

ALUCO ECOLOGY LTD

**WINTER
WATERFOWL SURVEY**

**LAND AT SUMMER LANE,
PAGHAM**

MARCH 2015

Aluco Ecology Ltd Registered in England No. 5598341
info@alucoecology.co.uk www.alucoecology.co.uk

Hampshire [REDACTED]
Registered Office: Pencairn, Penmenner Road, The Lizard, Cornwall TR12 7NR

WINTER WATERFOWL SURVEY LAND AT SUMMER LANE, PAGHAM

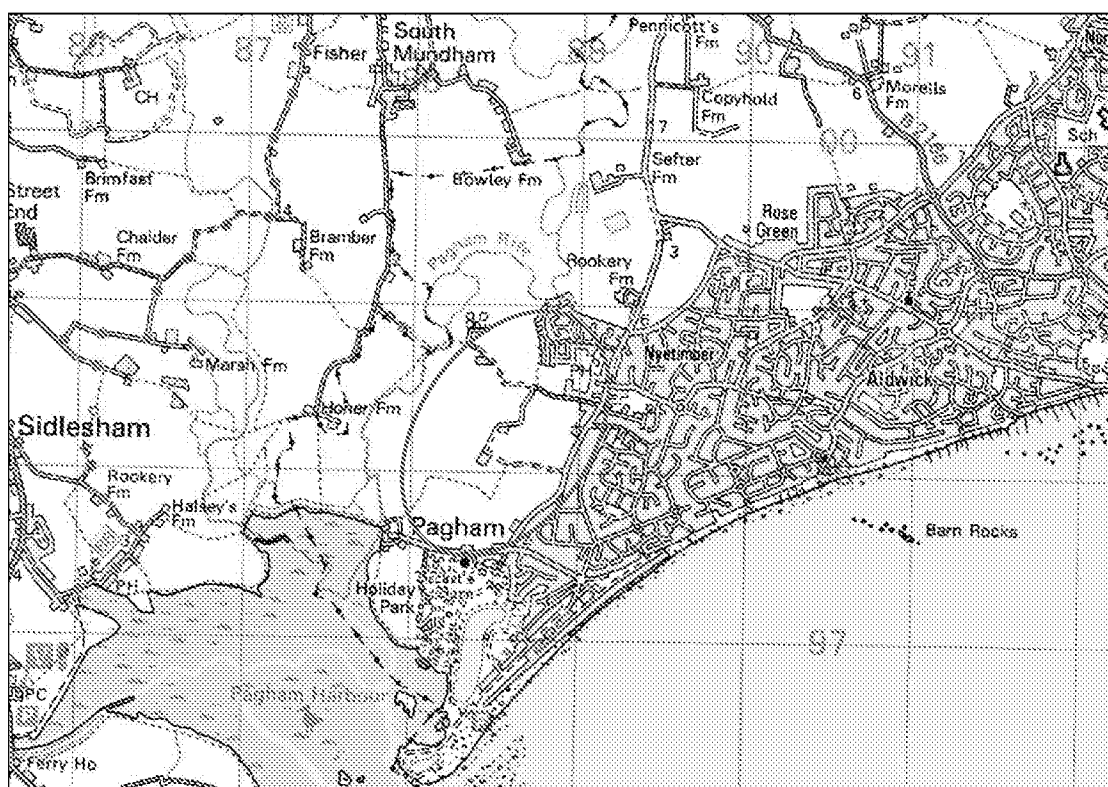
1.0 INTRODUCTION

Background

- 1.1 This document presents survey data for winter bird survey counts during the period November 2014 -February 2015 for an area of farmland at Summer Lane, Pagham, and adjacent areas.

Site Location

- 1.2 The survey area consists of arable farmland, permanent pasture, and scrub. Its location is shown at **Figure 1** below.
- 1.3 The survey area is just over 400m from the coastal designated sites at Pagham Harbour at its closest point. These are designated for waterfowl and coastal habitats and include within 1km: Pagham Harbour Special Protection Area (SPA) and Ramsar Site, Solent Maritime and Solent & Isle of Wight Lagoons Special Areas of Conservation (SAC), Pagham Harbour Site of Special Scientific Interest (SSSI) and Farlington Marshes Local Nature Reserve (LNR). Citations for these designated sites outlining the special interest features are provided at **Technical Appendix 1**.



© Crown copyright 2015 Ordnance Survey. All rights reserved. Licence number OS 1000047209

Figure 1: Location of the Main Survey Area

2.0 METHODOLOGY

- 2.1 The survey area was selected on the basis of the field network around the proposed development site (fields 1 & 2, see **Figure 2** below). All of the fields on the plateau east of the Pagham Rife valley were surveyed. Consideration was also given to fields further west of fields 5/6 and North of 5 / Rookery Farm with additional casual monitoring of these areas on the edge of the main survey block.
- 2.2 The survey area was scanned using binoculars and telescopes to check for any feeding or roosting waders and wildfowl. Survey work was undertaken by experienced bird surveyors. Observations of other species were sometimes recorded on an incidental basis. For each visit a note was usually made of the state of the tide and weather conditions (which might affect use by waterfowl). Visits were made during high tide and other tidal states. Public use of each area was also recorded.
- 2.3 The main survey area was then walked on foot, scanning all open areas to locate feeding birds. The survey area was divided into defined count areas. Area 1 and 2 are part of the proposed development location at Summer Lane. **Figure 2** shows the survey areas for winter waterfowl work during 2014/15.

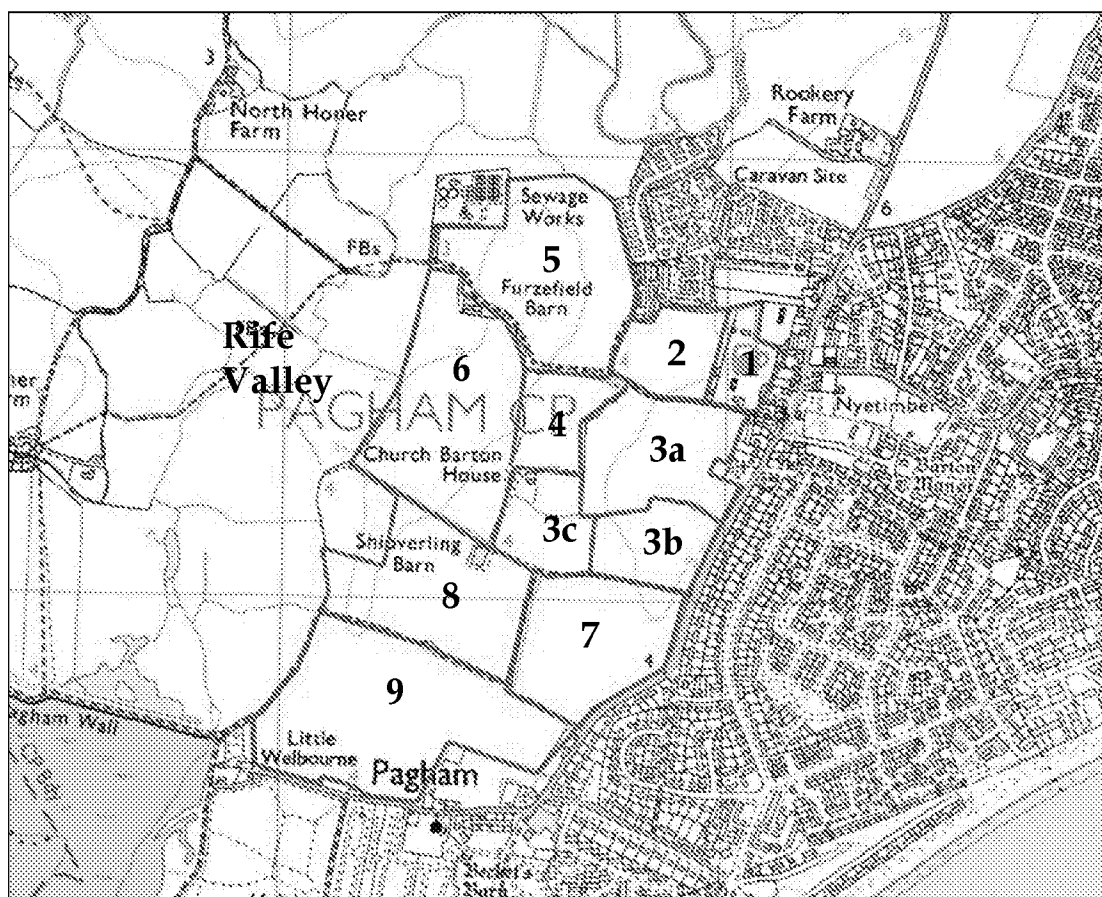


Figure 2: Count Areas for Winter Waterfowl Survey

3.0 RESULTS

Description of Count Areas

- 3.1 The count areas consist of farmland along Summer Lane (Areas 1-6), and areas to the south along the public rights of way (Areas 7-9) which are mostly under arable production at present with the exception of Fields 1, 3c and a very small section of the top of 6, which are horse paddocks. The arable fields were ploughed in late autumn or early winter and during the survey were mostly bare, apart from field 5 which was early growth winter wheat. Mature hedges are present around some of the fields particularly towards the centre of the count area, and others contain open ditches.

Waterfowl Records

- 3.2 Brent Goose *Branta bernicula* and Wader records are provided for the 1km square of the count area, but detailed locations of these records have not been provided.
- 3.3 The survey comprised fifteen visits carried out between the end of November 2014 and very early March 2015. Details of timing are presented at **Table 1** below.
- 3.4 **Table 2** below shows details of waterfowl species recorded, with **Table 3** providing a summary of other birds noted during the winter period.
- 3.5 The survey recorded waterfowl in Fields 5, where on two dates in early winter part of the Dark-bellied Brent Goose *Branta bernicula bernicula* flock from Pagham Harbour used the field, along with a single European White-fronted Goose *Anser albifrons albifrons* during the second date. No other waterfowl were recorded on site, or on any other dates. Waders including Eurasian Curlew *Numenius arquata* and Northern Lapwing *Vanellus vanellus* used the ploughed fields at 3b, 5, 7 and 9. This was generally in low numbers for feeding and roosting, but with a peak count of 71 in Field 7. Occasional flocks of Lapwing and Brent Geese were noted flying around the wider Rife Valley. Numbers of other waterfowl were noted in the wider Rife valley, but this is outside and to the west of the count area. No Brent Geese were recorded from the fields immediately west/north of Field 5/6 of the count area during survey work, which could be monitored from the edge of the count area.
- 3.6 The main survey areas at Summer Lane (Areas 1-3a) recorded no waterfowl use during the survey with the majority of records coming from field 5 as well as 3b and 7 further south. The majority of the ploughed fields were used by a number of Gulls mostly for loafing and roosting. These records are provided in **Technical Appendix 1**.
- 3.7 Dog walkers and walkers were recorded on every visit, usually in low numbers (see **Table 1**). The use of the footpaths heading east and west through the site was regular. Use of the wider footpath network into the Rife Valley north of Pagham harbour was much less frequent during survey visits. The use of the sea wall is also frequent.

Table 1: Survey Dates

Date	Ob(s)	Start	End	Weather	Tides	Notes
30 Nov 2014	PM-R & JN	10:00	11:10	Sunny, cold, light wind.	LT 11:02 (1.5m)	See map and e-mail of 1st Dec for details of habitats, etc. Dog walkers - c.4 along Summer Lane, including one using path between 5 and 2; about 2 more using path between 7, 8 & 9 and the Furzefield Barn road.
7 Dec 2014	PM-R	11:10	12:10	Cloudy, threatening rain. Brisk NW wind	HT 11:37 (5.6m)	Dog walkers - 3 along Summer Lane and one using path between 5 and 2. Informed by a local that crop spraying took place on field 5 on 3 Dec 2014 and no Brent seen since.
12 Dec 2014	PM-R	09:30	10:30	Heavy rain overnight. Cloudy. Brisk W wind	LT 08:44 (1.4m)	Dog walkers - 4 along Summer Lane and 3 along road to Shipverling Barn and 1 between 8 and 9. Field 7 has been recently flattened and ploughed with very fine, shallow furrows as if ready for seeding.
19 Dec 2014	GK	09:00	10:30	Sunny, cold, light wind 7c	HT 08:49 (5m)	Dog walkers 3people and 2 dogs north footpath; 4people 3 dogs south footpath
28 Dec 2014	PM-R	12:30	13:30	Sunny, cold, light north wind.	LT 09:21 (1.0m)	Dog walkers - 2 along Summer Lane and 2 along road to Shipverling Barn and 3 between 8 and 7. A flock of 300+ Lapwing seen rising from the field immediately north of field 5 and dropping back down.
1 Jan 2015	GK	11:00	12:00	Rain clearing 6c	LT 13:56 (1.3m)	2 people 3 dogs south footpath
8 Jan 2015	PM-R	13:00	14:00	Bright sunshine after a morning of torrential rain	HT 13:07 (5.3m)	No dog walkers. 400+ Lapwing seen rising from the field immediately west of field 6 and dropping back down.
17 Jan 2015	GK	07:00	09:00	Part cloud at start with some frost, light drizzle by end. Med. Strength SW wind	HT 08:17 (4.8m)	2people and 2 dogs south path. 1 person 1 dog north path
22 Jan	GK	07:00	09:30	clear to begin, no wind 1c	LT05:46 (0.4m)	2 dog walkers along Summer Lane with 3 dogs.

2015						
1 Feb 2015	PM-R	09:45	10:45	Cloudy with sunny spells. Bitter north wind	HT 09:38 (4.8m)	Dog walkers - 2 along Summer Lane and 2 along road to Shipverling Barn and then between 7 and 8.
5 Feb 2015	GK	11:30	15:00	clear, sunny 7c	HT12:16 (5.4m)	1 dog walker with 2 dogs summer lane, 2 dog walkers southern footpath with 2 dogs
12 Feb 2015	GK	14:00	16:00	Part cloud 6c	Ht 16:21 (4.5m)	1 Dog Walker with 1 dog Summer Lane
15 Feb 2015	PM-R	09:40	10:30	Bright sunshine. Mild 7C.	HT 07:50 (4.6m)	2 dog walkers along Summer Lane, plus a horse and rider and 3 dog walkers along road to Shipverling Barn and then between 7 & 8.
19 Feb 2015	GK	06:30	09:30	Part Cloud to light rain by end. 5c-6c SW wind	HT 11:21 (5.9m)	2 dog walkers 3 dogs on summer lane
1 Mar 2015	PM-R	11:35	12:10	Bright sunshine. Windy. Mild 10C	HT 08:20 (4.5m)	Just the one dog walker along road to Shipverling Barn

Surveyors: JN – John Norton, PM-R – Peter Milnets-Raby, GK - Gareth Knass

Table 2: Waterfowl Recorded During Survey

Date	Time	Field	Species	Count	Notes
30 Nov 2014	10:10	5	Brent Goose	1086	Feeding (present 10.00=10.30 at least and settled; a few flew in during count).
30 Nov 2014	10:50	7	Curlew	26	Feeding; flew off when disturbed by Peregrine.
30 Nov 2014	10:55	3b	Lapwing	4	Roosting.
12 Dec 2014	09:36	5	Brent Goose	747	Compact feeding flock very close to boundary with field 2
12 Dec 2014	09:36	5	White-fronted Goose	1	Feeding in with Brent - a juvenile
12 Dec 2014	09:52	3b	Lapwing	8	Roosting
19 Dec 2014	09:45	7	Curlew	71	feeding
28 Dec 2014	13:40	5	Lapwing	4	Roosting
1 Jan 2015	11:35	7	Curlew	2	roosting
1 Jan 2015	11:50	9	Curlew	3	Feeding
8 Jan 2015	13:08	5	Curlew	39	Feeding
8 Jan 2015	13:35	7	Curlew	3	Feeding
1 Feb 2015	09:50	5	Curlew	8	Feeding
1 Feb 2015	10:20	3b	Lapwing	5	Roosting
12 Feb 2015	15:30	9	Curlew	2	Feeding
15 Feb 2015	10:15	3b	Lapwing	4	Roosting

Table 3: Other Species recorded from the Count Area

Species	Status	Comments
Grey Partridge <i>Perdix perdix</i>	Red BAP	Recorded in fields 5 & 6 on two occasions. Max count 8 birds. Also noted west of site in Rife Valley.
Lapwing <i>Vanellus vanellus</i>	Red	Recorded loafing in arable fields on a few dates
Herring Gull <i>Larus argentatus</i>	Red	loafing on arable fields regularly in small numbers
Skylark <i>Alauda arvensis</i>	Red BAP	Recorded regularly in Rife Valley adjacent to the site. Occasionally noted overflying count area.
Fieldfare <i>Turdus pilaris</i>	Red	Noted flying over site on two dates
Song Thrush <i>Turdus philomelos</i>	Red, BAP	Present in count area around boundary habitats
Common Starling <i>Sturnus vulgaris</i>	Red	Present in low numbers around the residential edge of count area, occasionally using fields on site.
House Sparrow <i>Passer domesticus</i>	Red	Numerous pairs located in housing along east boundary, and along Summer Lane
Linnet <i>Carduelis cannabina</i>	Red, BAP	Recorded flying over count area, and present in Rife Valley to the west.
Yellowhammer <i>Emberiza citrinella</i>	Red	Recorded on hedgerow adjacent to sewerage works west edge of count area (field 5). Present in Rife Valley.
Brent Goose <i>Branta bernicula bernicula</i>	Amber	Recorded on two dates in Field 5.
Common Kestrel <i>Falco tinnunculus</i>	Amber	Recorded flying over.
Eurasian Curlew <i>Numenius arquata</i>	Amber	Recorded feeding on ploughed fields in count area.
Mediterranean Gull <i>Ichthyaetus melanocephalus</i>	Amber, Sch1	Recorded on two dates in Field 7
Black-headed Gull <i>Chroicocephalus ridibundus</i>	Amber	Recorded in count area.
Common Gull <i>Larus canus</i>	Amber	Recorded in count area.
Lesser Black-backed Gull <i>Larus fuscus graellsii</i>	Amber	Recorded in count area.
Great Black-backed Gull <i>Larus marinus</i>	Amber	Recorded in count area.
Green Woodpecker <i>Picus viridis</i>	Amber	Regularly seen and heard around Summer Lane area
Meadow Pipit <i>Anthus pratensis</i>	Amber	Small flocks on arable land, with max ccount of 13 in Field 7. Sometimes associating with Pied Wagtail flock.
Dunnock <i>Prunella modularis</i>	Amber	Common species around field boundaries where woody.
Goldcrest <i>Regulus regulus</i>	Amber	Recorded from boundary of Field 1
Reed Bunting <i>Emberiza schoeniclus</i>	Amber	Recorded on hedgerow adjacent to sewerage works west edge of count area (field 5). Present in Rife Valley.

Peregrine Falcon <i>Falco peregrinus</i>	Sch1	Recorded in Field 9 on one visit.
Cetti's Warbler <i>Cettia cetti</i>	Sch1	Heard from count area at western edge – present along Pagham Rife.
Chiff Chaff <i>Phylloscopus collybita</i>	not listed	recorded on a couple of dates around sewerage works, and also present along Rife outside count area
Sparrowhawk <i>Accipiter nisus</i>	not listed	Recorded on two dates around Summer Lane area and north of count area.
Pied Wagtail <i>Motacilla alba yarrelli</i>	not listed	max count of 44 individuals in 3b on one date

Key

Sch1 = Listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended)

BAP = Listed as a local or national Biodiversity Action Plan species

Red = Red Listed bird of Conservation Concern

Amber = Amber listed bird of Conservation Concern

(nb details of these category listings is provided in Eaton et al (2009))

4.0 CONCLUSIONS

- 4.1 A winter waterfowl survey was undertaken on farmland at Summer Lane and surrounds to the west of Pagham, during November 2014 to March 2015. The survey recorded some use of the open fields by waterfowl (wildfowl/Geese or waders).
- 4.2 There was no use of Fields 1, 2, 3a, 3c, 4, 6 or 8 by waterfowl. Fields 3b, 5, 7 and 9 were used by both Curlew and Lapwing, with field 5 also used on two occasions by part of the wintering flock of Brent Geese from Pagham Harbour.
- 4.3 The count area provides wintering habitats and opportunities for a number of birds of conservation concern. This use is part associated with Pagham Harbour and Pagham Rife valley to the west of the count area, where habitats of local to international value for bird species are present. The habitats within the count area are generally more intensively managed arable farmland.

5.0 REFERENCES

Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp296–341

Sussex Biodiversity Records Centre Data Search June 2013.

Technical Appendix 1

Coastal Designated Sites Within 1km of the Survey Area

SPA description

(information as published 2001)

Pagham Harbour

Country	England
Unitary Authority	West Sussex
SPA status	Classified 30/03/1988
Latitude	50 45 48 N
Longitude	00 45 38 W
SPA EU code	UK9012041
Area (ha)	636.68
Component SSSI/ASSIs	Pagham Harbour

Pagham Harbour is located on the south coast of England in West Sussex. It is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mud-flats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by Common Cord-grass *Spartina anglica*, with patches of Glasswort *Salicornia* spp. The area supports breeding Little Tern *Sterna albibrons* in summer, as well as wintering concentrations of Ruff *Philomachus pugnax* and Pintail *Anas acuta*.



Qualifying species

For individual species accounts visit the [Species Accounts section](#)

This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Little Tern *Sterna albibrons*, 12 pairs representing 0.5% of the breeding population in Great Britain (Count as at 1995)

Over winter;

Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9% of the wintering population in Great Britain

This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter;

Pintail *Anas acuta*, 628 individuals representing at least 1.0% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Note:

Many designated sites are on private land: the listing of a site in these pages does not imply any right of public access.

Note that sites selected for waterbird species on the basis of their occurrence in the breeding, passage or winter periods also provide legal protection for these species when they occur at other times of the year.

Designated Site Map (ESD/13/350)

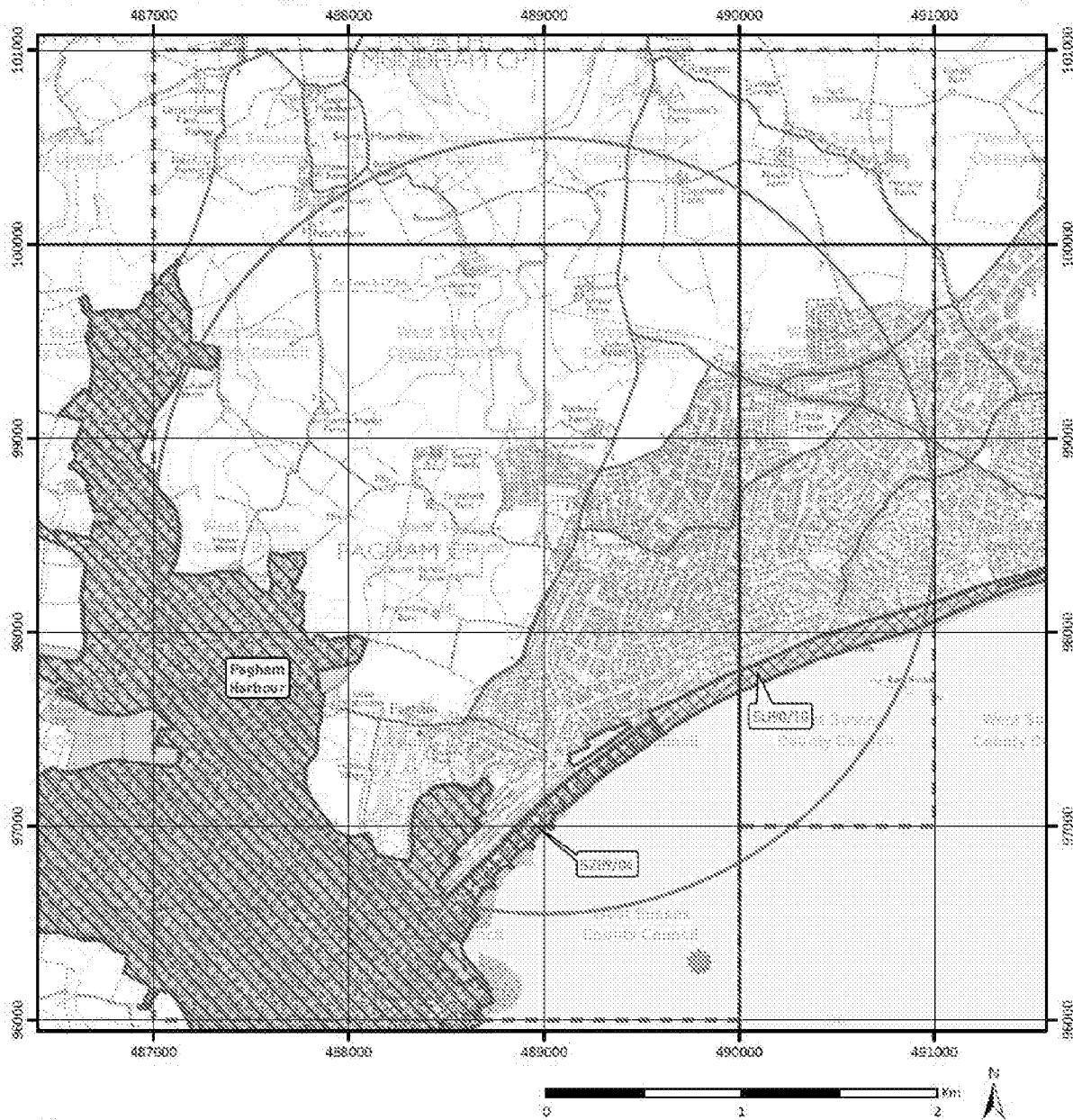
Land at Summer Lane, Pagham + 2km radius

Prepared for Gareth Knapp (Aluco Ecology Ltd) - 27/06/2013



**Sussex
Biodiversity
Record Centre**

Woods Mill, Haverhill,
West Sussex BN9 9SD
info@sussexbrc.org.uk
01273 402250/0522
www.sussexbrc.org.uk



Key to Map:

- Enquiry area
- Species search area
- LGS
- LNR
- Marine SSSI
- Ramsar
- SPA
- SSSI

© Crown copyright and database rights 2013 Ordnance Survey, West Sussex County Council 100023447, East Sussex County Council 100019601, Natural England 100046223, Sussex Wildlife Trust 100026883.

Ramsar, Special Areas of Conservation (SAC), Special Protection Area (SPA), National Park, Area of Outstanding Natural Beauty (AONB), National Nature Reserves (NNR), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR) and Country Park data reproduced with permission of Natural England. Site of Nature Conservation Importance (SNCI) data provided by East and West Sussex County Councils, and Arun & New City Council. Notable Road Verge Area supplied by East and West Sussex County Councils. Local Geological Site (LGS) data created by SuBRC in partnership with Sussex Geomorphology Group. All rights reserved 2013.

SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)

Site Name:	Pagham Harbour		
County:	West Sussex		
District:	Chichester, Arun		
Local Planning Authority:	Chichester District Council, Arun District Council		
Size:	615.9 hectares (1521.9 acres)		
National Grid Ref:	SZ875970		
Date Notified (Under 1949 Act):	1954	Date of last revision:	1980
Date Notified (Under 1981 Act):	1986	Date of last revision:	-
Other Information:	This site lies within the South Coast Plain. Pagham Harbour is a proposed NCR site. This site contains Pagham Harbour GCR site and part of Begnor Regis (Palaeobotany) GCR site. This is also a proposed Ramsar/SPA site.		

Reason for Notification

This site comprises an extensive central area of salt-marsh and tidal mudflats with surrounding habitats including shingle, open water, reed swamp and wet permanent grassland. Pagham Harbour is of national importance for wintering wildfowl and waders and also for breeding birds both within the Harbour and the surrounding grazing pasture. The site supports nationally important communities of plants and invertebrates.

Pagham Harbour was reclaimed for agriculture in the late nineteenth century but was flooded again by a storm in the early twentieth century. The extensive intertidal mudflats are rich in algae and invertebrates and provide important feeding areas for birds.

Salt-marsh is a habitat threatened nationally through reclamation for agriculture. The lower part of the salt-marsh is dominated by the hybrid common cord-grass *Spartina anglica* with patches of the glassworts *Salicornia* spp. Above this zone sea-purslane *Halimione portulacoides* covers large areas with other species such as sea aster *Aster tripolium* in the periphery. At one part of the site within a mixed salt-marsh community greater sea-spurrey *Spergularia media* and sea lavender *Limonium vulgare* are found. The upper margin of the salt-marsh has developed a narrow strip of grassland dominated by sea couch *Elymus pycnanthus*.

Vegetated shingle is a nationally rare community. At Pagham, the type and extent of plant cover is dictated by the shifting nature of the substrates, the sea defence works, and by its relative exposure to the elements. In sheltered areas a diverse grass sward has developed with herbs such as early forget-me-not *Myosotis ramosissima*, biting stonecrop *Sedum acre* and the nationally endangered chiding pink *Petrorhagia nanteuilli*. This contrasts with the sparse vegetation of the shingle ridge where the uncommon sea-kale *Crambe maritima* and yellow-vetch *Vicia lutea* are found.

Pagham Harbour has a wide variety of wetland habitats. Brackish drainage ditches dissect the land where common reed *Phragmites australis* dominates. This forms fairly extensive swamps in some areas including the Severals to the west of the Harbour which are important for breeding and migrating reed and sedge warblers. Sidlesham ferry to the north-west provides high water feeding and roosting areas for waders while Pagham Lagoon in the east is a stormy weather sheltering site for sea duck. Here may also be found the nationally endangered starlet sea anemone *Nematostella vectensis*.

The small amount of woodland at Pagham Harbour is dominated by willow and oak. One of these areas supports a small heronry. In contrast, the ancient woodland at Norton Priory is drier with oak standards and a rich ground flora. Scrub is found both in the form of hedges and as more extensive patches with hawthorn *Crataegus monogyna* and gorse *Ulex europaeus* being the main constituents. The damp unimproved grassland surrounding the Harbour is used as a major wader roost and is grazed by large numbers of Brent Geese. Some fields of improved grassland are included in the site as they too, support nationally important populations of birds.

Pagham Harbour is an overwintering area for over 120 species of bird. The numbers of wintering pintail,

ringed and grey plover and black-tailed godwit regularly reach 1% of British populations and the site is of international importance for wintering ruff and Brent Geese. The mudflats also provide food for a diverse breeding community of birds including oystercatcher, shelduck and redshank.

Notable invertebrates include the sand dart *Agrotis ripae*, Matthew's wainscot moth *Mythimna favicolor* and the long-winged conehead grasshopper *Conocephalus discolor*.

Geology

Pagham Harbour is a key site for coastal geomorphology. It is significant both as a classic shingle spit landform and for the links that have been demonstrated between the coastal near shore and offshore forms and sediments. The shingle spit system comprises a series of sub-parallel ridges and recurves, marking different phases of extension and frontal accretion. Shingle reaches the beach via the intertidal zone, and the so-called "Pagham delta" and the behaviour of the spits and delta are intimately linked with water and sediment circulation around the Selsey peninsula. The area also provides an excellent example of the role of weed rafting of shingle in coastal sediment budgets.

This site also includes, at the north-eastern end, part of a key site for plant fossils from the London Clay (divisions B₁ and B₂). It is the only locality in the Hampshire Basin to yield abundant London Clay plants and the only site known to have yielded plants from the B₂ division of this formation. The site has yielded examples of some one hundred and thirty species (representing seventy families), including numerous type specimens. Dominant families include the Vitaceae, Menispermaceae and Burseraceae. The genera *Bognoria* and *Aldwychia* are only found here, as are some thirty species. An outstanding palaeobotanical site of great importance to studies of Tertiary floras.

COUNTY: WEST SUSSEX

SITE NAME: BOGNOR REEF

DISTRICT: ARUN

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority: ARUN DISTRICT COUNCIL

National Grid Reference: SZ 912982

Area: 64.4 (ha.) 159.1 (ac.)

Ordnance Survey Sheet 1:50,000: 197

1:10,000: SZ 99 NW, SZ 89 NE

Date Notified (Under 1949 Act): 1980

Date of Last Revision: –

Date Notified (Under 1981 Act): 1988

Date of Last Revision: –

Other Information:

This site will be listed in 'A Geological Conservation Review'.

Reasons for Notification:

This site comprises a long stretch of foreshore of great geological interest and an extensive area of vegetated shingle, a habitat type which is rare in Britain. At the western end is a small area of old sand dune with an interesting flora including a specially protected species listed on Schedule 8 of the Wildlife and Countryside Act 1981.

Biological Interest

The shingle strip which runs along the beach at Bognor develops into an extensive shingle beach west of SZ 915982. In the shelter of the main bank shingle plant communities have developed, typically with yellow horned poppy *Glaucium flavum*, sea beet *Beta vulgaris*, and the uncommon sea kale *Crambe maritima*. Small grassy patches occur infrequently, with false oat-grass *Arrhenatherum elatius* and red fescue *Festuca rubra*.

The small outlying area of sand dune at The Green is all that remains of a once much more extensive dune system. The grassland, scrub and small marsh support a number of interesting plants and invertebrates including the long-winged conehead grasshopper *Conocephalus discolor* and the nationally endangered childing pink *Petrorhagia nanteuilii*.

Geological Interest

The foreshore here is one of the few places where the whole thickness of the London Clay can be studied in sequence, although favourable tides occur infrequently and some exposures remain constantly under water. Most of the rocks are clays or sands but there are two sequences of more resistant rocks: calcareous sandstones which form the main Bognor Reef and glauconitic sandstones which comprise the less substantial Barn Rocks to the west. The fossil flora and fauna of these beds is outstanding.

The site is a key site for plant fossils from the London Clay (divisions B₁ and B₂) and is of great importance to the study of Tertiary floras. It is the only locality in the Hampshire Basin to yield abundant London Clay plants and the only site known to have yielded plants from the B₂ division of this formation. The site has yielded examples of some one hundred and thirty species (representing seventy families), including numerous type specimens. Dominant families include the Vitaceae, Menispermaceae and Burseraceae. The genera *Bognoria* and *Aldwichia* are found only here, as are some thirty species. An outstanding palaeobotanical site of great importance to studies of Tertiary floras.

The eastern foreshore is a valuable site which has yielded a diverse Lower Eocene avifauna, including a significant number of small species which are only rarely preserved. Seven

species (representing seven orders) have been recorded from the site. For five species this is the type locality. Three orders, the Charadriiformes, Columbiformes and Apodiformes, are unique to Great Britain at this time.

Finally the most important site in the world for pyritised fossil insects (especially beetles) is on the foreshore at Aldwick. This mode of fossilisation preserves insects uncrushed and they can be extracted simply by sieving. The insects are allochthonous, being derived from the land and associated with a marine fauna (of Lower Eocene age) after death. One species of beetle belongs to a genus, *Pactopus*, now confined to western North America, and otherwise unknown in a fossil state. Other beetles include representatives of modern tropical genera, as well as the earliest known members of the families Eucnemidae and Anobiidae.

Technical Appendix 2

Records of Gulls

Date	Time	Area	Species	No.
30 Nov 2014	10:55	9	Great Black-backed Gull	21
7 Dec 2014	11:45	9	Great Black-backed Gull	59
7 Dec 2014	11:45	9	Herring Gull	14
12 Dec 2014	09:55	7	Black-headed Gull	72
12 Dec 2014	10:10	9	Great Black-backed Gull	21
12 Dec 2014	10:10	9	Herring Gull	17
19 Dec 2014	09:10	5	Black-headed Gull	23
19 Dec 2014	09:45	7	Black-headed Gull	65
19 Dec 2014	09:45	7	Herring Gull	12
19 Dec 2014	09:45	7	Great Black-backed Gull	1
19 Dec 2014	09:45	7	Mediterranean Gull	1
28 Dec 2014	13:55	7	Great Black-backed Gull	22
28 Dec 2014	13:55	7	Herring Gull	31
1 Jan 2015	11:10	5	Black-headed Gull	13
1 Jan 2015	11:35	7	Black-headed Gull	75
1 Jan 2015	11:35	7	Common Gull	2
1 Jan 2015	11:35	7	Great-black Backed Gull	19
1 Jan 2015	11:35	7	Herring Gul	22
1 Jan 2015	11:50	9	Herring Gull	5
8 Jan 2015	13:08	5	Great Black-backed Gull	9
8 Jan 2015	13:08	5	Mediterranean Gull	1
8 Jan 2015	13:08	5	Black-headed Gull	32
8 Jan 2015	13:08	5	Common Gull	1
8 Jan 2015	13:35	7	Great Black-backed Gull	59
8 Jan 2015	13:35	7	Herring Gull	22
17 Jan 2015	08:00	7	Herring Gull	2
17 Jan 2015	08:00	7	Black-headed Gull	7
17 Jan 2015	08:15	3b	Black-headed Gull	8
17 Jan 2015	08:15	3a	Black-headed Gull	5
17 Jan 2015	08:30	5	Black-headed Gull	2
17 Jan 2015	08:50	2	Black-headed Gull	3
17 Jan 2015	08:50	2	Common Gull	1
22 Jan 2015	09:00	2	Herring Gull	2
22 Jan 2015	07:30	4	Herring Gull	1
22 Jan 2015	09:00	5	Black-headed Gull	2
22 Sep 2015	08:00	9	Black-headed Gull	3
1 Feb 2015	10:35	7	Great Black-backed Gull	6
1 Feb 2015	10:35	7	Herring Gull	3

1 Feb 2015	10:35	7	Common Gull	1
5 Feb 2015	11:45	2	Black-headed Gull	13
5 Feb 2015	11:50	3a	Herring Gull	4
5 Feb 2015	11:50	3a	Black-headed Gull	3
5 Feb 2015	12:00	5	Herring Gull	2
5 Feb 2015	14:35	7	Herring Gull	3
5 Feb 2015	14:35	7	Black-headed Gull	4
5 Feb 2015	14:20	9	Black-headed Gull	7
12 Feb 2015	14:50	7	Great Black-backed Gull	4
15 Feb 2015	10:10	7	Great Black-backed Gull	2
19 Feb 2015	06:50	5	Herring Gull	3
19 Feb 2015	09:00	9	Herring Gull	2
19 Feb 2015	09:00	3b	Black-headed Gull	7