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Ditch monitoring at Walland Marsh SSSI 1993/4

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Ditch monitoring at Walland Marsh SSSI 1993/4

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LIST OF TABLES AND FIGURES

CONTENTS page

SUMMARY

During 1993 and 1994 a total of 534 ditches were sampled on Walland Marsh, representing almost complete coverage of the ditches within the SSSI. A few ditches adjacent to the SSSI were also sampled. The results provide information on the distribution and abundance of ditch flora in different blocks of grazing marsh and across the site as a whole, and establishes a base line for future monitoring, which is necessary to ensure that the conservation interest for which the site was notified continues to be maintained.

Comparisons have been made between:

i. Different areas of grazing marsh
ii. Ditches in pasture and ditches adjacent arable land
iii. Grazed ditches and ditches in arable land
iv. 1985 and 1993/4 survey results

Some areas of grazing marsh are inherantly more diverse than others, and in some areas improvements in management are required. All areas however still meet the SSSI selection criteria. Limited comparison with the 1985 survey (which used a different survey method) indicate that on a broad level species diversity within the SSSI has been maintained, though an increase in sheep grazing has probably lead to a decrease in the abundance of some emergent species, including several scarce species.

Significant differences occur between ditches adjacent to arable land and those in pasture. In particular ditches adjacent arable, which are protected from grazing on one side, support a greater abundance of emergent and bank species than ditches in pasture and thus add significantly to the diversity of the site. Ditches within arable land however are species-poor and under-managed, and a reversion to pasture should be encouraged where arable land remains in the SSSI.

Six nationally scarce species were recorded across the site. A seventh rare species, Chenopodium chenopodiodes, was not re-recorded during this survey, but may return with reinstated cattle grazing. Following a recent survey two species previously considered to be nationally scarce, *Ceratophyllum submersum* and *Ranunculus baudotti,* no longer meet the criteria (occurring in less than 100 10km squares).

1. INTRODUCTION

Walland Marsh in south Kent is a large SSSI of just under 2000 ha. Figure 1 shows the current boundary of the site. It consists of discrete blocks of long established grazing marsh separated by intensive arable land. The remaining areas of grazing marsh are protected from further conversion to arable by Management Agreements.

Though a few arable fields are included within the SSSI, the majority of the site is permanent pasture and farmed intensively for sheep, with remarkably high stocking densities in most areas. Gradual changes in land management, such as a move away from sheep and cattle to sheep only, a reduction in the amount of hay crops, and increased use of fertilizers on adjacent arable land underlie the need for establishing a monitoring programme on this site.

The extensive system of ditches and dykes which drains the marsh is an important example of lowland, slow moving and nutrient-rich (eutrophic) waters, with a brackish influence near the sea and also inland in the large sewers or where peat deposits, which leach salt, lie close to the surface.

The management objective with regard the ditch system is to maintain the floral and invertebrate interest by rotational clearance of the ditches and by controlling as far as possible the water supply and quality. Water control has to extend beyond the SSSI, because the arable ditches are connected with the SSSI.

The site was originally notified under the 1949 Act in 1977, and was renotified under the 1981 Act in 1986, following a ditch by ditch survey carried out by K Whisson (File report, 1985). As a consequence the site was reduced dramatically in size (Figure 2), though the original boundary would have been all-inclusive, and in effect little more than a planning consultation area.

The 1985 survey was used as a basis for comparison with the results of this survey, thought comparison was limited because the methods used in the two surveys were different.

Much of the basic description of the site however comes from an earlier report by W. Latimer in 1980.

The purpose of this survey was:

1. To assess whether all of the site still qualifies as an SSSI on botanical grounds.

2. Identify problems with the management of the site

3. Provide a baseline for future monitoring

4. To enable assessment of the effectiveness of Management Agreements on the SSSI.

WALLAND MARSH

KENT / EAST SUSSEX

Figure 1 The current SSSI boundary

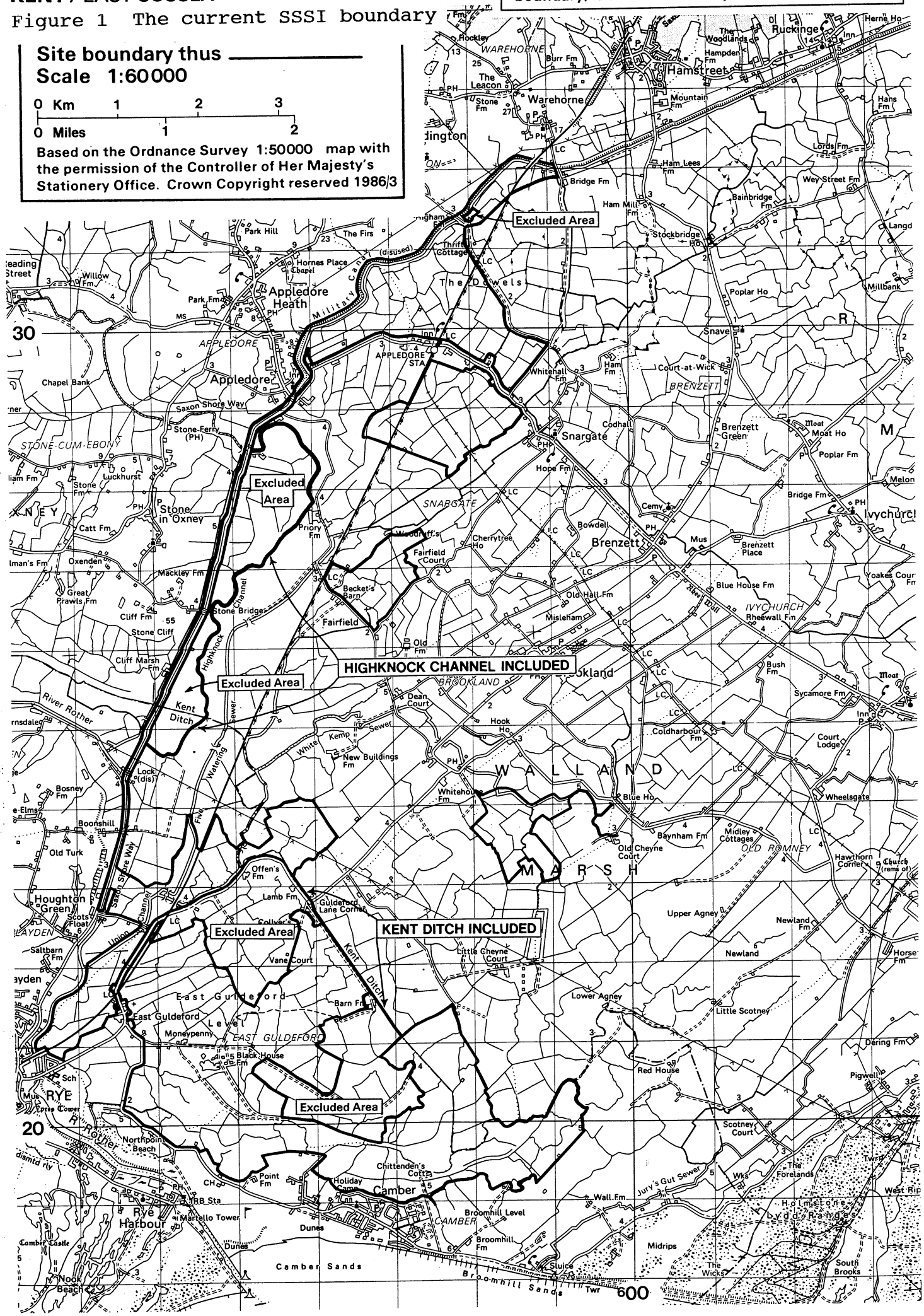
NOTE: A larger scale map, showing the definitive boundary, is available on request.

Site boundary thus ——

Scale 1:60000

0 Km 1 2 3

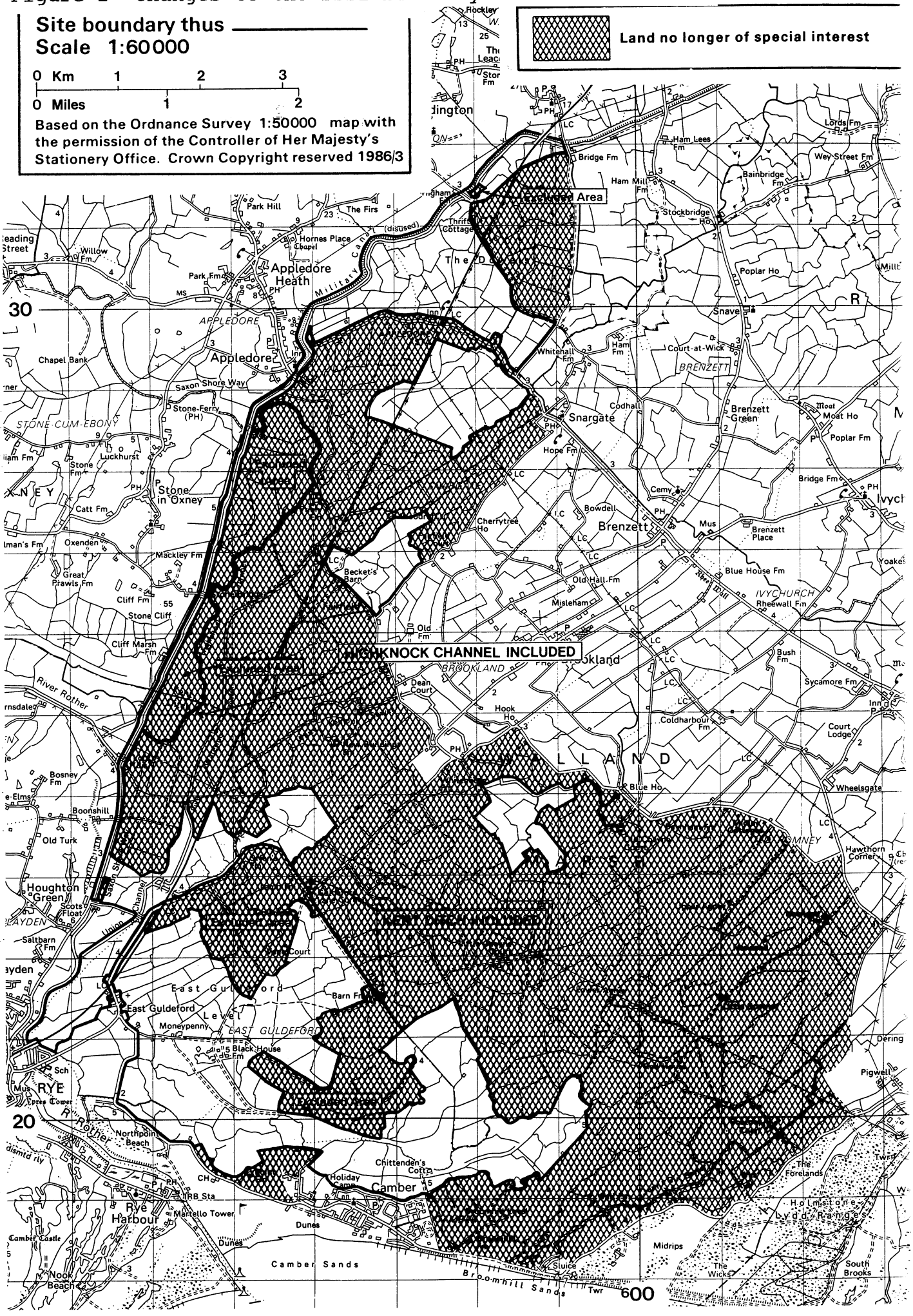
0 Miles 1 2



WALLAND MARSH
KENT / EAST SUSSEX

NOTE: A larger scale map, showing the definitive boundary, is available on request.

Figure 2 Changes to the SSSI boundary at renotification



2. DESCRIPTION OF AREAS

2.1 Location

There are five main areas of grazing marsh across the site;

1. **The Dowels** lies furthest to the north, about 12 km from the coast. Grid ref: TQ 97 30 Area: approx. 300 ha.

2. **Snargate** lies directly to the south, separated from the east side of the Dowels by a road. Grid ref: TQ 98 29 Area: approx. 130 ha.

3. **Fairfield** lies about 1 km south of Snargate. Grid ref: TQ 97 27 Area: approx 70 ha.

4. **Woolpack** lies about 5 km from the coast, just over 2 km south east of Fairfield. Grid ref: TQ 98 23 Area: approx 90 ha.

5. **East Guldeford** lies adjacent the coast between East Guldeford and Dungeness. This area has been divided into north, east and west. Grid ref: TQ 94 23, TQ 94 21, TQ 97 20 Area: approx. 1400 ha

2.2 Soils

The northern part of the site forms part of the Old Decalcified Marsh, which is divided from the New Calcareous Marsh by an inland 13th century sea wall that enclosed The Dowels, Snargate Fairfield and most of Woolpack. The Old Marsh is lower lying than the New Marsh and contains finely textured, poorly drained and largely decalcified soils, overlying deeper peat deposits. The New Marsh contains calcified soils which are fine to coarsely textured and generally better drained and therefore more suited to arable cultivation. More information on the soils in different area of the marsh is contained in Latimer (1980).

2.3 **Conservation interest**

The Dowels contains the greatest proportion of fresh water ditches on the marsh and has the highest species diversity, with many uncommon and several scarce species. It is a the main locality on the marsh for *Hottonia palustris* and *Sium latifolium** and is also important for *Hydrocharis morsus-ranae, Ranunculus circinatus, Potamogeton lucens, Potamogeton trichoides**, *Sagittaria sagittifolia, Myriophyllum verticllatum**, and *Utricularia sp.*

(* = nationally scarce species.)

Although components of this diverse flora are also found in the adjacent northern end of Snargate, the majority of Snargate falls into the same category as Fairfield and Woolpack, where most of the ditches contain a characteristic but less diverse brackish ditch community. The typical aquatic species are *Ceratophyllum submersum, Myriophyllum spicatum, Potamogeton pectinatus, Ranunculus baudotti, Ranunculus trichophyllus* and *Zannichellia palustris*. The nationally scarce species *Wolffia arrhiza* occurs sporadically at Fairfield and elsewhere in freshwater ditches.

The dominant emergent species in these areas are *Scirpus maritimus* and *Phragmites australis*, with which several scarce invertebrate species are associated.

The ditch banks support a number of upper salt-marsh species, such as *Juncus gerardii, Glaux maritima, Triglochin maritima,* and the nationally scarce species *Carex divisa*, the last two species being restricted to Fairfield and Woolpack. In addition *Salicornia sp* and the nationally rare species *Chenopodium chenopodiodes* have in the past been recorded at Fairfield, and may return with cattle grazing which has recently been reintroduced.

The large area of grazing marsh at East Guldeford also contains predominantly brackish ditches, though overall East Guldeford is less brackish than Snargate, Fairfield and Woolpack. Management across the area is also less uniform, with parts less heavily grazed than others, and in addition

some arable fields are included within the SSSI. The ditches in the arable fields and adjacent arable are protected by 5m buffer zones, where the crop is unsprayed. In some cases the zone is maintained as a grass verge by annual cutting. The ditches which are ungrazed or only lightly grazed are particularly important for *Althea officinalis*, which is the food plant of the rare giant ear moth, *Hydraecia osselola*. This moth was re-recorded on the site this year, after several years without being recorded.

3. METHOD

The following survey method was employed, which is a modified version of the standard method for ditch recording set out by Alcock & Palmer (1985). The standard method was modified to increase coverage rate by recording presence / absence rather than DAFOR.

1. The numbering system used in the 1985 survey was again used to identify individual ditches.

2. Within each ditch a representative 20m section was then sampled, recording the presence of all aquatic, emergent and wet bank species.

3. Dominance by any species was recorded, though otherwise abundance values were not used.

4. It was also recorded if the ditch was dry or choked.

5. The survey work was carried out over two field seasons; Fairfield, Snargate and the west side of The Dowels were surveyed in July and August 1993, and the east side of The Dowels, Woolpack and East Guldeford were surveyed between June and August 1994.

6. A small part of East Guldeford, the Royal Military Canal and the Highknock Channel were not surveyed.

4. RESULTS

4.1 Summary results

A total of 534 ditches were sampled during 1993/4, representing complete coverage of the ditches in each survey area, with the exception of a small area adjacent the village of East Guldeford, which was surveyed in 1990 by the Chris Blandford Associates in connection with the A259 Rye bypass.

The full results of ditch sampling 1993/4 are contained in spreadsheets in Appendix 1. Summary results are provided for both 1985 and 1993/4 in Tables 1-4 on page 17. Tables 1 & 3 give the frequency of occurrence of species in different ditch blocks and for the site as a whole, and Table 2 & 4 give the frequency of occurrence as a percentage of the total number of ditches in each ditch block. These tables are the basis for further analysis in the discussion. The data for both years is divided into the following ditch blocks:

code	ditch block
PS	Snargate (surveyed 1993)
PDW	The Dowels West side (surveyed 1993)
PDE	The Dowels East side (pasture)
DE(Aj)	Ditches adjacent arable
PW	Woolpack (pasture)
W(Aj)	Ditches adjacent arable
PF	Fairfield (surveyed 1993)
PGN	East Guldeford (pasture) North side
GN(Aj)	Ditches adjacent arable
PGW	East Guldeford (pasture) West side
GW(Aj)	Ditches adjacent arable
PGE	East Guldeford (pasture) East side
GE(Aj)	Ditches adjacent arable
Ar	Arable ditches (DE, W, GE, GN, GW combined)

4.2 **Distribution maps**

Large scale maps of the survey areas showing the ditch numbering system are given in Appendix 3. Distribution maps have also been produced and are contained in Appendix 4. These show the distribution of:

i. Freshwater ditches with 15+ species (ie. species-rich freshwater ditches).

ii. Freshwater ditches with between 10 and 14 species (ie. good but not exceptional ditches).

iii. Brackish ditches with 10+ species (ie. species-rich brackish ditches).

iv. Ditches with 5 or fewer species (ie. species-poor ditches, usually associated with the dominance of an emergent or aquatic species or low water levels.)

v. Ditches dominated by emergents or recorded as choked.

vi. Ditches dominated by *Enteromorpha*/filamentous algae

vii. Distribution of arable ditches and possible exclusions from the SSSI.

viii Species which are infrequent across the site:

	number of records
1. *Althea officinalis**	69
2. *Azolla filiculoides*#	8
3. *Butomus umbelatus*	3
4. *Carex divisa**	6
5. *Carex riparia*	12
6. *Glaux maritima*	20
7. *Hottonia palustre*	18
8. *Hydrocotyle vulgaris*	45
9. *Juncus gerardii*	50
10. *Hippuris vulgaris*	1
11. *Lemna gibba*	15
12. *Myriophyllum verticillatum**	2
13. *Potamogeton crispus*	15
14. *Potamogeton pusillus*	14
15. *Potamogeton berchtoldii*	12
16. *Potamogeton lucens*	15
17. *Potamogeton natans*	16
18. *Potamogeton trichoides**	15
19. *Ranunculus baudotti*	15

20.	*Ranunculus circinatus*	17
21.	*Sagittaria sagittifolia*	3
22.	*Samolus valerandi*	26
23.	*Sium latifolium**	5
24.	*Triglochin palustris*	13
25.	*Triglochin maritima*	3
26.	*Utricularia sp*	8
27.	*Wolffia arrhiza*	2
28.	*Zannichellia palustris*	32

* = nationally scarce species # = alien species

4.3 **Comparison with 1985 survey**

Unfortunately comparison with the 1985 survey was limited by a major difference in methods used. In the 1985 survey ditches were surveyed along their entire length and not from 20m sections, which is the standard ditch recording method recommended by Alcock & Palmer (1985). However the following comparisons are assumed to be valid:

1. **Species which appear to have increased in abundance.** Species would have been recorded more frequently in 1985 from full ditch lengths, and as a result most species appear to have decreased in abundance. However for those species recorded more frequently in 1993/4, an increase in abundance may have occurred.

2. **Changes in the relative abundance of species.** Changes in species ranking between the two survey years (eg. *Althea officinalis* was the 27th most abundant species in 1994 but the 19th most abundant in 1985) may give an indication of species which have decreased in abundance.

3. **Changes in the number of key aquatic, emergent and bank species in each area.** The overall numbers of species recorded in each area are comparable between the two survey years. A diversity index based on ranking areas according to the number of key species they contain has been used to indicate changes in diversity between survey years.

4.4 Key species

The summary results in Tables 1 to 4 include all species recorded during the survey. A distinction is made however in further analysis of the results between species which are of key importance to the site and those which do not contribute to the special interest of the site. This also includes several alien or problem species, which pose a threat to the interest of the site.

In this report key species include both **nationally scarce species and those native species which define and characterise good or exceptionally species-rich freshwater and brackish ditches** and are therefore of key importance to the botanical interest of the site. A list of key species is given below:

Key aquatic species

Ceratophyllum demersum
C. submersum
Chara sp
Hottonia palustre
Hydrocharis morsus-ranae
Nupha lutea
Myriophyllum spicatum
Myriophyllum verticillatum
Nymphaea alba
Potamogeton berchtoldii
P. lucens
P. crispus
P. natans
P. pectinatus
P. pusillus
P. trichoides
Polygonum amphibium
Ranunculus circinatus
R. baudotti
R. trichophyllus
Sparganium emersum
Utricularia sp
Wolffia arrhiza
Zannichellia palustris

Key emergent species

Alisma plantago-aquatica
Apium nodiflorum
Berula erecta
Butomus umbelatus
Carex riparia
Glyceria maxima
Hippuris vulgaris
Iris pseudocorus
Mentha aquatica
Myosotis laxa
Nasturtium officinale agg.
Oenanthe aquatica
O. fistulosa
Rumex hydrolapathum
Sagittaria sagittifolia
Samolus valerandi
Schoenoplectus tabernaemontani
Typha angustifolia
Veronica catenata

Key bank species

Althaea officinalis
Apium graveolens
Carex divisa
Carex distans
Glaux maritima
Hydrocotyle vulgaris
Juncus gerardii
Lycopus europaeus
Lythrum salicaria
Oenanthe lachenalii
Ophioglossum vulgatum
Salicornia sp
Sium latifolium
Spergularia marina
Triglochin palustris
Triglochin maritima

4.5 SSSI selection criteria

In line with SSSI criteria freshwater ditches are considered **exceptional** if they contain 15 or more aquatic, emergent and wet bank species and **good** if they contain between 10 and 14 species per 20 meters. For brackish ditches, which are inherently less species-rich, **exceptional** ditches contain 10 or more species and **good** ditches between 6 and 9 species per 20 meters. (Guidelines for the selection of biological SSSIs, section 5.2.2). These totals include all common native species, such as *Lemna sp, Enteromorpha, Scirpus maritimus* and *Phragmites australis*, in addition to the key species identified in this report which make up the floristic diversity, such as *Potamogeton spp, Ceratophyllum spp,* and *Myriophyllum spp.*

Generally, to qualify for selection as an SSSI on botanical grounds alone at least 50% of wet ditches in a complex should rate as "good" or "exceptional." Reference to distribution maps (i) - (iii) indicate that all areas of grazing marsh qualify on this criteria. The site as a whole also qualifies by supporting at least six nationally scarce species.

Table 1 Summary data 1993/4 Frequency of species in 20m ditch sections

ditch block	PS	PDW	PDE	DE(Aj)	PF	PW	PW(Aj)	PGE	GE(Aj)	PGN	GN(Aj)	PGW	GW(Aj)	Ar	total
Azolla filiculoides		6								1		1			8
Callitriche obtusangula	10	13	3	1	2	7	3	34	13	9	9	31	15	7	157
Ceratophyllum demersum	11	28	5	1	2			5	1	5	5	5	8	1	77
C. submersum	31	7	6		24	7	3	28	9		1	15	17	6	154
Chara sp		5			2	7	1	3		2		4	2		26
Crassula helmsii												1			1
Elodea nuttalii	4	28	2	1	6	1	1	9	2	4	3		2	2	65
Enteromorpha sp	25	15	7	2	18	4	6	15	10	10	9	25	14	11	171
Filamentous algae	23	23	7	1	3	11	3	48	17	12	13	25	22	8	216
Fontinalis antipyretica			1		4	1	1	2	1			2	1		13
Glyceria fluitans	8	32	4		3	4	3	48	14	11	9	19	9	2	166
Hottonia palustre	3	15													18
Hydrocharis morsus-ranae	2	43	3	3	4			11	5	2	1	8	9	7	98
Lemna minor	31	68	19	3	23	11	7	64	25	16	16	40	24	10	357
L. trisulca	36	67	18	2	30	19	6	67	23	13	12	41	29	14	377
L. gibba		1	2				1	3				4	3	1	15
Myriophyllum spicatum	22	11	11	2	20	4	5	31	4	6	3	16	10	9	154
Myriophyllum verticillatum		2													2
Nymphaea alba		3													3
Potamogeton berchtoldii			1		1			2	2			4		2	12
P. lucens	3	10	2												15
P. crispus		1			2			1	1	3	1	4	2		15
P. natans		7			2			1	2	1		2	1		16
P. pectinatus	29	12	15	2	22	9	3	34	6	5	4	15	13	6	175
P. pusillus	2	3			3	3	1					2			14
P. trichoides		8	1					1	1		1	2	1		15
Polygonum amphibium		7	2	1											10
Ranunculus circinatus	1	10			3		1		1					1	17
R. baudotti					2	3			1	2	3	2	2		15
Ranunculus trichophyllus	13	2	1		3	12	2	30	8	6	10	22	6	2	117
Sparganium emersum		1													1
Utricularia sp		8													8
Wolffia arrhiza					1							1			2
Zannichellia palustris			5		11	5	1	4	1	1		2	1	1	32
Alisma plantago-aquatica	4	47	4	2	2	4	2	28	15	8	8	20	11	9	164
Apium nodiflorum			1					24	7	9	3	16	7		67
Berula erecta				1											1
Butomus umbelatus		1			2										3
Carex riparia	2	8	2												12
Eleocharis palustris	28	26	6		17	9	1	72	17	13	8	44	16	2	259
Glyceria maxima		18	3		4						2				27
Hippuris vulgaris					1										1
Iris pseudocorus		9	1										2		12
Juncus articulatus	3	22	1		1	1	1	15	3	2		1	1		51
Nasturtium officinale agg.	8	25		2	2	6	1	36	14	11	11	19	15	1	151
Oenanthe aquatica					6	9	4	40	13	3	3	14	14	7	113
O. fistulosa	10	53	6		4	2		33	9	7	7	19	12	7	169
Phalaris arundinacea		4	1		1					2					8
Phragmites australis	28	15	13	3	27	15	7	17	10	2	8	4	8	8	165
Ranunculus sceleratus		1	1		1	1					1				5
Rumex hydrolapathum	3	19	3	3	2			7	3		1			1	42
Sagittaria sagittifolia		3													3
Samolus valerandi	1		1		1		1	7	1	1		7	5	1	26
Schoenoplectus tabernaemontani	5	3			15	7	3	13	7	6	2	3	15	2	81
Scirpus maritimus	24	3	15		31	15	5	34	24	4	8	24	24	17	228
Sparganium erectum	7	52	2	1	4	4	2	48	22	11	11	16	17	8	205
Typha angustifolia		19	5	2	3			4	4		5	6	6	3	57
Veronica catenata						10	1	25	7	6	2	19	5		75
Typha latifolia		2							1						3
Agrostis stolonifera		18						13	8	4	4	4	3	1	55
Althaea officinalis	2		1		3		1	8	20	1	5	6	10	12	69
Carex divisa					4	1								1	6
Carex distans		2						2					1	1	6
Carex otrubae		15	11	1	13	13	4	45	19	9	11	18	17	8	184
Epilobium hirsutum		4		1		2	1	2	9	1	1	2	2	3	28
Equisetum palustre		7			1			2	1		1	1			13
Galium palustre		6			3	7	3	42	18	12	9	14	11	6	131
Glaux maritima	2				12	1	1	2	1			1			20
Hydrocotyle vulgaris	3	9					1	21	3			8			45
Juncus effusus		36													36
Juncus inflexus	12	60	8	2	10	8	7	67	26	9	19	31	29	7	295
J. gerardii	1		2		7	3	1	12	1	2	4	13	4		50
Lycopus europaeus		5			1	1		5	3			1	1		17
Lythrum salicaria		4													4
Mentha aquatica		10			1			9	2	2	1		1		26
Myosotis laxa		1		1	1	2	1	21	6	4	6	11	1	1	56
Oenanthe lachenalii			5	2	24	2	4	23	5	7	5	13	7	3	100
Pulicaria dysenterica		7			1		1	9	8		7	4	7	2	46
Sium latifolium	1	3												1	5
Solanum dulcamara		5	1		3		1	2	5	1	10	2	2	3	35
Triglochin maritima					1	2									3
Triglochin palustris			2					6	2			3			13
number of ditches in block	45	92	25	3	43	24	12	98	40	17	22	53	36	24	534
number of choked\dry ditches	3	31	7	1				38	15	1	3	10	10	12	165

Total number of aquatic species	17	28	20	11	23	16	17	21	21	18	16	25	21	17	34
Total number of emergent species	12	21	16	8	20	13	12	17	18	15	17	15	17	13	27
Total number of bank species	6	14	7	4	13	10	11	16	15	9	11	15	12	12	21
Total number of all species	35	63	43	23	56	39	40	54	54	42	44	55	50	42	82

Table 2 Summary data 1993/4 Percentage frequency of species in 20m sections

ditch block	PS	PDW	PDE	DE(Aj)	PF	PW	PW(Aj)	PGE	GE(Aj)	PGN	GN(Aj)	PGW	GW(Aj)	Ar	total
Azolla filiculoides		6.5								5.9		1.9			1.5
Callitriche obtusangula	22.2	14.1	12.0	33.3	4.7	29.2	25.0	34.7	32.5	52.9	40.9	58.5	41.7	29.2	29.5
Ceratophyllum demersum	24.4	30.4	20.0	33.3	4.7			5.1	2.5	29.4	22.7	9.4	22.2	4.2	14.5
C. submersum	68.9	7.6	24.0		55.8	29.2	25.0	28.6	22.5		4.5	28.3	47.2	25.0	28.9
Chara sp		5.4			4.7	29.2	8.3	3.1		11.8		7.5	5.6		4.9
Crassula helmsii												1.9			0.2
Elodea nuttalii	8.9	30.4	8.0	33.3	14.0	4.2	8.3	9.2	5.0	23.5	13.6		5.6	8.3	12.2
Enteromorpha sp	55.6	16.3	28.0	66.7	41.9	16.7	50.0	15.3	25.0	58.8	40.9	47.2	38.9	45.8	32.1
Filamentous algae	51.1	25.0	28.0	33.3	7.0	45.8	25.0	49.0	42.5	70.6	59.1	47.2	61.1	33.3	40.6
Fontinalis antipyretica			4.0		9.3	4.2	8.3	2.0	2.5			3.8			2.4
Glyceria fluitans	17.8	34.8	16.0		7.0	16.7	25.0	49.0	35.0	64.7	40.9	35.8	25.0	8.3	31.2
Hottonia palustre	6.7	16.3													3.4
Hydrocharis morsus-ranae	4.4	46.7	12.0	100.0	9.3			11.2	12.5	11.8	4.5	15.1	25.0	29.2	18.4
Lemna minor	68.9	73.9	76.0	100.0	53.5	45.8	58.3	65.3	62.5	94.1	72.7	75.5	66.7	41.7	67.1
L. trisulca	80.0	72.8	72.0	66.7	69.8	79.2	50.0	68.4	57.5	76.5	54.5	77.4	80.6	58.3	70.9
L. gibba		1.1	8.0				8.3	3.1				7.5	8.3	4.2	2.8
Myriophyllum spicatum	48.9	12.0	44.0	66.7	46.5	16.7	41.7	31.6	10.0	35.3	13.6	30.2	27.8	37.5	28.9
Myriophyllum verticillatum		2.2													0.4
Nymphaea alba		3.3													0.6
Potamogeton berchtoldii			4.0		2.3			2.0	5.0			7.5		8.3	2.3
P. lucens	6.7	10.9	8.0												2.8
P. crispus		1.1			4.7			1.0	2.5	17.6	4.5	7.5	5.6		2.8
P. natans		7.6			4.7			1.0	5.0	5.9		3.8	2.8		3.0
P. pectinatus	64.4	13.0	60.0	66.7	51.2	37.5	25.0	34.7	15.0	29.4	18.2	28.3	36.1	25.0	32.9
P. pusillus	4.4	3.3			7.0	12.5	8.3					3.8			2.6
P. trichoides		8.7	4.0					1.0	2.5		4.5	3.8	2.8		2.8
Polygonum amphibium		7.6	8.0	33.3											1.9
Ranunculus circinatus	2.2	10.9			7.0		8.3		2.5					4.2	3.2
R. baudotti					4.7	12.5		0.0	2.5	11.8	13.6	3.8	5.6		2.8
Ranunculus trichophyllus	28.9	2.2	4.0		7.0	50.0	16.7	30.6	20.0	35.3	45.5	41.5	16.7	8.3	22.0
Sparganium emersum		1.1													0.2
Utricularia sp		8.7													1.5
Wolffia arrhiza					2.3							1.9			0.4
Zannichellia palustris			20.0		25.6	20.8	8.3	4.1	2.5	5.9		3.8	2.8	4.2	6.0
Alisma plantago-aquatica	8.9	51.1	16.0	66.7	4.7	16.7	16.7	28.6	37.5	47.1	36.4	37.7	30.6	37.5	30.8
Apium nodiflorum			4.0					24.5	17.5	52.9	13.6	30.2	19.4		12.6
Berula erecta				33.3											0.2
Butomus umbelatus		1.1			4.7										0.6
Carex riparia	4.4	8.7	8.0												2.3
Eleocharis palustris	62.2	28.3	24.0		39.5	37.5	8.3	73.5	42.5	76.5	36.4	83.0	44.4	8.3	48.7
Glyceria maxima		19.6	12.0		9.3						9.1				5.1
Hippuris vulgaris					2.3										0.2
Iris pseudocorus		9.8	4.0										5.6		2.3
Juncus articulatus	6.7	23.9	4.0		2.3	4.2	8.3	15.3	7.5	11.8		1.9	2.8		9.6
Nasturtium officinale agg.	17.8	27.2		66.7	4.7	25.0	8.3	36.7	35.0	64.7	50.0	35.8	41.7	4.2	28.4
Oenanthe aquatica					14.0	37.5	33.3	40.8	32.5	17.6	13.6	26.4	38.9	29.2	21.2
O. fistulosa	22.2	57.6	24.0		9.3	8.3		33.7	22.5	41.2	31.8	35.8	33.3	29.2	31.8
Phalaris arundinacea		4.3	4.0		2.3										1.5
Phragmites australis	62.2	16.3	52.0	100.0	62.8	62.5	58.3	17.3	25.0	11.8	36.4	7.5	22.2	33.3	31.0
Ranunculus sceleratus		1.1	4.0		2.3	4.2					4.5				0.9
Rumex hydrolapathum	6.7	20.7	12.0	100.0	4.7			7.1	7.5		4.5			4.2	7.9
Sagittaria sagittifolia		3.3													0.6
Samolus valerandi	2.2		4.0		2.3		8.3	7.1	2.5	5.9		13.2	13.9	4.2	4.9
Schoenoplectus tabernaemontani	11.1	3.3			34.9	29.2	25.0	13.3	17.5	35.3	9.1	5.7	41.7	8.3	15.2
Scirpus maritimus	53.3	3.3	60.0		72.1	62.5	41.7	34.7	60.0	23.5	36.4	45.3	66.7	70.8	42.9
Sparganium erectum	15.6	56.5	8.0	33.3	9.3	16.7	16.7	49.0	55.0	64.7	50.0	30.2	47.2	33.3	38.5
Typha angustifolia		20.7	20.0	66.7	7.0			4.1	10.0		22.7	11.3	16.7	12.5	10.7
Veronica catenata						41.7	8.3	25.5	17.5	35.3	9.1	35.8	13.9		14.1
Typha latifolia		2.2							2.5						0.6
Agrostis stolonifera		19.6						13.3	20.0	23.5	18.2	7.5	8.3	4.2	10.3
Althaea officinalis	4.4		4.0		7.0		8.3	8.2	50.0	5.9	22.7	11.3	27.8	50.0	13.0
Carex divisa					9.3	4.2								4.2	1.1
Carex distans		2.2						2.0					2.8	4.2	1.1
Carex otrubae		16.3	44.0	33.3	30.2	54.2	33.3	45.9	47.5	52.9	50.0	34.0	47.2	33.3	34.6
Epilobium hirsutum		4.3		33.3		8.3	8.3	2.0	22.5	5.9	4.5	3.8	5.6	12.5	5.3
Equisetum palustre		7.6			2.3			2.0	2.5		4.5	1.9			2.4
Galium palustre		6.5			7.0	29.2	25.0	42.9	45.0	70.6	40.9	26.4	30.6	25.0	24.6
Glaux maritima	4.4				27.9	4.2	8.3	2.0	2.5			1.9			3.8
Hydrocotyle vulgaris	6.7	9.8					8.3	21.4	7.5			15.1			8.5
Juncus effusus		39.1													6.8
Juncus inflexus	26.7	65.2	32.0	66.7	23.3	33.3	58.3	68.4	65.0	52.9	86.4	58.5	80.6	29.2	55.5
J. gerardii	2.2		8.0		16.3	12.5	8.3	12.2	2.5	11.8	18.2	24.5	11.1		9.4
Lycopus europaeus		5.4			2.3	4.2		5.1	7.5			1.9	2.8		3.2
Lythrum salicaria		4.3													0.8
Mentha aquatica		10.9			2.3			9.2	5.0	11.8	4.5		2.8		4.9
Myosotis laxa		1.1		33.3	2.3	8.3	8.3	21.4	15.0	23.5	27.3	20.8	2.8	4.2	10.5
Oenanthe lachenalii			20.0	66.7	55.8	8.3	33.3	23.5	12.5	41.2	22.7	24.5	19.4	12.5	18.8
Pulicaria dysenterica		7.6			2.3		8.3	9.2	20.0		31.8	7.5	19.4	8.3	8.6
Sium latifolium	2.2	3.3												4.2	0.9
Solanum dulcamara		5.4	4.0		7.0		8.3	2.0	12.5	5.9	45.5	3.8	5.6	12.5	6.6
Triglochin maritima					2.3	8.3									0.6
Triglochin palustris			8.0					6.1	5.0			5.7			2.4
number of ditches in block	45	92	25	3	43	24	12	98	40	17	22	53	36	24	534
number of choked\dry ditches	6.7	33.7	28.0	33.3				38.8	37.5	5.9	13.6	18.9	27.8	50.0	31.0

Table 3 Summary 1985 data Frequency of species in full ditch lengths

ditch block	PS	PDW	PDE	DE(Aj)	PF	PW	PW(Aj)	PGE	GE(Aj)	PGN	GN(Aj)	PGW	GW(Aj)	Ar	tot
Azolla filiculoides		2	2												4
Callitriche obtusangula	19	43	1	1	5	13	2	53	18	10	15	39	16	6	241
Ceratophyllum demersum	2	11	1		3			1		1	1	14	1	1	36
C. submersum	29	14	8		21	3		20	4	5	2	7	6	3	122
Chara sp		4						2			2	1			9
Elodea canadensis	2	16	2					1	1	2	3	1		1	29
Enteromorpha sp	27	19	10	5	21	4	3	38	12	13	8	41	22	16	239
Filamentous algae	7	23	3		9	3		19	5	1		13	2	7	92
Glyceria fluitans	11	48	4		6	10	4	67	25	15	14	31	11	7	253
Hottonia palustris	2	17		1										1	21
Hydrocharis morsus-ranae	4	48	1	1	5			13	7	3	2	6	5	2	97
Lemna minor	34	56	3		12	6	3	49	15	15	13	40	19	18	283
L. trisulca	36	51	4	1	22	8	3	64	13	12	8	36	21	15	294
L. gibba	1	2			4	2	1	4	1	2	2	5	5	2	31
Myriophyllum spicatum	18	3	10		22	4	4	37	5	10	7	12	5	8	145
Myriophyllum verticillatum					1						1			1	3
Nupha lutea		1													1
Nymphaea alba		3													3
Potamogeton berchtoldii											1	3	1		5
P. lucens	2	10												1	13
P. crispus		1			1			6	3	2	2	12	5	1	33
P. friesii		5													5
P. natans		18			1			5	3	4	2	3	1	1	38
P. pectinatus	28	6	11		21	3	3	32	11	5	2	12	1	5	140
P. pusillus	1	14	1	1	1			5		4	1	8	2	2	40
Polygonum amphibium		4	1												5
Ranunculus circinatus	2	6									1				9
R. baudotti	2	1			4	1	1	16	2	1	1	9	2		40
Ranunculus trichophyllus	12	7	1		7	12	2	46	13	7	9	35	13	3	167
Sparganium emersum								2							2
Utricularia sp	1	9													10
Zannichellia palustris	4	2			7	3		14	4	3	2	14	6		59
Alisma plantago-aquatica	14	64	3	2	2	5	5	50	26	12	18	28	17	11	257
Apium nodiflorum	1							27	15	6	1	14	8	3	75
Berula erecta		6												2	8
Butomus umbellatus		2			1						1		1		5
Carex riparia	6	21		1							2			6	36
Eleocharis palustris	34	56	12	2	26	10	5	82	23	17	12	51	24	11	365
Glyceria maxima		30	1		4			1						6	42
Iris pseudocorus		19	1	1						1			2	2	26
Juncus articulatus		9				2		11	6	2	1	3	3	2	39
Oenanthe aquatica	13	11		1	2	12	4	53	18	4	6	24	11	6	165
O. fistulosa	18	60	4	1	21	10	4	31	11	7	6	18	14	11	216
Nasturtium officinale agg.	12	21		2	3	5	5	43	13	13	11	30	11	7	176
Phalaris arundinacea		2													2
Phragmites australis	40	32	13	7	33	22	8	24	13	3	8	8	10	14	235
Ranunculus sceleratus		14	2			1	2	2			2	1			24
Rumex hydrolapathum	6	27	1	2	2			8	3					2	51
Sagittaria sagittifolia		6													6
Samolus valerandi	10	9	2	1	2			8	4	1	1	2	1	3	44
Schoenoplectus tabernaemontani	12	5	1		27	17	6	35	11	8	5	19	16	10	173
Scirpus maritimus	33	13	13	3	34	19	7	53	33	12	10	29	26	15	300
Sparganium erectum	8	60	2	1	4	4	4	61	33	10	14	22	14	15	252
Typha angustifolia	7	30	3	4	4		1	7	9		6	11	4	5	91
Typha latifolia		3							2		3				8
Veronica catenata	6	6		1	2	6	1	27	9	8	3	21	4	3	97
Agrostis stolonifera		30	5	3		12	6	44	19	11	10	35	14	10	199
Althaea officinalis	14	6	2	3	11	6	6	16	23	4	7	15	12	16	141
Apium graveolens												3	1		4
Carex distans					1							1	1		3
Carex otrubae		27	4		12	12	6	33	20	12	15	20	16	11	188
Chenopodium chenopodiodes					1										1
Epilobium hirsutum		10	1		1		3	5	1	1	5	6	1	5	39
Equisetum palustre		9						1						1	11
Galium palustre		13			5	6	5	46	21	5	3	15	9	5	133
Glaux maritima	4				5										9
Hydrocotyle vulgaris	5	12						19	8			7			51
Juncus inflexus	5	68	7	2	14	10	7	64	24	10	15	34	16	11	287
Juncus effusus		34													34
J. gerardii	8		5	1	17	10	2	15	1	1		5	7	1	73
Lycopus europaeus		4			1		1	2	4		1	1			14
Lythrum salicaria		7													7
Mentha aquatica		29	1		3		1	7	5	4	6		1		57
Myosotis laxa		29	1	1	3	4	2	37	11	6	4	12	2	3	115
Oenanthe lachenalii	20	2	3	1	24	3	1	6	1	4	4	5	1	2	77
Ophioglossum vulgatum												1			1
Spergularia marina					3							1			4
Pulicaria dysenterica		9		1	3		1	7	8	4	10	7		6	56
Salicornia sp					1										1
Sium latifolium	4	11		1										1	17
Solanum dulcamara		4			2		1	1	3	2	7	4	2		26
Triglochin maritima					3										3
Triglochin palustris			2					1		1					4
number of ditches	45	92	15	7	43	25	10	103	41	19	23	60	27	31	541

Totals															
Total number of aquatic species	21	29	16	6	19	13	10	20	17	19	22	21	19	20	31
Total number of emergent species	15	25	15	15	18	13	14	20	18	16	20	16	18	20	23
Total number of bank species	7	15	8	7	15	7	11	14	12	11	10	16	11	11	27
Total number of all species	43	69	39	28	52	33	35	54	47	46	52	53	48	51	81

Table 4 Summary 1985 data Percentage frequency of species in full ditch lengths

ditch block	PS	PDW	PDE	DE(Aj)	PF	PW	PW(Aj)	PGE	GE(Aj)	PGN	GN(Aj)	PGW	GW(Aj)	Ar	tot
Azolla filiculoides		2.2	13.3												0.8
Callitriche obtusangula	42.2	46.7	6.7	14.3	11.6	52.0	20.0	51.5	43.9	52.6	65.2	65.0	43.2	19.4	45.3
Ceratophyllum demersum	4.4	12.0	6.7		7.0			1.0		5.3	4.3	23.3	2.7	3.2	6.8
C. submersum	64.4	15.2	53.3		48.8	12.0		19.4	9.8	26.3	8.7	11.7	16.2	9.7	22.9
Chara sp		4.3						1.9			8.7	1.7			1.7
Elodea canadensis	4.4	17.4	13.3					1.0	2.4	10.5	13.0	1.7		3.2	5.5
Enteromorpha sp	60.0	20.7	66.7	71.4	48.8	16.0	30.0	36.9	29.3	68.4	34.8	68.3	59.5	51.6	44.9
Filamentous algae	15.6	25.0	20.0		20.9	12.0		18.4	12.2	5.3		21.7	5.4	22.6	17.3
Glyceria fluitans	24.4	52.2	26.7		14.0	40.0	40.0	65.0	61.0	78.9	60.9	51.7	29.7	22.6	47.6
Hottonia palustris	4.4	18.5		14.3										3.2	3.9
Hydrocharis morsus-ranae	8.9	52.2	6.7	14.3	11.6			12.6	17.1	15.8	8.7	10.0	13.5	6.5	18.2
Lemna minor	75.6	60.9	20.0		27.9	24.0	30.0	47.6	36.6	78.9	56.5	66.7	51.4	58.1	53.2
L. trisulca	80.0	55.4	26.7	14.3	51.2	32.0	30.0	62.1	31.7	63.2	34.8	60.0	56.8	48.4	55.3
L. gibba	2.2	2.2			9.3	8.0	10.0	3.9	2.4	10.5	8.7	8.3	13.5	6.5	5.8
Myriophyllum spicatum	40.0	3.3	66.7		51.2	16.0	40.0	35.9	12.2	52.6	30.4	20.0	13.5	25.8	27.3
Myriophyllum verticillatum					2.3						4.3			3.2	0.6
Nupha lutea		1.1													0.2
Nymphaea alba		3.3													0.6
Potamogeton berchtoldii											4.3	5.0	2.7		0.9
P. lucens	4.4	10.9												3.2	2.4
P. crispus		1.1			2.3			5.8	7.3	10.5	8.7	20.0	13.5	3.2	6.2
P. friesii		5.4													0.9
P. natans		19.6			2.3			4.9	7.3	21.1	8.7	5.0	2.7	3.2	7.1
P. pectinatus	62.2	6.5	73.3		48.8	12.0	30.0	31.1	26.8	26.3	8.7	20.0	2.7	16.1	26.3
P. pusillus	2.2	15.2	6.7	14.3	2.3			4.9		21.1	4.3	13.3	5.4	6.5	7.5
Polygonum amphibium		4.3	6.7												0.9
Ranunculus circinatus	4.4	6.5									4.3				1.7
R. baudotti	4.4	1.1			9.3	4.0	10.0	15.5	4.9	5.3	4.3	15.0	5.4		7.5
Ranunculus trichophyllus	26.7	7.6	6.7		16.3	48.0	20.0	44.7	31.7	36.8	39.1	58.3	35.1	9.7	31.4
Sparganium emersum								1.9							0.4
Utricularia sp	2.2	9.8													1.9
Zannichellia palustris	8.9	2.2			16.3	12.0		13.6	9.8	15.8	8.7	23.3	16.2		11.1
Alisma plantago-aquatica	31.1	69.6	20.0	28.6	4.7	20.0	50.0	48.5	63.4	63.2	78.3	46.7	45.9	35.5	48.3
Apium nodiflorum	2.2							26.2	36.6	31.6	4.3	23.3	21.6	9.7	14.1
Berula erecta		6.5												6.5	1.5
Butomus umbellatus		2.2			2.3						4.3		2.7		0.9
Carex riparia	13.3	22.8		14.3							8.7			19.4	6.8
Eleocharis palustris	75.6	60.9	80.0	28.6	60.5	40.0	50.0	79.6	56.1	89.5	52.2	85.0	64.9	35.5	68.6
Glyceria maxima		32.6	6.7		9.3			1.0						19.4	7.9
Iris pseudocorus		20.7	6.7	14.3						5.3			5.4	6.5	4.9
Juncus articulatus		9.8				8.0		10.7	14.6	10.5	4.3	5.0	8.1	6.5	7.3
Nasturtium officinale agg.	26.7	22.8		28.6	7.0	20.0	50.0	41.7	31.7	68.4	47.8	50.0	29.7	22.6	33.1
Oenanthe aquatica	28.9	12.0		14.3	4.7	48.0	40.0	51.5	43.9	21.1	26.1	40.0	29.7	19.4	31.0
O. fistulosa	40.0	65.2	26.7	14.3	48.8	40.0	40.0	30.1	26.8	36.8	26.1	30.0	37.8	35.5	40.6
Phalaris arundinacea		2.2													0.4
Phragmites australis	88.9	34.8	86.7	100.0	76.7	88.0	80.0	23.3	31.7	15.8	34.8	13.3	27.0	45.2	44.2
Ranunculus sceleratus		15.2	13.3			4.0	20.0	1.9			8.7	1.7			4.5
Rumex hydrolapathum	13.3	29.3	6.7	28.6	4.7			7.8	7.3					6.5	9.6
Sagittaria sagittifolia		6.5													1.1
Samolus valerandi	22.2	9.8	13.3	14.3	4.7			7.8	9.8	5.3	4.3	3.3	2.7	9.7	8.3
Schoenoplectus tabernaemontani	26.7	5.4	6.7		62.8	68.0	60.0	34.0	26.8	42.1	21.7	31.7	43.2	3.2	32.0
Scirpus maritimus	73.3	14.1	86.7	42.9	79.1	76.0	70.0	51.5	80.5	63.2	43.5	48.3	70.3	48.4	56.4
Sparganium erectum	17.8	65.2	13.3	14.3	9.3	16.0	40.0	59.2	80.5	52.6	60.9	36.7	37.8	48.4	47.4
Typha angustifolia	15.6	32.6	20.0	57.1	9.3		10.0	6.8	22.0		26.1	18.3	10.8	16.1	17.1
Typha latifolia		3.3							4.9		13.0				1.5
Veronica catenata	13.3	6.5		14.3	4.7	24.0	10.0	26.2	22.0	42.1	13.0	35.0	10.8	9.7	18.2
Agrostis stolonifera		32.6	33.3	42.9		48.0	60.0	42.7	46.3	57.9	43.5	58.3	37.8	32.3	37.4
Althaea officinalis	31.1	6.5	13.3	42.9	25.6	24.0	60.0	15.5	56.1	21.1	30.4	25.0	32.4	51.6	26.5
Apium graveolens												5.0	2.7		0.8
Carex distans					2.3							1.7	2.7		0.6
Carex otrubae		29.3	26.7		27.9	48.0	60.0	32.0	48.8	63.2	65.2	33.3	43.2	35.5	35.3
Chenopodium chenopodiodes					2.3										0.2
Epilobium hirsutum		10.9	6.7		2.3		30.0	4.9	2.4	5.3	21.7	10.0	2.7	16.1	7.3
Equisetum palustre		9.8						1.0						32.2	2.1
Galium palustre		14.1			11.6	24.0	50.0	44.7	51.2	26.3	13.0	25.0	24.3	16.1	25.0
Glaux maritima	8.9				11.6										1.7
Hydrocotyle vulgaris	11.1	13.0						18.4	19.5			11.7			9.6
Juncus inflexus	11.1	73.9	46.7	28.6	32.6	40.0	70.0	62.1	58.5	52.6	65.2	56.7	43.2	35.5	53.9
Juncus effusus		37.0													6.4
J. gerardii	17.8		33.3	14.3	39.5	40.0	20.0	14.6	2.4	5.3		8.3	18.9	3.2	13.7
Lycopus europaeus		4.3			2.3		10.0	1.9	9.8		4.3	1.7			2.6
Lythrum salicaria		7.6													1.3
Mentha aquatica		31.5	6.7		7.0		10.0	6.8	12.2	21.1	26.1		2.7		10.7
Myosotis laxa		31.5	6.7	14.3	7.0	16.0	20.0	35.9	26.8	31.6	17.4	20.0	5.4	9.7	21.6
Oenanthe lachenalii	44.4	2.2	20.0	14.3	55.8	12.0	10.0	5.8	2.4	21.1	17.4	8.3	2.7	6.5	14.5
Ophioglossum vulgatum												1.7			0.2
Spergularia marina					7.0							1.7			0.8
Pulicaria dysenterica		9.8		14.3	7.0		10.0	6.8	19.5	21.1	43.5	11.7		19.4	10.5
Salicornia sp					2.3										0.2
Sium latifolium	8.9	12.0		14.3										3.2	3.2
Solanum dulcamara		4.3			4.7		10.0	1.0	7.3	10.5	30.4	6.7	5.4		4.9
Triglochin maritima					7.0										0.6
Triglochin palustris			13.3					1.0		5.3					0.8
number of ditches	45	92	15	7	43	25	10	103	41	19	23	60	27	31	541

5. DISCUSSION

5.1 Species showing an increase in abundance

Table 5 below shows those species which show an apparent percentage increase in abundance between 1985 and 1993/4.

Species	Percentage
Lemna trisulca	15.6
Lemna minor	13.9
Ceratophyllum demersum	7.7
Elodea nuttalii	6.8
Potamogeton pectinatus	6.6
Ceratophyllum submersum	6.0
Oenanthe lachenalii	4.3
Chara sp	3.2
Potamogeton trichoides	2.8
Fontinalis antipyretica	2.4
Juncus articulatus	2.3
Glaux maritima	2.1
Triglochin palustris	1.7
Solanum dulcamara	1.7
Juncus inflexus	1.5
Ranunculus circinatus	1.5
Myriophyllum spicatum	1.5
Potamogeton berchtoldii	1.3
Phalaris arundinacea	1.1
Carex divisa	1.1
Polygonum amphibium	0.9
Azolla filiculoides	0.8
Carex distans	0.6
Lycopus europaeus	0.6
Equisetum palustre	0.4
Potamogeton lucens	0.4
Wolffia arrhiza	0.4
Juncus effusus	0.4
Hydrocharis morsus-ranae	0.2
Hippuris vulgaris	0.2
Nymphaea alba	0.0
Triglochin maritima	0.0

A total of 33 species appear to have either stayed the same or shown an increased in abundance, 19 of which are key

species. Eleven key aquatic species appear to have increased, including *Ceratophyllum demersum, Potamogeton pectinatus* and *Ceratophyllum submersum*. These are relatively marginal increases however compared to the large increases shown by filamentous algae, *Lemna trisulca* and *Lemna minor*, though it is probable that filamentous algae if not the *Lemnas* were under-recorded in 1985. It is possible however that the ditch system is now more eutrophic, either as a result of fertilizer run off or low water levels during the recent drought years concentrating nutrients which have not been adequately flushed out.

Several species of *Potamogeton* appear to have increased, or in the case of *P. trichoides* are newly recorded, though this probably reflects uncertain identification in the 1985 survey. *P. trichoides*, a nationally scarce species, (which was recorded by Latimer in 1980 but not in 1985) appears to be well distributed across the site, though of low abundance. *P. fresii*, recorded in the 1985 survey, was not re-recorded and may have been confused in 1985 for young specimens of *P. crispus*. In 1985 *P. pusillus* was recorded much more frequently than *P. berchtoldii*, though all specimens critical examined in 1994 proved to be *P. berchtoldii* (providing the key identification features are reliable), and specimens recorded as *P. pusillus* earlier in the survey were not critically examined, and cannot therefore be confirmed.

The majority of the species which appear to have increase are aquatics, though several bank species such as *Oenanthe lachenalii, Glaux maritima* and *Triglochin palustre* also appear to have increased. This may reflect the increase in sheep grazing on the marsh, producing for them a more favourable short sward structure along the banks.

5.2.1 **Alien/problem species**

Three alien/problem species have appeared to increase in abundance; filamentous algae, *Elodea nuttalii, Azolla filiculoides* and one is newly recorded; *Crassula helmsii* (1 ditch). In 1985 only *Elodea canadensis* was recorded, whereas only *Elodea nuttalii* was recorded in 1993/4, and records for both species have been combined for comparison

between survey years. The resulting 7% increase may reflect a general increase in the distribution and abundance of *Elodea nuttalii* in recent years, which has largely displaced *Elodea canadensis*. Both *Lemna gibba* and *Azolla filiculoides* are of low abundance and do not appear to pose a significant threat. The occurrence of *Crassula helmsii* in one ditch is of more concern, and steps should be taken to eliminate this invasive plant from the site.

5.3 Comparison of ranking of species

In Table 6 species are compared with regard their relative abundance in the two survey years 1985 and 1993/4. Thus for example *Lemna triscula* is the most abundant species in 1994, but only the third most abundant in 1985. This gives some indication of changes that may have occurred in species abundance, though not without caution. The large changes in relative of abundance of Filamentous algae and *Potamogeton pusillus* for example reflect differences in recording and identification rather than actual changes in abundance.

Those species which show an increase in abundance show a corresponding increase in rank. While the majority of aquatic and bank species show an increase, the majority of emergent species show a decrease in rank. The large decrease in rank of the two nationally scarce species *Althea officinalis* and *Sium latifolium* probably does reflect a real decrease in their overall abundance, as farming practice has shifted toward more intensive sheep grazing and less hay cropping. A way of alleviating the effects of intensive sheep grazing on emergents has been tried this year at Fairfield, where the growth of emergent species has been successfully encouraged by temporary electric fencing along ditch banks. In addition better control of water levels may also help, as ditches which are liable to dry can be completely grazed out, and regrowth of emergents after the ditch has refilled impeded.

No adverse effect of intensive grazing on the majority of bank species is apparent from these results, with species such as *Glaux maritima, Triglochin palustre* and *Juncus spp* showing an increase in rank, corresponding with their increase in abundance. These species probably benefit from the sward structure produced by grazing, though they may have been under-recorded in 1985. Several bank species were

Table 6 Changes in species ranking 1985 - 1994

Species ranking in	1994	1985	change
Lemna trisulca	1	3	2
Lemna minor	2	5	3
Juncus inflexus	3	4	1
Eleocharis palustris	4	1	-3
Scirpus maritimus	5	2	-3
Filamentous algae	6	26	20
Sparganium erectum	7	8	1
Carex otrubae	8	13	5
Potamogeton pectinatus	9	20	11
Enteromorpha sp	10	10	0
Oenanthe fistulosa	11	12	1
Glyceria fluitans	12	7	-5
Phragmites australis	13	11	-2
Alisma plantago-aquatica	14	6	-8
Callitriche obtusangula	15	9	-6
Ceratophyllum submersum	16	22	6
Myriophyllum spicatum	17	18	1
Nasturtium officinale agg.	18	14	-4
Galium palustre	19	21	2
Ranunculus trichophyllus	20	15	-5
Oenanthe aquatica	21	16	-5
Oenanthe lachenalii	22	28	6
Hydrocharis morsus-ranae	23	24	1
Schoenoplectus tabernaemontani	24	17	-7
Ceratophyllum demersum	25	43	18
Veronica catenata	26	24	-2
Althaea officinalis	27	19	-8
Apium nodiflorum	28	29	1
Elodea nuttalii/canadensis	29	48	19
Typha angustifolia	30	27	-3
Myosotis laxa	31	23	-8
Juncus articulatus	32	40	8
Juncus gerardii	33	30	-3
Pulicaria dysenterica	34	33	-1
Hydrocotyle vulgaris	35	34	-1
Rumex hydrolapathum	36	34	-2
Juncus effusus	37	45	8
Solanum dulcamara	38	49	11
Zannichellia palustris	39	31	-8
Epilobium hirsutum	40	40	0
Glyceria maxima	41	37	-4
Samolus valerandi	42	36	-6
Mentha aquatica	42	32	-10
Chara sp	42	58	16
Glaux maritima	45	58	13
Hottonia palustre	46	52	6
Ranunculus circinatus	47	58	11
Lycopus europaeus	47	54	7
Potamogeton natans	49	42	-7
Potamogeton crispus	50	46	-4
Potamogeton lucens	50	55	5
Lemna gibba	50	47	-3
Ranunculus baudotti	50	38	-12
Potamogeton pusillus	54	38	-16
Equisetum palustre	55	56	1
Triglochin palustris	55	68	13
Potamogeton berchtoldii	57	65	8
Carex riparia	57	43	-14
Iris pseudocorus	57	49	-8
Polygonum amphibium	60	65	5
Azolla filiculoides	61	68	7
Utricularia sp	61	57	-4
Carex distans	63	70	7
Phalaris arundinacea	63	73	10
Sium latifolium	65	53	-12
Ranunculus sceleratus	65	51	-14
Lythrum salicaria	67	63	-4
Nymphaea alba	68	70	2
Sagittaria sagittifolia	68	64	-4
Typha latifolia	68	61	-7
Butomus umbelatus	68	65	-3
Myriophyllum verticillatum	72	70	-2
Berula erecta	73	61	-12

Species in descending order	change
Filamentous algae	20
Elodea nuttalii/canadensis	19
Ceratophyllum demersum	18
Chara sp	16
Triglochin palustris	13
Glaux maritima	13
Potamogeton pectinatus	11
Solanum dulcamara	11
Ranunculus circinatus	11
Phalaris arundinacea	10
Potamogeton berchtoldii	8
Juncus effusus	8
Juncus articulatus	8
Lycopus europaeus	7
Carex distans	7
Azolla filiculoides	7
Oenanthe lachenalii	6
Hottonia palustre	6
Ceratophyllum submersum	6
Polygonum amphibium	5
Potamogeton lucens	5
Carex otrubae	5
Lemna minor	3
Galium palustre	2
Lemna trisulca	2
Nymphaea alba	2
Oenanthe fistulosa	1
Sparganium erectum	1
Myriophyllum spicatum	1
Juncus inflexus	1
Hydrocharis morsus-ranae	1
Apium nodiflorum	1
Equisetum palustre	1
Enteromorpha sp	0
Epilobium hirsutum	0
Pulicaria dysenterica	-1
Hydrocotyle vulgaris	-1
Veronica catenata	-2
Myriophyllum verticillatum	-2
Rumex hydrolapathum	-2
Phragmites australis	-2
Eleocharis palustris	-3
Typha angustifolia	-3
Butomus umbelatus	-3
Lemna gibba	-3
Juncus gerardii	-3
Scirpus maritimus	-3
Nasturtium officinale agg.	-4
Glyceria maxima	-4
Lythrum salicaria	-4
Sagittaria sagittifolia	-4
Utricularia sp	-4
Potamogeton crispus	-4
Glyceria fluitans	-5
Ranunculus trichophyllus	-5
Oenanthe aquatica	-5
Callitriche obtusangula	-6
Samolus valerandi	-6
Potamogeton natans	-7
Typha latifolia	-7
Schoenoplectus tabernaemontani	-7
Alisma plantago-aquatica	-8
Myosotis laxa	-8
Zannichellia palustris	-8
Iris pseudocorus	-8
Althaea officinalis	-8
Mentha aquatica	-10
Berula erecta	-12
Ranunculus baudotti	-12
Sium latifolium	-12
Ranunculus sceleratus	-14
Carex riparia	-14
Potamogeton pusillus	-16

not re-recorded in 1993/4, notably the saltmarsh species *Salicornia sp*, *Puccinella fasciculata* and *Chenopodium chenopodiodes* at Fairfield. The area where *Salicornia* occurred has reverted to reedbed and needs grazing. Similarly *Chenopodium chenopodiodes* requires poached muddy margins, and the re-introduction of cattle at Fairfield may encourage its return. Though it was not recorded *Puccinella fasciculata* may still be present as no specific search was made for it.

5.4 **Comparison between areas**

To enable a comparison between different areas of grazing marsh corresponding pasture and adjacent arable ditch blocks have been combined. Tables 8-11 show the abundance and percentage abundance of key species in each area, for both 1985 and 1993/4.

5.4.1 **Comparison of species totals**

In the following table the areas are listed according to the total number of key aquatic, emergent and bank species they contain. (This is of more use than the average number of species per ditch section because species totals are more comparable between the two survey years.)

Table 7 Comparison of key species totals between areas and survey years.

	aquatic species		**emergent species**		**bank species**		**all key species**		
year	**85**	**94**	**85**	**94**	**85**	**94**	**85**	**94**	**+/-**
DOWELS WEST	19	19	15	11	9	7	**43**	**37**	-6
FAIRFIELD	12	15	11	11	12	9	35	35	0
GULDEFORD W	13	15	11	10	11	9	35	34	-1
GULDEFORD E	13	14	11	10	8	9	32	33	+1
GULDEFORD N	15	12	12	11	7	5	**34**	**28**	-6
DOWELS EAST	9	11	12	11	7	4	28	26	-2
WOOLPACK	6	9	7	7	6	9	**19**	**25**	+6
SNARGATE	13	10	11	7	4	5	**28**	**22**	-6
ARABLE	6	7	10	6	4	5	20	18	-2
totals	22	23	16	17	**18**	**13**	56	53	-3

Changes in species numbers by 5 or more are highlighted in bold.

Table 7 shows that the total numbers of species recorded for different areas of the marsh and overall are very similar between the two survey years, which indicates that on a broad scale site diversity appears to have been maintained.

The only significant change in the overall totals is the decrease of 5 in the number of bank species, which is accounted for mainly by the loss of three species which previously occurred at Fairfield. However the comparison of numbers of species does not established if there has been any significant change in their abundance.

Figures 3-6 give a graphical representation of the number of key aquatic, emergent and bank species in each area.

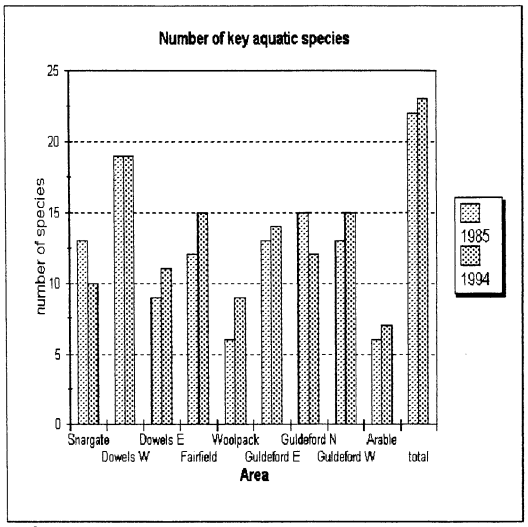


Figure 3

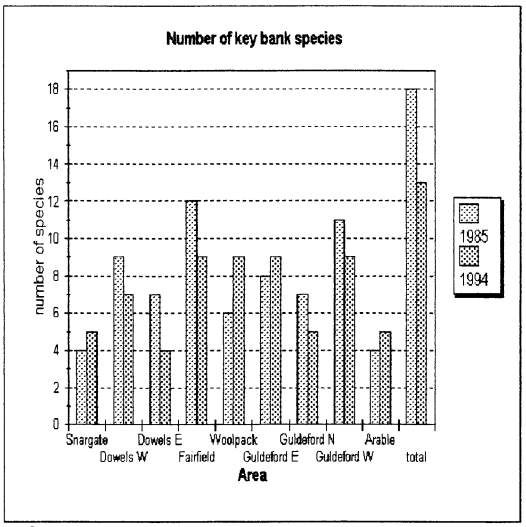


Figure 5

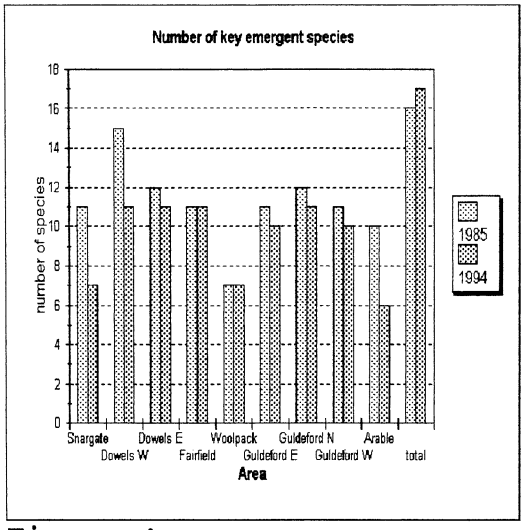


Figure 4

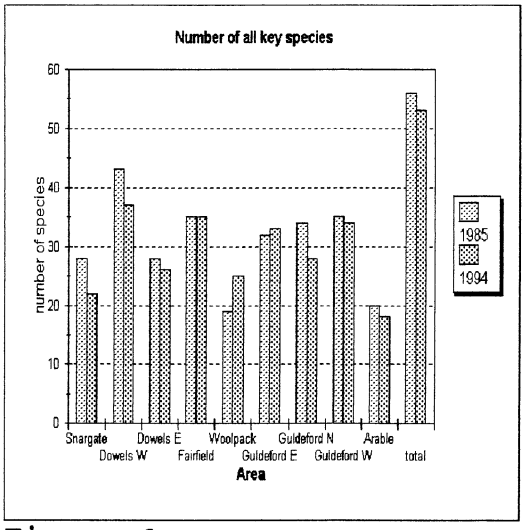


Figure 6

5.4.2 **Diversity Index**

In order to accentuate more clearly the differences in diversity between areas a relative index of diversity has been calculated, based on the ranking of areas with regard the number of aquatic, emergent and bank species they contain. In this context diversity is not simply the overall number of key species each area contains, but takes into account the numbers of species in each of the three groups. Thus an area with several aquatic, emergent and bank species is considered more diverse than an area with the same number of species in one group only.

The index is calculated by first adding the ranking position of each area within the four groups (aquatic, emergent, bank and all species) to give the value x. If an area was 9th in each of the 4 groups, this would give the highest possible value of x = 36. The index is then calculated using the formula; score = 36 - x, where x is the value for each area, so that the area which was 9th in each group scores 0. The minumim value for x is 4, therefore the maximum score is 32.

The index scores for each area for both 1985 and 1993/4 are given in Table 8, and are represented graphically in Figures 7 and 8.

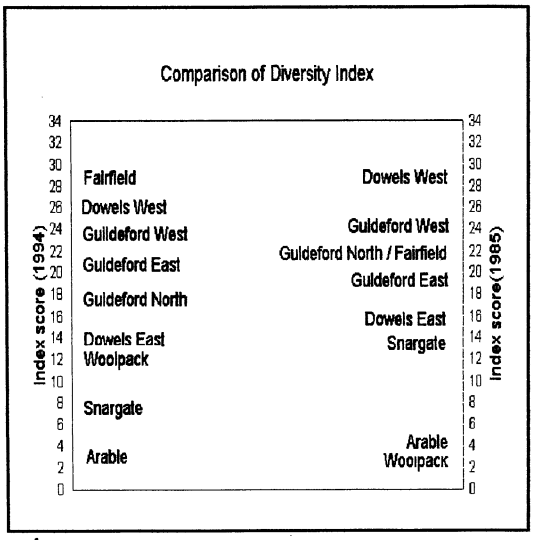


Figure 7

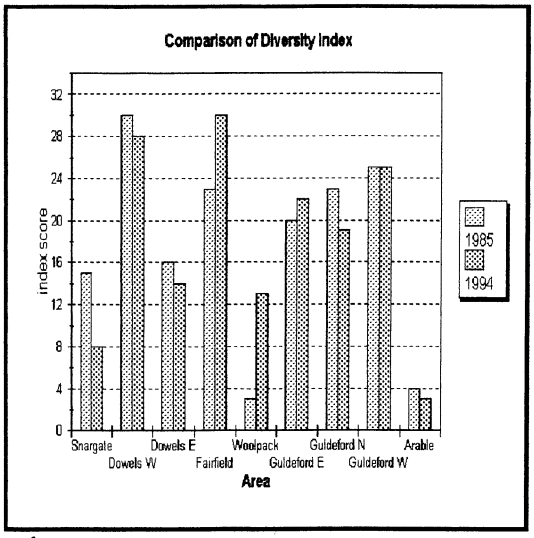


Figure 8

These results give an indication of the relative diversity of the different areas, and also the changes in diversity which appear to have occurred between 1985 and 1993/4.

In both survey years the number of key aquatic species and the number of key species overall was highest on the west side of The Dowels, reflecting the predominance of fresh water ditches in this area, and in 1985 this part of The Dowels scored the highest diversity index value. In 1993/4 however The Dowels scored slightly less than Fairfield, even though it contains two more species, because it ranks only fifth with regard the number of bank species recorded, whereas Fairfield does not rank lower than second in any group (see Table 8). Fairfield can be considered more diverse with regard the range of species present, which encompasses both fresh and brackish water ditches. This diversity is moreover contained within a smaller area, as Fairfield has less than half the number of ditches than the three large areas The Dowels (west), East Guldeford (west) and East Guldeford (east). Both the west and east sides of East Guldeford contain very similar numbers of key species, only one or two fewer than at Fairfield.

The remaining small areas, The Dowels (east), Snargate, Woolpack and East Guldeford (north) are as we might expect less diverse than the larger areas. While most areas have not changed significantly in diversity, a very large increase in diversity appears to have occurred at Woolpack, which in 1985 ranked lowest overall, but is now more diverse than Snargate and comparable with The Dowels (east).

The greatest decrease in diversity appears to have occurred at Snargate, which is now the least diverse area, other than the group of arable ditches. Though the number of species at Snargate is not incomparable with the arable ditches, the greater abundance of key species such as *Ceratophyllum submersum*, *Potamogeton pectinatus*, and *Ranunculus trichophyllus* distinguish ditches at Snargate from ditches in arable. In addition several species both at Snargate and The Dowels (west) may have been overlooked during the 1993 survey season (through inexperience), such as *Oenanthe lachenalii*, which was not recorded in 1993 though it was frequent in 1985.

Only those ditches which were arable in both survey years have been included in the comparison between areas. (There has been a reduction in the number of arable ditches within the surveyed areas, from 31 in 1985 to 22 in 1993/4, with 18 recorded as arable in both years.) The diversity index score for these arable ditches is significantly lower in both 1985 and 1993/4 than for the areas of permanent pasture, with the exception of Woolpack in 1985. Compared to pasture the only significant interest in the arable ditches is the abundance of *Althaea officinalis* on the banks.

5.4.3 **Comparison of species distribution**

Differences in species distribution between areas are due mainly to differences in salinity. Snargate, Fairfield and Woolpack containing predominantly brackish ditches, with only a few freshwater ditches, mainly at the margins. East Guldeford contains a greater mixture of brackish and freshwater ditches. Freshwater ditches only predominate however on the west side of the Dowels, and this area contains several freshwater species not recorded elsewhere on the site. This indicates that the freshwater ditches in other areas are either in effect isolated or subject to enough saline influence to restrict the distribution of some freshwater species such as *Utricularia sp* and *Myriophyllum verticillatum*.

Most areas of the marsh are intensively sheep grazed, which has a very noticeable effect on the distribution of *Althea officinalis*. Parts of East Guldeford are less heavily grazed than elsewhere, and this area also includes some arable in the SSSI, and in consequence contains the highest abundance of *Althea officinalis*, though it is mainly restricted to ditches both within and adjacent arable land. Other emergent species, such as *Nasturtium officinale agg, Oenanthe aquatica* and *Veronica catenata* are also more frequent at East Guldeford, perhaps also for the same reason.

Table 8 Summary data 1994 Comparison of key species between areas

Area	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ceratophyllum demersum	11	28	6	2		6	10	13	
C. submersum	31	7	6	24	10	37	1	32	6
Chara sp		5		2	8	3	2	6	
Hottonia palustre	3	15							
Hydrocharis morsus-ranae	2	43	6	4		16	3	17	6
Myriophyllum spicatum	22	11	13	20	9	35	9	25	8
Myriophyllum verticillatum*		2							
Nymphaea alba		3							
Potamogeton berchtoldii			1	1		4		4	2
P. lucens	3	10	2						
P. crispus		1		2		2	4	6	
P. natans		7		2		3	1	3	
P. pectinatus	29	12	17	22	12	40	9	28	5
P. pusillus	2	3		3	4			2	
P. trichoides*		8	1			2	1	3	
Polygonum amphibium		7	3						
Ranunculus circinatus	1	10		3	1	1			1
R. baudotti				2	3	1	5	4	
Ranunculus trichophyllus	13	2	1	3	14	38	16	28	
Sparganium emersum		1							
Utricularia sp		8							
Wolffia arrhiza*				1				1	
Zannichellia palustris			5	11	6	5	1	3	1
Alisma plantago-aquatica	4	47	6	2	6	43	16	31	6
Apium nodiflorum			1			31	12	23	
Berula erecta			1						
Butomus umbelatus		1		2					
Carex riparia	2	8	2						
Glyceria maxima		18	3	4			2		
Hippuris vulgaris				1					
Iris pseudocorus		9	1					2	
Nasturtium officinale agg.	8	25	2	2	7	50	22	34	
Oenanthe aquatica				6	13	53	6	28	5
O. fistulosa	10	53	6	4	2	42	14	31	4
Rumex hydrolapathum	3	19	6	2		10	1		
Sagittaria sagittifolia		3							
Samolus valerandi	1		1	1	1	8	1	12	1
Schoenoplectus tabernaemontani	5	3		15	10	20	8	18	1
Typha angustifolia		19	7	3		8	5	12	1
Veronica catenata					11	32	8	24	
Althaea officinalis*	2		1	3	1	28	6	16	9
Carex distans		2				2		1	1
Carex divisa*				4	1				1
Glaux maritima	2			12	2	3		1	
Hydrocotyle vulgaris	3	9			1	24		8	
Juncus gerardii	1		2	7	4	13	6	17	
Lycopus europaeus		5		1	1	8		2	
Lythrum salicaria		4							
Mentha aquatica		10		1		11	3	1	
Myosotis laxa		1	1	1	3	27	10	12	
Oenanthe lachenalii			7	24	6	28	12	20	2
Sium latifolium*	1	3							1
Triglochin maritima				1	2				
Triglochin palustris			2			8		3	
number of ditches in block	45	92	28	43	36	138	39	91	18
number of choked\dry ditches	3	31	8			53	4	20	9

* = nationally scarce species

Totals	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Total number of aquatic species	10	19	11	15	9	14	12	15	7
Total number of emergent species	7	11	11	11	7	10	11	10	6
Total number of bank species	5	7	4	9	9	9	5	9	5
Total number of all key species	22	37	26	35	25	33	28	34	18

1985 Totals	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Total number of aquatic species	13	19	9	12	6	13	15	13	6
Total number of emergent species	11	15	12	11	7	11	12	11	10
Total number of bank species	4	9	7	12	6	8	7	11	4
Total number of all species	28	43	28	35	19	32	34	35	20

change 1985 -1994	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Change in aquatic species	-3	0	2	3	3	1	-3	2	1
Change in emergent species	-4	-4	-1	0	0	-1	-1	-1	-4
Change in bank species	1	-2	-3	-3	3	1	-2	-2	1
Change in all key species	-6	-6	-2	0	6	1	-6	-1	-2

1994 Rankings	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ranking of aquatic species	7	1	6	2	8	4	5	2	9
Ranking of emergent species	7	1	1	1	7	5	1	5	9
Ranking of bank species	6	5	9	1	1	1	6	1	6
Ranking of all species	8	1	6	2	7	4	5	3	9

1985 Rankings	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ranking of aquatic species	3	1	7	6	8	3	2	3	8
Ranking of emergent species	4	1	2	4	9	4	2	4	8
Ranking of bank species	8	3	5	1	7	4	5	2	8
Ranking of all species	6	1	6	2	9	5	4	2	8

Change in Rankings 1985-1994	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Change in ranking of aquatics	-4	0	1	4	0	-1	-3	1	-1
Change in ranking of emergents	-3	0	1	3	2	-1	1	-1	-1
Change in ranking of bank species	2	-2	-4	0	6	3	-1	1	2
Change in ranking of all species	-2	0	0	0	2	1	-1	-1	-1

Diversity Rank Index	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Index score for 1994	8	28	14	30	13	22	19	25	3
Index score for 1985	15	30	16	23	3	20	23	25	4
Change in Index score 1985-1994	-7	-2	-2	7	10	2	-4	0	-1

Table 9 Summary data 1994 Percentage comparison of key species between areas

Area	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ceratophyllum demersum	24.4	30.4	21.4	4.7		4.3	25.6	14.3	
C. submersum	68.9	7.6	21.4	55.8	27.8	26.8	2.6	35.2	33.3
Chara sp		5.4		4.7	22.2	2.2	5.1	6.6	
Hottonia palustre	6.7	16.3							
Hydrocharis morsus-ranae	4.4	46.7	21.4	9.3		11.6	7.7	18.7	33.3
Myriophyllum spicatum	48.9	12.0	46.4	46.5	25.0	25.4	23.1	27.5	44.4
Myriophyllum verticillatum*		2.2							
Nymphaea alba		3.3							
Potamogeton berchtoldii			3.6	2.3		2.9		4.4	11.1
P. lucens	6.7	10.9	7.1						
P. crispus		1.1		4.7		1.4	10.3	6.6	
P. natans		7.6		4.7		2.2	2.6	3.3	
P. pectinatus	64.4	13.0	60.7	51.2	33.3	29.0	23.1	30.8	27.8
P. pusillus	4.4	3.3		7.0	11.1			2.2	
P. trichoides*		8.7	3.6			1.4	2.6	3.3	
Polygonum amphibium		7.6	10.7						
Ranunculus circinatus	2.2	10.9		7.0	2.8	0.7			5.6
R. baudotti				4.7	8.3	0.7	12.8	4.4	
Ranunculus trichophyllus	28.9	2.2	3.6	7.0	38.9	27.5	41.0	33.0	
Sparganium emersum		1.1							
Utricularia sp		8.7							
Wolffia arrhiza*				2.3				1.1	
Zannichellia palustris			17.9	25.6	16.7	3.6	2.6	3.3	5.6
Alisma plantago-aquatica	8.9	51.1	21.4	4.7	16.7	31.2	41.0	35.2	33.3
Apium nodiflorum			3.6			22.5	30.8	25.8	
Berula erecta			3.6						
Butomus umbelatus		1.1		4.7					
Carex riparia	4.4	8.7	7.1						
Glyceria maxima		19.6	10.7	9.3			5.1		
Hippuris vulgaris				2.3					
Iris pseudocorus		9.8	3.6					2.2	
Nasturtium officinale agg.	17.8	27.2	7.1	4.7	19.4	36.2	56.4	38.5	
Oenanthe aquatica				14.0	36.1	38.4	15.4	33.0	27.8
O. fistulosa	22.2	57.6	21.4	9.3	5.6	30.4	35.9	35.2	22.2
Rumex hydrolapathum	6.7	20.7	21.4	4.7		7.2	2.6		
Sagittaria sagittifolia		3.3							
Samolus valerandi	2.2		3.6	2.3	2.8	5.8	2.6	13.2	5.6
Schoenoplectus tabernaemontani	11.1	3.3		34.9	27.8	14.5	20.5	19.8	5.6
Typha angustifolia		20.7	25.0	7.0		5.8	12.8	14.3	5.6
Veronica catenata					30.6	23.2	20.5	26.4	
Althaea officinalis*	4.4		3.6	7.0	2.8	20.3	15.4	18.7	50.0
Carex distans		2.2				1.4		1.1	5.6
Carex divisa*				9.3	2.8				5.6
Glaux maritima	4.4			27.9	5.6	2.2		1.1	
Hydrocotyle vulgaris	6.7	9.8			2.8	17.4		8.8	
Juncus gerardii	2.2		7.1	16.3	11.1	9.4	15.4	18.7	
Lycopus europaeus		5.4		2.3	2.8	5.8		19.1	
Lythrum salicaria		4.3							
Mentha aquatica		10.9		2.3		8.0	7.7	1.1	
Myosotis laxa		1.1	3.6	2.3	8.3	19.6	25.6	13.5	
Oenanthe lachenalii			25.0	55.8	16.7	20.3	30.8	22.0	11.1
Sium latifolium*	2.2	3.3							5.6
Triglochin maritima				2.3	5.6				
Triglochin palustris			7.1			5.8		3.3	
number of ditches in block	45	92	28	43	36	138	39	91	18
Percentage choked\dry ditches	6.7	33.7	28.6			38.4	10.3	22.5	50.0

* = nationally scarce species

PercentageTotals 1993/4	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
% of total number of aquatic species	43.5	82.6	47.8	65.2	39.1	60.9	52.2	65.2	30.4
% of total number of emergent species	41.2	64.7	64.7	64.7	41.2	58.8	64.7	58.8	35.3
% of total number of bank species	35.7	50.0	28.6	64.3	64.3	64.3	35.7	64.3	35.7
% of total number of all key species	40.7	68.5	48.1	64.8	46.3	61.1	51.9	63.0	33.3

PercentageTotals 1985	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
% of total number of aquatic species	61.9	90.5	42.9	57.1	28.6	61.9	71.4	61.9	28.6
% of total number of emergent species	78.6	107.1	85.7	78.6	50.0	78.6	85.7	78.6	71.4
% of total number of bank species	28.6	64.3	50.0	85.7	42.9	57.1	50.0	78.6	28.6
% of total number of all key species	57.1	87.8	57.1	71.4	38.8	65.3	69.4	71.4	40.8

Change in percentage totals	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
% change in aquatic species	-18.4	-7.9	5.0	8.1	10.6	-1.0	-19.3	3.3	1.9
% change in emergent species	-37.4	-42.4	-21.0	-13.9	-8.8	-19.7	-21.0	-19.7	-36.1
% change in bank species	7.1	-14.3	-21.4	-21.4	21.4	7.1	-14.3	-14.3	7.1
% change in all key species	-16.4	-19.2	-9.0	-6.6	7.5	-4.2	-17.5	-8.5	-7.5

Table 10 Summary data 1985 Comparison of key species between areas

Area	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ceratophyllum demersum	2	11	1	3		1	2	15	
C. submersum	29	14	8	21	3	24	7	13	2
Chara sp		4				2	2	1	
Hottonia palustris	2	17	1						1
Hydrocharis morsus-ranae	4	48	2	5		20	5	11	
Myriophyllum spicatum	18	3	10	22	8	42	17	17	5
Myriophyllum verticillatum*				1			1		
Nupha lutea		1							
Nymphaea alba		3							
Potamogeton berchtoldii							1	4	
P. lucens	2	10							
P. crispus		1		1		9	4	17	
P. natans		18		1		8	6	4	
P. pectinatus	28	6	11	21	6	43	7	13	3
P. pusillus	1	14	2	1		5	5	10	1
Polygonum amphibium		4	1						
Ranunculus circinatus	2	6					1		
R. baudotti	2	1		4	2	18	2	11	
Ranunculus trichophyllus	12	7	1	7	14	59	16	48	1
Sparganium emersum						2			
Utricularia sp	1	9							
Zannichellia palustris	4	2		7	3	18	5	20	
Alisma plantago-aquatica	14	64	5	2	10	76	30	45	7
Apium nodiflorum	1					42	7	22	
Berula erecta		6							1
Butomus umbellatus		2		1			1	1	
Carex riparia	6	21	1				2		3
Glyceria maxima		30	1	4		1			
Nasturtium officinale agg.	12	21	2	3	10	56	24	41	2
Iris pseudocorus		19	2				1	2	
Oenanthe aquatica	13	11	1	2	16	71	10	35	4
O. fistulosa	18	60	5	21	14	42	13	32	6
Rumex hydrolapathum	6	27	3	2		11			
Sagittaria sagittifolia		6							
Samolus valerandi	10	9	3	2		12	2	3	2
Schoenoplectus tabernaemontani	12	5	1	27	23	46	13	35	5
Typha angustifolia	7	30	7	4	1	16	6	15	2
Veronica catenata	6	6	1	2	7	36	11	25	2
Althaea officinalis*	14	6	5	11	12	39	11	27	11
Apium graveolens								4	
Carex distans				1				2	
Chenopodium chenopodiodes*				1					
Glaux maritima				1					
Hydrocotyle vulgaris		10	1	1	3	6	6	7	
Juncus gerardii	5	12				27		7	
Oenanthe lachenalii	20	2	4	24	4	7	8	6	2
Lycopus europaeus		4		1	1	6	1	1	
Lythrum salicaria		7							
Mentha aquatica		29	1	3	1	12	10	1	
Myosotis laxa		29	2	3	6	48	10	14	2
Ophioglossum vulgatum								1	
Spergularia marina				3				1	
Salicornia sp				1					
Sium latifolium*	4	11	1						1
Triglochin maritima				3					
Triglochin palustris			2			1	1		
number of ditches	45	92	22	43	35	144	42	87	18

* = nationally scarce species

Totals	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Total number of aquatic species	13	19	9	12	6	13	15	13	6
Total number of emergent species	11	15	12	11	7	11	12	11	10
Total number of bank species	4	9	7	12	6	8	7	11	4
Total number of all species	28	43	28	35	19	32	34	35	20

Table 11 Summary data 1985 Percentage comparison of key species between areas

Area	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
Ceratophyllum demersum	4.4	12.0	4.5	7.0		0.7	4.8	17.2	
C. submersum	64.4	15.2	36.4	48.8	8.6	16.7	16.7	14.9	11.1
Chara sp		4.3				1.4	4.8	1.1	
Hottonia palustris	4.4	18.5	4.5						5.6
Hydrocharis morsus-ranae	8.9	52.2	9.1	11.6		13.9	11.9	12.6	
Myriophyllum spicatum	40.0	3.3	45.5	51.2	22.9	29.2	40.5	19.5	27.8
Myriophyllum verticillatum*				2.3			2.4		
Nupha lutea		1.1							
Nymphaea alba		3.3							
Potamogeton berchtoldii							2.4	4.6	
P. lucens	4.4	10.9							
P. crispus		1.1		2.3		6.3	9.5	19.5	
P. natans		19.6		2.3		5.6	14.3	4.6	
P. pectinatus	62.2	6.5	50.0	48.8	17.1	29.9	16.7	14.9	16.7
P. pusillus	2.2	15.2	9.1	2.3		3.5	11.9	11.5	5.6
Polygonum amphibium		4.3	4.5						
Ranunculus circinatus	4.4	6.5					2.4		
R. baudotti	4.4	1.1		9.3	5.7	12.5	4.8	12.6	
Ranunculus trichophyllus	26.7	7.6	4.5	16.3	40.0	41.0	38.1	55.2	5.6
Sparganium emersum						1.4			
Utricularia sp	2.2	9.8							
Zannichellia palustris	8.9	2.2		16.3	8.6	12.5	11.9	23.0	
Alisma plantago-aquatica	31.1	69.6	22.7	4.7	28.6	52.8	71.4	51.7	38.9
Apium nodiflorum	2.2					29.2	16.7	25.3	
Berula erecta		6.5							5.6
Butomus umbellatus		2.2		2.3			2.4	1.1	
Carex riparia	13.3	22.8	4.5				4.8		16.7
Glyceria maxima		32.6	4.5	9.3		0.7			
Nasturtium officinale agg.	26.7	22.8	9.1	7.0	28.6	38.9	57.1	47.1	11.1
Iris pseudocorus		20.7	9.1				2.4	2.3	
Oenanthe aquatica	28.9	12.0	4.5	4.7	45.7	49.3	23.8	40.2	22.2
O. fistulosa	40.0	65.2	22.7	48.8	40.0	29.2	31.0	36.8	33.3
Rumex hydrolapathum	13.3	29.3	13.6	4.7		7.6			
Sagittaria sagittifolia		6.5							
Samolus valerandi	22.2	9.8	13.6	4.7		8.3	4.8	3.4	11.1
Schoenoplectus tabernaemontani	26.7	5.4	4.5	62.8	65.7	31.9	31.0	40.2	27.8
Typha angustifolia	15.6	32.6	31.8	9.3	2.9	11.1	14.3	17.2	11.1
Veronica catenata	13.3	6.5	4.5	4.7	20.0	25.0	26.2	28.7	11.1
Althaea officinalis*	31.1	6.5	22.7	25.6	34.3	27.1	26.2	31.0	61.1
Apium graveolens								4.6	
Carex distans				2.3				2.3	
Chenopodium chenopodiodes*				2.3					
Glaux maritima	8.9			11.6					
Hydrocotyle vulgaris	11.1	13.0				18.8		8.0	
Juncus gerardii	17.8		27.3	39.5	34.3	11.1	2.4	13.8	
Lycopus europaeus		4.3		2.3	2.9	4.2	2.4	1.1	
Lythrum salicaria		7.6							
Mentha aquatica		31.5	4.5	7.0	2.9	8.3	23.8	1.1	
Myosotis laxa		31.5	9.1	7.0	17.1	33.3	23.8	16.1	11.1
Oenanthe lachenalii	44.4	2.2	18.2	55.8	11.4	4.9	19.0	6.9	11.1
Ophioglossum vulgatum								1.1	
Spergularia marina				7.0				1.1	
Salicornia sp				2.3					
Sium latifolium*	8.9	12.0	4.5						5.6
Triglochin maritima				7.0					
Triglochin palustris			9.1			0.7	2.4		
number of ditches	45	92	22	43	35	144	42	87	18

* = nationally scarce species

PercentageTotals	Snargate	Dowels W	Dowels E	Fairfield	Woolpack	Guldeford E	Guldeford N	Guldeford W	Arable
% of total number of aquatic species	61.9	90.5	42.9	57.1	28.6	61.9	71.4	61.9	28.6
% of total number of emergent species	78.6	107.1	85.7	78.6	50.0	78.6	85.7	78.6	71.4
% of total number of bank species	28.6	64.3	50.0	85.7	42.9	57.1	50.0	78.6	28.6
% of total number of all key species	57.1	87.8	57.1	71.4	38.8	65.3	69.4	71.4	40.8

5.5 Comparison between ditches in pasture and adjacent arable

Tables 12 and 13 give a comparison of the percentage abundance of species in ditches in pasture and those adjacent arable for both 1994 and 1985. These tables show significant differences in the abundance of species between ditches in pasture and those adjacent arable. The greatest difference is shown by *Althaea officinalis*, which in 1985 was 28% and in 1993/4 24.5% more frequent in adjacent arable ditches than in pasture ditches. The key difference between the two ditch types is that one side of the adjacent arable ditch is protected from grazing, and thus in addition to *Althaea officinalis* several other emergent and bank species, such as *Scirpus maritimus, Phragmites australis, Sparganium erectum, Solanum dulcamara* and *Pulicaria dysenterica* are significantly more frequent along these ditches. Surprisingly perhaps ditches adjacent arable were not more frequently choked/dry than those in pasture; in both about 25% of ditches were recorded as choked or dry.

Enteromorpha was 8% more frequent in ditches adjacent arable ditches in 1993/4. This may reflect wider fluctuations in water levels concentrating nutrients or reducing competition in ditches which dry temporarily, or may be the result of direct fertilizer run-off from arable land. However there is no other evidence to suggest a greater level of eutrophication in ditches adjacent arable.

Though it is mainly emergent and bank species which show an increase in abundance, several aquatic species also show marginal increases, perhaps the most significant of which is *Hydrocharis morsus-ranae*, which was 5% more frequent in adjacent arable ditches in 1994 and 3.5% more frequent in 1985.

A similar number of species show a decrease in abundance in adjacent arable ditches rather than an increase. In both years the greatest difference is shown by the emergent *Eleocharis palustris*, which is nearly 30% less frequent in 1994 and 16% less frequent in 1985. Another emergent which shows a significant difference in both years is *Veronica catenata*, which is over 10% less frequent in both years.

Several other emergent and bank species, such as *Oenanthe lachenalii* and *Juncus gerardii* show marginal decreases in abundance. Of the aquatic species, the greatest difference is shown by *Myriophyllum spicatum* and *Potamogeton pectinatus*, which are approximately 10% less frequent in adjacent arable in both 1985 and 1994.

These differences in abundance between pasture and adjacent arable ditches appear to reflect not only the difference in grazing pressure but also a difference in salinity, with a higher proportion of fresh water ditches adjacent the arable land than in the lower lying and more brackish pasture.

This is shown in particular by the greater abundance of *Hydrocharis morsus-ranae* and the lower abundance of *Eleocharis palustris, Myriophyllum spicatum, Potamogeton pectinatus*, *Juncus gerardii* and others. This suggests that the arablization of Walland Marsh has concentrated on the less low lying, better drained, fresh water areas, leaving the lower lying and more brackish areas as pasture. The nationally scarce species *Myriophyllum verticillatum* and *Sium latifolium* are among those freshwater species restricted to a relatively small number of freshwater ditches in and adjacent the remaining pasture.

Table 12 Summary data 1994 Percentage comparison of abundance between pasture and adjacent arable ditches

Percentage abundance in	Pasture	Adjacent	A-P
Callitriche obtusangula	38.7	36.3	-2.4
Ceratophyllum demersum	9.2	13.3	4.1
C. submersum	25.8	26.5	0.7
Chara sp	7.4	2.7	-4.7
Elodea nuttalii	7.4	8.0	0.6
Enteromorpha sp	28.1	36.3	8.2
Filamentous algae	47.5	49.6	2.1
Fontinalis antipyretica	2.8	2.7	-0.1
Glyceria fluitans	39.6	31.0	-8.7
Hydrocharis morsus-ranae	11.1	15.9	4.9
Lemna minor	69.1	66.4	-2.8
L. trisulca	72.8	63.7	-9.1
L. gibba	4.1	3.5	-0.6
Myriophyllum spicatum	31.3	21.2	-10.1
Potamogeton berchtoldii	3.2	1.8	-1.5
P. crispus	3.7	3.5	-0.1
P. natans	1.8	2.7	0.8
P. pectinatus	35.9	24.8	-11.2
P. pusillus	2.3	0.9	-1.4
P. trichoides	1.8	2.7	0.8
Ranunculus circinatus	0.0	1.8	1.8
R. baudotti	3.2	5.3	2.1
Ranunculus trichophyllus	32.7	23.0	-9.7
Zannichellia palustris	7.8	2.7	-5.2
Alisma plantago-aquatica	29.5	33.6	4.1
Apium nodiflorum	23.0	15.0	-8.0
Eleocharis palustris	66.4	37.2	-29.2
Glyceria maxima	1.4	1.8	0.4
Iris pseudocorus	0.5	1.8	1.3
Juncus articulatus	9.2	4.4	-4.8
Mentha aquatica	5.1	3.5	-1.5
Myosotis laxa	17.5	13.3	-4.2
Nasturtium officinale agg.	33.2	38.1	4.9
Oenanthe aquatica	30.4	30.1	-0.3
O. fistulosa	30.9	24.8	-6.1
Phragmites australis	23.5	31.9	8.4
Rumex hydrolapathum	4.6	6.2	1.6
Samolus valerandi	7.4	6.2	-1.2
Schoenoplectus tabernaemontani	13.4	23.9	10.5
Scirpus maritimus	42.4	54.0	11.6
Sparganium erectum	37.3	46.9	9.6
Typha angustifolia	6.9	15.0	8.1
Veronica catenata	27.6	13.3	-14.4
Althaea officinalis	7.4	31.9	24.5
Carex otrubae	44.2	46.0	1.8
Epilobium hirsutum	3.2	12.4	9.2
Equisetum palustre	1.4	1.8	0.4
Galium palustre	34.6	36.3	1.7
Glaux maritima	1.8	1.8	-0.1
Hydrocotyle vulgaris	13.4	3.5	-9.8
Juncus inflexus	56.7	73.5	16.8
J. gerardii	14.7	8.8	-5.9
Lycopus europaeus	3.2	3.5	0.3
Oenanthe lachenalii	23.0	20.4	-2.7
Pulicaria dysenterica	6.0	20.4	14.4
Solanum dulcamara	2.8	15.9	13.2
Triglochin palustris	5.1	1.8	-3.3
number of ditches in block	217	113	-104
Percentage of choked\dry ditches	25.8	25.7	-0.1

Species in descending order	A-P
Althaea officinalis	24.5
Juncus inflexus	16.8
Pulicaria dysenterica	14.4
Solanum dulcamara	13.2
Scirpus maritimus	11.6
Schoenoplectus tabernaemontani	10.5
Sparganium erectum	9.6
Epilobium hirsutum	9.2
Phragmites australis	8.4
Enteromorpha sp	8.2
Typha angustifolia	8.1
Nasturtium officinale agg.	4.9
Hydrocharis morsus-ranae	4.9
Alisma plantago-aquatica	4.1
Ceratophyllum demersum	4.1
Filamentous algae	2.1
Ranunculus baudotti	2.1
Carex otrubae	1.8
Ranunculus circinatus	1.8
Galium palustre	1.7
Rumex hydrolapathum	1.6
Iris pseudocorus	1.3
Potamogeton trichoides	0.8
Potamogeton natans	0.8
Ceratophyllum submersum	0.7
Elodea nuttalii	0.6
Equisetum palustre	0.4
Glyceria maxima	0.4
Lycopus europaeus	0.3
Glaux maritima	-0.1
Fontinalis antipyretica	-0.1
Potamogeton crispus	-0.1
Oenanthe aquatica	-0.3
Lemna gibba	-0.6
Samolus valerandi	-1.2
Potamogeton pusillus	-1.4
Potamogeton berchtoldii	-1.5
Mentha aquatica	-1.5
Callitriche obtusangula	-2.4
Oenanthe lachenalii	-2.7
Lemna minor	-2.8
Triglochin palustris	-3.3
Myosotis laxa	-4.2
Chara sp	-4.7
Juncus articulatus	-4.8
Zannichellia palustris	-5.2
Juncus gerardii	-5.9
Oenanthe fistulosa	-6.1
Apium nodiflorum	-8.0
Glyceria fluitans	-8.7
Lemna trisulca	-9.1
Ranunculus trichophyllus	-9.7
Hydrocotyle vulgaris	-9.8
Myriophyllum spicatum	-10.1
Potamogeton pectinatus	-11.2
Veronica catenata	-14.4
Eleocharis palustris	-29.2

Table 13 Summary data 1985 Percentage comparison between pasture and adjacent arable ditches

Percentage abundance in	Pasture	Adjacent	A-P
Callitriche obtusangula	48.2	48.1	-0.1
Ceratophyllum demersum	7.7	1.9	-5.8
C. submersum	19.4	11.1	-8.3
Chara sp	1.4	1.9	0.5
Elodea canadensis	2.7	3.7	1.0
Enteromorpha sp	47.7	46.3	-1.5
Filamentous algae	17.6	6.5	-11.1
Glyceria fluitans	57.2	50.0	-7.2
Hydrocharis morsus-ranae	10.4	13.9	3.5
Lemna minor	50.9	46.3	-4.6
L. trisulca	55.9	42.6	-13.3
L. gibba	5.9	8.3	2.5
Myriophyllum spicatum	32.9	19.4	-13.4
Potamogeton berchtoldii	1.4	1.9	0.5
P. crispus	9.0	9.3	0.3
P. natans	5.4	5.6	0.2
P. pectinatus	28.4	18.5	-9.9
P. pusillus	8.1	2.8	-5.3
R. baudotti	12.2	5.6	-6.6
Ranunculus trichophyllus	45.5	34.3	-11.2
Zannichellia palustris	15.3	11.1	-4.2
Alisma plantago-aquatica	44.1	63.0	18.8
Apium nodiflorum	21.2	22.2	1.1
Eleocharis palustris	77.5	61.1	-16.4
Iris pseudocorus	0.9	2.8	1.9
Juncus articulatus	8.1	9.3	1.2
Mentha aquatica	5.4	12.0	6.6
Myosotis laxa	27.0	18.5	-8.5
Nasturtium officinale agg.	41.0	38.9	-2.1
Oenanthe aquatica	41.4	37.0	-4.4
O. fistulosa	27.5	33.3	5.9
Phragmites australis	31.1	42.6	11.5
Ranunculus sceleratus	2.7	3.7	1.0
Rumex hydrolapathum	4.1	4.6	0.6
Samolus valerandi	5.9	6.5	0.6
Schoenoplectus tabernaemontani	36.0	35.2	-0.9
Scirpus maritimus	56.8	73.1	16.4
Sparganium erectum	44.6	61.1	16.5
Typha angustifolia	9.5	22.2	12.8
Veronica catenata	27.5	16.7	-10.8
Agrostis stolonifera	48.2	48.1	-0.1
Althaea officinalis	19.4	47.2	27.9
Apium graveolens	1.4	0.9	-0.4
Carex otrubae	36.5	35.2	-1.3
Epilobium hirsutum	5.9	9.3	3.4
Galium palustre	32.4	35.2	2.8
Hydrocotyle vulgaris	11.7	7.4	-4.3
Juncus inflexus	56.3	58.3	2.0
J. gerardii	12.2	10.2	-2.0
Lycopus europaeus	1.4	5.6	4.2
Oenanthe lachenalii	9.5	7.4	-2.1
Pulicaria dysenterica	8.1	16.7	8.6
Solanum dulcamara	3.2	12.0	8.9
number of ditches	222	108	-114

Species in descending order	A-P
Althaea officinalis	27.9
Alisma plantago-aquatica	18.8
Sparganium erectum	16.5
Scirpus maritimus	16.4
Typha angustifolia	12.8
Phragmites australis	11.5
Solanum dulcamara	8.9
Pulicaria dysenterica	8.6
Mentha aquatica	6.6
Oenanthe fistulosa	5.9
Lycopus europaeus	4.2
Hydrocharis morsus-ranae	3.5
Epilobium hirsutum	3.4
Galium palustre	2.8
Lemna gibba	2.5
Juncus inflexus	2.0
Iris pseudocorus	1.9
Juncus articulatus	1.2
Apium nodiflorum	1.1
Ranunculus sceleratus	1.0
Elodea canadensis	1.0
Samolus valerandi	0.6
Rumex hydrolapathum	0.6
Chara sp	0.5
Potamogeton berchtoldii	0.5
P. crispus	0.3
P. natans	0.2
Agrostis stolonifera	-0.1
Callitriche obtusangula	-0.1
Apium graveolens	-0.4
Schoenoplectus tabernaemontani	-0.9
Carex otrubae	-1.3
Enteromorpha sp	-1.5
Juncus gerardii	-2.0
Oenanthe lachenalii	-2.1
Nasturtium officinale agg.	-2.1
Zannichellia palustris	-4.2
Hydrocotyle vulgaris	-4.3
Oenanthe aquatica	-4.4
Lemna minor	-4.6
Potamogeton pusillus	-5.3
Ceratophyllum demersum	-5.8
Ranunculus baudotti	-6.6
Glyceria fluitans	-7.2
Ceratophyllum submersum	-8.3
Myosotis laxa	-8.5
Potamogeton pectinatus	-9.9
Veronica catenata	-10.8
Filamentous algae	-11.1
Ranunculus trichophyllus	-11.2
Lemna trisulca	-13.3
Myriophyllum spicatum	-13.4
Eleocharis palustris	-16.4

5.6 Ditches within arable land

In comparison to ditches in pasture or adjacent arable those within arable fields contain fewer aquatic, emergent and bank species. They are more frequently choked with emergents, because maintenance as a wet fence is not necessary, water levels tend to be either very low or subject to wide fluctuations, and nutrient levels can be extremely high. Though the banks are cut annually, this is not as effective at maintaining floral diversity as grazing, which produces a more diverse physical and floristic structure.

Those arable fields at the edge of the SSSI boundary (see distribution map in Appendix 2) could be excluded from the SSSI without loss of integrity. However there may be other interests associated with arable fields, such as wintering Bewick swans, which may justify retaining them in some areas. Arable ditches enclosed within existing pasture should be retained in order to maintain the integrity of the site and provided habitat for *Althaea officinalis*, though reversion to pasture would be desirable.

5.7 Distribution of emergent dominated ditches

The distribution of emergent dominated ditches and/or recorded as choked indicates where ditch clearance has become or is will shortly become necessary. Across the site as a whole the average percentage of choked ditches is approximately 25%, though in arable the figure rises to 50%. Excluding arable the ditch system as a whole appears therefore to be adequately maintained, though management may have lapsed where choked ditches are clustered.

5.8 Distribution of ditches dominated by *Enteromorpha* /filamentous algae

The distribution map (Appendix 2) shows clearly that ditches dominated by algal weed are very much clustered together. Snargate is the most affected area, with over 40% of the ditches dominated by either *Enteromorpha* and/or filamentous algae. Algal weed can completely choke nutrient enriched ditches, though they may also dominate after a dry ditch has

refilled, when there is reduced competition. It is not necessarily the case therefore that the high instances of ditches dominated by algal weed at Snargate and elsewhere are caused by nutrient enrichment, but the situation needs monitoring and if necessary ways to control water levels and water quality should be considered.

5.9 **Distribution of species infrequent across the site**

Distribution maps of species which are infrequent or have a restricted distribution across the site have been produced in order to update earlier distribution maps produced by W Latimer in 1980. The new maps are not as comprehensive as the earlier maps, because they are based on sample sections rather than full ditch lengths, but they do provide a basis for monitoring the distribution of key species which are infrequent across the site. A brief description of the distribution of these species, including an indication of changes in distribution that may have occurred since 1980 and 1985, is given below.

1. *Althea officinalis* 69 records

The distribution of this species is determined very largely by its susceptible to grazing. It appears to have declined markedly at The Dowels, Snargate and Woolpack and is now largely confined to East Guldeford, where it still fairly common along ditches mainly adjacent and within arable land. The 1980 distribution map shows that it was common in arable areas now excluded from the SSSI, and this is probably still the case.

2. *Azolla filiculoides* 8 records

This alien species is restricted to a small number of connected freshwater ditches on the west side of The Dowels, where it was also recorded in 1980, and a couple of ditches at East Guldeford.

3. *Butomus umbelatus* 3 records

This freshwater species was recorded in one ditch on the west side of The Dowels and in a further two at Fairfield. It was more widely distributed in 1980, though this must to some extent this reflects the greater recording intensity. (It was also recorded in the Royal Military Canal and Highknock channel but these watercourses were not sampled during this survey.)

4. *Carex divisa* 6 records

This species is restricted mainly to Fairfield, though it also occurs along one ditch at Woolpack and also along an arable ditch at East Guldeford. Its distribution does not appear to have changed much, though it was recorded previously at The Dowels.

5. *Carex riparia* 12 records

This freshwater emergent species is restricted mainly to ditches at the northern end of The Dowels, with a few records for the east side of The Dowels and Snargate.

6. *Glaux maritima* 20 records

This is another saltmarsh species which occurs mainly at Fairfield, with scattered records for Snargate, Woolpack and East Guldeford. This species appears to have increased in abundance.

7. *Hottonia palustre* 18 records

This species occurs fairly frequently in fresh water ditches on the west side of The Dowels and at the northern end of Snargate. Its distribution has not changed since 1980.

8. *Hydrocotyle vulgaris* 45 records

This species occurs along less brackish ditches on the west side of The Dowels, the northern end of Snargate and fairly frequently across East Guldeford, particularly on the east side.

9. *Juncus gerardii* 50 records

This saltmarsh species is well represented at Fairfield, Woolpack and across East Guldeford, and like *Glaux maritima* appears to have increased in abundance, perhaps as a result of an increase in sheep grazing.

10. *Hippuris vulgaris* 1 record

This species was recorded in one ditch at Fairfield. It was not recorded during the 1985 survey.

11. *Lemna gibba* 15 records

This often dominant species occurs infrequently across East Guldeford, with a few records at The Dowels and Woolpack and does not represent a significant problem.

12. *Myriophyllum verticillatum* 2 records

This species was recorded in 2 freshwater ditches on the west side of The Dowels and in 3 ditches in 1985. It may have been a more frequent species prior to large scale arabalization of the freshwater habitat.

13. *Potamogeton crispus* 15 records

This species occurs in brackish ditches mainly across East Guldeford, with 2 records for Fairfield and 1 for the north side of The Dowels. Young specimens of this species were probably mistaken for *P. fresii* in 1985.

14/15. *Potamogeton pusillus/berchtoldii* 26 records

The distinction between these two fine leaved *Potamogeton* species is not easily made in the field, and *P. berchtoldii* appears to be more frequent than previously thought. Both were recorded fairly infrequently across all areas, but their distribution appears to have increased since 1980.

16. *Potamogeton lucens* 15 records

The distribution of this species is entirely consistent with its 1980 distribution, occurring in freshwater ditches at The Dowels and the northern end of Snargate.

17. *Potamogeton natans* 16 records

This species has a wider distribution than *P. natans*, though of similar abundance, occurring in a small number of freshwater ditches on the west side of The Dowels and at Fairfield and across East Guldeford. It can be dominant where it occurs.

18. *Potamogeton trichoides* 15 records

In 1980 this nationally scarce *Potamogeton* was recorded only from the northern end of The Dowels, and was not recorded in 1985. Its distribution appears to have increased since 1980, occurring both at The Dowels and scattered across East Guldeford. It is an extremely fine leaved species and may have been overlooked in the past, though the national distribution of this species appears to be increasing.

19. *Ranunculus baudotti* 15 records

In 1980 this species was recorded mainly on the east side of The Dowels, Snargate and at Fairfield. It's present distribution is consistent with its 1985 distribution, occurring in brackish ditches mainly across East Guldeford, with a small number of records for Woolpack and Fairfield.

20. *Ranunculus circinatus* 17 records

The distribution of this species is largely confined to fresh water ditches on the west side of The Dowels, with 3 records for Fairfield, and single records for Snargate, Woolpack and East Guldeford. It appears to have been more frequent at Fairfield in 1980.

21. *Sagittaria sagittifolia* 3 records

This freshwater species is limited to 3 ditches on the west side of The Dowels, and its distribution has not changed since 1980.

22. *Samolus valerandi* 26 records

This species appears to have increased it's distribution since 1980, occurring widely across East Guldeford though infrequently recorded elsewhere. It occurs mainly along brackish ditches and is generally found near the sea.

23. *Sium latifolium* 5 records

This nationally scarce species was recorded in 4 ditches at the northern end of The Dowels and in a single ditch at Snargate. It was also recorded only in this locality in 1980, but appears to have decreased in abundance, which, like the apparent decline in *Althea officinalis* in this area, may have been caused by an increase in sheep grazing.

24. *Triglochin palustris* 13 records

This species was either overlooked in the past, or has increased it's distribution. In 1980 it occurred only at Fairfield, and 1985 was recorded in only 4 ditches. It was recorded during this survey along 11 ditches on the west side of East Guldeford, with a further 2 records for the east side of The Dowels.

25. *Triglochin maritima* 3 records

This saltmarsh species was recorded in 2 ditches at Woolpack and in a single ditch at Fairfield. In 1985 it was recorded only at Fairfield.

26. *Utricularia sp* 8 records

This freshwater species is restricted to a few ditches in the central area of The Dowels, near or adjacent the Royal Military Canal.

27. *Wolffia arrhiza* 2 records

This nationally scarce species was recorded in two freshwater ditches, one at Fairfield and the other on the western side of East Guldeford. Its occurrence however tends to be unpredictable from year to year.

28. *Zannichellia palustris* 32 records

This species occurs fairly frequently at Fairfield and Woolpack, and less frequently across East Guldeford and on the east side of East Guldeford.

5.10 **Species not re-recorded in 1993/4**

Several species were not re-recorded during this survey. Some, such as *Chenopodium chenopodiodes* and *Salicornia sp* are known to have disappeared since 1985, though others may not have been picked up by the sampling method because of their very infrequent distribution. A list of these species is given below:

Alisma lanceloatum
Chenopodium chenopodiodes
Petroselinum segetum
Centaurium pulchellum
Salicornia sp
Puccinellia fasciculata
Apium graveolens
Eleogiton fluitans
Ranunculus peltatus

5.11 **Monitoring S15 Management Agreements**

Data can be extracted from the survey data tables and summarised for particular areas, such as S15 Management Agreements or larger ownership blocks. This enables an assessment of the ditches within the particular area to be made, and serves as a baseline for future monitoring. An example of spreadsheet data for one Management Agreement is shown in Table 14, which covers a small area on the east side of East Guldeford.

Table 14 Wall.94 Management Agreement All Souls College

Ditch number	614	616	627	628	630	631	637	638	641	total	9
Ceratophyllum demersum						1	1			2	22%
C. submersum						1	1			2	22%
Elodea nuttalii		1			1	1				3	33%
Filamentous algae					1	1			1	3	33%
Glyceria fluitans	1		1	1	1	1		1		6	67%
Hydrocharis morsus-ranae		1	1							2	22%
Lemna minor	1	1	1	1	1	1	1		1	8	89%
L. trisulca	1	1	1		1	1	1		1	7	78%
Myriophyllum spicatum	1	D	1		1	1				5	56%
Potamogeton pectinatus						1	1			2	22%
P. trichoides*	1									1	11%
Alisma plantago-aquatica	1		1	1	1		1			5	56%
Apium nodiflorum	1		1		1	1	1			5	56%
Eleocharis palustris	1	1	1	1	1	1	1	1		8	89%
Nasturtium officinale agg.	1				1	1				3	33%
Oenanthe aquatica	1			1	1	1	1		1	7	78%
O. fistulosa	1	1	1		1	1	1		1	7	78%
Phragmites australis							1			1	11%
Sparganium erectum	1	1	1			1	1		1	6	67%
Veronica catenata	1		1	1	1	1				5	56%
Agrostis stolonifera				1				1	1	3	33%
Carex otrubae				1	1			1		3	33%
Equisetum palustre				1						1	11%
Galium palustre			1		1				1	3	33%
Hydrocotyle vulgaris					1					1	11%
Juncus inflexus	1	1	1	1	1			1	1	7	78%
Mentha aquatica			1	1						3	33%
Myosotis laxa			1		1				1	4	44%

* = Nationally scarce species

Ditch number	614	616	627	628	630	631	637	638	641	total	avg
number of aquatic species	5	5	5	2	6	9	5	1	3	11	4.6
number of emergent species	8	4	6	4	7	7	7	1	3	9	5.2
number of bank species	3	1	4	5	5	0	0	3	4	8	2.8
total number of species	16	10	15	11	18	16	12	5	10	28	12.6

COMMENT

A typical group of freshwater ditches, with 4 ditches containing 15+ species per 20 metres.
The average number of species (12.6) exceeds the SSSI selection criteria of 10 species per 20 meters.
There are no choked ditches, though ditch 636 is dry and needs restoring .

6. CONCLUSION

Comparisons with the 1985 survey suggest that overall the floristic diversity of the site has been maintained. All areas still meet the SSSI selection criteria on botanical grounds alone, and the SSSI has succeeded in protecting and in some areas enhancing the special interest of the site.

The survey has however highlighted the following problems:

1. The west side of The Dowels and Snargate appear to have declined in diversity to some extent. This may be a consequence of increased sheep grazing, with some emergent species such as *Althea officinalis* showing a decrease in abundance. Temporary electric fencing has been used successfully at Fairfield to alleviate this problem and should be tried elsewhere. However several short turf bank species may have benefited from sheep grazing, such as *Oenanthe lachenalii, Glaux maritima* and *Triglochin palustre*.

2. Snargate appears also to be subject to high level of eutrophication, with over 40% of ditches recorded as dominated by algal weed. This may have been caused by nutrient run-off from the adjoining arable land or fluctuating water levels which concentrate nutrients and reduce competition where ditches have temporarily dried out. The situation at Snargate requires monitoring and possible ways to control water levels and quality need to be considered.

3. Though overall the ditch system is well maintained, ditches choked by emergents are clustered in some areas. As a follow on from this report owners with areas where management may have lapsed will be contacted. Such owners should be given priority when compiling individual Site Management Statements.

4. While ditches adjacent to arable land contribute significantly to the diversity of the site, ditches within arable are species-poor and under-managed, and should be excluded where possible from the SSSI. A

reversion to pasture should be encouraged where arable land remains in the SSSI, unless the fields are used by wintering Bewick swans.

5. While 5 meter fertilizer free buffer zones along ditches adjacent arable land appears to provide adequate protection against eutrophication, *Enteromorpha* was found to be 10% more frequent in ditches adjacent to arable land. Further study into the environmental conditions to which these ditches are subject and the response of species like *Enteromorpha* to them is needed to further appreciate the effects of the surrounding arable on the SSSI.

6. The survey data in this report has been stored and analysed in spreadsheet (QPW) format only. Further analysis will be facilitated by the development of an integrated database application, which will allow the data to be extracted in different formats for different uses, such as Twinspan analysis and distribution mapping (Dmap). The following diagram shows how an integrated database application will allow a much greater use of ditch survey data, at Walland, on the North Kent Marshes and at Sandwich Bay.

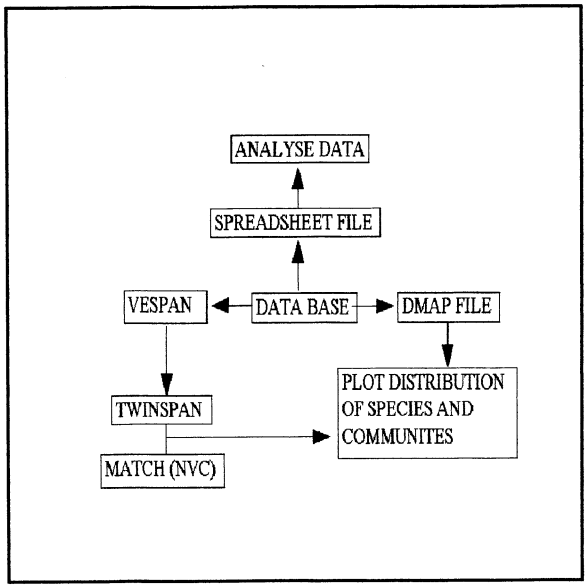


Figure 9

ACKNOWLEDGEMENTS

We would like to thank the farmers at Walland Marsh who allowed us access to their land in carrying out this survey. We hope the results of the survey will be of interest to them.

REFERENCES

LATIMER W	Survey of dykes at Romney Marsh	NCC 1980
WHISSON K	Walland Marsh dyke survey	File report 1985
CHRIS BLANDFORD ASSOCIATES	Ecological Survey of East Guldeford in connection with A259 Rye Bypass	Environmental Assessment 1992
NCC	Guidelines for the Selection of Biological SSSIs	1989
ALCOCK & PALMER	A standard method for the survey of ditch vegetation	CST Notes no. 37 NCC 1985

APPENDIX I SURVEY RESULTS FOR 1993/4

Ditch blocks are in numerical order

The Dowels West side
The Dowels East side (pasture)
Snargate
Fairfield
East Guldeford North side (pasture + adjacent arable)
East Guldeford West side (pasture + adjacent arable)
East Guldeford East side (pasture + adjacent arable)
Woolpack (pasture + adjacent arable)
Arable ditches

Wall. 93 The Dowels (west side)

choked ditches		*	*	DRY	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	DRY		*	*	*		*	*
Ditch number	1	2	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Azolla filiculoides																															
Callitriche obtusangula												1								1					1			1		1	
Ceratophyllum demersum	1	1	1					1	1							1	1			1	1		1		1			1	1		1
C. submersum																															
Chara sp												1													1			1			
Elodea canadensis																									1			1			
E. nuttalii	1	1	1					1	D			1				D	1	D		D	1		D		1			1	1		
Enteromorpha sp								D	1									1					1		1			D	1		
Filamentous algae		1				1						1					1	1			1		D		1						
Glyceria fluitans	1	1					1	1						1						1					1				1		
Hottonia palustris					1							1		1							1				1	1	1	1			
Hydrochoris morsus-rana							1	1	1	D	1			D		1		1		1	D		1		1		1	1			1
Lemna miniscula																															
L. minor	1	1	D			1		1	1	D		1	1	1		1	1	1	1	1	1		1		1	1	1	1	1	D	1
L. trisulca		1	1			1	D		1	1		1		1		1	1	1		1	D		1		1	1	1	1	1	1	1
L. gibba																															
Myriophyllum spicatum	1	1														1		1		1					1			1			
M. verticillatum																1															
Nymphaea alba																												1			
Potamogeton crispus																															
P. natans																												1			
P. lucens	1	D						1	1							D	D	D		1											
P. pectinatus	1	1							1							1				1			1								
P. pusillus																				1					1						
P. trichoides	1					1											1						1		1			1	1		
Polygonum amphibium		1																										1			
Ranunculus circinatus																1		1		1			1		1			1	1		
R. trichophyllus																															
Sparganium emersum																															
Utricularia sp												1																			
Alisma plantago-aquatica	1	1	1		1		1			1		1				1		1		1	1	1	1		1	1			1		
Butomus umbelatus																															
Carex riparia		1				1	1		1	D		1	D		1																
Eleocharis palustris														1											1						
Glyceria maxima			1			1	1	1					1						D	1	1	D	1			D	D				
Iris pseudocorus								1		1		1		1				1			1	1	1								
Juncus articulatus					1																							1			
Oenanthe fistulosa		1			1		1							1				1			1		1		1	1					
Phalaris arundinacea									1							1					1										
Phragmites australis									D		D		1		D		D			1	1		1		1					1	D
Ranunculus sceleratus																															
Nasturtium officinale agg.					1																1				1						
Rumex hydrolapathum			1							1	1	1		1					1												
Sagittaria sagittifolia		1																													
Schoenoplectus tabernaemontani																															
Scirpus maritimus										1				1																	
Sparganium erectum		1	1		D	1	1					1		1				1			1	1	1		1	D	D	1	1	1	1
Typha angustifolia											1	D		1				1													D
T. latifolia												1															1				
Agrostis stolonifera																			1				1								
Carex distans																															
Carex otrubae																		1			1				1					1	
Epilobium hirsutum									1																						
Equisetum palustre									1		1		1		1	1		1													
Galium palustre					1		1														1				1	1					
Hydrocotyle vulgaris																															
Juncus inflexus	1		1		1		1	1		1		1			1	1		1		1	1	1	1		1	D	1	1	1	1	1
J. effusus								1				1		1				1			1	1				1	1				
Lycopus europaeus										1											1										
Lythrum salicaria						1						1			1																
Mentha aquatica							1							1								1				1			1		1
Myosotis laxa														1																	
Pulicaria dysenterica	1						1				1	1				1									1						
Solanum dulcamara		1								1			1						1												
Sium latifolium					1							1		1																	

Ditch number	1	2	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	31	32	33	34	35	36	37	38	39	40	41	42	43	44
number of aquatic species	8	10	4	0	1	4	3	7	8	3	1	8	1	5	0	10	7	8	1	13	7	0	10	0	16	3	4	13	10	3	4
number of emergent species	1	5	4	0	5	3	5	2	3	5	3	7	3	7	2	2	1	5	2	3	8	5	6	0	6	4	3	2	2	2	3
number of bank species	2	1	1	0	3	1	4	2	2	3	2	5	2	4	3	3	0	4	2	1	5	3	2	0	4	4	2	1	2	2	2
total number of species	11	16	9	0	9	8	12	11	13	11	6	20	6	16	5	15	8	17	5	17	20	7	18	0	26	11	9	16	14	7	9

Wall. 93 The Dowels (west side)

choked ditches	*	*	*	*	*		DRY	*	*	*	*	*	*					*	DRY			*					*
Ditch number	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Azolla filiculoides																												
Callitriche obtusangula		1				1		1			1						1				1							
Ceratophyllum demersum						1									1						1							
C. submersum																										1		
Chara sp																1												
Elodea canadensis						1										1												
E. nuttalii			1			1									D											1	1	
Enteromorpha sp			D			1								1														
Filamentous algae						1														1		1			1			
Glyceria fluitans		1						1	1		1	1	1	1			1		D	1	1		1					1
Hottonia palustris															1	1				1			1	1				
Hydrochoris morsus-rana			1			1					1	1								1	1	1	1	D	1	1	1	
Lemna miniscula																												
L. minor	1	1	1		1	1		1	1			D		1	1	1				1	1	1	1	1		1	1	1
L. trisulca	1	1	1		1	1			D	1	1	1	1	1	1	1				1	1	1			1	1	1	1
L. gibba																												
Myriophyllum spicatum																												
M. verticillatum																												
Nymphaea alba			1																									
Potamogeton crispus																												
P. natans															1									1	1			
P. lucens															1	1												
P. pectinatus																1												
P. pusillus																												
P. trichoides																												
Polygonum amphibium	1							1									1											
Ranunculus circinatus					1											1												
R. trichophyllus						1									1													
Sparganium emersum																												
Utricularia sp															1					1	1							1
Alisma plantago-aquatica		1	1			1		1	1	1	1	1	1		1	1					1	1	1	1	1	1	1	
Butomus umbelatus			1																									
Carex riparia																												
Eleocharis palustris																					1	1		1				1
Glyceria maxima				D	D													D	1									
Iris pseudocorus				1																								
Juncus articulatus										1	1		1								1			1	1	1	1	D
Oenanthe fistulosa		1	1		1	1					1	1			1	1				1	1	1	1	D	1	1	1	1
Phalaris arundinacea		1																										
Phragmites australis						1									D		1											
Ranunculus sceleratus																												
Nasturtium officinale agg.		1	1					1			1				1						1		1				1	1
Rumex hydrolapathum			1					1												1	1	1						
Sagittaria sagittifolia																												
Schoenoplectus tabernaemontani																												
Scirpus maritimus																												
Sparganium erectum	1	1	1		1	1			1					1	1	1	1			D	1	1	D	D	1	1	1	
Typha angustifolia	D	D						D	D	D	D	D	D								1							
T. latifolia																												
Agrostis stolonifera																				D	1		1		1	1		D
Carex distans																												
Carex otrubae			1					1	1	1		1	1	1									1					
Epilobium hirsutum																												
Equisetum palustre																												
Galium palustre											1											1	1	1			1	
Hydrocotyle vulgaris																					1	1		1	1			
Juncus inflexus	1	1	1	1	1	1		1	1	1	1	1	D	1	1	1		D	D	1		1	D	1	1	1	1	
J. effusus				1								1					1			D	1	1	D	1	1		1	1
Lycopus europaeus																												
Lythrum salicaria								1																				
Mentha aquatica			1							1										1								
Myosotis laxa																												
Pulicaria dysenterica																												
Solanum dulcamara																	1											
Sium latifolium																												

Ditch number	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
number of aquatic species	3	4	6	0	3	10	0	4	3	1	4	4	2	4	9	8	3	0	1	7	7	4	4	4	4	5	4	4
number of emergent species	2	6	6	2	3	4	0	4	3	3	5	3	3	1	5	3	2	1	1	3	8	5	4	5	4	4	5	4
number of bank species	1	1	3	2	1	1	0	3	2	3	2	3	2	2	1	1	2	1	1	4	3	4	5	4	4	2	3	2
total number of species	6	11	15	4	7	15	0	11	8	7	11	10	7	7	15	12	7	2	3	14	18	13	13	13	12	11	12	10

Wall. 93 The Dowels (west side)

choked ditches			*		*	*	*					DRY			*		*		*	*	*	*	DRY							*		59	64.1%
Ditch number	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	tot	92
Azolla filiculoides					D	D	D														1										D	D		6	6.5%
Callitriche obtusangula						1	1		1		1				1	1	1		1	1	1							1					1	23	25.0%
Ceratophyllum demersum									1	1		1			1		1		1						1		1	1	1	1	1			28	30.4%
C. submersum											1	1						1	1	1														7	7.6%
Chara sp			1																															5	5.4%
Elodea canadensis		1																																5	5.4%
E. nuttalii				1						1																	D							23	25.0%
Enteromorpha sp									1		1								1	1								1						15	16.3%
Filamentous algae			1	1		1			1	1	1	1		1		D											1	1					1	23	25.0%
Glyceria fluitans		1	1			1		D	1	1			1						1	1	1				1						1	1	1	35	38.0%
Hottonia palustris	1																							1										15	16.3%
Hydrochoris morsus-rana	D	1	1	1		1	1				1	1		1	1	1	1					1	1	D	1									43	46.7%
Lemna miniscula																		1	1	1														3	3.3%
L. minor	1	1	1	1	1	1	1	1	1		1	1			1	1	1		1	1				1	D		1	1	1	1	1	D	1	68	73.9%
L. trisulca	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1				1	1		1	1	1	1	1	1	1	67	72.8%
L. gibba																					D													1	1.1%
Myriophyllum spicatum				1					1	1																							1	11	12.0%
M. verticillatum																											1							2	2.2%
Nymphaea alba				1																														3	3.3%
Potamogeton crispus												1																						1	1.1%
P. natans										1		1		1																				7	7.6%
P. lucens																																		10	10.9%
P. pectinatus									1	1	1																1						1	12	13.0%
P. pusillus											1																							3	3.3%
P. trichoides		1																																8	8.7%
Polygonum amphibium									1			1															1							7	7.6%
Ranunculus circinatus				1																														10	10.9%
R. trichophyllus																																		2	2.2%
Sparganium emersum										1																								1	1.1%
Utricularia sp	1			1															1															8	8.7%
Alisma plantago-aquatica	1	1							1		1	1		1					1			1		1				1	1	1		1		47	51.1%
Butomus umbelatus																																		1	1.1%
Carex riparia																																		8	8.7%
Eleocharis palustris	1				1		1	1	1	1	1	1		1	1		1	1						1	1			1	1	1	1	1	1	26	28.3%
Glyceria maxima																				1	1													18	19.6%
Iris pseudocorus																																		9	9.8%
Juncus articulatus			1			D		1			1	1			1	D		1					1				1	1		1				23	25.0%
Oenanthe fistulosa	1	1		1		1	1	1	1	1	1	1		1	1	1	1	1	1	1		1	1	1	1		1	1	1	1		1	1	53	57.6%
Phalaris arundinacea																																		4	4.3%
Phragmites australis																															1			15	16.3%
Ranunculus sceleratus																												1						1	1.1%
Nasturtium officinale agg.		1				1	1				1	1		1	1		1		1				1						1		1	1	25	27.2%
Rumex hydrolapathum	1								1			1		1				1	1	1									1					19	20.7%
Sagittaria sagittifolia				1						1																								3	3.3%
Schoenoplectus tabernaemontani																												1	1	D				3	3.3%
Scirpus maritimus																												1						3	3.3%
Sparganium erectum	1	1		1		1	1			1		1		1				1	1				1	D			1		1	D	1			52	56.5%
Typha angustifolia			D											1	D		D					D												19	20.7%
T. latifolia																																		2	2.2%
Agrostis stolonifera		1		1			1							1	1	1						1	D	1			1							18	19.6%
Carex distans																1											1							2	2.2%
Carex otrubae									1																				1	1				15	16.3%
Epilobium hirsutum			1	1														1																4	4.3%
Equisetum palustre														1																				7	7.6%
Galium palustre			1																											1				12	13.0%
Hydrocotyle vulgaris														1		1		1				1	1											9	9.8%
Juncus inflexus		1	1	1			1		1	1	1	1			1		1		1		1				1		1	1						60	65.2%
J. effusus	1	1	1							1			1	1	1	1	1	1	1	1	1	1	1	1	1									36	39.1%
Lycopus europaeus																		1	1			1												5	5.4%
Lythrum salicaria																																		4	4.3%
Mentha aquatica																								1										10	10.9%
Myosotis laxa																																		1	1.1%
Pulicaria dysenterica																		1																7	7.6%
Solanum dulcamara																																		5	5.4%
Sium latifolium																																		3	3.3%

Ditch number	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	avg	tot
number of aquatic species	5	6	6	9	3	7	5	3	9	9	9	8	1	3	5	5	5	3	9	7	4	1	1	4	5	0	8	6	3	3	5	4	7	4.9	30
number of emergent species	5	4	2	3	1	4	4	3	4	4	5	7	0	7	5	2	4	5	5	3	1	3	4	4	2	0	3	7	5	8	3	4	3	3.6	19
number of bank species	1	3	4	3	0	0	2	0	2	2	1	1	1	4	3	4	2	5	3	1	2	4	3	3	2	0	2	1	1	2	0	0	0	2.1	16
total number of species	11	13	12	15	4	11	11	6	15	15	15	16	2	14	13	11	11	13	17	11	7	8	8	11	9	0	14	14	9	13	8	8	10	10.7	65

Wall.94 The Dowels (pasture) east side

choked ditches			*													*	*	*		*					*	*	7	28%
Ditch number	28	29	30	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	tot	25
Callitriche obtusangula							1					1											1			3	12%
Ceratophyllum demersum		1		1	1					1											1					5	20%
C. submersum							1	1	1		1		1							1						6	24%
Elodea nuttalii										1											1					2	8%
Enteromorpha sp	1	1							1		1				1		1				1					7	28%
Filamentous algae		1		1											1		1			1	1		1			7	28%
Fontinalis antipyretica										1																1	4%
Glyceria fluitans	1								1	1													1			4	16%
Hydrocharis morsus-ranae	1	1		1																						3	12%
Lemna minor	1	1		1	1	1	1	1	1	1	1	1	D	1	1				1	1	1		1	1		19	76%
L. trisulca	1	1	1	1			1	1	1	1	1	1	1	1	1		1		1		1		1	1		18	72%
L. gibba								1					D													2	8%
Myriophyllum spicatum	1			1	1	1	1			1		1	1	1				1			1					11	44%
Potamogeton berchtoldii										1																1	4%
P. lucens										1											1					2	8%
P. pectinatus				1	1	1	1	1	1		1	1	1	1	1		1	1		1		1				15	60%
P. trichoides		1																								1	4%
Polygonum amphibium		1																					1			2	8%
Ranunculus trichophyllus												1														1	4%
Zannichellia palustris										1	1	1			1			1								5	20%
Alisma plantago-aquatica	1	1								1														1		4	16%
Apium nodiflorum				1																						1	4%
Carex riparia		1																			1					2	8%
Eleocharis palustris							1	1				1	1	1										1		6	24%
Glyceria maxima		1																					1		1	3	12%
Iris pseudocorus																									1	1	4%
Juncus articulatus																								1		1	4%
Oenanthe fistulosa		1								1		1									1		1	1		6	24%
Phalaris arundinacea													1													1	4%
Phragmites australis	1		D	1					1	1				1	D	D	D		1	1	1				D	13	52%
Ranunculus sceleratus							1																			1	4%
Rumex hydrolapathum		1																			1				1	3	12%
Samolus valerandi												1														1	4%
Scirpus maritimus		1				1	1	1	1		1	1		1	1			1	1	1	1	1	1			15	60%
Sparganium erectum										1											1					2	8%
Typha angustifolia		1	1																1					D	1	5	20%
Althaea officinalis																						1				1	4%
Carex otrubae	1	1		1	1				1					1		1				1	1	1		1		11	44%
Juncus inflexus	1	1							1			1				1					1		1	1		8	32%
J. gerardii																			1	1						2	8%
Oenanthe lachenalii				1	1								1							1	1					5	20%
Solanum dulcamara																			1							1	4%
Triglochin palustris				1										1												2	8%

Ditch number	28	29	30	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	avg	tot
number of aquatic species	6	8	1	7	4	3	6	5	6	10	6	7	6	4	6	0	4	3	2	4	8	1	6	2	0	4.6	20
number of emergent species	2	7	2	2	0	1	3	2	2	4	1	4	2	3	2	1	1	1	3	2	6	1	3	5	5	2.6	16
number of bank species	2	2	0	3	2	0	0	0	2	0	0	1	1	2	0	2	0	0	2	3	3	2	1	2	0	1.2	7
total number of species	10	17	3	12	6	4	9	7	10	14	7	12	9	9	8	3	5	4	7	9	17	4	10	9	5	8.4	43

Wall.93 Snargate

choked ditches

Ditch number	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153
Callitriche obtusangula					1			1	1										1	1	1	
Ceratophyllum demersum	1	1	1	1	1	1			1													
C. submersum	1		1		1	1	1		1	1	1	1		1		1	1	1	1	1		1
Elodea nuttalii		1		1	1																	
Enteromorpha sp		D	D		1	1	1	D	D	1		D		1	D	1	D	D		D	1	1
Filamentous algae		1	1			1		D	1	D				D		1	1	1	1			1
Glyceria fluitans		1		1	1			1	1		1		1				1					
Hottonia palustris	1				1						1											
Hydrochoris morsus-rana				1	1																	
Lemna minor	1	1	1	1	1	1	1	1	1	1	D	1	1	1	D	1	1	1	1	1		1
L. trisulca	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1		1
Myriophyllum spicatum		1	1			1		1		1	1	1	1	1								1
Potamogeton lucens		1	1						1													
P. pectinatus		1				1	1		1	1	1	1	1	1		1			1		1	1
P. pusillus																						
Ranunculus circinatus									1													
R. baudotti/trichophyllus								1			1		1				1		1	1	1	1
Alisma plantago-aquatica	1		1					1	1													
Carex riparia	D																	D				
Eleocharis palustris			1	1	1	1		1	1	1	1		1	1	1	1	1		1	1	1	1
Juncus articulatus							1															
Nasturtium officinale agg.	1	1	1		1				1							1	1		1			
Oenanthe fistulosa		1	1	1	1				1			1				1		1				
Phragmites australis				1				D	D			1		D				D	1	D	D	1
Rumex hydrolapathum	1		1																			
Samolus valerandi					1																	
Schoenoplectus tabernaemontani							1															
Scirpus maritimus						1	1	1		1		1	1	1		1			1			1
Sparganium erectum	1	1	D	1	D				1													
Althaea officinalis																						
Glaux maritima																						
Hydrocotyle vulgaris		1		1	1																	
Juncus inflexus	1		1	1	1	1	1	1	1	1	1				1	1	1	1	1	1		
J. gerardii								1														
Siam latifolium	1																					

Ditch number	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153
number of aquatic species	5	11	8	6	10	8	5	8	11	7	8	6	6	7	2	6	6	5	7	6	4	8
number of emergent species	5	3	6	4	5	2	3	5	6	2	1	3	2	3	1	4	2	3	4	2	2	3
number of bank species	2	1	1	2	2	1	1	2	1	1	1	0	0	0	1	1	1	1	1	1	0	0
total number of species	12	14	15	12	17	11	9	15	18	10	10	9	8	10	4	11	8	9	12	9	6	11

Wall.93 Snargate

choked ditches		*		*															*		3	6.7%
Ditch number	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	total	45
Callitriche obtusangula	1		1									1		1							10	22.2%
Ceratophyllum demersum											1	1	1							1	11	24.4%
C. submersum	1				1	1	1	1	1	1	1		1	1		1	1	1		1	31	68.9%
Elodea nuttalii																				1	4	8.9%
Enteromorpha sp	1							1	D						1	1		1			25	55.6%
Filamentous algae	D	D	D		1	D		D		D	1									1	23	51.1%
Glyceria fluitans																					8	17.8%
Hottonia palustris																					3	6.7%
Hydrochoris morsus-rana																					2	4.4%
Lemna minor			1		1			1	1	1					1					1	31	68.9%
L. trisulca	1		1		1		D	1	1	1	1	1	1	1	1		1	1		1	36	80.0%
Myriophyllum spicatum					1	1		1		1	1	1	1	1				1		1	22	48.9%
Potamogeton lucens																					3	6.7%
P. pectinatus	1				1			1	1	1	1	1	1	1	1	1				1	29	64.4%
P. pusillus															1	1					2	4.4%
Ranunculus circinatus																					1	2.2%
R. baudotti/trichophyllus	1		1				1														13	28.9%
Alisma plantago-aquatica																					4	8.9%
Carex riparia																					2	4.4%
Eleocharis palustris	1			1				1	1	1	1	1	1		1					1	28	62.2%
Juncus articulatus									1		1										3	6.7%
Oenanthe fistulosa	1		1																		10	22.2%
Phragmites australis	D	D		D	D	D	D	1	1		D	1	D	D		D	D		D	1	28	62.2%
Nasturtium officinale agg.																					8	17.8%
Rumex hydrolapathum																				1	3	6.7%
Samolus valerandi																					1	2.2%
Schoenoplectus tabernaemontani						1		1			1									1	5	11.1%
Scirpus maritimus	1				1	D		D	1	D	1	1	D				1	1		1	24	53.3%
Sparganium erectum																				1	7	15.6%
Althaea officinalis											1			1							2	4.4%
Glaux maritima	1							1													2	4.4%
Hydrocotyle vulgaris																					3	6.7%
Juncus inflexus							1					1			1	1					12	26.7%
J. gerardii																					1	2.2%
Siam latifolium																					1	2.2%

Ditch number	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	avg	tot
number of aquatic species	8	2	5	1	6	3	3	7	5	6	6	5	5	7	7	5	2	4	0	9	5.9	17
number of emergent species	4	1	1	2	2	3	1	4	4	2	5	3	3	2	2	2	2	2	2	6	2.9	12
number of bank species	1	0	0	0	0	0	1	1	0	0	1	1	0	1	1	1	0	0	0	0	0.6	6
total number of species	12	2	6	2	8	6	6	12	9	8	12	9	8	8	7	6	4	5	1	14	9.1	35

Wall.93 Fairfield

ditch number	187	188	189	195	196	197	198	199	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	222	223	224	225	226	227	230	233	234	235	237	238	239	240	241	total	43
Callitriche obtusangula																													1															1	2.3%
C. stagnalis																																1													1	2.3%
Ceratophyllum demersum		1																											1															2	4.7%
C. submersum	1	1	1							1		1	1	1	1	1	1		1	1				1	1	1		1			1	1	1		1	1				1	1	1	1	25	58.1%
Chara sp																													1				1											2	4.7%
Elodea nuttallii	1	1	1							1				1		1																													6	14.0%
Enteromorpha sp	1	1	1							1	1	1		1	1	1	1			1											1		1	1						1	1	1	1	18	41.9%
Filamentous algae			1					1																								1												3	7.0%
Fontinalis antipyretica	1		1																						1	1																		4	9.3%
Glyceria fluitans				1							1																		1															3	7.0%
Hydrocharis morsus ranae																													1	1		1	1											4	9.3%
Lemna minor	1	1	1		1					1		1	1	1	1	1				1			1	1				1	1	1	1	1		1						1	1	1	1	24	55.8%
L. trisulca	1	1	1		1	1	1			1		1	1	1	1	1	1		1	1			1	1	1			1	1		1	1	1	1	1				1	1	1	1	30	69.8%
Myriophyllum spicatum	1		1							1		1	1	1		1	1		1	1				1	1	1		1		1			1	1	1						1	1		20	46.5%
Potamogeton crispus																													1				1											2	4.7%
P. berchtoldii																													1															1	2.3%
P. natans																													1				1											2	4.7%
P. pectinatus	1		1							1		1	1	1		1	1		1	1				1	1	1		1			1			1	1	1		1			1	1	1	22	51.2%
P. pusillus	1									1																									1									3	7.0%
Ranunculus circinatus			1							1																			1															3	7.0%
R. baudotii																				1					1																				2	4.7%
R. trichophyllus												1																											1	1					3	7.0%
Wolffia arrhiza																																	1											1	2.3%
Zannichellia palustris	1															1									1			1			1			1	1			1			1	1	1	11	25.6%
Alisma plantago-aquatica																													1			1												2	4.7%
Butomus umbellatus		1																											1															2	4.7%
Eleocharis palustris										1		1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1															17	39.5%
Glyceria maxima																													1	1		1	1											4	9.3%
Hippuris vulgaris	1																																												1	2.3%
Juncus articulatus																																1												3	7.0%
Oenanthe aquatica											1										1								1			1	1											5	11.6%
O. fistulosa	1			1		1							1																															4	9.3%
Phalaris arundinacea																														1															1	2.3%
Phragmites australis	1	1	1		D	D	D					1		1	D	1	1	1					D	D	1	D		1		D	1			1	1	1		1	D	1	1	1	D	28	65.1%
Ranunculus sceleratus																				1																									1	2.3%
Nasturtium officinale agg.																													1				1											2	4.7%
Rumex hydrolapathum																														1		1												2	4.7%
Samolus valerandi																								1																					1	2.3%
Schoenoplectus tabernaemontani	1	1	1							1			1	1		1	1		1						1	1		1	1		1			1										15	34.9%
Scirpus maritimus	1		1		1	1		1		1	1	1	1	1	1	1	1	1	1	1					1	1	1	1			1			1	1	1	1	1	1	1	1	1	1	31	72.1%
Sparganium erectum																													1	1		1	1											4	9.3%
Triglochin maritima					1																																							1	2.3%
Typha angustifolia																														D		1	1											3	7.0%
Althaea officinalis																														1		1	1											3	7.0%
Carex divisa																																		1	1	1	1							4	9.3%
C. otrubae	1	1			1							1		1					1											1	1		1					1			1	1	1	13	30.2%
Epilobium parviflorum																														1															1	2.3%
Equisetum palustre					1																																							1	2.3%
Galium palustre																														1		1	1											3	7.0%
Glaux maritima											1	1	1				1				1			1	1	1								1				1		1		1			12	27.9%
Juncus gerardii																								1	1	1					1						1	1			1				7	16.3%
J. inflexus	1	1	1							1	1																		1	1	1	1	1											10	23.3%
Lycopus europaeus		1																																										1	2.3%
Mentha aquatica																																1												1	2.3%
Myosotis laxa																																	1											1	2.3%
Oenanthe lachenalii	1	1	1	1						1		1	1	1	1	1	1		1	1	1				1	1		1			1				1	1	1	1		1		1	24	55.8%
Pulicaria dysenterica																														1															1	2.3%
Solanum dulcamara																														1		1	1											3	7.0%

ditch number	187	188	189	195	196	197	198	199	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	222	223	224	225	226	227	230	233	234	235	237	238	239	240	241	avg	tot
number of aquatic species	10	6	10	1	2	1	1	1	0	9	2	7	5	7	4	8	5	0	4	7	0	0	2	5	7	4	0	6	11	2	7	5	10	5	7	3	0	2	2	5	7	7	6	4.5	24
number of emergent species	5	3	3	1	3	3	1	1	0	3	2	3	4	4	2	4	4	3	2	3	2	1	2	3	4	4	2	4	7	7	2	8	5	2	3	2	1	2	2	2	2	2	2	3.0	19
number of bank species	3	4	2	1	2	0	0	0	0	2	2	3	2	2	1	1	2	0	2	2	1	0	0	2	3	3	0	1	1	7	4	5	6	2	1	2	4	3	2	0	4	1	2	1.9	15
total number of species	18	13	15	3	7	4	2	2	0	14	6	13	11	13	7	13	11	3	8	12	3	1	4	10	14	11	2	11	19	16	13	18	21	9	11	7	5	7	6	7	13	10	10	9.4	58

Wall.94 East Guildeford (pasture) north side

choked ditches	*																	1	5.9%
Ditch number	287	288	289	290	291	292	293	298	299	304	312	313	314	315	324	325	327	tot	17
Azolla filiculoides				1														1	5.9%
Callitriche obtusangula			1	1	1				1	1			1	1	1	1		9	52.9%
Ceratophyllum demersum					1	1	1	1	1									5	29.4%
Chara sp								1			A							2	11.8%
Elodea nuttalii					1	1									1		1	4	23.5%
Enteromorpha sp						1		1	D	D		1	1	A	D	D	1	10	58.8%
Filamentous algae			1	1	1	1	1	1			1	1	1	1	1		1	12	70.6%
Glyceria fluitans		1	1	1	1	1	1			1	1		1			1	1	11	64.7%
Hydrocharis morsus-ranae								1			1							2	11.8%
Lemna minor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	16	94.1%
L. trisulca	1		1	1	1	1	1	1	1		1	1	1		1		1	13	76.5%
Myriophyllum spicatum					1	1		1					1		1		1	6	35.3%
Potamogeton crispus											1	1		1				3	17.6%
P. natans											1							1	5.9%
P. pectinatus	1							1						1	1		1	5	29.4%
Ranunculus baudotti															1		1	2	11.8%
R. trichophyllus			1						1	1	1	1				1		6	35.3%
Zannichellia palustris												1						1	5.9%
Alisma plantago-aquatica		1	1	1		1	1		1	1	1							8	47.1%
Apium nodiflorum					1	1	1	1	1					1	1	1	1	9	52.9%
Eleocharis palustris	1		1	1	1	1	1	1	1				1	1	1	1	1	13	76.5%
Juncus articulatus									1	1								2	11.8%
Nasturtium officinale agg.				1	1	1	1	1	1	1	1		1	1	1			11	64.7%
Oenanthe aquatica												1	1	1				3	17.6%
O. fistulosa										1	1		1	1	1	1	1	7	41.2%
Phragmites australis	1														1			2	11.8%
Samolus valerandi									1									1	5.9%
Schoenoplectus tabernaemontani					1		1	1			1					1	1	6	35.3%
Scirpus maritimus	1						1	1									1	4	23.5%
Sparganium erectum		D	1		1		1	1	1	1	1	A		1	1			11	64.7%
Veronica catenata			1		1	1	1		1								1	6	35.3%
Agrostis stolonifera		1	1	1						A								4	23.5%
Althaea officinalis	1																	1	5.9%
Carex otrubae		1	1	1		1	1	1			1	1			1			9	52.9%
Epilobium hirsutum	1																	1	5.9%
Galium palustre	1		1	1		1		1	1	1	1	1	1		1			11	64.7%
Juncus inflexus		1						1		1	1	1	1	1	1		1	9	52.9%
J. gerardii													1			1		2	11.8%
Mentha aquatica								1			1							2	11.8%
Myosotis laxa		1	1	1	1													4	23.5%
Oenanthe lachenalii		1	1	1	1	1		1									1	7	41.2%
Solanum dulcamara	1																	1	5.9%

Ditch number	287	288	289	290	291	292	293	298	299	304	312	313	314	315	324	325	327	avg	tot
number of aquatic species	3	2	6	6	8	8	5	9	6	5	9	7	7	6	9	4	9	6.4	18
number of emergent species	3	2	4	3	6	5	8	6	8	5	5	2	4	6	6	4	6	4.9	13
number of bank species	4	5	5	5	2	3	1	5	1	3	4	3	3	1	3	1	2	3.0	11
total number of species	10	9	15	14	16	16	14	20	15	13	18	12	14	13	18	9	17	14.3	42

Wall.94 ditches adjacent arable (East Guildeford North)

choked ditches					*	*		*																3	8.1%
Ditch number	286	295	296	297	300	301	302	303	305	306	309	310	311	316	317	318	319	320	321	322	323	326	tot	22
Callitriche obtusangula			1	1			1			1	1						1	1	1		1		9	40.9%
Ceratophyllum demersum		1	1											1						1	1		5	22.7%
C. submersum												1											1	4.5%
Elodea nuttalii			1						1												1		3	13.6%
Enteromorpha sp		1	1				1	1	A										A	A	D	D	9	40.9%
Filamentous algae	A	1	1	1			1		1	1	1			1		1	1			A	1		13	59.1%
Glyceria fluitans	1		1	1			1			1	1								1		1	1	9	40.9%
Hydrocharis morsus-ranae									1														1	4.5%
Lemna minor	1	1	1		1		1		1	1		D	D	1	1	1	1		1	1	1		16	72.7%
L. trisulca	1		1		1		1		1		1	1	1		1	1				1	1		12	54.5%
Myriophyllum spicatum			1						1												1		3	13.6%
Potamogeton crispus				1																			1	4.5%
P. pectinatus			1						1					1							1		4	18.2%
P. trichoides			1																				1	4.5%
Ranunculus baudotti															1					1	1		3	13.6%
R. trichophyllus	1			1			1			1	1			1	1		1	1	1				10	45.5%
Alisma plantago-aquatica	1			1	1		1		1	1									1			1	8	36.4%
Apium nodiflorum									1						1						1		3	13.6%
Eleocharis palustris	1		1	1					1	1	1									1		1	8	36.4%
Glyceria maxima			1					1															2	9.1%
Nasturtium afficinale agg.			1							1	1			1	1	1	1	1	1	1		1	11	50.0%
Oenanthe aquatica										1					1		1						3	13.6%
Oenanthe fistulosa				1	1		1				1								1	1		1	7	31.8%
Phragmites australis		1				D			1		D					D	1	D			1		8	36.4%
Ranunculus sceleratus													1										1	4.5%
Rumex hydrolapathum			1																				1	4.5%
Schoenoplectus tabernaemontani							1	1															2	9.1%
Scirpus maritimus	1	1	1	1				1	1						1		1						8	36.4%
Sparganium erectum			1		1		1		1	1	1			1	1		1			D		1	11	50.0%
Typha angustifolia			1						1			D	A									1	5	22.7%
Veronica catenata									1												1		2	9.1%
Agrostis stolonifera					D		1	1		1													4	18.2%
Althaea officinalis	1	1								1		1	1										5	22.7%
Carex otrubae	1		1		1		1		1	1	1	1			1		1					1	11	50.0%
Epilobium hirsutum						1																	1	4.5%
Equisetum palustre												1											1	4.5%
Galium palustre	1				1						1	1		1	1		1	1	1				9	40.9%
Juncus inflexus		1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1		1	1	19	86.4%
J. gerardii			1											1	1							1	4	18.2%
Mentha aquatica									1														1	4.5%
Myosotis laxa					1					1	1	1			1		1						6	27.3%
Oenanthe lachenalii	1	1			1	1			1														5	22.7%
Pulicaria dysenterica	1				1		1			1			1		1		1						7	31.8%
Solanum dulcamara							1	1			1	1	1	1	1	1	1				1		10	45.5%

Ditch number	286	295	296	297	300	301	302	303	305	306	309	310	311	316	317	318	319	320	321	322	323	326	avg	tot
number of aquatic species	5	4	11	5	2	0	7	1	8	5	5	3	2	5	4	3	4	2	5	6	11	2	4.5	16
number of emergent species	3	2	7	4	3	1	4	3	8	5	5	1	2	2	5	2	5	2	3	4	3	6	3.6	15
number of bank species	5	3	3	1	7	3	5	3	4	6	5	7	3	4	7	2	6	2	2	0	2	3	3.8	13
total number of species	13	9	21	10	12	4	16	7	20	16	15	11	7	11	16	7	15	6	10	10	16	11	12.0	44

Wall.94 East Guildeford (pasture) west side

choked ditches			*	*						*															
Ditch number	347	348	349	351	358	359	360	362	370	373	374	375	376	380	381	382	383	384	385	388	389	390	391	392	393
Azolla filiculoides																							1		
Callitriche obtusangula		1	1	1	1		1	1			1		1	1	1	1	1	1			1	1	1	1	
Ceratophyllum demersum					1	1	1		1																1
C. submersum		1																						1	1
Chara sp																							1	1	
Crassula helmsii																									
Enteromorpha sp	D					1		1	1		D	1	1	D	1	D	D		1	D	D			1	1
Filamentous algae		1				1	1		1		1		1		1		1		1	1	1		1		1
Fontinalis antipyretica																						1			
Glyceria fluitans										D			1								1	1	1		
Hydrocharis morsus-ranae				1	1		1																		1
Lemna minor	1	1		1	1	1	1	1	1		1	1	1		1		1		1	1		1	1	1	1
L. trisulca	1	1		1	1	1	1	1	1		1	1	1		1	1	1		1	1		1	1	1	1
L. gibba															1		1	D							
Myriophyllum spicatum						1	1	1	1		1	1							1		1				1
Potamogeton berchtoldii								1																	
P. crispus						1		1						1											
P. natans																									
P. pectinatus					1	1			1		1					1			1						1
P. pusillus						1																			
P. trichoides											1														
Ranunculus baudotti																			1						
R. trichophyllus		1	1			1	1						1	1	1							1	1		
Wolffia arrhiza																									
Zannichellia palustris						1																			
Alisma plantago-aquatica		1		1	1				1				1	1	1								1		
Apium nodiflorum					1		1	1	1	1	1	1				1	1	1					1		1
Eleocharis palustris	1	1			1	1	1	1	1		1	1	1	1	1	1	1	1	1	1		1	1		1
Juncus articulatus																									
Nasturtium officinale agg.	1	1						1		1	1		1	1	1	1	1								
Oenanthe aquatica		1		1										1						1	1	1		1	1
O. fistulosa	1		1			1	1	1	1	1	1	1		1	1	1				1		1	1		
Phragmites australis																								1	D
Samolus valerandi								1		1					1		1								
Schoenoplectus tabernaemontani					1							1												1	
Scirpus maritimus	1				1			1						1	1		1	1	1					1	
Sparganium erectum		1			1									1			1							1	1
Typha angustifolia		1	D	D	1		D		1																
Veronica catenata					1				1		1		1	1			1				1	1	1		
Agrostis stolonifera				1														1							
Althaea officinalis		1	1																						
Carex otrubae					1					1				1	1		1	1		1				1	
Epilobium hirsutum			1																						
Equisetum palustre																									
Galium palustre		1	1	1										1			1				1		1	1	
Glaux maritima														1											
Hydrocotyle vulgaris														1	1		1					1	1		
Juncus inflexus	1	1		1			1						1		1		1			1	1	1	1	1	1
J. gerardii					1				1	1	1	1	1	1	1	1		1							
Lycopus europaeus																									
Myosotis laxa			1																		1	1		1	
Oenanthe lachenalii					1			1						1				1							
Pulicaria dysenterica																								1	
Solanum dulcamara																									
Triglochin palustris																									

Ditch number	347	348	349	351	358	359	360	362	370	373	374	375	376	380	381	382	383	384	385	388	389	390	391	392	393
number of aquatic species	3	6	2	4	6	11	8	7	7	1	8	4	7	4	7	4	6	2	7	4	5	6	8	6	9
number of emergent species	4	6	2	3	8	2	4	6	6	4	5	4	4	8	6	4	7	3	2	3	2	4	5	5	5
number of bank species	1	3	4	3	3	0	1	1	1	2	1	1	2	6	4	1	4	4	0	2	3	3	3	5	1
total number of species	8	15	8	10	17	13	13	14	14	7	14	9	13	18	17	9	17	9	9	9	10	13	16	16	15

Wall.94 East Guildeford (pasture) west side

choked ditches																				*	*		*	*			*	DRY	10	18.9%
Ditch number	396	416	417	418	421	452	454	455	456	457	458	459	460	461	462	481	483	484	485	491	492	493	494	495	496	497	498	499	tot	53
Azolla filiculoides																													1	1.9%
Callitriche obtusangula							1	1	1	1	1	1	1	1	1			1	1		1		1					1	31	58.5%
Ceratophyllum demersum																													5	9.4%
C. submersum	1	1	1	1	1	1	1		1	1				1	1				1										15	28.3%
Chara sp																		1	1										4	7.5%
Crassula helmsii									1																				1	1.9%
Enteromorpha sp									1	A		A	D		D									1	1	1	1	1	25	47.2%
Filamentous algae	1					1	1	1	1		A					1		1		1		1			1			1	25	47.2%
Fontinalis antipyretica																			1										2	3.8%
Glyceria fluitans					1			1	1	1	1	1	1	1	1	1	1			1	1	1							19	35.8%
Hydrocharis morsus-ranae		1	1															1	1										8	15.1%
Lemna minor	1	1		1	1	1	1	1	1	1	1	1	1	1						1	1	1		1	1	1	1	1	40	75.5%
L. trisulca	1	1	1	1	1	1	1	1	1	1		1	1	1	1		1	1	1					1	1	1		1	41	77.4%
L. gibba										1																			4	7.5%
Myriophyllum spicatum	1		1	1	1									1			1									1			16	30.2%
Potamogeton berchtoldii					1	1																				1			4	7.5%
P. crispus																			1										4	7.5%
P. natans														1								1							2	3.8%
P. pectinatus	1								1					1			1		1						1	1		D	15	28.3%
P. pusillus																		1											2	3.8%
P. trichoides																			1										2	3.8%
Ranunculus baudotti																												1	2	3.8%
R. trichophyllus							1	1	1	1	1	1	1	1	1	1	1	1	1										22	41.5%
Wolffia arrhiza			1																										1	1.9%
Zannichellia palustris							1																						2	3.8%
Alisma plantago-aquatica		1	1	1		1	1	1	1									1		1		1	1	1					20	37.7%
Apium nodiflorum				1													1	1				1							16	30.2%
Eleocharis palustris	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1			1	44	83.0%
Juncus articulatus																		1											1	1.9%
Nasturtium officinale agg.							1	1	1	1		1	1	1	1			1											19	35.8%
Oenanthe aquatica	1																1	1	1	1		1							14	26.4%
O. fistulosa					1											1	1				1								19	35.8%
Phragmites australis																											1	1	4	7.5%
Samolus valerandi		1			1													1											7	13.2%
Schoenoplectus tabernaemontani																													3	5.7%
Scirpus maritimus	1				1		1	1	1		1				1				1	1			1	1	1	1	D	1	24	45.3%
Sparganium erectum	1	1	1		1													1		D		D	1	1	1				16	30.2%
Typha angustifolia																													6	11.3%
Veronica catenata								1	1	1		1	1	1	1	1	1		1										19	35.8%
Agrostis stolonifera																			1				1						4	7.5%
Althaea officinalis				1	1													1	1										6	11.3%
Carex otrubae	1	1				1	1	1	1									1	1				1	1					18	34.0%
Epilobium hirsutum						1																		1					2	3.8%
Equisetum palustre																													1	1.9%
Galium palustre						1	1	1	1							1			1										14	26.4%
Glaux maritima																													1	1.9%
Hydrocotyle vulgaris		1	1													1													8	15.1%
Juncus inflexus		1	1	1	1	1	1	1	1							1	1	1	1	1	1	1	1	1	1				31	58.5%
J. gerardii															1	1										1			13	24.5%
Lycopus europaeus																			1										1	1.9%
Myosotis laxa							1	1	1					1				1	1			1							11	20.8%
Oenanthe lachenalii		1	1	1			1		1			1											1		1	1			13	24.5%
Pulicaria dysenterica				1		1	1																						4	7.5%
Solanum dulcamara						1							1																2	3.8%
Triglochin palustris																									1	1	1		3	5.7%

Ditch number	396	416	417	418	421	452	454	455	456	457	458	459	460	461	462	481	483	484	485	491	492	493	494	495	496	497	498	499	avg	tot
number of aquatic species	6	4	5	4	6	5	7	6	10	8	5	6	6	9	6	3	5	7	10	3	3	4	1	2	5	6	2	7	5.5	25
number of emergent species	4	4	3	3	5	2	4	5	5	3	2	3	3	3	4	3	5	8	4	5	2	4	4	3	3	1	2	3	4.0	14
number of bank species	1	4	3	4	2	6	6	4	5	0	0	1	1	1	1	4	1	4	7	1	1	2	4	3	3	3	1	0	2.5	16
total number of species	11	12	11	11	13	13	17	15	20	11	7	10	10	13	11	10	11	19	21	9	6	10	9	8	11	10	5	10	12.0	55

Wall.94 ditches adjacent arable (East Guildeford West)

choked ditches				*	*	*						*										*	*															6	16.7%
Ditch number	344	346	350	352	353	354	356	357	361	363	369	377	379	386	394	395	397	398	399	401	402	407	410	419	420	422	424	426	464	465	466	467	477	478	480	489	tot	36
Callitriche obtusangula	1	1				1			1			1	1				1						1			1			1	1		1		1	1	1	15	41.7%
Ceratophyllum demersum			1						1		1			1	1			1		1																1	8	22.2%
C. submersum									1	1	1					1	1	1	1	1		1		1	1	1	1		1	1		1	1				17	47.2%
Chara sp									1																									1			2	5.6%
Elodea nuttalii		1														1																					2	5.6%
Enteromorpha sp		1	1				D	D	D				D		1		1		1	1			1					1						1	1		14	38.9%
Filamentous algae		1				1	1	1	1				1	1	1	1	D	1	1	1		1					1		1	1	1	A	1	1	1		22	61.1%
Fontinalis antipyretica											1																										1	2.8%
Glyceria fluitans										1		1											1		1	1			1	1	1						9	25.0%
Hydrocharis morsus-ranae			1					1	1	1							1			1	1					1	1										9	25.0%
Lemna minor	1		1				1	1		1	D	1			1	1	1	1		1	1	1		1	1	1	1	1			1		1	1	1	1	24	66.7%
L. trisulca	1	1	1				1	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1	1	1		1	29	80.6%
L. gibba																													A	A		1					3	8.3%
Myriophyllum spicatum											1		1	1	1	1		1	1				1	1													10	27.8%
Potamogeton crispus													1										1														2	5.6%
P. natans																																				1	1	2.8%
P. pectinatus		1							1	1	1			1	1	1		1				1	1	1										1	1		13	36.1%
P. trichoides															1																						1	2.8%
Ranunculus baudotti													1		1																						2	5.6%
R. trichophyllus						1			1	1													1								1					1	6	16.7%
Zannichellia palustris																											1										1	2.8%
Alisma plantago-aquatica		1					1						1					1		1			1	1						1	1	1				1	11	30.6%
Apium nodiflorum	1	1					1			1	1													1											1		7	19.4%
Eleocharis palustris	1								1	1	1		1	1	1				1				1	1	1			1	1		1	1	1				16	44.4%
Iris pseudocorus																								1				1									2	5.6%
Juncus articulatus									1																												1	2.8%
Nasturtium officinale agg.	1		1			1	1			1		1							1				1	1				1	1	1		1			1	1	15	41.7%
Oenanthe aquatica		1				1				1			1				1	1									1	1		1	1		1	1	1	1	14	38.9%
O. fistulosa			1				1	1			1	1		1				1				1	1		1	1									1	12	33.3%
Phragmites australis	D	D			D						1			D	1						D						D									8	22.2%
Samolus valerandi			1																1			1				1							1			5	13.9%
Schoenoplectus tabernaemontani								1	1	1	1					1	1	1	1	1			1				1			1	1			1		1	15	41.7%
Scirpus maritimus		1				1	1	1	1				1			1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1		24	66.7%
Sparganium erectum		1				1	1		1	1			1				1					1		1	1	1		1		1		1	1		1	D	17	47.2%
Typha angustifolia			D	D		1	1	1			1																										6	16.7%
Veronica catenata		1																											1	1	1			1			5	13.9%
Agrostis stolonifera	1									1																										1	3	8.3%
Althaea officinalis							1		1							1				1					1			1	1	1	1					1	10	27.8%
Carex distans																			1																		1	2.8%
Carex otrubae		1		1		1		1									1		1			1	1	1		1	1		1	1	1	1		1	1		17	47.2%
Epilobium hirsutum																																1		1			2	5.6%
Galium palustre		1				1		1	1								1						1				1		1	1	1				1		11	30.6%
Juncus inflexus		1	1	1	1	1	1	1	1	1		D	1				1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	80.6%
J. gerardii											1		1																1			1						4	11.1%
Lycopus europaeus																	1																				1	2.8%
Mentha aquatica								1																													1	2.8%
Myosotis laxa																																			1		1	2.8%
Oenanthe lachenalii								1	1	1																			1	1	1	1					7	19.4%
Pulicaria dysenterica		1				1			1								1	1																1	1		7	19.4%
Solanum dulcamara					1	1																															2	5.6%

Ditch number	344	346	350	352	353	354	356	357	361	363	369	377	379	386	394	395	397	398	399	401	402	407	410	419	420	422	424	426	464	465	466	467	477	478	480	489	avg	tot
number of aquatic species	3	6	5	0	0	3	4	5	10	7	7	3	7	5	9	7	7	7	5	7	2	5	8	5	5	6	6	3	6	6	4	5	5	7	4	7	5.3	21
number of emergent species	4	7	4	1	1	5	7	4	5	6	6	2	5	3	2	2	4	5	5	3	1	4	6	7	4	4	3	6	4	7	6	5	4	5	5	6	4.4	15
number of bank species	1	4	1	2	2	5	2	5	5	3	1	1	2	0	0	1	5	1	3	2	0	2	3	2	2	2	3	2	6	5	5	5	1	4	5	3	2.7	14
total number of species	8	17	10	3	3	13	13	14	20	16	14	6	14	8	11	10	16	13	13	12	3	11	17	14	11	12	12	11	16	18	15	15	10	16	14	16	12.4	50

Wall.94 East Guildeford (pasture) east side

choked ditches	DRY	DRY	*														*			*				*	
Ditch number	500	501	502	503	504	505	511	512	513	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533
Callitriche obtusangula	1	1			1		1									1		1	1					1	
Ceratophyllum demersum																									
C. submersum								1	1					1	1				1				1		1
Chara sp							D																		
Elodea nuttalii								1	1																1
Enteromorpha sp					1	D																			
Filamentous algae		1	1	1	1		1				1			1				1	1						1
Fontinalis antipyretica																									
Glyceria fluitans		1					1							1				1	1	1			1		
Hydrocharis morsus-ranae																									
Lemna minor			1		1	1		1	1	1	1	1	1	1	1	D		1	1	1	1	1	1	1	1
L. trisulca			1		1		1	1	1	1	1	1	1	1	1	D	1		1		1	1	1	1	1
L. gibba																				D					
Myriophyllum spicatum			1	1				1	1	D	D	D	1	1							1	1	1		1
Potamogeton berchtoldii			1																				1		
P. crispus																									
P. natans																									
P. pectinatus			1	1	1	1		1	1			1	1		1	1			1		1	1	1		1
P. trichoides																									
Ranunculus trichophyllus	1	1	1		1			1	1			1	1			1		1							1
Zannichellia palustris																									
Alisma plantago-aquatica		1					1		1																
Apium nodiflorum																									
Eleocharis palustris	D	1	1	1	1	1		1	1	1	1	1	1	1				1	1	1		1	1		1
Juncus articulatus		1					1																		
Nasturtium officinale agg.		1		1			1									1		1	1						
Oenanthe aquatica									1							1								1	1
O. fistulosa							1	1		1															
Phragmites australis			1					1	1						D	1	D				1	1			1
Rumex hydrolapathum																									
Samolus valerandi																									
Schoenoplectus tabernaemontani					1						1		1		1						1	1			
Scirpus maritimus			1	1	1	1		1	1	1	1	1	1	1		1	1			1	1	1	1		1
Sparganium erectum							1																	D	
Typha angustifolia																									
Veronica catenata							1									1		1	1	1					
Agrostis stolonifera		1																							
Althaea officinalis								1									1		1						
Carex distans																									
Carex otrubae		1						1	1				1					1		1					1
Epilobium hirsutum							1																		
Equisetum palustre																									
Galium palustre		1					1	1											1					1	
Glaux maritima																									
Hydrocotyle vulgaris		1																							
Juncus inflexus							1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1
J. gerardii	1		1											1											
Lycopus europaeus																									
Mentha aquatica																									
Myosotis laxa							1																		
Oenanthe lachenalii		1				1						1	1	1	1	1	1								1
Pulicaria dysenterica							1	1																	
Solanum dulcamara																	1								
Triglochin palustris												1	1						1			1			

Ditch number	500	501	502	503	504	505	511	512	513	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533
number of aquatic species	2	4	7	3	7	3	5	7	7	3	4	5	5	6	4	5	1	5	7	3	4	4	7	3	8
number of emergent species	1	4	3	3	3	2	6	4	5	3	3	2	3	2	2	5	2	3	3	3	3	4	2	2	4
number of bank species	1	5	1	0	0	1	5	5	2	1	1	3	3	3	2	2	3	2	4	2	1	2	1	2	3
total number of species	4	13	11	6	10	6	16	16	14	7	8	10	11	11	8	12	6	10	14	8	8	10	10	7	15

Wall.94 East Guildeford (pasture) east side

choked ditches													*	GONE	*			*	*	*					*		
Ditch number	535	537	540	541	542	543	544	547	548	549	550	551	553	554	555	560	561	565	566	567	573	576	582	583	584	585	
Callitriche obtusangula					1	1		1	1	1	1	1	1			1	1	1		1	1		1	1		1	
Ceratophyllum demersum		1							1						1												
C. submersum		1			1	1	1			1								1				1		1	1	1	
Chara sp																											
Elodea nuttalii		1																								1	
Enteromorpha sp			1	1		1	D	1	1		A	1				1	1										
Filamentous algae		1	1	1	1	1	1		1	1	1		D		1	D	1	1		1	1						
Fontinalis antipyretica																											
Glyceria fluitans			1	1	1				1				1			1	D		1								
Hydrocharis morsus-ranae																						1	1				
Lemna minor	1	1	1	1	1	1	1		1	1	1	1	1				1	1		1	1	1			1	1	
L. trisulca	1	1	1	1	1	1	1	1	1	A	1	1	1		1			1		1	1	1	1	1	1	1	
L. gibba																											
Myriophyllum spicatum	1	1	1	1	1		1		1	1		1										1					
Potamogeton berchtoldii																											
P. crispus										1																	
P. natans																											
P. pectinatus	1	1	D	1	1	1	1		1	1		1									1						
P. trichoides																											
Ranunculus trichophyllus		1	1	1	1					1			1		1		1			1						
Zannichellia palustris										1					1						1						
Alisma plantago-aquatica							1	1							1	1	1	1	1	1							
Apium nodiflorum			1	1	1	1	1		1	1											1	1			1	1	
Eleocharis palustris			1	1	1	1	1		1	1	1	1	1		1	1	1	1	1		1	1			1		
Juncus articulatus						1										1	1				1						
Nasturtium officinale agg.				1	1	1	1		1		1								1								
Oenanthe aquatica		1		1	1		1	1	1			1	1		1		1	1		1		1				1	
O. fistulosa					1	1			1																		
Phragmites australis	1	1																			D			D			
Rumex hydrolapathum																											
Samolus valerandi	1																						1				
Schoenoplectus tabernaemontani		1											1		1												
Scirpus maritimus	1	1		1			1	1	1			1	1		1	1											
Sparganium erectum						1	1		1			1	1		1	1		D	D	D		1	D	1	D	D	
Typha angustifolia																											
Veronica catenata						1	1		1		1				1			1	1							1	
Agrostis stolonifera				1	1	1		1				1															
Althaea officinalis		1						1				1											1				
Carex distans																1											
Carex otrubae	1			1	1	1		1			1		1		1	1	1		1			1	1				
Epilobium hirsutum																											
Equisetum palustre																											
Galium palustre						1		1	1										1	1		1	1		1	1	
Glaux maritima																											
Hydrocotyle vulgaris				1		1																					
Juncus inflexus								1	1								1	1	1	1	1	1	1	1	1	1	
J. gerardii				1		1	1																				
Lycopus europaeus																							1	1			
Mentha aquatica																											
Myosotis laxa									1														1		1	1	
Oenanthe lachenalii	1		1	1	1					1	1					1	1				1						
Pulicaria dysenterica																							1				
Solanum dulcamara																											
Triglochin palustris	1														1												

Ditch number	535	537	540	541	542	543	544	547	548	549	550	551	553	554	555	560	561	565	566	567	573	576	582	583	584	585
number of aquatic species	4	9	8	8	9	7	7	3	9	10	5	6	6	0	5	4	6	5	1	5	6	5	3	3	3	5
number of emergent species	3	4	2	5	5	7	8	3	8	2	3	4	5	0	7	5	4	5	5	3	4	4	2	2	3	4
number of bank species	3	1	1	5	3	5	1	5	3	1	2	2	1	0	2	3	3	1	3	2	2	3	7	2	3	3
total number of species	10	14	11	18	17	19	16	11	20	13	10	12	12	0	14	12	13	11	9	10	12	12	12	7	9	12

Wall.94 East Guildeford (pasture) east side

choked ditches	*	*	*				*	*	*								*					*		*	
Ditch number	586	587	588	591	592	593	594	595	596	601	602	603	605	607	610	611	612	613	614	616	616	617	618	619	620
Callitriche obtusangula			1							1		1						1					1		
Ceratophyllum demersum																									
C. submersum										1			1										1		1
Chara sp						1						1													
Elodea nuttalii																					1				
Enteromorpha sp				1																					
Filamentous algae					1	1	1		1	1		1	1		1	1	1								
Fontinalis antipyretica														1				1							
Glyceria fluitans							1	1	1	1	1	1	1	1	1	1	D	1	1	1		D			
Hydrocharis morsus-ranae		1			1	1				1			1								1				
Lemna minor				1			1			1	1	1	1			1	1		1	1	1		1		1
L. trisulca		1		1	1	1				1			1						1	1	1		1	1	1
L. gibba																									
Myriophyllum spicatum																			1	1	D				1
Potamogeton berchtoldii																									
P. crispus																									
P. natans															1										
P. pectinatus					1															1					D
P. trichoides																			1						
Ranunculus trichophyllus				1						1			1		1									1	1
Zannichellia palustris				1																					
Alisma plantago-aquatica			1	1	1	1							1	1	1	1			1						
Apium nodiflorum										1	1	1	1						1	1					
Eleocharis palustris							1	1	1	1	1	1	1	1	1	1		1	1	1	1		1		1
Juncus articulatus												1	1	1	1		1	1		1					
Nasturtium officinale agg.	1		1	1		1	1			1	1	1	1				1		1	1			1		
Oenanthe aquatica					1	1	1												1	1			1	1	
O. fistulosa				1			1		1	1	1	1	1	1	1	1	1	1	1	1	1				
Phragmites australis																								1	
Rumex hydrolapathum	1	1	1	1	1	1	1																		
Samolus valerandi						1								1	1			1							
Schoenoplectus tabernaemontani				1	1	1																			1
Scirpus maritimus							1	1								1		1							1
Sparganium erectum	1			1	1	1	1	1	1	1			1			1			1	1	1	1	1	1	
Typha angustifolia	D	D	D																						
Veronica catenata										1			1		1				1						1
Agrostis stolonifera														1	1			1							
Althaea officinalis																									
Carex distans																	1								
Carex otrubae							1		1		1			1	1	1	1	1					1	1	1
Epilobium hirsutum			1																						
Equisetum palustre								1																	
Galium palustre	1			1		1	1	1	1		1			1	1	1	1	1				1	1	1	
Glaux maritima																									
Hydrocotyle vulgaris				1	1		1	1			1	1	1	1	1	1	1	1					1		
Juncus inflexus	1	1	1	1	1	1	1	1	1					1	1	1	1	1	1		1	1	1	1	
J. gerardii										1	1	1					1								1
Lycopus europaeus					1	1		1																	
Mentha aquatica																									
Myosotis laxa						1	1				1			1	1	1		1						1	
Oenanthe lachenalii	1				1	1																			
Pulicaria dysenterica	1		1	1	1				1							1									
Solanum dulcamara						1																			
Triglochin palustris																									

Ditch number	586	587	588	591	592	593	594	595	596	601	602	603	605	607	610	611	612	613	614	616	616	617	618	619	620
number of aquatic species	0	2	1	5	4	4	3	1	2	8	2	5	7	2	4	3	3	3	5	5	5	1	4	2	6
number of emergent species	4	2	4	6	5	7	7	3	3	6	4	5	8	5	6	5	3	5	8	7	3	1	4	3	4
number of bank species	4	1	3	4	5	6	5	5	4	1	5	2	1	6	7	6	6	6	1	0	1	2	4	4	2
total number of species	8	5	8	15	14	17	15	9	9	15	11	12	16	13	17	14	12	14	14	12	9	4	12	9	12

Wall.94 East Guildeford (pasture) east side

choked ditches	*										DRY							*					38	38.8%
Ditch number	622	623	624	625	626	627	628	630	631	632	633	635	636	637	638	641	642	643	645	646	647	654	tot	98
Callitriche obtusangula																		1	1	1	1	1	34	34.7%
Ceratophyllum demersum									1					1									5	5.1%
C. submersum			1						1	1			1	1			1			1			28	28.6%
Chara sp																							3	3.1%
Elodea nuttalii								1	1				1										9	9.2%
Enteromorpha sp		1											1										15	15.3%
Filamentous algae				1	1			1	1	1	1		1			1		1		1	1	1	48	49.0%
Fontinalis antipyretica																							2	2.0%
Glyceria fluitans	1	1	1	1	1	1	1	1	1	1	1	D			1			1	1	1	1	1	48	49.0%
Hydrocharis morsus-ranae						1				1			1										11	11.2%
Lemna minor		1	1	1		1	1	1	1	1				1		1					1	1	64	65.3%
L. trisulca		1	1	1		1		1	1	1	1		1	1		1	1			1	1		67	68.4%
L. gibba													1				D						3	3.1%
Myriophyllum spicatum						1		1	1				1										31	31.6%
Potamogeton berchtoldii																							2	2.0%
P. crispus																							1	1.0%
P. natans																							1	1.0%
P. pectinatus			1						1				1	1			1						34	34.7%
P. trichoides																							1	1.0%
Ranunculus trichophyllus											1								1	1		1	30	30.6%
Zannichellia palustris																							4	4.1%
Alisma plantago-aquatica				1	1	1	1	1			1		1	1									28	28.6%
Apium nodiflorum						1		1	1				1	1			1				1		24	24.5%
Eleocharis palustris	1	1	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1	1		72	73.5%
Juncus articulatus				1							1												15	15.3%
Nasturtium officinale agg.			1	1				1	1	1		1					1		1		1	1	36	36.7%
Oenanthe aquatica		1		1	1		1	1	1				1	1		1	1	1	1	1	1	1	40	40.8%
O. fistulosa	1		1	1	1	1		1	1	1		1	1	1		1							33	33.7%
Phragmites australis		1												1							1		17	17.3%
Rumex hydrolapathum																							7	7.1%
Samolus valerandi				1																			7	7.1%
Schoenoplectus tabernaemontani																							13	13.3%
Scirpus maritimus		1																					34	34.7%
Sparganium erectum			1	1	D	1			1	D	1		1	1		1	1		1	1	1	1	48	49.0%
Typha angustifolia																				1			4	4.1%
Veronica catenata						1	1	1	1				1				1				1		25	25.5%
Agrostis stolonifera	D						1								1	1							13	13.3%
Althaea officinalis																		1					8	8.2%
Carex distans																							2	2.0%
Carex otrubae	1			1			1	1			1	1	1		1		1	1	1	1	1	1	45	45.9%
Epilobium hirsutum																							2	2.0%
Equisetum palustre							1																2	2.0%
Galium palustre				1	1	1		1		1	1	1	1			1			1	1	1	1	42	42.9%
Glaux maritima																	1						2	2.0%
Hydrocotyle vulgaris								1					1							1	1	1	21	21.4%
Juncus inflexus	1	1	1	1	1	1	1	1		1	1	1	1		1	1		1	1	1	1	1	67	68.4%
J. gerardii													1										12	12.2%
Lycopus europaeus																							5	5.1%
Mentha aquatica				1	1	1	1			1	1	1									1	1	9	9.2%
Myosotis laxa				1		1		1		1						1			1	1		1	21	21.4%
Oenanthe lachenalii	1										1												23	23.5%
Pulicaria dysenterica																							9	9.2%
Solanum dulcamara																							2	2.0%
Triglochin palustris																							6	6.1%

Ditch number	622	623	624	625	626	627	628	630	631	632	633	635	636	637	638	641	642	643	645	646	647	654	avg	total
number of aquatic species	1	4	5	4	2	5	2	6	9	6	4	1	9	5	1	3	4	3	3	6	5	5	3.6	21
number of emergent species	2	4	4	8	5	6	4	7	7	4	4	3	6	7	1	3	6	2	4	4	7	3	3.2	15
number of bank species	4	1	1	5	3	4	5	5	0	4	5	4	5	0	3	4	2	3	4	5	5	6	2.0	18
total number of species	7	9	10	17	10	15	11	18	16	14	13	8	20	12	5	10	12	8	11	15	17	14	8.8	54

Wall.94 ditches adjacent arable (East Guildeford East)

ditches choked									*							*	*		*		*																		15	37.5%
Ditch number	506	507	508	509	536	538	539	545	556	559	562	563	564	568	569	571	572	575	578	580	581	589	590	599	600	608	609	615	621	629	634	639	640	644	648	649	650	653	655	656	tot	40
Callitriche obtusangula	1	1	1						1		1	1	1	1	1		1		1		1																		1		13	32.5%
Ceratophyllum demersum				1																																					1	2.5%
C. submersum					1	1	1		1			1	1						1			1	1																			9	22.5%
Elodea nuttalii																							1												1							2	5.0%
Enteromorpha sp						1	1	D		D	D	1							1										1							1			1		10	25.0%
Filamentous algae	1		1	1	1	1								1	1		1					1	1	1			1		1						1		1		1	17	42.5%
Fontinalis antipyretica																												1												1	2.5%
Glyceria fluitans	1		1		1	1		1			1	1												1	1			1		1		1			1				1	14	35.0%
Hydrocharis morsus-ranae				1									1						1			1	1																	5	12.5%
Lemna minor	1	1	1		1	1	1		1	1	1	1			1		1	1	1		1			1	1	1	1	1	1	1		1			1	1			1		25	62.5%
L. trisulca	1	1	1	1	1	1	1		1	1	1	1	1				1		1				1			1	1	1	1	1	1	1			1	1					23	57.5%
Myriophyllum spicatum									1				1										1												1						4	10.0%
Potamogeton berchtoldii					1														1																						2	5.0%
P. crispus																												1													1	2.5%
P. natans	1	D																										1	1						1	1					6	15.0%
P. pectinatus					1								1															1													1	2.5%
P. trichoides																							1																		1	2.5%
Ranunculus circinatus																																									1	2.5%
R. baudotti					1																																				8	20.0%
R. trichophyllus	1		1				1		1			1		1	1																										1	2.5%
Zannichellia palustris																	1																									15	37.5%
Alisma plantago-aquatica	1		1								1			1		1	1						1		1	1	1	1		1				1	1		1				7	17.5%
Apium nodiflorum							1					1					1			D	1							1							1						17	42.5%
Eleocharis palustris		1	1				1		1		1	1					1			1	1			1	1	1		1	1						1				1	1	3	7.5%
Juncus articulatus												1												1	1																14	35.0%
Nasturtium afficinale agg.	1				1	1		1			1	1		1	1		1							1				1		1					1				1		13	32.5%
Oenanthe aquatica		1				1		1					1	1													1	1	1	1			1			1				1	9	22.5%
O. fistulosa		1						1	1															1	1	1	1	1													10	25.0%
Phragmites australis				1					1				1	1		1	1	D	1										1				1								3	7.5%
Rumex hydrolapathum																						1	1							1											1	2.5%
Samolus valerandi																																									7	17.5%
Schoenoplectus tabernaemontani																	1		1	1	D		1						1	1	1	1		1		1	1		1	1	24	60.0%
Scirpus maritimus	1	1	1	1	1	1	1	1	1	1			1			1	1		1									1	1	1	1		1		1	1		1	1	1	22	55.0%
Sparganium erectum	D	1	1			1			D		1	1							1	1	1	1				1	1	1		1	D	1			1		1	1	1	1	4	10.0%
Typha angustifolia																						1	1										1	1							1	2.5%
Typha latifolia																																									7	17.5%
Veronica catenata	1	1										1		1	1															1											8	20.0%
Agrostis stolonifera							1	A							1	1								1	1		1	1													20	50.0%
Althaea officinalis	1		1	1		1	1		1	1	1								1				1			1			1	1	1	1		1	1	1	1			1	19	47.5%
Carex otrubae			1	1		1	1		1		1	1		1	1	1					1	1		1	1			1			1		1		1		1	1	1		9	22.5%
Epilobium hirsutum				1								1									1	1				1				1		1									1	2.5%
Equisetum palustre																															1										18	45.0%
Galium palustre						1						1		1			1				1	1		1	1	1		1		1	1	1		1			1	1	1	1	1	1	1	2.5%
Glaux maritima																																			1						3	7.5%
Hydrocotyle vulgaris												1												1	1																26	65.0%
Juncus inflexus		1	1					1			1	1	1		1	1	1		1	1	1	1	1			1	1	1	1	1	1	1	1			1	1	1		1	1	1	2.5%
J. gerardii																													1												3	7.5%
Lycopus europaeus																							1			1					1										2	5.0%
Mentha aquatica																						1		1				1												1	6	15.0%
Myosotis laxa												1																	1												5	12.5%
Oenanthe lachenalii					1						1	1					1													1						1	1	1			8	20.0%
Pulicaria dysenterica				1	1														1	1																				1	5	12.5%
Solanum dulcamara				1																										1		1	1							1	2	5.0%
Triglochin palustris					1							1																															

Ditch number	506	507	508	509	536	538	539	545	556	559	562	563	564	568	569	571	572	575	578	580	581	589	590	599	600	608	609	615	621	629	634	639	640	644	648	649	650	653	655	656	avg	tot
number of aquatic species	7	4	6	4	8	6	5	2	6	3	5	7	6	3	4	0	5	1	7	0	2	3	7	3	2	2	2	8	4	3	2	1	0	0	8	3	1	0	6	1	3.7	21
number of emergent species	5	6	4	2	2	4	3	4	5	1	4	6	3	5	2	3	7	1	4	4	4	3	4	3	5	4	4	8	5	7	2	1	4	2	9	1	3	2	6	5	3.9	16
number of bank species	1	1	3	5	3	3	3	2	2	1	4	8	1	2	3	3	3	0	3	2	3	4	3	5	3	7	3	4	5	5	6	4	2	4	4	3	4	4	5	6	3.4	17
total number of species	13	11	13	11	13	13	11	8	13	5	13	21	10	10	9	6	15	2	14	6	9	10	14	11	10	13	9	20	14	15	10	6	6	6	21	7	8	6	17	12	11.0	54

Wall.94 Woolpack (pasture)

Ditch number	657	660	661	662	664	665	666	667	668	669	679	681	682	683	684	685	686	687	688	690	691	692	693	694	tot	24
Callitriche obtusangula	1	1			1						1				1	1	1								7	29.2%
Ceratophyllum submersum		1						1	1			1			1				1			1			7	29.2%
Chara sp	1	1	1		1						1		1				1								7	29.2%
Elodea nuttalii																			1						1	4.2%
Enteromorpha sp												1							1		1	1			4	16.7%
Filamentous algae	1	1			1								1	D	1	1	1				1		D	1	11	45.8%
Fontinalis antipyretica		1																							1	4.2%
Glyceria fluitans			1					1							1	1									4	16.7%
Lemna minor	1						1				1	1					1	1	1	1	1	1	1		11	45.8%
L. trisulca	1	1			1		1	1	1	1	1	1	1	1	1	1	1	1		1		1	D	1	19	79.2%
Myriophyllum spicatum												1							1	1		1			4	16.7%
Potamogeton pectinatus	1							1	1		1	1					1		1	1		1			9	37.5%
P. berchtoldii/pusillus												1							1	1					3	12.5%
Ranunculus baudotti	1										1	1													3	12.5%
R. trichophyllus	1			1			1		1		1	1	1	1	1	1	1				1				12	50.0%
Zannichellia palustris	1	1													1		1				1				5	20.8%
Alisma plantago-aquatica			1							1					1		1								4	16.7%
Eleocharis palustris			1				1	1	1		1			1	1	1	1								9	37.5%
Juncus articulatus			1																						1	4.2%
Nasturtium officinale agg.		1	1		1		1	1													1				6	25.0%
Oenanthe aquatica		1	1					1			1			1	1	1	1	1							9	37.5%
O. fistulosa																		1						1	2	8.3%
Phragmites australis	1	1	1	1			D			1			1			1	1	1	1	1	D		D	D	15	62.5%
Ranunculus sceleratus													1												1	4.2%
Schoenoplectus tabernaemontani								1		1				1	1		1			1	1				7	29.2%
Scirpus maritimus	1		1		1					1	1		1	1	1	1	1	1	1	1	1	1			15	62.5%
Sparganium erectum		1	1						1						1										4	16.7%
Veronica catenata	1	1	1		1		1						1		1		1		1		1				10	41.7%
Carex divisa												1													1	4.2%
Carex otrubae	1	1	1		1				1	1		1		1	1	1	1	1						1	13	54.2%
Epilobium hirsutum									1														1		2	8.3%
Galium palustre		1	1	1	1			1	1	1															7	29.2%
Glaux maritima																		1							1	4.2%
Juncus inflexus		1		1	1		1	1	1			1									1				8	33.3%
J. gerardii	1	1										1													3	12.5%
Lycopus europaeus										1															1	4.2%
Myosotis laxa			1	1																					2	8.3%
Oenanthe lachenalii																		1				1			2	8.3%
Triglochin maritima															1			1							2	8.3%

Ditch number	657	660	661	662	664	665	666	667	668	669	679	681	682	683	684	685	686	687	688	690	691	692	693	694	avg	tot
number of aquatic species	9	7	2	1	4	0	3	4	4	1	7	9	4	3	7	5	8	2	7	5	5	6	3	2	4.5	16
number of emergent species	3	5	9	1	3	0	4	4	2	4	3	0	4	4	7	4	7	4	3	3	5	1	1	2	3.5	12
number of bank species	2	4	3	3	3	0	1	2	4	3	0	4	0	1	2	1	1	4	0	0	1	1	1	1	1.8	11
total number of species	14	16	14	5	10	0	8	10	10	8	10	13	8	8	16	10	16	10	10	8	11	8	5	5	9.7	39

Wall.94 ditches adjacent arable (Woolpack)

Ditch number	658	659	663	670	671	677	678	680	689	693	695	696	tot	12
Callitriche obtusangula	1	1			D								3	8.1%
C. submersum						1	1					1	3	25.0%
Chara sp	1												1	8.3%
Elodea nuttalii									1				1	8.3%
Enteromorpha sp					1	1	1		1		1	1	6	50.0%
Filamentous algae				1				1		D			3	25.0%
Fontinalis antipyretica		1											1	8.3%
Glyceria fluitans	1		1	1									3	25.0%
Lemna minor					1	1	1		1	1	1	1	7	58.3%
L. trisulca		D		1	1	1	1			D			6	50.0%
L. gibba					1								1	8.3%
Myriophyllum spicatum						1	1		1		1	1	5	41.7%
Potamogeton pectinatus						1	1		1				3	25.0%
P. pusillus									1				1	8.3%
Ranunculus circinatus											1		1	8.3%
R. trichophyllus	1			1									2	16.7%
Zannichellia palustris	1												1	8.3%
Alisma plantago-aquatica	1			1									2	16.7%
Eleocharis palustris	1												1	8.3%
Juncus articulatus					1								1	8.3%
Nasturtium afficinale agg.					1								1	8.3%
Oenanthe aquatica	1	1		1	1								4	33.3%
Phragmites australis	1	D				1	1		1	D	1		7	58.3%
Samolus valerandi								1					1	8.3%
Schoenoplectus tabernaemontani					1						1	1	3	25.0%
Scirpus maritimus					1	1	1		1		1		5	41.7%
Sparganium erectum	1			1									2	16.7%
Veronica catenata	1												1	8.3%
Althaea officinalis					1								1	8.3%
Carex otrubae			1		1		1	1					4	33.3%
Epilobium hirsutum										1			1	8.3%
Galium palustre		1	1	1									3	25.0%
Glaux maritima								1					1	8.3%
Hydrocotyle vulgaris								1					1	8.3%
Juncus inflexus	1	1	1	1		1	1					1	7	58.3%
J. gerardii				1									1	8.3%
Myosotis laxa				1									1	8.3%
Oenanthe lachenalii	1					1	1	1					4	33.3%
Pulicaria dysenterica					1								1	8.3%
Solanum dulcamara				1									1	8.3%

Ditch number	658	659	663	670	671	677	678	680	689	693	695	696	avg	tot
number of aquatic species	5	3	1	4	5	6	6	1	6	3	4	4	4	17
number of emergent species	6	2	0	4	5	2	2	2	2	1	3	1	2.5	11
number of bank species	2	2	3	4	3	2	3	4	0	1	0	1	2.1	11
total number of species	13	7	4	12	13	10	11	7	8	5	7	6	8.6	39

Wall.94 ditches adjacent arable (Dowels East)

choked ditches			*	1
Ditch number	23	27	129	tot
Callitriche obtusangula	1			1
Ceratophyllum demersum		1		1
Elodea nuttalii	1			1
Enteromorpha sp	1	1		2
Filamentous algae	1			1
Hydrocharis morsus-ranae	1	1	1	3
Lemna minor	1	1	1	3
L. trisulca	1	1		2
Myriophyllum spicatum	1	1		2
Potamogeton pectinatus	1	1		2
Polygonum amphibium	1			1
Alisma plantago-aquatica	1	1		2
Berula erecta		1		1
Phragmites australis	1	D	D	3
Nasturtium afficinale agg.	1	1		2
Rumex hydrolapathum	1	1	1	3
Sparganium erectum	1			1
Typha angustifolia		1	1	2
Carex otrubae	1			1
Epilobium hirsutum			1	1
Juncus inflexus	1	1		2
Myosotis laxa		1		1
Oenanthe lachenalii	1	1		2

Ditch number	23	27	129	tot
number of aquatic species	10	7	2	11
number of emergent species	5	6	3	7
number of bank species	2	1	1	3
total number of species	17	14	6	21

Wall.94 Arable ditches (all areas combined)

													DRY												12	50.0%
choked		*	*			*								*	*	*	*	*	*	*	*				tot	24
Ditch number	24	25	26	130	131	355	378	400	408	409	423	488	490	514	552	557	558	579	651	652	672	673	674	675	7	29.2%
Callitriche obtusangula			1	1		1		1		1				1						1					1	4.2%
Ceratophyllum demersum					1											1							1	1	6	25.0%
C. submersum								1		1	1														2	8.3%
Elodea nuttalii			1		1											1	1				D	D	1	1	11	45.8%
Enteromorpha sp	1			D			D	1	1						1								1		8	33.3%
Filamentous algae	1		1			1			1		1			1	1										2	8.3%
Glyceria fluitans							1										1								7	29.2%
Hydrocharis morsus-ranae	1	1	1	1				1	1	1															10	41.7%
Lemna minor	1		1	1	1		1	1			1	1				1							1		14	58.3%
L. trisulca	1		1	1	1	1	1	1	1	1	1	1				1		1							1	4.2%
L. gibba																						1			9	37.5%
Myriophyllum spicatum			1		1			1	1	1	1											1	1	1	2	8.3%
Potamogeton berchtoldii			1																			1			6	25.0%
P. pectinatus					1			1		1	1											1	1		1	4.2%
Ranunculus circinatus			1																						2	8.3%
Ranunculus trichophyllus						1	1																		1	4.2%
Zannichellia palustris											1														9	37.5%
Alisma plantago-aquatica	1			1	1	1		1	1	1	1			1											2	8.3%
Eleocharis palustris										1	1														1	4.2%
Nasturtium officinale agg.						1																			7	29.2%
Oenanthe aquatica						1	1	1	1			1		1			D								7	29.2%
O. fistulosa				1	1	1		1	1	1	1														8	33.3%
Phragmites australis	D	D	D	1		1										D		D			1				1	4.2%
Rumex hydrolapathum					1																				1	4.2%
Samolus valerandi										1															2	8.3%
Schoenoplectus tabernaemontani					1					1															17	70.8%
Scirpus maritimus				1	1	1	1	1	1	1	1	1	1	1	1		1		D			1	1	1	8	33.3%
Sparganium erectum				1	1		1				1	1		D	1					1					3	12.5%
Typha angustifolia		1			1	D																			1	4.2%
Agrostis stolonifera															D										12	50.0%
Althaea officinalis							1		1	1		1	1	1	1				1	1		1	1	1	1	4.2%
Carex divisa													1												1	4.2%
Carex distans										1															8	33.3%
Carex otrubae						1	1		1	1				1	1				1	1					3	12.5%
Epilobium hirsutum				1											1					1				1	6	25.0%
Galium palustre						1	1	1		1										1					7	29.2%
Juncus inflexus				1	1	1	1				1							1		1					1	4.2%
Myosotis laxa						1																			3	12.5%
Oenanthe lachenalii			1		1					1															2	8.3%
Pulicaria dysenterica									1	1															1	4.2%
Sium latifolium	1																								3	12.5%
Solanum dulcamara							1							1						1						

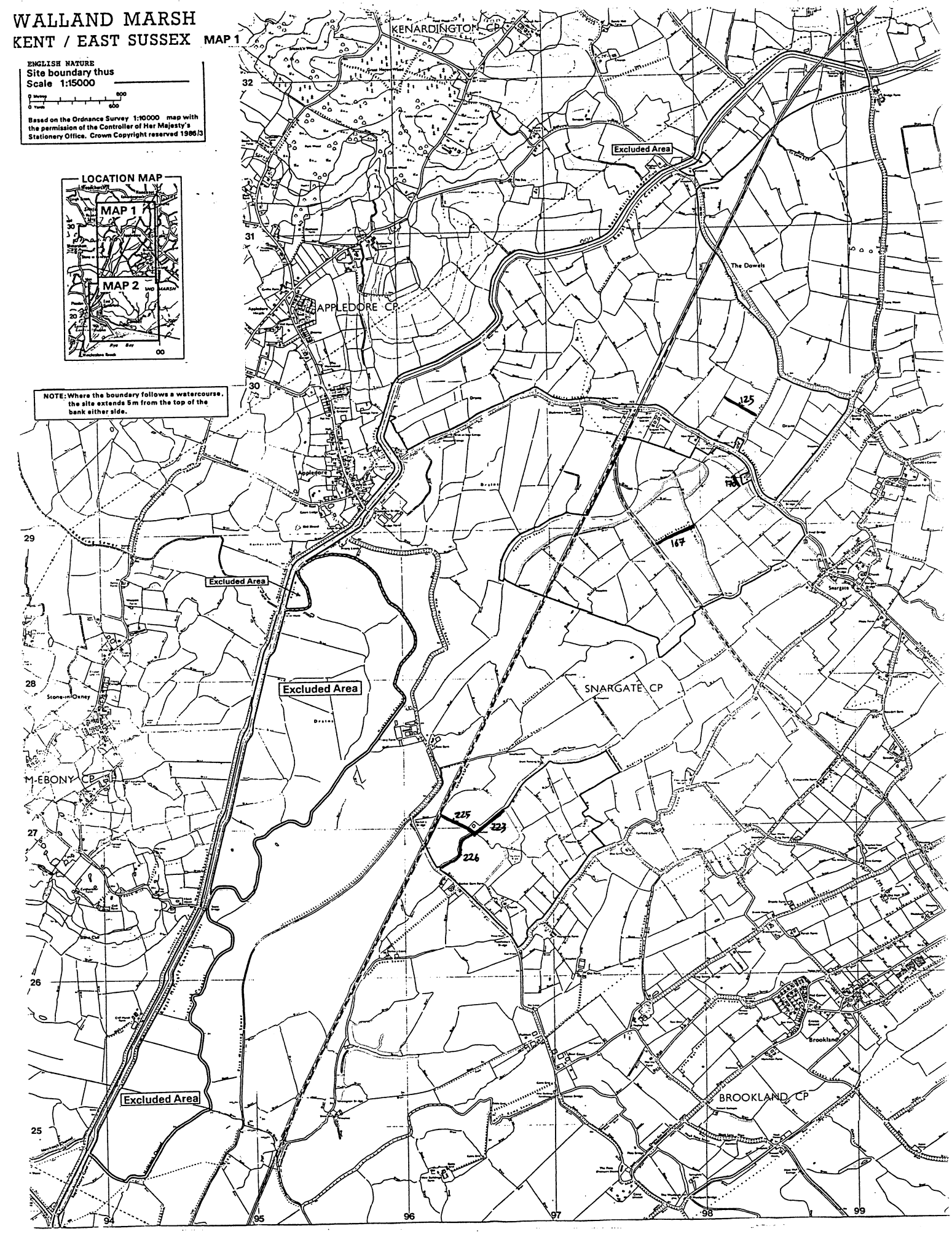
Ditch number	24	25	26	130	131	355	378	400	408	409	423	488	490	514	552	557	558	579	651	652	672	673	674	675	avg	tot
number of aquatic species	5	1	9	5	6	4	5	8	5	6	7	2	0	2	1	4	2	1	0	1	1	5	7	3	3.8	17
number of emergent species	2	2	1	5	7	7	3	4	4	6	5	3	1	4	2	1	2	1	1	1	1	1	1	1	2.8	12
number of bank species	1	0	1	2	2	4	5	1	3	6	1	1	2	3	4	0	0	1	2	6	0	1	1	2	2.0	13
total number of species	8	3	11	12	15	15	13	13	12	18	13	6	3	9	7	5	4	3	3	8	2	7	9	6	8.5	42

APPENDIX II DISTRIBUTION MAPS

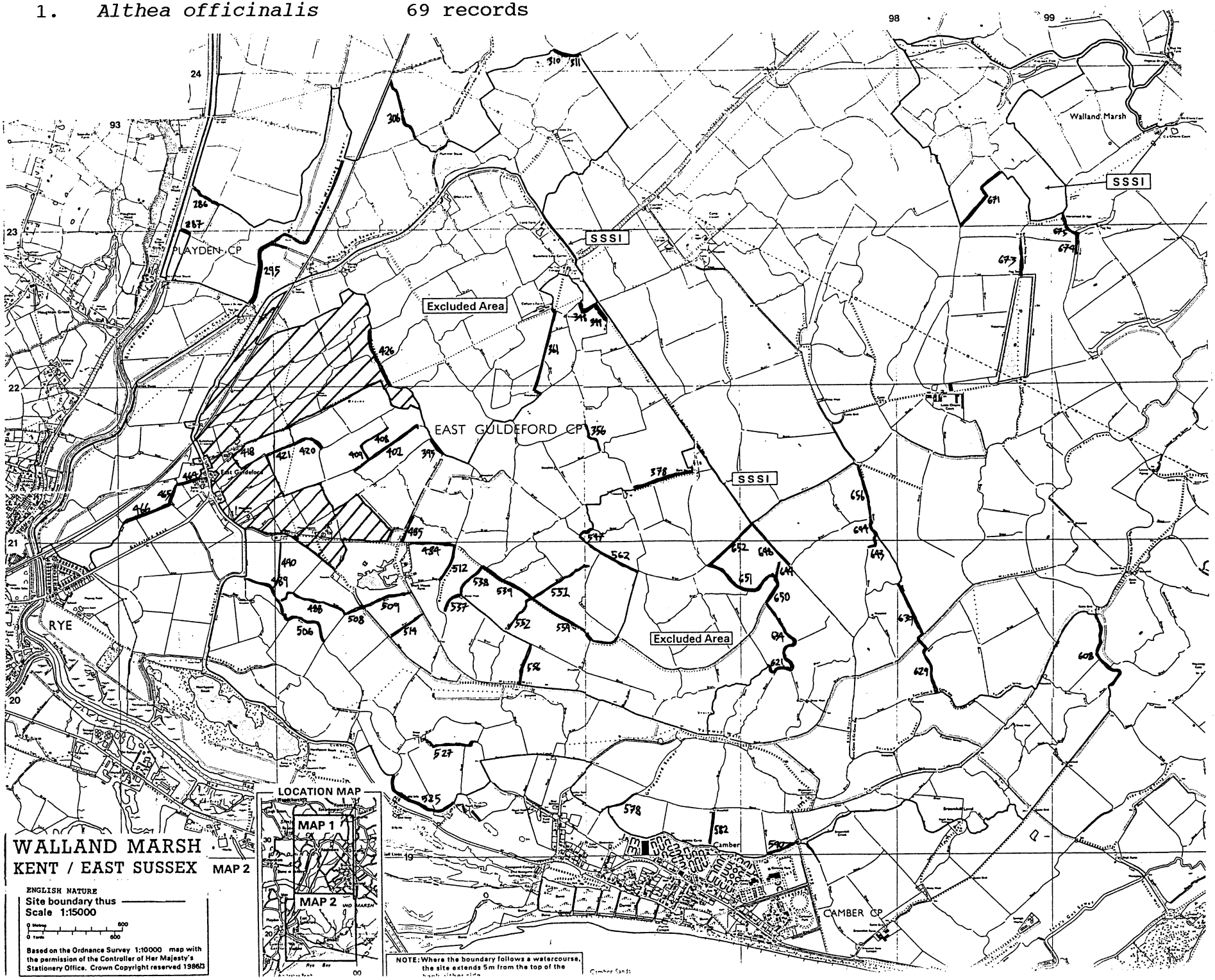
	number of records
1. *Althea officinalis*[*]	69
2. *Azolla filiculoides*[#]	8
3. *Butomus umbelatus*	3
4. *Carex divisa*[*]	6
5. *Carex riparia*	12
6. *Glaux maritima*	20
7. *Hottonia palustre*	18
8. *Hydrocotyle vulgaris*	45
9. *Juncus gerardii*	50
10. *Hippuris vulgaris*	1
11. *Lemna gibba*	15
12. *Myriophyllum verticillatum*[*]	2
13. *Potamogeton crispus*	15
14. *Potamogeton pusillus*	14
15. *Potamogeton berchtoldii*	12
16. *Potamogeton lucens*	15
17. *Potamogeton natans*	16
18. *Potamogeton trichoides*[*]	15
19. *Ranunculus baudotti*	15
20. *Ranunculus circinatus*	17
21. *Sagittaria sagittifolia*	3
22. *Samolus valerandi*	26
23. *Sium latifolium*[*]	5
24. *Triglochin palustris*	13
25. *Triglochin maritima*	3
26. *Utricularia sp*	8
27. *Wolffia arrhiza*	2
28. *Zannichellia palustris*	32

* = nationally scarce species # = alien species

1. *Althea officinalis* 69 records

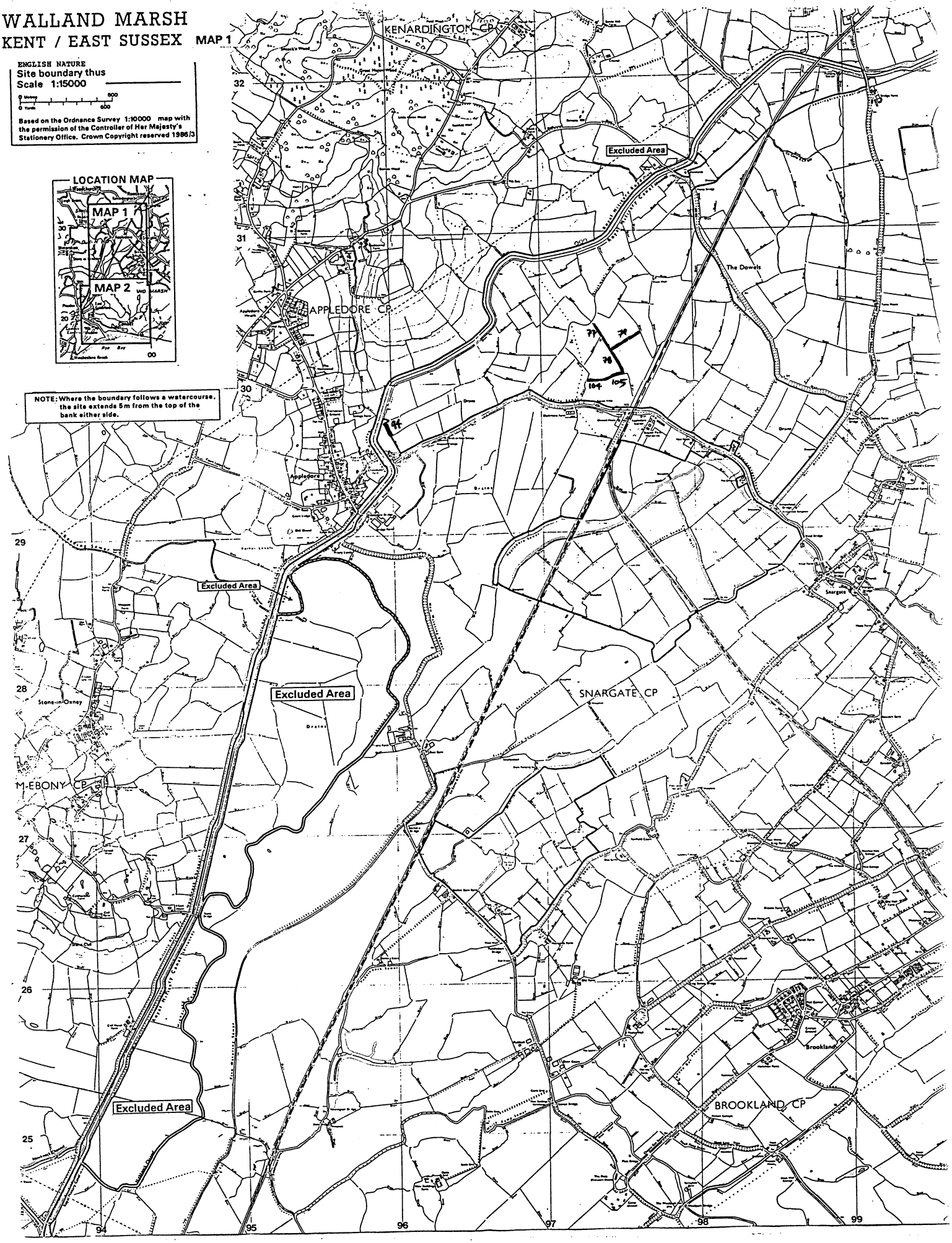


1. *Althea officinalis* 69 records

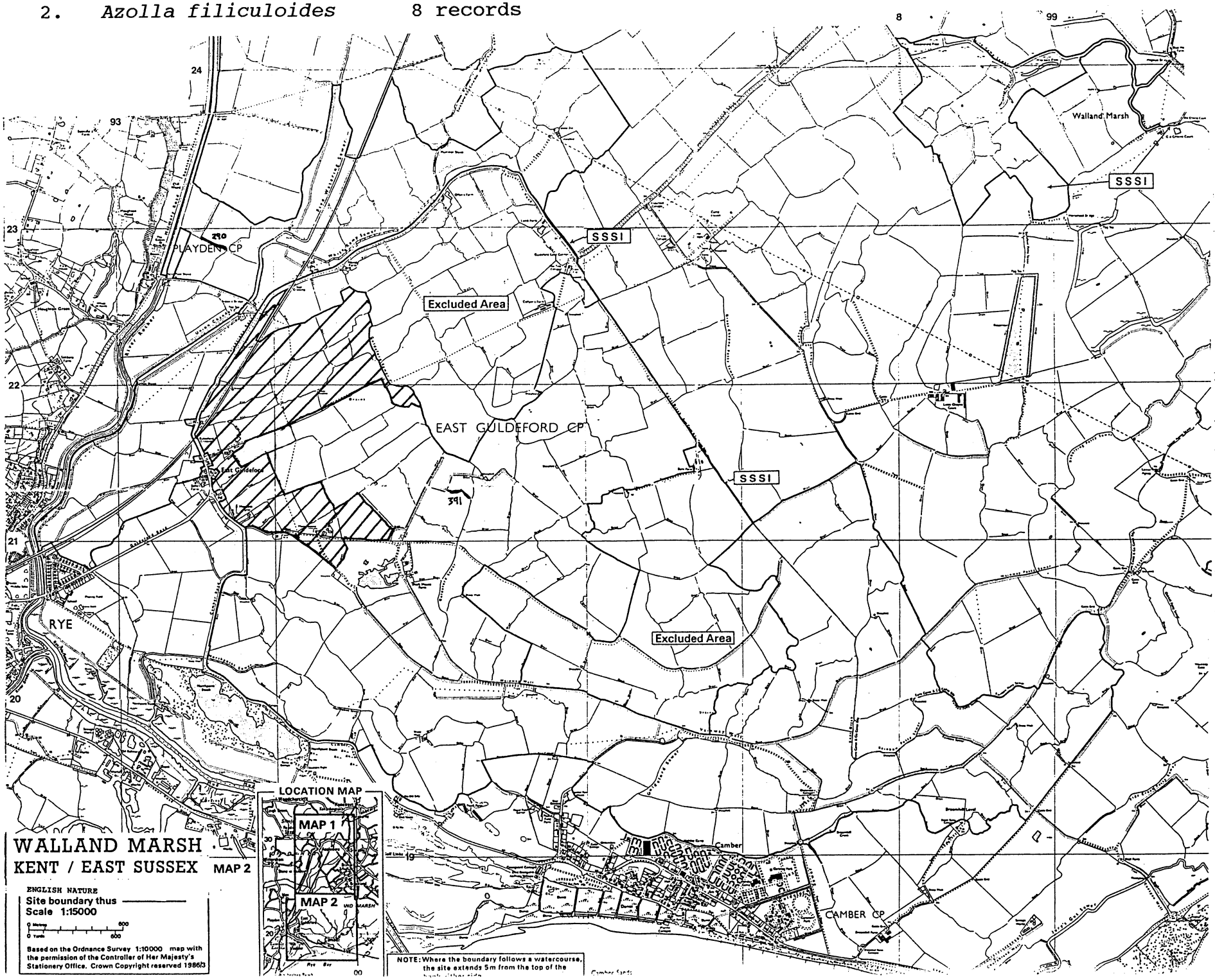


2. *Azolla filiculoides* 8 records

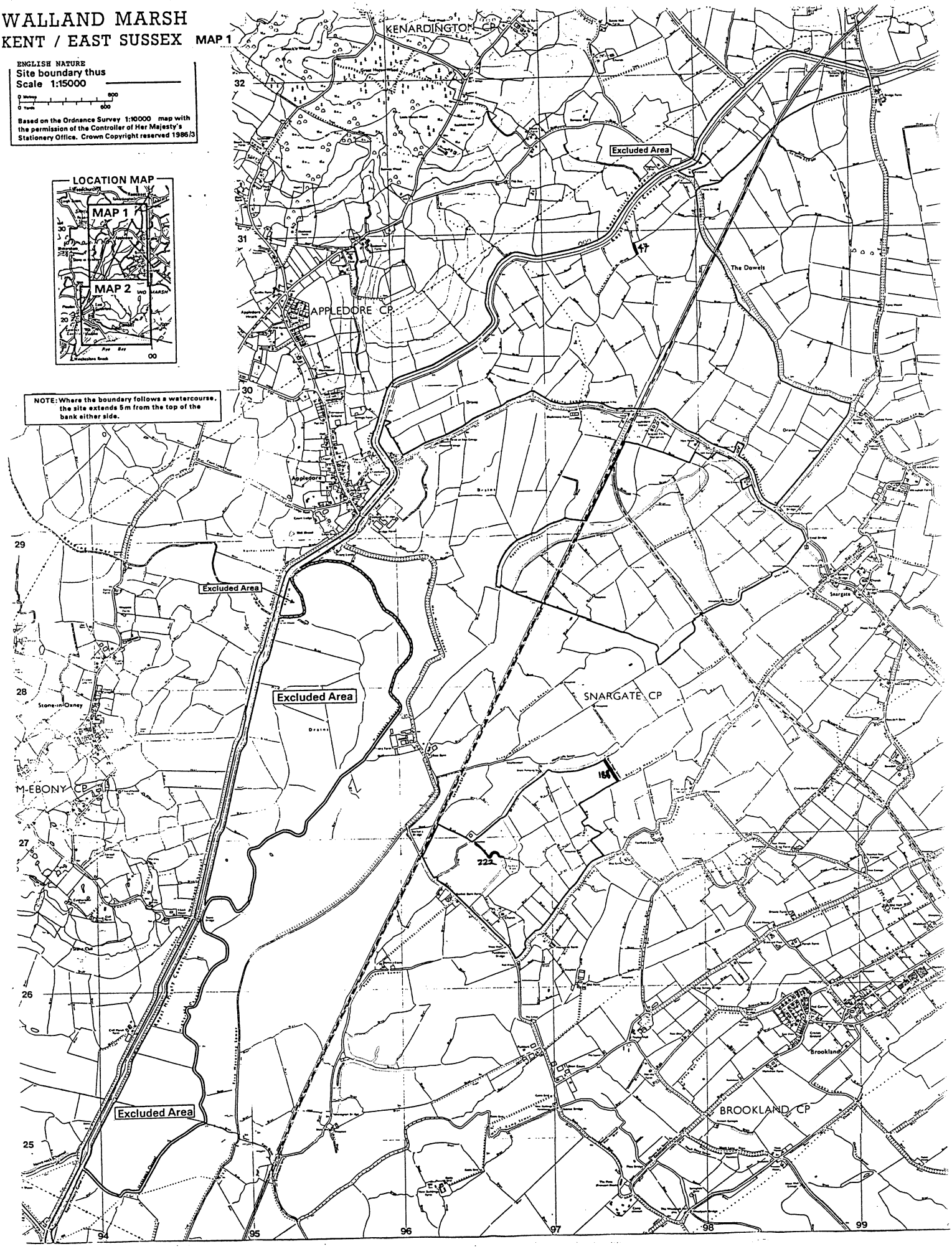
Azolla



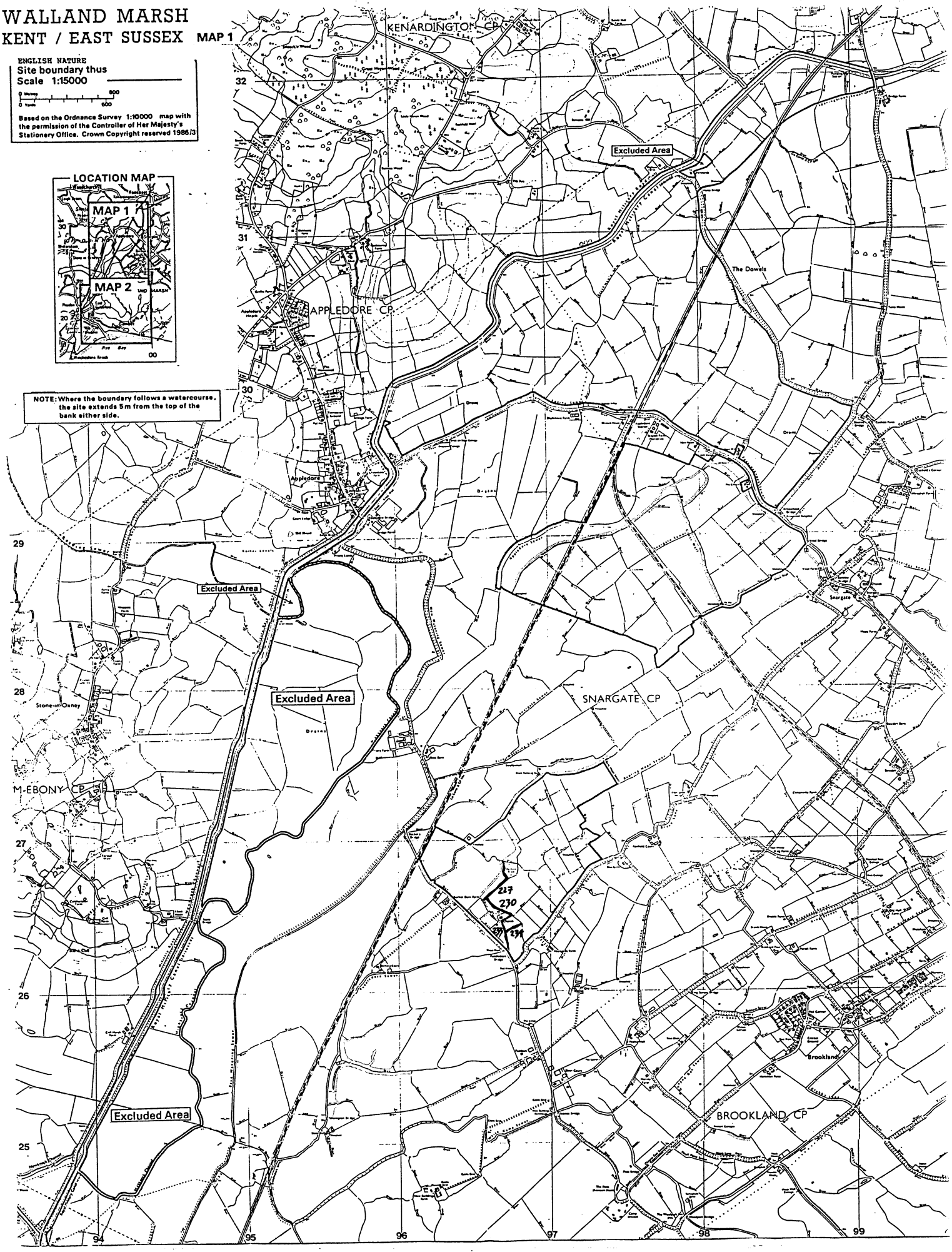
2. *Azolla filiculoides* 8 records



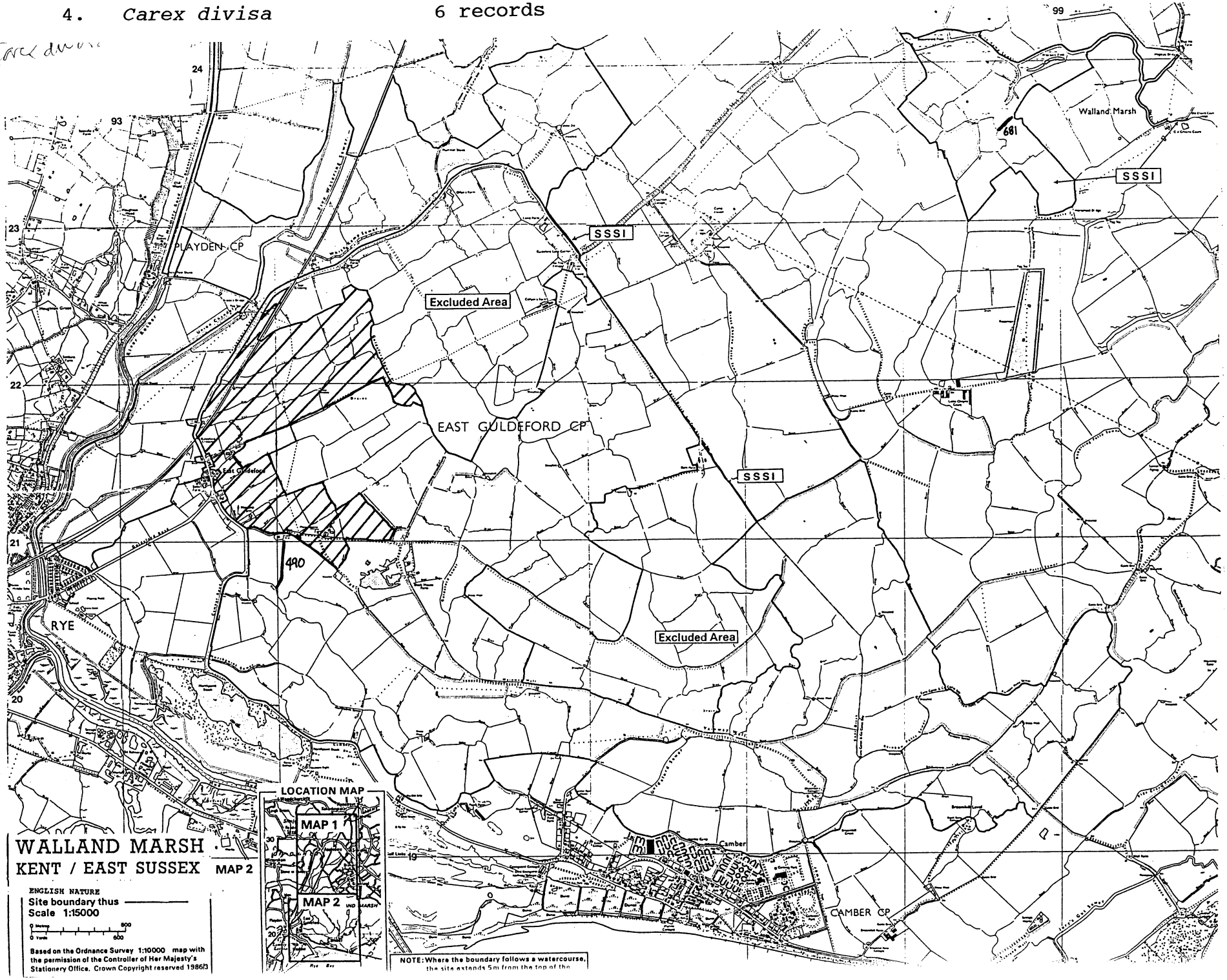
3. *Butomus umbelatus* 3 records



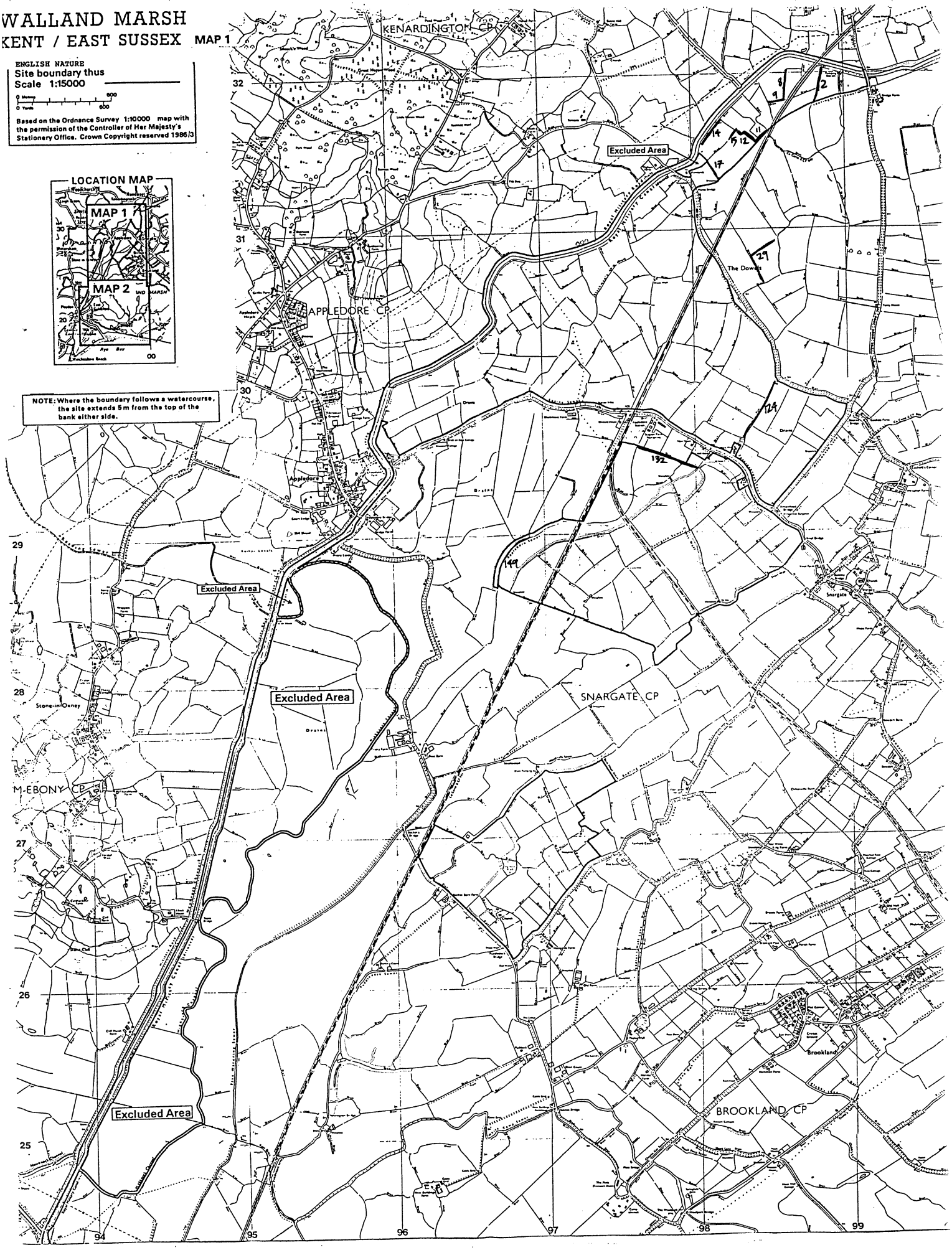
4. *Carex divisa* 6 records



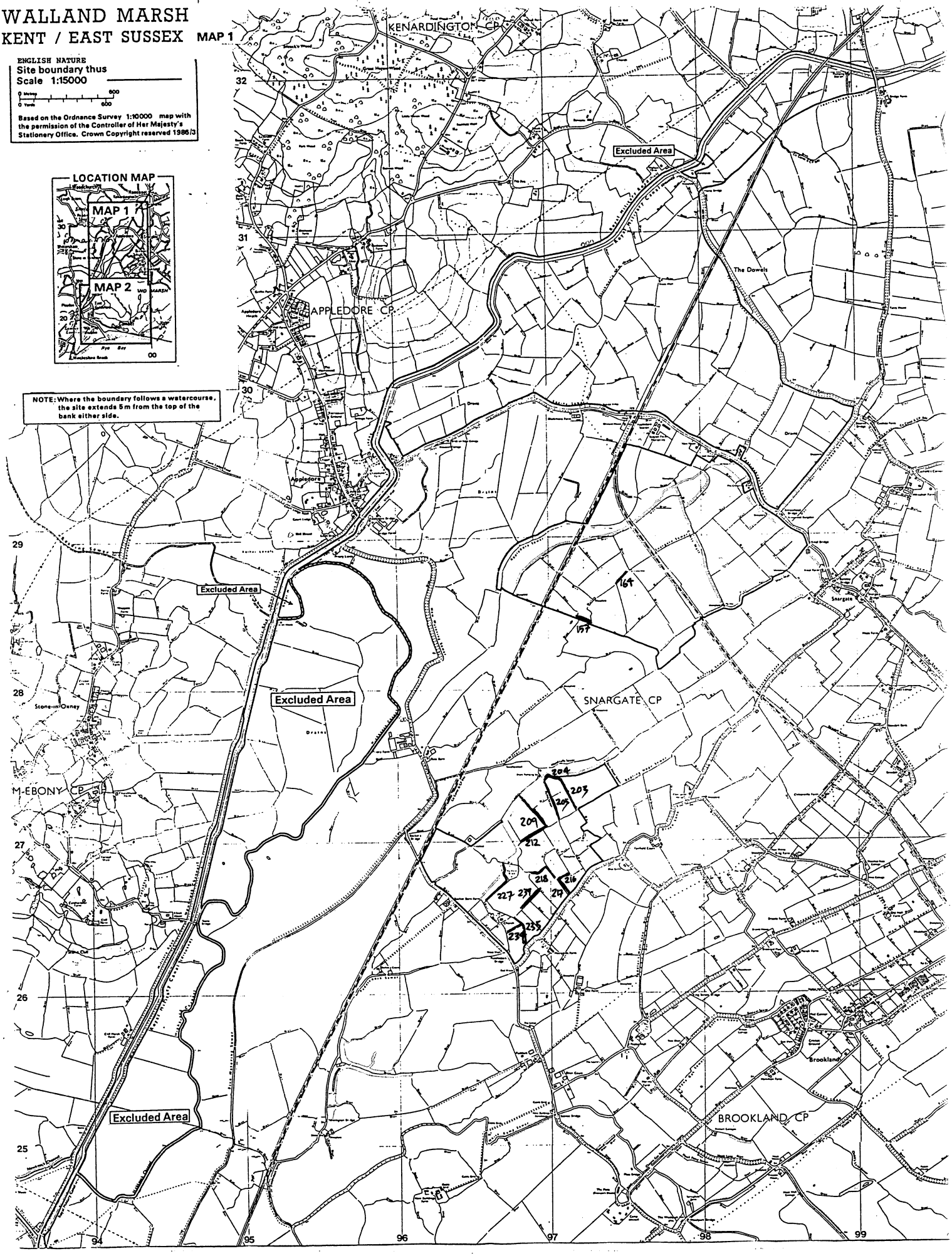
4. *Carex divisa* 6 records



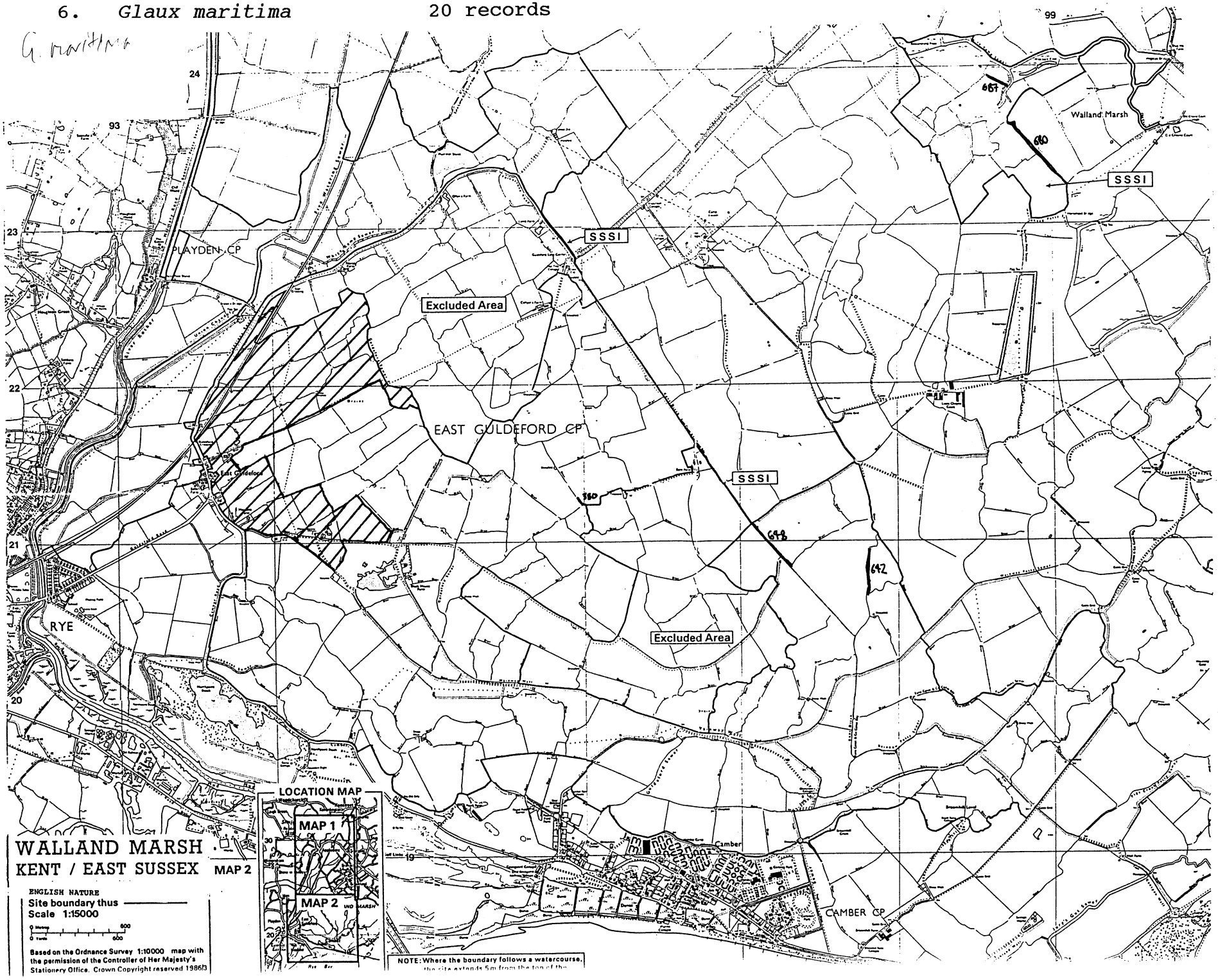
5. *Carex riparia* 12 records



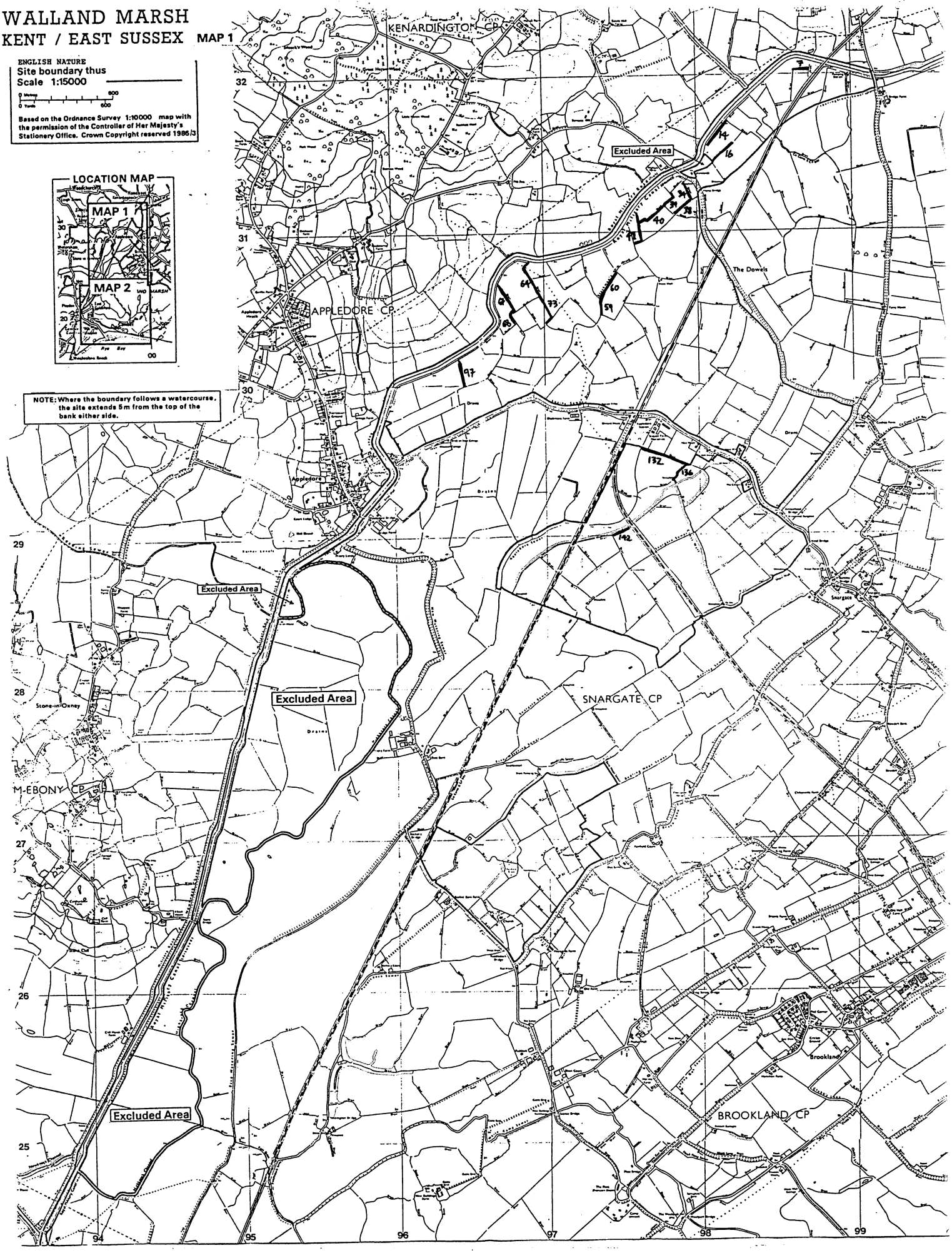
6. *Glaux maritima* 20 records



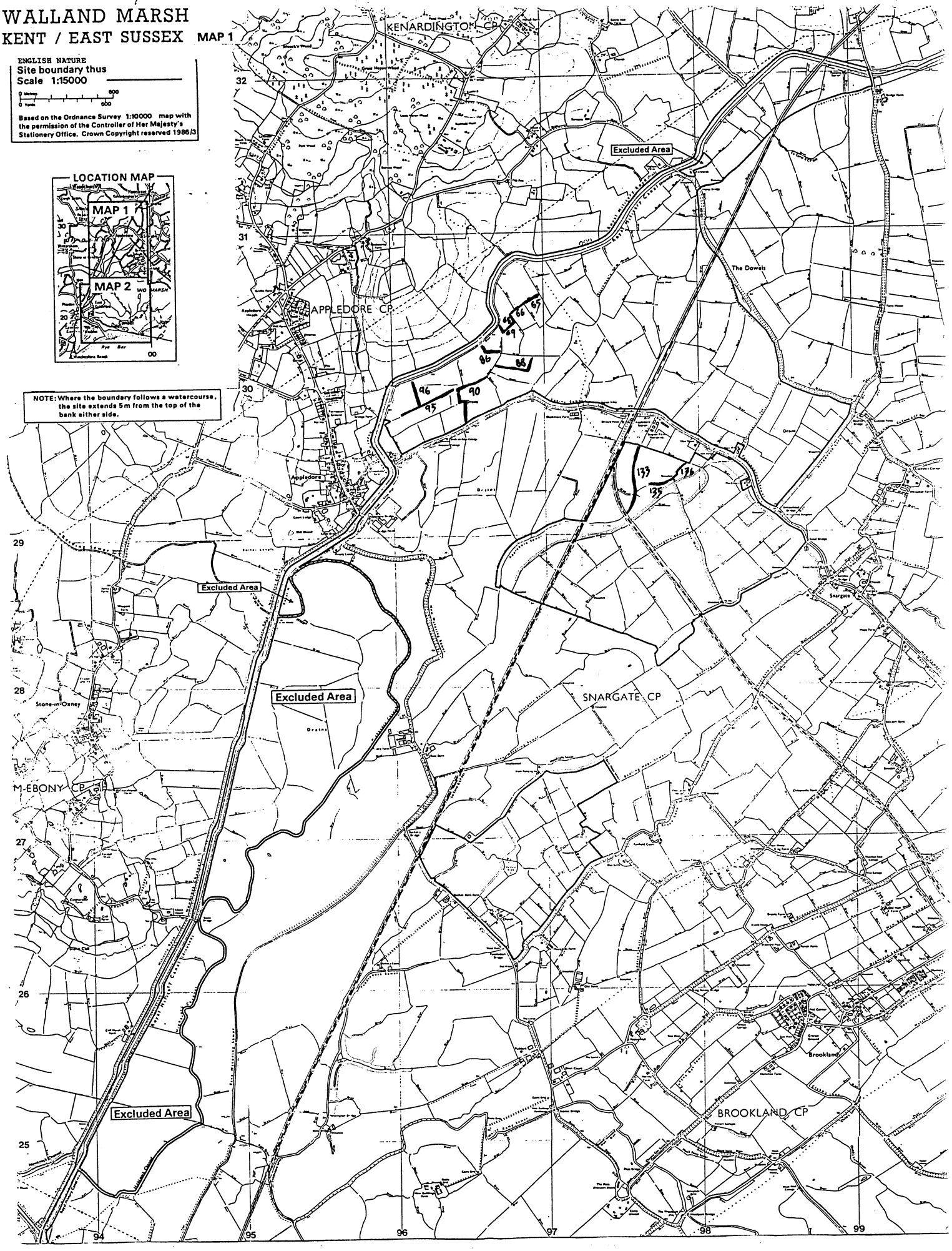
6. *Glaux maritima* 20 records



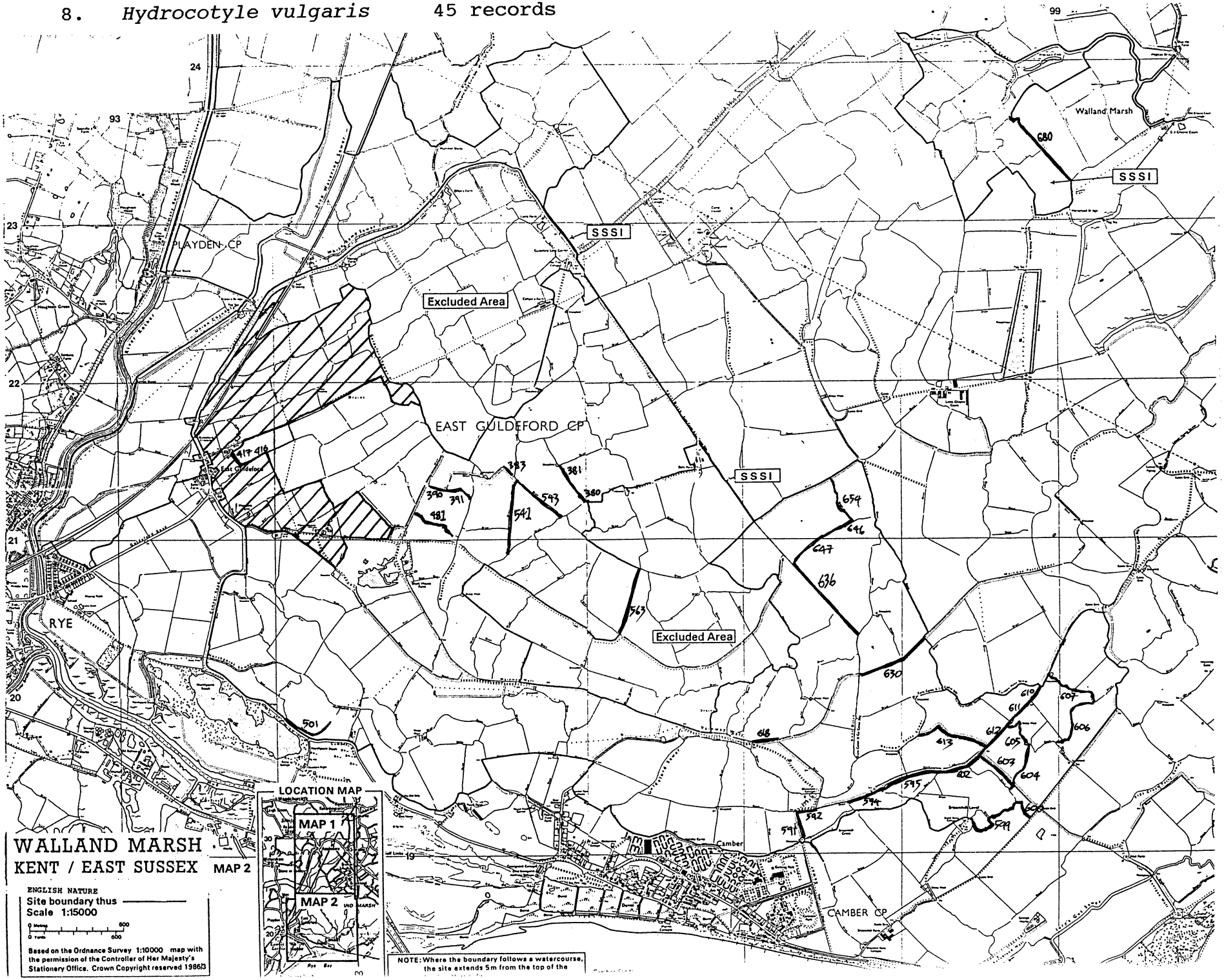
7. *Hottonia palustre* 18 records



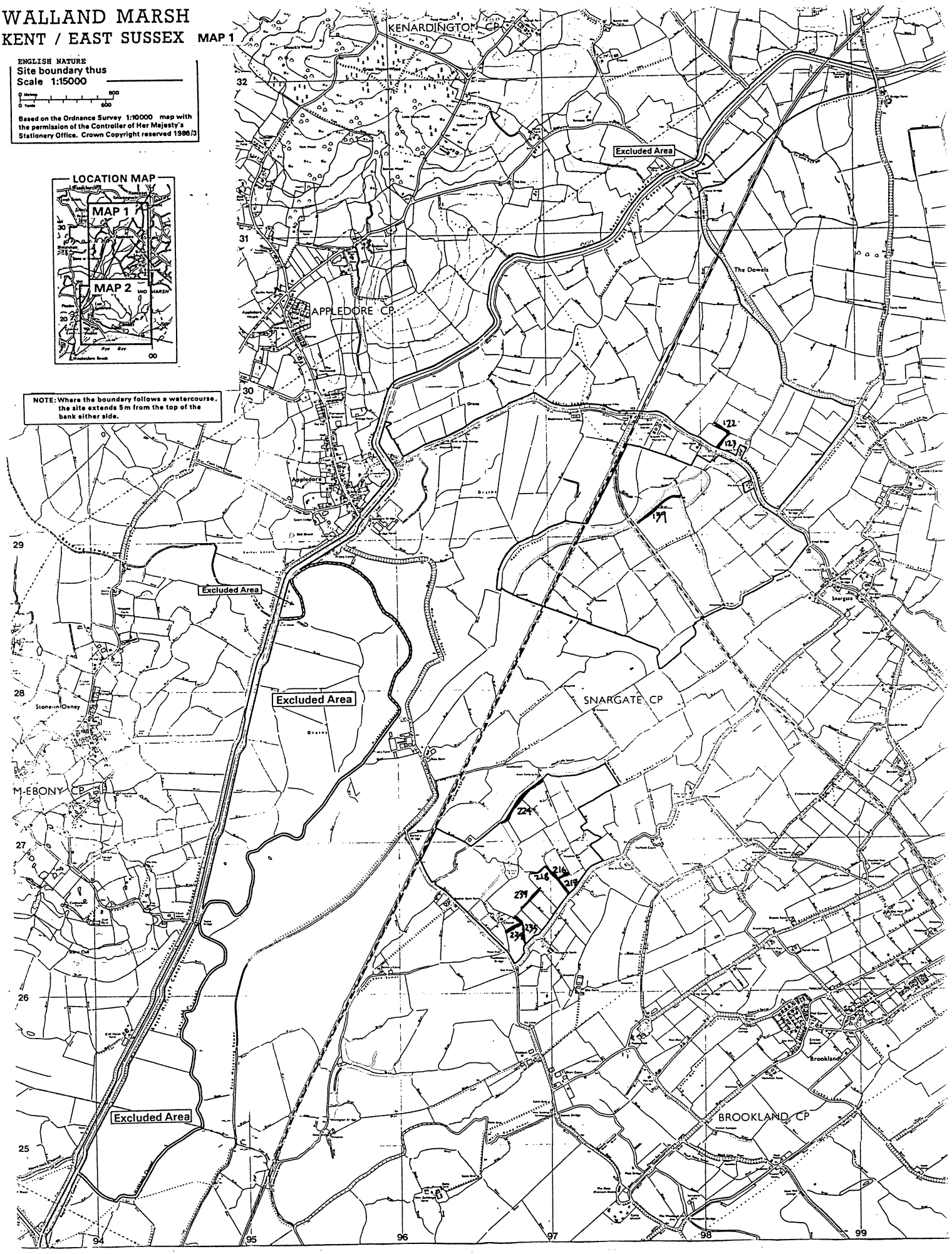
8. *Hydrocotyle vulgaris* 45 records



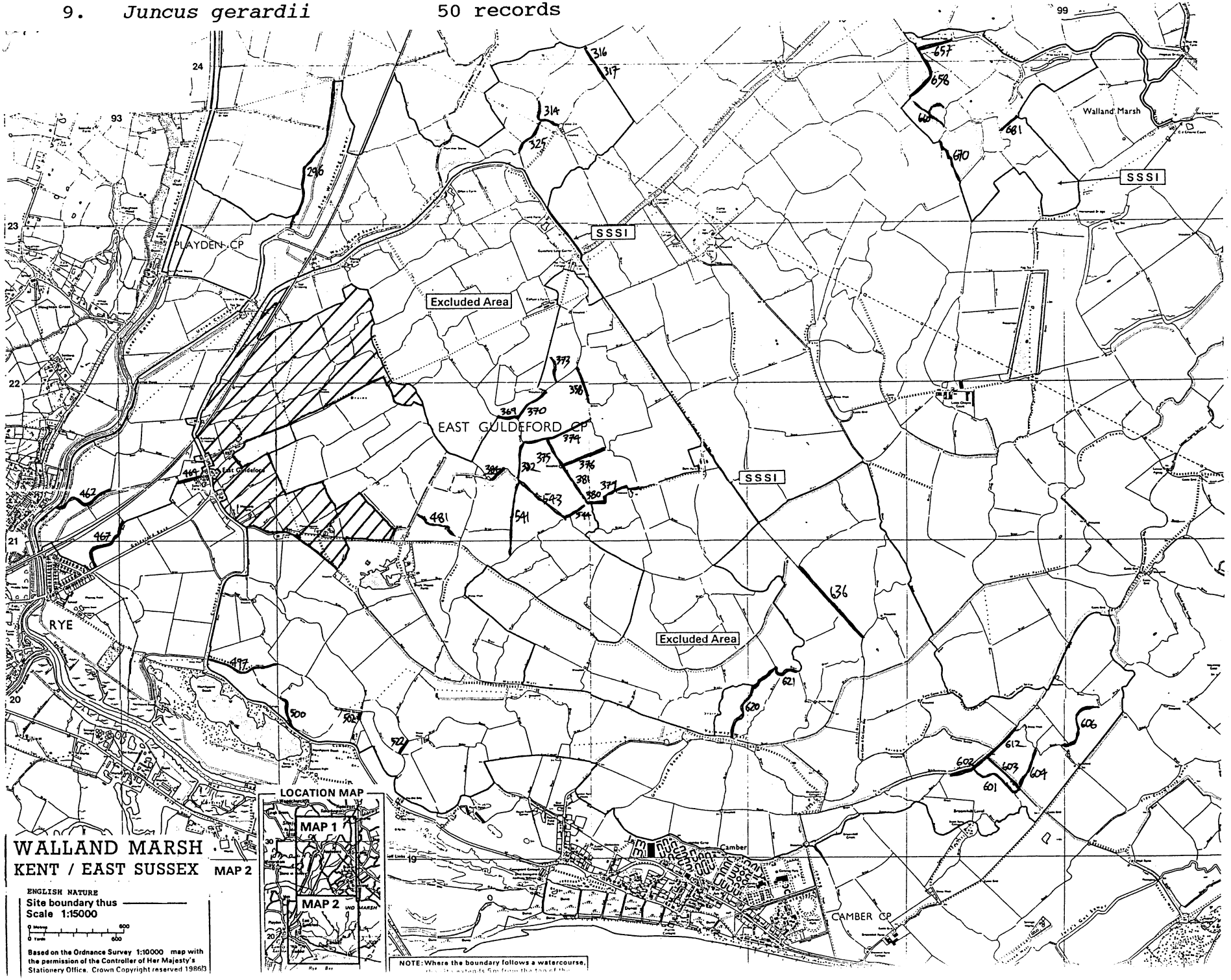
8. *Hydrocotyle vulgaris* 45 records



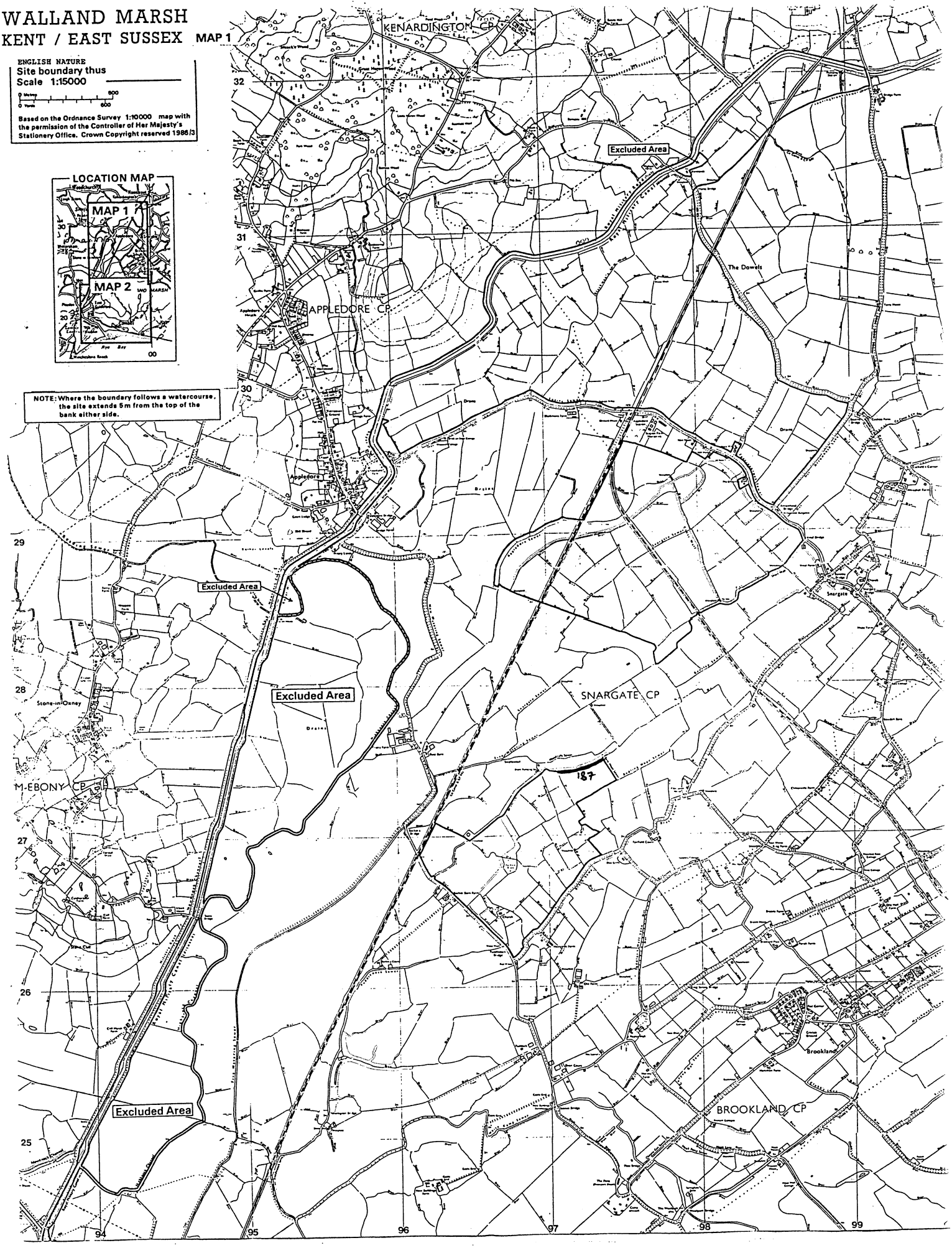
9. *Juncus gerardii* 50 records



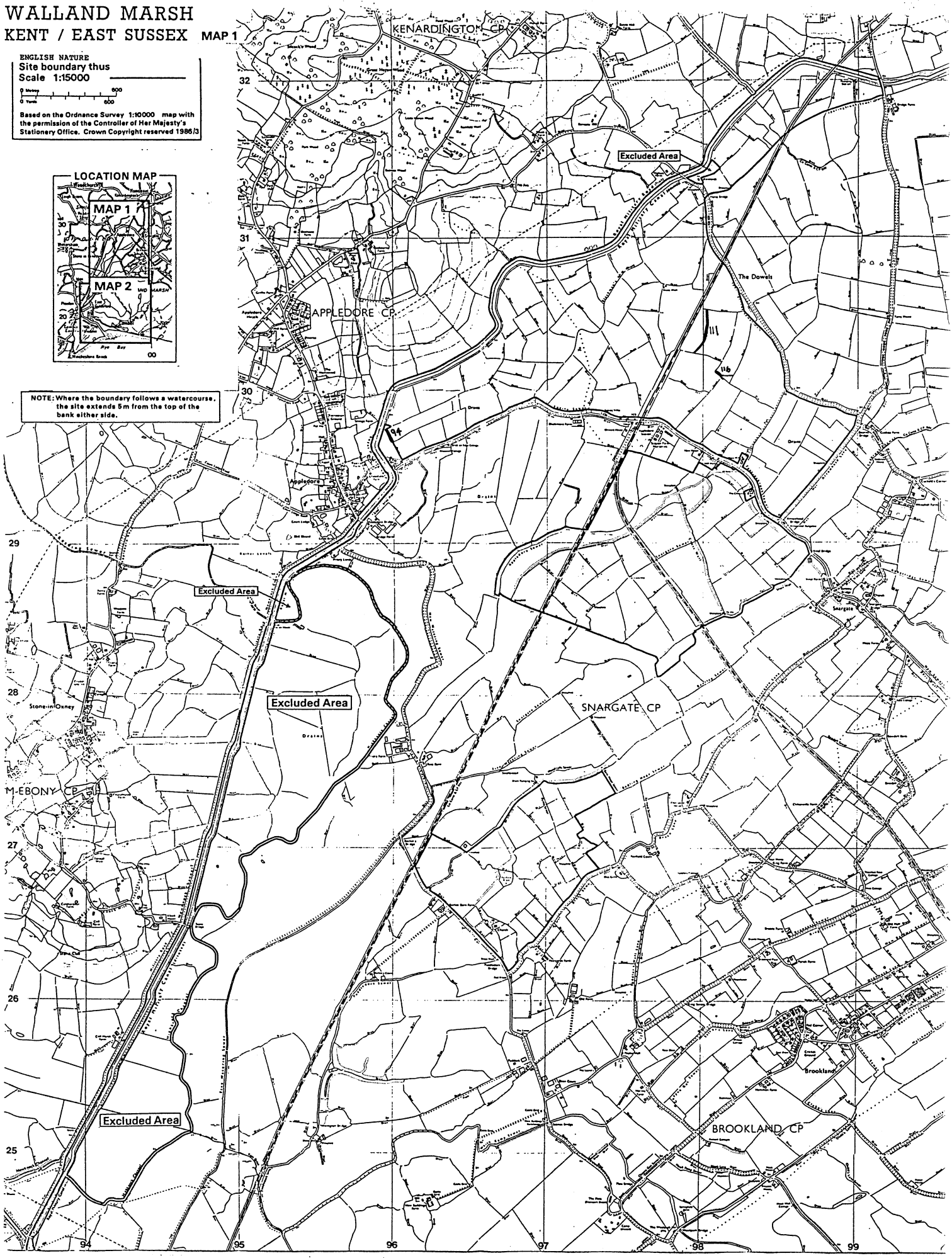
9. *Juncus gerardii* 50 records



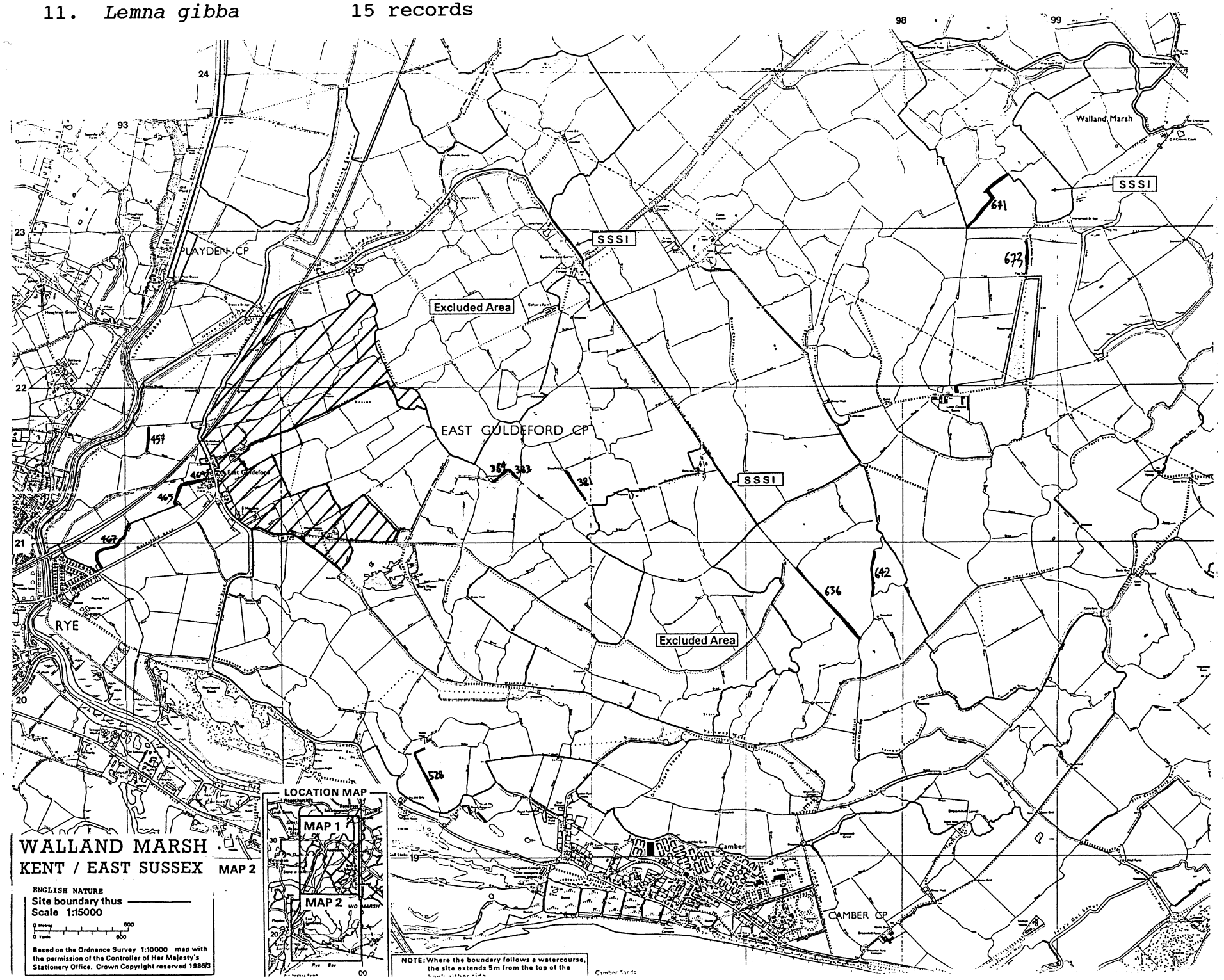
10. *Hippuris vulgaris* 1 record



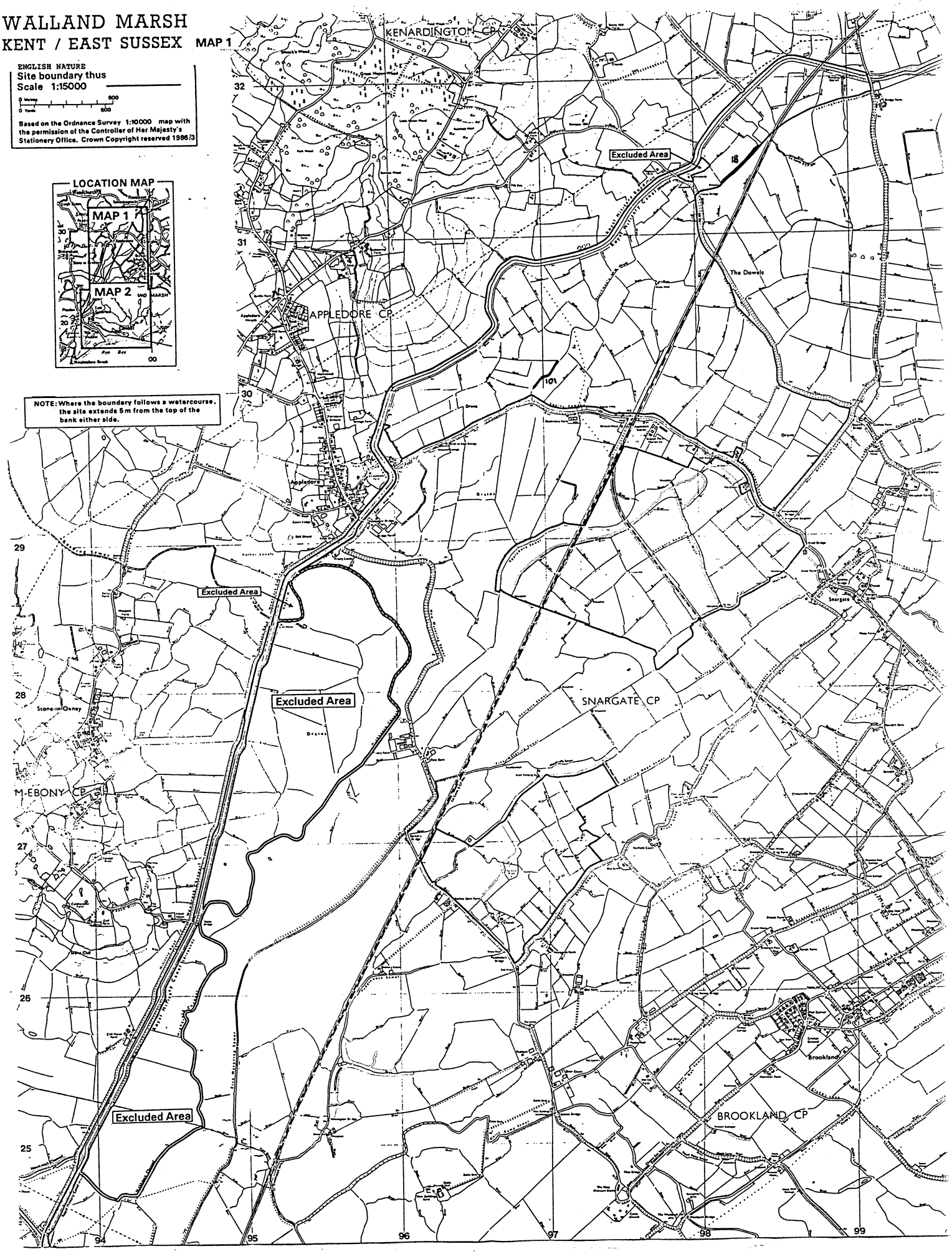
11. *Lemna gibba* 15 records



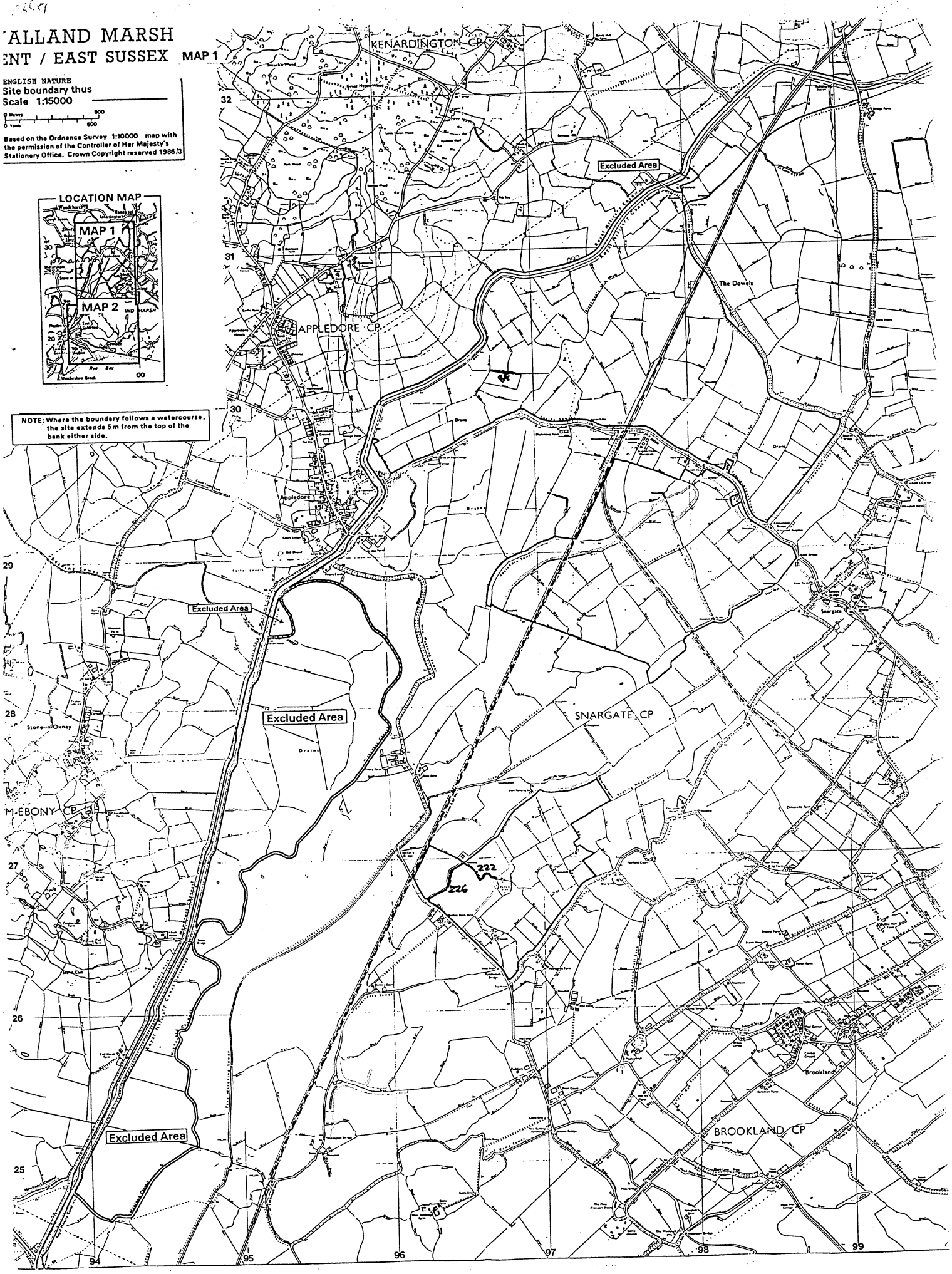
11. *Lemna gibba* 15 records



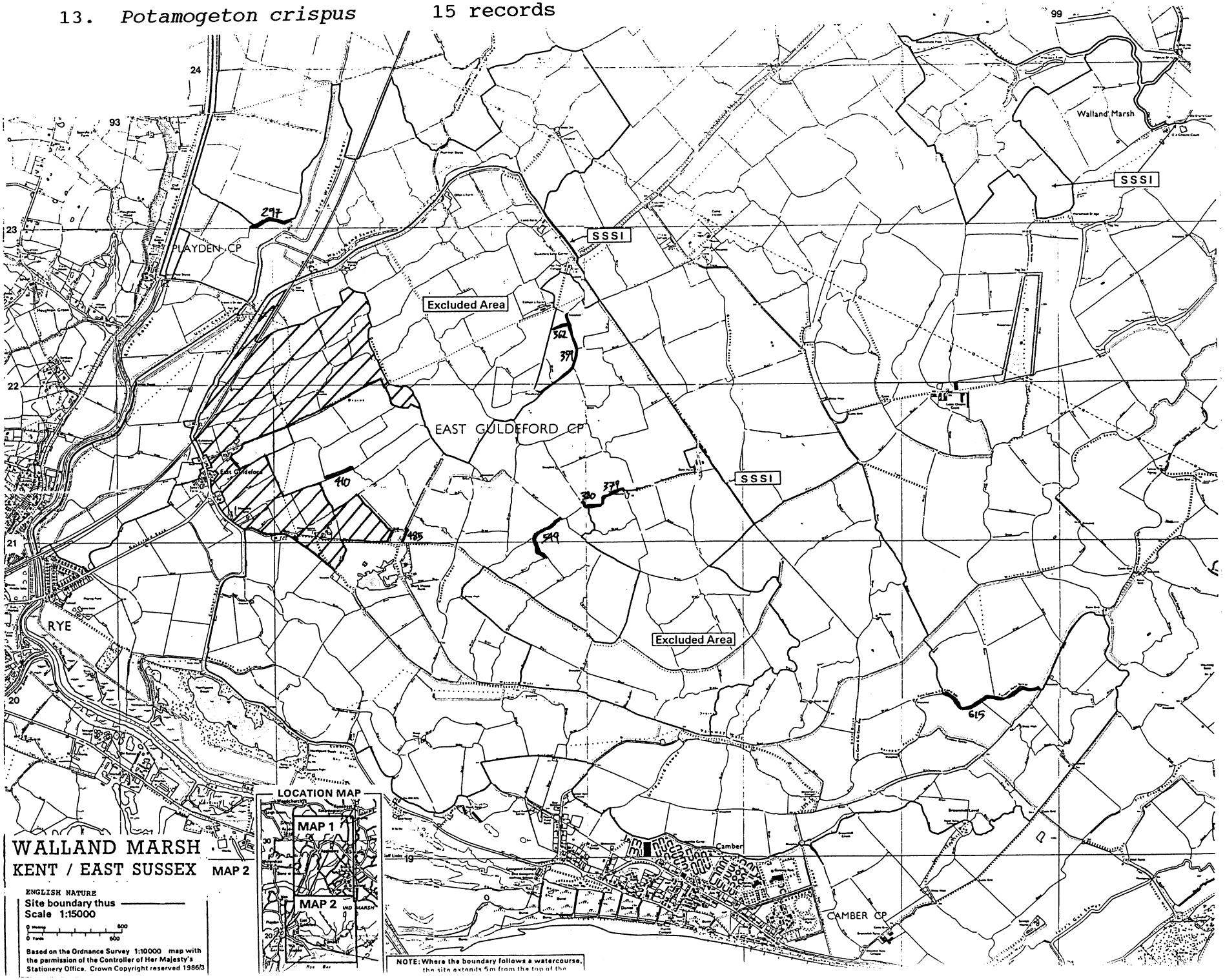
12. *Myriophyllum verticillatum* 2 records

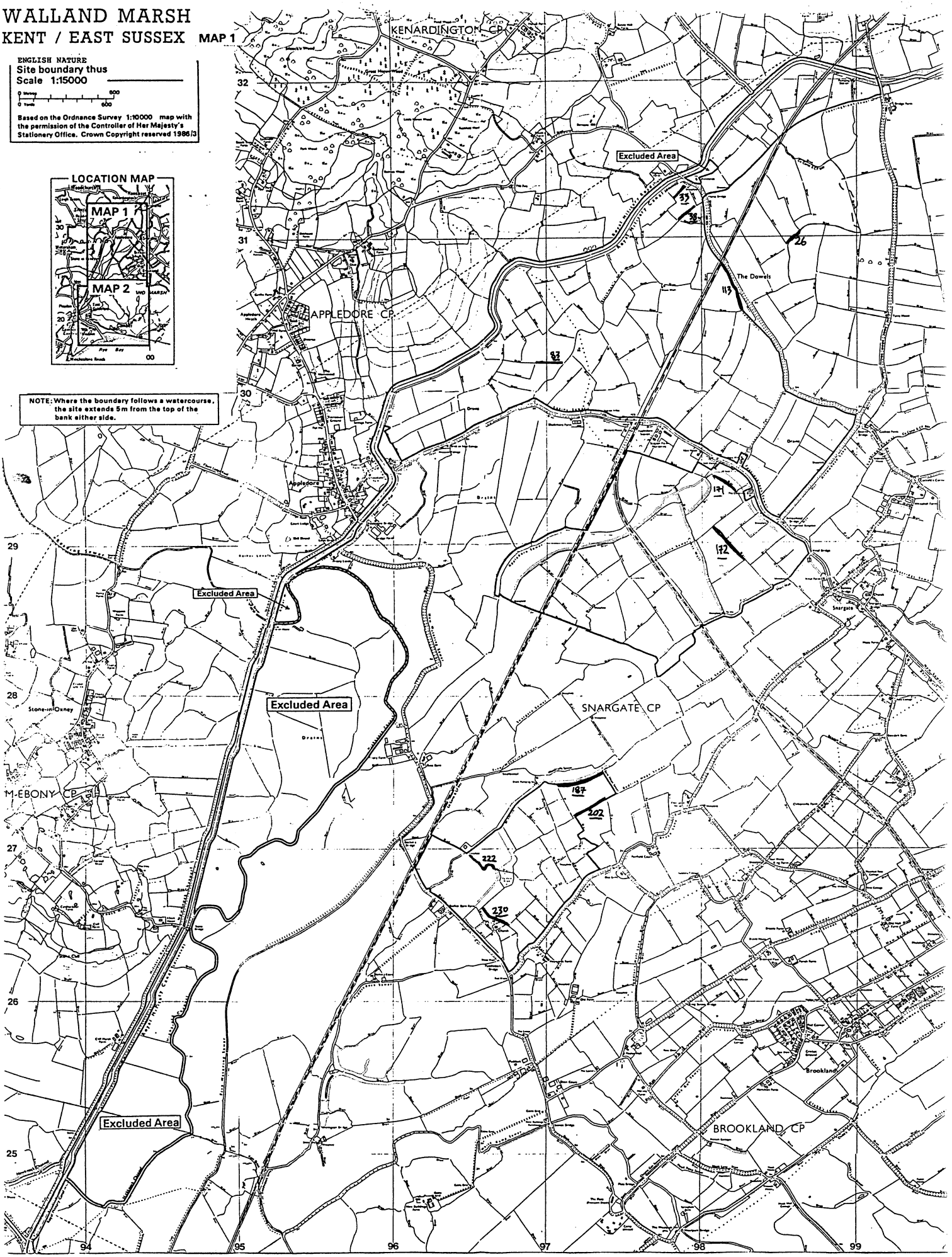


13. *Potamogeton crispus* 15 records

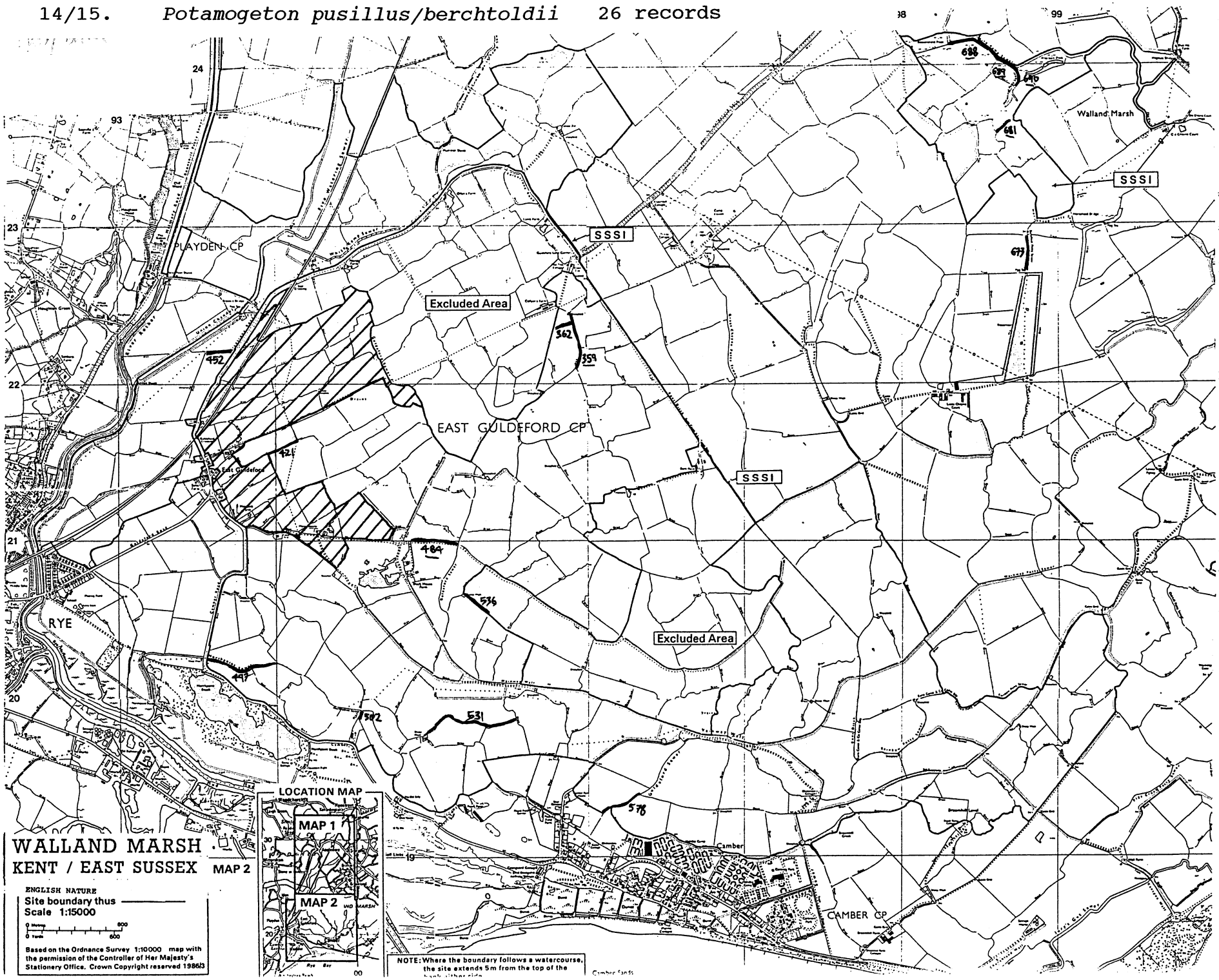


13. *Potamogeton crispus* 15 records

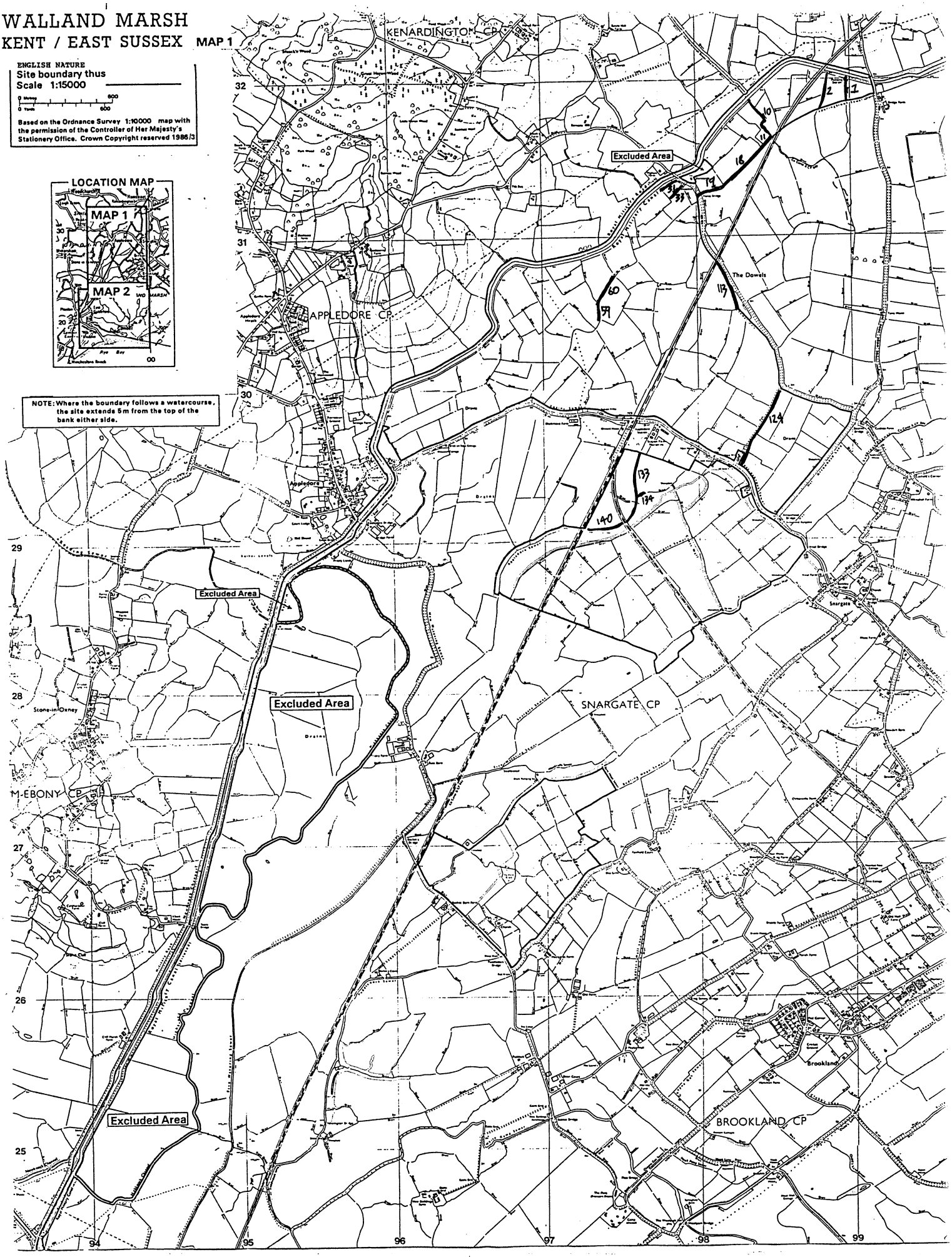



WALLAND MARSH
KENT / EAST SUSSEX MAP 1
ENGLISH NATURE
Site boundary thus
Scale 1:15000
0 Yards 600
Based on the Ordnance Survey 1:10000 map with the permission of the Controller of Her Majesty's Stationery Office. Crown Copyright reserved 1986/3
LOCATION MAP
MAP 1
MAP 2
NOTE: Where the boundary follows a watercourse, the site extends 5m from the top of the bank either side.
KENARDINGTON CP
APPLEDORE CP
SNARGATE CP
BROOKLAND CP
Excluded Area
Excluded Area
Excluded Area
Excluded Area
The Dowels
Appledore
Snargate
Brookland
Stone-in-Oxney
32
31
30
29
28
27
26
25
94
95
96
97
98
99

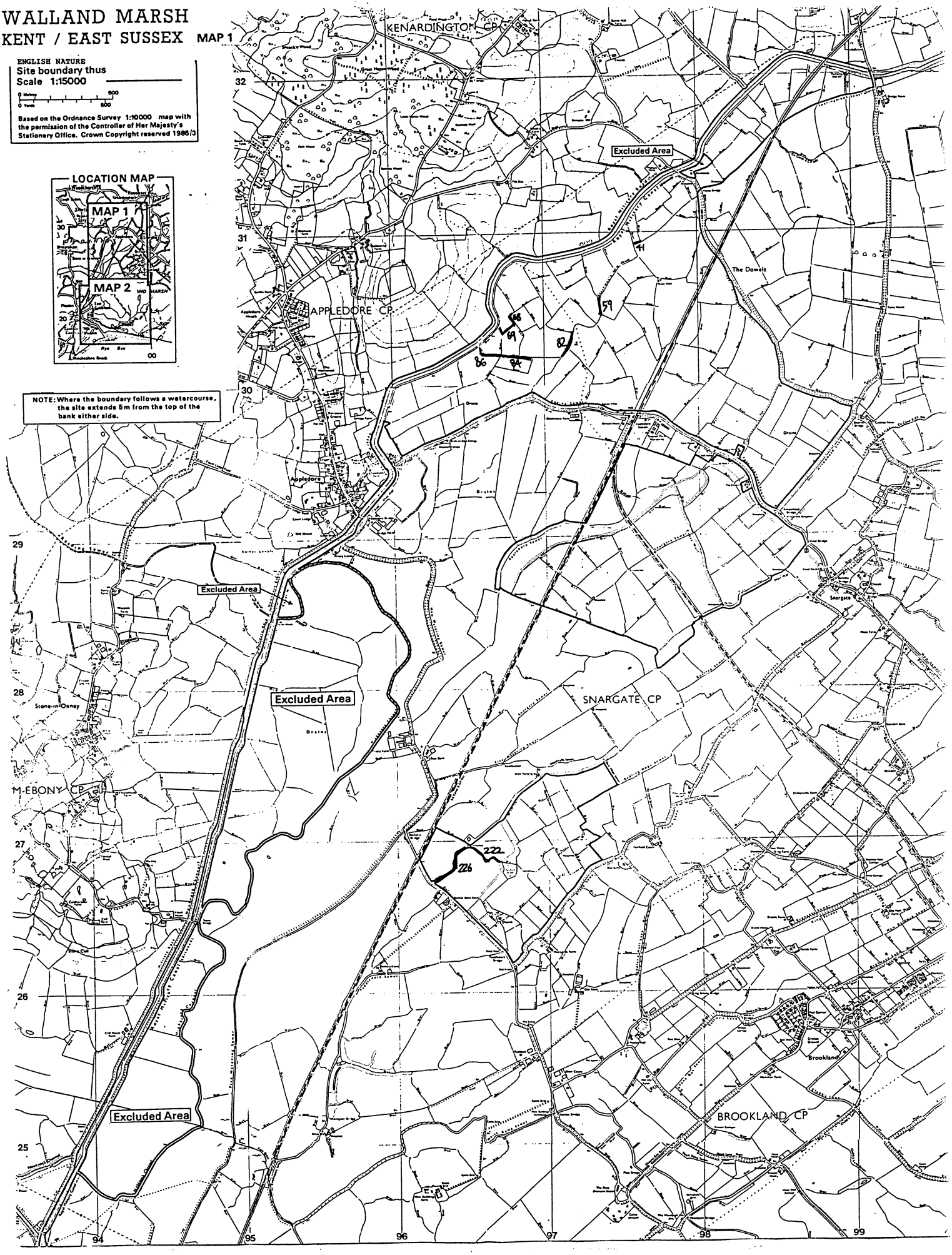
14/15. *Potamogeton pusillus/berchtoldii* 26 records



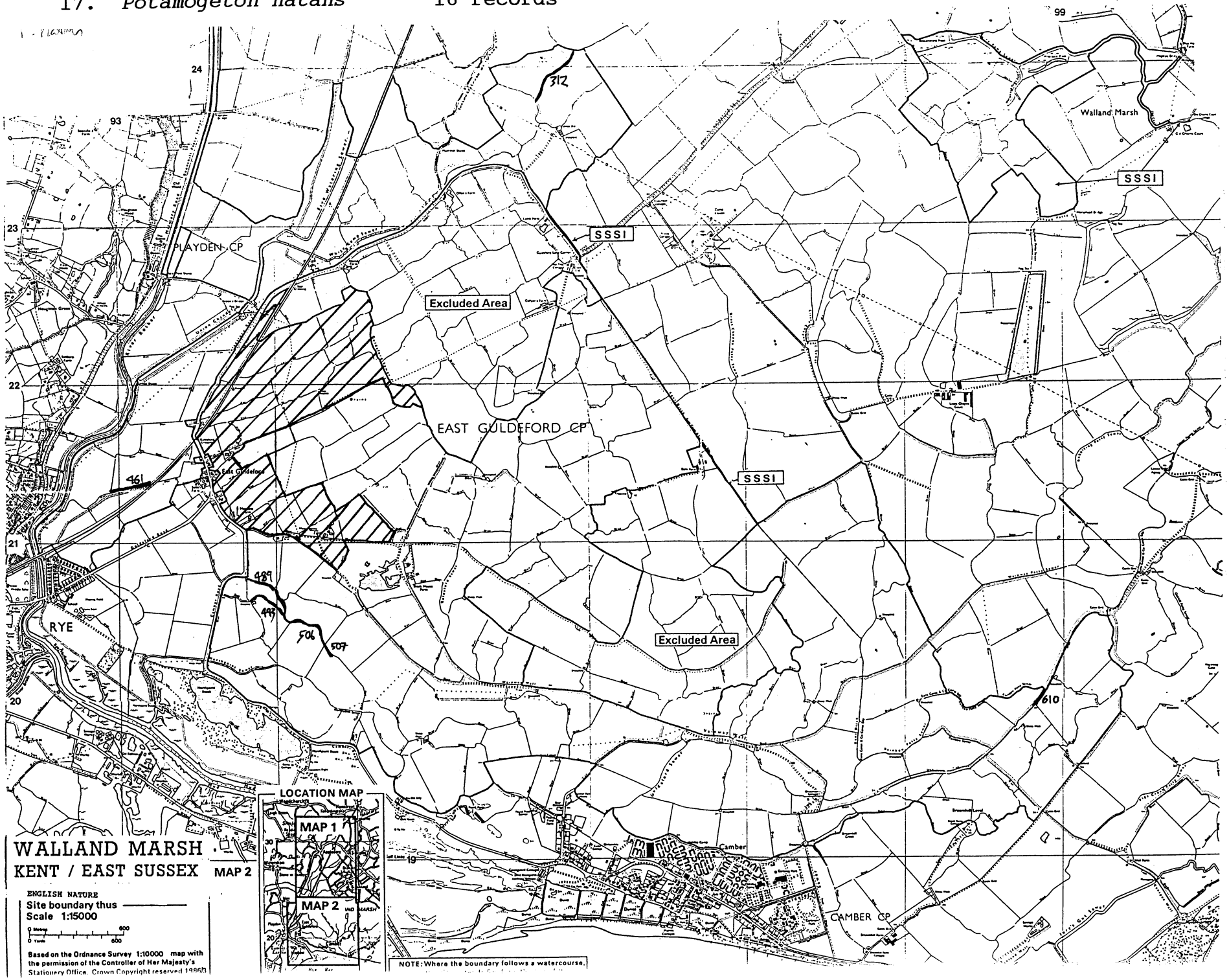
16. *Potamogeton lucens* 15 records



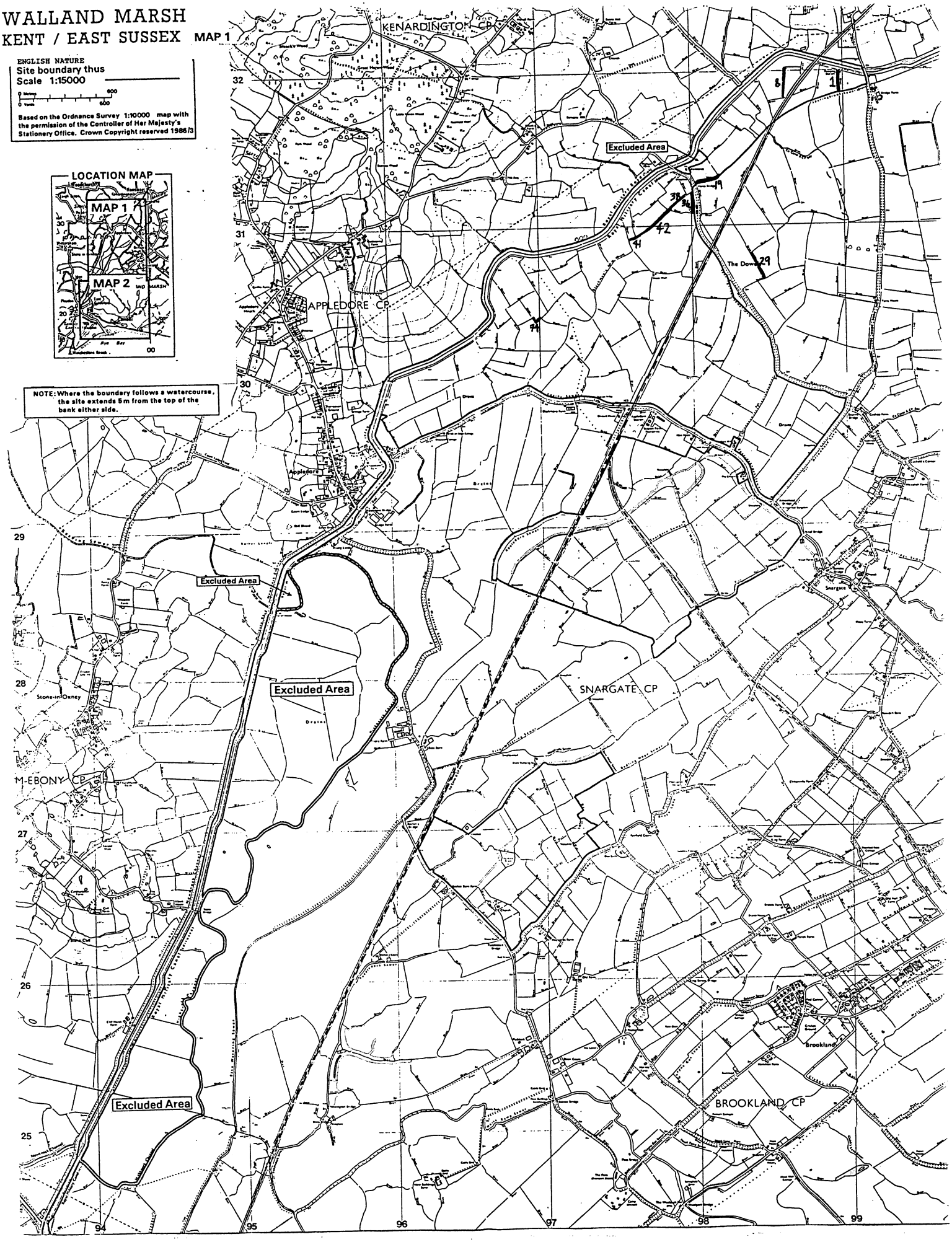
17. *Potamogeton natans* 16 records



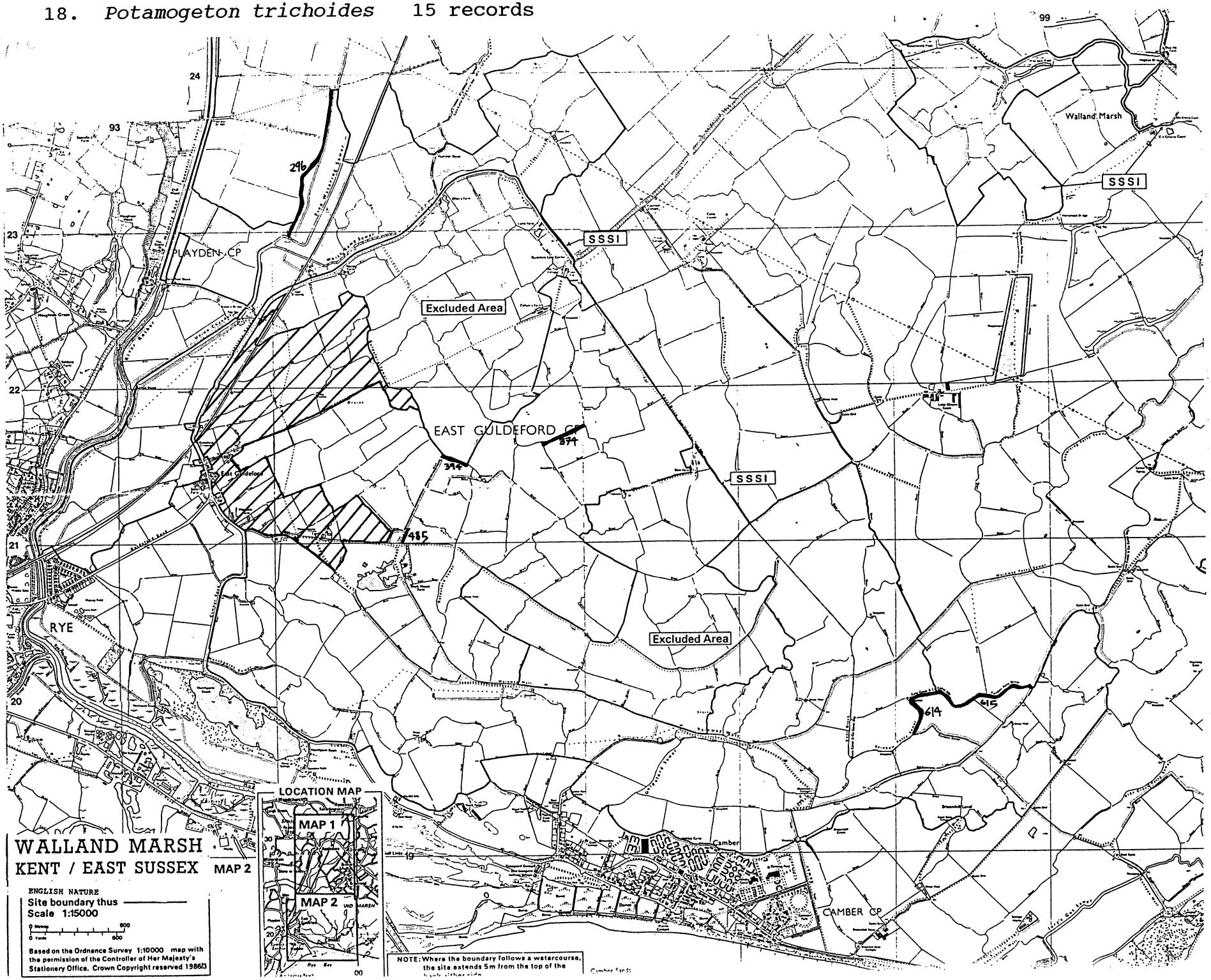
17. *Potamogeton natans* 16 records



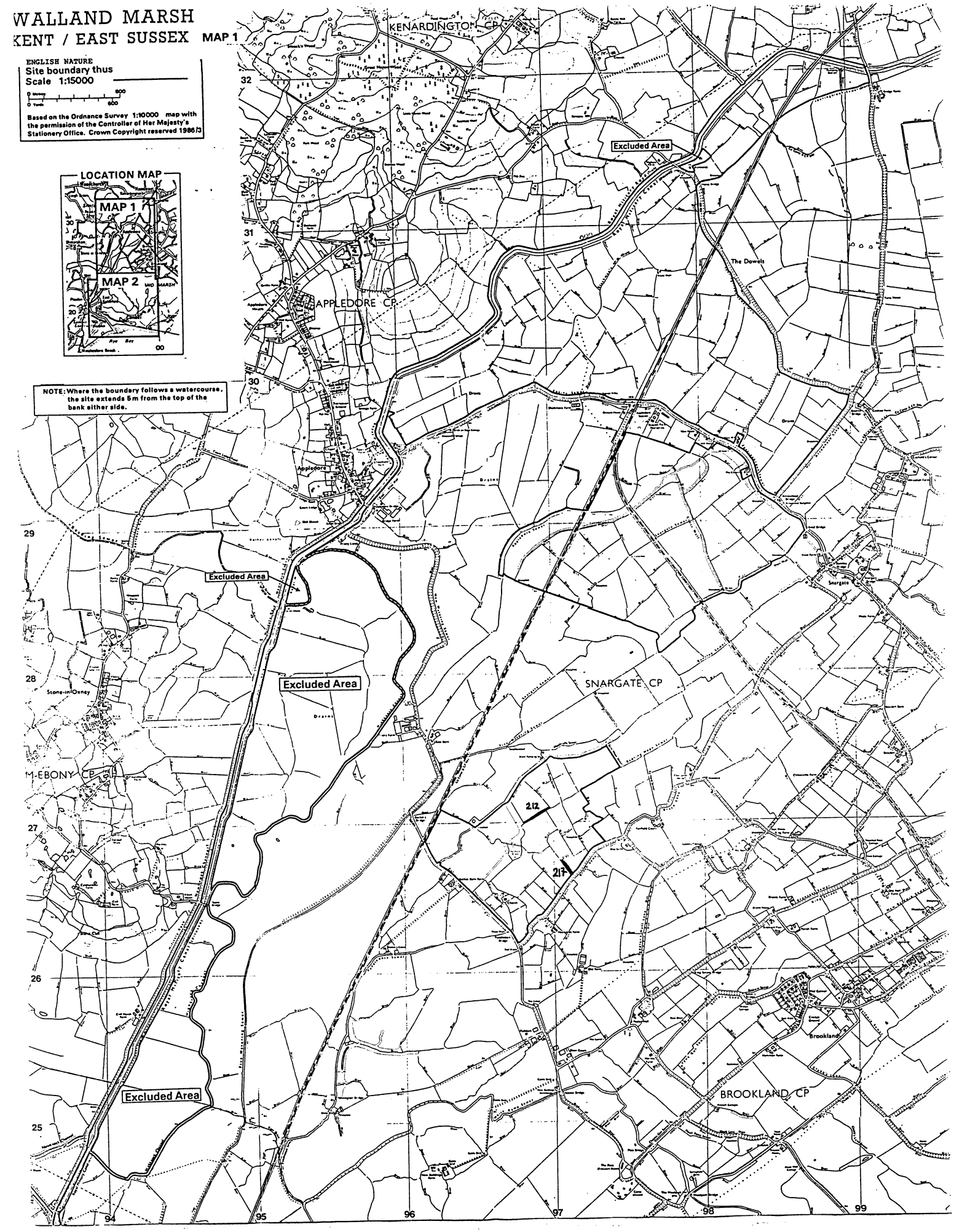
18. *Potamogeton trichoides* 15 records



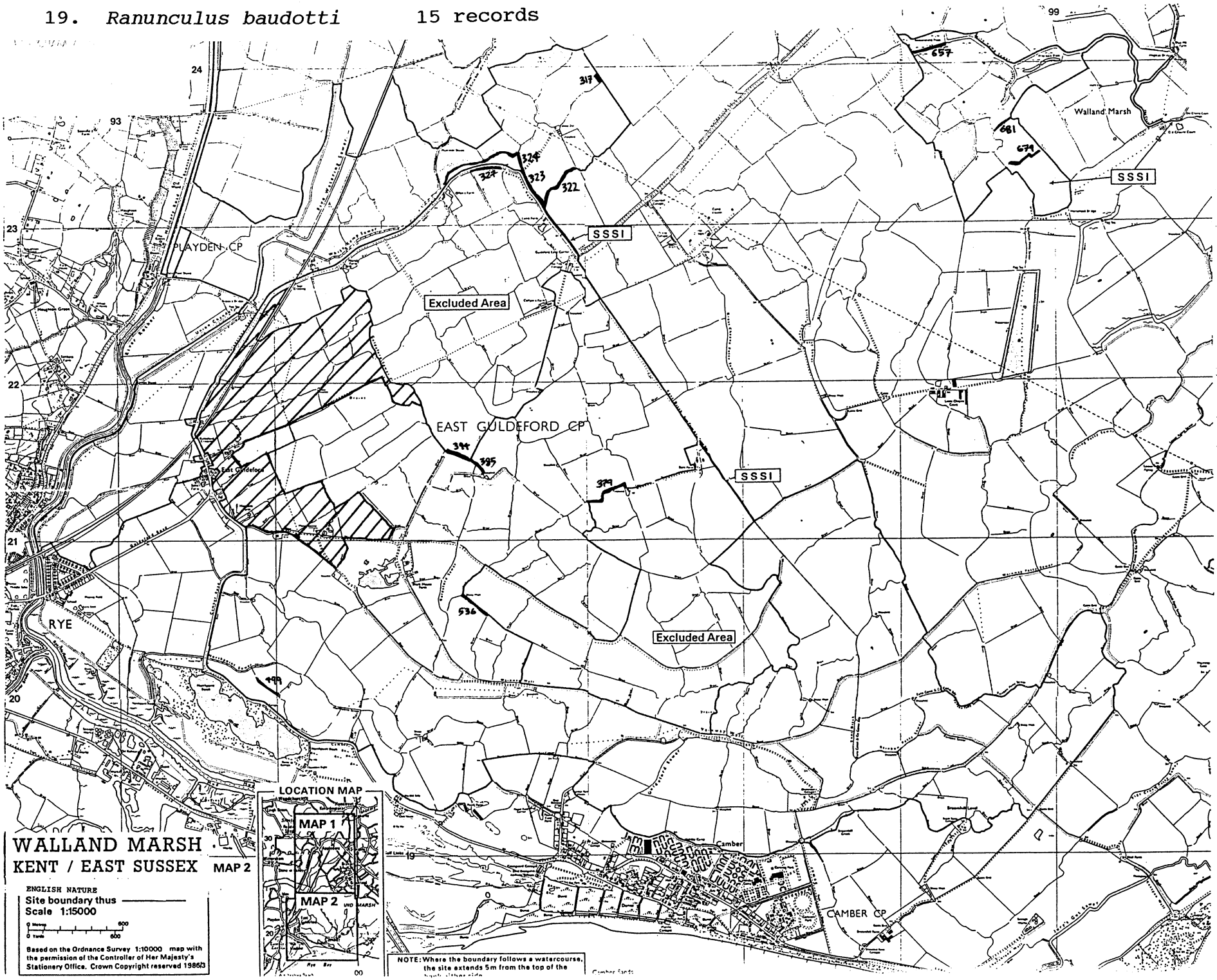
18. *Potamogeton trichoides* 15 records



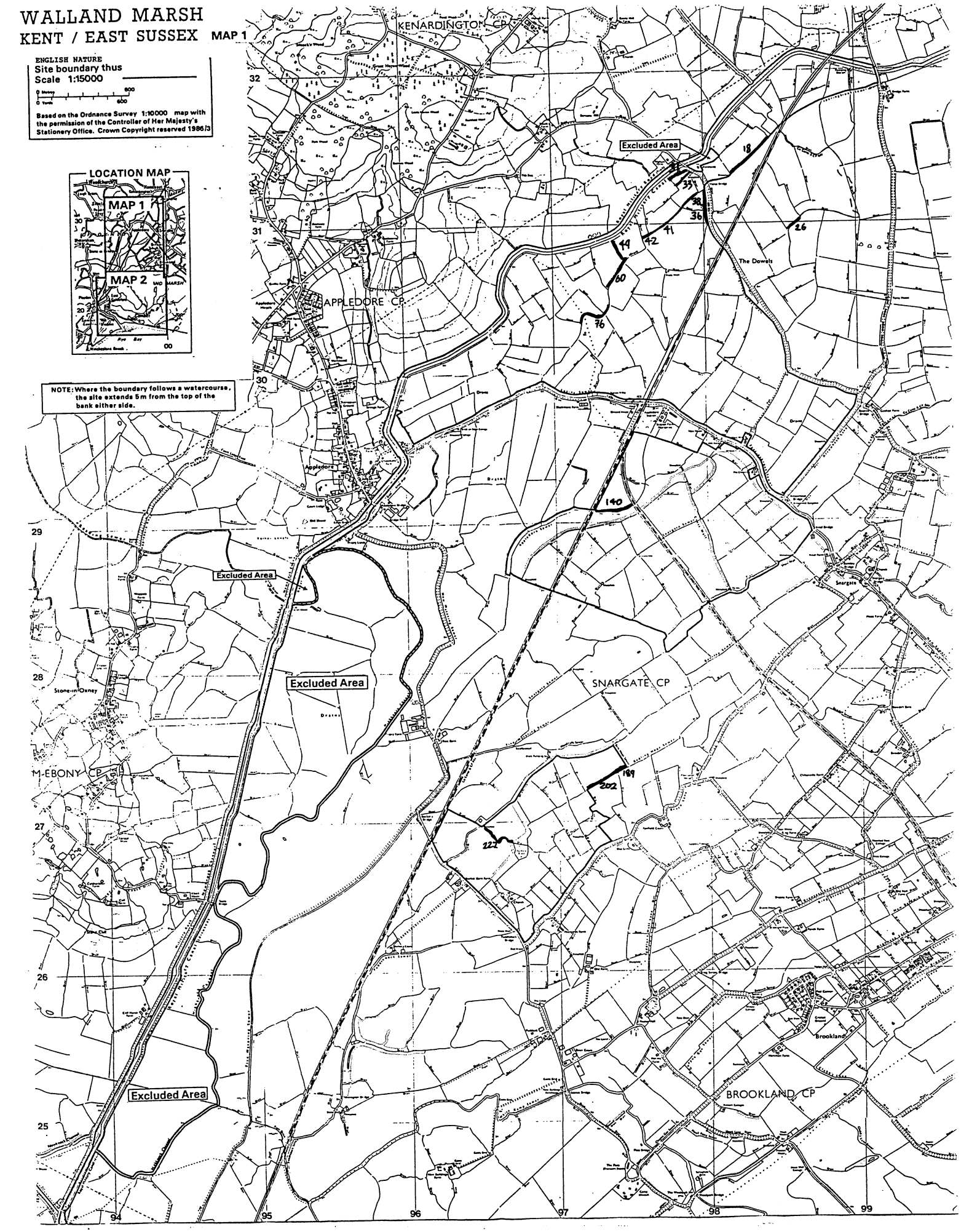
19. *Ranunculus baudotti* 15 records



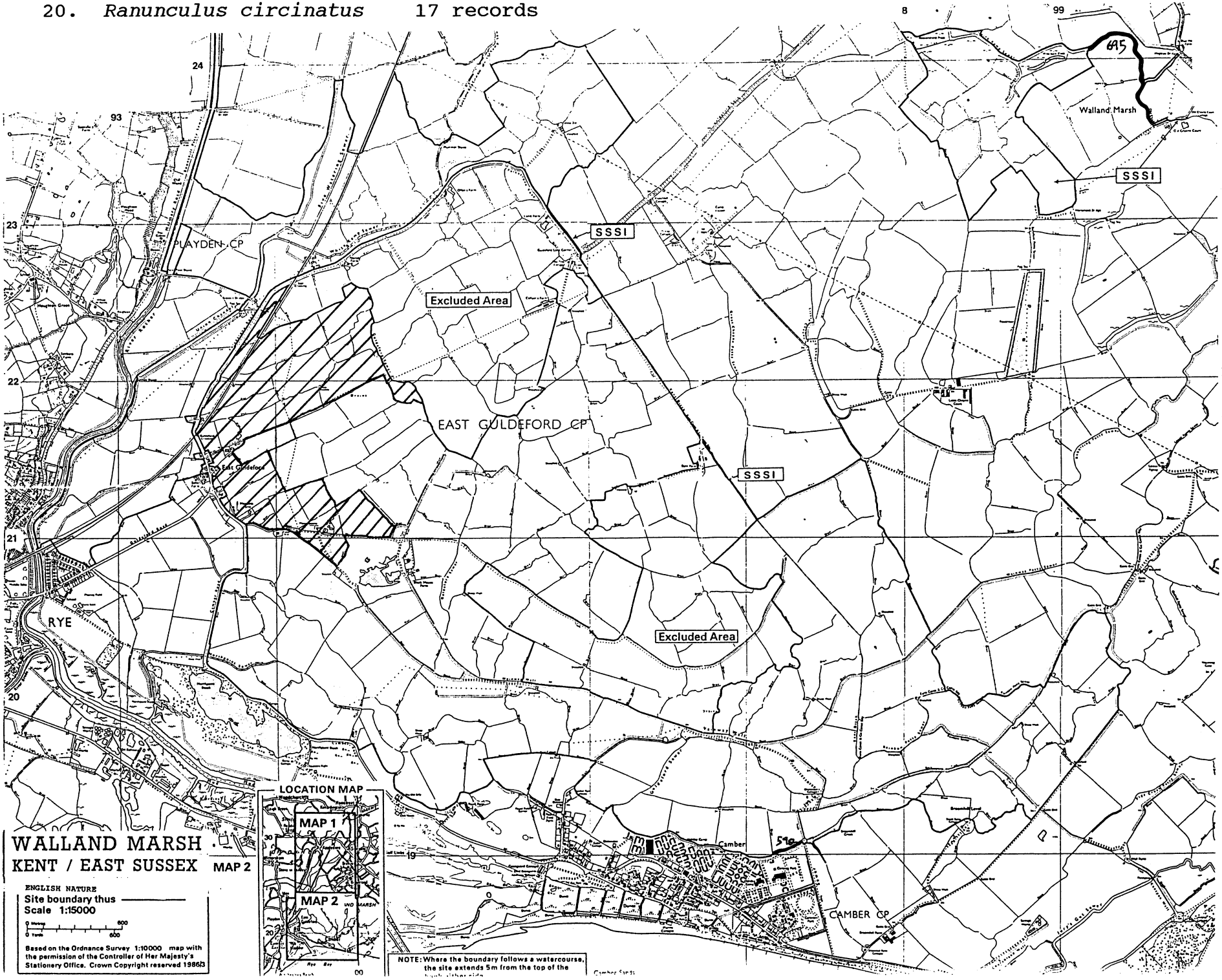
19. *Ranunculus baudotti* 15 records



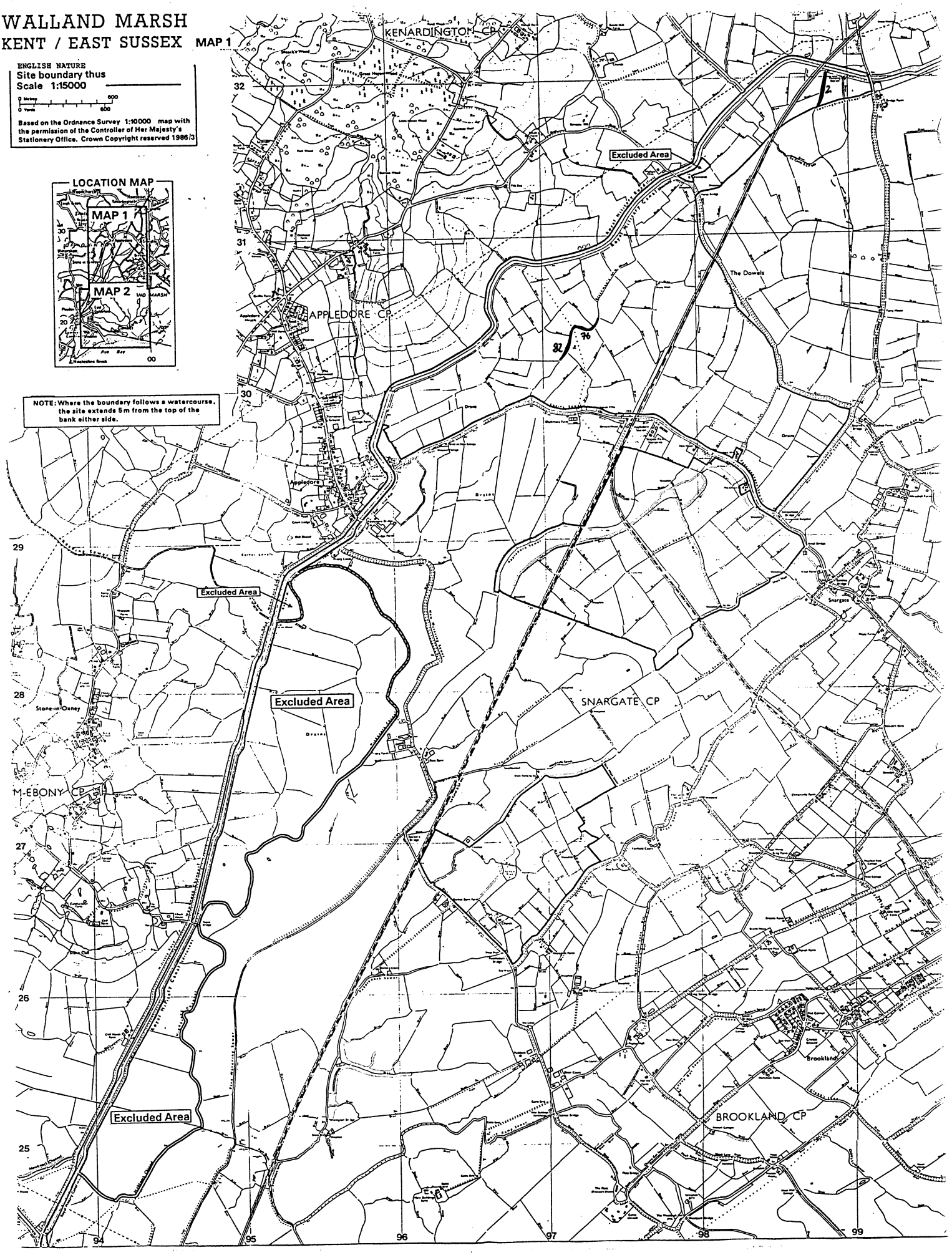
20. *Ranunculus circinatus* 17 records



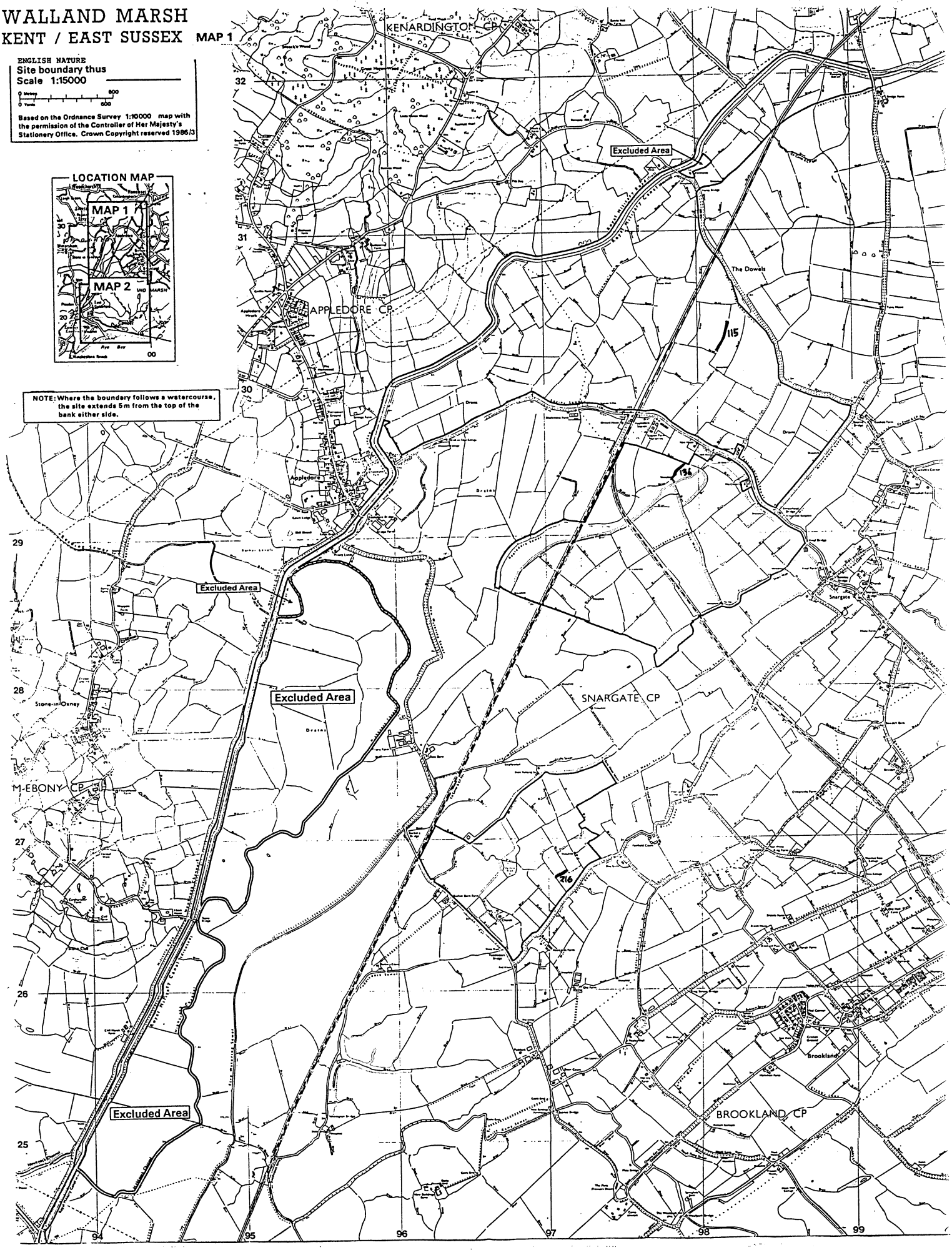
20. *Ranunculus circinatus* 17 records



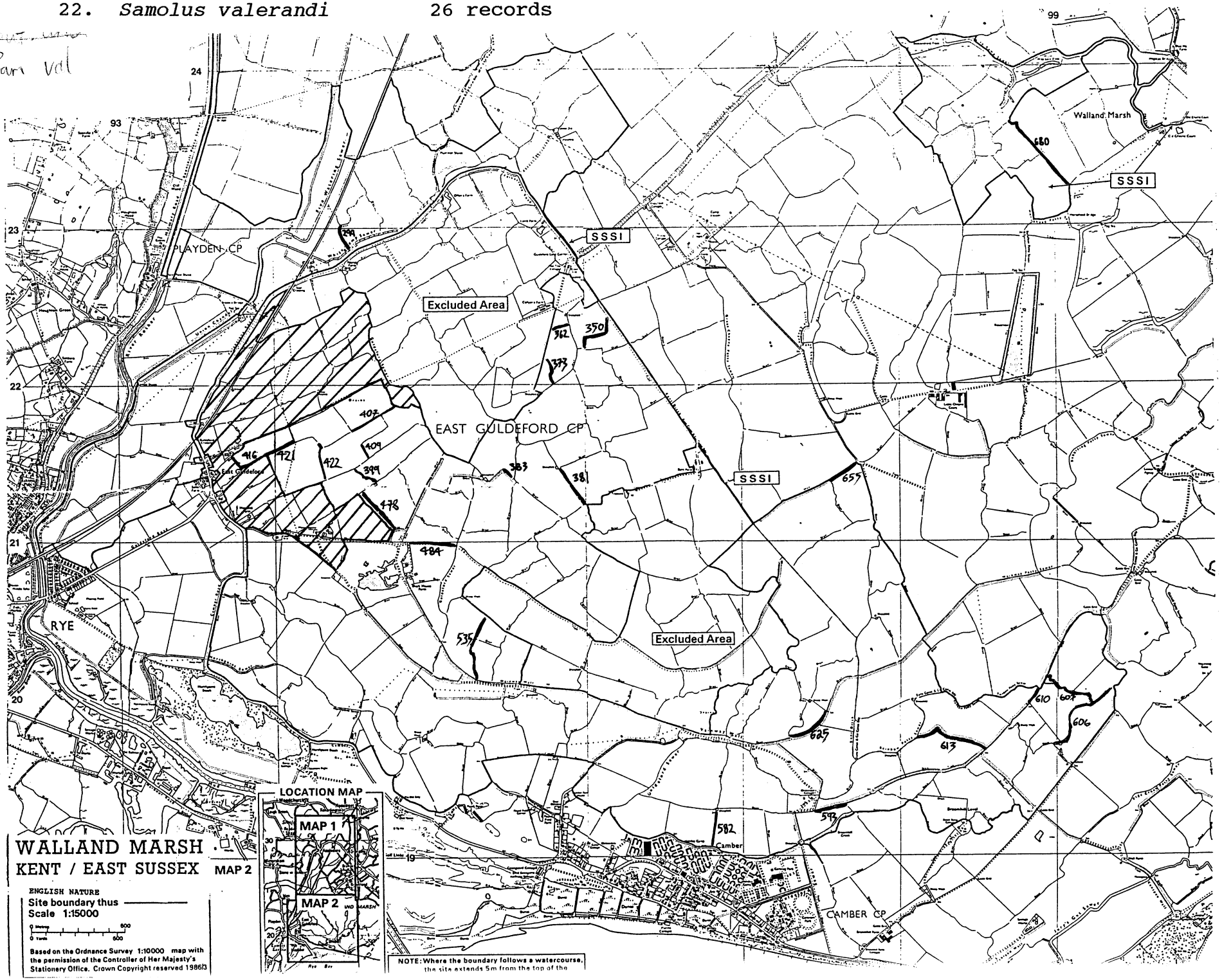
21. *Sagittaria sagittifolia* 3 records



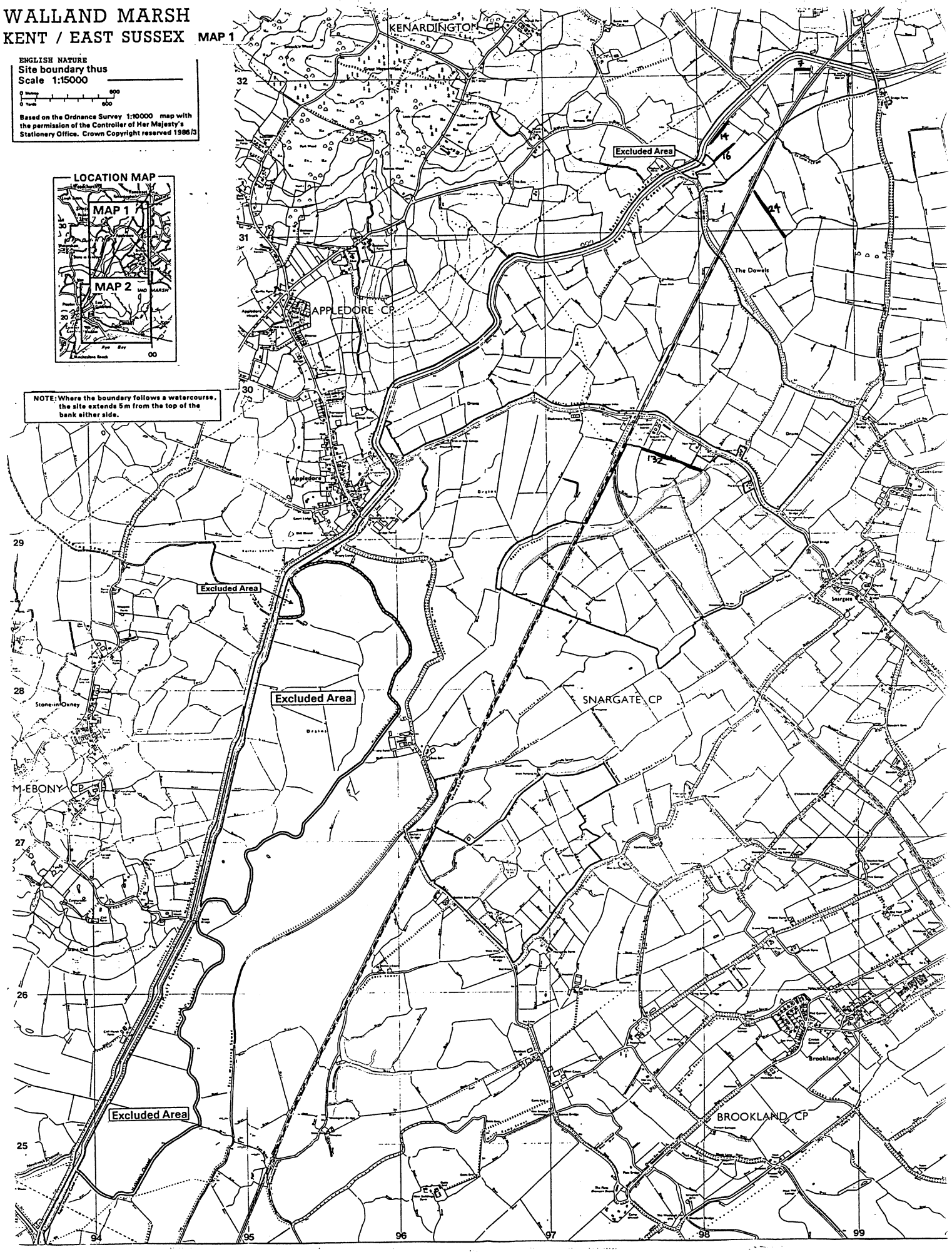
22. *Samolus valerandi* 26 records



22. *Samolus valerandi* 26 records

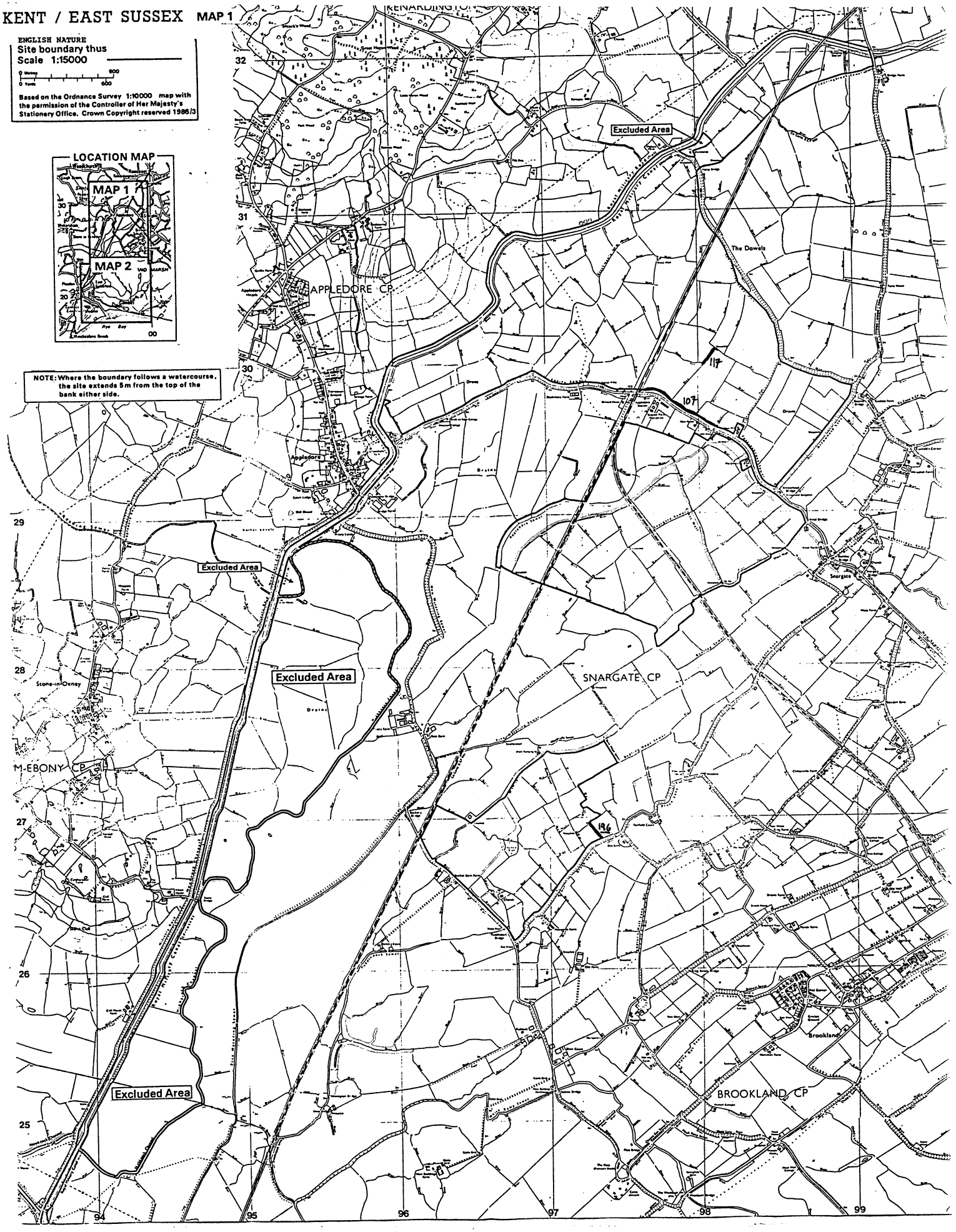


23. *Sium latifolium* 5 records



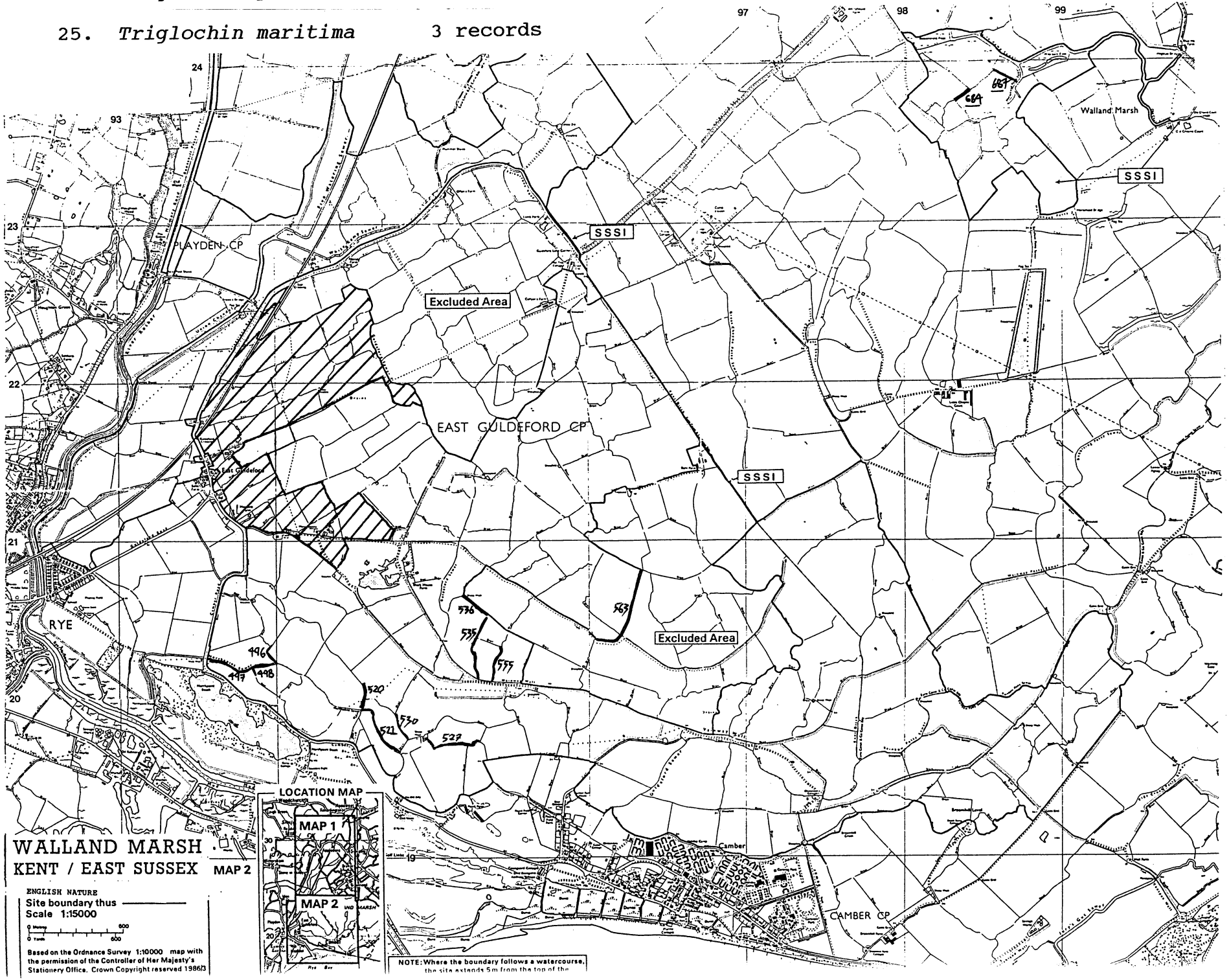
24. *Triglochin palustris* 13 records

25. *Triglochin maritima* 3 records

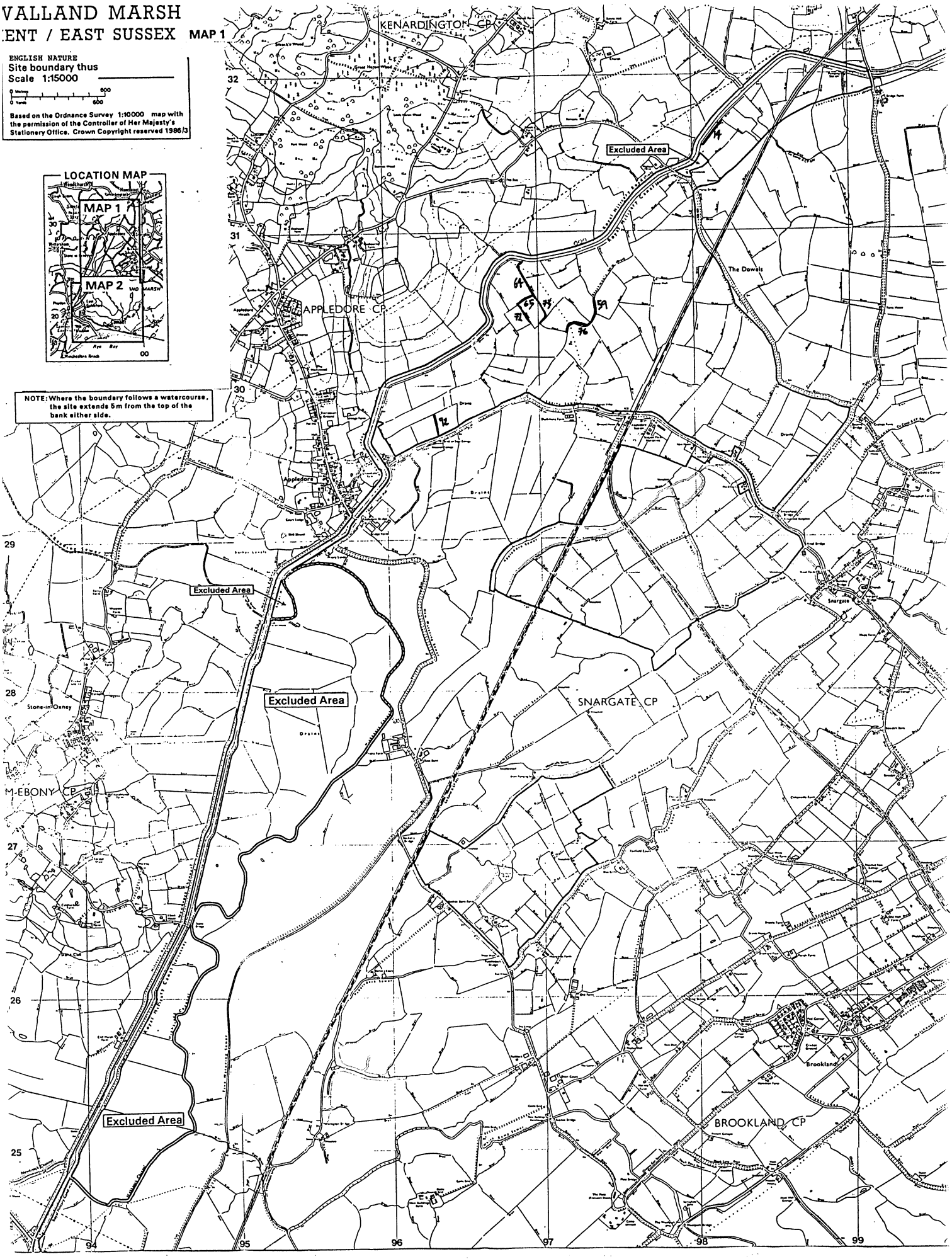


24. *Triglochin palustris* 13 records

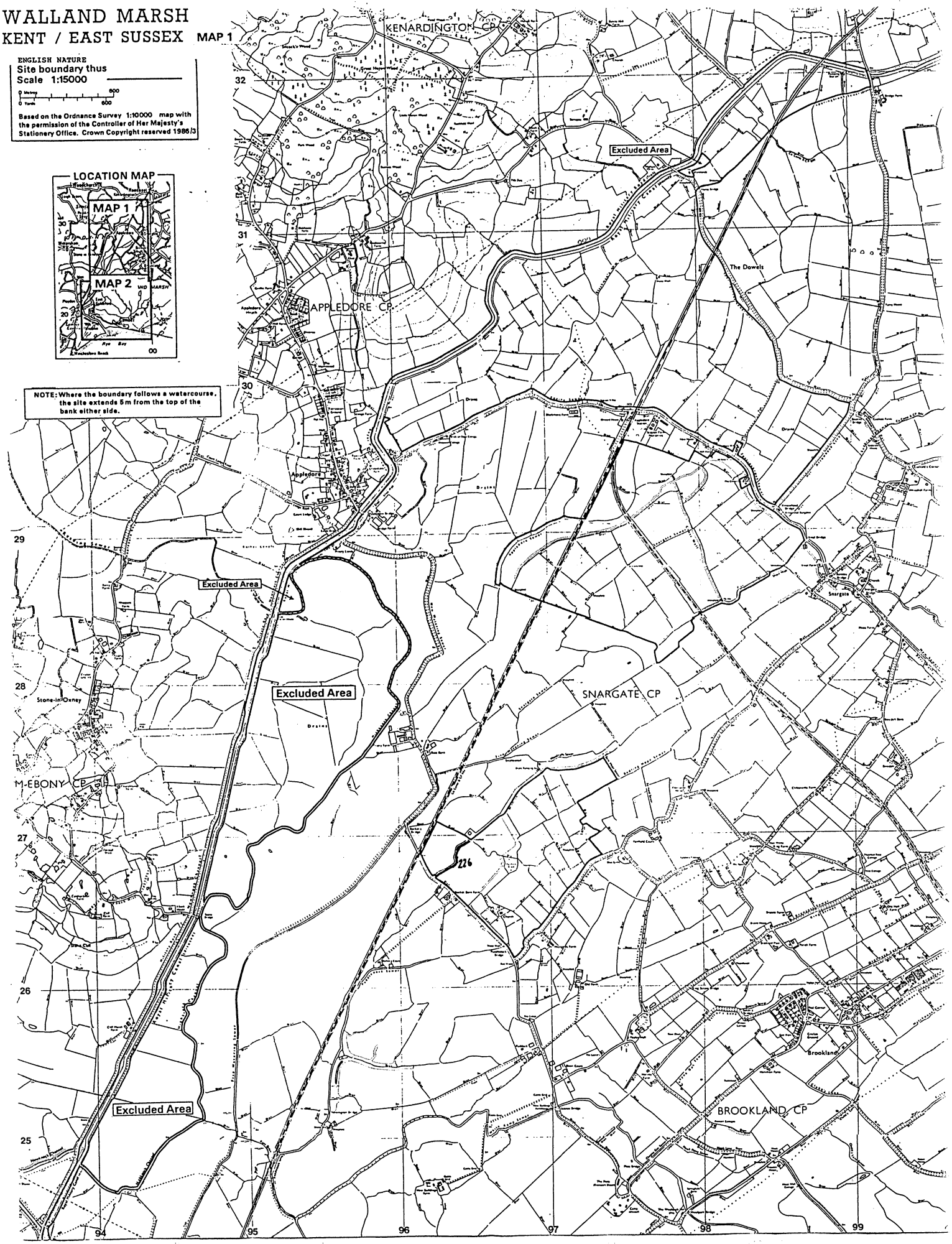
25. *Triglochin maritima* 3 records



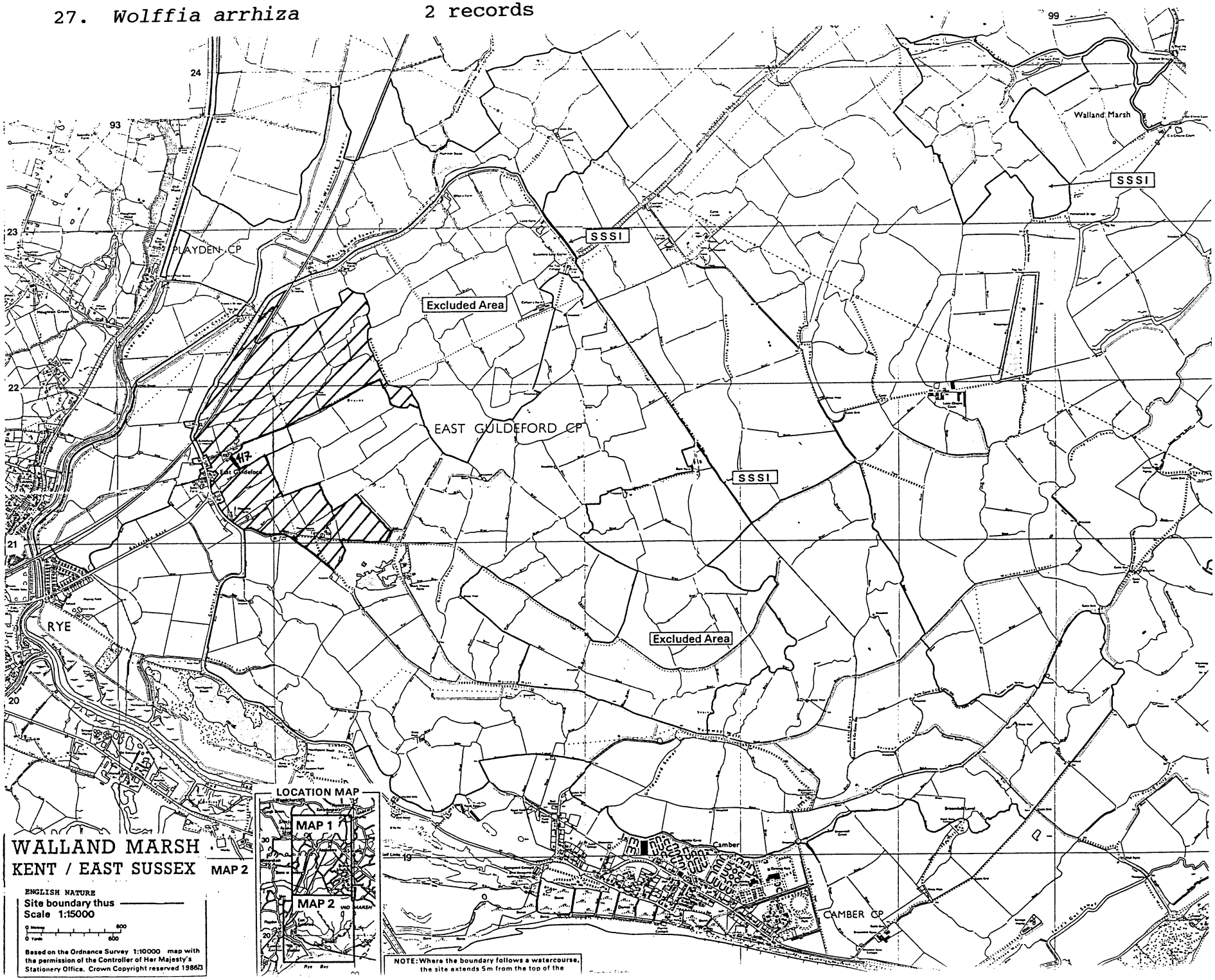
26. *Utricularia sp* 8 records



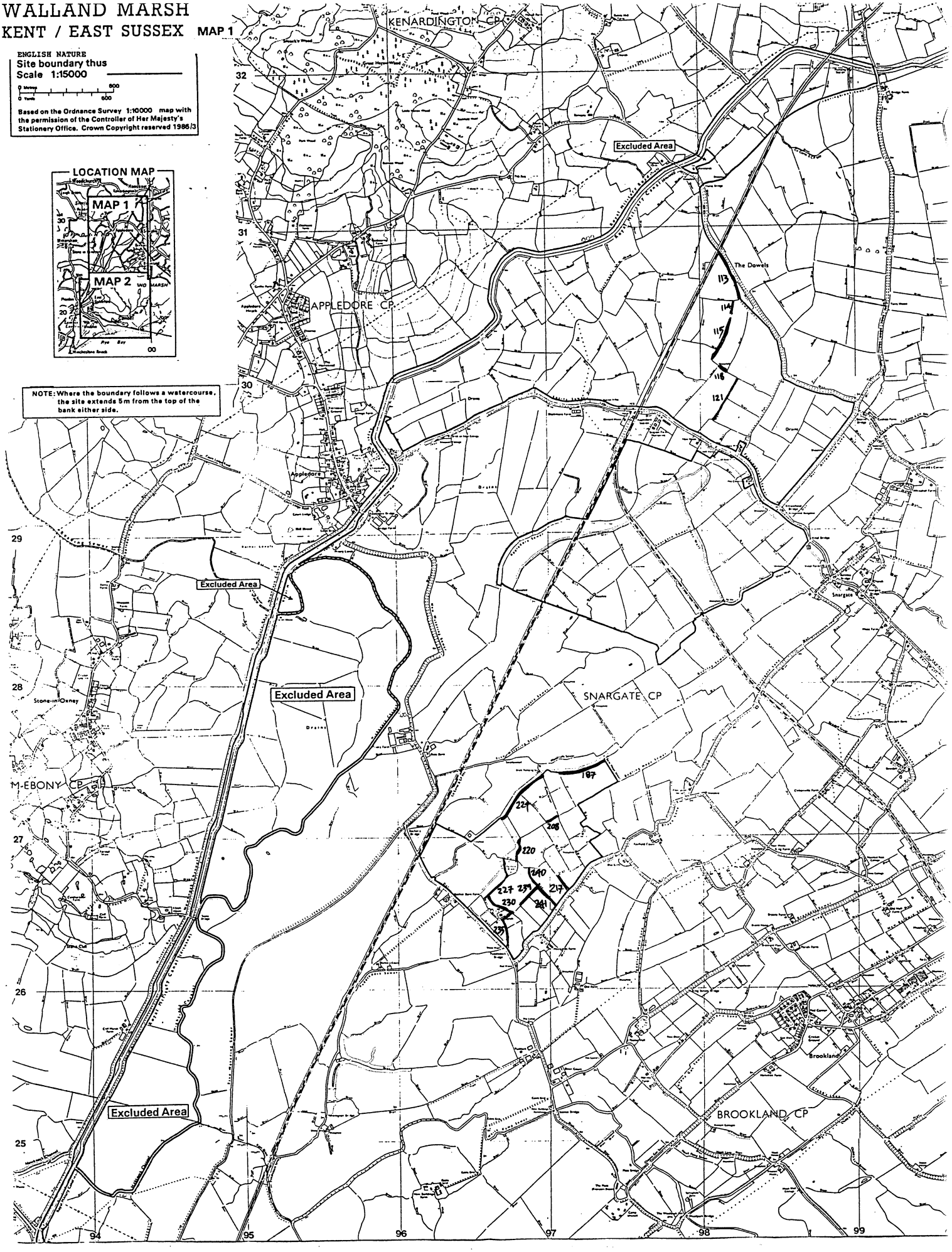
27. *Wolffia arrhiza* 2 records



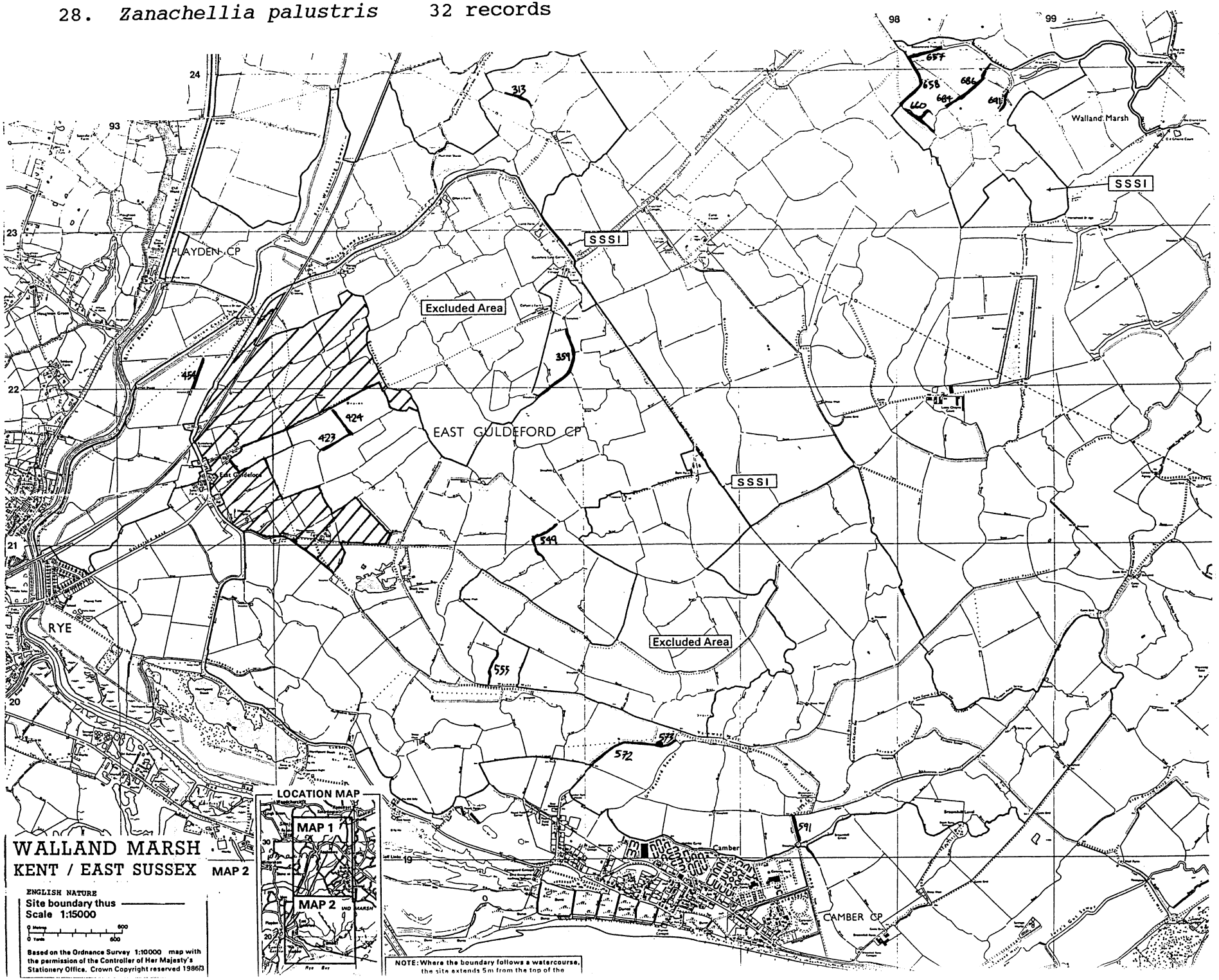
27. *Wolffia arrhiza* 2 records



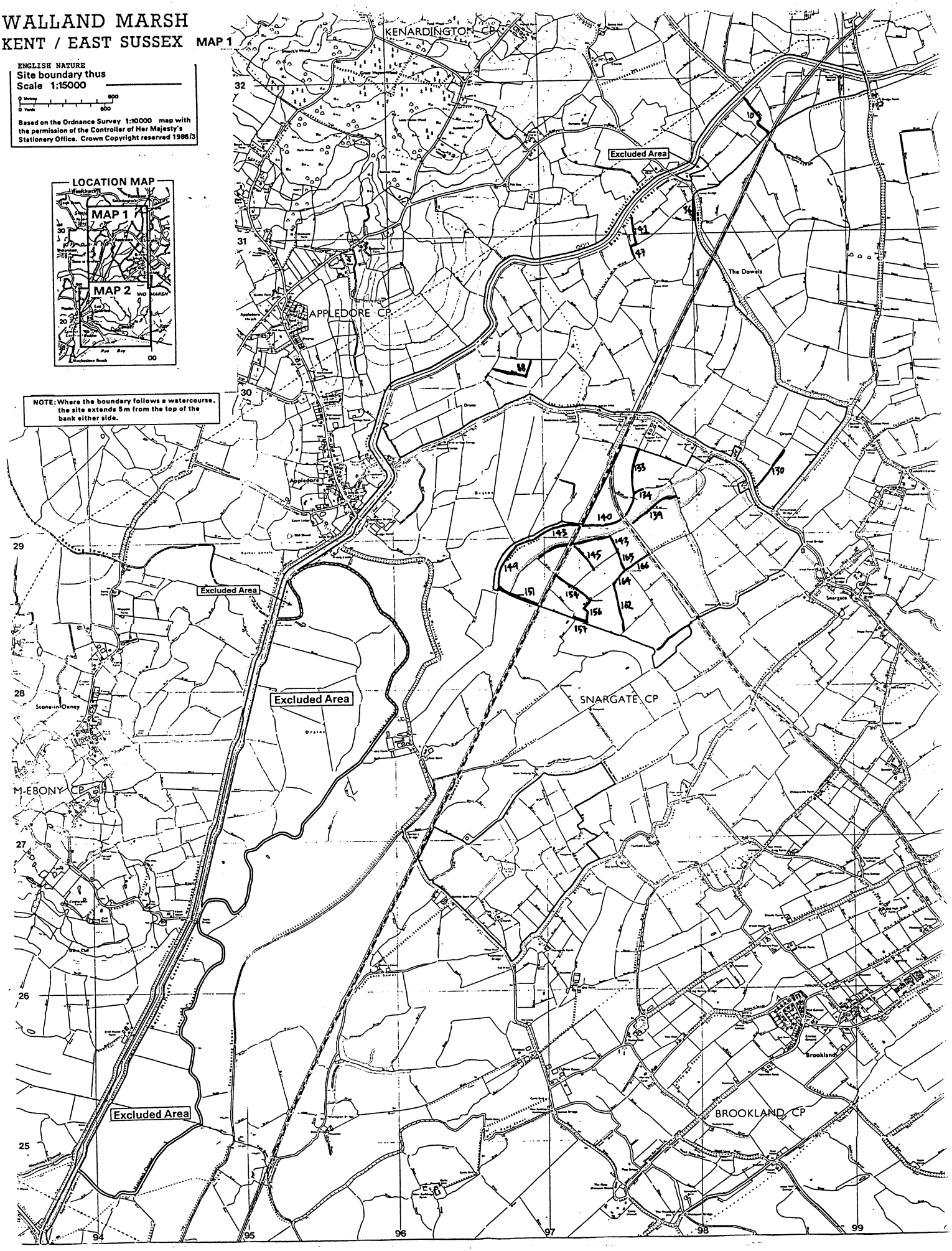
28. *Zanachellia palustris* 32 records



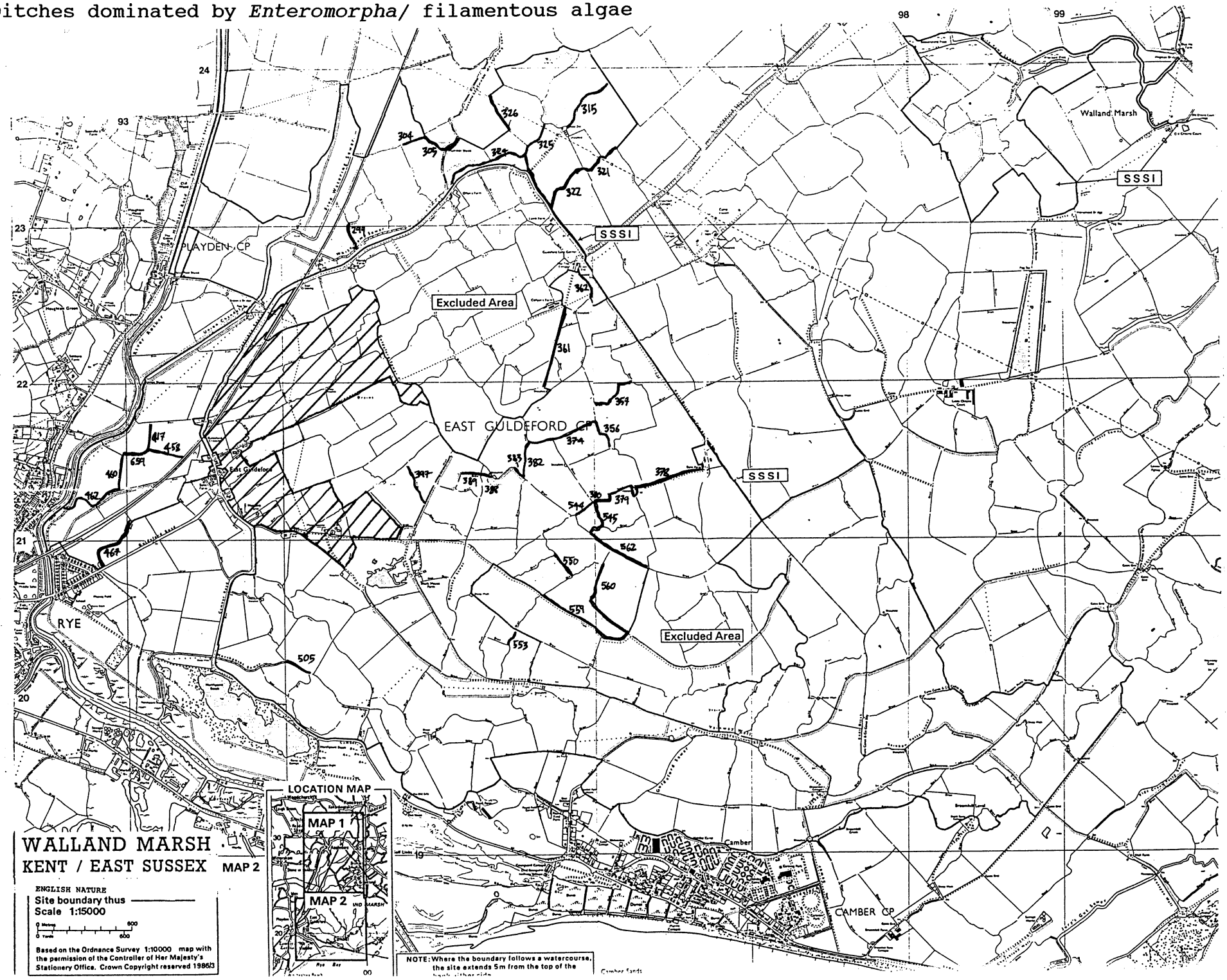
28. *Zanachellia palustris* 32 records



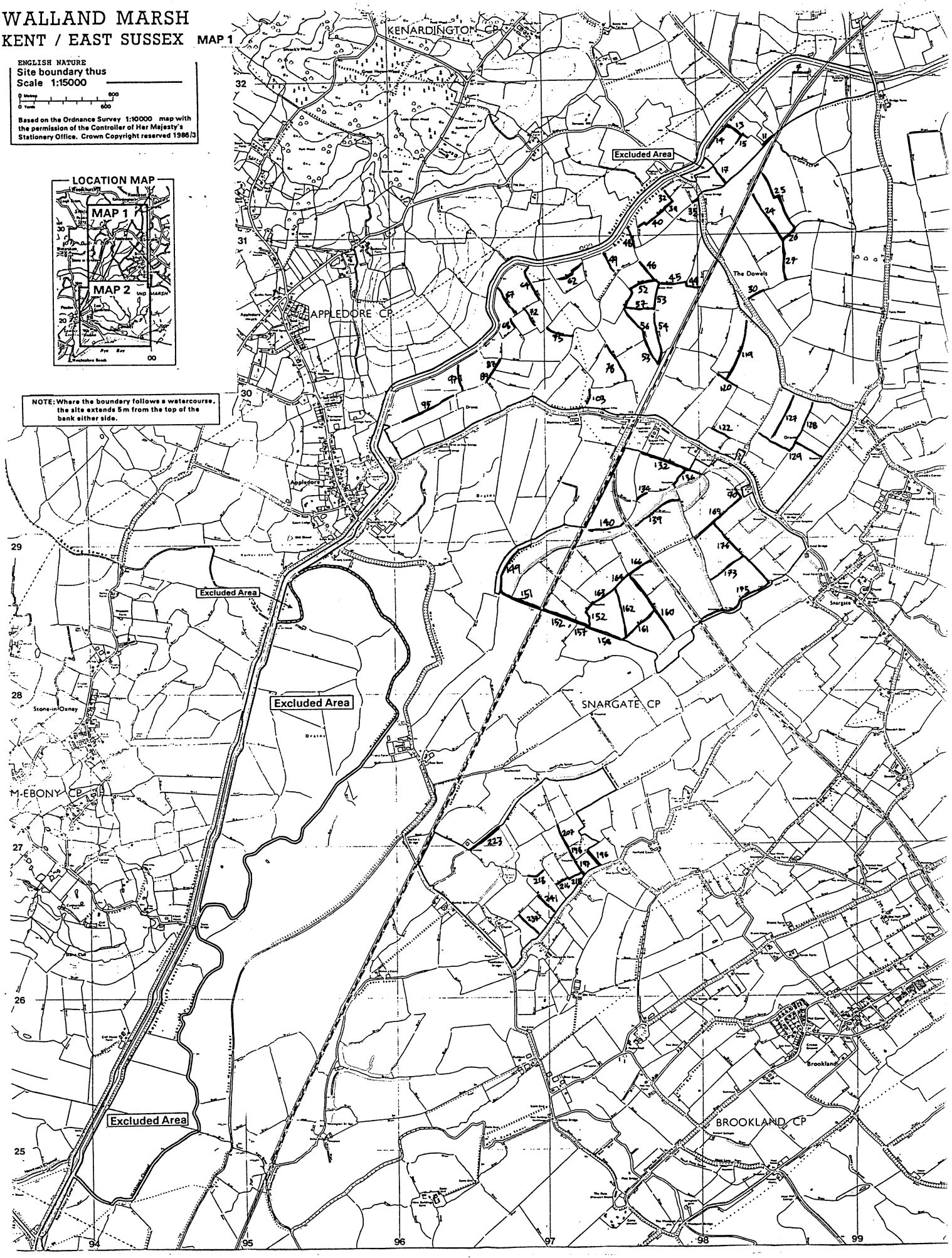
Ditches dominated by *Enteromorpha*/ filamentous algae



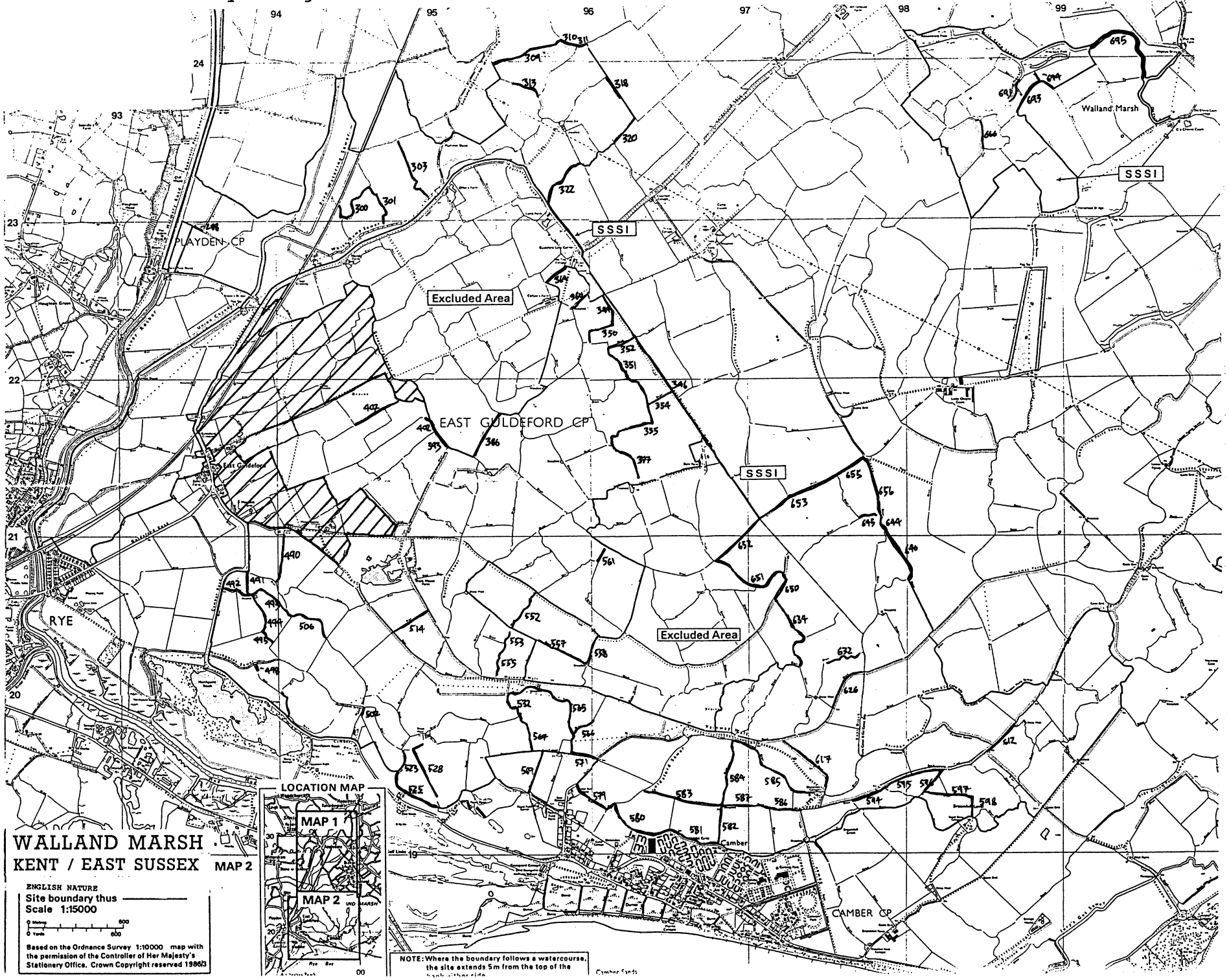
Ditches dominated by *Enteromorpha*/ filamentous algae



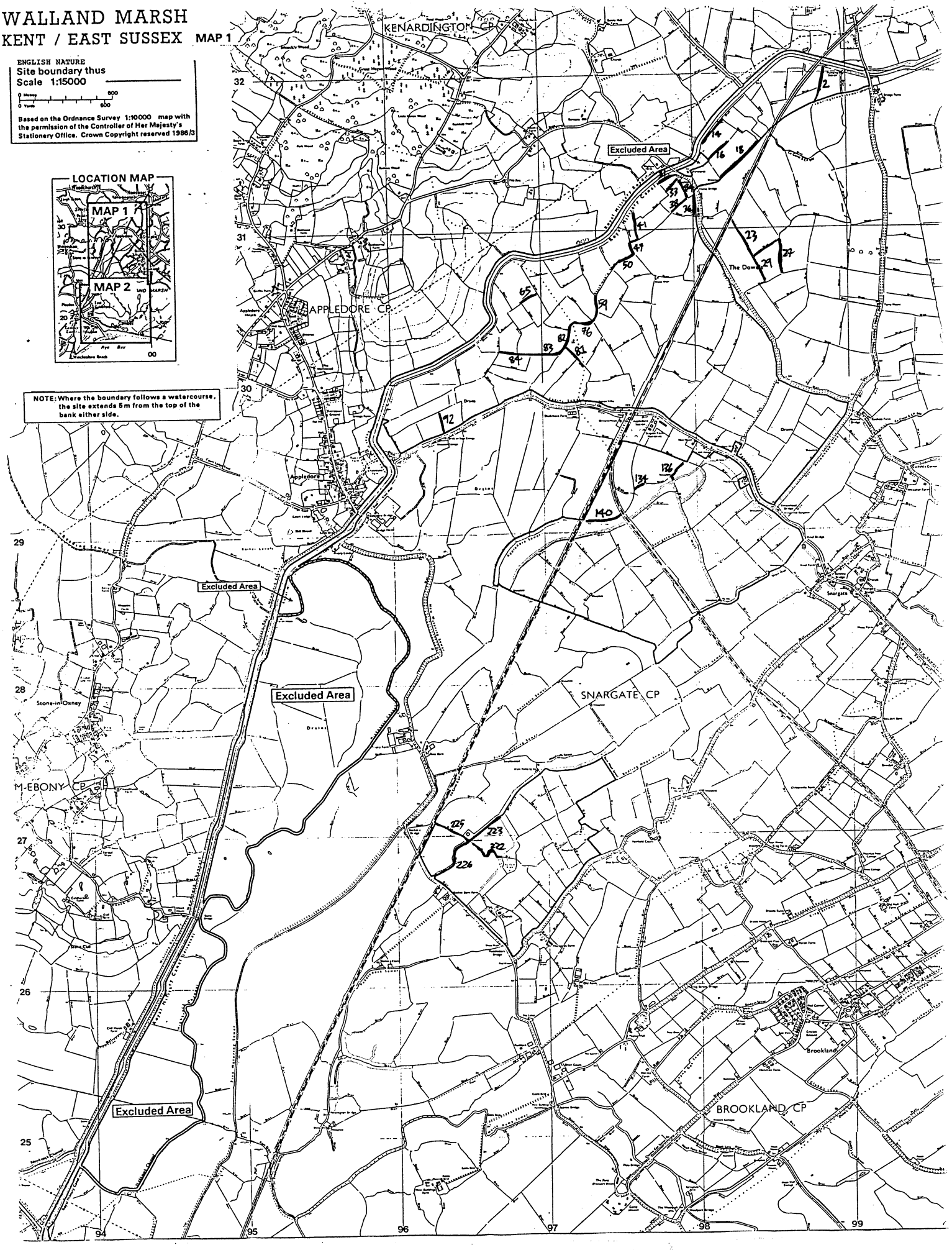
Ditches dominated by emergents



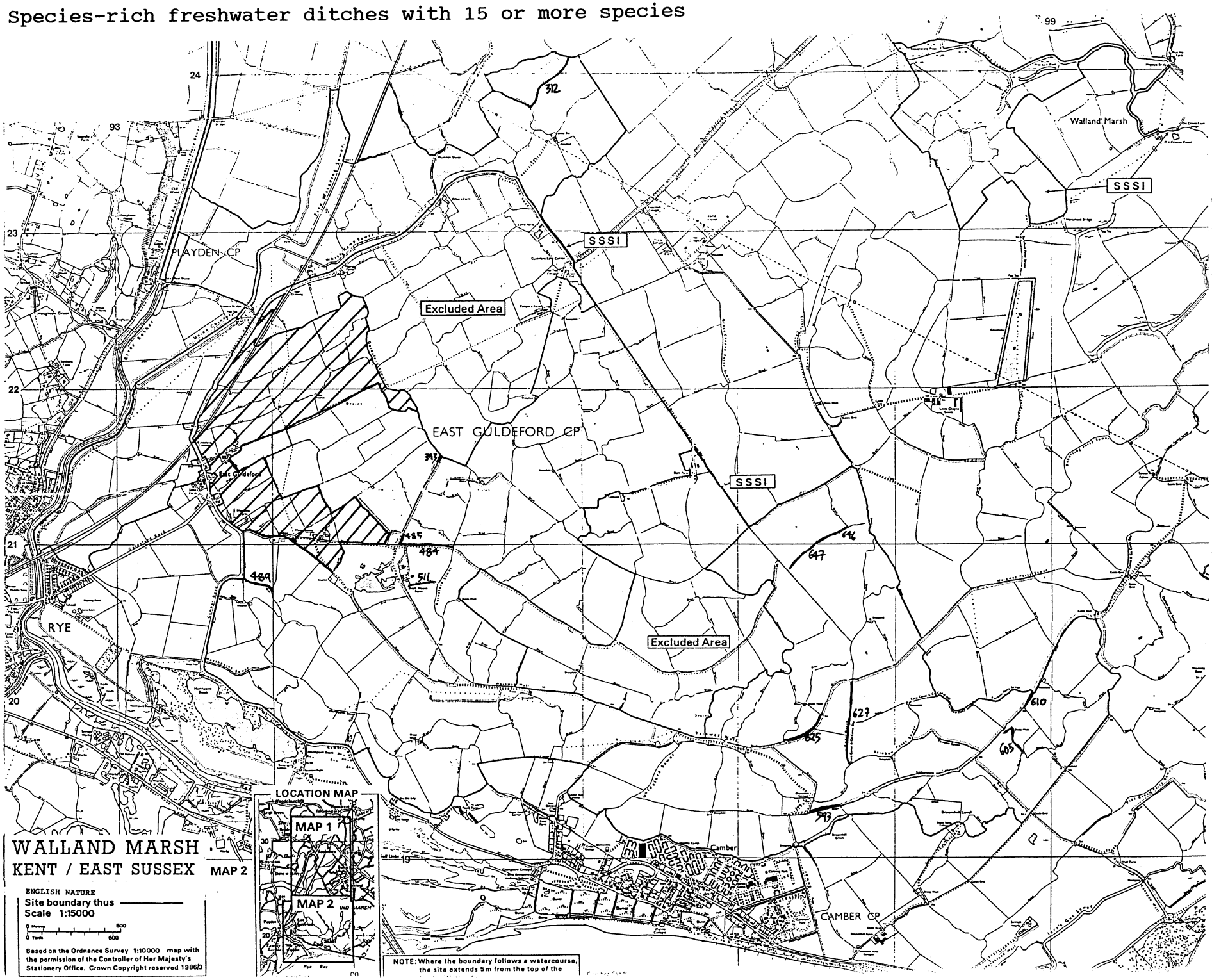
Ditches dominated by emergents



Species-rich freshwater ditches with 15 or more species



Species-rich freshwater ditches with 15 or more species



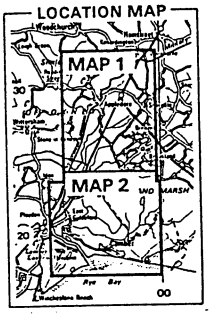
Freshwater ditches with between 10-14 species

WALLAND MARSH
KENT / EAST SUSSEX

MAP 1

ENGLISH NATURE
Site boundary thus
Scale 1:15000

LOCATION MAP



NOTE: Where the boundary follows a watercourse, the site extends 5m from the top of the bank either side.

KENARDINGTON CP

APPLEDORE CP

SNARGATE CP

BROOKLAND CP

M-EBONY CP

Excluded Area

Excluded Area

Excluded Area

Excluded Area

Appledore

Stone-in-Oxney

Snargate

Brookland

The Dowels

32

31

30

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97

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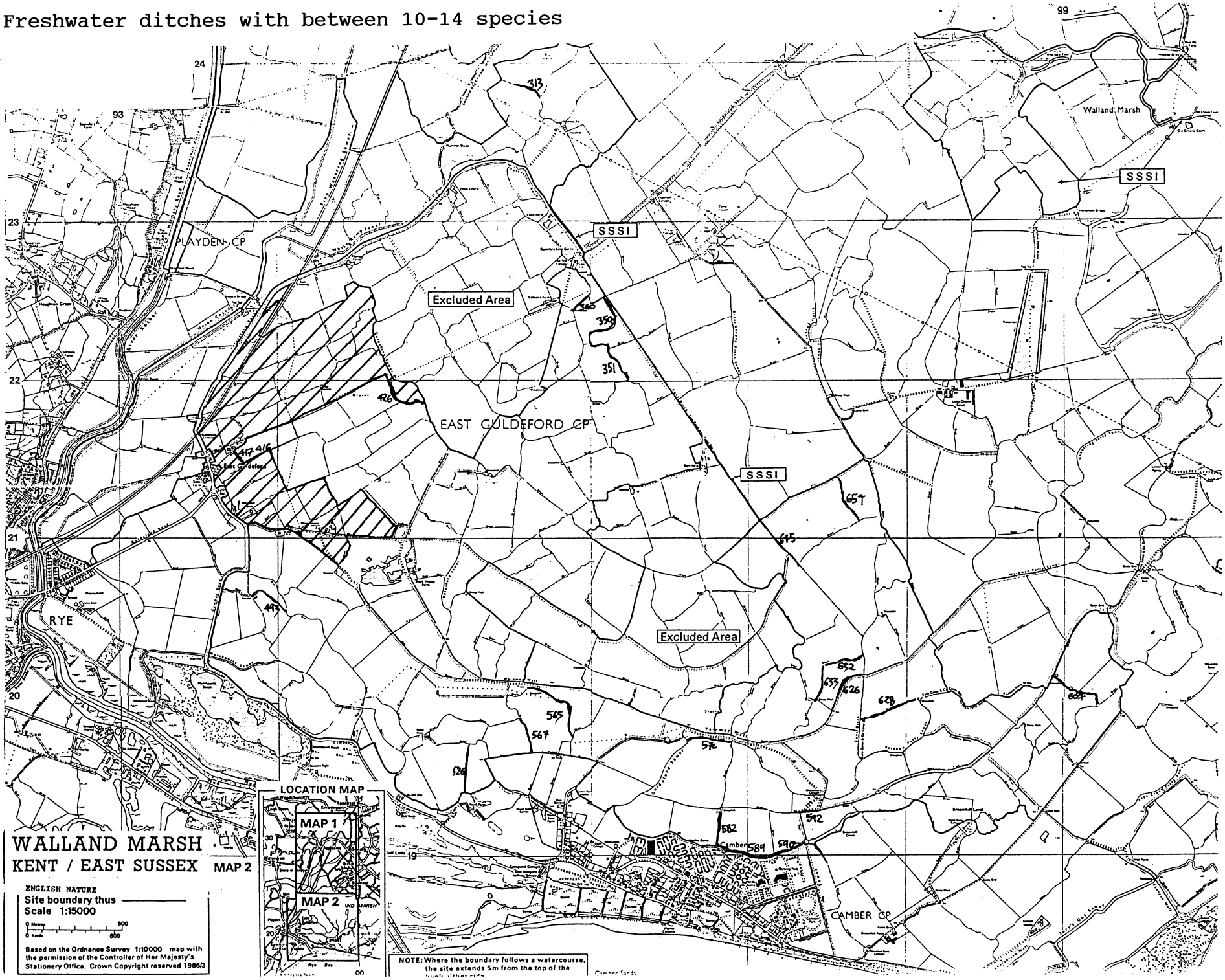
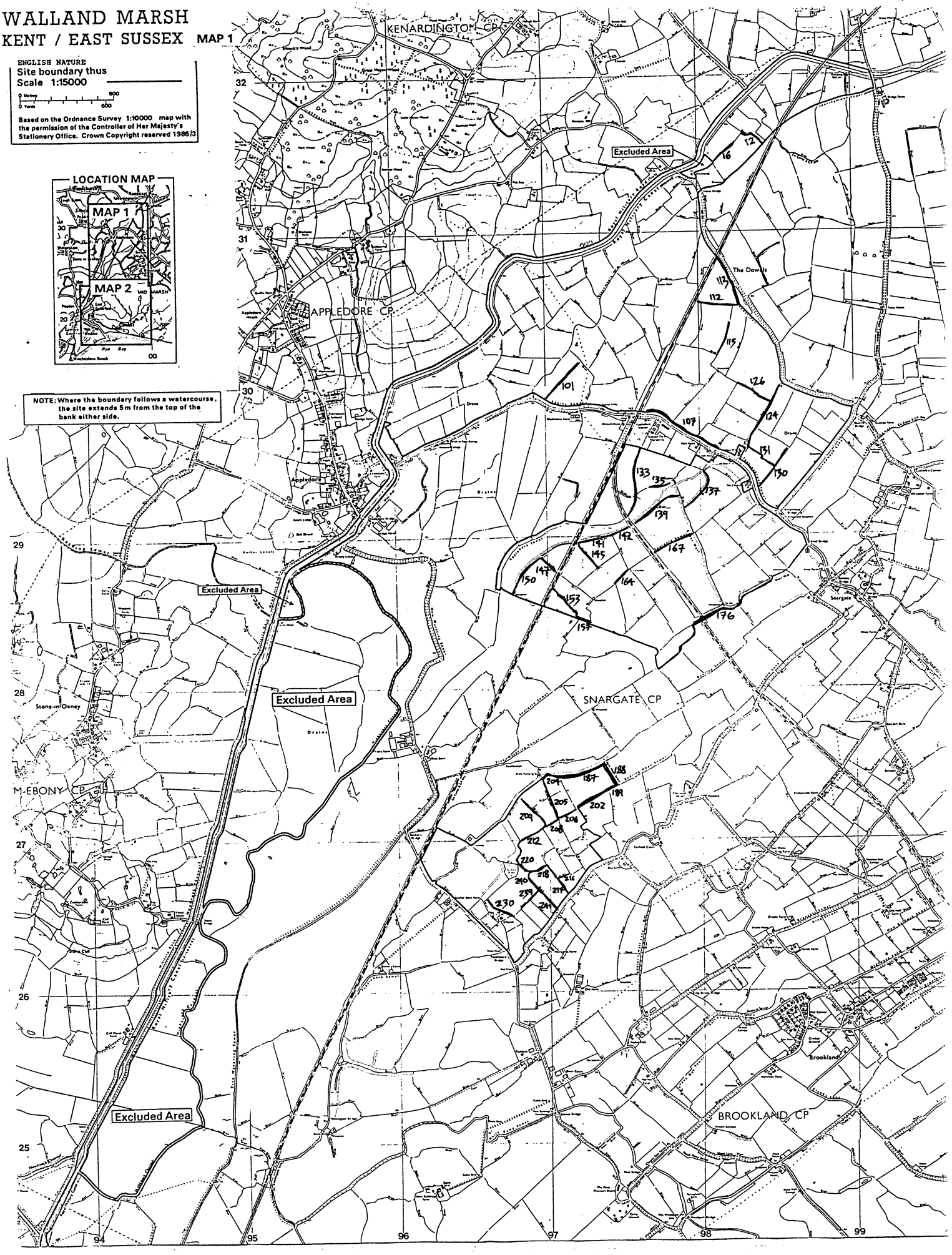
99

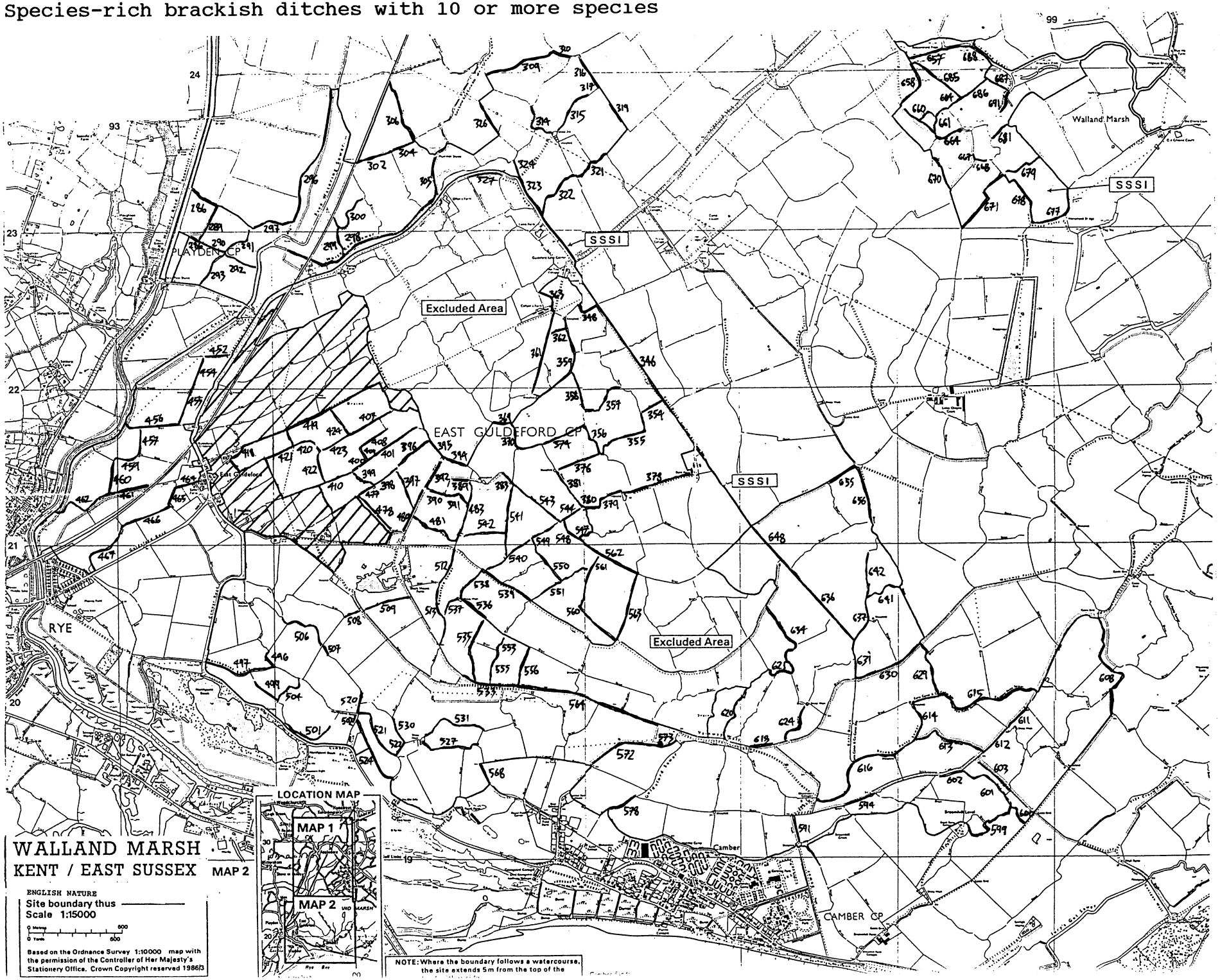
Freshwater ditches with between 10-14 species



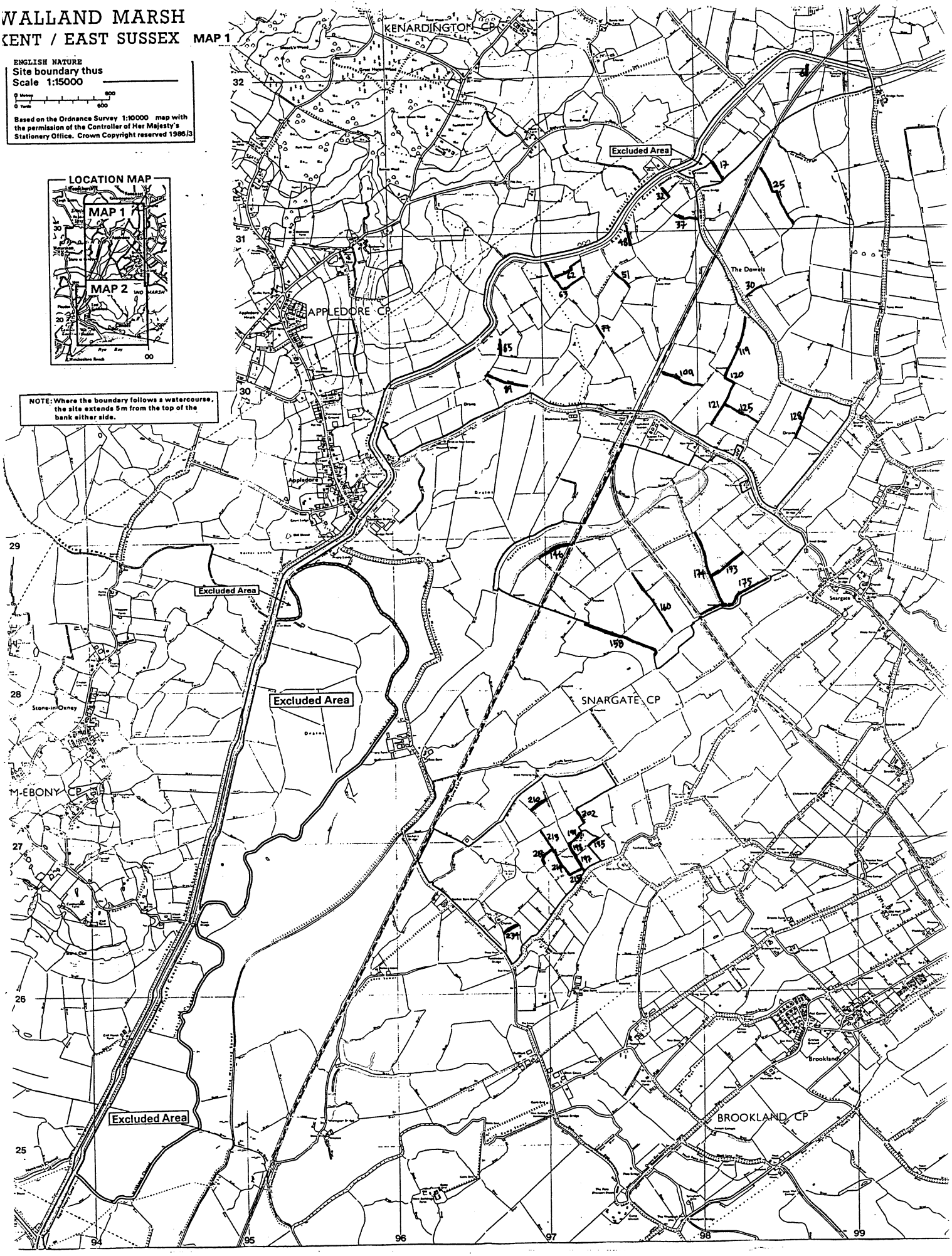
Species-rich brackish ditches with 10 or more species



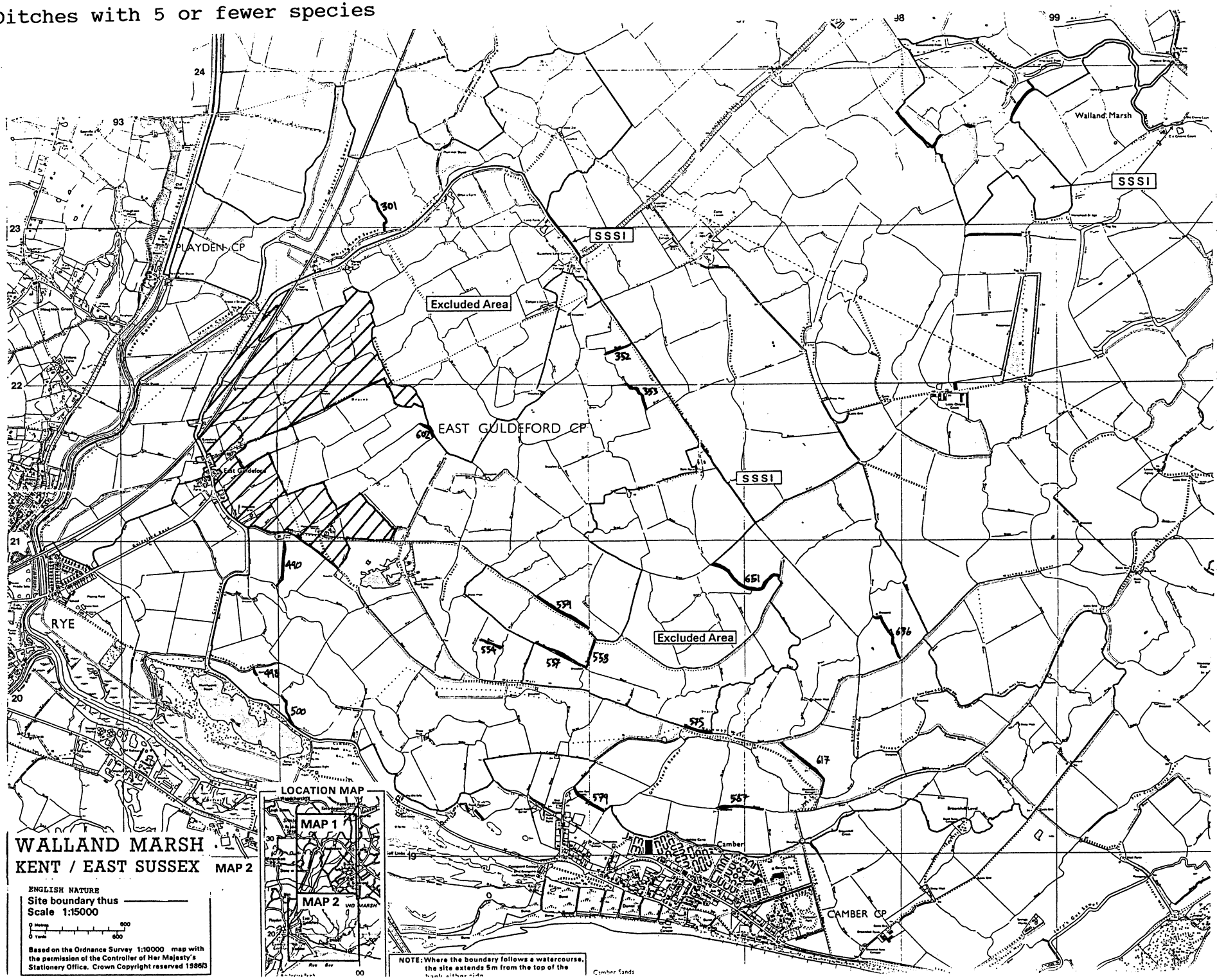
Species-rich brackish ditches with 10 or more species



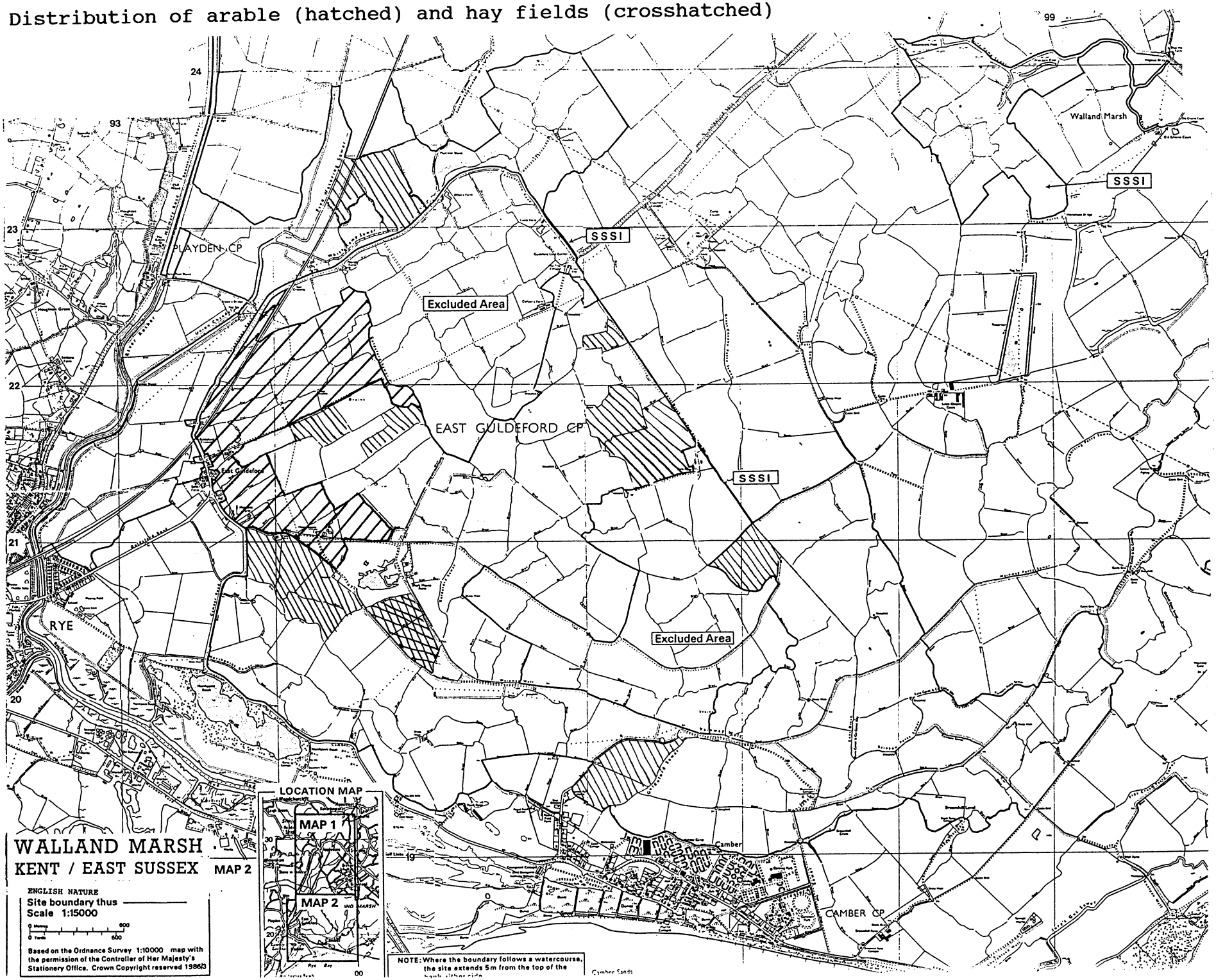
Ditches with 5 or fewer species



Ditches with 5 or fewer species



Distribution of arable (hatched) and hay fields (crosshatched)



Distribution of arable (hatched) and hay fields (crosshatched)