendens	0	1

Mayflies	Spring	Autumn
Ephemera danica	69	1
Baetis scambus	0	76
Baetis rhodani	79	22
Serratella ignita	4	4
Heptagenia sulphurea	5	2
Caenis rivulorum	49	0

Stoneflies	Spring	Autumn
Leuctra		1

Beetles & Bugs	Spring	Autumn
Elmis aenea	56	147
Oulimnius tuberculatus	0	12
Limnius volckmari	1	23
Haliplidae	0	1
Nymphula stagnata	0	1
Sigara	0	1
Gyrinus	0	2

River Avon - U/S Ratfyn STW

Spring & Autumn - 2018

True Flies	Spring	Autumn
Simulium	44	4831
Tanytarsini	18	6
Orthocladiinae	8	25
Dixa	0	3
Dicranota	0	1
Hemmerodromia	1	0
Lispe	1	0

Alderfly	Spring	Autumn
Sialis		

Crustaceans	Spring	Autumn
Gammarus pulex	127	451
Asellus aquaticus		
Asellus meridianus		

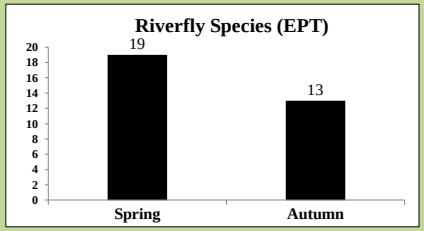
Biometrics	Spring	Autumn
BMWP	**154**	**155**
ASPT	**6.16**	**5.96**
WHPT	**164**	**166.5**
ASPT	**6.06**	**5.95**
Number of Taxa	**25**	**26**
Riverfly - species	**19**	**13**
Riverfly - numbers	**272**	**176**
CCI	**16.00**	**12.54**
LIFE	**7.86**	**7.84**
PSI	**66.00**	**66.10**
SPEAR	**46.72**	**33.10**
TRPI	**66.67**	**69.23**
Saprobic	**1.88**	**2.37**

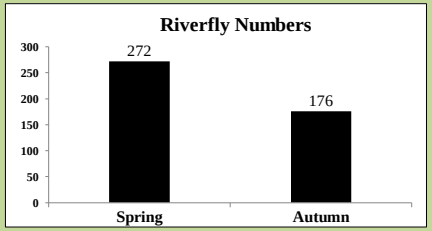
Molluscs	Spring	Autumn
Theodoxus fluviatilis	0	1
Bithynia tentaculata	0	0
Lymnaea pereger	0	3
Gyraulus albus	0	9
Anisus vortex	0	5
Sphaeriidae	0	0
Pisidium	10	0
Physa fontinalis	0	3
Ancylus fluviatilis	1	8
Valvata piscinalis	1	0
Potamopyrgus antipodarum	1	28
Lispe	1	0

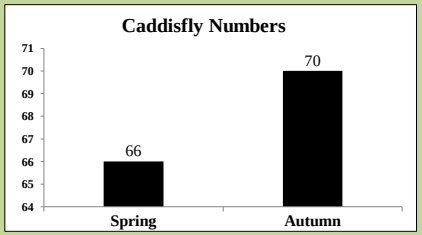
Leeches & Worms	Spring	Autumn
Helobdella stagnalis	0	1
Glossiphonia complanata	3	1
Oligochaeta	6	0

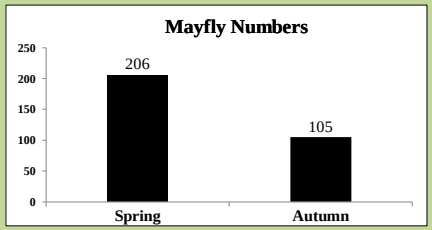
Appendix 8 - Site 3 (Spring & Autumn Data)

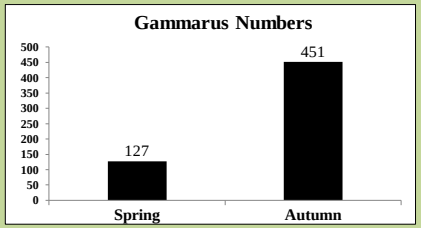
River Avon - U/S Ratfyn STW

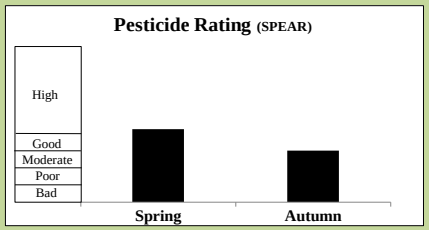


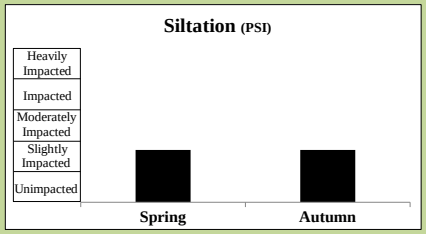


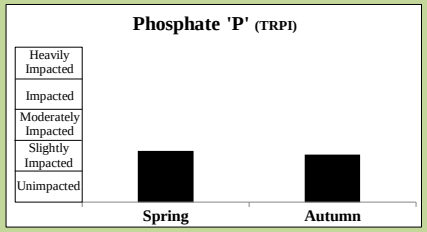


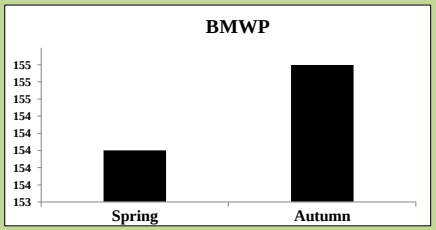


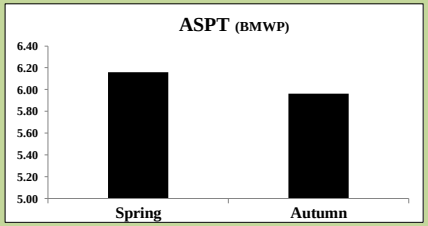


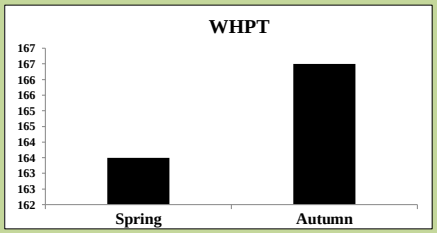


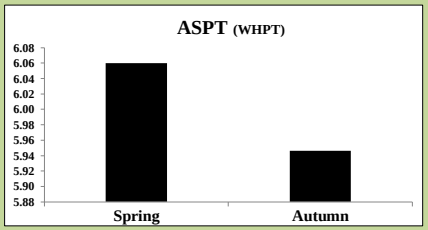


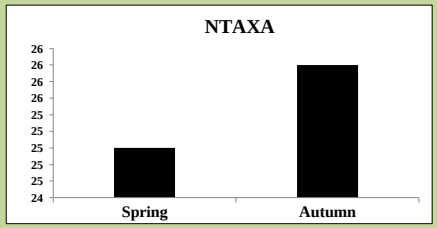


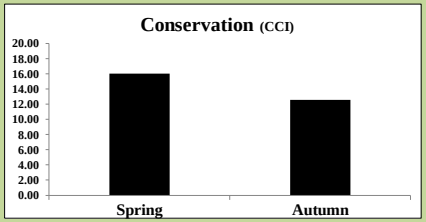


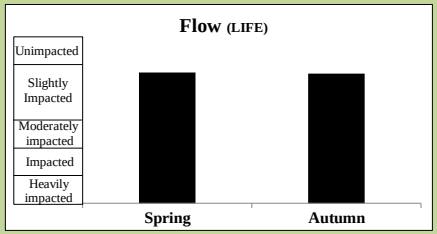


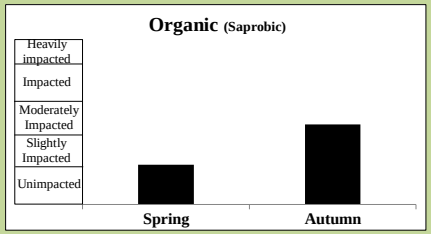












Appendix 9 - Site 4 (Spring & Autumn Inverts)

Caddisflies	Spring	Autumn
Silo nigricornis	15	31
Agapetus		42
Lepidostoma hirtum		
Athripsodes cinereus		18
Athripsodes albifrons	1	2
Mystacides azurea	1	2
Sericostoma personatum	19	3
Halesus radiatus	2	
Limnephilus	3	
Limnephilus lunatus	5	
Limnephilus flavicoris	1	
Melampophylax mucoreus	1	
Potamophlax latipennis		
Drusus annulatus	1	
Hydroptila		
Anabolia nervosa	8	
Hydropsyche siltalai	1	3
Hydropsyche pellucidula		13
Hydropsyche contubernalis		4
Rhyacophila dorsalis		
Polycentropus flavomaculatus		3
Psychomyia pusilla		

Damsels & Dragons	Spring	Autumn
Calopteryx splendens	2	1

Mayflies	Spring	Autumn
Ephemera danica	57	20
Baetis scambus		27
Baetis rhodani	27	9
Serratella ignita	6	
Heptagenia sulphurea		2
Caenis rivulorum	102	
Caenis luctuosa	47	
Centroptilum luteolum		2

Stoneflies	Spring	Autumn
Leuctra		1

Beetles & Bugs	Spring	Autumn
Elmis aenea	53	165
Oulimnius tuberculatus	5	28
Limnius volckmari	23	61
Haliplidae		
Nymphula stagnata		
Sigara		
Gyrinus		2
Hydraena		1
Anacaena lutescens		1

River Avon - D/S Ratfyn STW

Spring & Autumn - 2018

True Flies	Spring	Autumn
Simulium	2	13
Tanytarsini		36
Tanypodinae	1	
Orthocladiinae	17	41
Dixa		
Dicranota		
Hemmerodromia		
Lispe		
Tabanidae		1
Stratiomyidae	1	

Alderfly	Spring	Autumn
Sialis		

Crustaceans	Spring	Autumn
Gammarus pulex	33	217
Asellus aquaticus	19	32
Asellus meridianus		

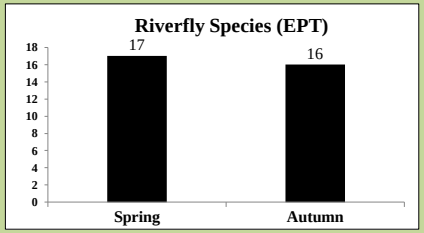
Biometrics	Spring	Autumn
BMWP	**133**	**134**
ASPT	**5.32**	**5.36**
WHPT	**130**	**159.9**
ASPT	**5.19**	**5.71**
Number of Taxa	**25**	**25**
Riverfly - species	**17**	**16**
Riverfly - numbers	**297**	**182**
CCI	**8.59**	**9.82**
LIFE	**7.09**	**7.42**
PSI	**38.81**	**52.17**
SPEAR	**45.24**	**32.44**
TRPI	**50.00**	**61.54**
Saprobic	**1.88**	**1.72**

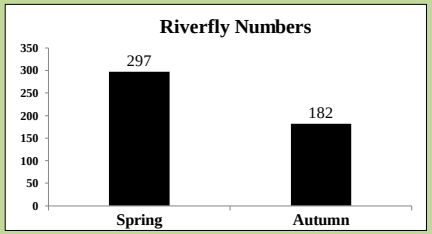
Molluscs	Spring	Autumn
Theodoxus fluviatilis		
Bithynia tentaculata	13	25
Lymnaea pereger	8	4
lymnaea palustris	1	
Gyraulus albus	3	26
Anisus vortex	6	12
Sphaeriidae	5	
Pisidium		
Physa fontinalis	2	7
Ancylus fluviatilis	1	
Valvata piscinalis	5	5
Potamopyrgus antipodarum		3
Lispe		

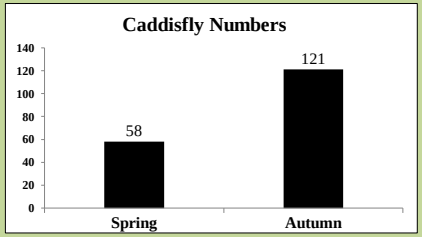
Leeches & Worms	Spring	Autumn
Helobdella stagnalis	3	
Glossiphonia complanata	1	2
Erpobdella octoculata	3	2
Oligochaeta	27	9

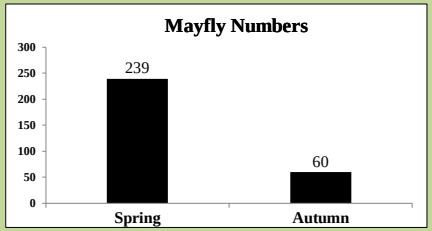
Appendix 10 - Site 4 (Spring & Autumn Data)

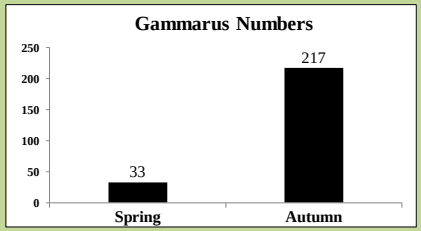
River Avon - D/S Ratfyn STW

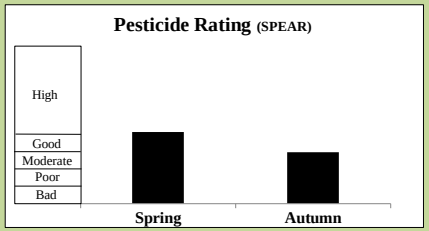


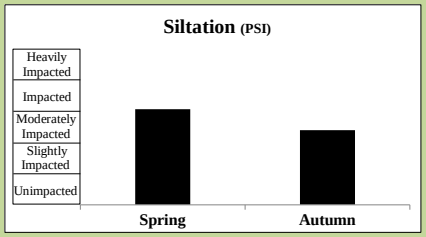


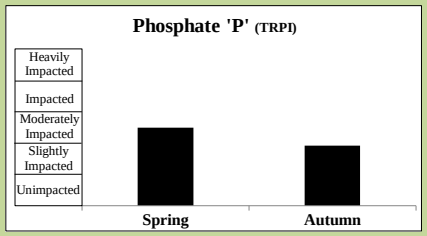


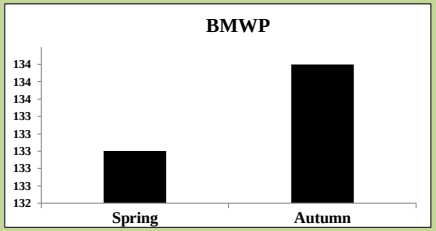


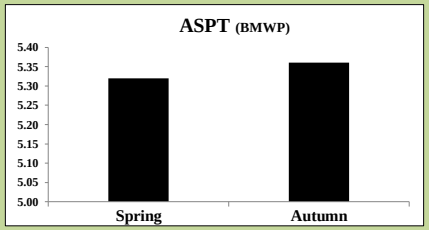


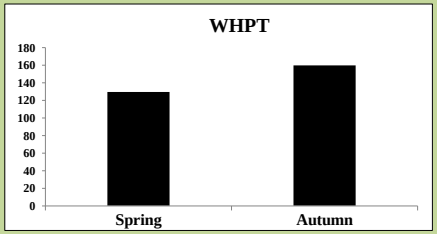


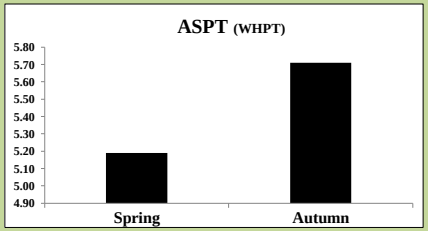


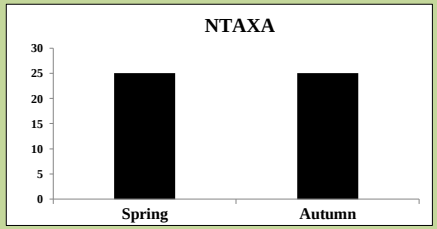


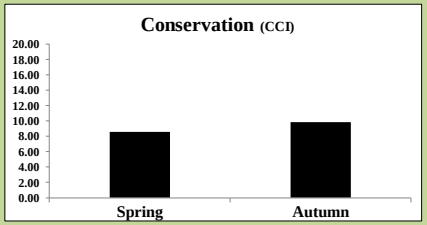


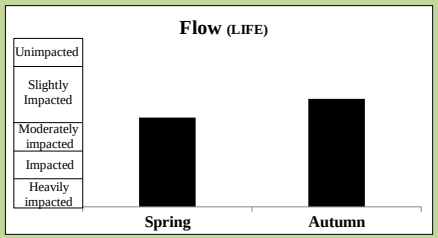


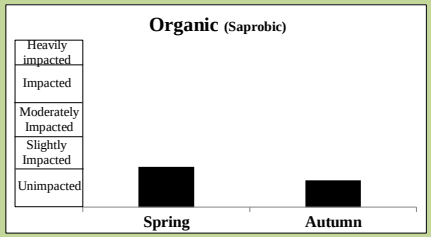












Appendix 11 - Site 5 (Spring Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	8	2	6	4	9
Goera pilosa	3	0	0	0	0
Lepidostoma hirtum	86	172	108	68	141
Artripsodes cinereus	0	1	0	0	15
Athripsodes bilineatus	0	1	0	0	0
Athripsodes aterimus	0	0	0	13	0
Cheumatopsyche lepida	0	0	0	16	36
Halesus radiatus	0	0	0	1	8
Mystacides azurea	3	0	6	0	0
Sericostoma personatum	36	18	12	8	39
Agapetus fuscipes	1	0	16	5	1
Chaetopteryx villosa	3	0	0	0	3
Potamophylax latipennis	0	1	0	0	0
Anabolia nervosa	6	0	0	1	1
Limnephilus	0	0	0	0	13
Limnephilus decipiens	0	1	0	5	3
Limnephilus lunatus	0	1	0	5	0
Brachycentrus subnubilus	0	0	0	0	7
Hydroptila	146	6	136	8	116
Ithytrichia lamellaris	12	0	0	0	0
Drusus annulatus	3	1	4	0	0
Oxyethira	0	0	2	0	0
Hydropsyche siltalai	11	7	10	19	0
Hydropsyche pellucidula	4	4	10	0	11
Rhyacophila dorsalis	6	2	0	0	3
Polycentropus flavomaculatus	0	1	2	0	14
Lype reducta	0	0	0	0	1

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx splendens	1	0	0	1	2

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	28	30	36	15	49
Baetis	537	0	14	0	0
Baetis rhodani	0	7	0	41	37
Baetis scambus	0	0	0	15	0
Baetis niger	0	0	0	0	1
Centroptilum	0	0	0	3	0
Paraleptophlebia submarginata	8	0	6	5	5
Serratella ignita	7	3	14	23	6
Heptagenia sulphurea	17	0	8	0	2
Caenis luctuosa	0	0	0	0	10
Caenis rivulorum	225	11	48	29	0

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	6	0	0	0	0
Leuctra geniculata	0	18	0	0	8

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	185	12	246	68	52
Limnius volckmari	9	7	26	54	29
Hygrobia hermanni	2	0	0	0	0
Oulimnius tuberculatus	3	0	6	0	17
Orectochilus villosus	3	2	4	0	0
Corixidae	0	0	2	0	0
Haliplidae	0	0	0	0	1
Dytiscidae	0	0	0	0	2

River Avon - Queensbury Bridge

Spring

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	551	147	32	17	118
Chironomidae	51	8	32	1	19
Orthocladiinae	0	0	0	6	56
Chironomus	0	25	0	0	0
Tanytarsini	0	2	0	1	0
Tanypodinae	0	0	6	0	0
Dicranota	10	5	2	1	0
Antocha	0	0	4	0	0
Hemerogromia	0	0	2	0	0
Rheotanytarsus	0	0	0	0	77
Tipula	0	0	0	0	1
Tabanidae	0	0	0	0	1

Alderfly	2015	2016	2017	2018	2019

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	929	125	164	55	152
Asellus aquaticus	1	1	0	0	0

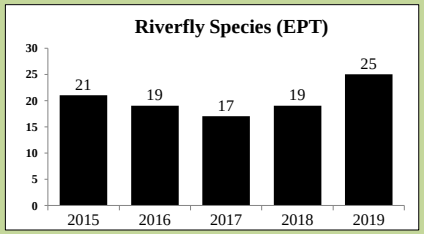
Biometrics	2015	2016	2017	2018	2019
BMWP	**204**	**168**	**180**	**161**	**226**
ASPT	**6.00**	**6.00**	**6.43**	**6.44**	**6.46**
WHPT	**220**	**177**	**188**	**160**	**235**
ASPT	**6.29**	**6.09**	**6.47**	**6.40**	**6.34**
Number of Taxa	**34**	**28**	**28**	**25**	**35**
Riverfly - species	**21**	**19**	**17**	**19**	**25**
Riverfly - numbers	**1156**	**287**	**438**	**284**	**539**
CCI	**18.79**	**13.22**	**30.24**	**14.27**	**21.32**
LIFE	**7.97**	**7.94**	**8.00**	**7.97**	**7.70**
PSI	**63.16**	**65.57**	**69.84**	**63.79**	**59.76**
SPEAR	**52.9**	**43.46**	**53.33**	**52.12**	**51.42**
TRPI	**67.00**	**70.00**	**81.00**	**73.33**	**71.43**
Saprobic	**2.04**	**1.84**	**1.72**	**1.80**	**1.89**

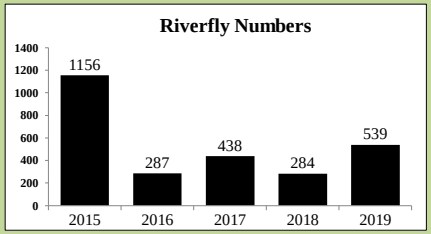
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	6	3	2	1	3
Bithynia tentaculata	3	1	0	0	1
Lymnaea pereger	1	5	14	5	7
Valvata piscinalis	4	13	0	0	0
Anisus vortex	5	5	4	3	5
Gyraulus albus	0	0	12	0	1
Sphaerium	0	1	0	0	0
Pisidium	9	0	0	0	0
Potamopyrgus antipodarium	0	18	6	0	6
Ancylus fluviatilis	23	0	4	2	4
Lymnaea palustris	0	0	0	0	1

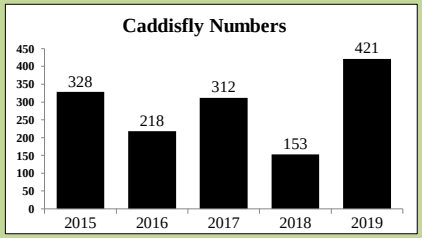
Leeches & Worms	2015	2016	2017	2018	2019
Helobdella stagnalis	1	0	0	1	5
Glossiphonia complanata	1	2	0	3	3
Erpobdella octoculata	2	0	2	0	0
Piscicola geometra	0	0	0	0	1
Polycelis felina	0	0	0	0	3
Oligochaeta	4	0	0	10	8

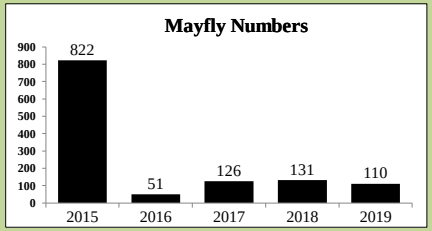
Appendix 12 - Site 5 (Spring – Data)

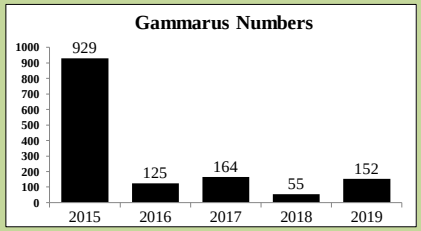
River Avon - Queensbury Bridge
Spring

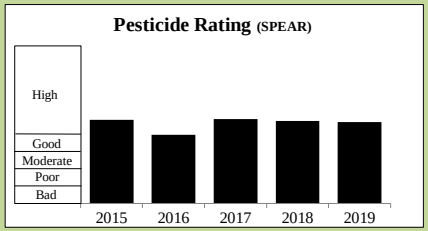


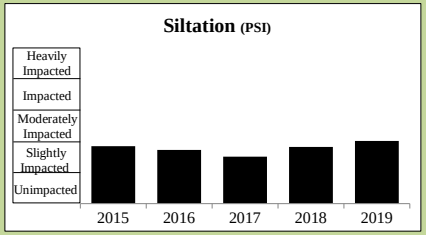


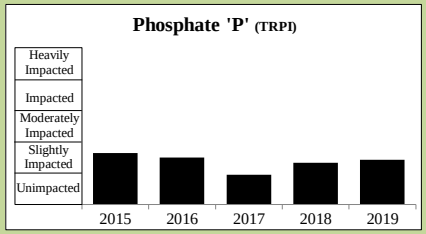


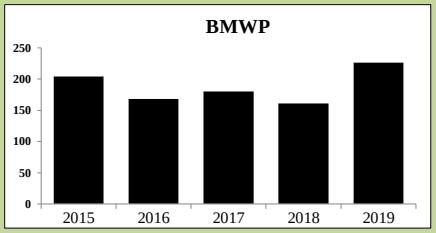


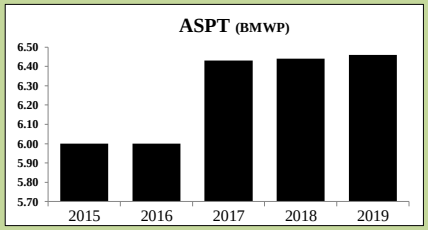


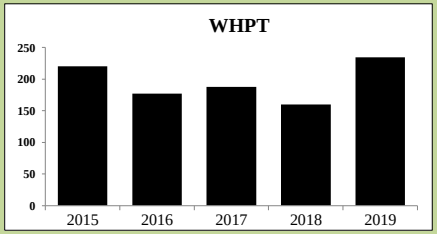


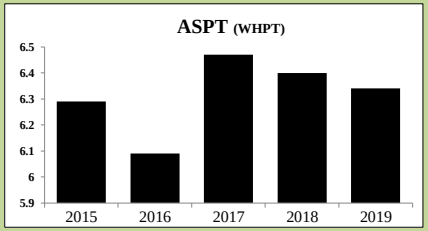


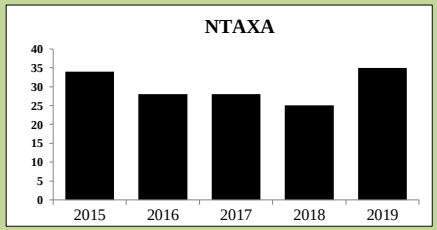


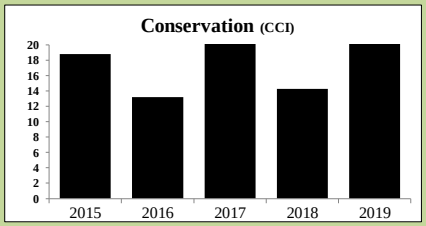


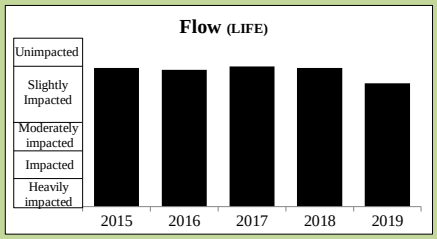


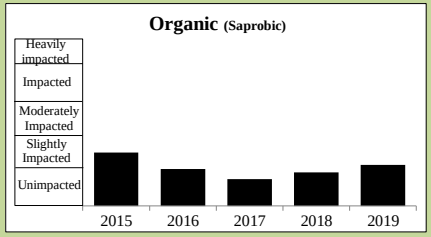












Appendix 13 – Site 5 (Autumn Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	5	3	1	10	
Goera pilosa	9	0	0		
Brachycentrus subnubilis	0	2	0	1	
Athripsodes cinereus	53	10	5	7	
Mystacides azurea	0	29	1	2	
Sericostoma personatum	16	4	2	5	
Agapetus fuscipes	1	0	0	16	
Halesus radiatus	1	0	0		
Leptoceridae	0	0	1		
Hydroptila	7	6	0	3	
Drusus annulatus	0	1	0		
Hydropsyche contubernalis	0	0	0	6	
Hydropsyche siltalai	0	7	0	9	
Rhyacophila dorsalis	8	3	1	8	
Hydropsyche pellucidula	68	48	5	19	
Polycentropus	2	1	0	3	
Cheumatopsyche lepida				15	
Lype reducta				1	

Damsels & Dragons	2015	2016	2017	2018	2019

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	78	74	7	5	
Baetis	688	0	9	23	
Baetis rhodani	0	50	0		
Baetis fuscatus	3	0	0		
Baetis scambus	23	0	12	51	
Serratella ignita	111	3	21	14	
Heptagenia sulphurea	0	0	0	3	
Centroptilum luteolum				2	

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	37	5	10		
Leuctra geniculata	6	0	1	6	

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	249	81	45	101	
Limnius volckmari	160	14	20	41	
Nebrioporus	0	5	0		
Oulimnius tuberculatus	0	11	3	10	
Haliplus	2	0	0		
Dytiscidae	2	0	0		
Sigara	0	4	0		
Gyrinus natator				1	

River Avon - Queensbury Bridge

Autumn

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	316	5	44	42	
Chironomidae	115	13	25		
Chironomus	0	11	0		
Tanytarsini	0	92	0	39	
Tanypodinae	0	32	0	3	
Dicranota	5	9	0		
Tabanidae	0	1	0		
Prodiamesa olivacea	0	17	0		
Orthocladiinae				68	
Hemerodromia				2	
Antocha				1	

Alderfly	2015	2016	2017	2018	2019
Sialis	0	3	0		

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	584	86	45	115	
Asellus aquaticus	0	0	0	1	

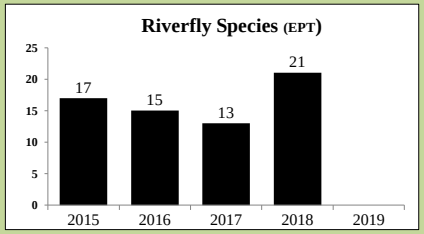
Biometrics	2015	2016	2017	2018	2019
BMWP	164	164	128	178	
ASPT	5.66	5.66	6.10	6.14	
WHPT	178	169	128	197	
ASPT	5.73	5.63	6.09	6.16	
Number of Taxa	29	29	21	29	
Riverfly - species	17	15	13	21	
Riverfly - numbers	1116	246	76	209	
CCI	13	12.9	10.00	16.71	
LIFE	7.94	7.34	7.63	7.89	
PSI	59.3	46.2	62.00	68.12	
SPEAR	42.4	32.7	41.29	39.11	
TRPI				58.82	
Saprobic	1.99	1.88	1.92	1.76	

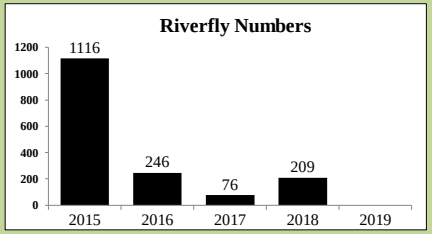
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	5	6	2	4	
Bithynia tentaculata	22	3	3	3	
Lymnaea peregra	39	16	3	3	
Valvata piscinalis	0	7	0		
Anisus vortex	110	25	5	5	
Gyraulus albus	0	0	3	5	
Sphaeriidae	0	12	0		
Pisidium	78	0	3		
Potamopyrgus antipodarium	15	0	0	6	
Physa fontinalis	1	5	1		
Ancylus fluviatilis	10	8	0	8	
Planorbis contortus	0	0	0		

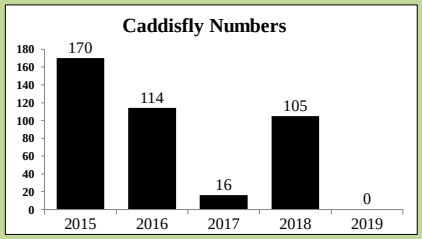
Leeches & Worms	2015	2016	2017	2018	2019
Erpobdella octoculata	0	0	0		
Piscicola geometra	1	0	0		
Theromyzon tessulatum	11	3	1		
Helobdella stagnalis	1	5	1	3	
Glossiphonia complanata	12	7	0		
Polycelis felina				1	
Oligochaeta					36

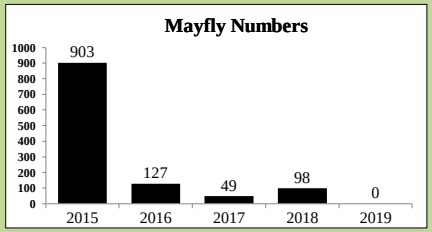
Appendix 14 - Site 5 (Autumn Data)

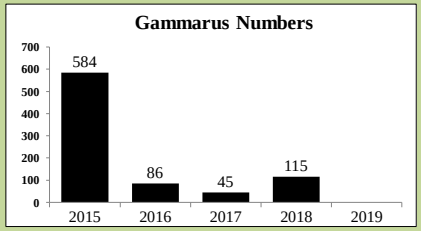
River Avon - Queensbury Bridge
Autumn

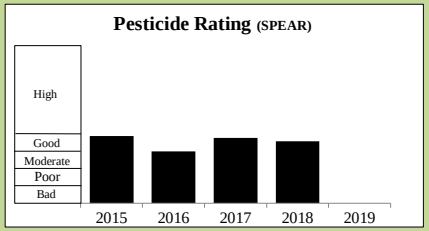


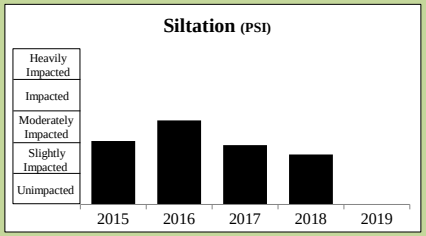


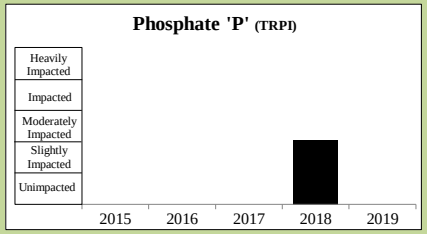


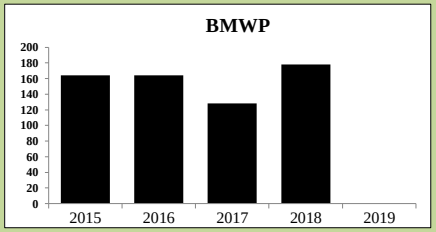


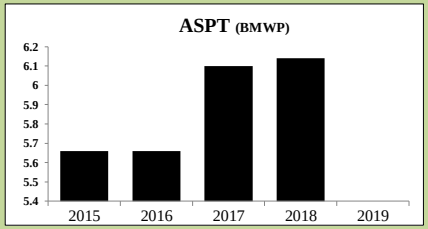


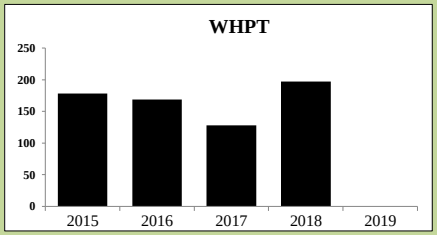


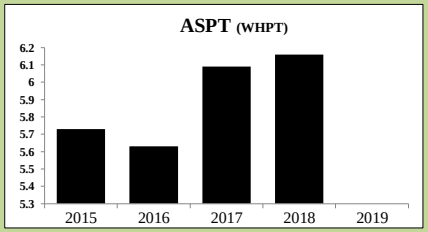


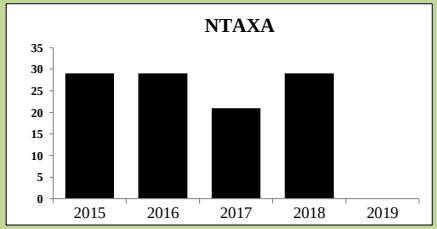


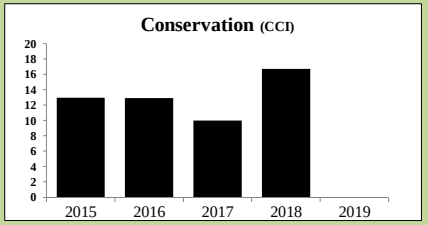


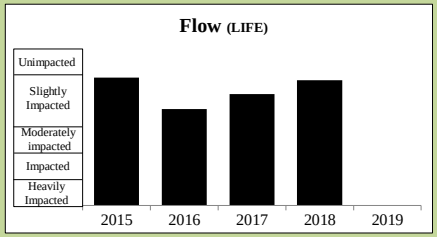


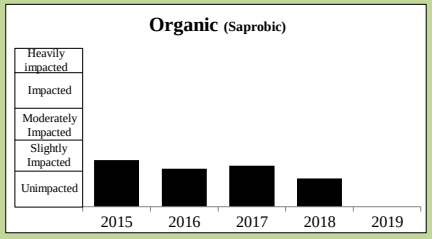












Appendix 15 - Site 6 (Spring Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	70	0	10	18	19
Goera pilosa	4	0	0	0	0
Lepidostoma hirtum	43	62	26	7	4
Athripsodes cinereus	14	3	4	16	8
Athripsodes albifron	0	0	0	0	3
Athripsodes bilineatus	0	16	0	0	0
Mystacides azurea	1	1	10	0	2
Sericostoma personatum	72	44	14	29	6
Brachycentrus subnubilis	0	0	0	0	2
Agapetus fuscipes	13	23	30	0	27
Limnephilus lunatus	0	0	2	3	1
Limnephilus rhombicus	0	0	0	0	2
Limnephilus decipiens	0	0	0	0	1
Potamophylax cingulatus	0	0	0	0	8
Potamophylax latipennis	6	5	6	0	0
Glyphotaelius pellucidus	0	0	0	0	1
Chaetopteryx villosa	3	4	0	0	0
Hydroptila	45	32	88	15	29
Anabolia nervosa	0	0	4	1	1
Drusus annulatus	14	20	14	0	0
Cheumatopsyche lepida	0	0	0	1	0
Halesus radiatus	0	0	0	1	7
Hydropsyche pellucidula	0	0	0	0	8
Hydropsyche siltalai	35	35	42	0	1
Rhyacophila dorsalis	1	3	0	0	1
Polycentropus flavomaculatus	0	0	0	0	1

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx splendens	1	2	0	1	2

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	54	46	22	45	14
Baetis	1154	955	6	0	0
Baetis scambus	0	296	0	0	20
Baetis rhodani	0	0	0	0	77
Baetis muticus	0	37	0	0	0
Serratella ignita	22	242	0	0	0
Heptagenia sulphurea	51	28	0	1	3
Caenis rivulorum	108	66	12	0	0
Caenis luctuosa	0	0	0	36	0
Paraleptophlebia submarginata	7	4	0	1	0

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	1	2	0	0	0
Isoperla grammatica	0	1	0	0	0

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	138	121	136	36	21
Platambus maculatus	0	0	0	0	1
Limnius volckmari	58	63	100	23	7
Riolus subviolaceus	0	0	18	0	0
Oreodytes sanmarkii	0	0	4	0	0
Brychius elevatus	0	0	0	1	3
Sigara	0	0	0	0	1
Oulimnius tuberculatus	0	0	0	0	4
Plea minutissima	0	0	0	0	2
Ostracod	0	0	0	0	5
Hydracarina	0	0	0	0	3

River Avon - Ham Hatches

Spring

True Flies	2015	2016	2017	2018	2019
Simulium	0	0	14	67	1081
Chironomidae	35	49	22	1	18
Tanytarsini	3	0	0	0	139
Tanypodinae	0	0	0	6	22
Orthocladiinae	0	0	0	13	45
Dicranota	1	1	0	1	0
Oxycera pygmaea	0	1	0	0	0
Antocha	0	0	0	5	0

Alderfly	2015	2016	2017	2018	2019
Sialis					

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	1145	3643	698	2	465
Asellus aquaticus	1	1	4	1	17

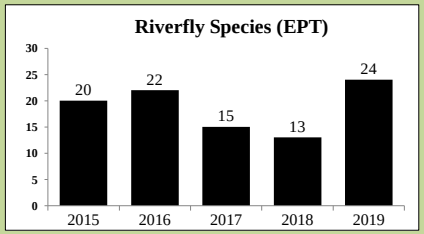
Biometrics	2015	2016	2017	2018	2019
BMWP	**177**	**186**	**134**	**151**	**189**
ASPT	**6.32**	**6.2**	**5.58**	**6.04**	**5.73**
WHPT	**185.5**	**202**	**145**	**149**	**187**
ASPT	**6.4**	**6.31**	**5.78**	**5.72**	**5.49**
Number of Taxa	**28**	**30**	**24**	**25**	**33**
Riverfly - species	**20**	**22**	**15**	**13**	**24**
Riverfly - numbers	**1718**	**1925**	**290**	**174**	**246**
CCI	**13.44**	**14.72**	**12.67**	**12.54**	**14.50**
LIFE	**8.35**	**8.26**	**7.63**	**7.54**	**7.42**
PSI	**62.5**	**67.06**	**48.39**	**41.30**	**51.22**
SPEAR	**61.21**	**60.28**	**43.66**	**47.92**	**40.43**
TRPI	**65.52**	**70.97**	**53.85**	**60.00**	**55.60**
Saprobic	**1.92**	**1.95**	**1.78**	**1.89**	**2.20**

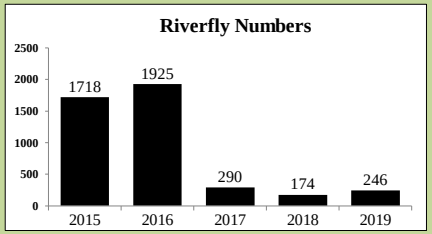
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	7	8	14	1	2
Bithynia tentaculata	15	13	2	3	11
Lymnaea palustris	0	0	0	0	1
Lymnaea pereger	4	8	4	0	2
Gyraulus albus	0	0	10	1	0
Anisus vortex	17	11	26	6	7
Sphaeriidae	0	0	2	27	23
Pisidium	21	17	0	0	0
Physa fontinalis	1	2	0	3	1
Ancylus fluviatilis	0	1	0	0	1
Potamopyrgus antipodarum	0	0	0	4	0
Valvata piscinalis	0	0	0	0	1

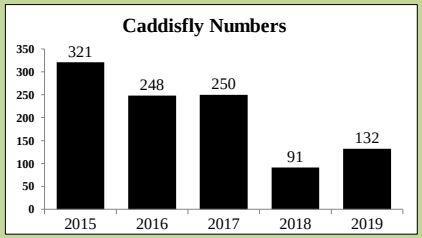
Leeches & Worms	2015	2016	2017	2018	2019
Helobdella stagnalis	0	0	10	0	2
Glossiphonia complanata	0	1	4	3	4
Oligochaeta	0	0	0	0	16

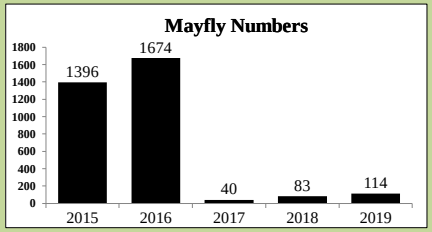
Appendix 16 - Site 6 (Spring Data)

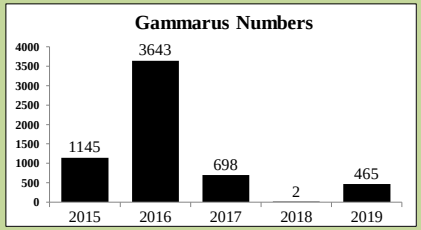
River Avon - Ham Hatches
Spring

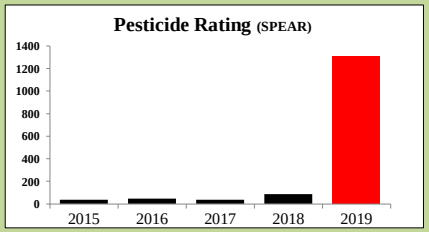


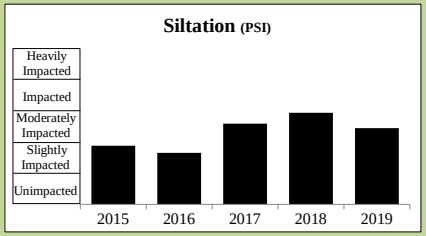


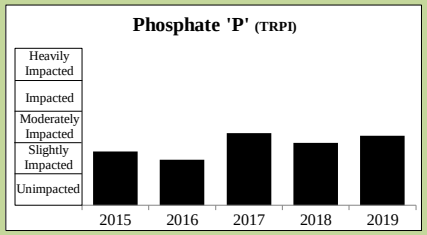


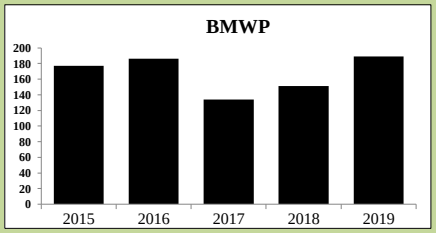


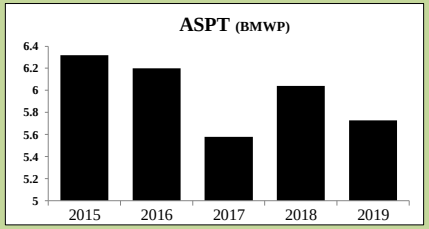


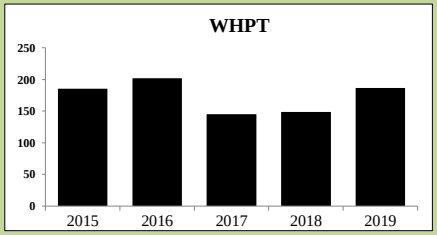


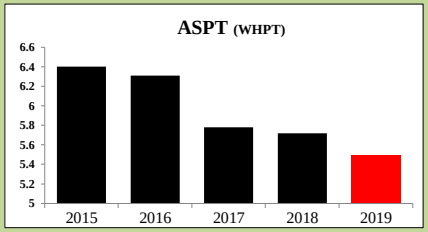


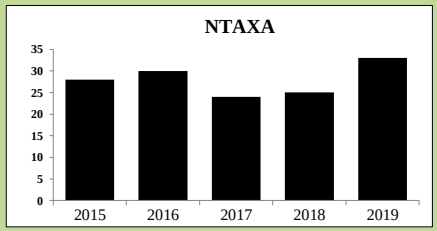


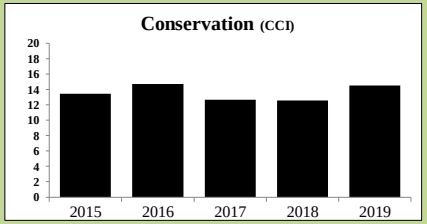


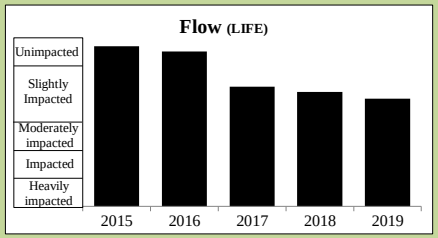


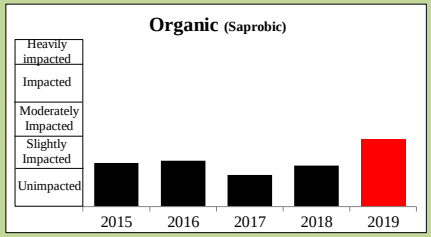












Appendix 17 - Site 6 (Autumn Inverts)

Caddisflies	2015	2016	2017	2018	2019
Goeridae	11	16	0	16	
Silo nigricornis	11	16	0	0	
Goera pilosa	64	0	0	0	
Athripsodes aterrimus	0	8	0	0	
Athripsodes cinereus	0	6	0	3	
Mystacides nigra	0	5	0	0	
Mystacides azurea	1	11	0	2	
Sericostoma personatum	37	0	1	2	
Agapetus fuscipes	3	63	0	0	
Limnephilus rombicus	1	0	0	0	
Limnephilus lunatus	2	0	0	3	
Molanna angustata	2	0	0	0	
Hydroptila	4	12	0	0	
Ithytrichia lamellaris	0	8	0	0	
Brachycentrus subnubilis	0	1	10	2	
Drusus annulatus	3	0	0	0	
Hydropsyche	46	0	0	0	
Hydropsyche instabilis	0	0	1	0	
Hydropsyche siltalai	0	0	2	1	
Hydropsyche pellucidula	109	37	0	4	
Polycentropus flavomaculatus	2	7	0	1	
Rhyacophila dorsalis	36	6	2	1	

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx	0	1	1	0	

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	77	17	0	0	
Baetis	1154	0	3	21	
Baetis scambus	26	14	0	0	
Baetis fuscatus	10	0	0	0	
Baetis rhodani	0	21	0	0	
Serratella ignita	34	3	1	0	
Heptagenia sulphurea	2	5	0	0	
Centrptilum luteolum	0	0	0	1	

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	3	0	2	0	

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	765	77	32	22	
Limnius volckmari	182	89	105	8	
Riolus subviolaceus	1	0	7	0	
Oreodytes villosus	1	0	0	0	
Haliplidae	1	7	0	0	
Dytiscidae	13	0	0	0	
Sigara	0	1	0	0	

River Avon - Ham Hatches

Autumn

True Flies	2015	2016	2017	2018	2019
Simulium	0	113	13	44	
Chironomidae	100	79	19	0	
Dicranota	45	10	0	0	
Limnophora	0	4	0	0	
Stratiomyidae	0	0	1	0	

Alderfly	2015	2016	2017	2018	2019
Sialis					

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	8220	96	339	49	
Asellus aquaticus	1	18	12	0	

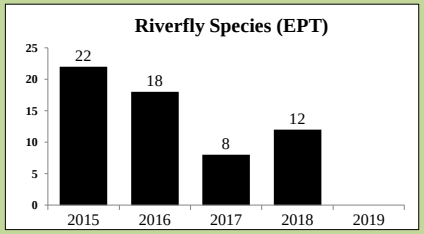
Biometrics	2015	2016	2017	2018	2019
BMWP	**184**	**165**	**118**	**110**	
ASPT	**5.97**	**5.69**	**5.13**	**5.79**	
WHPT	**196.3**	**178**	**127**	**117**	
ASPT	**5.95**	**5.55**	**5.08**	**5.86**	
Number of Taxa	**31**	**29**	**23**	**19**	
Riverfly - species	**22**	**18**	**8**	**12**	
Riverfly - numbers	**1638**	**256**	**22**	**57**	
CCI	**14.7**	**14.72**	**8.61**	**8.50**	
LIFE	**7.92**	**7.53**	**7.39**	**7.65**	
PSI	**60.64**	**48.68**	**49.09**	**58.54**	
SPEAR	**39.11**	**38.86**	**18.53**	**37.40**	
TRPI	**92.31**	**66.67**	**63.64**	**50.00**	
Saprobic	**1.95**	**1.74**	**1.86**	**2.04**	

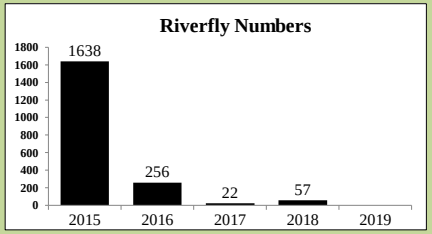
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	13	19	9	1	
Bithynia tentaculata	28	5	1	2	
Lymnaea pereger	36	0	0	0	
Lymnaea glabra	0	1	0	0	
Lymnaea palustris	0	0	1	0	
Gyraulus albus	0	0	1	0	
Anisus vortex	12	19	22	6	
Sphaeriidae	85	31	0	0	
Sphaerium	0	0	1	3	
Valvata piscinalis	0	0	1	3	
Physa fontinalis	0	1	0	1	
Ancylus fluviatilis	11	0	0	0	
Potamopyrgus antipodarum	0	0	0	5	
Radix balhica	0	0	0	2	

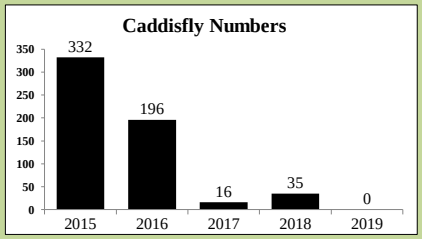
Leeches & Worms	2015	2016	2017	2018	2019
Helobdella stagnalis	0	3	5	0	
Glossiphonia complanata	23	11	5	0	
Theromyzon tessulatum	2	0	0	0	
Erpobdella octoculata	0	4	0	0	
Oligochaeta	14	5	6	8	

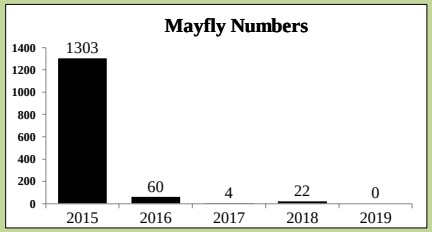
Appendix 18 - Site 6 (Autumn Data)

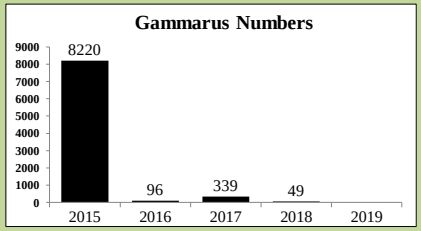
River Avon - Ham Hatches
Autumn

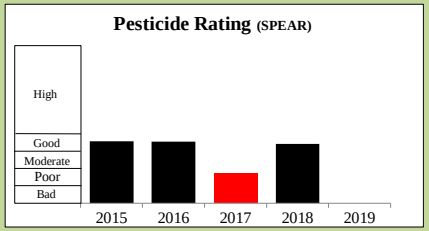


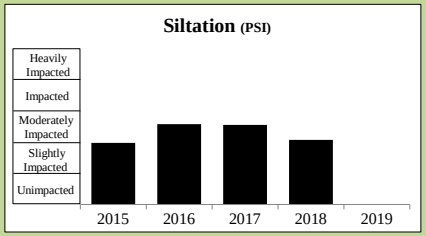


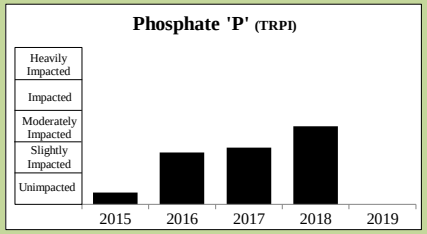


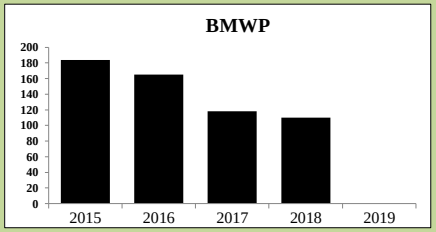


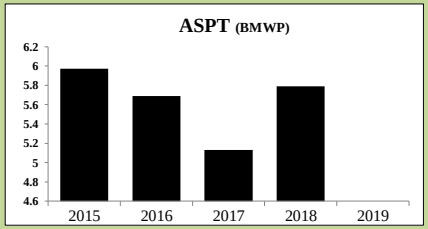


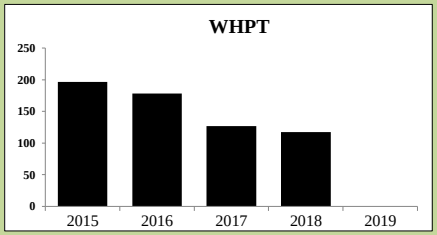


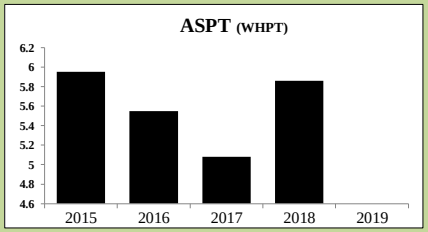


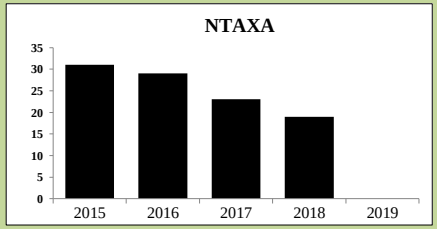


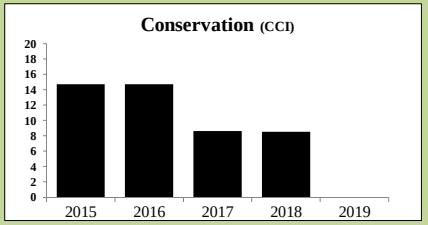


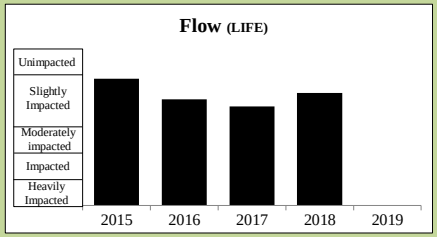


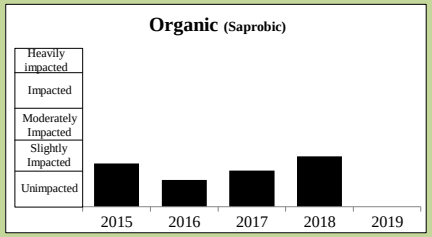












Appendix 19 - Site 7 (Spring & Autumn Inverts)

Caddisflies	Spring (EA)	Autumn (S&DAC)
Silo nigricornis	0	35
Goera pilosa	0	20
Lepidostoma hirtum	20	0
Athripsodes	5	0
Athripsodes aterrimus	0	2
Mystacides azurea	1	2
Sericostoma personatum	2	3
Brachycentrus subnubilis	3	8
Sericostoma personatum	2	3
Brachycentrus subnubilis	3	8
Limnephilus lunatus	0	3
Hydroptila	0	2
Anabolia nervosa	5	0
Drusus annulatus	1	1
Hydropsyche	1	0
Hydropsyche siltalai	0	3
Rhyacophila dorsalis	0	1
Polycentropus flavomaculatus	3	14

Damsels & Dragons	Spring (EA)	Autumn (S&DAC)
Calopteryx splendens		

Mayflies	Spring (EA)	Autumn (S&DAC)
Ephemera danica	18	28
Baetis	11	298
Baetis scambus	26	5
Baetis rhodani	22	6
Baetis fuscatus	0	1
Cloeon dipterum	0	3
Baetis buceratus	25	1
Serratella ignita	11	3
Heptagenia sulphurea	4	11
Caenis rivulorum	95	1

Stoneflies	Spring (EA)	Autumn (S&DAC)
Leuctra	2	0

Beetles & Bugs	Spring (EA)	Autumn (S&DAC)
Elmis aenea	33	113
Oulimnius	2	1
Limnius volckmari	2	132
Haliplidae	0	27
Corixa	0	2

River Avon - D/S Sleeper Bridge

Spring & Autumn - 2018

True Flies	Spring (EA)	Autumn (S&DAC)
Simulium	210	88
Chironomidae	0	1
Tanytarsini	2	28
Tanypodinae	1	3
Orthocladiinae	5	0
Ceratopogonidae	3	0

Alderfly	Spring (EA)	Autumn (S&DAC)
Sialis		

Crustaceans	Spring (EA)	Autumn (S&DAC)
Gammarus pulex	22	472
Asellus aquaticus	5	12
Asellus meridianus	1	2

Biometrics	Spring (EA)	Autumn (S&DAC)
BMWP	**138**	**178**
ASPT	**6.57**	**5.74**
WHPT	**140**	**176**
ASPT	**6.38**	**5.69**
Number of Taxa	**21**	**31**
Riverfly - species	**20**	**24**
Riverfly - numbers	**260**	**462**
CCI	**11.50**	**14.41**
LIFE	**7.76**	**7.52**
PSI	**63.64**	**52.27**
SPEAR	**49.35**	**39.70**
TRPI	**66.67**	**69.23**
Saprobic	**1.78**	**1.89**

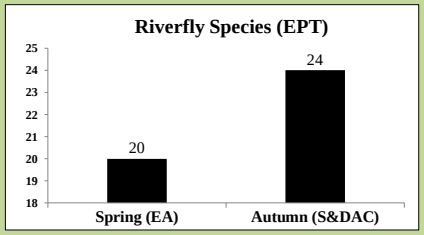
Molluscs	Spring (EA)	Autumn (S&DAC)
Theodoxus fluviatilis	0	3
Bithynia tentaculata	0	5
Lymnaea pereger	0	2
Gyraulus albus	0	1
Anisus vortex	0	18
Sphaeriidae	0	1
Pisidium	11	5
Physa fontinalis	0	3
Ancylus fluviatilis	0	17
Valvata piscinalis	0	11
Valvata piscinalis	0	11

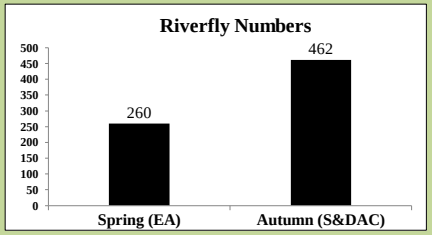
Leeches & Worms	Spring (EA)	Autumn (S&DAC)
Helobdella stagnalis	2	0
Glossiphonia complanata	2	8
Hydracarina	2	0
Oligochaeta	86	23

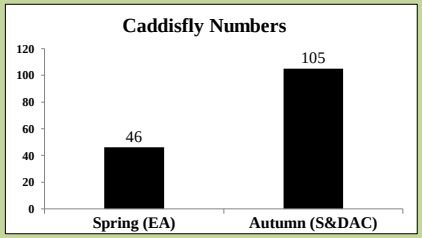
Appendix 20 - Site 7 (Spring & Autumn Data)

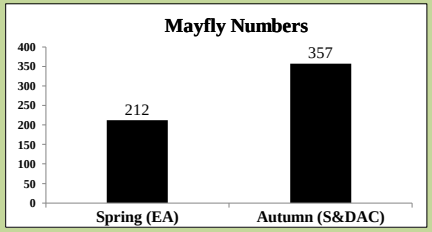
River Avon - D/S Sleeper Bridge

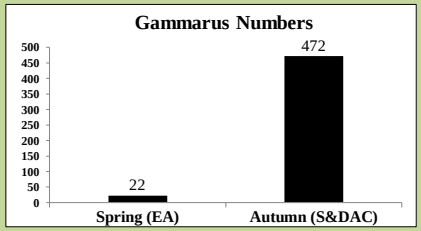
Spring & Autumn - 2018

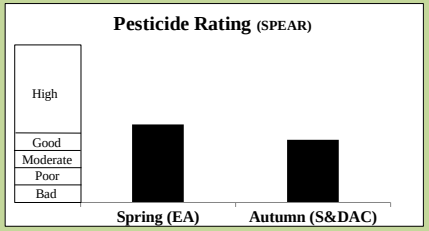


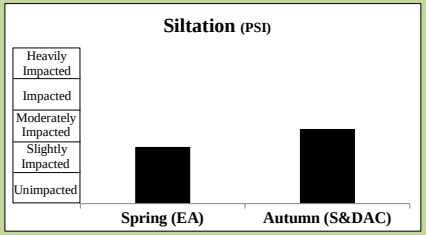


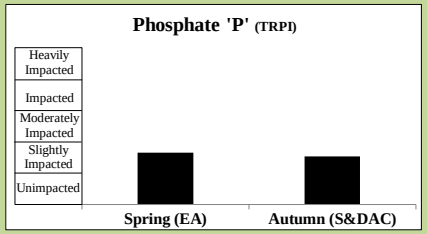


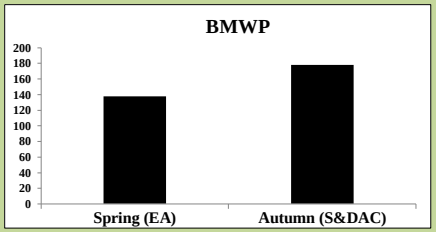


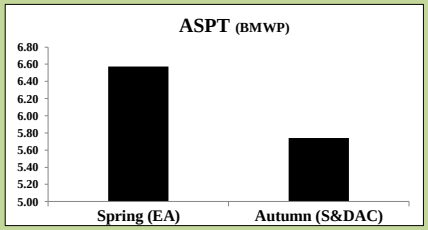


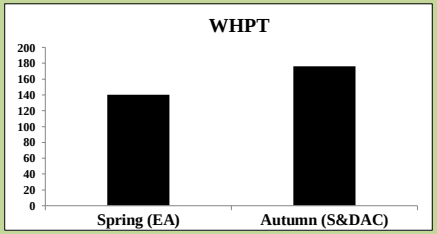


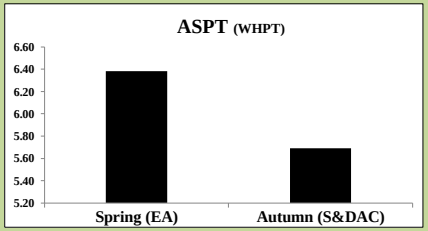


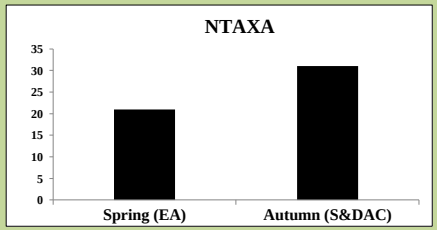


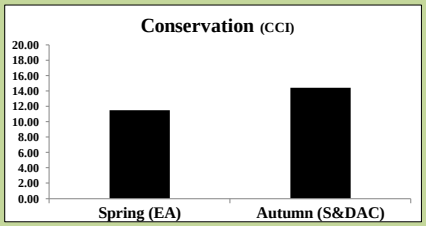


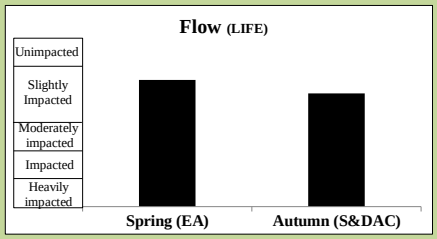


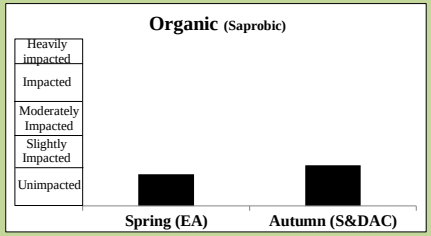












Appendix 21 - Beat 18 (Spring Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	9	0	2	2	14
Lepidostoma hirtum	26	51	8	6	8
Cheumatopsyche lepida	0	0	28	35	66
Athripsodes cinereus	0	5	8	4	0
Athripsodes bilineatus	0	13	0	0	0
Mystacides azurea	1	2	0	1	0
Sericostoma personatum	32	36	24	17	53
Agapetus fuscipes	5	0	34	3	77
Halesus digitatus	0	13	0	0	0
Anabolia nervosa	0	0	4	0	0
Hydroptila	4	6	28	36	12
Limnephilus	1	0	0	1	0
Limnephilus lunatus	0	3	0	0	4
Drusus annulatus	1	5	4	3	3
Potamophylax latipennis	0	1	0	3	1
Chaetopteryx villosa	7	5	0	0	0
Ithytrichia lamellaris	0	0	0	0	3
Hydropsyche	54	0	0	0	0
Hydropsyche siltalai	146	162	0	21	38
Rhyacophila dorsalis	1	7	6	0	2
Hydropsyche pellucidula	0	42	30	36	0
Plectrocnemia conspersa	0	0	0	0	4

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx splendens	2	0	2	0	0
Calopteryx virgo	0	3	0	1	0

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	68	48	34	15	37
Baetis	416	0	16	0	0
Baetis rhodani	0	311	0	81	81
Baetis scambus	0	76	0	0	37
Baetis muticus	0	0	0	3	0
Baetius vernus	0	0	0	0	7
Serratella ignita	84	195	0	25	55
Heptagenia sulphurea	79	19	4	5	16
Ecdyonurus dispar	23	0	0	0	0
Paraleptophlebia submarginata	0	0	2	1	3
Caenis rivulorum	8	10	2	0	11
Caenis luctuosa	1	0	2	2	0

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	7	0	0	0	0
Leuctra geniculata	0	3	0	3	3

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	197	175	154	22	15
Limnius volckari	64	43	164	59	83
Riolus subviolaceus	0	0	8	1	0
Orectochilus villosus	1	1	8	0	2
Oreodytes sanmarkii	0	0	0	0	1
Oulimnius tuberculatus	0	0	0	0	8
Polycelis felina	0	0	0	0	7

River Avon - Beat 18

Spring

True Flies	2015	2016	2017	2018	2019
Chironomidae	6	15	0	15	0
Orthocladiinae	0	0	0	0	32
Tanytarsini	0	3	0	0	46
Dicranota	2	5	0	1	0
Simulium ornatum	565	691	14	39	26
Antocha	0	0	16	7	29
Sigara	0	0	4	0	0
Clinocera	0	0	0	1	0
Hemerodromia	0	0	0	0	6
Ceratopogonidae	0	0	0	0	4

Alderfly	2015	2016	2017	2018	2019
Sialis					

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	2214	2854	1434	483	629
Asellus aquaticus	1	2	0	2	19

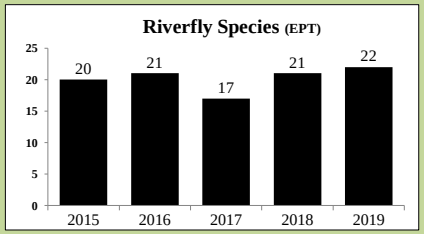
Biometrics	2015	2016	2017	2018	2019
BMWP	**180**	**166**	**157**	**164**	**196**
ASPT	**6.21**	**6.15**	**6.83**	**6.07**	**5.94**
WHPT	**194.3**	**171.0**	**165.0**	**175.8**	**226**
ASPT	**6.48**	**6.34**	**6.88**	**6.06**	**6.28**
Number of Taxa	**29**	**27**	**23**	**27**	**33**
Riverfly - species	**20**	**21**	**17**	**21**	**22**
Riverfly - numbers	**973**	**1013**	**236**	**303**	**535**
CCI	**13.46**	**14**	**15.75**	**13.48**	**15.26**
LIFE	**8.27**	**8.15**	**8.37**	**7.97**	**8.00**
PSI	**68.42**	**70.51**	**82.00**	**66.15**	**67.95**
SPEAR	**48.58**	**46.14**	**48.53**	**36.19**	**41.98**
TRPI	**73.08**	**67.86**	**73.33**	**73.08**	**72.73**
Saprobic	**2**	**2.02**	**1.83**	**1.90**	**1.77**

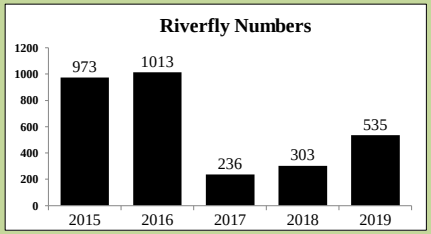
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	33	0	0	21	8
Bithynia tentaculata	8	11	0	3	0
Lymnaea peregra	3	33	0	10	0
Planorbis	1	1	0	1	0
Anisus vortex	0	0	0	0	9
Sphaeriidae	0	0	0	3	21
Pisidium	41	22	0	0	0
Ancylus fluviatilis	1	2	4	0	3
Potamopyrgus antipodarium	0	0	4	4	0
Valvata piscinalis	0	0	0	2	3
Physa fontinalis	0	0	0	0	4
Bathyomphalus contortus	0	0	0	0	2

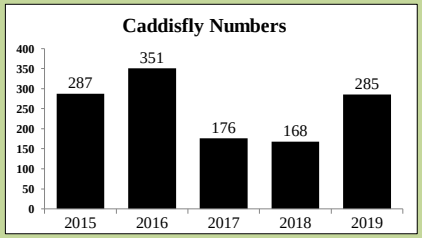
Leeches & Worms	2015	2016	2017	2018	2019
Erpobdella octoculata	0	0	4	1	10
Glossiphonia complanata	0	1	0	3	0
Piscicola geometra	0	0	0	0	1
Oligochaeta	2	0	0	7	1

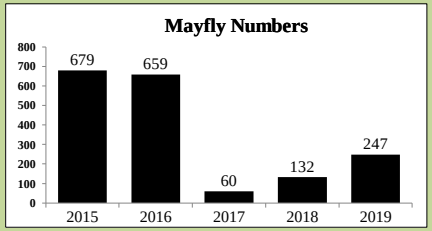
Appendix 22 - Site 8 (Spring Data)

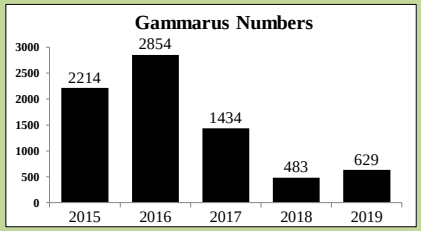
River Avon - Beat 18
Spring

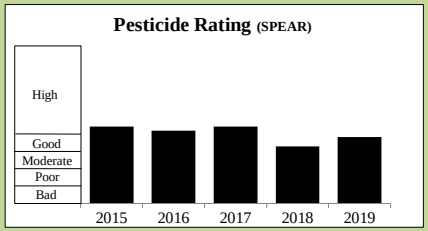


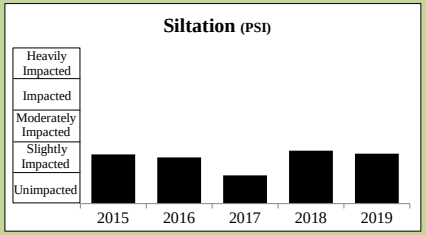


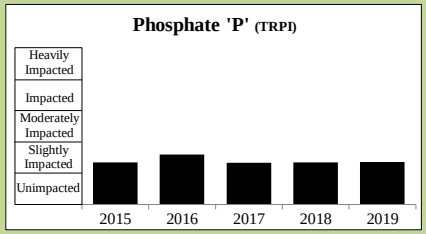


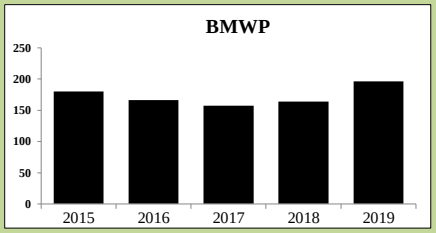


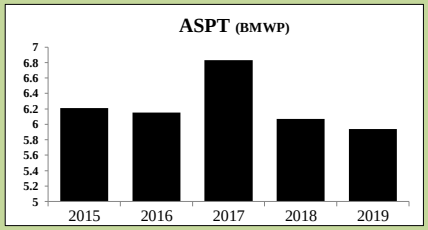


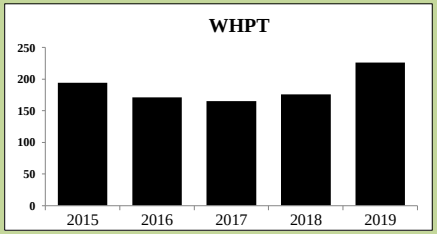


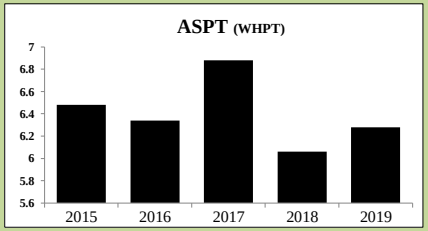


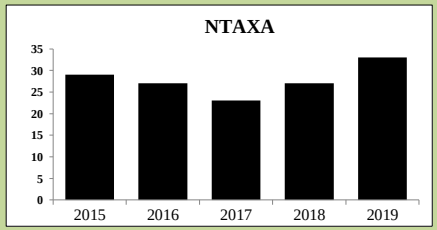


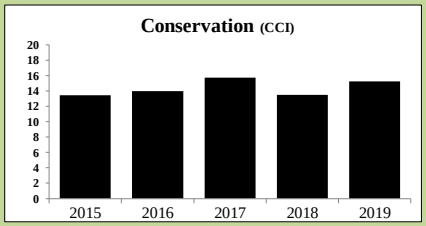


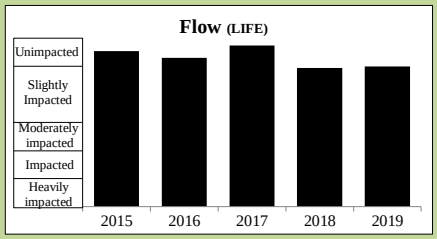


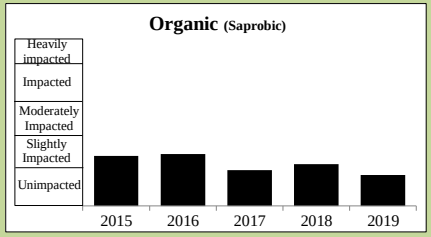












Appendix 23 - Site 8 (Autumn Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	15	16	0	19	
Goera pilosa	2	0	0	0	
Cheumatopsyche lepida	0	32	38	26	
Athripsodes cinereus	1	0	2	3	
Mystacides longicornis	0	1	0	0	
Mystacides azurea	0	0	2	0	
Sericostoma personatum	53	29	2	17	
Agapetus fuscipes	4	77	20	13	
Halesus digitatus	1	0	0	0	
Hydroptila	4	0	8	3	
Drusus annulatus	3	0	0	0	
Limnephilus lunatus	0	0	0	1	
Hydropsyche	56	0	0	0	
Hydropsyche siltalai	1	56	102	3	
Hydropsyche contubernalis	0	0	0	4	
Hydropsyche pellucidula	53	28	30	7	
Rhyacophila dorsalis	9	3	6	2	
Polycentropus flavomaculatus	16	10	14	3	

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx virgo	1	0	0	0	
Calopteryx splendens	0	0	1	1	

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	7	5	6	1	
Baetis	135	0	64	0	
Baetis rhodani	2	85	0	41	
Baetis fuscatus	58	0	0	15	
Baetis muticus	0	13	0	0	
Serratella ignita	15	0	0	0	
Heptagenia sulphurea	2	13	0	0	

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	23	0	2	0	
Leuctra geniculata	7	7	0	0	

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	556	48	36	10	
Limnius volckmari	108	31	42	38	
Riolus subviolaceus	6	9	6	0	
Oulimnius	0	0	16	0	
Haliplus	6	0	0	0	
Orectochilus villosus	1	11	4	3	
Dytiscidae	7	0	0	0	
Corixa	1	0	0	0	

River Avon - Beat 18

Autumn

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	0	0	6	16	
Chironomidae	40	0	16	0	
Orthocladiinae	0	0	0	3	
Limnophora	0	0	2	0	
Dicranota	5	1	0	0	
Tipula	2	0	0	0	
Antocha	0	0	0	1	

Alderfly	2015	2016	2017	2018	2019
Sialis					

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	3570	594	508	816	
Asellus aquaticus	3	14	4	0	

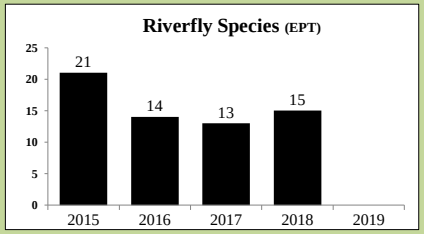
Biometrics	2015	2016	2017	2018	2019
BMWP	**179**	**140**	**118**	**124**	
ASPT	**5.97**	**5.83**	**5.90**	**6.20**	
WHPT	**190**	**160**	**135**	**135.3**	
ASPT	**5.94**	**6.15**	**6.12**	**6.44**	
Number of Taxa	**30**	**24**	**20**	**20**	
Riverfly - species	**21**	**14**	**13**	**15**	
Riverfly - numbers	**467**	**375**	**296**	**158**	
CCI	**14.97**	**14.81**	**7.50**	**10.00**	
LIFE	**7.95**	**8.14**	**8.00**	**8.25**	
PSI	**65.12**	**65.22**	**72.00**	**82.22**	
SPEAR	**38.82**	**32.32**	**36.18**	**36.38**	
TRPI	**75.00**	**75.00**	**72.00**	**87.50**	
Saprobic	**1.91**	**1.72**	**1.86**	**1.91**	

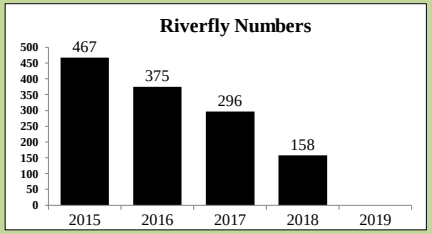
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	21	18	0	5	
Bithynia tentaculata	22	6	0	2	
Lymnaea peregra	7	10	4	0	
Valvata piscinalis	2	0	0	0	
Anisus vortex	26	8	12	0	
Sphaeriidae	0	13	0	0	
Pisidium	23	0	0	1	
Potamopyrgus antipodarium	11	17	6	0	
Physa fontinalis	11	0	0	0	
Ancylus fluviatilis	0	7	2	0	

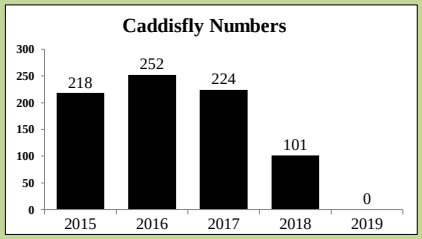
Leeches & Worms	2015	2016	2017	2018	2019
Erpobdella octoculata		1		0	
Polycelis felina		3		0	
Oligochaeta	0	4	0	0	

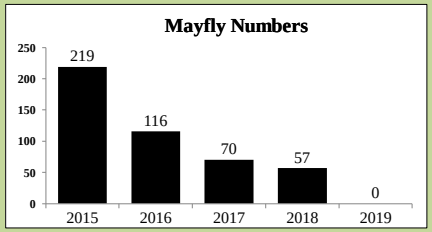
Appendix 24 - Site 8 (Autumn Data)

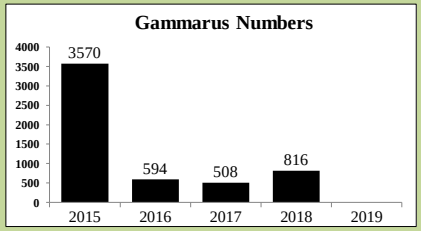
River Avon - Beat 18
Autumn

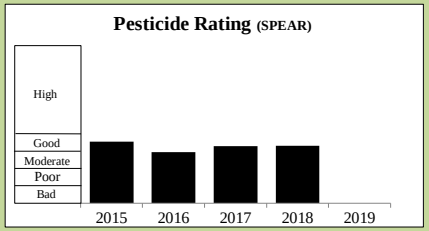


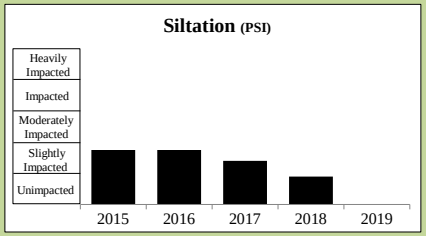


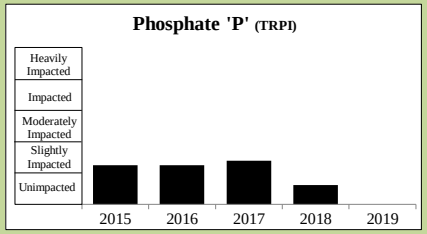


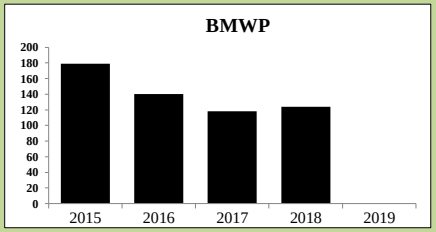


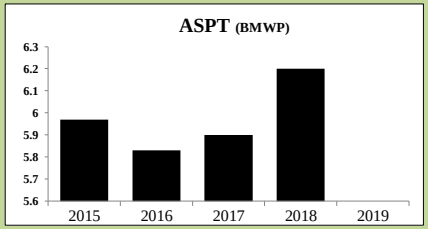


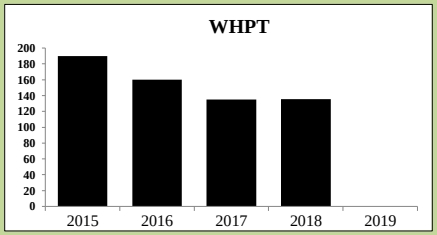


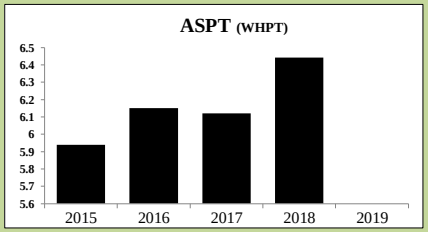


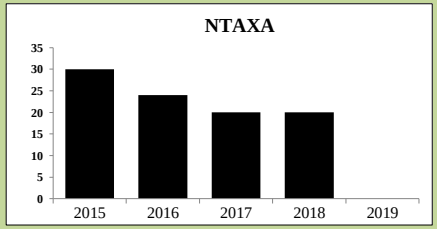


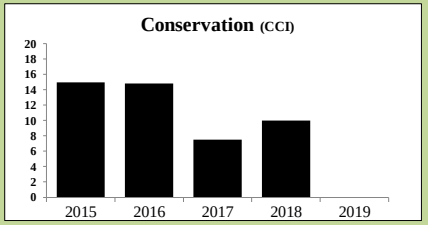


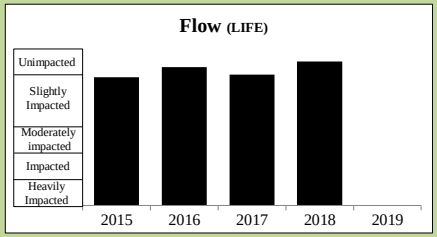


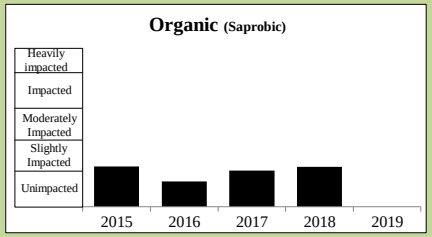












Appendix 25 - Site 9 (Spring Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	1	0	0	1	0
Cheumatopsyche lepida	0	25	5	59	29
Athripsodes bilineatus	0	2	0	0	0
Athripsodes cinereus	0	1	0	10	0
Mystacides nigra	0	0	1	0	0
Mystacides azurea	5	0	1	0	1
Sericostoma personatum	34	26	29	13	44
Limnephilus lunatus	0	1	5	0	0
Limnephilus	0	0	0	1	0
Brachycentrus subnubilus	0	0	0	1	0
Halesus radiatus	0	0	0	1	10
Lepidostoma hirtum	6	12	2	4	8
Hydroptila	3	0	17	7	5
Agapetus fuscipes	7	0	1	18	2
Drusus annulatus	6	4	3	4	0
Chaetopteryx villosa	2	1	0	0	0
Potamophylax	0	0	0	0	1
Potamophylax latipennis	0	1	0	0	0
Potamophylax cingulatus	0	2	0	0	0
Melampophylax mucoreus	0	0	0	0	5
Anabolia nervosa	26	0	1	3	4
Hydropsyche	15	0	0	0	0
Hydropsyche siltalai	26	22	5	3	26
Rhyacophila dorsalis	17	8	2	2	1
Hydropsyche pellucidula	0	10	16	6	13
Hydropsyche contubernalis	0	0	0	2	0
Psychomyia pusilla	0	0	0	6	0

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx virgo	0	2	0	1	0
Calopteryx splendens	1	0	1	0	0

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	29	22	16	54	18
Baetis	847	0	4	212	0
Baetis rhodani	0	6	0	0	201
Baetis muticus	0	0	0	5	6
Baetis niger	0	0	0	2	0
Baetis scambus	0	0	0	0	45
Caenis rivulorum	5	0	0	0	25
Caenis luctuosa	4	0	0	11	0
Caenis horaria	2	0	0	0	0
Serratella ignita	284	49	2	13	21
Ecdyonurus dispar	8	0	0	0	0
Heptagenia sulphurea	42	2	0	5	34

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	2	0	0	0	0
Leuctra geniculata	0	0	0	3	0

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	268	16	56	38	30
Limnius volckmari	96	11	61	59	45
Riolus subviolaceus	1	0	8	0	0
Nebrioporus elegans	0	1	0	0	0
Aphelocheirus aestivalis	5	0	0	0	0
Orectochilus villosus	1	0	2	1	0
Oreodytes sanmarkii	0	0	0	1	0
Hydracarina	0	0	1	1	5
Sialis lutaria	1	0	0	0	0
Oulimnius tuberculatus	0	0	0	0	7

River Avon - Stratford Bridge

Spring

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	245	67	1	27	79
Chironomidae	37	16	8	0	0
Orthocladiinae	0	0	0	13	26
Tanytarsini	0	8	2	0	51
Tanypodinae	0	4	0	2	0
Dicranota	3	0	0	1	0
Antocha	0	0	6	5	2
Tabanidae	1	0	0	0	0
Oxycera pygmaea	0	1	0	0	0
Oxycera analis	0	0	0	0	2
Ceratopogonidae	0	0	0	0	2

Alderfly	2015	2016	2017	2018	2019
Sialis					

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	1931	338	535	483	436
Asellus aquaticus	4	3	1	2	31

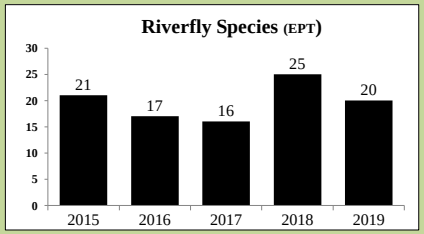
Biometrics	2015	2016	2017	2018	2019
BMWP	**197**	**145**	**136**	**203**	**155**
ASPT	**6.16**	**6.04**	**5.91**	**6.15**	**5.54**
WHPT	**212**	**146**	**152**	**211**	**176**
ASPT	**6.42**	**5.83**	**6.09**	**6.20**	**5.68**
Number of Taxa	**32**	**24**	**23**	**33**	**28**
Riverfly - species	**21**	**17**	**16**	**25**	**20**
Riverfly - numbers	**1371**	**194**	**110**	**446**	**499**
CCI	**14.44**	**13.77**	**8.75**	**21.14**	**25.88**
LIFE	**7.97**	**7.94**	**7.60**	**7.67**	**7.89**
PSI	**66.67**	**67.8**	**58.49**	**64.71**	**56.00**
SPEAR	**55.28**	**38.34**	**38.35**	**45.96**	**35.95**
TRPI	**73.08**	**68.42**	**71.43**	**75.86**	**68.18**
Saprobic	**1.98**	**1.94**	**1.86**	**1.89**	**1.97**

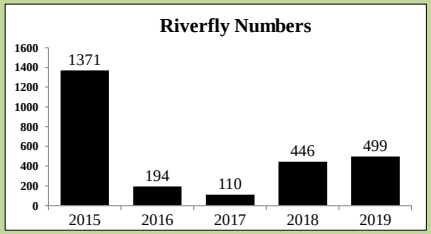
Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	5	12	2	7	11
Bithynia tentaculata	9	5	5	3	3
Lymnaea peregra	0	6	5	2	0
Lymnaea palustris	0	0	0	2	0
Anisus vortex	2	2	3	13	12
Sphaeriidae	0	4	0	19	16
Pisidium	43	0	0	0	0
Ancylus fluviatilis	7	0	0	0	0
Gyraulus albus	0	0	0	3	0
Valvata piscinalis	0	0	0	0	1
Physa fontinalis	0	0	0	0	1

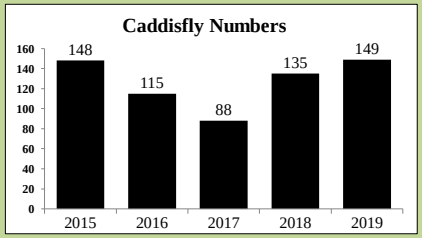
Leeches & Worms	2015	2016	2017	2018	2019
Glossiphonia complanata	0	0	3	3	4
Helobdella stagnalis	0	0	6	1	0
Theromyzon tessulatum	1	0	0	0	0
Erpobdella octoculata	4	2	0	1	7
Polycelis felina	0	0	0	0	3
Haplotaxis gordioides	0	0	0	0	2
Oligochaeta	1	0	0	16	28

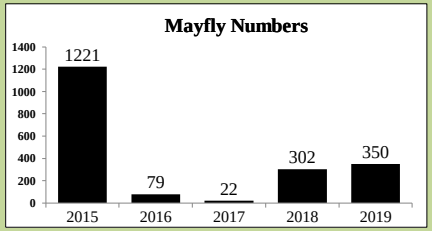
Appendix 26 - Site 9 (Spring Data)

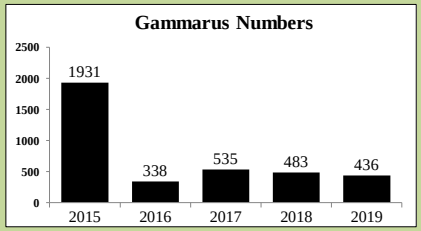
River Avon - Stratford Bridge
Spring

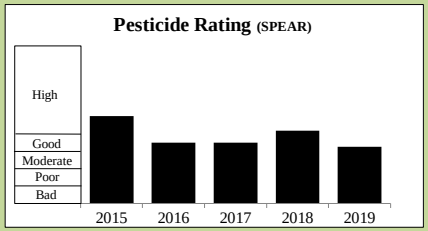


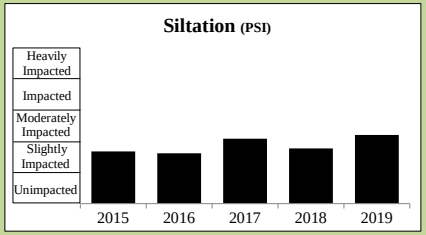


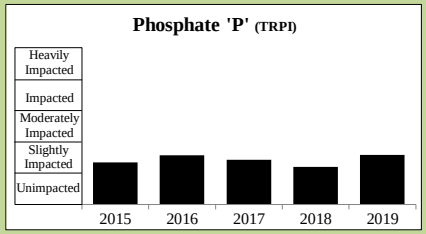


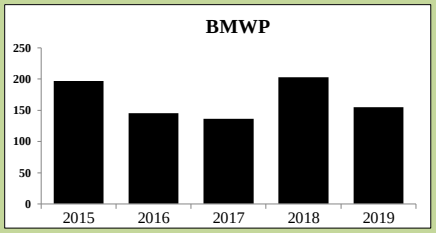


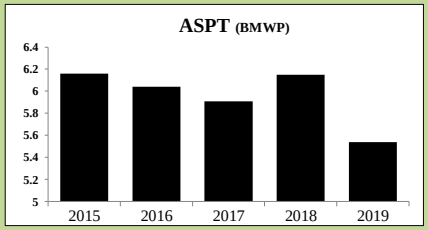


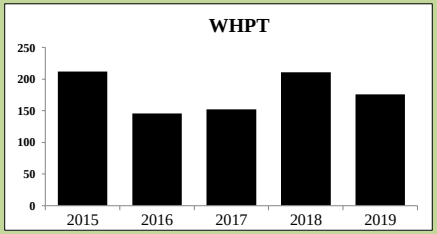


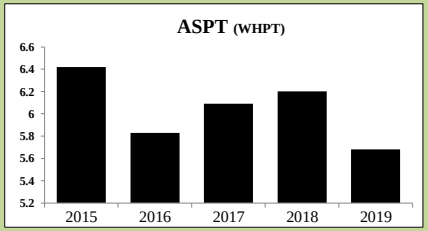


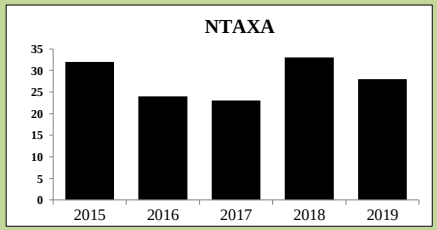


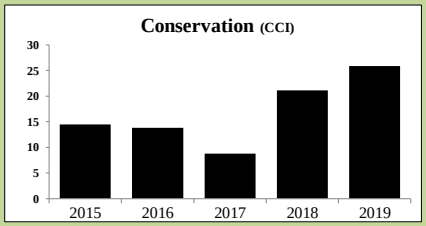


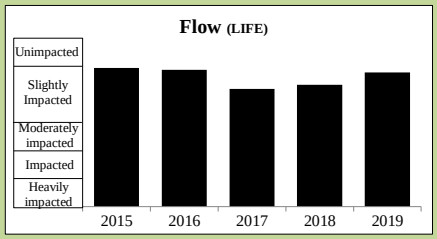


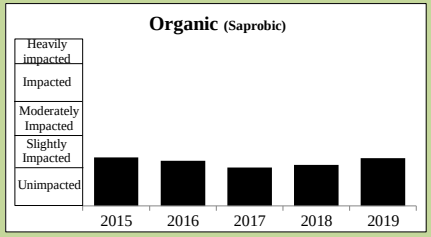












Appendix 27 - Site 9 (Autumn Inverts)

Caddisflies	2015	2016	2017	2018	2019
Silo nigricornis	8	4	0	2	
Goera pilosa	2	0	0	0	
Cheumatopsyche lepida	0	73	1	19	
Athripsodes cinereus	0	5	0	0	
Mystacides nigra	0	7	0	0	
Mystacides azurea	0	28	0	2	
Sericostoma personatum	16	8	3	1	
Limnephilus lunatus	0	1	0	0	
Lepidostoma hirtum	1	0	0	0	
Hydroptila	2	0	0	0	
Ithytrichia lamellaris	0	16	0	0	
Drusus annulatus	1	0	0	0	
Brachycentrus subnubilus	0	0	0	5	
Agapetus	0	0	0	19	
Molanna angustata	0	0	0	5	
Hydropsyche	45	0	0	0	
Hydropsyche siltalai	2	0	0	8	
Hydropsyche contubernalis	0	0	0	2	
Hydropsyche pellucidula	0	49	13	16	
Polycentropus flavomaculatus	12	5	0	0	
Rhyacophila dorsalis	2	4	0	2	

Damsels & Dragons	2015	2016	2017	2018	2019
Calopteryx	3	0	4	1	

Mayflies	2015	2016	2017	2018	2019
Ephemera danica	1	5	0	2	
Baetis	565	0	39	0	
Baetis scambus	28	0	0	45	
Baetis rhodani	0	37	0	20	
Baetis muticus	0	0	0	2	
Centroptilum luteolum	0	3	0	9	
Serratella ignita	5	0	0	0	
Paraleptophlebia submarginata	0	2	0	0	
Heptagenia sulphurea	3	0	0	1	

Stoneflies	2015	2016	2017	2018	2019
Leuctra fusca	7	0	1	0	

Beetles & Bugs	2015	2016	2017	2018	2019
Elmis aenea	550	118	35	32	
Oulimnius tuberculatus	0	0	0	8	
Limnius volckmari	186	45	46	47	
Riolus subviolaceus	2	13	0	0	
Brychius elevatus	0	0	2	0	
Aphelocheirus aestivalis	1	4	0	0	
Orectochilus villosus	0	6	1	0	
Dytiscidae	6	2	1	0	
Sigara	0	0	0	3	

River Avon - Stratford Bridge

Autumn

True Flies	2015	2016	2017	2018	2019
Simulium ornatum	9	45	76	113	
Chironomidae	35	108	7	0	
Orthocladiinae	0	0	0	9	
Tanytarsini	0	15	0	15	
Tanypodinae	0	0	0	2	
Dicranota	24	12	0	0	
Antocha	0	5	0	7	

Alderfly	2015	2016	2017	2018	2019
Sialis	0	0	0	2	

Crustaceans	2015	2016	2017	2018	2019
Gammarus pulex	1334	210	183	463	
Asellus aquaticus	3	11	0	5	

Biometrics	2015	2016	2017	2018	2019
BMWP	**180**	**159**	**97**	**154**	
ASPT	**6.21**	**5.68**	**4.85**	**5.70**	
WHPT	**182**	**162**	**108**	**158.1**	
ASPT	**6.26**	**5.78**	**5.12**	**5.65**	
Number of Taxa	**29**	**28**	**20**	**27**	
Riverfly - species	**16**	**15**	**5**	**17**	
Riverfly - numbers	**700**	**247**	**57**	**160**	
CCI	**14.78**	**15.93**	**5.17**	**14.22**	
LIFE	**8.03**	**7.66**	**7.24**	**7.54**	
PSI	**71.21**	**54.69**	**44.68**	**56.52**	
SPEAR	**46.24**	**28.16**	**17.14**	**28.95**	
TRPI	**75.00**	**81.82**	**66.67**	**57.14**	
Saprobic	**1.98**	**1.93**	**1.88**	**1.94**	

Molluscs	2015	2016	2017	2018	2019
Theodoxus fluviatilis	6	12	10	3	
Bithynia tentaculata	2	5	1	4	
Lymnaea peregra	0	4	1	0	
Lymnaea palustris	0	0	1	0	
Valvata piscinalis	0	3	0	1	
Planorbis	0	0	0	1	
Gyraulus albus	0	0	14	0	
Anisus vortex	4	18	11	6	
Sphaeriidae	39	46	7	0	
Sphaerium corneum	0	0	0	25	
Potamopyrgus antipodarium	0	0	2	0	
Physa fontinalis	1	4	0	3	

Leeches & Worms	2015	2016	2017	2018	2019
Glossiphonia complanata	1	3	1	3	
Piscicola geometra	1	0	0		
Theromyzon tessulatum	1	0	1		
Erpobdella octoculata	0	0	1		
Helobdella stagnalis				2	
Oligochaeta	0	0	0	4	

Appendix 28 - Site 9 (Autumn Data)

River Avon - Stratford Bridge
Autumn