Knepp wetland restoration invertebrate survey 2016

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Fig. 1. The RDB *Dieckmanniellus gracilis* found on Water-purslane on Scrape 2.

0 – Summary

This report provides details of an invertebrate survey on the river restoration on the Knepp Castle Estate. This 2016 survey is an attempt to replicate a survey carried out in 2005 by Pete Hodge. However, a thorough methodology was not available and only approximate grid references were available.

The survey consisted of two dates and these were matched as closely as possible to the dates in 2005. In order to make this survey more standardised, area that were thought to have been visited by Peter and areas that are of interest to the Estate were mapped and visited. A total of seven areas, three on the river, three in scrapes and on ditch were all visited for 30 minutes each on each visit. A site list was created for each sub-compartment and these were then run through Mike Edward's resource data base to analyse for their use by invertebrates.

A total of 188 species were recorded in 2016, up slightly by three from 2005. Fewer beetles were recorded in 2016 but more moths were noted. A reduction in specialists and herbivores could also be attributed to observer bias but this is not so clear. The stark rise in aquatic species and species with aquatic larvae is far less likely to be due to observer bias as the species are spread across a wide range of taxa. This is likely to be in response to the management. An increase in predators is also significant.

Perhaps the scarcest species of the survey was the tiny RDB weevil ***Dieckmanniellus gracilis*** found in Water-purslane on the edge of Scrape 2 in June (see figure 1). Strangely several nationally scarce a (Na) deadwood beetles were some of the rare species recorded.

Scrape 2 and River 2 scored the best in the resource analysis and this was reflected in direct observations. Ditch 1 and Scrape 3 scored the lowest with the remaining sites sitting in between.

The success of Scrape 2 was thought to be due to the wealth of botanical diversity and early successional stage. The success of River 2 over the other River sections was more to do with the fact that it was still canalised and had an abundance of vegetation and nectar sources.

A comparison with a similar restoration at Woods Mill on similar soils shows that the Woods Mill site has established quicker. The site is older but vegetation established there much more quickly than at Knepp. This is partly due to heavier clays further up the catchment not washing soil down but is also likely to be due to heavy grazing in this area. Reducing the grazing is therefore likely to hugely benefit the invertebrate fauna along the river restoration.

1 – Introduction

This survey was an attempt to emulate a survey made by Peter Hodge in 2005 along the river. However, no report was available as much as a derivation of Peter's findings in (Greenaway, 2005). Using the notes in this report, some comparisons have been made but at the time of writing, no species list was found. Only the total number of species per taxa and the names of the ten species found with conservation status.

Vague grid references were given and some surveying was focused on these areas in order to replicate was carried out in 2005 as closely as possible. By adding in seven sections, it was possible to stratify the effort along the river restoration and perhaps derive something more meaningful from this spatial data. As Peter Hodge did not record spider or molluscs, these were omitted from the survey.

The river restoration was split into seven sub-sections and each was surveyed for 30 minutes.

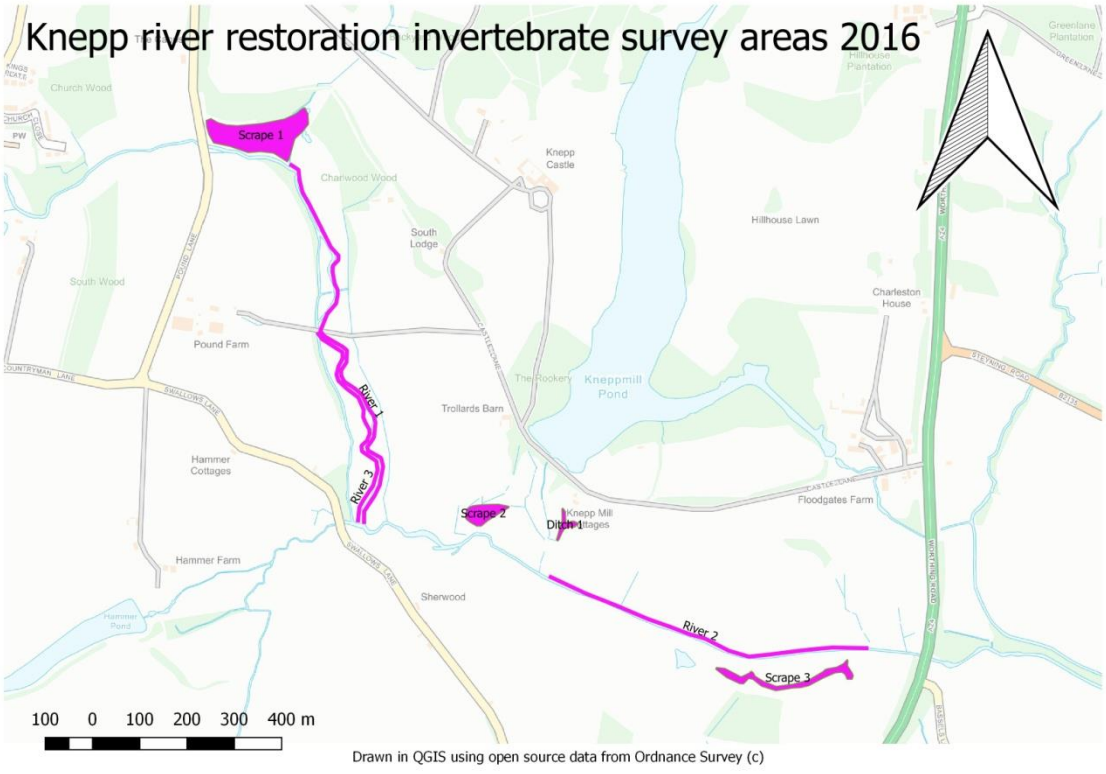

Fig. 2. Location of the seven plots covered by the survey.

These were as follows:

Scrape 1

No photo was taken of this first scrape that borders a woodland to the north. This scrape marks the most north-westerly part of the river restoration. A shallow muddy wet scrape

lines by rushes. The vegetation here was less rich than scrape 2. An area with greater botanical diversity (including Water Mint) lay between the scrape and the wood.

River 1

Sections 1 and 3 of the river lie on opposite sides of the same section. This area is very heavily over-grazed for invertebrate interest. Very few flowers were present and most of the banks of the river were covered in either grass or clay that had not yet been colonised by plants.

Fig. 3. River 1, showing the poor colonisation of vegetation and soil along this part of the river.

Scrape 2

This scrape was much more species-rich botanically than the others with Narrow-leaved Water-plantain, Unbranched Bur-reed, Flowering Rush and Water-purslane all present.

Fig. 4. Scrape 2 showing a wealth of Water-purslane.

Ditch 1

This old over-grown ditch bordering a hedge of willow was not photographed. The vegetation although over-grown was rich and varied and invertebrate biomass was high here.

Scrape 3

Although well grazed and botanical species-richness was lower than scrape 3, what this scrape benefited from was a long, shallow muddy area that can be seen in the image below.

Fig. 5. Scrape 3 with a long shallow muddy area that held some interesting species.

River 2

This is the only section of the river that was still canalised. Due to being harder to graze because of its steepness and being well established compared to the realigned stream, the vegetation here was lush, varied and full of nectar. A resource missing from much of the rest of the survey.

Fig. 6. The section of river that is still canalised (River 2) which shows plenty of structure and nectar sources.

River 3

This is the east side of the bank from the section labelled River 1.

Fig. 7. River 3 showing few nectar sources and little botanical structure.

2 – Methodology

Although a survey was carried out by Peter Hodge in 22545, a detailed report was not available. The report felt more like a document prepared by someone else based upon Peter's species list. As such it was difficult to carry out an identical survey. However, all known variables were matched and the two survey dates were selected to be as close to the original survey dates as possible. These were:

Visit 1: 19/06/2016

Visit 2: 23/07/2016

Sweeping was the predominant method as beating was not really possible in this vegetation type. Active searching was limited, especially on nectar sources. Also, active searching of bared mud was quite productive. Pond-netting was not carried out as this was not carried out in the previous survey.

All records have been sent to the Sussex Biodiversity Record Centre and to the ecologist at Knepp for synchronising with the Knepp biological records database. Rather than waste time duplicating this effort, the species list has not been attached in the appendices of the report but can be extracted as a survey from the SxBRC and/or the Knepp database.

3 - Results

3.1 - Summary of results

A total of 412 records were made of some 188 species. Of these, 93 were recorded from only one of the seven plots (49.5% of the species). Only four species were recorded in all seven compartments.

3.2 - Species composition

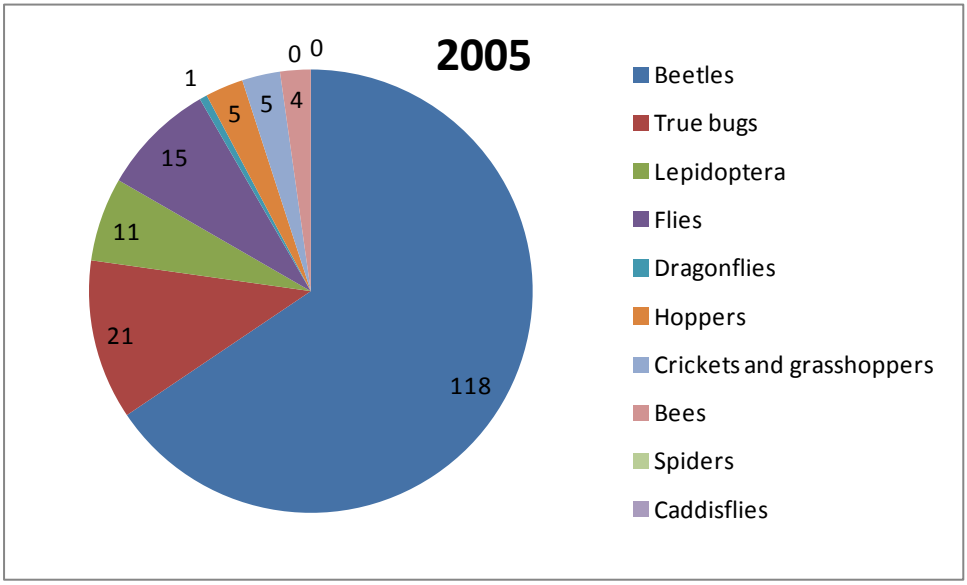

Fig. 8. Species composition in 2005.

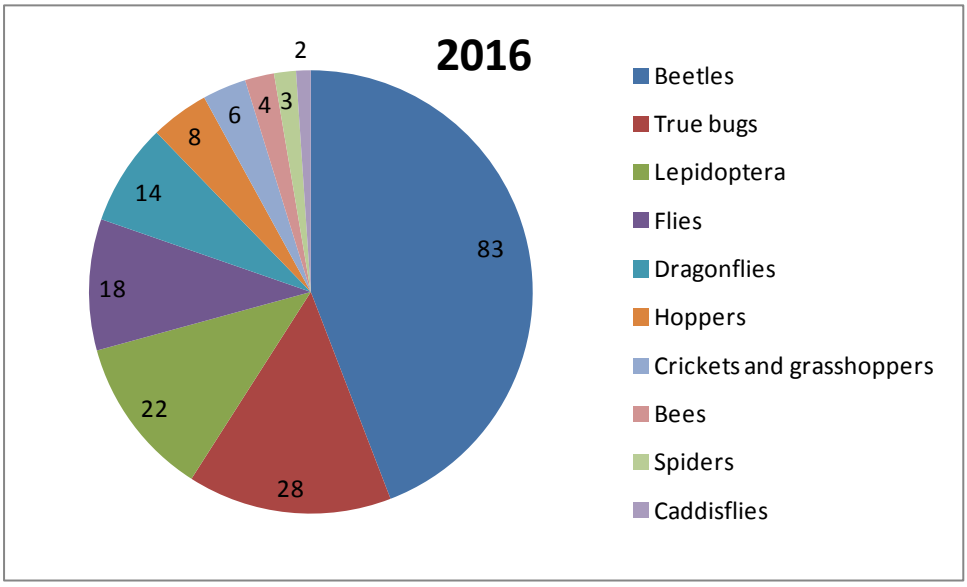

Fig. 9. Species composition in 2016.

3.3 - Species accounts for species with conservation status

A total of ten species with conservation status were recorded in 2005 compared to nine in 2016. Beetles with conservation status came in at six in both years but only one of these

was common to both years. Three species in 2016 were scarcer than any of those recorded in 2005 yet two of these were saproxylic. The scarcest species of the survey is the tiny weevil *Dieckmanniellus gracilis*.

***Salticus zebraneus* – Na**

Although spiders were not recorded during the survey (as Peter did not do so in 2005) it was not possible to miss this scarce little spider that was present on one of the bundles of woody debris on River 3. This spider is quite scarce but has been recorded at least twice before by the author at Knepp in 2015 and 2012.

Fig. 10. *Salticus zebraneus*

***Dieckmaniellus gracilis* – RDB3**

This tiny but distinctive weevil is found only with the food plant, Water-purslane. Large patches of Water-purslane (the largest the author has ever seen) were growing on the edge of Scrape 2. A handful of the plant was pulled out and sieved and two individuals were recorded instantly. The author has found this species at Pulborough Brooks only.

It is very restricted in distribution to the south east of England.

Fig. 11. *Dieckmanniellus gracilis* under the microscope.

Dasytes niger – **Na**

A saproxylic species that the author has only recorded twice before. Once at Knepp in 2013 and again at Cowdray park in 2011. This species seems to be genuinely scarce. It was recorded on the 23rd July on Scrape 1 which is contiguous with a block of woodland with plenty of dead wood.

Leptura aurulenta – **Na**

The Golden-haired Longhorn Beetle or Hornet Beetle is a scarce species that is well established in the West Weald. Like most of the longhorns it is saproxylic and feeds on dead and decaying wood. A single female was netted oddly with a male *Leptura quadrifasciata*, a different but closely related species. This was on River 1 on the second visit.

Fig. 12. *Leptura aurulenta*

Paederus fuscipes – **Nb**

This uncommon but striking rover beetle occurs occasionally in wetlands. It was also recorded along the banks of the river restoration at Woods Mill.

Pelenomus comari – **Nb**

This beetle is the only nationally scarce species that was recorded by Peter Hodge as well as this survey. Widely distributed but local in wetlands and this is the only time the author has seen this species. On this site it is likely to be feeding on Purple Loosestrife.

Fig. 13. *Pelenomus comari*

Pelenomus waltoni – **Nb**

This small mottled weevil is associated with Water-pepper and is the only time the author has recorded this species.

Fig. 14. *Pelenomus waltoni*

Protapion difforme – **Nb**

This tiny apionid weevil is found in damp grasslands and marshes and is thought to be associated with clovers.

Ochsenheimeria taurella – **Nb**

This odd little micro moth was also recorded by the author during the survey in 2015 and Knepp remains the only place the author has recorded it at. T requires rank grasses such as False Oat-grass. Typically with scarce species only one individual was found.

4 – Discussion and resource analysis

4.1 – Resource analysis

Combined with the 2005 data, the total number of species recorded is 298. This means an additional 115 species were recorded on the survey in 2016.

Tab. 1. Absolute values

	2005	2016	Scr 1	Riv 1	Scr 2	Dit 1	Riv 2	Scr 3	Riv 3
Total	183	188	66	60	59	62	72	39	54
Con status	12	12	3	3	3	2	4	1	5
Unique	n/a	n/a							
Specialist	91	79	21	22	20	26	38	11	26
Herbivore	118	106	32	26	30	32	52	18	34
Predator/parasite	39	55	27	23	21	18	11	19	16
Ratio of herbivore to predator	1:3.03	1:1.93	1:19	1:1.13	1:1.43	1:1.78	1:4.72	1:0.95	1:2.13
Aquatic	10	35	14	15	21	7	9	11	9
Aquatic larvae only	9	30	13	14	18	6	8	10	9
Aquatic emergent vegetation	13	14	5	3	10	3	5	1	2
Aquatic submerged vegetation	0	6	3	2	6	2	2	4	3
Aquatic flowing water	1	7	1	5	1	1	1	0	2
Water/land interface	5	1	2	2	0	0	1	3	0
Bare ground	13	14	4	4	2	1	10	5	1
Flowers	28	28	6	8	3	7	14	5	7
Herbaceous vegetation	149	134	46	33	40	51	58	22	39
Juncaceae	2	4	1	0	3	2	2	2	0
Poaceae	15	23	7	6	8	9	4	4	16
Coleoptera	116	83	27	29	25	29	37	15	20
Diptera	16	18	8	6	6	5	4	5	4
Hymenoptera	5	4	0	1	0	0	4	0	2
Heteroptera	21	28	11	5	8	13	10	2	10
Leipdoptera	10	22	6	6	4	4	9	6	6

Tab. 2. The same data but represented as a proportion of the total number of species seen in that year. An extra column is given to show changes in this percentage between 2005 and 2016. Only percentage changes of more than 5% are highlighted as significant.

	2005	2016	Change	Scr 1	Riv 1	Scr 2	Dit 1	Riv 2	Scr 3	Riv 3
Total	n/a	n/a		35.11	31.91	31.38	32.98	38.30	20.74	28.72
Con status	6.56	6.38	-0.18	1.60	1.60	1.60	1.06	2.13	0.53	2.66
Unique				0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Specialist	49.73	42.02	-7.71	11.17	11.70	10.64	13.83	20.21	5.85	13.83
Herbivore	64.48	56.38	-8.1	17.02	13.83	15.96	17.02	27.66	9.57	18.09
Predator/parasite	21.31	29.26	+7.95	14.36	12.23	11.17	9.57	5.85	10.11	8.51
Aquatic	5.46	18.62	+13.2	7.45	7.98	11.17	3.72	4.79	5.85	4.79
Aquatic larvae only	4.92	15.96	+11.0	6.91	7.45	9.57	3.19	4.26	5.32	4.79
Aquatic emergent vegetation	7.10	7.45	+0.35	2.66	1.60	5.32	1.60	2.66	0.53	1.06
Aquatic submerged vegetation	0.00	3.19	+3.19	1.60	1.06	3.19	1.06	1.06	2.13	1.60
Aquatic flowing water	0.55	3.72	+3.17	0.53	2.66	0.53	0.53	0.53	0.00	1.06
Water/land interface	2.73	0.53	-2.2	1.06	1.06	0.00	0.00	0.53	1.60	0.00
Bare ground	7.10	7.45	+0.35	2.13	2.13	1.06	0.53	5.32	2.66	0.53
Flowers	15.30	14.89	+0.41	3.19	4.26	1.60	3.72	7.45	2.66	3.72
Herbaceous vegetation	**81.42**	71.28	-10.1	24.47	17.55	21.28	27.13	30.85	11.70	20.74
Juncaceae	1.09	2.13	+1.04	0.53	0.00	1.60	1.06	1.06	1.06	0.00
Poaceae	8.20	12.23	+4.03	3.72	3.19	4.26	4.79	2.13	2.13	8.51
Coleoptera	63.39	44.15	-19.24	14.36	15.43	13.30	15.43	19.68	7.98	10.64
Diptera	8.74	9.57	+0.83	4.26	3.19	3.19	2.66	2.13	2.66	2.13
Hymenoptera	2.73	2.13	-0.60	0.00	0.53	0.00	0.00	2.13	0.00	1.06
Heteroptera	11.48	14.89	+3.41	5.85	2.66	4.26	6.91	5.32	1.06	5.32
Leipdoptera	5.46	11.70	+6.24	3.19	3.19	2.13	2.13	4.79	3.19	3.19

4.2 – Comparison between 2005 and 2016

Although the number of invertebrates rose, the number of beetles recorded dropped. It is the author's opinion that this is unlikely to reflect actual changes on the ground and may more likely be due to observer bias. Peter Hodge has many years experience in phytophagous Coleoptera and is likely to find many species by targeting them. The author although experienced, is much more of an all round entomologist, hence the slightly larger species list. It is therefore better to make comparisons between 2005 and 2016 using a resource database. This will look at the proportions of species present within a given resource. Say, the change in proportion of species requiring bare mud.

The percentage drop in Coleoptera of some 19.2% must be attributed to the skill difference between the author and Peter Hodge. The benefits of comparing proportions through such a data base are that observer bias can essentially be recognised but factored out of the analysis. There was a corresponding increase in moths and this is also likely to be down to observer bias.

A reduction in specialists and herbivores could also be attributed to observer bias but this is not so clear. The stark rise in aquatic species and species with aquatic larvae is far less likely to be due to observer bias as the species are spread across a wide range of taxa. This is likely to be in response to the management. An increase in predators is also significant.

4.3 – Comparison between plots

Scrape 1. Had the most predators and the most flies but beyond that was unremarkable, This shows that the plot was close to the average of all seven plots.

River 1. Had the most species associated with flowing water but again, beyond this was unremarkable.

Scrape 2. This scrape rich in aquatic plants, had the most aquatic species, species with aquatic larvae, species associated with aquatic emergent and submerged vegetation.

Ditch 1. Scored second lowest across the plots. Particularly for those species associated with water and emergent plants. It did however have the greatest number of Hemiptera. This is a more late successional wetland and reflects this.

River 2. This was the best river and had the most overall species of the survey, also the most specialists and herbivores (however it had the least predators). It had the most species associated with bare ground (despite there being little bare ground present), flowers and herbaceous vegetation. It also had the most Coleoptera, Hymenoptera and Lepidoptera of the survey.

Scrape 3. Came out as the worst of the survey with the lowest over all species, species with conservation status, species associated with herbaceous vegetation, species associated with grasses, Coleoptera, Hymenoptera and Hemiptera. It did however have the highest number of species associated with the water/land interface, this being due to the large area of wet mud.

River 3. A fairly unremarkable plot. However it did have the most species with conservation status and the most species associated with grasses. It had the lowest number of flies.

4.4 – Comparison between river restoration (River 1 & 3) and the Woods Mill river restoration

Water started flowing along the river restoration at Woods Mill in October 2009. Although it is older than the Knepp restoration, vegetation was established at Woods Mill within several years so this is thought to be at least a guide as to what can be achieved in this habitat. Pulsed grazing at Woods Mill meant there was much more

Tab. 3. Comparison with Rivers 1 & 3 and Woods Mill from the June visit only. Green changes are in favour of Knepp, red in favour of Woods Mill and amber where the change is less than 5%.

	Knepp	Woods Mill	Knepp %age	Woods Mill %age	Change
Total	48	68	n/a	n/a	+41.7
Con status	1	7	2.1	10.3	+8.2
Specialist	18	30	37.5	44.1	+6.6
Herbivore	22	39	45.8	57.4	+11.5
Predator/parasite	19	24	39.6	35.3	-4.3
Ratio of herbivore to predator	1:1.16	1:1.63	n/a	n/a	n/a
Aquatic	12	10	25.0	14.7	-10.3
Aquatic larvae only	11	9	22.9	13.2	-9.7
Aquatic emergent vegetation	3	8	6.3	11.8	+5.5
Aquatic submerged vegetation	1	1	2.1	1.5	-0.6
Aquatic flowing water	4	2	8.3	1.5	-6.8
Water/land interface	2	1	4.2	1.5	-2.7
Bare ground	3	8	6.3	11.8	+5.5
Flowers	4	7	8.3	10.3	+2.0
Herbaceous vegetation	27	53	56.3	77.9	+21.7
Juncaceae	0	2	0.0	2.9	+2.9
Poaceae	4	9	8.3	13.2	+4.9
Coleoptera	27	41	56.3	60.3	+4.0

Diptera	**4**	**6**	**8.3**	**8.8**	**+0.5**
Hymenoptera	**1**	**2**	**2.1**	**2.9**	**+0.9**
Heteroptera	**5**	**8**	**10.4**	**11.8**	**+1.3**
Leipdoptera	**0**	**4**	**0.0**	**5.9**	**+5.9**

Only the June visit was used to derive the data in table 3 above. A similar section of the river restoration at woods Mill was sued and 30 minutes was used on each bank making it comparable with River 1 and River 3 in this survey.

It is clear that Woods Mill has established a more diverse, species-rich and scarce invertebrate assemblage with 41.7% more species occurring there. This is clearly due to more varied an established vegetation along the river restoration at Woods Mill. At Knepp is caused by the heavy clay taking longer to establish vegetation and the very high grazing in this area.

5 – Management recommendations

The scrapes, particularly Scrape 2, look great for wildlife. Partly because livestock do not seem to be over-grazing the margin and partly because it appears to be more recently created. The river restoration however (River 1 & 3) is very over-grazed. The clay here is impeding the colonisation by vegetation but the large herd of Fallow Deer present in this area for much of the survey seem to be having a negative impact on the colonising vegetation. Nectar sources and structure are nearly none existent in this area.

The canalised River 3 scored highly because of the wealth of established vegetation and corresponding nectar sources. The steepness of the river here has protected this resource somewhat from the heavy grazing.

As stated in the 2015 report, a reduction in grazing would have a profoundly positive impact on plant, invertebrates and other taxa across the site.

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Appendices

All records have been sent to the Ecologist at Knepp Castle for synchronising in their database. The following appendix shows the species recorded in 2016 in each sub compartment.

Species	Order	Scrape 1	River 1	Scrape 2	Ditch 1	River 2	Scrape 3	River 3
Andrena flavipes	Aculeate					1		
Andrena wilkella	Aculeate					1		
Bombus lapidarius	Aculeate					1		1
HONEY BEE	Aculeate		1			1		1
Neoscona adianta	Araneae				1			
Ozyptila simplex	Araneae						1	
Salticus zebraneus	Araneae							1
14-SPOT LADYBIRD	Coleoptera	1	1	1	1		1	1
16-SPOT LADYBIRD	Coleoptera	1	1		1	1	1	1
7-SPOT LADYBIRD	Coleoptera	1		1	1	1	1	1
Amara eurynota	Coleoptera					1		
Aphthona nonstriata	Coleoptera					1		
Apion frumentarium	Coleoptera					1		1
Athous bicolor	Coleoptera			1				
Bembidion guttula	Coleoptera	1	1	1		1	1	1
Bembidion illigeri	Coleoptera		1					1
Bembidion varium	Coleoptera						1	
Brachypterus glaber	Coleoptera		1					
Cantharis lateralis	Coleoptera	1	1	1	1	1	1	1
Cantharis pallida	Coleoptera				1			
Canthatis nigra	Coleoptera	1	1	1	1	1	1	1
Ceratapion onopordi	Coleoptera				1			
Cercyon marinus	Coleoptera						1	
Ceutorhycnhus pallidactylis	Coleoptera		1			1		
Ceutorhycnhus typhae	Coleoptera					1		
Ceutorhynchus obstrictus	Coleoptera			1		1		
Chaetocnema hortensis	Coleoptera				1	1		1
Coccidula rufa	Coleoptera	1	1	1	1			
Coccidula scutellata	Coleoptera			1				
Cordylepherus viridis	Coleoptera	1						
Crepidodera fulvicornis	Coleoptera		1					
Dasytes niger	Coleoptera	1						
Dieckmaniellus gracilis	Coleoptera			1				
Donacia simplex	Coleoptera		1	1		1		1
Donacia vulgaris	Coleoptera			1				
Elaphrus riparius	Coleoptera						1	
Galerucella lineola	Coleoptera			1		1		
Galerucella pusilla	Coleoptera			1		1		
Galerucella sagittariae	Coleoptera			1		1		
Gastrophysa viridula	Coleoptera	1	1			1		
HARLEQUIN LADYBIRD	Coleoptera	1		1	1	1		
Helophorus grandis	Coleoptera		1	1	1	1		
Hydrobius fuscipes	Coleoptera			1				
Hypera rumicis	Coleoptera	1			1			
Ischnopterapion modestum	Coleoptera				1	1		
Kateretes rufilabris	Coleoptera			1	1			

Leptura aurulenta	Coleoptera		1					
Leptura quadrifasciata	Coleoptera		1					
Loricera pirricornis	Coleoptera		1					1
Malachius bipustulatus	Coleoptera	1			1			
Meligethes aenea	Coleoptera	1	1		1	1	1	
Nanophyes marmoreus	Coleoptera					1		
Neocrepidodera transversa	Coleoptera	1	1		1	1		1
Oedemera lurida	Coleoptera				1	1		
Oedemera nobilis	Coleoptera	1						
Oulema obscura	Coleoptera	1		1				1
Paederus fuscipes	Coleoptera		1					1
Paederus littoralis	Coleoptera		1					
Paederus riparius	Coleoptera	1			1			
Paranchus albipes	Coleoptera		1					
Pelenomus comari	Coleoptera					1		
Pelenomus waltoni	Coleoptera							1
Perapion hydrolapathi	Coleoptera	1	1		1	1		
Phaedon amoraciae	Coleoptera	1	1	1	1	1	1	
Phaedon cochleriae	Coleoptera	1	1			1		
Philonthus cognatus	Coleoptera			1				
Philonthus quisquiliarius	Coleoptera						1	
Phyllobius pomaceus	Coleoptera					1		
Phyllotreta ochripes	Coleoptera		1					
Phyllotreta undulata	Coleoptera		1			1		
Plateumaris sericea	Coleoptera	1						
Protapion dichroum	Coleoptera				1		1	1
Protapion difforme	Coleoptera					1		
Psylliodes chrysocephala	Coleoptera		1			1		
Rhagonycha fulva	Coleoptera	1	1		1	1		1
Rhinoncus perpendicularis	Coleoptera					1		
Rhyzobius litura	Coleoptera	1		1			1	
Scirtes haemesphericus	Coleoptera	1		1				
Sitona lepidus	Coleoptera				1	1		1
Sitona lineatus	Coleoptera				1			1
Sphaeroderma rubidum	Coleoptera					1		
Stenurella melanura	Coleoptera				1			
Stenus binotatus	Coleoptera	1						
Tachyporus chrysomelinus	Coleoptera	1			1			
Tachyporus hypnorum	Coleoptera						1	
Telmatophilus caricis	Coleoptera							1
Temnocerus nanus	Coleoptera				1			
THISTLE WEEVIL	Coleoptera				1			
Thryogenes festucae	Coleoptera			1				
Tychius picirostris	Coleoptera		1			1		
Anasimyia contracta	Diptera			1				
BLACK SNIPE FLY	Diptera	1						
Chloromyia formosa	Diptera			1				

Chorisops nagatomii	Diptera				1			
Chrysotoxum bicinctum	Diptera	1						
DOLLY FLY	Diptera	1	1			1	1	
Eristalis arbustorum	Diptera		1					
Eristalis horticola	Diptera					1		
Eristalis nemorum	Diptera					1		
Helophilus pendulus	Diptera	1		1	1			
KLEG	Diptera	1	1	1	1		1	1
Leptogaster cylindrica	Diptera							1
Melanostoma scalare	Diptera		1				1	1
ODD FLY	Diptera	1	1	1	1	1	1	1
Pyrophaena granitarsa	Diptera				1			
Pyrophaena rosarum	Diptera	1						
Tabanus autumnalis	Diptera			1			1	
Xylota sylvarum	Diptera	1	1					
Amblytylus nasutus	Heteroptera		1		1	1	1	1
BRASSICA BUG	Heteroptera					1		
Closterotomus norwegicus	Heteroptera	1		1	1	1		1
Coreus marginatus	Heteroptera	1			1			
Cymus melanocephalus	Heteroptera			1	1	1		
Deraeocoris flavilinea	Heteroptera					1		
Deraeocoris ruber	Heteroptera	1			1			
GREEN SHIELD BUG	Heteroptera	1						
Heterotoma planicornis	Heteroptera				1			
Leptopterna dolobrata	Heteroptera	1		1	1	1	1	1
Lopus decolor	Heteroptera			1				1
Miridius quadrivigatus	Heteroptera					1		1
Nabis ferus	Heteroptera				1			
Nabis flavomarginatus	Heteroptera	1						
Nabis limbatus	Heteroptera		1					
Neolygus contaminatus	Heteroptera	1						
Notostira elongata	Heteroptera				1			
Phylus melanocephalus	Heteroptera	1						
Pithanus maerkelii	Heteroptera	1		1	1	1		1
Plagiognathus arbustorum	Heteroptera				1			
Stenodema calcarata	Heteroptera			1				1
Stenodema laevigata	Heteroptera							1
Stenotus binotatus	Heteroptera	1	1	1	1	1		
Tingis ampliata	Heteroptera		1		1			1
TORTOISE BUG	Heteroptera	1						
Trigonotylus ruficornis	Heteroptera							1
WATER SCORPION	Heteroptera			1				
Willow mirid	Heteroptera		1			1		
ALDER SPITTLE BUG	Hopper	1						
Conomelus anceps	Hopper						1	
Evacanthus interuptus	Hopper	1						1
Jaavesella pellucida	Hopper			1	1			1

Neophilaenus lineatus	Hopper		1		1	1		1
Philaenus spumarius	Hopper	1		1	1	1		1
RUSH LEAFHOPPER	Hopper	1		1	1	1	1	
RUSH PLANTHOPPER	Hopper			1	1			
Agapeta hamana	Lepidoptera							1
BLOOD-VEIN	Lepidoptera	1						
BROWN CHINA-MARK	Lepidoptera	1		1	1	1	1	1
Chrysoteuchia culmella	Lepidoptera		1					
COMMA	Lepidoptera		1					
Crambus perlella	Lepidoptera			1				
ESSEX SKIPPER	Lepidoptera					1		1
GATEKEEPER	Lepidoptera		1			1		1
GREEN-VEINED WHITE	Lepidoptera					1	1	
HOLLY BLUE	Lepidoptera							1
LARGE WHITE	Lepidoptera			1		1	1	
MARBLED WHITE	Lepidoptera					1		
MEADOW BROWN	Lepidoptera	1				1	1	1
MULLEIN	Lepidoptera	1						
Ochsenheimeria taurella	Lepidoptera				1			
PAINTED LADY	Lepidoptera		1					
PEACOCK	Lepidoptera		1		1			
RED ADMIRAL	Lepidoptera						1	
SILVER-Y	Lepidoptera				1		1	
SMALL CHINA-MARK	Lepidoptera	1		1				
SMALL TORTOISHELL	Lepidoptera					1		
SMALL WHITE	Lepidoptera	1	1			1		
AZURE DAMSELFLY	Odonata	1		1	1		1	
BANDED DEMOISELLE	Odonata		1		1	1		1
BEAUTIFUL DEMOISELLE	Odonata		1					
BLACK-TAILED SKIMMER	Odonata	1		1				
BLUE-TAILED DAMSELFLY	Odonata	1	1	1		1	1	1
BROAD-BODIED CHASER	Odonata	1	1	1			1	
BROWN HAWKER	Odonata	1	1				1	
COMMON BLUE DAMSELFLY	Odonata	1	1	1				
COMMON DARTER	Odonata			1				
EMPORER DRAGONFLY	Odonata			1				
FOUR-SPOTTED CHASER	Odonata			1				
LARGE RED DAMSELFLY	Odonata		1					
RUDDY DARTER	Odonata			1			1	1
SCARCE CHASER	Odonata		1					
COMMON GREEN GRASSHO	Orthoptera	1					1	
LONG-WINGED CONEHEAD	Orthoptera	1		1	1	1		
MEADOW GRASSHOPPER	Orthoptera	1	1	1	1	1	1	1
ROESEL'S BUSH-CRICKET	Orthoptera		1		1	1		1
SLENDER GROUNDHOPPER	Orthoptera						1	
SPECKLED BUSH-CRICKET	Orthoptera	1	1	1				
Hydropsyche angustipennis	Trichoptera		1					1
Mystacides nigra	Trichoptera							1