

**KNEPP ESTATE
REPEAT BOTANICAL SURVEY
OF RIVER ADUR AND LANCING BROOK**

***DOLPHIN ECOLOGICAL SURVEYS
2007***

**Dolphin Ecological Surveys
6a Northfield Cottages
Isfield
Uckfield
East Sussex
TN22 5XN**

**01825 750645
eco.dolphin@virgin.net**

INTRODUCTION

The original botanical survey of parts of the River Adur and Lancing Brook that run through the Knepp Estate in West Sussex was carried out on 17th August 2005 by Kate Ryland of Dolphin Ecological Surveys. An early season repeat of this survey was undertaken on 24th and 25th May 2007 using the same methodology, though more time was available for the field survey in 2007.

The survey covered aquatic plants found within the channel, marginal species and plants growing on the banks of the watercourses up to the change of slope at the top of the banks. Aquatic vegetation was sampled at regular intervals along the watercourses using a grapnel. A table of the results of the 2005 and 2007 surveys shows the vascular plant species observed in each distinct section of the watercourses with a measure of their abundance given on the DAFOR scale (D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare, L = Locally).

RESULTS

Submerged aquatic vegetation was almost absent from the stretches of river surveyed in 2007, but this is not unexpected at the beginning of the field season since many aquatics do not become evident until later in the summer.

There was much less duckweed present in 2007 than was observed during the 2005 survey. A marked difference between 2005 and 2007 was the significant reduction in the amount of duckweed in 2007, which may be a result of both seasonal factors and the much higher water levels in 2007 compared with the survey period in 2005. A greater volume of water in the channel (although much of the river was still very sluggish or static) combined with less extreme eutrophic conditions and cooler water temperatures than those in 2005 are likely to account for this observed difference.

As predicted in 2005, carrying out a survey earlier in the season has produced additional botanical records for all four stretches of watercourse. These additional records tend to consist of a small number of early flowering wetland species (such as cuckoo-flower and ragged robin), identifiable sedges (false fox-sedge, greater pond-sedge) grasses and common herbaceous plants from the riverbanks.

In summary the likely reasons for differences in the species lists for each section of the river between 2005 and 2007, especially the increased number of species recorded in 2007, are:

- Seasonal effects, including overall lower vegetation height on the riverbanks in spring allowing more ground level species to be seen.
- Recorder error/omissions from 2005.
- More time available for survey in 2007.
- Real differences caused by habitat change. This applies particularly to section 4 where poplar plantation has been felled so there is much more light reaching the watercourse.
- Higher water levels and lower water temperatures in 2007.
- Some slight natural changes in bankside and marginal communities over a two-year period.
- The DAFOR scale is subjective and not especially accurate, though sufficient for the purpose of giving a picture of riparian plant communities present. However, it does not allow direct, accurate comparison of species abundance over time.

Section 1 River Adur, Shipley Windmill to Capps Bridge (TQ144217 to TQ148217)

There was much less duckweed in this section in 2007 and the only other aquatic plant recorded was yellow water-lily.

The centre of the channel was clear of emergent vegetation for most of its length, in contrast to 2005. A continuous fringe of marginal plants was present, dominated by reed canary-grass, bulrush and branched bur-reed. It appears that some of the channel vegetation may have been mechanically cleared between 2005 and 2007.

The riverbanks are steep in this section and access to the water's edge is poor. The coarse vegetation on the banks is dominated by bramble and nettle.

Section 2 River Adur, Capps Bridge to A24 (TQ148217 to TQ164207)

There was more water in this section of the river in 2007 than in 2005, but nevertheless areas of low/no flow were present and the water was scummy in places between Tenchford and Pound Farm bridges and alga was locally frequent in the water upstream of the small weir and near the confluence with Lancing Brook.

Downstream of the main weir, near the A24, there was little water in the channel and emergent vegetation was dense, dominated by reed canary-grass, branched bur-reed and common club-rush.

Aquatic vegetation was very scarce, but some fragments of shining pondweed were retrieved and yellow water-lily was quite frequent. Fringed water-lily was observed in small quantities near the A24 in a similar location to 2005. Some common duckweed was present towards Capps Bridge but much less was observed in the downstream areas.

Great yellow-cress was recorded in the same area as in 2005 and also appears to have spread downstream since the first survey and was observed in small quantities as far downstream as the footpath bridge.

Section 3 Lancing Brook, Hammer Pond (TQ148208 to TQ144208)

Little change was observed in this section, though there are now some young black poplars planted in the wet grassland/fen area at the upstream extent of the section.

The additional species recorded in this section include some wetland plants, probably overlooked in 2005, such as yellow flag, water horsetail, common spike-rush and false fox-sedge.

Section 4 Lancing Brook, Hammer Pond to Tenchford Bridge/Adur confluence (TQ148208 to TQ153210)

The main change in this section of Lancing Brook is the removal of the poplar plantation, which has allowed considerably more light to reach the channel. Additional species recorded include fools watercress, greater pond-sedge, gipsywort and fat duckweed (the only location where this latter species was recorded in 2007). Several grasses and herbaceous species were also added to the list for this section.

Table of Results Comparing 2005 and 2007 Surveys

SPECIES	Section 1		Section 2		Section 3		Section 4	
	2005	2007	2005	2007	2005	2007	2005	2007
<i>Acer campestre</i> Field maple	O	O	R	RLO			R	R
<i>Achillea millefolium</i> Yarrow	O	O	O	O	O		R	R
<i>Adoxa moschatellina</i> Moschatel		R						
<i>Agrostis stolonifera</i> Creeping bent	A	A	F	F	A	A	F	F
<i>Alisma plantago-aquatica</i> Common water-plantain		R	O	O	OLF	R	O	R
<i>Alliaria petiolata</i> Garlic mustard		R		O				
<i>Alnus glutinosa</i> Alder	OLF	OLF	OLF	O				
<i>Alopecurus geniculatus</i> Marsh foxtail				O	OLA	OLA		
<i>Alopecurus pratensis</i> Meadow foxtail		F		F	OLA	FLA		F
<i>Angelica sylvestris</i> Wild angelica	O		RLO	R			OLF	O
<i>Anisantha sterilis</i> Barren brome	O	O				LF		
<i>Anthriscus sylvestris</i> Cow parsley		OLF		O				O
<i>Apium nodiflorum</i> Fools water-cress	R		O			R		R
<i>Arctium minus</i> Lesser burdock	O	O	R					
<i>Arrhenatherum elatius</i> False oat-grass	F	OLF		O	F	OLF		
<i>Barbarea vulgaris</i> Wintercress			R	O				R
<i>Bellis perennis</i> Daisy				R				
<i>Bidens tripartita</i> Trifid bur-marigold			R	R	OLF	O		
<i>Brachypodium sylvaticum</i> False-brome		R						
<i>Brassica nigra</i> Black mustard			R	R				
<i>Bromus hordeaceus</i> Soft brome			O	O				
<i>Butomus umbellatus</i> Flowering rush			O					
<i>Callitriche</i> agg. Water-starwort			R				O	
<i>Calystegia sepium</i> Hedge bindweed	A	A	OLF	OLF	FLA	FLA	A	A
<i>Cardamine flexuosa</i> Wavy bittercress				R				
<i>Cardamine pratensis</i> Cuckoo-flower						O		
<i>Carex hirta</i> Hairy sedge					OLA	OLA		
<i>Carex otrubaea</i> False fox-sedge				R		R		
<i>Carex pendula</i> Pendulous sedge			O					
<i>Carex riparia</i> Greater pond sedge		R		RLO				LF
<i>Carex</i> spp. Sedge spp.			LF			OLF	R	
<i>Centaurea nigra</i> Common knapweed	O	R	R		R	R		
<i>Chenopodium</i> sp. Goosefoot sp.				LF		LF		
<i>Cirsium arvense</i> Creeping thistle	FLA	F	OLF	OLF	OLF	OLF	LF	O
<i>Cirsium vulgare</i> Spear thistle			O		OLF	O		
<i>Conium maculatum</i> Hemlock	R		O	OLF				
<i>Cornus sanguinea</i> Dogwood	R	R		R				
<i>Corylus avellana</i> Hazel			RLO	R				
<i>Crataegus monogyna</i> Hawthorn		R		R				
<i>Cruciata laevipes</i> Crosswort	R	OLF	R	O	OLF	O		O
<i>Cynosurus cristatus</i> Crested dogs-tail			O					
<i>Dactylis glomerata</i> Cocks-foot	F	F	O	O	OLF	OLF	O	O
<i>Deschampsia cespitosa</i> Tufted hair-grass	O	O	O	O				
<i>Dipsacus fullonum</i> Teasel	OLF	O	RLO	O	O	O		R
<i>Dryopteris filix-mas</i> Male fern							R	
<i>Eleocharis palustris</i> Common spike-rush						R		
<i>Elytrigia repens</i> Common couch		LF	OLF	OLF	LA	LA		

SPECIES	Section 1		Section 2		Section 3		Section 4	
	2005	2007	2005	2007	2005	2007	2005	2007
<i>Epilobium hirsutum</i> Great willowherb	F	F	O	R			R	O
<i>Epilobium</i> sp. Willowherb sp.						O		
<i>Equisetum arvense</i> Field horsetail			O	R			R	O
<i>Equisetum fluviatile</i> Water horsetail						OLF	LF	OLF
<i>Equisetum</i> sp. Horsetail sp.				LO		O		
<i>Festuca rubra</i> Red fescue		R						
<i>Filipendula ulmaria</i> Meadowsweet	F	F	O	O			O	O
<i>Fraxinus excelsior</i> Ash	O	O	O	O			R	
<i>Galium aparine</i> Common cleavers		OLF			OLF	F	F	F
<i>Galium palustre</i> Common marsh-bedstraw					OLF	OLF		
<i>Geranium dissectum</i> Cut-leaved cranesbill		R	R	R				O
<i>Geum urbanum</i> Wood avens		R						
<i>Glechoma hederacea</i> Ground-ivy	O	O		R		R	LF	O
<i>Glyceria fluitans</i> Floating sweet-grass					LA	LA		
<i>Glyceria maxima</i> Reed sweet-grass			LF	RLO				
<i>Hedera helix</i> Ivy		O					LA	O
<i>Heracleum sphondylium</i> Hogweed	O	O	RLO	R	O	R		O
<i>Hieracium</i> agg. Hawkweed				R				
<i>Holcus lanatus</i> Yorkshire fog	F	F	O	OLF	F	F		OLF
<i>Hordeum secalinum</i> Meadow barley		O	FLA	F	O	O		
<i>Humulus lupulus</i> Hop		R	OLF	O				
<i>Hypochaeris radicata</i> Common cats-ear			R					
<i>Iris pseudacorus</i> Yellow flag		O	R	O		O	R	O
<i>Juncus effusus</i> Soft rush	O	O	O	OLF	OLF	OLF	O	O
<i>Juncus inflexus</i> Hard rush		R	O	O		R		
<i>Lathyrus nissolia</i> Grass vetchling		R						
<i>Lathyrus pratensis</i> Meadow vetchling	O	O	O					
<i>Lemna gibba</i> Fat duckweed	ALD		ALD					LF
<i>Lemna minor</i> Common duckweed	LA	OLA	O	O		R	LA	LF
<i>Leontodon autumnalis</i> Autumnal hawkbit			O	R				
<i>Linaria vulgaris</i> Common toadflax				R				
<i>Lolium perenne</i> Perennial rye-grass			F	F		OLF		O
<i>Lychnis flos-cuculi</i> Ragged robin				R				
<i>Lycopus europaeus</i> Gipsywort	F		O	OLF	F	F		R
<i>Lysimachia vulgaris</i> Yellow loosestrife	O	O			F	FLA	O	OLF
<i>Lythrum salicaria</i> Purple loosestrife	F	F	OLF	OLF	O	O	O	R
<i>Malva sylvestris</i> Common mallow			R	R				
<i>Mentha aquatica</i> Water mint	F	OLF	OLF	F	F	F	OLF	OLF
<i>Myosotis scorpioides</i> Water forget-me-not			OLF	OLF	OLF	F	OLF	R
<i>Myosoton aquaticum</i> Water chickweed			R	R			OLF	
<i>Nuphar lutea</i> Yellow water-lily	OLF	F	F	F			O	R
<i>Nymphoides peltata</i> Fringed water-lily			O	R				
<i>Oenanthe crocata</i> Hemlock water-dropwort	F	FLA	OLF	OLF	F	FLA	OLF	FLA
<i>Persicaria amphibia</i> Amphibious bistort			OLF	O	FLA	FLA		
<i>Persicaria hydropiper</i> Water-pepper			F	FLA	OLF	OLF		
<i>Persicaria maculosa</i> Redshank			OLF	O	OLF	OLF	O	O

SPECIES	Section 1		Section 2		Section 3		Section 4	
	2005	2007	2005	2007	2005	2007	2005	2007
<i>Phalaris arundinacea</i> Reed canary-grass	ALD	ALD	A	ALD	ALD	ALD	OLF	F
<i>Phleum pratense</i> Timothy			OLF		OLF			
<i>Phragmites australis</i> Common reed							OLA	OLA
<i>Picris echioides</i> Bristly ox-tongue								R
<i>Pimpinella saxifraga</i> Burnet saxifrage			R					
<i>Plantago lanceolata</i> Ribwort plantain	R			R				
<i>Poa trivialis</i> Rough meadow-grass		F	O	F		F		A
<i>Populus x</i> Poplar hybrid								O
<i>Potamogeton lucens</i> Shining pondweed			FLA	RLO				
<i>Potentilla anserina</i> Silverweed					ALD	FLA		
<i>Potentilla reptans</i> Creeping cinquefoil	O	R				O		
<i>Prunus spinosa</i> Blackthorn	OLF	OLF	OLF	OLF	OLF	OLF	F	O
<i>Pteridium aquilinum</i> Bracken			O	R				
<i>Pulicaria dysenterica</i> Fleabane			O	R	O			
<i>Quercus robur</i> Pedunculate oak		R	R	R			R	
<i>Ranunculus acris</i> Meadow buttercup		O		O				R
<i>Ranunculus ficaria</i> Lesser celandine				O				
<i>Ranunculus repens</i> Creeping buttercup		O	OLF	OLF	F	F	OLF	O
<i>Ranunculus sceleratus</i> Celery-leaved buttercup			R	R				
<i>Rorippa amphibia</i> Great yellow-cress			LO	O				
<i>Rosa canina</i> Dog rose		O		R		R	O	O
<i>Rubus fruticosus</i> Bramble	A	A	O	O			OLF	OLF
<i>Rumex acetosa</i> Common sorrel		R		R				
<i>Rumex conglomeratus</i> Clustered dock		R	O	R				
<i>Rumex crispus</i> Curled dock		O	O	O		OLF		
<i>Rumex obtusifolius</i> Broad-leaved dock	O	O	O	O	O	O	O	O
<i>Sagittaria sagittifolia</i> Arrowhead	O		OLF					
<i>Salix alba</i> White willow					R	R		
<i>Salix babylonica</i> Weeping willow	R	R						
<i>Salix caprea</i> Goat willow			R	R			R	
<i>Salix cinerea</i> Grey willow		R	OLA	OLA	F	F	F	O
<i>Salix viminalis</i> Osier			O	O				
<i>Sambucus nigra</i> Elder	O	O	R	R			R	
<i>Schoenoplectus lacustris</i> Common club-rush			OLF	OLF	FLA	OLF		
<i>Scirpus sylvaticus</i> Wood club-rush					OLF	OLF		
<i>Scrophularia auriculata</i> Water figwort	F	F	O	O			O	O
<i>Scutellaria galericulata</i> Common skullcap	R							
<i>Senecio aquaticus</i> Marsh ragwort	O				R	R		
<i>Senecio erucifolius</i> Hoary ragwort	R	O	O	R				
<i>Senecio jacobaea</i> Common ragwort	O		O	O				
<i>Silaum silaus</i> Pepper-saxifrage			R					
<i>Sison amomum</i> Stone parsley	F	OLF	F	FLA			R	OLF
<i>Solanum dulcamara</i> Bittersweet		O	O	O	O	O	R	R
<i>Sonchus arvensis</i> Perennial sow-thistle		R			RLO		R	
<i>Sonchus asper</i> Prickly sow-thistle			R	R				
<i>Sparganium emersum</i> Unbranched bur-reed	R		O	O				

SPECIES	Section 1		Section 2		Section 3		Section 4	
	2005	2007	2005	2007	2005	2007	2005	2007
<i>Sparganium erectum</i> Branched bur-reed	ALD	FLA	FLA	FLA	OLF	OLF	OLF	OLF
<i>Stachys palustris</i> Marsh woundwort	O		F	OLF	FLA	OLF	OLF	O
<i>Stachys sylvatica</i> Hedge woundwort						R		
<i>Stellaria graminea</i> Lesser stitchwort		O		R		O		
<i>Taraxacum</i> agg. Dandelion		R	O	O				R
<i>Tragopogon pratensis</i> Goat's-beard				R				
<i>Trifolium campestre</i> Hop trefoil				R				
<i>Trifolium pratense</i> Red clover		R	R	R	OLF			
<i>Trifolium repens</i> White clover			LF	LF				
<i>Typha latifolia</i> Bulrush	OLF	O	OLF	R	FLA	FLA		
<i>Urtica dioica</i> Nettle	A	A	FLA	FLA	FLA	FLA	ALD	ALD
<i>Veronica beccabunga</i> Brooklime				R				
<i>Veronica chamaedrys</i> Germander speedwell		R		R				
<i>Veronica hederifolia</i> Ivy-leaved speedwell		R						
<i>Vicia cracca</i> Tufted vetch	O	R	O	R		R	R	

Fauna observed along the river and stream during the 2007 survey

Beautiful demoiselle *Calopteryx virgo*
 Banded demoiselle *Calopteryx splendens*
 Large red damselfly *Pyrrosoma nymphula*
 Azure damselfly *Coenagrion puella*
 Blue-tailed damselfly *Ischnura elegans*
 Hairy dragonfly *Brachytron pratense*
 Black tailed skimmer *Orthetrum cancellatum*

Dingy skipper *Erynnis tages*
 Small white *Pieris rapae*

Marsh frog *Rana ridibunda*
 Grass snake *Natrix natrix*

Grey heron *Ardea cinerea*
 Mute swan *Cygnus olor*
 Moorhen *Gallinula chloropus*
 Coot *Flica atra*
 Grey wagtail *Motacilla cinerea*
 Reed bunting *Emberiza schoeniclus*