

Supplementary Environmental Information

**INVERTEBRATE SURVEYS OF
DRAINAGE DITCHES
AND RUNWAY EXTENSION FOOTPRINT**

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SUMMARY

Invertebrate surveys were undertaken of drainage ditches along part of the route of the proposed extension for the main runway at London Ashford Airport (Lydd), Dungeness, West Sussex. These surveys mainly took the form of aquatic macro-invertebrate surveys for which water beetles and medicinal leech were particular target groups. Three surveys were undertaken in May, July and August 2007 on a series of ditches or drains that might be affected by the proposed extension. In July 2007, terrestrial invertebrates were also surveyed along a transect within the route. The results of the survey are presented here.

Survey work was undertaken in late May, mid July and mid August 2007. The results of the first and last surveys are provided in the report; the mid-July samples were infested with *Lemna* duckweed. Red Data Book (RDB) species were assessed; a total of one RDB1, two RDB2, three RDB3 and twelve Nationally Scarce invertebrate species were recorded. In addition, further RDB/Nationally Scarce species may be expected from amongst the unidentified *Bagous* weevils which were found in several samples. Surveys for medicinal leech were also conducted but this species was not recorded. Invertebrate species richness in the drains was high as indicated by the relatively long list of species recorded (Appendices 1 & 2).

An assessment based on the presence of Red Data Book and Nationally Scarce in each of the drains has been conducted. All seven drains within the footprint of the development support rare and uncommon species. The drains must be considered of high nature conservation value for invertebrates which reflect factors such as good water quality and the availability of features of importance to invertebrates that utilise drainage ditches.

The impact of the proposed development on the invertebrate species recorded is that those present in the ditch network to be affected by the in-fill of ditch would be lost. Since important invertebrate species are present, the new ditch network proposed should be 'seeded' with sediment and other ditch habitat to ensure that species are translocated in sufficient quantity. That work should be supervised by a trained entomologist.

INVERTEBRATE SURVEYS OF DRAINAGE DITCHES

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INVERTEBRATE SURVEYS OF DRAINAGE DITCHES

INTRODUCTION

Aquatic invertebrate surveys of drainage ditches were conducted along part of the route of the proposed extension for the main runway at London Ashford Airport (LAA) at Lydd, Dungeness, West Sussex. Sweep-netting for terrestrial invertebrates was also requested along a transect on the proposed development footprint. This report describes the invertebrate survey work undertaken between May and August 2007 and presents the results of the survey.

METHODS

The sample methodology was 3 minute sampling from the ditch-sides using a standard pond net (supplied by EFE/GB Nets, Bodmin, Cornwall) with a 1mm mesh. The net was passed along the sides and over the bed of each channel and through submerged weed and open water. The sorting procedure involved placing the sample in a coarse sieve (1cm) with a finer sieve (500 microns) and white tray placed beneath and pouring ditch water over these several times until all the mud had been washed out and the water collecting in the white tray was clear. The material caught in the coarse sieve was placed into a white tray and sorted out on the bank for large invertebrates. The washed and sieved samples were placed into a tray, clean ditch water was added and the samples were sorted in the field. Vouchers of all taxa were taken and abundances of frequent species were estimated in the field.

Duckweed (*Lemna* spp) caused problems with the sampling in July and August because the weed clogs the pond-net and washes straight through the coarse sieve used. The July samples were preserved and retained in bulk to sort later because of this problem but sorting bulk samples is extremely time consuming and in case time was not immediately available when the report was required, further samples were taken in mid-August. The samples in August were obtained by letting the live invertebrates work their way through the mat of weed in the coarse sieve (1cm mesh) above and drop into the finer sieve below. This method may leave slow moving invertebrates in the weed but should work reasonably well for more active groups such as the water beetles.

Medicinal leech were surveyed for using the 'splash sampling' technique described by Ausden et al (2002). This involves splashing with a net in shallow water for ten minutes or so. Medicinal leeches locate their prey by detecting movement in the water, and swim towards the source of the disturbance in search of it. Most leeches in the surveys reported by Ausden et al (2002) and carried out by the author have appeared within the first 10 minute sampling interval. Ausden et al (ibid) have shown that the optimum months for sampling are in descending order are June, July, May, August, April, etc and consequently the surveys in late May, mid July and mid August fall well within the optimum time of year for sampling. The author has used the splash sampling method successfully elsewhere in a pond on the fringes of Lydd Airport (unpublished report to PB/LAA). Wilkin (1989) also recorded medicinal leech from ponds surrounding the airport and from Mockmill Sewer. Other surveys such as those commissioned by the Romney Marsh Countryside Project (Nixon 1999, McConnell 2000) record medicinal leeches from the airport ponds and surrounding ditches.

A total of ten samples were taken per survey and these were taken at the same locations on each visit. The relationship between the sample sites and the drain numbers as shown on a map provided

by the client is given in Table 1.

Drain Number (from LAA)	Sample Sites
Drain 1	9
Drain 2	8
Drain 3 (Mockmill Sewer)	1 & 2
Drain 4	4
Drain 5 (Mockmill Sewer)	5, 6 & 7
Drain 6	3
Drain 7	10
N = 7	N = 10

Table 1: Relationship between Drain numbers and sample sites

Detailed notes on each sample site were taken. Grid references were taken using a Garmin eTrex global positioning system (GPS). Grid references are provided in Appendices 1 & 2.

Water beetles and medicinal leech were specified as particular target groups by the client. Most aquatic macro-invertebrate species have been identified to species level, the exceptions being Heteroptera and small Odonata nymphs, Diptera larvae, Hydrachnellae (water mites), some more terrestrial invertebrates that were caught in the net and various other groups which are normally not identified to species level in routine aquatic invertebrate surveys. Vouchers of most of uncommon and rare species have been retained by the author (the exception being certain easily identifiable species (such as the great silver water beetle *Hydrophilus piceus*) which were returned to the ditches at the time of sampling).

All survey work took place in good to excellent weather conditions.

RESULTS AND DISCUSSION

SPECIES ASSESSMENT

Details of the aquatic macro-invertebrates recorded in May 2007 and August 2007 are provided in Appendices 1 & 2 respectively. Definitions of the Red Data Book (RDB) and Nationally Scarce/Notable categories used below and elsewhere in this report are defined in Appendix 5.

A total of one RDB1, two RDB2, three RDB3 and twelve Nationally Scarce species were recorded. In addition, further RDB/Nationally Scarce species may be expected from amongst the unidentified *Bagous* weevils which were found in several samples. Because *Bagous* weevils are semi-aquatic and probably because they are also difficult to identify, they are often not included in aquatic invertebrate surveys. The RDB/Nationally Scarce species are listed below:

Odonata

<i>Brachytron pratense</i>	Aeshnidae	Notable
<i>Lestes dryas</i>	Lestidae	Red Data Book 2

Coleoptera

<i>Peltodytes caesius</i>	Haliplidae	Notable B
<i>Graptodytes bilineatus</i>	Dytiscidae	Red Data Book 3
<i>Rhantus suturalis</i>	Dytiscidae	Notable B
<i>Enochrus coarctatus</i>	Hydrophilidae	Notable B

<i>Enochrus nigrinus</i> (= <i>isotae</i>)	Hydrophilidae	Red Data Book 3
<i>Enochrus quadripunctatus</i>	Hydrophilidae	Notable B
<i>Helochares lividus</i>	Hydrophilidae	Notable B
<i>Hydrochus elongatus</i>	Hydrophilidae	Red Data Book 1
<i>Hydrophilus piceus</i>	Hydrophilidae	Red Data Book 3
<i>Limnoxenus niger</i>	Hydrophilidae	Notable A
<i>Helophorus griseus</i>	Helophoridae	Notable B
<i>Hydraena testacea</i>	Hydraenidae	Notable B
<i>Bagous</i> spp	Curculionidae	Red Data Book /Notable
<i>Odacantha melanura</i>	Carabidae	Notable B

Diptera

<i>Odontomyia tigrina</i>	Stratiomyidae	Notable
<i>Odontomyia ornata</i>	Stratiomyidae	Red Data Book 2
<i>Stratiomys singularior</i>	Stratiomyidae	Notable

Details of the ecology, statuses and distribution of the Red Data Book and Nationally Scarce/Notable species are provided in Appendix 4.

In addition to the above species, a number of other species may be considered infrequent. The ruddy hawker (*Sympetrum sanguineum*) was for example, given Notable status although it appears to be a frequent and widespread species in recent years and it's Notable status has been dropped to local. Further rare and uncommon species are likely amongst other material such as the Diptera and possibly other taxonomic groups.

Terrestrial invertebrates were sampled along a transect extending from the present end of the runway to the end of the proposed new extension on the 16th July 2007. A relatively small number of species have been identified to date and these are listed in Appendix 3. None of the terrestrial invertebrates recorded can be considered rare or uncommon.

The list of rare and uncommon species indicates that the ditches are of very high value for aquatic invertebrates. Species richness and diversity is also high further confirming the valuable status of the ditches for invertebrates.

HABITAT ASSESSMENT

The presence of RDB and Nationally Scarce species in the different drains recognised by LAA is provided in Table 2.

Drain Number	RDB/Nationally Scarce species present
Drain 1	<i>Lestes dryas</i> , <i>Bagous</i> sp., <i>Graptodytes bilineatus</i> , <i>Hydraena testacea</i> , <i>Hydrochus elongatus</i> , <i>Hydrophilus piceus</i> , <i>Peltodytes caesius</i>
Drain 2	<i>Lestes dryas</i> , <i>Bagous</i> sp., <i>Enochrus quadripunctatus</i> , <i>Limnoxenus niger</i>
Drain 3 (Mockmill Sewer)	<i>Brachytron pratense</i> , <i>Bagous</i> sp., <i>Enochrus coarctatus</i> , <i>Helochares lividus</i> , <i>Hydrochus elongatus</i> , <i>Limnoxenus niger</i> , <i>Peltodytes caesius</i> , <i>Rhantus suturalis</i> , <i>Odontomyia tigrina</i>
Drain 4	<i>Bagous</i> sp., <i>Helochares lividus</i> , <i>Odacantha</i>

	<i>melanura</i>
Drain 5 (Mockmill Sewer)	<i>Brachytron pratense, Enochrus nigrinus, Helochares lividus, Helophorus griseus, Hydrochus elongatus, Hydrophilus piceus, Limnoxenus niger, Peltodytes caesius, Odontomyia tigrina, Odontomyia ornata, Stratiomys singularior</i>
Drain 6	<i>Limnoxenus niger, Odontomyia ornate</i>
Drain 7	<i>Brachytron pratense, Bagous sp., Helochares lividus, Limnoxenus niger</i>

Table 2: Red Data Book and Nationally Scarce species recorded from individual drains

A number of points can be deduced from Table 2, namely:

- All the drains support Red Data Book and Nationally Scarce species.
- All the drains can be assumed to have good to excellent water quality and provide favourable habitat for demanding/sensitive rare and scarce invertebrates.
- Current airport operations would appear to have a negligible impact on the water quality of the drains (in relationship with aquatic invertebrates)

It is clear however from Appendices 1 & 2 and from Table 2 that all the drains are species-rich and support rare and uncommon species.

COMMENTS ON CURRENT MANAGEMENT

A number of comments on habitat management are provided here which may be relevant to the application. In late May 2007, Drain 1 had clearly been recently slubbed-out (possibly overwinter) and some of the other drains were relatively clear of vegetation indicating that ditch management (presumably on rotation by the Inland Drainage Board) is undertaken. Some other drains were choked with emergent vegetation in places and most of the drains had an almost complete cover of *Lemna* in July and August. The drains are currently immediately surrounded by arable fields and ungrazed semi-improved grassland (with airport lighting), the latter presumably as a safety buffer for the existing runway. Heavily sheep-grazed grassland is also present adjacent to the track to Belgar Farm and Lydd Golf course is also less than 1km from the survey area. The presence of arable farming and a golf course close to the drains may pose some risk to water quality but the results of the survey would suggest low impact at present. As mentioned above, current airport activities have little impact on the drains. No signs of pollution were noted at any of the sample sites.

CONCLUSIONS

The results of an aquatic invertebrate survey of ditches within the footprint of the proposed extension to the main runway at London Ashford Airport, Lydd are presented. Survey work was undertaken in late May, mid July and mid August 2007. The results of the first and last surveys are provided in the report. A total of one RDB1, two RDB2, three RDB3 and twelve Nationally Scarce species were recorded. In addition, further RDB/Nationally Scarce species may be expected from amongst the unidentified *Bagous* weevils which were found in several samples. Surveys for medicinal leech were also conducted but this species was not recorded. Invertebrate species richness in the drains was high as indicated by the relatively long list of species recorded (Appendices 1 & 2).

An assessment based on the presence of Red Data Book and Nationally Scarce in each of the drains was conducted. All seven drains support rare and uncommon species. The drains must be considered of high nature conservation value for invertebrates which must reflect factors such as good water quality and the availability of features of importance to invertebrates that utilise drainage ditches.

The insects sampled on the runway footprint are mainly common species associated with grassland and are not unique to that habitat.

The impact of the proposed development on the invertebrate species recorded is that those present in the ditch network to be affected by the in-fill of ditch would be lost. Since important invertebrate species are present, the new ditch network proposed should be 'seeded' with sediment and other ditch habitat to ensure that species are translocated in sufficient quantity. That work should be supervised by a trained entomologist.

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**APPENDIX 1: AQUATIC MACRO-INVERTEBRATE SPECIES RECORDED ON 30 MAY
2007**

APPENDIX 1: AQUATIC INVERTEBRATES RECORDED FROM LYDD AIRPORT IN MAY 2007										
SAMPLE SITE	1	2	3	4	5	6	7	8	9	10
GRID REFERENCE (TR)	TR6792225	TR6962235	TR6967241	TR6992238	TR07012288	TR07052227	TR07062222	TR07192256	TR07272280	TR07072225
TRICLADIDA										
Polycelis nigra		1		3	1	1	1			
Species indet.				2	1	1	1		1	
ANNELIDA										
Oligochaeta indet.									1	
Erpobdella octoculata										
Erpobdella testacea		1						2		
Glossiphonia complanata										
Helobdella stagnalis										
MOLLUSCA										
Anisus leucostoma	15	40	20	15		1			40	
Bithynia leachii										
Bithynia tentaculata	3	30		15	50	20	30			20
Gyraulus albus					1					
Hippeutis complanata										
Lymnaea palustris s.l.						1	1	3	3	1
Lymnaea stagnalis						1	1			
Oxyloma pfeifferi					2	2				1
Planorbis carinatus/planorbis	2	2	20	15	20	40	40	100	50	20
Radix balthica		10	20	2	3	40	10	50	30	10
Valvata cristata							1	4		1
Musculium lacustre							1	30	5	1
Pisidium sp										
Sphaerium corneum						1	2		1	
CRUSTACEA										
Asellus aquaticus	1			6	10	15	1	50	30	20
Asellus meridianus				1	1			1		1
Asellus sp								2		
Crangonyx pseudogracilis	1	4	4	4	10	9	9	50	5	20
Eurycerus lamellatus	4			7		3	4			1
Simocephalus vetulus				2	1	1				
Copepoda		10	50	30		5	15		5	
Ostracoda	5	14	30	30	15	15	10	50	30	4
ARACHNIDA										
Argyroneta aquatica										
Hydrachnellae		2	1	3	1	5	2			
EPHEMEROPTERA										
Caenis robusta	2			3		5	4			2
Cloeon dipterum	3	1				1				
ORTHOPTERA										
Conocephalus sp (nymphs)			1				1	1		
ODONATA										
Coenagrionidae indet.		1								1
Ischnura elegans	1									
Lestes dryas								6	1	
Aeshnidae indet.	1	4	1	2	1	1	1	12	4	
Brachytron pratense										
Sympetrum sanguineum/striolatum	2	1	11	2	6	3		37	2	
TRICHOPTERA										
Athripsodes aterrimus						2				
Oecetis furva						2				1
Triaenodes bicolor										
HETEROPTERA										
Corixa sp (nymphs)				2			1			
Corixidae (nymphs)	1	2	10	2			4			1
Gerris lacustris		1								
Gerris sp	4	5	5	1						
Hydrometra stagnorum										
Ilyocoris cimicoides	20	5			4	2	12			1
Microvelia reticulata	1									
Nepa cinerea			1							
Notonecta glauca										
Notonecta sp (nymphs)	15	8	10	4	9	10	5	15	10	5
Plea leachii	3	10	6	10	7	3	8		10	1
Sigara dorsalis										
Sigara falleni										
Sigara sp (female)							1			
COLEOPTERA										
Gyrinus substriatus			1		1					
Haliplus immaculatus	2									
Haliplus lineatocollis		2	1	2	2				1	
Haliplus ruficollis			3				1			
Haliplus ruficollis group (female)	1	1					1		1	
Peltodytes caesius										
Noterus clavicornis			6	4	5	1	2		2	1
Agabus bipustulatus			1							
Agabus didymus						1			2	
Agabus nebulosus						1				
Agabus sturmii										
Copelatus haemorrhoidalis								1		
Dytiscus sp (larvae)								1	3	
Hydroporus discretus										
Hydroporus memnonius									1	
Hydroporus palustris			1							
Hydroporus planus					1		3			
Hydroporus pubescens		1								
Hygrotus inaequalis	1		4		2					1
Graptodytes bilineatus									6	
Laccophilus minutus					1					1
Rhantus suturalis										
Anacena globulus										
Anacena limbata	1			2	1				4	
Cymbiodyta marginella									6	1

Enochrus nigrinus (= isotae)						1				
Enochrus testaceus		1		3	3	2				4
Helochares lividus					1	1	1		1	1
Helophorus brevipalpis									1	
Helophorus griseus										
Hydraena testacea										
Hydrobius fuscipes								5	7	
Hydrochus elongatus	6	3			2	1			1	
Hydrophilus piceus (larvae)									1	
Laccobius bipunctatus				1		1				2
Laccobius biguttatus	2									
Limnoxenus niger								6		1
Ochthebius minimus										
Dryops luridus										
Dryops sp (females)				2				1		
Bagous spp	2			2				3	2	2
Heterocerus fossor										1
Odacantha melanura				1						
Anisosticta 19-punctata		1		1	2	2				1
DIPTERA										
Tipulidae (larvae)								1		
Limoniidae (larvae)										1
Chironomidae (larvae)		1	20	1		4	4	4	4	
Ceratopogonidae (larvae)						1		1		
Odontomyia tigrina (larvae)		1			2					
Odontomyia ornata (larvae)	1									
Odontomyia sp (larvae)						2				
Oplodontha viridula (larvae)					1			4	2	1
Stratiomys singularior (larvae)										
Ephydriidae (larvae/pupae)								3		1
PISCES										
Pungitius pungitius	1									
AMPHIBIA										
Triturus sp (efts)		1	2			1	1	1	1	
REPTILIA										
Lacerta viviparus								1		

APPENDIX 2: AQUATIC MACRO-INVERTEBRATE SPECIES RECORDED ON 15 AUGUST 2007

APPENDIX 2: AQUATIC INVERTEBRATES RECORDED FROM LYDD AIRPORT IN AUGUST 2007

SAMPLE SITE	1	2	3	4	5	6	7	8	9	10
GRID REFERENCE (TR)	TR6792225	TR6962235	TR6967241	TR6992238	TR07012288	TR07052227	TR07062222	TR07192256	TR07272280	TR07072225
TRICLADIDA										
Polycelis nigra				1	1	9	3	2	5	2
Species indet.	20									
ANNELIDA										
Oligochaeta indet.				2		2	1			3
Erpobdella octoculata					8	20	2	10	3	3
Erpobdella testacea	2	9				4		1		
Glossiphonia complanata	2	1		1		3	5			2
Helobdella stagnalis				1	3	3				
Theromyzon tessulatum		3		1	3	6	2			
MOLLUSCA										
Anisus leucostoma	50	3							30	
Bithynia leachii	8				1	4				
Bithynia tentaculata		1		3	15	7	6		30	3
Gyraulus albus										
Hippeutis complanata	2			1						
Lymnaea palustris s.l.	1	2	1		7	9	1	1		4
Lymnaea stagnalis	1									
Oxyloma pfeifferi	2	1				1				
Planorbis carinatus/planorbis	100	20			40	100	30	30	100	100
Radix balthica	20	1	1	2	50	150	30	1	100	30
Valvata cristata				1				2		
Musculium lacustre									4	
Pisidium sp									2	
Sphaerium comeum	5	30		1	6		2			
CRUSTACEA										
Asellus aquaticus	50	50		50	50	100	50	5	100	100
Asellus meridianus	3									1
Asellus sp										
Crangonyx pseudogracilis	9	50		50	4	100	1	100	10	80
Eurycerus lamellatus										
Simocephalus vetulus										1
Ostracoda						1				
ARACHNIDA										
Argyroneta aquatica						1		1	1	
Hydrachnellae		1				2			1	
EPHEMEROPTERA										
Caenis horaria	1									
Caenis robusta					1		1			
Cloeon dipterum	20	1				2				
ORTHOPTERA										
Conocephalus sp (nymphs)									1	
ODONATA										
Coenagrionidae indet.	30									
Enallagma cyathigerum	12								2	
Ischnura elegans	2									
Lestes dryas										
Aeshnidae indet.	2									
Brachytron pratense	1				1					1
Sympetrum sanguineum/striolatum					1	4	1			2
TRICHOPTERA										
Athripsodes aterrimus	1									
Athripsodes sp						1				
Oecetis furva										
Trietodes bicolor	2									
HETEROPTERA										
Corixa sp (nymphs)								1	3	
Corixidae (nymphs)										
Gerris lacustris										
Gerris sp (nymphs)	1			1					2	
Hydrometra stagnorum										
Ilyocoris cimicoides		6	3	3		4	3	3		1
Microvelia reticulata	10				3	1				
Nepa cinerea	1					1				
Notonecta glauca	2			1				5	5	
Notonecta sp (nymphs)										
Plea leachii	50	4	1	2	2	4	15	7	10	3
Sigara dorsalis									2	
Sigara falleni									1	
Sigara sp (female)										
COLEOPTERA										
Gyrinus substriatus									4	
Halipus sp (larvae)					1		1		1	2
Halipus immaculatus				1		1				
Halipus lineatocollis	1	1		8	2	2	3	21		
Halipus ruficollis					1	2	3	1		1
Halipus ruficollis group (female)				2	1	1	2			
Peltodytes caesus		1					4		1	
Noterus clavicornis	12	100		22	80	33	100	16	1	10
Agabus bipustulatus	1					1				
Agabus didymus										
Agabus nebulosus										
Agabus sturmii		17								
Copelatus haemorrhoidalis										
Hydroporus discretus					1					
Hydroporus memnonius										
Hydroporus palustris							1			
Hydroporus planus				1						
Hydroporus pubescens										
Hygrotus inaequalis		1				2				
Hyphydus ovatus				1		1				
Graptodytes bilineatus									9	
Graptodytes pictus	3	4		4	6	8	3			
Laccophilus minutus		12		1	10	16	4	4		
Rhantus suturalis		3								
Anacena globulus					1					
Anacena limbata	2	23		1		3	1		5	1
Coelostoma orbiculare	1	1				1				
Cymbiodyta marginella								2	2	
Enochrus coarctatus	1									
Enochrus nigratus (=isotae)										
Enochrus quadripunctatus								1		
Enochrus testaceus					1	1		2	2	1
Helochaetes lividus		1		1	2	13	1			
Helophorus brevipalpis										
Helophorus griseus					1					
Helophorus minutus						1				
Hydraena testacea									2	
Hydrobius fuscipes		1								
Hydrochus elongatus										
Hydrophilus piceus (larvae)										
Hydrophilus piceus (adult)							1			
Laccobius bipunctatus						2		1		1
Laccobius biguttatus	10	2		1			1			2
Laccobius minutus							1			
Limnebius truncatulus										1
Limnoxenus niger	1	2	1		2	5	5	1		1
Ochthebius minimus	1	1		1	3	15	1			
Dryops luridus		1			5	6				1
Dryops sp (females)		1						1	1	
Bagous spp	1									
Heteroceris fossor										
Odacantha melanura										
Anisosticta 19-punctata										
Teimatophilus caricis										1
LEPIDOPTERA										
Cataglyphis lemnae		2								
DIPTERA										
Tipulidae (larvae)										
Limoniidae (larvae)										
Ptychoptera sp (larvae)				1	2					1
Ceratopogonidae (larvae)									1	
Chironomidae (larvae)		1					2	1		1
Odontomyia tigrina (larvae)										
Odontomyia ornata (larvae)			1		1	1				
Odontomyia sp (larvae)										
Oplodontha viridula (larvae)										
Stratiomys singularior (larvae)							2			
Sciomyzidae (larvae)									1	
Ephydriidae (larvae/pupae)										1
PISCES										
Gasterosteus aculeatus	1					1			3	

APPENDIX 3: TERRESTRIAL INVERTEBRATES RECORDED ALONG A TRANSECT ON THE AIRPORT EXTENSION ON 16 JULY 2007

<i>Helix aspersa</i>	Garden snail
<i>Conocephalus</i> sp (nymph)	Conehead
<i>Enallagma cyathigerum</i>	Common blue damselfly
<i>Ischnura elegans</i>	Blue-tailed damselfly
<i>Lestes sponsa</i> (adult male)	Emerald damselfly
<i>Sympetrum sanguineum</i>	Ruddy darter
<i>Philanus spumarius</i>	Spittlebug
<i>Heterogaster urticae</i>	Nettle groundbug
<i>Leptopterna dolabrata</i>	
<i>Anisosticta 19-punctata</i>	Water ladybird
<i>Coccinella 7-punctata</i>	7-spot ladybird
<i>Tytthaspis 16-punctata</i>	16-spot ladybird
<i>Cantharis fusca</i>	
<i>Malachius bipustulatus</i>	
<i>Inachis io</i>	Peacock
<i>Maniola jurtina</i>	Meadow brown
<i>Melanargia galathea</i>	Marbled white
<i>Pyronia tithonus</i>	Gatekeeper
<i>Thymelicus sylvestris</i>	Small skipper
<i>Tyria jacobaeae</i>	Cinnabar
<i>Symplecta stictica</i>	
<i>Chloromyia formosa</i>	
<i>Empis livida</i>	
<i>Lonchoptera lutea</i>	
<i>Melanostoma mellinum</i>	
<i>Platycheirus angustatus</i>	
<i>Platycheirus clypeatus</i>	
<i>Sphaerophoria scripta</i>	
<i>Syrirta pipiens</i>	
<i>Urophora cardui</i>	
<i>Geomyza tripunctata</i>	
<i>Asteia concinna</i>	
<i>Thaumatomyia notata</i>	
<i>Scaptomyza pallida</i>	
<i>Scatella tenuicosta</i>	
<i>Scathophaga stercoraria</i>	Yellow dung-fly
<i>Bombus pascuorum</i>	Common carder bee

APPENDIX 4: DETAILS OF THE ECOLOGY, STATUS AND DISTRIBUTION OF THE RED DATA BOOK AND NATIONALLY SCARCE SPECIES RECORDED

ODONATA

Brachytron pratense Aeshnidae Notable

The hairy dragonfly breeds in mesotrophic ponds, lakes mature gravel pits, canals, ditches and marshy fens where there is plenty of tall emergent vegetation amongst the margins of which males fly low searching for ovipositing females. *B. pratense* may also breed occasionally in slow-moving rivers. It is most commonly found in Britain on the coastal levels and grazing marshes of Somerset, Suffolk, Kent and Norfolk. This species declined considerably in the post-war period, as a result of changes in agricultural land use from grassland to arable. These changes resulted in an increase in pollution, the eutrophication of many wetland sites and, additionally, in the case of grazing marshes, the implementation of adverse dyke management schemes, including the lowering of the water table. Despite these factors, *B. pratense* appears to have increased in recent years in unpolluted dykes in some areas at least.

Lestes dryas Lestidae Red Data Book 2

The scarce emerald damselfly breeds in shallow ponds and lakes, overgrown canals and ditches and temporary pools which are generally neutral to slightly alkaline and where there is an abundance of tall emergent plants such as common club-rush, rushes, sedges and horsetails. In coastal grazing marshes, it can tolerate brackish conditions and may be found where sea club-rush predominates,

This species was always very local in England and was confined to eastern counties from East Sussex to Yorkshire. During the 1950s and 1960s, *L. dryas* was lost from many of its known sites in England and there were no records at all for a period in the 1970s and it was feared extinct. It was rediscovered in Essex in 1983. It had probably been overlooked and since then it has been found at other sites in Essex, Kent and Norfolk. The causes of the contraction of its breeding range in England were due to agricultural improvements which resulted in lower water tables and the destruction of marshy habitat.

The *Lestes* larvae from Lydd should be examined further because at least one additional *Lestes* species (*L. viridis*) has recently been added to the British fauna as a breeding species from coastal levels in North Kent and a fourth species (*L. barbatus*) is also mentioned as a migrant/vagrant which could conceivably breed here. Continental literature would be required to check the nymphs of these species.

COLEOPTERA

Peltodytes caesius Haliplidae Notable B

P. caesius is confined to lowland slow-moving drains and ponds with permanent water, often brackish, always base-rich, and usually with a soft, muddy bottom. Typically, these lie in areas of old grazing fen on coastal marsh systems, though it does occur well inland in Oxfordshire. The larva and adults feed on filamentous algae, and possibly also on stoneworts. Oviposition occurs in the spring on submerged vegetation. Fully grown larvae and teneral adults occur later in the summer, and it is likely that this species overwinters as adults out of the water.

This species has been recorded from 63 hectads in England and Wales since 1950, and 35 since 1990, with old records for Lancashire, around the Wash and inland in southern England. This species was found in one sample of the British Countryside Survey in 1990. It was noted as one of three species to disappear from the Wash drainage system. It is in decline in Denmark, possibly because of pollution, and it appears in many Red Lists in Europe.

The decline in this species must be associated with habitat loss, but it would also appear to be

sensitive to changes in water quality and land use, possibly the conversion of grazing fen to arable land, which results in a reduction in the number of dykes.

Graptodytes bilineatus Dytiscidae Red Data Book 3

The typical habitat of *G. bilineatus* in Britain is reedswamps with some moss, receiving brackish or otherwise base-rich water. These include one of the Peterborough clay pits receiving brackish water. In Ireland, it has been classified as one of the "moss edge dwellers" associated with turloughs. Flight capacity is unknown but the species occurs in sites of modern origin, such as excavations dating from the Second World War and isolated clay pits.

This species has been recorded from 18 hectads in England, and one in Wales since 195, and seven since 1990. This species has been recorded as possibly extinct in Somerset, but it has recently been recorded from West Gloucestershire. The northernmost site, on the Humber shore, has apparently disappeared.

Most forms of coastal development are deleterious for this species, in particular new coastal defence systems. The clay pit at Peterborough is threatened by development.

Rhantus suturalis Dytiscidae Notable B

R. suturalis occurs in exposed lowland ponds and ditches amongst vegetation. It is unusual among *Rhantus* spp. in that it overwinters as adults in the water rather than away from it. The development time of 33 days at about 20°C from egg laying to adult emergence is short compared to 52 days for the common *Agabus bipustulatus* under similar conditions. This species is often attracted to light at night and readily takes to flight.

This species has been recorded from 136 hectads in England and four in Wales since 1950. It has been recorded from 89 English and two Welsh hectads since 1990. Many isolated records, including two for the only Scottish site, probably represent the full extent of range of a dispersive species.

This species is not considered to be under threat.

Enochrus coarctatus Hydrophilidae Notable B

This species was originally accorded Scarce B status, but, with over 200 ten km records from 1950 onwards, widely distributed in England, Scotland and Wales, this species cannot be considered as having a scarcity status (Foster in prep.).

Enochrus nigritus (= *isotae*) Hydrophilidae Red Data Book 3

E. nigritus occurs in mesotrophic and base-rich fens in lowlands. The life history details of *Enochrus* species appear to vary considerably from one species to another and the life history of individual British species has not been described. An egg-case is produced, sometimes under water, and larval development may last between one and two months. Adults feed on algae and decaying plants whereas the larvae are predaceous.

This species has been detected in 20 hectads, 14 of them since 1990. It would appear that this species has been lost from the Surrey heaths.

The major risk appears to be posed by excessive abstraction of water in the Breckland adversely affecting the hydrology. Loss of wet heathland habitats will also have contributed to its decline.

Enochrus quadripunctatus Hydrophilidae Notable B

E. quadripunctatus occurs in base-rich lowland fens and in well-vegetated parts of shallow pools on an otherwise exposed substratum. This species is known to fly and has been caught by the use of a

Robinson light trap. The life history details of *Enochrus* species appear to vary considerably from one species to another and the life history of individual British species has not been described. An egg-case is produced, sometimes under water, and larval development may last between one and two months. Adults feed on algae and decaying plants whereas the larvae are predaceous.

No count of hectads for 1950 onwards is possible for *E. quadripunctatus*, but it has been recorded from twelve hectads in England from 1990 onwards, plus one in Wales.

Although this species can occur in man-made habitats, it is principally recorded from relic fenland sites. The latter include many sites on the Breckland, the hydrology of which is under threat from excessive abstraction of groundwater.

Helochares lividus Hydrophilidae Notable B

H. lividus has been recorded from 174 hectads from 1990 onwards and it was found in five samples of the British Countryside Survey in 1990. These data indicate the need for this species to lose its Nationally Scarce (Notable) status.

Hydrochus elongatus Hydrophilidae Red Data Book 1

This species occurs in shallow, well vegetated, still water, often in reedbeds and other areas with rich emergent vegetation over clay, in low-lying areas. *Hydrochus* species are aquatic as adults and larvae, but do not swim. They are slow in their movements, and feign death when disturbed. Adults feed on algae but the larval diet is unknown.

There are records for 21 hectads in England from 1950 onwards and twelve since 1990. This species has contracted in range, owing to loss of sites in Scotland, north-east England and London. There are also no modern records for Broadland. Its occurrence includes some man-made habitats unlike its sibling species, which is almost entirely associated with ancient fenland.

Because of the possibility of further *Hydrochus* species being present at Lydd, all the voucher material collected in 2007 should be examined more closely and dissections of the males made to confirm the determination. The present identification is made on quick examination of the external features only.

Loss of fenland habitats, particularly reedbeds, will be detrimental to this species.

Hydrophilus piceus Hydrophilidae Red Data Book 3

In Britain, the great silver water beetle *H. piceus* is largely confined to drains in coastal levels. Those specially favoured are choked with vegetation such as ivy-leaved duckweed (*Lemna trisulca*) and fringed by common reed (*Phragmites australis*). *H. piceus* is a summer breeder (larvae reported from mid-May to the beginning of August in the Netherlands). The larvae feed on water snails, and the presence of *Hydrophilus* may be implied from the characteristic biting marks to be seen on empty snail shells. The life-cycle and construction of the egg cocoon have been described (see references in Foster in prep.). In the Somerset Levels, adults are found mainly in rhynes that have been recently cleared, whereas larvae occur in ditches thickly choked with vegetation. Adults have often been caught in light traps, and may occasionally be seen below street lamps, or on greenhouse roofs.

This species has been recorded from a total of 68 hectads in Britain, 42 of them in England from 1950 onwards, plus three in Wales. The equivalent counts since 1990 are 17 and three. It appears to have contracted in range in that there are no modern records for the English Midlands, the Cambridgeshire Fens, Glamorgan and the immediate vicinity of London. It is, however, well established in the Somerset Levels, the Broads, and coastal levels in Kent and Sussex.

Loss of traditional grazing fen may result in loss of this species, particularly if drains are destroyed or become overgrown. Drainage of the Cambridgeshire Fens and the London Marshes in the 19th Century must have resulted in the greatest reductions in this species in Britain, indicating the potential for further decline.

Limnoxenus niger

Hydrophilidae

Notable A

L. niger occupies a range of exposed lowland fen habitats including peaty areas with rich vegetation and exposed clay in brackish ponds. The eggs are laid in a cocoon secured to foliage below the water's surface, but receiving an air supply through a 6 cm-long ribbon.

This species has been recorded from 38 hectads in England and 2 in Wales since 1950 and from 22 since 1990. It has declined in the north of its range, and it was identified as one of three species that had apparently become extinct in the Wash drainage system following the loss of grazing fen.

Arabilisation of former grazing fens most probably explains the decline of this species in the north, resulting in its largely being confined to coastal marshes and to the Somerset Levels.

Helophorus griseus

Helophoridae

Notable A

H. griseus is found in exposed, temporary, clayey pools in lowlands. In the northern part of its range, at Teesmouth in the east and Flint in the west, it occupies saltmarshes. It is an active flier, and this perhaps explains the only confirmed Scottish record, for a single specimen in a Borders stream at 300 metres altitude, and probably also the specimen found in a squirrel's drey in County Durham.

It is not possible to provide a complete count of hectad records from 1950 onwards, but it has been recorded from 36 English and two Welsh hectads from 1990 onwards. This species was found in one sample of the British Countryside Survey in 1990. It is not under threat, but is sufficiently infrequent in occurrence to justify Nationally Scarce status.

No threats to this species can easily be identified.

Hydraena testacea

Hydraenidae

Notable B

This species is found in stagnant water in association with a well-developed marginal vegetation line, but it also occurs in slow-moving water in canals and streams, being found in the moist zone just above the main water line. The seasonal occurrence of adults is strongly bimodal, with peaks in June and September.

This species has been recorded from 108 hectads in England, four in Wales and three in Scotland from 1950 onwards, the equivalent values since 1990 being 62, one and one. *H. testacea* occurred at one of the 614 sites sampled for RIVPACS III. It is known from Neolithic, Iron Age and post-Iron Age deposits in the Somerset Levels, where it is still common.

Despite some evidence of contraction in range, this species is not under threat.

Bagous spp

Curculionidae

Red Data Book/Notable

At least two and probably more species of *Bagous* weevils are represented in the material from Lydd Airport. All species are semi-aquatic and are well adapted for life in freshwater, particularly in having well developed plastron respiration. Virtually all are rare, with three, possibly four, species are considered to be or may be extinct. They appear to be relict species, survivals from the cooler periods of interglacials and they have been adversely affected by human activities particularly drainage and pollution. *Bagous* in common with the other weevils sometimes found in ditches, ponds and other waterbodies are not regarded as truly aquatic and therefore are often not included in aquatic invertebrate surveys. They are also difficult to identify and some are

distinguishable on small and comparative characters. Many of the records in the older British literature are inaccurate and there has been confusion in nomenclature. More time would be required to examine the vouchers taken in order to determine the species present and they may need to be submitted to an expert for either determination or confirmation.

Odacantha melanura

Carabidae

Notable B

This distinctive ground beetle was identified in one of the Lydd Airport samples even though it is not aquatic. It occurs in fens, marshes, broads, grazing levels and the margins of standing water. It is predominantly associated with reed in reed-beds, where it can be found under the outer, dead sheathing leaves of the flowering stems. It has also been found on bulrushes, particularly on the dead stems. Hyman and Parsons (1992) provide more information on its ecology and distribution.

This species is widespread but local in southern and eastern England.

DIPTERA

Odontomyia tigrina

Stratiomyidae

Notable

This soldierfly is a distinctly local species, being confined mainly to the southern half of England but also occurring in South Wales and extending northwards as a rarity into Scotland. It is found at the margins of ponds and ditches particularly those with a rich flora of both emergent and floating vegetation. The adults are most often found feeding at flowers or sitting on leaves at their breeding sites. The larvae tend to be more elusive than the adults. In the Gwent Levels, the larvae were found to prefer narrow ditches with a dense growth of emergent plants and to be least frequent in wide, open ditches.

Odontomyia ornata

Stratiomyidae

Red Data Book 2

This soldierfly has two strongholds in the Somerset Levels and the Gwent Levels, where it is widespread and by no means uncommon. There are also sizeable populations on the freshwater parts of the coastal levels in East Sussex. The species has been recorded sparsely as adults or larvae in similar habitats in West Sussex, Kent, Essex, Suffolk and Norfolk. The adults may be found on umbellifers such as hemlock water-dropwort. However, it is easier to find the larvae, which are locally common in ditches and on grazing levels. They are free-floating or more often crawling amongst aquatic vegetation near the surface, especially amongst ivy-leaved duckweed and frog-bit. The preferred ditches are wide (>1m) and have a rich and structurally diverse cover of vegetation floating near the surface, rather than those which are choked with emergent plants. Ditches cleared in the previous year may also support larvae, providing that some floating or emergent vegetation is present. Almost certainly the key to its survival is the presence of extensive areas with ditches that are cleaned out on a cycle of about five years.

Stratiomys singularior

Stratiomyidae

Notable

In Britain, *Stratiomys singularior* is mainly found in brackish coastal marshes where it occurs along ditches with such plants as sea club-rush although it is not so strongly restricted on the Continent or in Ireland. Its coastal distribution is southern, extending northwards to the Humber and south Wales. Where it breeds inland, it is usually possible to detect some brackish influence in other elements of the flora and fauna, for example, in the Peterborough Brick Pits which have very slightly brackish pools. The larvae can be frequent in ditches and ponds where they live in the shallow water at the margins and among dense floating vegetation. The adults visit flower such as hogweed.

APPENDIX 5: INVERTEBRATE STATUS CATEGORIES

For the purposes of evaluating invertebrate faunas and priorities for conservation action, invertebrates are attributed various rarity status categories, the meanings of which are given below. Criteria for the selection of species into Red Data Book categories one to five follow Shirt (1987), with minor modifications derived from Hyman & Parsons (1992) and Parsons (1993).

Categories RDBI (Indeterminate) and RDBK (Insufficiently Known) are based on the criteria used by Wells, Pyle and Collins (1983).

Criteria for the selection of Nationally Scarce species follow Eversham (1983) and Ball (1986).

Red Data Book Category 1. RDB1 - ENDANGERED

Definition. Taxa in danger of extinction in Great Britain and whose survival is unlikely if the causal factors continue operating.

Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct.

Criteria. Species, which are known or believed, to occur as only a single population within one 10km square of the National Grid.

Species, which only occur in habitats known to be especially vulnerable.

Species, which have shown a rapid and continuous decline over the last twenty years and are now estimated to exist in five or fewer 10km squares.

Species which are possibly extinct but have been recorded this century but which if rediscovered would need protection.

Red Data Book Category 2. RDB2 - VULNERABLE

Definition. Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating.

Included are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that

have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Criteria. Species declining throughout their range.

Species in vulnerable habitats.

Red Data Book Category 3. RDB3 - RARE

Definition. Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk.

These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

Criteria. Species, which are estimated to exist in only 15 or fewer 10km, squares. This criterion may be relaxed where populations are likely to exist in over 15 10km squares but occupy small areas of especially vulnerable habitat.

Red Data Book Category 4. RDB4 - OUT OF DANGER

Definition. Taxa formerly meeting the criteria of one of the aforementioned categories but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival in Great Britain has been removed.

Red Data Book Category 5. RDB5 - ENDEMIC

Definition. Taxa, which are not known to occur naturally outside Great Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all.

There are few truly endemic species in Great Britain. Most that have been identified are in fairly obscure groups, which are relatively poorly known, and the species may well eventually be discovered elsewhere in Europe.

Red Data Book Appendix. RDBApp. - EXTINCT

Definition. Taxa which formerly had breeding populations in Great Britain but which are now believed to have died out. (Taxa not recorded since 1900)

Red Data Book Category I. RDB I - INDETERMINATE

Definition. Taxa considered being Endangered, Vulnerable or Rare, but where

there is not enough information to say which of the three categories (RDB1 to 3) is appropriate.

Red Data Book Category K. RDBK - INSUFFICIENTLY KNOWN

Definition. Taxa that are suspected, but not definitely known, to belong to any of the aforementioned categories, because of lack of information.

Criteria. Taxa recently discovered or recognised in Great Britain, which may prove to be more widespread in the future (although some recent discoveries may be placed in other categories if the group to which they belong is thought not to be under- recorded).

Taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult or unstable groups.

Species with very few or perhaps only a single known locality, inhabiting inaccessible or infrequently sampled but widespread habitats, such as some northern moorland species, species associated with some agricultural situations and species which are adult only during the winter.

Species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Provisional Red Data Book. pRDB

Definition. The prefix 'p' before any Red Data Book category implies that the grading is provisional. In the majority of cases this means that the species' status has been reconsidered and changed in a Species Group Review produced subsequent to the publication of the relevant Red Data Book.

(continued) The statuses so given are described as provisional, pending the publication of a future edition of that Red Data Book. These statuses are however, based upon a greater amount of evidence than was available for the original Red Data Book and therefore are more likely to be a true representation of the species' actual status.

The prefix 'p' is also used for RDB status categories in groups where a Red Data Book has not yet been produced but is in preparation, or is used for species in groups covered by the original Red Data Book, where it is considered that there is evidence that the original grading was incorrect or that there has been a genuine change in status of the taxon.

Nationally Scarce (Notable) Species

The term 'Nationally Scarce' was adopted and replaced the term 'Notable' during the compilation of the Guidelines for the Selection of Biological SSSIs. The two terms are thus

interchangeable but 'Nationally Scarce' is preferable.

Ball (1986) discusses the allocation of species to Nationally Scarce categories:

"The Invertebrate Site Register project includes the preparation of National Species Reviews which seek to identify and document uncommon species. The criteria used have been based directly on those evolved by botanists and two levels of 'National Notability' has been used. These are Notable A, for species known to occur in 30 or less 10km squares of the National Grid and Notable B for those known from 100 or less squares.

Although this system can be used directly with well-recorded groups like Dragonflies, Butterflies and Grasshoppers; when dealing with many other groups of insects, the level of recording is not sufficient to apply the criteria rigorously. A combination of three alternative approaches has been employed:

1. *The approximate number of squares in which a species may occur can be estimated by looking at the number it has been recorded from as a proportion of the total in which the whole group (e.g. its family) has been recorded.*

2. *Coarser measurements such as the number of vice-counties in which a species has occurred can be used (7 or less for Notable A, 20 or less for Notable B).*

3. *Experts can be asked to use their field experience to judge the status of species in their particular specialist group against others with a better-established status. By consulting as many people as possible and taking a consensus of their views, geographical and personal biases can be minimized.*

In some groups in which widespread interest and recording is a rather recent phenomenon, no attempt has yet been made to separate Notable A and Notable B species, and all Nationally Notable species are simply graded 'Notable'."

Nationally Scarce (Notable). N - NOTABLE

Definition. Species, which are estimated to occur in 16 to 100 10km, squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not sensible to be so exact.

Nationally Scarce (Notable) Category A. Na - NOTABLE A

Definition. Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well recorded groups, within 7 or fewer vice-counties.

Nationally Scarce (Notable) Category B. Nb - NOTABLE B

Definition. Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less well recorded groups, between 8 and 20 vice-counties.

Regionally Scarce (Notable). Nr - NOTABLE

Definition. Species which are considered to occur in 5 or less 10km squares in an area equivalent in size to a region of the old Nature Conservancy Council or larger, approximately one eighth the total area of England.

Such statuses were worked out during the compilation of the Invertebrate Site Registers. They cover various groups in Scotland, in northern England as a whole, in northeast and northwest England, in vice-county Yorkshire and in the east Midlands and East Anglia. They were worked out by local entomologists.

LOCAL

Definition. The term is not rigidly defined, but loosely means species confined to a particular habitat type (usually associated with better quality examples of that habitat), a particular geographic area, or species that are too widespread to warrant Nationally Scarce (Notable) status but are nevertheless infrequently encountered.

COMMON

Definition. Common or very widespread species, frequently recorded.

SYANTHROPIC SPECIES

Definition. Species dependent upon man, his buildings, livestock or crops.

UNKNOWN

Definition. Species where no status has been attributed. There may be confusion over the species' taxonomy, it may belong to a poorly recorded group or may occur in an infrequently sampled habitat. As a species is entered into the Invertebrate Site Register or RECORDER, the status automatically defaults to 'Unknown'. Certain common or local species may therefore occasionally appear in this category if there has been no necessity to use the species record.