

SITE NAME:	Swanpool
LOCATION:	Falmouth, Cornwall
GRID REFERENCE:	SW 802 315
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, LNR Reserve
AREA (ha):	4.0
MAX DEPTH (m):	3 (mean = 1.6)
SALINITY (‰):	7.5
ADJACENT HABITATS:	Semi-natural habitats - swamp and reed-beds which merge into wet Willow woodland or Salix carr.
SURVEY DATE:	1984 (1996 - P. Gainey for trembling sea mat)
SURVEYOR:	C Little
MANAGEMENT:	LNR plan produced in 1994

## Lagoon Description

Swanpool is a lagoon behind a sand and shingle bar on the open coast fed by a small freshwater stream and seepages of the Swanvale catchment to the north (see Map 18, which is taken from Gowenlock 1994). Its existence was first recorded in 1540 and was probably formed at the end of the last Ice Age. In 1826 an outlet culvert to the sea was dug, lowering the level of the pool allowing seawater to enter at high tide. In 1983 this culvert was replaced and an additional freshwater source, the runoff from a large housing estate, was diverted into the pool. Swanpool is almost unique in Cornwall because of the presence of an outlet culvert allowing seawater to enter on a regular basis. Swanpool is, therefore, held artificially at a brackish-water stage.

Swanpool support characteristic brackish lagoon species including *Gammarus chevreuxi*<sup>f</sup>, *Palaemonetes varians* and *Neomysis vulgaris*. However, its primary importance is that it is the only UK site where the Trembling sea mat *Victorella pavida*<sup>\*\*a,c,e,f</sup> is found. Its continued existence has been confirmed by a short survey in 1994 (B. Tonkin pers comm.) and a further mapping survey in 1996 (P. Gainey pers comm.), growing mainly on submerged stones within the lagoon and the outlet culvert.

The open unvegetated water of the brackish lagoon is fringed by Common reed *Phragmites australis* and reed-beds, the occurrence of Sea-club rush *Scripus maritimus* is indicative of the brackish conditions. Since the ecological studies of the 1970's/80's the hydrology of the lagoon has altered, eg additional surface water runoff enters the the pool from the housing estate to the west (Golden Bank). There have also been increasing algal blooms over recent years. The pool exhibits a well developed halocline which persists throughout the year and is maintained by the incursion of sea water on high spring tides. The degree of salinity varies across the pool, creating a range of ecological conditions.

Swanpool is leased by Mr Nichols from Carrick District Council and was used in the past for boating. The pool is still used by the Falmouth Model Boat Club.

## Species present

*Scripus maritimus*  
*Phragmites australis*  
*Ruppia cirrhosa*<sup>f</sup>  
*Victorella pavida*<sup>\*\*a,c,e,f</sup>


*Gammarus chevreuxi*  
*Palaemonetes varians*  
*Neomysis vulgaris*

## References

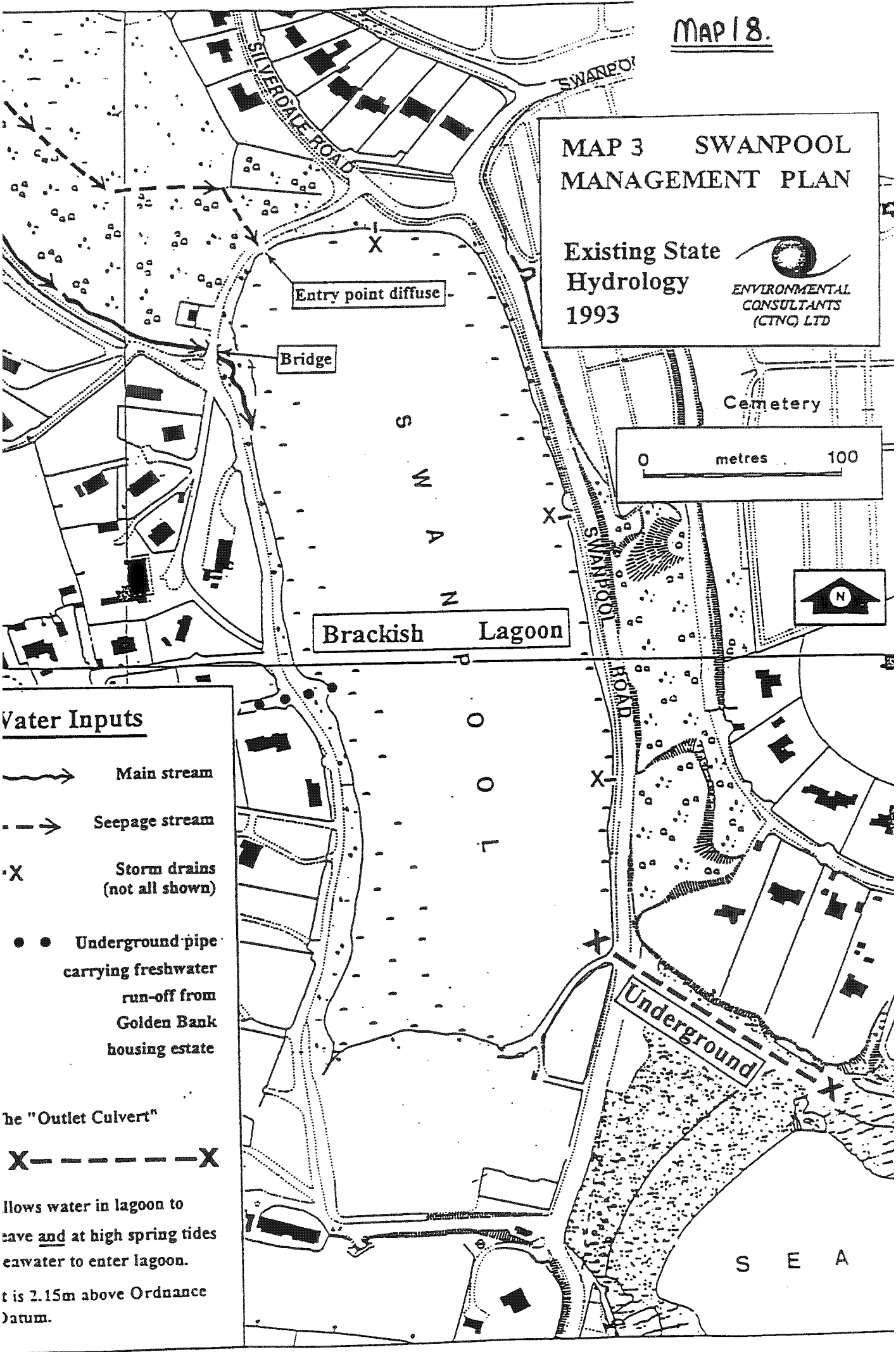
- BARNES, R.S.K., DOREY, A.E. & LITTLE, C., 1971. An ecological study of a pool subject to varying salinity (Swanpool, Falmouth): an introductory account of the topography, fauna and flora. *Journal of Animal Ecology* 40: 709-734.
- CRAWFORD, R.M., DOREY, A.E., LITTLE, C. & BARNES, R.S.K., 1979. Ecology of Swanpool, Falmouth 135-160.
- DAVIDSON, N.C., D. d'A. LAFFOLEY, DOODY, J.P., WAY, L.S., GORDON, J., KEY, R., PIENKOWSKI, M.W., MITCHELL, R. & DUFF, K.L., 1991. *Nature conservation and estuaries in Great Britain*. Peterborough: Nature Conservancy Council.
- DOREY, A.E., LITTLE, C. & BARNES, R.S.K., 1973. An ecological study of the Swanpool, Falmouth II. Hydrology and its relation to animal distributions. *Estuarine and Coastal Marine Science* 1: 153-176.
- ENGLISH NATURE, 1991. *Local Nature Reserves in England*. Peterborough: English Nature.
- GOWENLOCK, J. 1994. *Swanpool Management Plan*. A report to Carrick District Council & Swanpool F
- JOINT NATURE CONSERVATION COMMITTEE, 1991. *British Red Book 3 -Invertebrates other than Insects*. Peterborough: Joine Nature Conservation Committee.
- LITTLE, C., 1985. *Coastal saline lagoons in Cornwall*. (CSD Report No 601.) Peterborough: Nature Conservancy Council.
- LITTLE, C, BARNES, R.S.K. & DOREY, A.E., 1976. An ecological study of the Swanpool, Falmouth III. Origin and history. *Cornish Studies*.

**MAP 3 SWANPOOL MANAGEMENT PLAN**





Existing State Hydrology 1993



ENVIRONMENTAL CONSULTANTS (CIN) LTD



**Water Inputs**

-  Main stream
-  Seepage stream
-  Storm drains (not all shown)
-  Underground pipe carrying freshwater run-off from Golden Bank housing estate

**The "Outlet Culvert"**



Allows water in lagoon to leave and at high spring tides seawater to enter lagoon.

It is 2.15m above Ordnance Datum.



## Lagoon-like Saline Ponds in England Recommended for Conservation

---

Killingholme Pools

Humberstone Fitties

Cliffe Marshes

Pagham Lagoons

Birdham Pool

Shut Lake

Keyhaven-Lymington

Gilkicker

Little Anglesey

Bembridge Harbour Lagoon

Harbour Farm (Brading Marshes)



SITE NAME:	Killingholme Pool 1 (North)
LOCATION:	Immingham, South Humberside
GRID REFERENCE:	TA 167 198
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	pSSSI, Managed by Lincolnshire and South Humberside Trust for Nature Conservation. Owned by National Power.
AREA (ha):	9
MAX DEPTH (m):	0.5 (+ ?)
SALINITY (‰):	22 - 48
ADJACENT HABITATS:	Urban industrial and mudflats
SURVEY DATE:	August 1986
SURVEYOR:	M Sheader & A Sheader 1986
ADDITIONAL SURVEYS:	Bamber <i>et al.</i> 1990
MANAGEMENT:	

## Lagoon Description

The National Power site at Killingholme on the Humber Estuary contains three ponds at the northeast corner adjacent to Killingholme Haven (see **Map 19**, which is taken from Bamber *et al.* (1990)). They have developed from flooded clay pits and all three sites are fenced with no public access. The result of this is that the lagoon and its surrounding border of vegetation is virtually undisturbed.

A high sea wall (4.5m high) to the estuary runs along the north-eastern side of the lagoon, which is surrounded by a border of scrub vegetation (hawthorn, bramble, dogrose and rough grassland). The lagoon bank is steep and about 1m high. A narrow band of emergent *Phragmites* extends around the lagoon, widening to a dense stand in the north-eastern corner. There are a number of small islands.

The sediment consists of mud/clay, and at the time of visit an area in the north-western corner was exposed and dry, probably the result of seasonal variation in water level. The depth of the reducing layer of submerged sediment is less than 1cm. The water depth near the margins is around 30-50cm, though it may be deeper in the centre.

There is no obvious freshwater input but there is a stream running along the north-western side of the lagoon to North Killingholme Haven. The sea channel runs from the northern corner of the lagoon through *Phragmites* beds as a ditch, passing under the sea wall (pipe 50cm diameter) for a distance of about 20m, to open on the south bank of the Haven. Sea water enters on most high tides to give a relatively high salinity.

The bottom of the lagoon is mostly bare, with stands of *Zannichellia palustris* throughout.

## Species present

bryozoa  
 oligochaetes  
*Zannichellia palustris*  
*Phragmites australis*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Hydrobia neglecta*<sup>a,f</sup>  
*Capitella capitata*

*Manayunkia aestaurina*  
*Streblospio shrubsoli*  
*Alkmaria romijni*<sup>\*\*\*,e,f</sup>  
*Heidste diversicolor*  
*Sphaeroma hookeri*<sup>f</sup>  
*Jaera nordmanni*  
*Gammarus zaddachi*  
*Gammarus duebeni*  
*Corophium volutator*  
*Palaemonetes varians*  
*Idotea chelipes*<sup>f</sup>  
*Cyprideis torosa*

The species diversity in this shallow lagoon is relatively high for lagoons in the study area, and the whole site appears healthy and attractive. *Alkmaria romijni*<sup>\*\*\*,e,f</sup>, a small polychaete, although relatively common in suitable habitats on eastern North Sea coasts is recorded in only 4 British sites including Killingholme.



SITE NAME:	Killingholme Pool 2 (East)
LOCATION:	Immingham, South Humberside
GRID REFERENCE:	TA 168 196
TYPE/CLASSIFICATION:	Isolated
DESIGNATION:	pSSSI, Managed by Lincolnshire and South Humberside Trust for Nature Conservation. Owned by National Power.
AREA (ha):	2
MAX DEPTH (m):	0.3
SALINITY (‰):	4
ADJACENT HABITATS:	Mudflats
SURVEYOR:	M Sheader & A Sheader 1986
ADDITIONAL SURVEYS:	Bamber <i>et al.</i> 1990
MANAGEMENT:	

## Lagoon Description

This lagoon (see Map 19), an old claypit, lies behind the sea wall to the southeast of Killingholme Pool 1, from which it is separated by a narrow ridge of clay with scrub vegetation. The site is owned by the CEEB, and is fenced with no public access. The lagoon and its surrounding vegetation are therefore virtually undisturbed at present.

A high sea wall (4-5m) runs along the northeast side of the lagoon. A band of scrub vegetation (hawthorn, bramble, dogrose and rough grassland) surrounded the site. The bank of the lagoon is steep (about 1m high) with a broad stand of *Phragmites* around the whole margin.

The sediment is organically rich soft mud. The water depth is 20-30cm, with no evidence of variation in water level. The water was turbid with silt at the time of visit, and had a salinity of 4‰ compared with the adjacent estuary at 26‰.

There are no discernable freshwater or seawater inputs to the lagoon. Seawater may enter occasionally by flooding, but this must be a rare event, or possibly by percolation from Killingholme Pool 1.

In addition to *Phragmites*, *Scirpus maritimus* occurs as emergent in the shallow eastern corner. The lagoon bottom is mostly bare, with occasional clumps of *Zannichellia palustris* and *Myriophyllum verticillatum*.

## Species present

*Phragmites australis*  
*Scirpus maritimus*  
*Zannichellia palustris*  
*Myriophyllum verticillatum*  
*Hydrobia ventrosa*<sup>a,f</sup> (empty shells)  
*Limnaea pereger*  
acarini  
*Sphaeroma hookeri*<sup>f</sup>  
*Myriophyllum verticillatum*  
*Neomysis integer*

*Gammarus duebeni*  
*Palaemonetes varians*  
*Sigara stagnalis*  
chironomid  
coleopteran larvae (2 spp.).

The species diversity is above average for a low salinity lagoon in the study area. There is an interesting mixture of freshwater and brackish species, differing in species composition almost completely from the neighbouring Killingholme Pool 1.

SITE NAME:	Killingholme Pool 3 (West)
LOCATION:	Immingham, South Humberside
GRID REFERENCE:	TA 165 196
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	pSSSI, Managed by Lincolnshire and South Humberside Trust for Nature Conservation. Owned by National Power.
AREA (ha):	4
MAX DEPTH (m):	0.1
SALINITY (‰):	27
ADJACENT HABITATS:	Urban industrial and mudflats
SURVEYOR:	M Sheader & A Sheader 1986
ADDITIONAL SURVEYS:	Bamber <i>et al.</i> 1990
MANAGEMENT:	

### Lagoon Description

This lagoon (see Map 19) was at a low water level and considered to be freshwater by Sheader & Sheader when they visited the site in 1986. In the 1990 survey the water level was low; extensive areas of dry mud were present, on which were found numerous dead shells of *Cerastoderma* and dead *Zanichella* plants. The water remaining over some 35% of the pond was found to be brackish.

### Species present

*Zanichellia pallustris*  
 chironomid  
 oligochaete  
*Hediste diversicolor*  
*Alkmaria romijni*<sup>a,e,f</sup>  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Hydrobia neglecta*<sup>a,f</sup>  
*Cyprideis torosa*  
*Sphaeroma hookeri*<sup>f</sup>  
*Gammarus duebeni*  
*Corophium volutator*  
*Palaemonetes varians*

## References

BAMBER, R.N., BATTEN, S.D., & BRIDGEWATER, N.D. 1990. *The brackish ponds at Killingholme*. Unf TEC/L/0288/R90.)

SHEADER, M. & SHEADER, A., 1986. *A survey of brackish coastal lagoons, South Humberside to Boston*. Peterborough: Nature Conservancy Council.

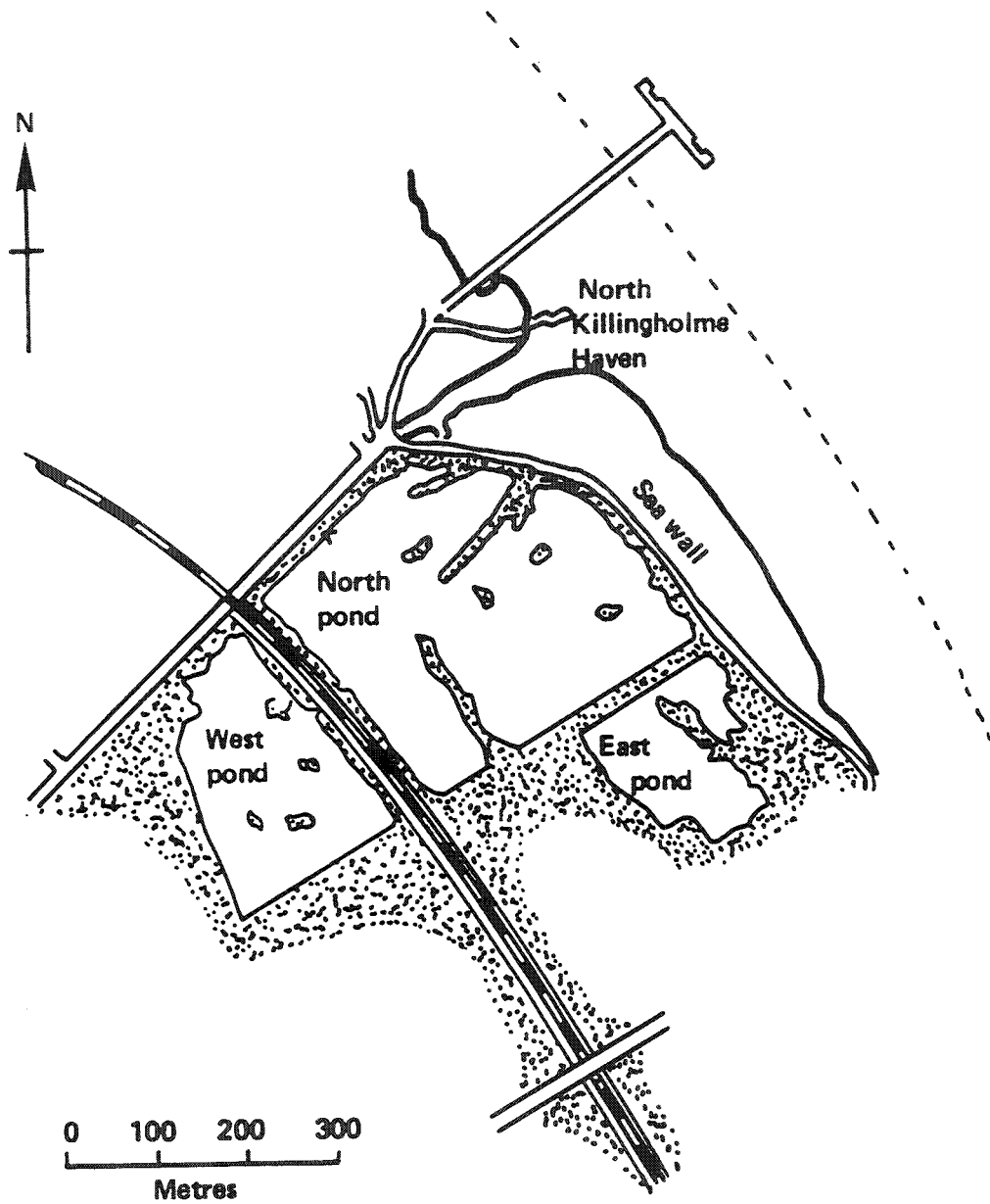


Fig. 1 The Brackish Ponds at Killingholme



SITE NAME:	Humberston Fitties Lagoon
LOCATION:	Lincolnshire, Nr Cleethorpes
GRID REFERENCE:	TA 336 048
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	North Lincolnshire Coast SSSI, SPA, Ramsar, NCR, RSPB Reserve
AREA (ha):	1.75
MAX DEPTH (m):	0.35
SALINITY (‰):	20
ADJACENT HABITATS:	Saltmarsh, sand dunes and agricultural land
SURVEY DATE:	August 1986
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

This is a small shallow lagoon (see Map 20, which is taken from Sheader & Sheader (1986)) behind the sea wall at Humberston Fitties at the mouth of the Humber. To the north are holiday caravan parks and chalets, and to the east is a sea wall above an extensive sandy shore, with an upper zone of saltmarsh vegetation. Landwards there are dunes and agricultural land, and to the southwest a large area of upper saltmarsh (Tetney Marshes) behind a ridge of sand dunes.

It appears that the lagoon was at one time used as a boating lake, and there remains a wooden platform on the eastern margin, and a series of posts linked by rope on the northern margin. The lagoon still attracts a large number of holiday makers during the summer months, when the holiday sites to the north of the lagoon are in use.

The north western margin has mown grass and benches, with a narrow road running to a dinghy clubhouse near the sea wall, where there is a public hard to the open shore. There is a mixture of dune and saltmarsh vegetation on the remaining lagoon margins.

The sediment in the lagoon varies from mud to coarse sand with a mixture of rubble. The reduction layer is at a depth of 2-3cm. The maximum depth of the lagoon is around 35cm shelving gradually to become very shallow on the south eastern edge, where there are small areas of exposed mud with *Salicornia* and mats of blue-green algae.

There is no obvious freshwater input. The input from the sea is via a very long saltmarsh channel (about 1km long, 2-3m minimum width), which meanders through Tetney Marshes to the south-east of the lagoon. Seawater probably enters at most high tides. This area is relatively undisturbed and is leased/owned by the North Lincolnshire Wildfowling Club.

The salinity at the time of visit was 19-20‰, and 20‰ in the channel (flowing into the lagoon), with the adjacent sea at 26‰. This might indicate a degree of freshwater drainage from the marsh to the channel.

Apart from a small area on the south-eastern margin, very little sediment surface is exposed at low tide, the channel acting as a sill to retain water in the lagoon.

There are no marginal species other than the previously noted *Salicornia*, but *Ruppia maritima*<sup>f</sup> and *Chaetomorpha linum*<sup>f</sup> form dense stands within the lagoon, the latter species both attached and free-floating.

## Species present

*Ruppia maritima*<sup>f</sup>  
*Salicornia* sp.  
*Canopeum seurati*<sup>f</sup>  
oligochaetes  
*Hediste diversicolor*  
*Arenicola marina*  
*Chaetomorpha linum*<sup>f</sup>  
*Caulleriella* sp.  
*Polydora ciliata*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Hydrobia ulvae*  
*Cerastoderma* sp. (empty shells)  
*Gammarus insensibilis*<sup>\*\*a,e,f</sup>  
*Microdeutopus gryllotalpa*  
*Corophium insidiosum*<sup>f</sup>  
*Idotea chelipes*<sup>f</sup>  
*Neomysis integer*  
*Palaemonetes varians*  
*Carcinus maenas*

The lagoon exhibits a high species diversity for the area with several typical lagoonal species. This is the northernmost record of the lagoonal amphipod, *Gammarus insensibilis*<sup>\*\*a,e,f</sup> in Britain (Sheader & Sheader, 1987). It is also the most northerly site for *Chaetomorpha linum*<sup>f</sup> on the east coast of England in the current series of lagoon surveys.

The lagoon is probably natural in origin as an upper saltmarsh pool, though it has obviously been modified by man's activities. The fauna and flora at this site are more typical of high salinity silled lagoons on the south coast.

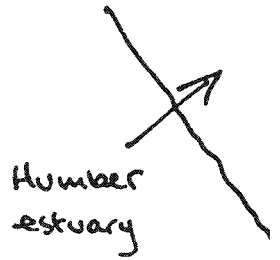


## References

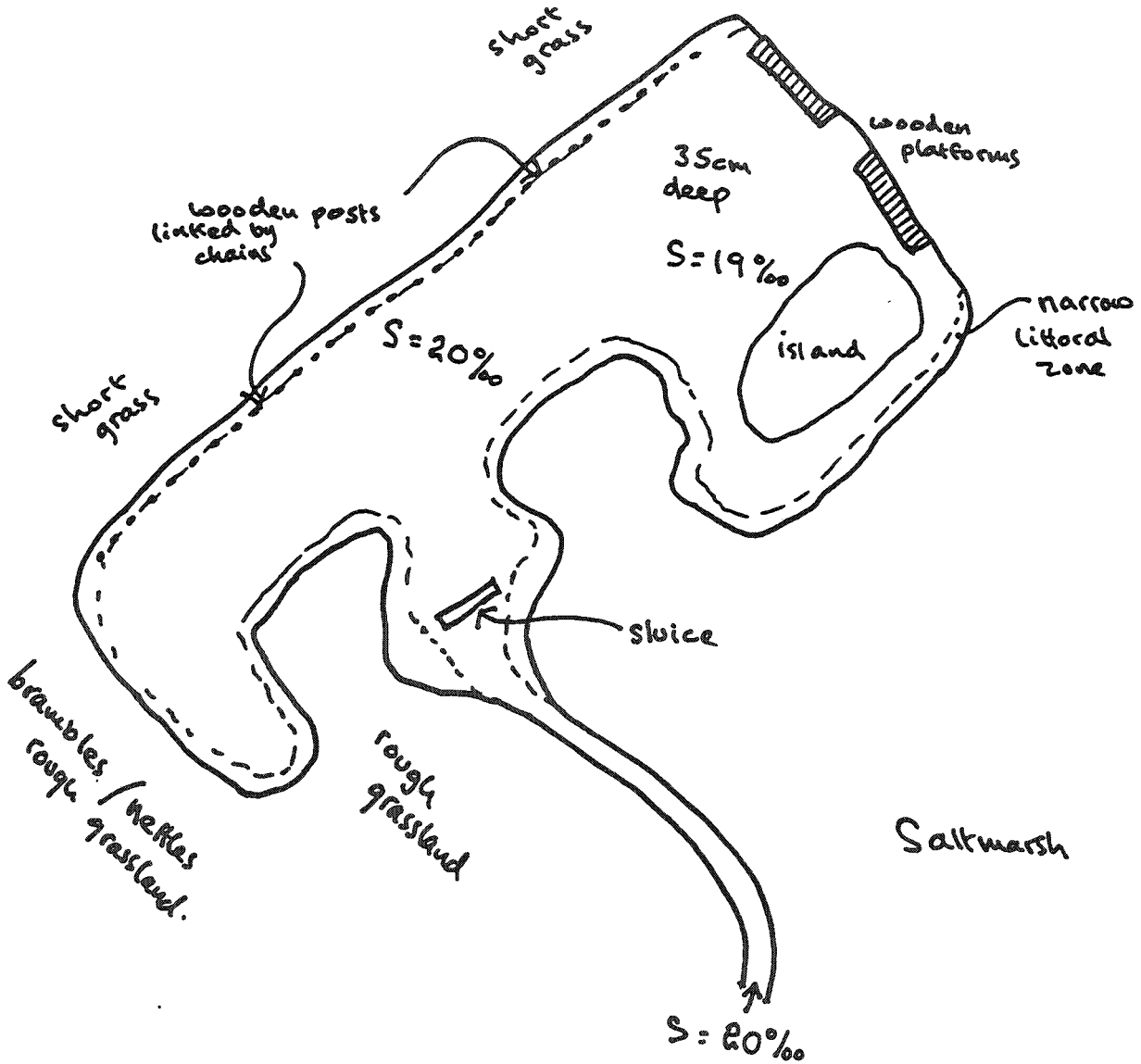
- SHEADER, M. & SHEADER, A. 1987. *A survey of brackish coastal lagoons, South Humberside to Boston Haven, Lincolnshire 1986: Final Report.* (CSD Report No. 812.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER, A. 1986. *A survey of brackish coastal lagoons, South Humberside to Boston Haven, Lincolnshire 1986: Field Report.* (CSD Report No. 812.) Peterborough: Nature Conservancy Council.

HUMBERSTON FITTIES

LAGOON



Dunes



All the lagoons are owned by Blue Circle Industries and over some of them there is planning permission for infilling with river dredgings. Westminster Dredging Company is the contractor which would do this infilling work. At the moment the planning permission is being renegotiated. It is hoped that total infilling of the pools can be avoided by permitting partial infilling over a greater area. As part of this deal, the RSPB are intending to take over day-to-day management responsibilities and run it as a reserve. To this end a draft management plan for the Cliffe Pools Complex has been produced.

<b>SITE NAME:</b>	Cliffe Fort Lagoon, Cliffe Marshes - Southern Lagoon A
<b>LOCATION:</b>	Kent
<b>GRID REFERENCE:</b>	TQ 713 760
<b>TYPE/CLASSIFICATION:</b>	Isolated
<b>DESIGNATION:</b>	South Thames Estuary and Marshes SSSI, candidate and Ramsar
<b>SPA</b>	
<b>AREA (ha):</b>	44
<b>MAX DEPTH (m):</b>	>0.35
<b>SALINITY (‰):</b>	6
<b>ADJACENT HABITATS:</b>	Rough herbaceous grassland
<b>SURVEY DATE:</b>	August 1988 (small survey July 1993 by M & A Sheader)
<b>SURVEYOR:</b>	M & A Sheader
<b>MANAGEMENT:</b>	Management plan in preparation

## Lagoon Description

Cliff Fort Lagoon (see Map 21, which is taken from Sheader & Sheader (1993)) is one of a group of large flooded clay/gravel pits. Gravel is currently being extracted to the south. Most are interconnected by a system of culverts, and there appears to be a single culvert connecting the system to a marine inlet (Cliffe Creek).

This is a large body of water, surrounded by rough herbaceous grassland and by the sea wall on its western margin. The site is used by the Cliffe Fort Sailing Club for dinghy sailing and windsurfing. The lagoon is also fished by anglers. The lagoon is some distance from the northern lagoons, being separated from them by a private road, gravel conveyor belt, arable fields and Cliffe Creek.

The sides of the lagoon are steep, with clay erosion banks (generally less than 0.5m in height), and a bottom sediment consisting of clay, shingle and marginal rubble. The north eastern margin of the lagoon is protected against excessive erosion by wooden boards at water level. The water depth at the margins is 20-30 cm shelving steeply in places (maximum depth not determined).

There are small patches of emergent *Phragmites* around the margins, with a *Scirpus* marsh in a small bay on the eastern margin. There was a little marginal *Potamogeton pectinatus*. The high turbidity made it impossible to estimate the extent of its distribution.

In 1988 the salinity at the site was recorded at 6‰, and no obvious seawater or freshwater inputs were located (other than rainfall). There is a fire brigade water pumping site adjacent to the sailing club at Cliffe Fort, but the structure does not appear to represent an input or outflow from the system. During the 1993 visit, a significant inflow of seawater from the estuary (at 24‰) was noted at a point on the eastern margin, where water flowed through a weak section of the sea-wall. As a result of the deterioration of the sea-wall and the resulting

greater inflow of saline water to the lagoon since 1988, the salinity throughout the lagoon is now more than twice that previously recorded, having risen to 15-16‰/∞.

Such an increase might be expected, with time, to result in an increase in the number of brackish and lagoonal species. Most of the species recorded are weed-associated and were collected amongst *Potamogeton* and the submerged stems of emergent reeds. The sediment is generally a hard clay (anoxic under weed beds) supporting little fauna.

### Species present

1988	1993
<i>Phragmites australis</i>	<i>Phragmites australis</i>
<i>Scirpus</i> sp.	<i>Scirpus</i> sp.
-	<i>Cladophora</i> sp.
<i>Potamogeton pectinatus</i>	<i>Potamogeton pectinatus</i>
<i>Hydrobia ventrosa</i> <sup>a,f</sup>	<i>Hydrobia ventrosa</i> <sup>a,f</sup>
-	<i>Potamopyrgus jenkinsii</i>
<i>Gammarus duebeni</i>	<i>Gammarus duebeni</i>
<i>Gammarus zaddachi</i>	<i>Gammarus zaddachi</i>
<i>Palaemonetes varians</i>	<i>Palaemonetes varians</i>
-	<i>Sphaeroma hookeri</i> <sup>f</sup>
Chironomid spp.	Chironomid spp.
-	<i>Sigaria</i> sp.
-	Zygopteran sp. nymphs
-	Coleopteran sp.
-	Dipteran sp. larvae
-	<i>Pomatoschistus microps</i>
-	Fish fry indet.

Most of the new species recorded are insects, which, since they are seasonal and mobile, can rapidly and temporarily colonise new habitats and do not, therefore, necessarily represent permanent populations. Of greater significance is the addition of the lagoonal isopod *Sphaeroma hookeri*<sup>f</sup> and the fresh/brackish water gastropod *Potamopyrgus jenkinsii*. However, neither of these species are nationally rare.

SITE NAME:	Cliffe Fort Lagoon, Cliffe Marshes - Southern Lagoon B
LOCATION:	Kent
GRID REFERENCE:	TQ 716 752
TYPE/CLASSIFICATION:	Isolated, percolation
DESIGNATION:	South Thames Estuary and Marshes SSSI, candidate and Ramsar
SPA	
AREA (ha):	12
MAX DEPTH (m):	>0.30
SALINITY (‰):	8
ADJACENT HABITATS:	Rough herbaceous grassland and industrial wasteland
SURVEY DATE:	July 1993
SURVEYOR:	M & A Sheader
MANAGEMENT:	Management plan in preparation

### Lagoon Description

This is a sizeable body of water surrounded by rough herbaceous grassland on its western and southern margin, and on its north eastern margin by industrial wasteland consisting of brushwood, rough grassland and tipped gravel (see Map 21). On the northern margin there is marsh backed by a high and wide concrete wall. There is no obvious connection between this lagoon and the estuary, which lies half a kilometer to the north west. In addition, a wide earth bank to the west separates the lagoon from coastal grazed pasture. It must, therefore, be assumed that any saline input to the lagoon must be by percolation from Southern Lagoon A.

The sides of the lagoon are steep, with clay erosion banks (30-40 cm), except on the north eastern margin, where there is a *Phragmites* and *Scripus* marsh. On the north eastern margin there is a small gently-sloping mud/clay beach. The water depth at the margin is 20-30 cm, sloping rapidly with distance from the edge (maximum depth not determined). The submerged sediment is hard mud/clay. At the time of the survey, the water was turbid with silt and phytoplankton. The salinity was measured at 8‰, confirming percolation of saline water into the system.

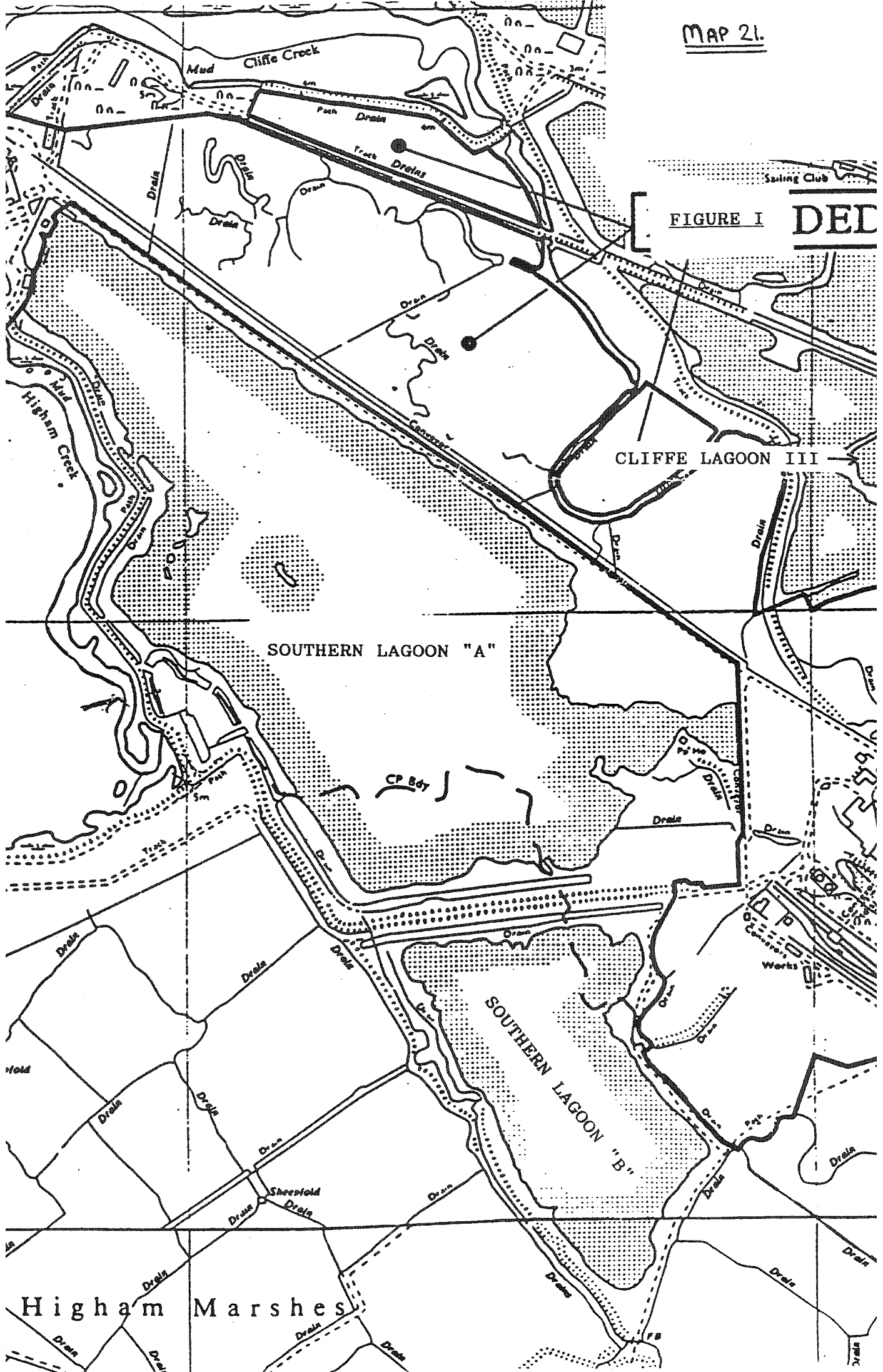
Apart from the emergent *Phragmites* and *Scripus*, there were narrow submerged stands of *Potamogeton pectinatus* around the edge of the lagoon. There were also small amounts of *Enteromorpha* and *Cladophora* around the submerged stems of the emergent vegetation.

Most of the fauna was weed-associated, with very little fauna in the firm clay substrate. The lagoon supports an impoverished low salinity fauna, with most of the species recorded also being present in Southern Lagoon A.

### Species present

*Cladophora* sp.  
*Enteromorpha* sp.  
*Potamogeton pectinatus*  
*Potamopyrgus jenkinsii*  
*Gammarus zaddachi*  
*Sphaeroma hookeri*<sup>f</sup>  
*Palaemonetes varians*  
Chironomid sp.

*Sigara* sp.  
*Rana temporaria*\*\*







SITE NAME:	Cliffe Lagoon I
LOCATION:	Kent
GRID REFERENCE:	TQ 720 770
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	South Thames Estuary and Marshes SSSI, candidate and Ramsar
SPA	
AREA (ha):	25.5
MAX DEPTH (m):	?
SALINITY (‰):	22
ADJACENT HABITATS:	Rough grassland
SURVEY DATE:	August 1988
SURVEYOR:	M & A Sheader
MANAGEMENT:	Management plan in preparation

## Lagoon Description

This lagoon (see Map 22, which is taken from Sheader & Sheader (1988)) is adjacent to Cliffe Creek, and receives seawater at high tide through a culvert (50-60cm diameter and 8m long) which passes through the sea wall and under a maintenance track. The lagoon is surrounded by scrub vegetation on its southeastern and eastern margins. The western margin has an extensive *Phragmites* marsh, which fills an adjacent small claypit. This occasionally receives water via a culvert from Lagoon I. On the northern margin there is an area of rough grassland. The western and south-western shores slope gently to give a narrow littoral zone, exposed at each tide. Adjacent to the culvert leading to the *Phragmites* marsh is an area of mudflat with *Salicornia*. The remaining margin has a clay erosion bank (approx. 50cm high).

The submerged vegetation consisted of predominantly floating clumps of *Ulva* and *Chaetomorpha*.

## Species present

*Phragmites australis*  
*Ulva* sp.  
*Chaetomorpha* sp.  
*Aurelia aurita*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Salicornia* sp.  
*Cerastoderma glaucum*<sup>a,f</sup>  
*Mya arenaria*  
*Tubificoides benedii*  
*Hediste diversicolor*  
*Polydora ciliata*  
*Idotea chelipes*<sup>f</sup>  
*Sphaeroma hookeri*<sup>f</sup>  
*Corophium insidiosum*<sup>f</sup>  
*Corophium volutator*  
*Melita palmata*  
*Gammarus duebeni*  
*Palaemonetes varians*  
*Pomatoschistus microps*  
*Balanus balanoides*

This is an interesting large tidal lagoon, with a crustacean dominated fauna, and including several typical estuarine species such as *Mya*.

SITE NAME:	Cliffe Lagoon II
LOCATION:	Kent
GRID REFERENCE:	TQ 725 767
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	South Thames Estuary and Marshes SSSI, candidate and Ramsar
SPA	
AREA (ha):	21.7
MAX DEPTH (m):	?
SALINITY (‰):	20
ADJACENT HABITATS:	Scrubland
SURVEY DATE:	August 1988
SURVEYOR:	M & A Sheader
MANAGEMENT:	Management plan in preparation

### Lagoon Description

This is situated to landward of Lagoon I, to which it is connected by a break in the bank which separates the two (see Map 22). It is surrounded by scrubland on its southern, eastern and western margins and by rough herbaceous grassland on the northern margin. There is also a small flooded claypit on the northern margin (not visited).

There is no obvious freshwater input, but brackish water enters at each tide from Lagoon I. The bottom sediment consisted of clay/mud with some shingle and occasional stones.

*Ruppia*, *Cladophora* and *Chaetomorpha* occurred at the site and there were occasional stands of marginal *Scirpus* and *Phragmites*.

### Species present

*Aurelia aurita*  
*Ruppia* sp.  
*Cladophora* sp.  
*Scirpus* sp.  
*Chaetomorpha* sp.  
*Phragmites australis*  
nemertine  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Littorina saxatilis tenebrosa*<sup>f</sup>  
*Mya arenaria*  
*Unio pictorum*?  
*Tharyx* sp.  
*Idotea chelipes*  
*Sphaeroma hookeri*<sup>f</sup>  
*Gammarus duebeni*  
*Talitrus saltator*  
*Palaemonetes varians*  
chironomid  
*Conopeum seurati*<sup>f</sup>  
*Pomatoschistus microps*

A high diversity lagoon, with a fauna similar to that of Lagoon I.

SITE NAME: Cliffe Lagoon III

LOCATION: Kent

GRID REFERENCE: TQ 720 766

TYPE/CLASSIFICATION: Sluiced

DESIGNATION: South Thames Estuary and Marshes SSSI, candidate  
and Ramsar

SPA

AREA (ha): 19

MAX DEPTH (m): ?

SALINITY (‰): 20 (1988) - 25 (1993)

ADJACENT HABITATS: Rough grassland

SURVEY DATE: August 1988 (small survey July 1993 by M & A Sheader)

SURVEYOR: M & A Sheader

MANAGEMENT: Management plan in preparation

### Lagoon Description

This lagoon (see Map 22) is surrounded by other claypits on much of its northern and western margin, from which it is separated by scrub covered embankments. Its eastern margin consists of a mixture of rough grassland and scrub trees.

Brackish water enters the lagoon from Lagoon II via a culvert on the northern edge. There is also a culvert entering from a section of Cliffe Creek. On extreme tide, saline water may also enter the lagoon via this route. There is no apparent freshwater input. The sediment consisted of muddy/clay, shingle and plant debris.

There were small stands of marginal/emergent *Phragmites* in places, and a dense marginal band of submerged *Ruppia*.

### Species present

1988	1993
<i>Hydrobia ventrosa</i> <sup>a,f</sup>	<i>Hydrobia ventrosa</i> <sup>a,f</sup>
<i>Phragmites australis</i>	-
<i>Littorina saxatilis tenebrosa</i> <sup>f</sup>	<i>Littorina tenebrosa</i> <sup>f</sup>
<i>Ruppia</i> sp.	-
-	<i>Chaetomorpha</i> sp.
<i>Mya arenaria</i>	<i>Mya arenaria</i>
<i>Cerastoderma glaucum</i> <sup>a,f</sup>	<i>Cerastoderma glaucum</i> <sup>a,f</sup>
<i>Polydora ciliata</i>	<i>Polydora ciliata</i>
<i>Idotea chelipes</i> <sup>f</sup>	<i>Idotea chelipes</i> <sup>f</sup>
<i>Sphaeroma hookeri</i> <sup>f</sup>	<i>Sphaeroma hookeri</i> <sup>f</sup>
-	<i>Ligia oceanica</i>
-	<i>Melita palmata</i>
-	<i>Talitrus saltator</i>
<i>Corophium insidiosum</i> <sup>f</sup>	<i>Corophium insidiosum</i> <sup>f</sup>
<i>Palaemonetes varians</i>	<i>Palaemonetes varians</i>
Chironomid spp.	Chironomid spp.
<i>Conopeum seurati</i> <sup>f</sup>	<i>Conopeum seurati</i> <sup>f</sup>
<i>Pomatoschistus microps</i>	<i>Pomatoschistus microps</i>

A species rich lagoon similar to Lagoons I and II.

SITE NAME:	Cliffe Lagoon IV
LOCATION:	Kent
GRID REFERENCE:	TQ 720 763
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	South Thames Estuary and Marshes SSSI, candidate SPA
AREA (ha):	4.5
MAX DEPTH (m):	?
SALINITY (‰):	20
ADJACENT HABITATS:	Rough grassland
SURVEY DATE:	August 1988
SURVEYOR:	M & A Sheader
MANAGEMENT:	Management plan in preparation

## Lagoon Description

This is the smallest of the four high salinity lagoons (see Map 22), and is surrounded by the embankment of Lagoon III on its northern and eastern margins. The south-eastern margin is bounded by the sea wall maintenance track and rough grassland.

The bottom sediment consisted of muddy clay and shingle. There was no apparent freshwater input, but the lagoon receives brackish water at each tide through a culvert on its eastern margin, which connects it with Lagoon III.

There were small clumps of marginal/emergent *Scirpus* around the lagoon, and submerged *Ruppia* and *Chaetomorpha*.

## Species present

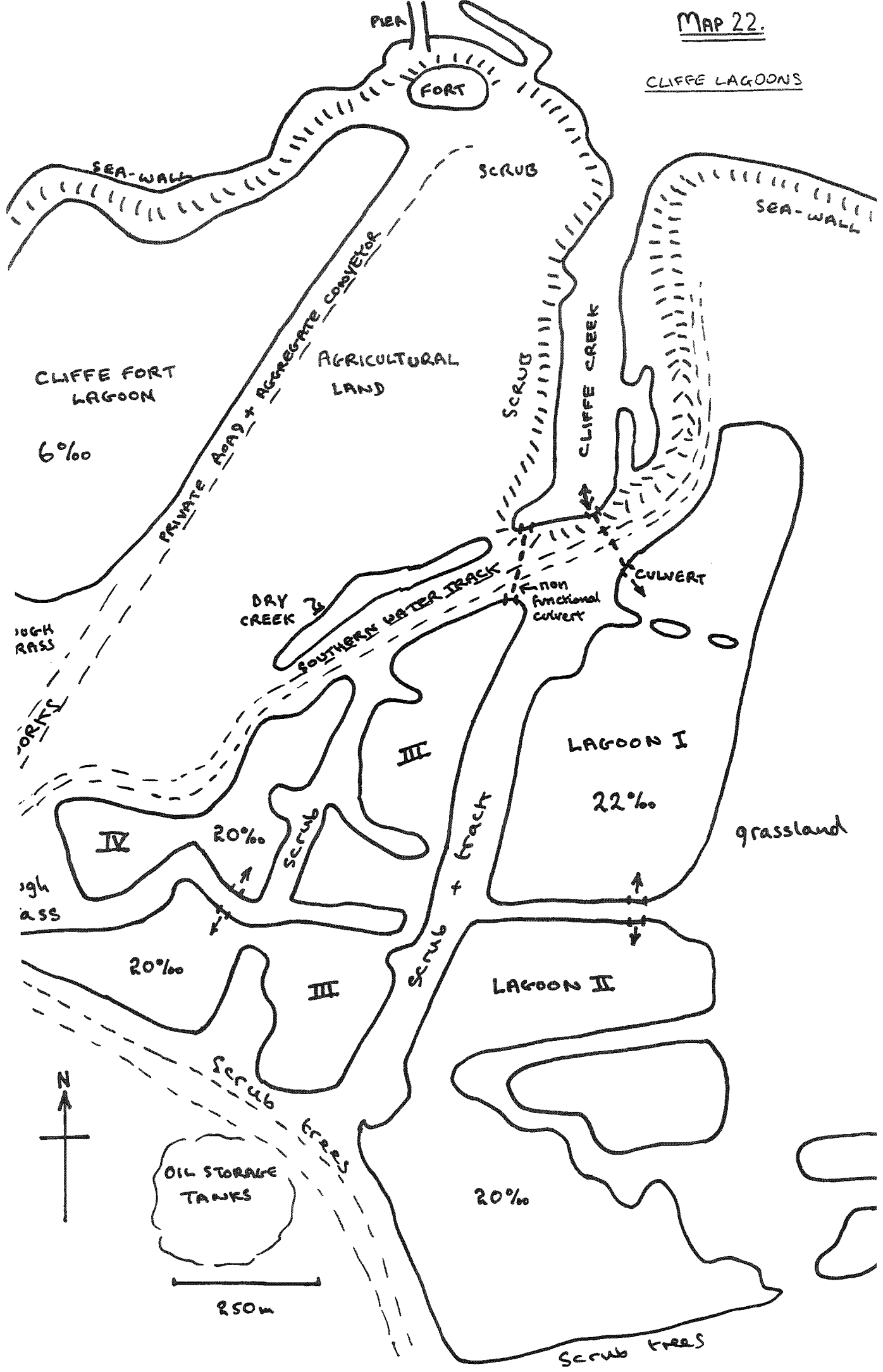
*Scirpus* sp.  
*Ruppia* sp.  
*Chaetomorpha* sp.  
nemertine  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Littorina saxatilis tenebrosa*<sup>f</sup>  
*Mya arenaria*  
*Cerastoderma glaucum*<sup>a,f</sup>  
*Polydora ciliata*  
*Idotea chelipes*<sup>f</sup>  
*Sphaeroma hookeri*<sup>f</sup>  
*Cyathura carinata*  
chironomids  
*Conopeum seurati*<sup>f</sup>  
*Pomatoschistus microps*

These four interconnected medium to high salinity lagoons are rich in wildfowl, and support a diverse mollusc/crustacean dominated fauna. *Mya*, an unusual species in lagoon habitats in England, occurs at very high densities represented by a number of age classes. Many typical lagoon species occur such as the lagoon winkle and cockle. Within the 4 inter-connected Cliffe lagoons, there were 4 macrophytes and 24 species of macrofauna recorded.

## References

- SHEADER, M., & SHEADER, A. 1993. *Lagoon survey of Southern Cliffe Pools*. (Contractor: University of Southampton, Department of Oceanography, Southampton.) Unpublished report to English Nature, Kent Local Area Team.
- SHEADER, M., & SHEADER, A. 1990. *Lagoon survey of north Kent (Whitstable to Gravesend) August, 1988. Final report*. (CSD Report, No. 1115.) Peterborough: Nature Conservancy Council.
- SHEADER, M., & SHEADER, A. 1988. *Lagoon survey of north Kent (Whitstable to Gravesend) August, 1988. Field report*. (CSD Report, No. 1115.) Peterborough: Nature Conservancy Council.

CLIFFE LAGOONS







SITE NAME:	Little Spit Lagoon
LOCATION:	Pagham, West Sussex
GRID REFERENCE:	SZ 882 967
TYPE/CLASSIFICATION:	Percolation
DESIGNATION:	Pagham Harbour SSSI & LNR
AREA (ha):	1.0
MAX DEPTH (m):	?
SALINITY (‰):	24
ADJACENT HABITATS:	Shingle
SURVEY DATE:	1984 (additionally in 1988 J Barton)
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

This lagoon (see Map 23, which is taken from Sheader & Sheader (1985a)) is within a deep pit on the shingle spit to the east of the entrance to Pagham Harbour. The sides of the lagoon basin are steep loose shingle, in excess of 6m in height, with metal piling and wood reinforcement on the western side. There are no obvious freshwater or seawater input channels, but seawater undoubtedly enters by percolation through the broad (30m) shingle bank and sea wall. Despite the apparent enclosed nature of the lagoon, water level varies markedly, with a tidal range comparable with that of the adjacent open shore. At low tide the water occupies only one third of the lagoon basin, with a vertical tidal range of 1.0-1.5m.

The sediment is soft muddy sand overlying coarse shingle with a proportion of larger cobble-sized stones. The sediment at the eastern end is somewhat finer. There are no emergent plants, but many of the algae are littoral within the lagoon and exposed at each low tide.

## Species present

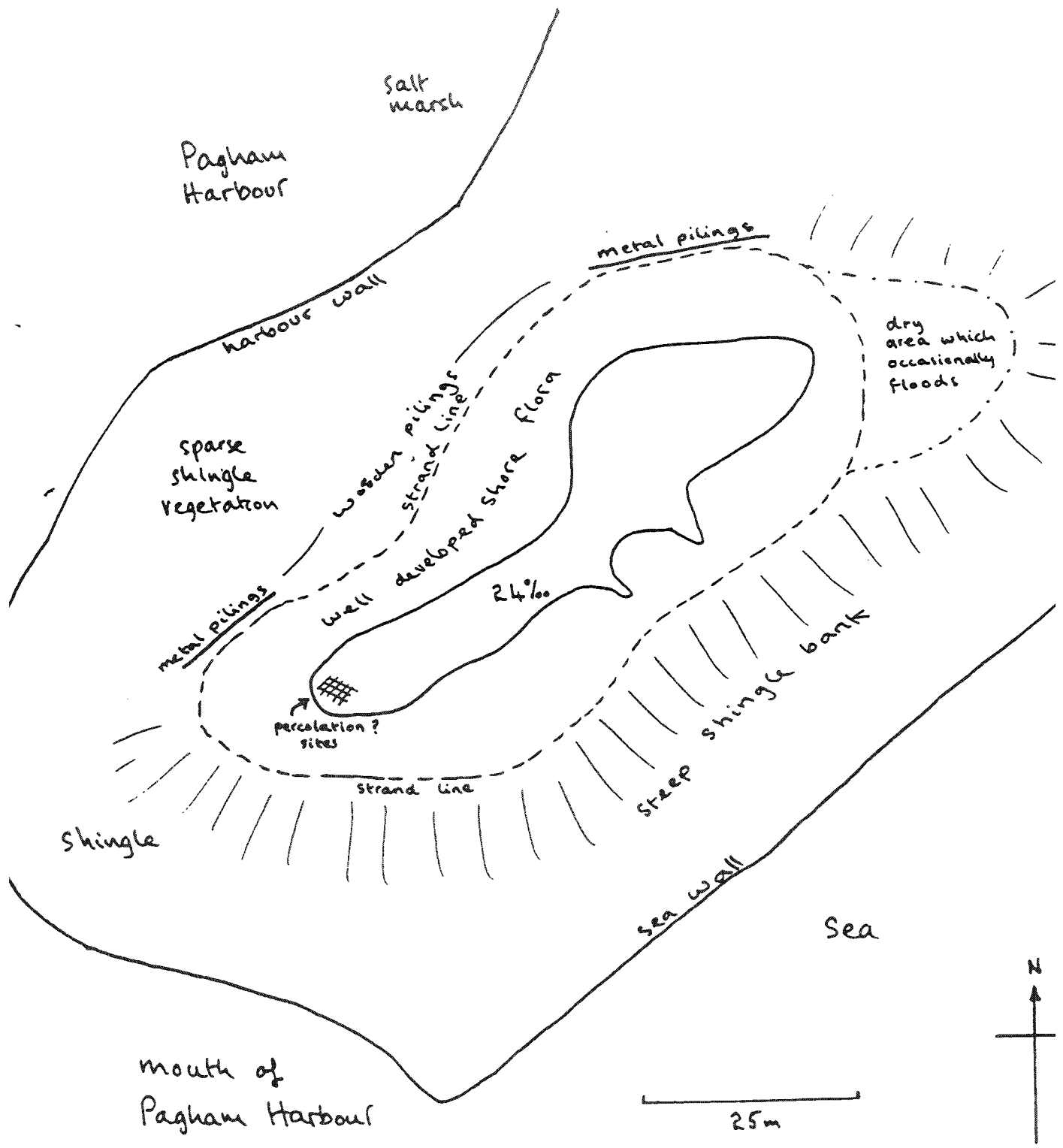
*Sagartia* sp.  
*Fucus spiralis*  
*Enteromorpha* sp.  
*Cladophora* sp.  
*Spongomorpha* sp.  
*Porphyra umbilicalis*  
*Vaucheria* sp.  
oligochaetes  
*Arenicola marina*  
*Littorina saxatilis tenebrosa*<sup>f</sup>  
*Littorina littoralis*  
prosobranch  
*Lasaea rubra*  
*Carcinus maenas*  
*Hyale nilssoni*  
*Tanais dulongii*

The lagoon was also visited in July and August 1988 by J Barton when the following additional species were observed:

*Lineus viridis*  
*Ophelia bicornis*  
*Capitella capitata*  
*Cirratulus cirratus*  
*Pygosopio elegans*  
*Sabelliaceae* sp.  
syllid  
serpulid  
*Tubicoides benidii*  
*Lumbricillus* sp.  
*Limapontia* sp.  
*Melita palmata*  
*Liljeborgia kinhani*  
*Gammarus* sp.  
*Sphaeroma rugicauda*  
*Cyathura carinata*  
*Praunus flexuosus*  
*Tanais dulongii*  
*Onoba aculeus*<sup>f</sup>  
*Leucophytia bidentata*  
*Amphipholus squamata*  
*Ciona intestinalis*  
*Pomatoschistus microps*  
*Pomatoschistus pictus*  
*Lingula semicostata*

This is an interesting lagoon and is odd in that, although it is isolated from the sea, it maintains a tidal cycle by percolation. Possibly the movement of seawater through the shingle is so free that algal spores and pelagic larvae are able to enter, resulting in the reasonably diverse community. This lagoon is well worth further study.

LITTLE SPIT LAGOON





SITE NAME:	The Lagoon, Pagham
LOCATION:	Pagham, West Sussex
GRID REFERENCE:	SZ 855 970
TYPE/CLASSIFICATION:	Percolation
DESIGNATION:	Pagham Harbour SSSI
AREA (ha):	6.99
MAX DEPTH (m):	?
SALINITY (‰):	4-18
ADJACENT HABITATS:	Saltmarshes
SURVEY DATE:	1984 (additionally in 1988 J Barton)
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

This lagoon is situated on the eastern side of Pagham Harbour (see **Map 24**, which is taken from Sheader & Sheader (1985a), lying at the base of the shingle spit which separates the harbour and the sea. Its orientation and shape suggest that at one time it may have been a sea inlet, subsequently blocked off by an increase in height of the saltmarsh and/or by a shift in the shingle spit.

The eastern and the southern margins are shingle with fixed shingle vegetation, with a bank of gorse on the eastern margin. On the north-eastern margin is a small area of wet *Phragmites* marsh, separated from the main lagoon by a raised pathway. On the north-western margin is a sizeable caravan site with a grassy bank down to the lagoon. On the remaining western side is an area of scrub and trees dividing the lagoon from the saltmarshes of Pagham Harbour.

The banks around the lagoon are steep, 3-4m in height, and there is no obvious saline input. An outflow, probably freshwater, though not running at the time of visit, was present on the north-east corner below the caravan site. There was no evidence to suggest seasonable or diurnal changes in water level. The sediment is mainly clean sand and shingle, with an admixture of mud on the western and extreme northern margin. The bottom of the lagoon shelved gradually from the margins, but maximum depth was not established.

*Phragmites* occurs as emergent vegetation in two areas on the northern and mid-western margins.

Sheader found only *Chironomus salinarius* when he sampled the lagoon, however J Barton observed the following species during her visit in 1988 (4 years later).

## Species present

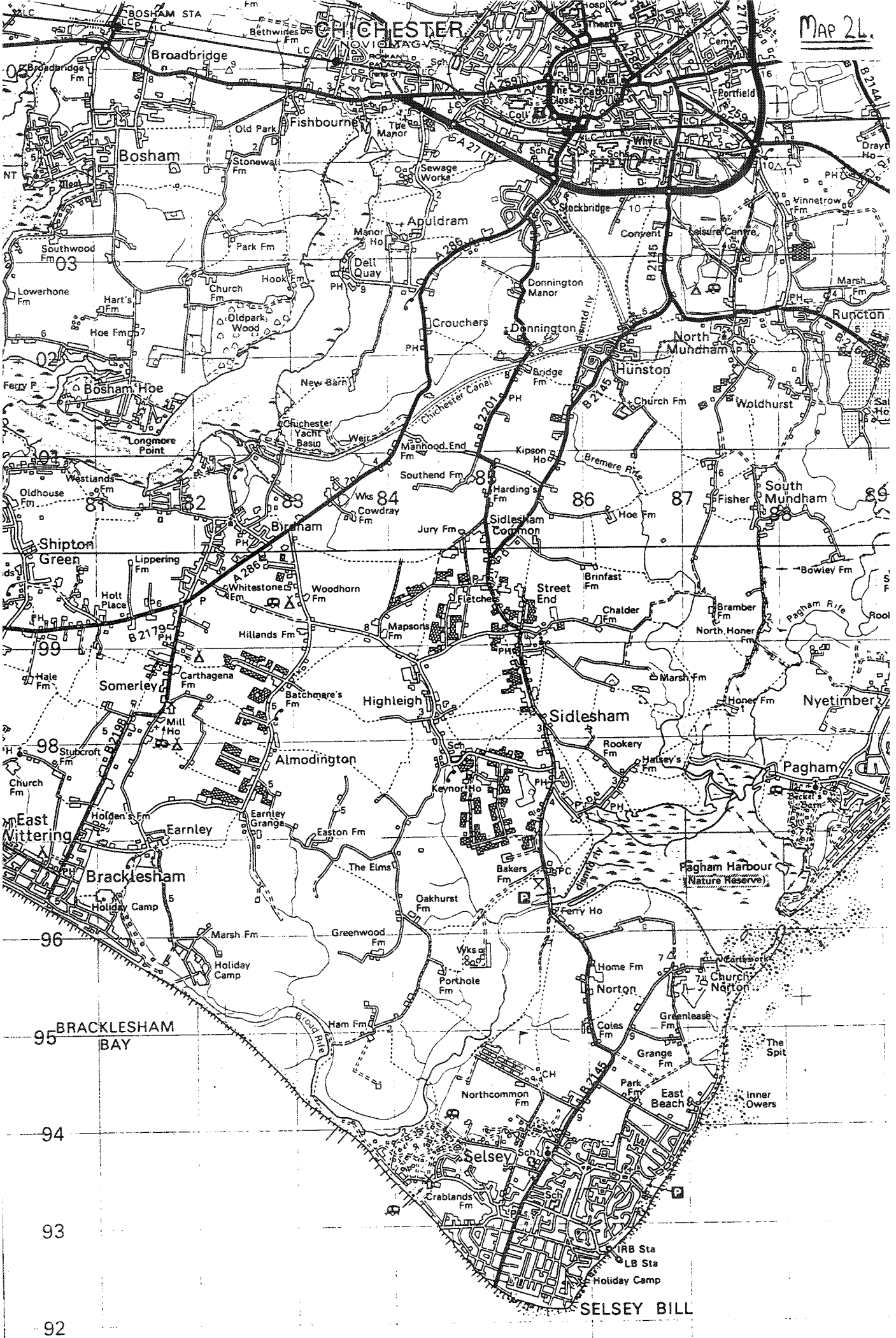
*Hediste diversicolor*  
*Polydora ciliata*  
*Tubifex costatus*  
*Gammarus dubeni*  
*Gammarus* sp.  
*Sphaeroma hookeri*<sup>f</sup>  
*Praunus flexuosus*  
*Palaemonetes varians*  
*Chironomus thummi*

*Praunus flexuosus*  
*Palaemonetes varians*  
chironomids  
bryozoa  
*Conopeum seurati*<sup>f</sup>

The crustacean dominated fauna is of moderate diversity, and contains *Gammarus insensibilis*,<sup>\*\*a,e,f</sup> a species protected under the Wildlife and Countryside Act. In addition, the lagoon also contains the introduced polychaete *Ficopomatus*. The fauna suggests that the salinity is usually in excess of 10‰/‰.

## References

- SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.



95 BRACKLESHAM BAY

SELSEY BILL





The Keyhaven-Lymington System consists of a number of ponds and channels situated in an area of old saltings behind the sea-wall between Keyhaven and Lymington.

SITE NAME:	Normandy Farm
LOCATION:	Lymington, Hampshire
GRID REFERENCE:	SZ 332 947
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, NNR, pSAC
AREA (ha):	5
MAX DEPTH (m):	
SALINITY (‰):	22 - 25
ADJACENT HABITATS:	Grazed wet grassland and saltmarsh
SURVEY DATE:	September 1990 (Ref 1991)
SURVEYOR:	L McDonagh
ADDITIONAL SURVEYS:	Shedder & Shedder, 1985
MANAGEMENT:	

## Lagoon Description

The original Normandy Farm lagoon system (see Map 26, which is taken from Shedder & Shedder (1985a)), surveyed by Shedder and Shedder in 1984, lies to the east of Eight Acre Pond and extended some 2.5 km with the easternmost 0.5 km forming a very narrow ditch section <1 m wide. The remaining ditch systems were approximately 4 m wide, and the central section expanded to 8 m for 600 m. The depth of the system was 40 - 150 cm. Reconstruction of the seawall landwards resulted in inevitable loss of some of the lagoons and ditches. New compensatory lagoons were dug between May and October 1990. New sluices were also constructed. Large quantities of surface mud were removed from the infilled sections of lagoon and were stored on land. This was subsequently transferred to the newly dug sites in an effort to retain some of the sediment associated biota. When surveyed the lagoons had only been in existence for 6 months so the fauna and flora was not as diverse or as abundant as would be expected in an established location.

The following two species lists are from the original system surveyed in 1984 and the new system survey at the end of 1990.

## Species present in the original system (1984)

*Nematostella vectensis*\*\*<sup>a,e,f</sup>  
nemertine  
(large) nematode  
oligochaetes (2 spp)  
*Capitella capitata*  
*Hediste diversicolor*  
*Pygospio elegans*  
*Limapontia* sp.  
*Gammarus insensibilis*\*\*<sup>a,e,f</sup>  
*Corophium insidiosum*<sup>f</sup>  
*Sphaeroma rugicauda*  
*Halocladia varians*  
*Arenicola marina*

*Carcinus maenas*  
*Palaemonetes varians*  
*Melita palmata*  
*Chaetomorpha* sp.  
*Vaucheria* sp.  
*Ectocarpus* sp.  
*Ulva* sp.  
*Enteromorpha* sp.  
*Fabricia stellata*  
*Abra tenuis*  
*Hydrobia ulvae*  
*Corophium volutator*  
*Microdeutopus gryllotalpa*  
*Palaemonetes varians*  
*Chironomus salinarius*  
*Ulva* sp.  
*Enteromorpha* sp.  
*Ectocarpus* sp.

### Species present in the new lagoons (1990)

chironomid  
oligochaetes  
*Manayunkia aestuarina*  
*Corophium insidiosum*  
*Polydora ciliata*  
*Eurytemora* sp.  
syllid  
*Capitella capitata*  
*Microdeutopus gryllotalpa*  
*Tubificoides* sp.  
*Hydrobia ulvae*  
*Cladophora* sp.  
*Ruppia* sp.  
*Ulva lactuca*  
Colonial diatoms  
*Sphaeroma nyicauda*  
*Coleoptera* sp.  
*Hediste divesicolor*  
*Enteromorpha* sp.  
*Gammarus insensibilis*<sup>a,e,f</sup>  
*Gammarus locusta*  
*Corophium volutator*  
*Palaemonetes varians*  
*Sagartia*

*Nemabonella* and *G. insensibilis*<sup>a,e,f</sup> are common throughout the Normandy system, which seems to have fully recovered the rebuilding of the seawall (M Sheader pers comm.).

### References

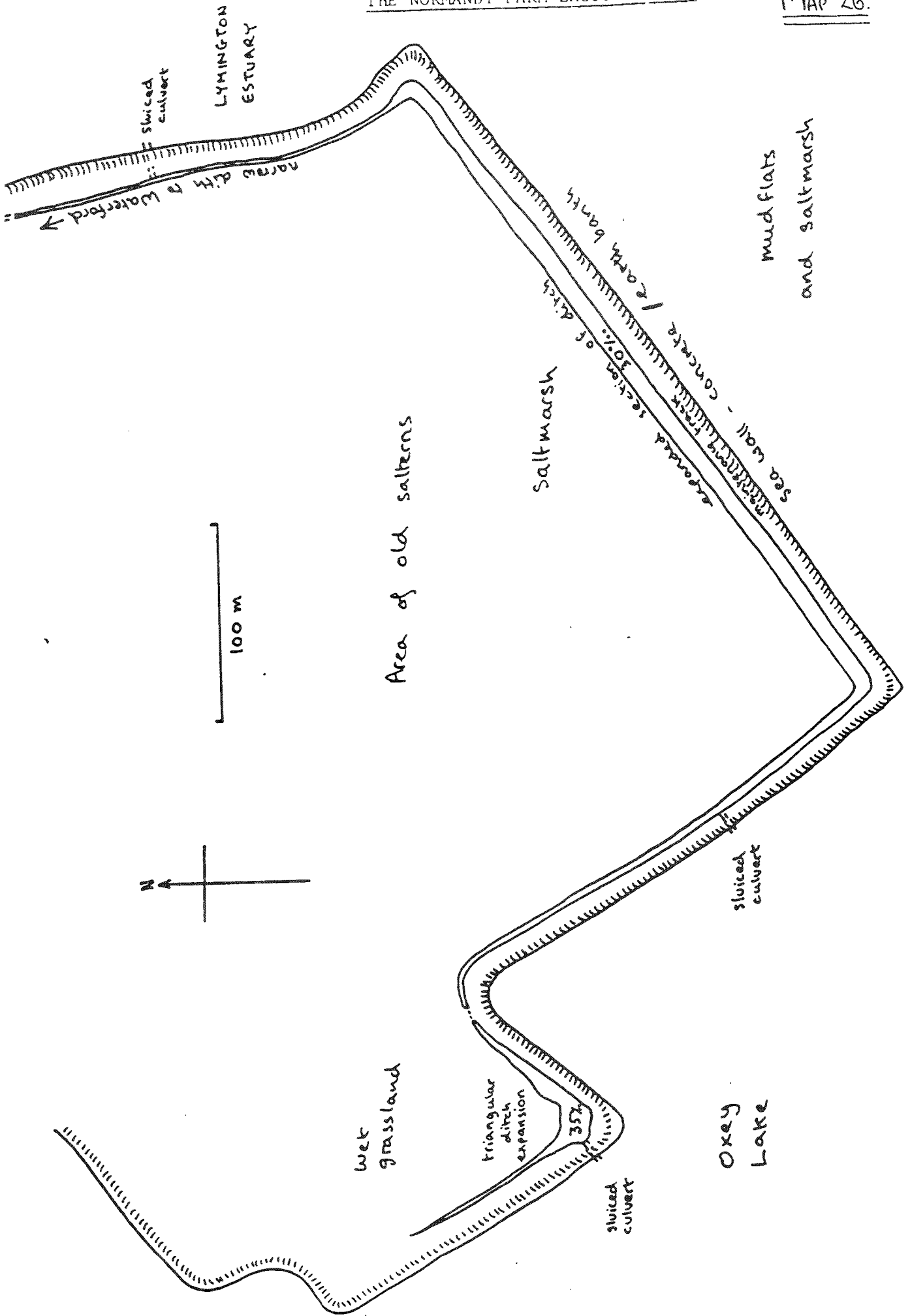
SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

THE NORMANDY FARM LAGOON SYSTEM

MAP 26.



SITE NAME:	Eight Acre Pond
LOCATION:	Lymington, Hampshire
GRID REFERENCE:	SZ 327938
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, NNR, pSAC
AREA (ha):	2.9
MAX DEPTH (m):	2.0
SALINITY (‰):	36
ADJACENT HABITATS:	?
SURVEY DATE:	1984 (Ref 1985b)
SURVEYOR:	M Sheader & A Sheader

## Lagoon Description

This is a roughly rectangular lagoon bounded by banks, lying behind the seawall of Oxey Lake (see Map 27, which is taken from Sheader & Sheader 1985a)). The lagoon is an area of ancient salterns, but possibly originated as a fishpond. It is now used as a boating lake. There are four small grass/shrub covered islands within the lagoon.

The north-eastern and south-eastern sides consist of grassed shingle and earth banks with occasional clumps of *Spartina*, whereas the southern margin has emergent *Phragmites* with banks of scrub vegetation. Along the north-western margin is a *Phragmites* marsh backed by trees.

There are two sluices through the seawall, one at each of the seaward corners. The sluice on the south-east corner acts to maintain a more or less constant level in the lagoon. There are no apparent freshwater inputs.

The level of water in the lagoon changes on a tidal basis by 10-20cm, with virtually none of the bottom sediment exposed at low tide, owing to the action of a tidal flap on the sluice. However at various intervals since 1975, the whole lagoon has been drained to leave only a few pools in the deeper southern part of the lagoon. Accurate records are not kept as to when this is done, nor as to how long the mud surface remains exposed (several months on some occasions). The reasons put forward for drainage are: 1) to attract and provide additional feeding areas for wading birds and 2) to prevent erosion of the banks of the lagoon.

Sediment varied from soft mud in the centre to muddy sand with a high proportion of shingle around most of the margin. Shallow muddier sediment overlying hard clay occurs along the south-western margin, with a more organic sediment beneath an overhanging tree in the western corner. Water depth is between 50cm at 2m from the bank, reaching a maximum depth of about 2m in the central region off the western sluice.

The submerged vegetation is dominated by *Chaetomorpha* sp, together with *Fucus vesiculosus*, *Ectocarpus pyliella*, *Ruppia* sp. *Cladophora* sp. and *Vaucheria* sp. *Lamprothamnium papulosum*, although not found as mature plants during the visit, occurred as spores and overwintering bodies within sediment samples.

## Species present

*Nematostella vectensis*<sup>\*\*e,f</sup>  
*Capitella capitata*

*Streblospio shrubsoli*  
 nemertine  
 oligochaetes  
*Armandia cirrhosa*<sup>\*\*e,f</sup>  
*Polydora ciliata*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Gammarus insensibilis*<sup>\*\*a,e,f</sup>  
*Microdeutopus gryllotalpa*  
*Corophium volutator*  
*Praunus flexuosus*  
*Halocladia varians*  
*Pomatoschistus microps*  
*Fucus vesiculosus*  
*Ectocarpus pyliella*  
*Cladophora* sp.  
*Ruppia* sp.  
*Lamprothamnium papulosum*<sup>\*\*e,f</sup>  
*Vaucheria* sp.  
*Cerastoderma glaucum*<sup>a,f</sup>  
*Carcinus maenas*  
*Corophium insidiosum*<sup>f</sup>  
 glycerid  
*Idotea chelipes*<sup>f</sup>  
*Chironomus salinarius*  
*Amphipholis aculeata*  
*Gasterosteus aculeatus*.

In addition, eel and juvenile bass and flounder were found in a 1985 survey by Shabbeer.

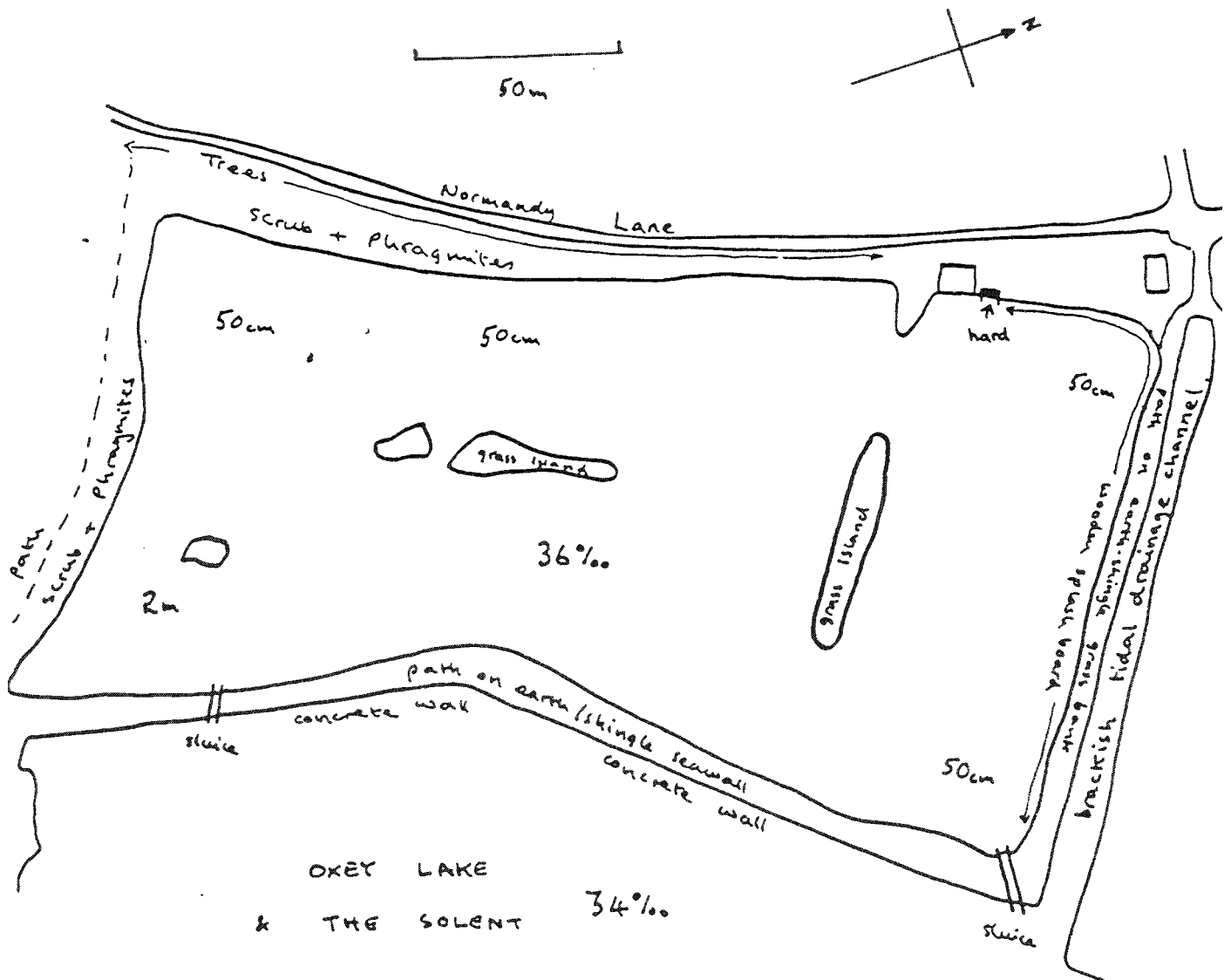
*Armandia* sp. a polychaete, is either a species new to Britain or new to science. Its taxonomic relationship to other species in the genus is under study.

The presence of *Lamprothamnium*<sup>\*\*e,f</sup>, *Nematostella*<sup>\*\*e,f</sup>, *Gammarus insensibilis*<sup>\*\*a,e,f</sup> and *Armandia*<sup>a,e,f</sup>, together with a fairly diverse fauna make Eight Acre Pond one of the most important lagoon sites on the south coast of England, if not in Britain, well worthy of conservation and further study. The present, somewhat irregular, control of water level within Eight Acre Pond needs to be reviewed urgently if these populations are to be maintained.

## References

- SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

EIGHT-ACRE POND







SITE NAME:	Salterns Lagoon
LOCATION:	Hampshire
GRID REFERENCE:	SZ 328 935
TYPE / CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, NNR, cSAC
AREA (ha):	0.094
MAX DEPTH (m):	0.80
SALINITY (‰):	36
ADJACENT HABITATS:	?
SURVEY DATE:	1984
SURVEYOR:	M Sheader & A Sheader

## Lagoon Description

The system consists of two adjacent sites of old salterns (see Map 28, which is taken from Sheader & Sheader (1985a)), with the remains of the original retaining walls still evident. The first site, to the south of Eight Acre Pond is shallow, maximum depth 20cm, and contains a little *Enteromorpha*, emergent *Salicornia* and an area of *Phragmites* and *Scirpus*. Although salinity was found to be 36ppt following high spring tides there is no obvious seawater or freshwater inputs.

In the second site behind the seawall bordering Oxy Lake the water was turbid with sediment. There was only a little *Enteromorpha* around the margins, and with emergent *Scirpus maritima* on the western end of the lagoon. Macrofauna was absent from weed and sediment samples. Salinity here too was 36ppt. There is a newly constructed culvert entering this lagoon from Oxy Lake through the seawall allowing water to enter at high tide. Depth in the lagoon varies between 20 and 80cm.

The sediment at both sites was soft sandy mud with low levels of organic matter. Both sites are shallow whilst the second site also seemed relatively new. Both factors would contribute to the low species diversity recorded.

## Species present

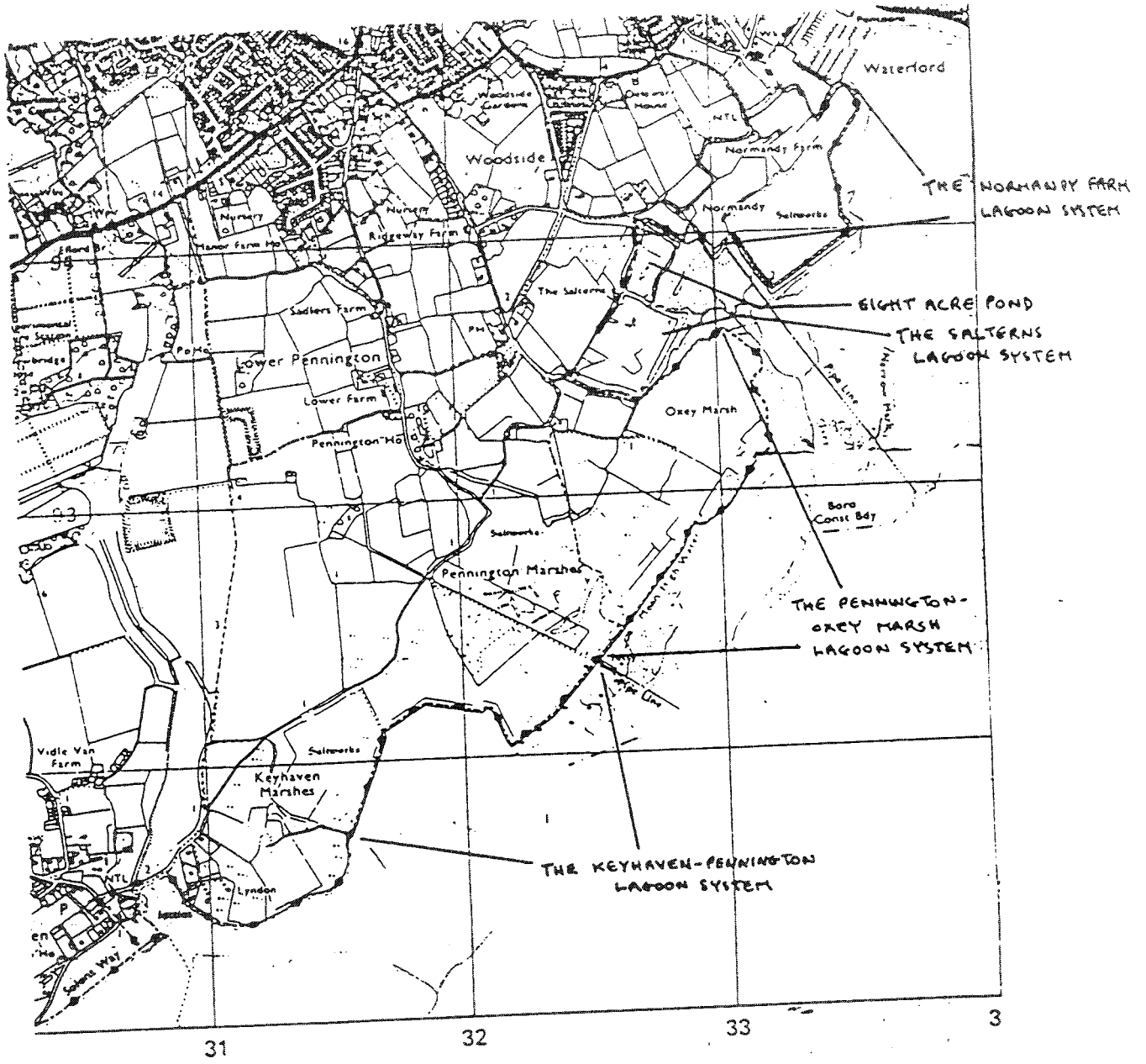
oligochaetes  
*Scirpus maritima*  
*Salicornia* sp.  
*Enteromorpha* sp.  
*Sphaeroma rugicauda*  
*Capitella capitata*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Corophium volutator*  
*Microdeutopus gryllotalpa*

## References

SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.





SITE NAME:	Pennington-Oxey Marsh System
LOCATION:	Hampshire
GRID REFERENCE:	SZ 326926
TYPE / CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, NNR, cSAC
AREA (ha):	2.27
MAX DEPTH (m):	0.5
SALINITY (‰):	12 - 37
ADJACENT HABITATS:	Saltmarsh
SURVEY DATE:	1984
SURVEYOR:	M Sheader & A Sheader

## Lagoon Description

A series of connected ditches and ponds behind the seawall (see MAP 29, which is taken from Sheader & Sheader (1985a)), 1.5km in length and running north-easterly from Pennington sewer to Oxey Lake. Along its landward edge there is grazed rough grassland with some freshwater marsh. Along the seaward edge a wide maintenance track runs along the inner edge of the seawall. The seawall is an earth embankment faced with concrete and stone.

At the eastern end the lagoon system consists of a narrow ditch (min 1m) upto 30cm deep. At three places in this eastern section the ditch widens to about 20m. The western end of the ditch system forms a more sizeable expanse of water, 500m in length with a maximum width of 50m and depth of 50cm.

Several ditches drain freshwater and seawater in time of flood from the surrounding agricultural/marshland. There are two connections through the seawall allowing seawater to enter at high tide consisting of pipes, 50cm in diameter passing about 10cm under the maintenance track and seawall to open at the top of extensive saltmarsh and mudflats. Even at low tide, virtually all sediment within the lagoon remains covered with water.

The lagoon is bordered by grass banks with emergent *Scirpus maritimus* and *Phragmites*, especially along the ditch sections, with occasional chumps of *Spartina* along the seaward margin. The sediment is firm mud-shingle and the submerged macroflora consisted of *Ulva latuca*, *Enteromorpha* sp., *Ruppia* sp. and *Chaetomorpha* sp.

## Species present

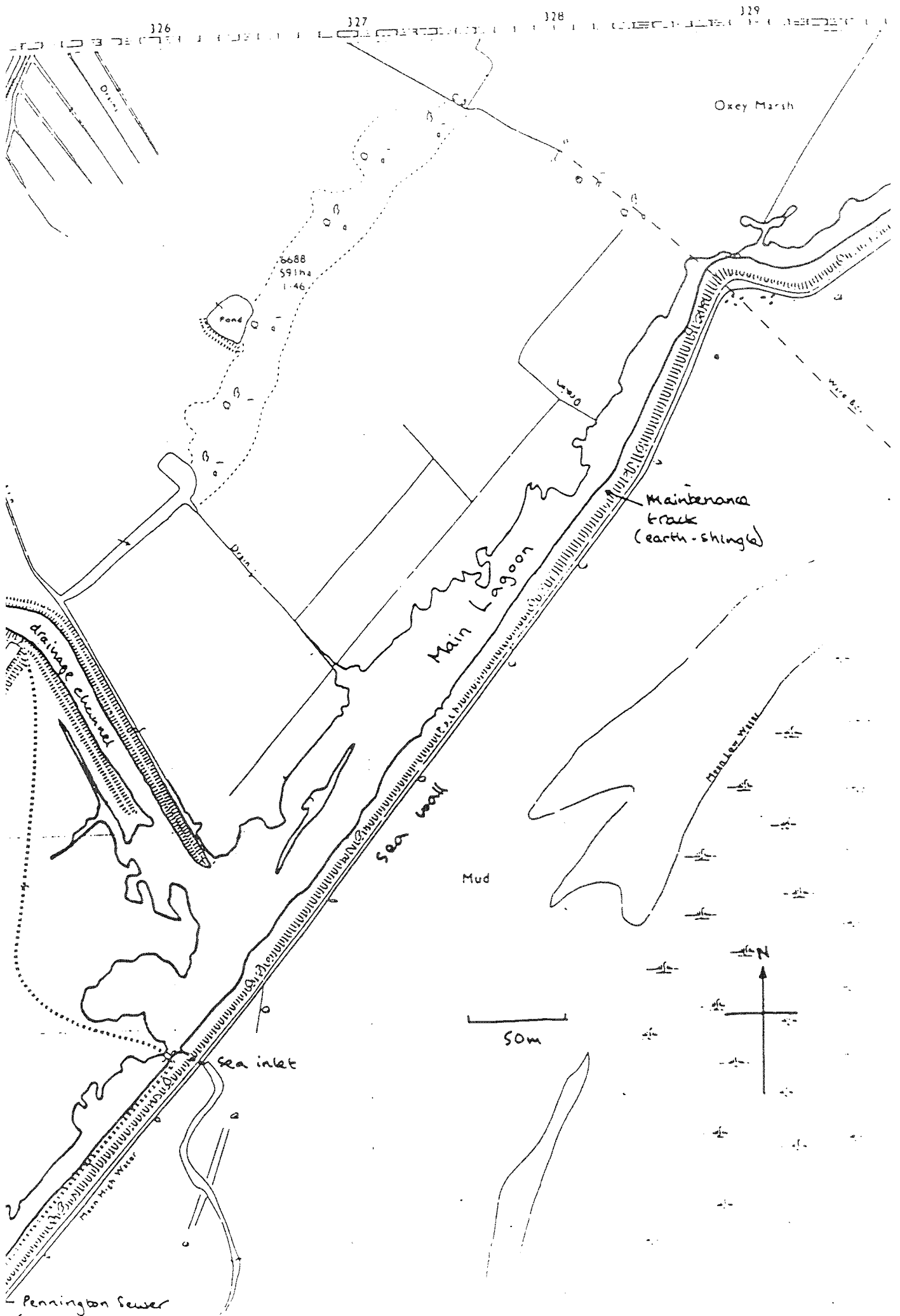
*Nematostella vectensis*<sup>\*\*e,f</sup>  
*Streblospio shrubsoli*  
 nemertine  
*Cirriformia tentaculata*  
*Fabricia stellata*  
*Manayukia aestuarina*  
*Hediste diversicolor*  
*Arenicola marina*  
*Abra tenuis*  
*Cerastoderma glaucum*<sup>a,f</sup>  
 oligochaetes  
*Gammarus insensibilis*<sup>\*\*e,f</sup>  
*Microdeutopus gryllotalpa*

*Sphaeroma rugicauda*  
*Halocladia varians*  
*Scirpus maritimus*  
*Ulva latuca*  
*Phragmites australis*  
*Enteromorpha* sp.  
*Spartina*  
*Ruppia* sp.  
*Chaetomorpha* sp.  
*Polydora ciliata*  
*Hydrobia ulvae*  
*Carcinus maenas*  
*Corophium volutator*  
*Melita palmata*  
*Idotea chelipes*<sup>f</sup>  
*Chironomus salinarius*  
insect larvae

This is very similar to the fauna found in the Keyhaven-Pennington system with high numbers of *Nematostella*<sup>\*\*a,e,f</sup> and *Gammarus insensibilis*<sup>\*\*a,e,f</sup>. The lagoon cockle, *Cerastoderma glaucum*<sup>a,f</sup> is an additional species in the Pennington-Oxey system.

## References

- SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.







SITE NAME:	Keyhaven-Pennington Lagoon System
LOCATION:	Keyhaven, Hampshire
GRID REFERENCE:	SZ 324923
TYPE / CLASSIFICATION:	Sluiced
DESIGNATION:	SSSI, NNR, cSAC
AREA (ha):	0.7
MAX DEPTH (m):	?
SALINITY (‰):	19 - 25
ADJACENT HABITATS:	Saltmarsh, rough grazing
SURVEY DATE:	1984
SURVEYOR:	M Sheader & A Sheader

## Lagoon Description

This is a series of connected ditches and ponds behind the seawall (see **Map 30**, which is taken from Sheader & Sheader (1985a)), stretching for 1.5 Km from Keyhaven marshes to Pennington marshes at the point where the Pennington sewer runs to the sea. Along the landward edge there is grazed rough grassland with some freshwater marsh, and along the seaward edge a wide maintenance track runs along the inner edge of the seawall. The seawall is an embankment faced with concrete and stone.

At the western end the lagoon system consists of a narrow ditch (max 2m wide, 1m deep) with an adjacent very shallow temporary pool with dimensions varying seasonally. *Salicornia* grows densely within this pool. At the eastern end of the system the ditch widens to 25m, although here too, a shallow temporary pond extends landwards into the grazed marshland. The maximum depth of the eastern section varies between 20 and 40cm.

Several ditches drain the surrounding agricultural/marshland bringing freshwater into the lagoon following periods of rainfall, and draining seawater from the marsh following occasional tidal inundation. There are two connections to the sea through the seawall, allowing water to enter at high tide. Each consists of a pipe approximately 50cm in diameter passing about 10cm under the maintenance track and seawall to open at the top of an extensive saltmarsh. One pipe opens at the western end and one midway along the lagoon system.

The western ditch section has grass banks with some emergent *Phragmites*, and contains mats of free floating *Ulva lactuca*. The sediment is an organic anoxic mud. The eastern section had similar emergent vegetation, with occasional clumps of *Spartina*. The submerged flora was more diverse with *Ulva latuca*, *Ruppia* sp. and *Chaetomorpha* sp. with the latter dominating over most of this section. The sediment varied from mud to muddy sand with a mixture of shingle giving a firm bottom for attachment of algae.

## Species present

*Nematostella vectensis*<sup>\*\*e,f</sup>  
 oligochaetes  
*Hediste diversicolor*  
*Fabricia stellata*  
*Streblospio shrubsoli*  
*Hydrobia ulvae*  
*Corophium insidiosum*<sup>f</sup>

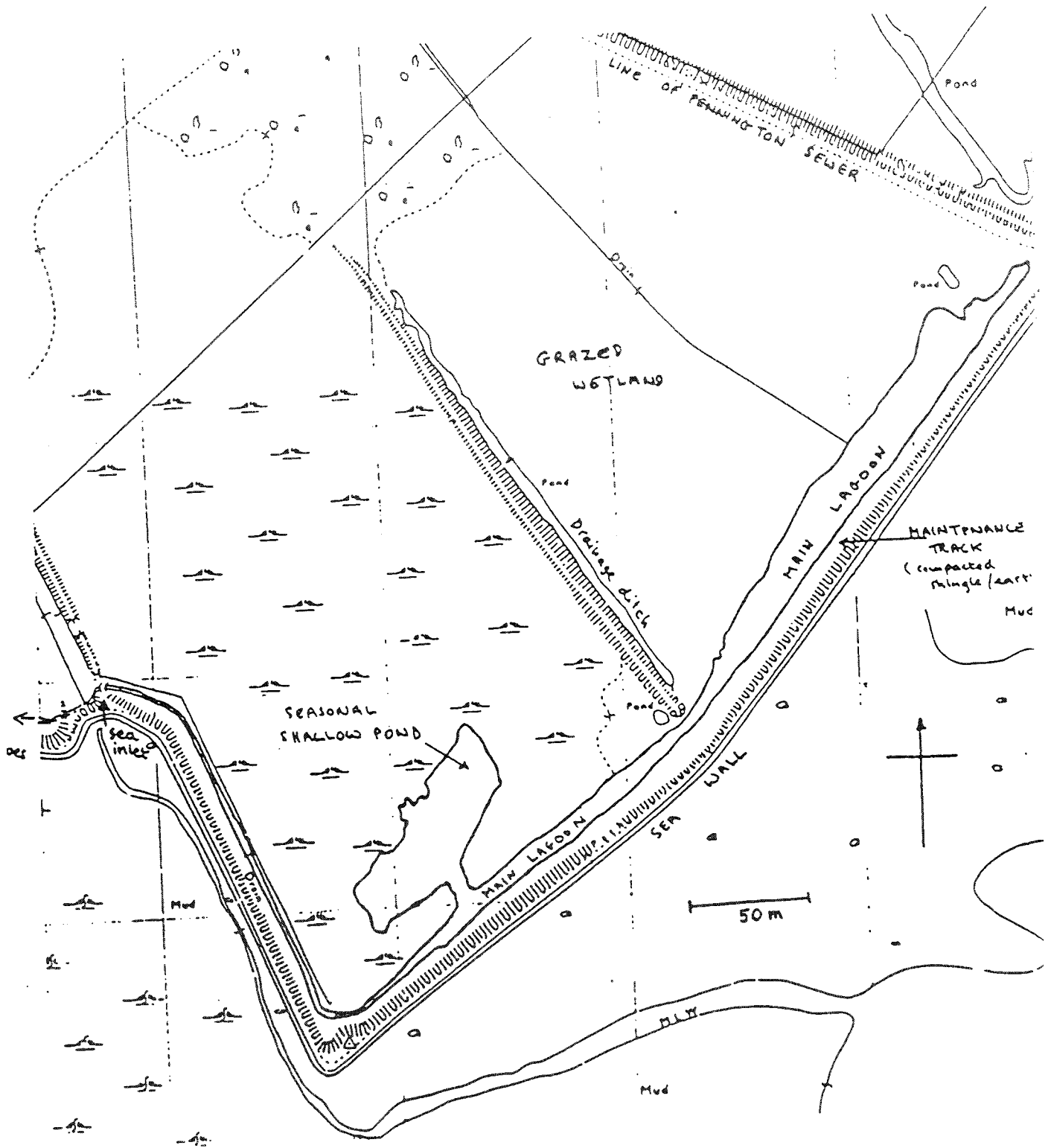
*Microdeutopus gryllotalpa*  
*Idotea chelipes*<sup>f</sup>  
*Chironomus salinarius*  
*Gasterosteus aculeatus*  
*Ulva lactuca*  
*Salicornia* sp.  
*Spartina* sp.  
*Chaetomorpha* sp.  
*Ruppia* sp.  
*Gammarus insensibilis*<sup>\*\*a,e,f</sup>  
*Melita palmata*  
*Sphaeroma rugicauda*  
*Palaemonetes varians*  
*Halocladia varians*  
*Pomatoschistus microps*

The eastern section of this lagoon exhibits higher species diversity. Here the starlet anemone *Nematostella*<sup>\*\*e,f</sup> reaches densities as high as 9000 m<sup>-2</sup>.

## References

- McDONAGH, L. & SHEADER 1991. *Deterioration in the biota of Widewater lagoon, west Sussex and colonisation of newly created lagoons at Normandy Farm, Lymington, Hampshire.* Department of Oceanography, University of Southampton.
- SHEADER, M., & SHEADER, A. 1991. *The current status of newly-formed saline lagoons at Normandy Farm, Lymington, (Hampshire).* CSD Report, No. 1204. Peterborough: Nature Conservancy Council.
- SHEADER, M., & SHEADER, A. 1990. *The impact of the severe winter storms of 1989/90 on the Keyhaven - Pennington and Pennington - Oxey marsh lagoons.* CSD Report, No. 1203. Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.*
- SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- HAMP CC & NEW FOREST DISTRICT COUNCIL, 1979. *Lymington - Keyhaven coastal management plan* (Draft Plan September 1979) New Forest District Key No. 7/55.
- IRVING, R. 1987. *The Hampshire Coast: a compendium of sites of nature conservation importance.*

THE KEYHAVEN-PENNINGTON LAGOON SYSTEM





SITE NAME:	Fort Gilkicker Moat
LOCATION:	Gosport, Hampshire
GRID REFERENCE:	SZ 608 978
TYPE/CLASSIFICATION:	Sluiced
DESIGNATION:	Gilkicker Lagoon SSSI, cSAC
AREA (ha):	4.26
MAX DEPTH (m):	0.8
SALINITY (‰):	15-42
ADJACENT HABITATS:	Golf Course
SURVEY DATE:	1984
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

The present day lagoon consists of a landward pond (area 1.3ha) and a large seaward pond (area 3ha) situated in the grounds of a golf course (see Map 31, which is taken from Sheader & Sheader (1985a)). There is a storm drain on the north-east margin of the landward lagoon which occasionally contributes a small amount of freshwater to the system. Brackish water also enters occasionally on the northwest corner of the seaward lagoon when the groundsmen use a pump to remove water from a channel draining the golf course. The seawater enters the system through a pipe running through the sea wall to the beach. The sluice is permanently open with seawater entering at most high tides. Maximum tidal range in the lagoon is 20cm, with a sill maintaining the level and resulting in very little sediment being experienced at low water (<<1%). A broad channel leads from the seaward lagoon to the sea outfall.

Both lagoons are surrounded by golf course turf, with clumps of gorse on the eastern margins. The western and southern margins consist of rougher gorse with occasional brambles and bushes. The banks of the upper lagoon form shallow cliffs (<40cm). The banks of the lower lagoon vary between 50cm on the eastern side to 1m on the western edge. The southern edge shows signs of erosion with parts of the earth bank collapsing into the lagoon.

The bank of the seawater channel in a gradually shelving area with *Salicornia* marsh. Sediments vary between soft mud to fine muddy sand with shingle, muds dominating in the upper lagoon, with fine muddy sand on the eastern side of the lower lagoon. The maximum depth (at low water) in both lagoons is about 80cm, with an overall depth in the lower lagoon of around 40-50cm.

There is a marked seasonal pattern in salinity. In the winter values can fall as low as 15‰ with lowest salinity in the landward lagoon, whereas in dry summers (eg 1984) values of 42‰ have been recorded with highest salinities in the landward lagoon. However, the sea channel leading to the sluice maintains a salinity of 34-35‰ at all times.

## Species present

*Nematostella vectensis*\*\*<sup>e,f</sup>  
*Actinia equina*  
 nemertine  
 oligochaetes (4 species)  
*Capitella capitata*  
*Malacoceros fuliginosa*

*Pygospio elegans*  
*Eteone* sp.  
 syllid  
*Caulleriella caputesocis* aeolid  
*Abra tenuis*  
*Hydrobia ulvae*  
*Cerastoderma glaucum*<sup>a,f</sup>  
*Macoma* sp.  
*Corophium insidiosum*<sup>f</sup>  
*Melita palmata*  
*Neomysis integer*  
*Sphaeroma rugicauda*  
*Palaemonetes varians*  
 bryozoan  
*Phragmites australis*  
*Chaetomorpha* sp.  
*Ruppia cirrhosa*<sup>f</sup>  
*Lamprothamnium papulosum*<sup>\*\*e,f</sup>  
*Sargassum muticum*<sup>d</sup>  
*Ulva lactuca*  
*Enteromorpha* sp.  
*Spirorbis* sp.  
*Arenicola marina*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Limapontia* sp.  
*Littorina saxatilis tenebrosa*<sup>f</sup>  
*Carcinus maenas*  
*Gammarus insensibilis*<sup>\*\*a,e,f</sup>  
*Microdeutopus gryllotalpa*  
*Idotea chelipes*<sup>f</sup>  
 ostracods  
*Chironomus salinarius*  
*Gasterosteus aculeatus*

Flounders and eels are occasionally taken, and *Orchestia mediterranea* and *Ligia oceanica* can be found in marginal debris.

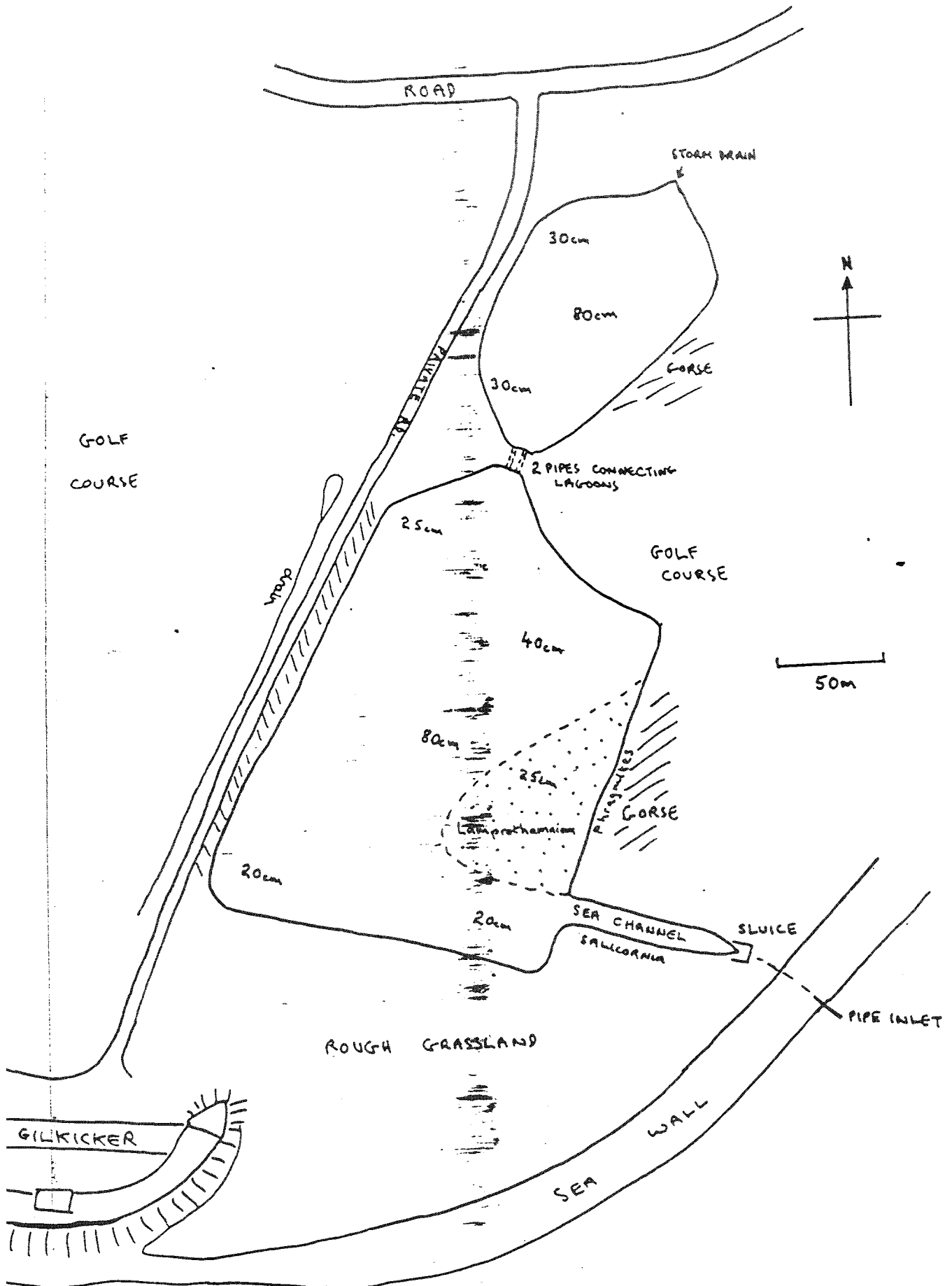
This is a lagoon with a high faunal and flora diversity for its size, containing three of the uncommon lagoonal species - *Nematostella vectensis*<sup>\*\*e,f</sup>, *G. insensibilis*<sup>\*\*a,e,f</sup> and *Lamprothamnium papulosum*<sup>\*\*e,f</sup>. It is a site worthy of conservation.

## References

- AL-SUURAILLEN (1992). *The ecology of a saline lagoon in Southern England*. Ph.D thesis University of Southampton.
- SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report*. (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report*. (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.)  
Peterborough: Nature Conservancy Council.

FORT GILKICKER MOAT LAGOON





SITE NAME:	Little Anglesey
LOCATION:	Gosport, Hampshire
GRID REFERENCE:	SZ 605 988
TYPE/CLASSIFICATION:	Sluiced and silled
DESIGNATION:	None
AREA (ha):	2.3
MAX DEPTH (m):	1
SALINITY (‰):	35
ADJACENT HABITATS:	Urban
SURVEY DATE:	1984
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

Little Anglesey is a lagoon formed by the construction of a viaduct and sill at the western (see Map 32, which is taken from Sheader & Sheader (1985a)), extremity of Stoke Lake, a sea inlet running via Haslar Lake to the western side of Portsmouth Harbour. This is an adjacent habitat lagoon with Little Anglesey Road, backed by houses, forming the northern margin. A hard muddy shingle sediment shelves gradually from the road into the lagoon with no marginal vegetation. The gardens of private houses and a church hall back onto the southern margin, with a narrow band of rough grass/saltmarsh vegetation.

The sea channel, 5m wide, runs over a metal sill which lies under an iron viaduct on the eastern margin. At the time of visit, water in the lagoon was level with the sill, and some 50cm higher than the water in Stoke Lake. The depth near the outflow is 2m, with a maximum depth in the centre of the lagoon of around 1m. The shore shelves gradually, especially on the northern margin, where the depth is 50cm at 5m from the edge. The substrate throughout the lagoon is a firm, muddy shingle with softer mud along the middle section of the lagoon.

Water enters the lagoon at spring tides but the water level is maintained by the sill. This results in a relatively small area of shore being exposed (2-3m wide) mainly on the northern margin.

## Species present

*Sagartia* sp.  
*Nemertine*  
 hydroid  
*Bugula* sp.  
 bryozoa  
 oligochaetes  
*Capitella capitata*  
*Hediste diversicolor*  
*Polydora ciliata*  
*Spirorbis* sp.  
*Malacoceros fuliginosa*  
*Arenicola marina*  
*Limapontia* sp.  
*Macoma balthica*

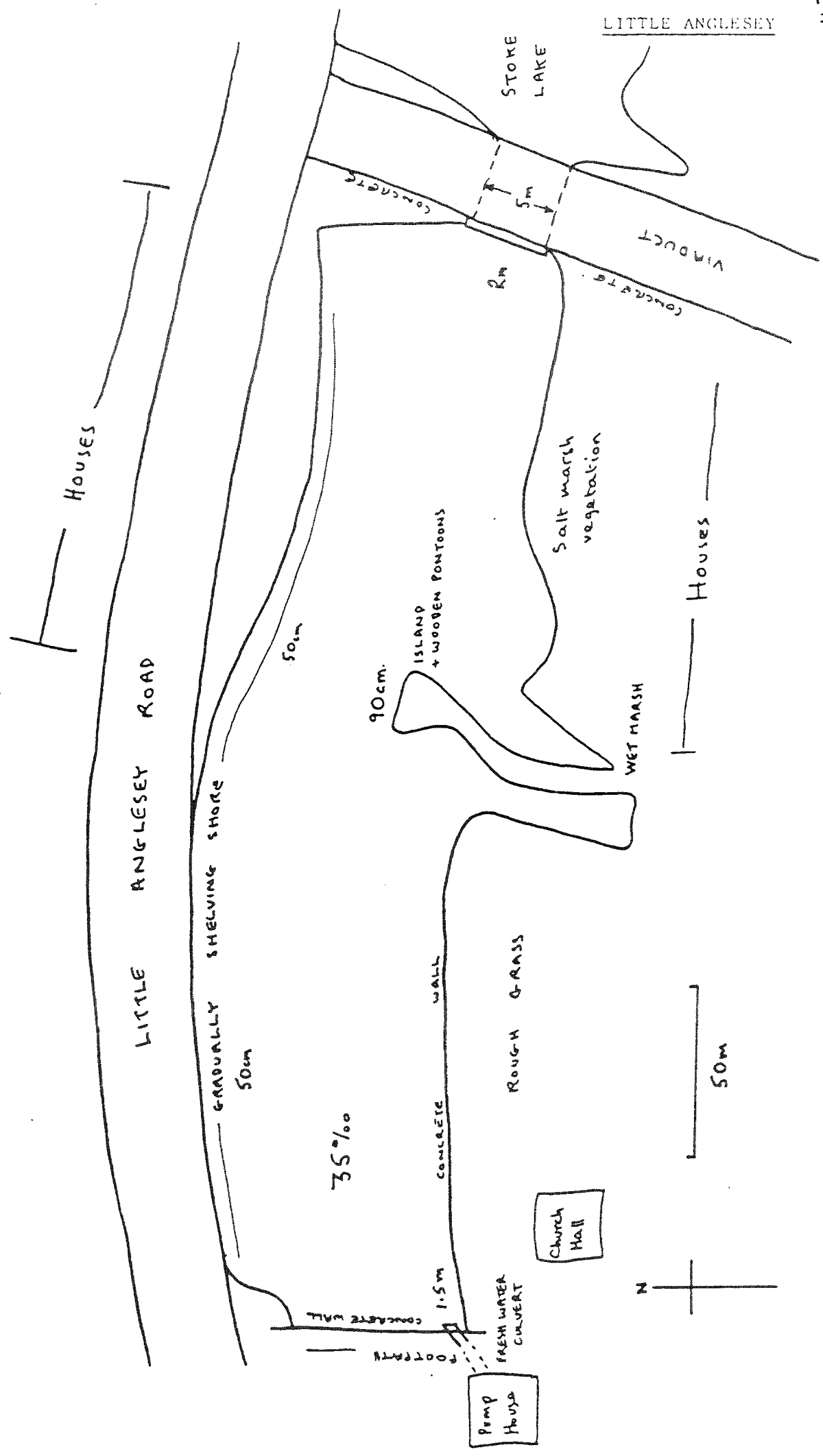
*Littorina littoralis*  
*Hydrobia ventrosa*<sup>a,f</sup>  
*Palaemonetes varians*  
*Gammarus insensibilis*<sup>\*\*a,e,f</sup>  
*Corophium lacustre*<sup>e</sup>  
*Corophium volutator*  
*Phtisica marina*  
*Idotea chelipes*<sup>f</sup>  
*Tanais dulongii*  
*Amphipholis aculeata*  
*Phragmites australis*  
*Spartina* sp.  
*Salicornia* sp.  
*Enteromorpha* sp.  
*Ulva* sp.  
*Chaetomorpha* sp.  
*Vaucheria* sp.  
*Sargassum* sp.<sup>d</sup>  
*Elachista* sp.  
*Gracillaria* sp.  
*Ascophyllum nodosum*  
*Fucus spiralis*  
*Mercenaria mercenaria*<sup>d</sup>  
*Cerastoderma glaucum*<sup>a,f</sup>  
*Hydrobia ulvae*  
*Carcinus maenas*  
*Aora gracilis*  
*Gammarus locusta*  
*Corophium insidiosum*<sup>f</sup>  
*Chelura terebrans*  
*Limnoria lignorum*  
*Praunus flexuosus*  
*Halocladia varians*  
*Gasterosteus aculeatus*

With 37 macrofaunal and 9 macroalgal species, this lagoon is particularly diverse. Little attention was given to the deep central area. The lagoon certainly deserves further study.

SHEADER, M. & SHEADER A. [1989]. *Lagoon survey of the south coast, Dorset to East Sussex. Final Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985a. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Field Report.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER A. 1985b. *A survey of brackish coastal lagoons Sussex to Dorset, 1984-85. Appendix to the Field Report: Record Sheets.* (CSD Report, No. 739.) Peterborough: Nature Conservancy Council.



50m

Pump House

Church Hall

FRESH WATER CUVERT

CONCRETE WALL

ROUGH GRASS

WET MAASH

SALT MARSH vegetation

ISLAND + WOODEN PONTOONS

90cm

2m

STOKE LAKE

WINDUCT

CONCRETE

50cm

GRADUALLY SHELIVING SHORE

LITTLE ANGLESEY ROAD

Houses

Houses



SITE NAME:	Bembridge Harbour Lagoon
LOCATION:	Bembridge, Isle of Wight
GRID REFERENCE:	SZ 636 884
TYPE/CLASSIFICATION:	Isolated Lagoon
DESIGNATION:	SSSI, cSAC
AREA (ha):	2.0
MAX DEPTH (m):	0.50
SALINITY (‰):	26
ADJACENT HABITATS:	Marshland
SURVEY DATE:	September 1987
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

### Lagoon Description

This lagoon is located in a depression behind the sea wall and coast road on the southern margin of Bembridge Harbour (see Map 33, which is taken from Sheader & Sheader (1987b)).

The northern margin is bounded by the sea wall, coast road and small boatyards, with a bank of scrub vegetation leading down to the lagoon. The eastern margin is formed by the private road to Harbour Farm, and the southern margin by a raised track marking the line of the dismantled narrow-gauge coastal railway. The western margin is formed by a low embankment and drainage ditch leading from Brading Marshes.

The lagoon is shallow (maximum depth about 50cm), with a sediment of soft bare mud. There is no obvious freshwater input, and no direct channel connecting the lagoon to the harbour. Water presumably enters by percolation from the harbour, with perhaps some lateral percolation to the adjacent Harbour Farm Lagoon I. Brackish water may also enter the lagoon by drainage ditch from the estuary of the River Yar via Brading Marshes.

The eastern and northern margins have stands of marginal *Phragmites*. The southern margin consists of *Salicornia*-dominated saltmarsh, with a group of dead trees, probably dating from the time of saline flooding of the area.

The sediment surface is for the most part bare, with an incredibly high density of *Nematostella vectensis*<sup>\*\*e,f</sup>. Mats of blue-green algae are present at the shallow margins, with a small amount of *Enteromorpha* sp. attached to hard surfaces such as wood debris.

### Species present

*Nematostella vectensis*<sup>\*\*e,f</sup>

*Lineus* sp.

*Sphaeroma rugicauda*

*Corophium volutator*

chaoborid sp.

*Enteromorpha* sp.

*Capitella capitata*

*Gammarus duebeni*

*Corophium insidiosum*<sup>f</sup>

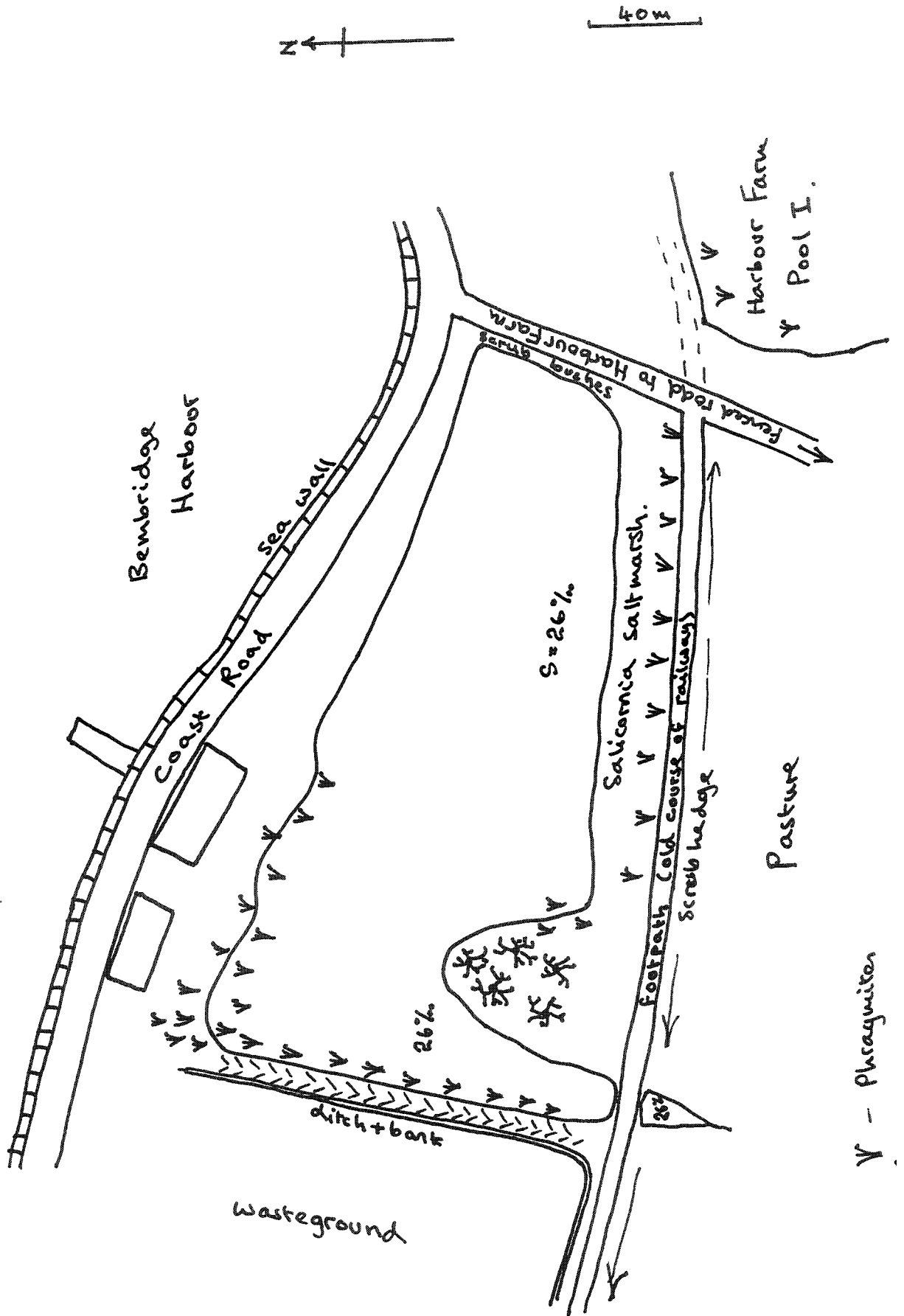
This is an interesting site in that it has formed recently by changes in the pattern of percolation in the area. It is a fairly rich lagoon for one which is so recently formed, and it is probable that most of the species have been acquired from the adjacent Harbour Farm Lagoon I. The high numbers of *Nematostella*<sup>o.e.f</sup> on the bare mud surface suggest that the species is best adapted for new habitats, though, at lower densities, remains as a member of the more diverse communities associated with certain older lagoons in the Solent area.

The lagoon is owned by Bembridge Harbour Company, who have proposed to build a marina on the harbour margin adjacent to the lagoon. This would undoubtedly affect the percolation of seawater to the pond.

## References

- SHEADER, M. & SHEADER, A. 1987a. *A lagoon survey of the Isle of Wight. Final Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER, A. 1987b. *A lagoon survey of the Isle of Wight. Field Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER, A. 1987c. *A lagoon survey of the Isle of Wight. Progress Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.

# BEMBRIDGE HARBOUR LAGOON



V - Phragmites





SITE NAME:	Harbour Farm Lagoon I
LOCATION:	Bembridge, Isle of Wight
GRID REFERENCE:	SZ 638 883
TYPE/CLASSIFICATION:	Isolated Lagoon
DESIGNATION:	Part of Brading Marshes SSSI, cSAC
AREA (ha):	4.7
MAX DEPTH (m):	0.50
SALINITY (‰):	16.00
ADJACENT HABITATS:	Grazed pasture
SURVEY DATE:	September 1987
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

## Lagoon Description

The lagoon is situated behind the sea wall and coast road on the southeastern side of the Bembridge Harbour, and at the northeastern edge of Brading Marshes (see Map 34, which is taken from Sheader & Sheader (1989b)). It is owned by the Bembridge Harbour Company, who propose to develop the site seaward of the lagoon.

The lagoon is sited in grazed pasture, with a copse of trees on the eastern margin. A raised track (the course of the dismantled coastal railway) skirts the northeastern edge of the lagoon. There is a small area of wet saltmarsh between the track and the coast road.

The lagoon sediment is a fine sand. There are no obvious marine and freshwater inputs, and it must be assumed that brackish water enters by percolation from the harbour, or from the surrounding Brading Marshes.

## Species present

*Nematostella vectensis*<sup>\*\*e,f</sup>  
*Hydrobia ventrosa*<sup>a,f</sup>  
 oligochaetes  
*Streblospio shrubsoli*  
*Sphaeroma rugicauda*  
*Jaera ischiosetosa*  
*Gammarus duebeni*  
*Corophium insidiosum*<sup>f</sup>  
*Neomysis integer*  
 Ostracod sp.  
 chaoborid sp.  
*Lipura maritima*  
*Canopeum seurati*<sup>f</sup>  
*Phragmites australis*  
*Scirpus maritimus*  
*Potamogeton pectinatus*  
 Chaetomorpha sp.  
 Enteromorpha sp.  
*Lamprothamnium papulosum*<sup>\*\*e,f</sup>  
*Gammarus zaddachi*  
*Corophium volutator*

*Palaemonetes varians*  
chironomids (2 spp)  
coleoptera (2 spp)  
insect larva  
*Pomatoschistus* sp.

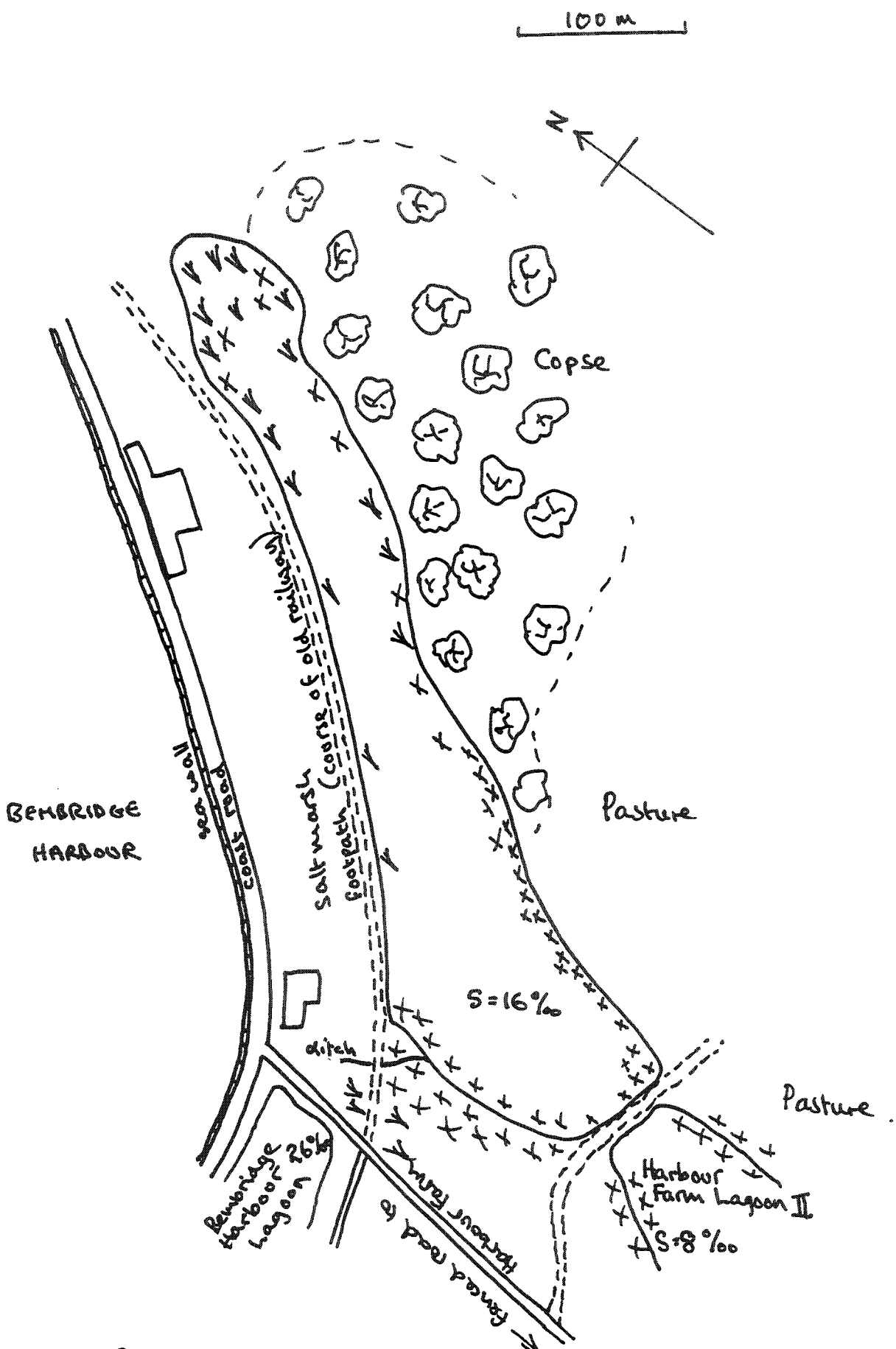
This site is of great interest in that two of the lagoonal species recently protected under the Wildlife and Countryside Act occur here. Indeed this is the type locality for *Nematostella vectensis*<sup>21</sup>. The species diversity is high. The site is possibly under threat by the proposed marina development, which would undoubtedly affect the saline input to the lagoon, almost certainly resulting in the loss of these protected species.

## References

- SHEADER, M. & SHEADER, A. 1987a. *A lagoon survey of the Isle of Wight. Final Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER, A. 1987b. *A lagoon survey of the Isle of Wight. Field Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.
- SHEADER, M. & SHEADER, A. 1987c. *A lagoon survey of the Isle of Wight. Progress Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.

HARBOUR FARM LAGOON I

MAP 34.



X - Scirpus



SITE NAME:	Harbour Farm Lagoon II
LOCATION:	Bembridge, Isle of Wight
GRID REFERENCE:	SZ 636 880
TYPE/CLASSIFICATION:	Isolated Lagoon
DESIGNATION:	Part of Brading Marshes SSSI, cSAC
AREA (ha):	3.2
MAX DEPTH (m):	0.30
SALINITY (‰):	8.0
ADJACENT HABITATS:	Pasture and woodland
SURVEY DATE:	September 1987
SURVEYOR:	M Sheader & A Sheader
MANAGEMENT:	

### Lagoon Description

This lagoon is sited landwards of Harbour Farm Lagoon I, from which it is separated by a farm track and is surrounded by pasture with a small copse of trees on the eastern side. The southern tip is isolated from the main lagoon, and contains freshwater. The lagoon has formed as a result of reclamation of Brading Harbour (see Map 35, which is taken from Sheader & Sheader (1987b)).

There are no obvious fresh- or seawater inputs to the lagoon, and brackish water is assumed to percolate from the adjacent Harbour Farm Lagoon I, and to drain from the surrounding pasture of Brading Marshes. The sediment is a mixture of shingle, sand and mud, with organic detritus derived from extensive marginal reed beds.

### Species present

*Hydrobia ventrosa*<sup>a,f</sup>  
*Capitella capitata*  
*Sphaeroma rugicauda*  
*Gammarus zaddachi*  
chironomids (2 spp)  
*Scirpus maritimus*  
*Phragmites australis*  
*Potamogeton pectinatus*  
*Neomysis integer*  
dipteran larva

The species diversity is fairly low, but with most of the margin consisting of reed beds, access for sampling is limited, and the lagoon was probably under-sampled.

### References

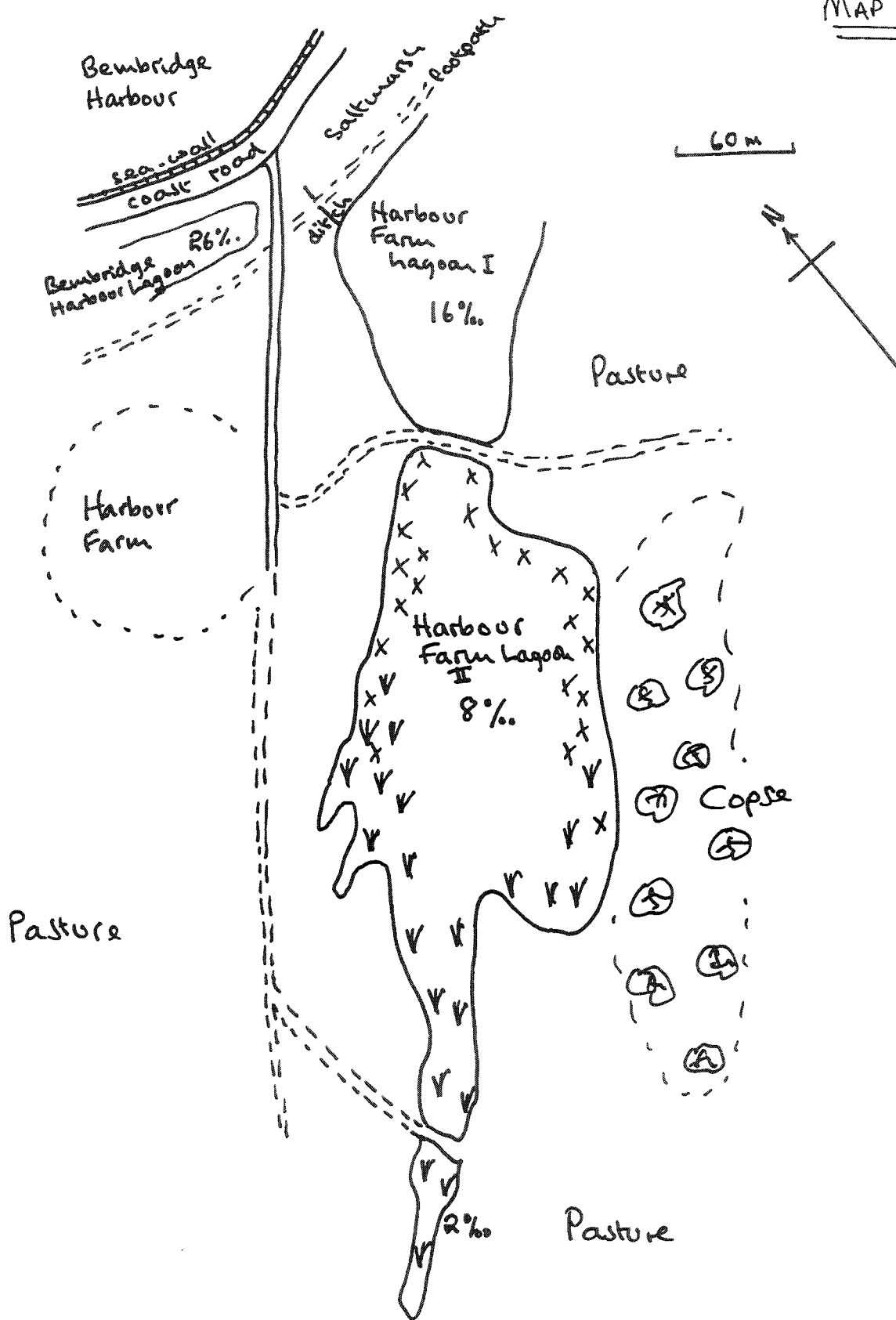
- COLLINS, K.J., HERBERT, R.J.H., & MALLINSON, J.J. 1990. The marine flora and fauna of Bembridge and St Helens, Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archeological Society*, 9: 41 - 85.
- SHEADER, M. & SHEADER, A. 1987a. *A lagoon survey of the Isle of Wight. Final Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER, A. 1987b. *A lagoon survey of the Isle of Wight. Field Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.

SHEADER, M. & SHEADER, A. 1987c. *A lagoon survey of the Isle of Wight. Progress Report.* (CSD Report, No. 820.) Peterborough: Nature Conservancy Council.

HARBOUR FARM LAGOON II

MAP 35



- x - Scirpus
- v - Phragmites
- (x) - trees





## GENERAL REFERENCES

- ADLE, M. 1986. *The lagoons and coastal ponds of southern England: a threatened habitat?* B.Sc. (Hon) project, University of Southampton (Environmental Sciences).
- ALLEN, J.R. 1992. *Hydrography, ecology and water quality management of the South Docks, Liverpool*. Ph.D. thesis, University of Liverpool.
- BAMBER, R.N., BATTEN, S.D., & BRIDGEWATER, N.D. 1991. *On the ecology of brackish water lagoons in the UK*. (Contractor: University of Southampton, Fawley Marine Biological Unit, Southampton.).
- BAMBER, R.N., BATTEN, S.D., & BRIDGEWATER, N.D. 1993. Design criteria for the creation of brackish lagoons. *Biodiversity and Conservation*, 2: 127-137.
- BAMBER, R.N., BATTEN, S.D., SHEADER, M., & BRIDGEWATER, N.D. 1992. On the ecology of brackish water lagoons in Great Britain. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 2: 65-94.
- BARNES, R.S.K. 1980. *Coastal lagoons: the natural history of a neglected habitat*. Cambridge, Cambridge University Press. (Studies in Modern Biology.)
- BARNES, R.S.K. 1985. Coastal saline lagoons of East Anglia, U.K. (Contractor: University of Cambridge, Department of Zoology, Cambridge.) *Nature Conservancy Council, CSD Report*, No. 600.
- BARNES, R.S.K. 1988. The coastal lagoons of Britain: an overview. (Contractor: University of Cambridge, Department of Zoology, Cambridge.) *Nature Conservancy Council, CSD Report*, No. 933.
- BARNES, R.S.K. 1991. Dilemmas in the theory and practice of biological conservation as exemplified by British coastal lagoons. *Biological Conservation*, 55: 315-328.
- BARNES, R.S.K. 1991. European estuaries and lagoons: a personal overview of problems and possibilities for conservation and management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 1: 79-87.
- BARNES, R.S.K. 1991. Macrofaunal community structure and life histories in coastal lagoons. In: *Coastal lagoon process*, ed. by B. Kjerfve. Amsterdam, Elsevier.
- BARNES, R.S.K. 1994. The coastal lagoons of Europe. *Coastline*, 3: 3-8.
- BARNES, R.S.K. 1994. *Macrofaunal community structure and life histories in coastal lagoons*. In: *Coastal Lagoon Processes* edited by B. Kjerfve (Elsevier Oceanography Series, 60): 311-361.
- BEARDALL, C.H., DRYDEN, R.C., & HOLZER, T.J. 1988. The Suffolk estuaries. A report by the Suffolk Wildlife Trust on the wildlife and conservation of the Suffolk estuaries. Segment Publications for Suffolk Wildlife Trust, Saxmundham.
- BOYDEN, C.R., & RUSSELL, P.J.C. 1972. The distribution and habitat of the brackish water cockle (*Cardium*, *Cerastoderma glaucum*) in the British Isles. *Journal of Animal Ecology*, 41: 719-734.

- BRATTON, J.H. ed. 1991. British Red Data Books: 3. Invertebrates other than insects. Peterborough, Joint Nature Conservation Committee.
- CARR, A.P. 1981. Chesil Beach: aspects of its structure, stability and the processes acting upon it. In: *The Fleet and Chesil Beach. Structure and biology of a unique coastal feature*, ed. by M. Ladle, 9-14. Dorchester, Dorset County Council for Fleet Study Group.
- CHERRILL, A.J., & JAMES, R. 1985. The distribution and habitat preferences of four species of Hydrobiidae in East Anglia. *Journal of Conchology*, 32: 123-133.
- CONLAN, K. 1987. The hydrography and ecology of Preston Docks and upper Ribble estuary. M.Sc. thesis, University of Manchester, Department of Environmental Biology.
- ENO, N.C. 1993. Pacific oyster spatfall monitoring in the Fleet lagoon as part of the JNCC's survey of non-native marine species. In: *The Fleet Lagoon and Chesil Beach Symposium*, 16 October 1993.
- ENO, N.C. 1994. Monitoring of temperature regimes to which the Pacific oyster *Crassostrea gigas* is subject to in coastal inlets in Britain (the Fleet lagoon and Teign and Dart estuaries) in relation to their reproductive success. In: 82nd ICES Statutory Meeting, St Johns, Newfoundland, Canada. Copenhagen, International Council for the Exploration of the Sea.
- ENO, N.C., & Seaward, D.R. In prep. A year's temperature recording in the Fleet lagoon and the Teign and Dart estuaries (March 1993-March 1994) in relation to Pacific oyster reproduction. Joint Nature Conservation Committee Report, No. 200.
- ENVIRONMENTAL RESOURCES Ltd. 1989. *Assessment of thermal discharge to cavendish dock, Barrow-in-Furness*. (Contractor: Environmental Resources Ltd, London.) Unpublished report to Lakeland Power Ltd. Ferreira, S., & Seeliger, U. 1985. The colonisation process of algal epiphytes on *Ruppia maritima* L. *Botanica Marina*, 26: 245-249.
- FOWLER, S.L. & SHEADER, M. 1992. *Feasibility study for the lagoon sandworm Armandia cirrhosa under the Species Recovery Programme*. Report to English Nature.
- FOWLER, S.L. & SHEADER, M. 1993. *Report for the Species Recovery Programme: on the lagoon sandworm (Armandia cirrhosa)*. Report to English Nature.
- HEEREBOUT, G.R. 1970. A classification system for isolated brackish inland waters, based on median chlorinity and chlorinity fluctuation. *Netherlands Journal of Sea Research*, 4: 494-503.
- HEIP, C., & HERMAN, R. 1979. Production of *Nereis diversicolor* O.F. Müller (Polychaeta) in a shallow brackish-water pond. *Estuarine and Coastal Marine Science*, 8: 297-305.
- HENDRY, K., WHITE, K.N., CONLAN, K., JONES, H.D., BEWSHER, A.D., PROUDLOVE, G.S., PORTEOUS, G., BELLINGER, E.G., & HAWKINS, S.J. 1988. *Investigation into the ecology and potential use for nature conservation of disused docks*. CSD Report, No. 848. Peterborough: Nature Conservancy Council.
- HENDRY, K., & WOODWARD, J. 1988. *The ecology of Cavendish Dock (Barrow-in-Furness, Cumbria)*. (Contractor: University of Manchester, Department of Environmental Biology, Manchester.) Unpublished report to Nature Conservancy Council.

- IRVING, R. 1987. The Hampshire coast. A compendium of sites of nature conservation importance. (Contractor: R. Irving, London.) Unpublished report to Hampshire County Council.
- KJERFVE, B. (ed.) 1994. *Coastal Lagoon Processes*. (Elsevier Oceanography Series, 60) Elsevier Science Publications.
- MARKPWSKI, S. 1962. Faunistic and ecological investigations in Cavendish Dock, Barrow-in-Furness. *Journal of Animal Ecology*, 31: 43-52.
- MASON, C.F. 1986. Invertebrate populations and biomass over four years in a coastal, saline lagoon. *Hydrobiologia*, 133: 21-29.
- McDONAGH, L. 1991. A study of the changes in lagoon communities in response to habitat deterioration and regeneration. Unpublished, Department of Oceanography, Southampton University.
- McLEOD, M.A. 1975. An ecological study of a brackish water pond. B.A. dissertation, University of Stirling, Department of Biology.
- MUNFORD, J.G. & LAFFOLEY, D. 1994. *The management of lagoons to conserve their natural heritage*. In: *Wetland Management*. Thomas Telford, London.
- PROBERT, P.K. 1981. Report on the shores of Lincolnshire and East Anglia. A biological survey of the littoral zone. Unpublished, Nature Conservancy Council. (Internal Report.)
- REMANE, A. 1971. Ecology of brackish water. In: *Biology of brackish water*. 2nd ed., ed. by A. Remane & C. Schlieper, 1-210. New York, John Wiley & Sons.
- REMANE, A., & SCHLIEPER, C. 1971. *Biology of brackish water*. 2nd ed. New York, John Wiley & Sons.
- ROBSON, E.A. 1957. A sea-anemone from brackish water. *Nature*, 179: 787-788.
- ROS, J. ed. 1989. Topics in marine biology. 22nd European Marine Biology Symposium, Barcelona, 1987. *Scientia Marina*, 53(2-3).
- SAVAGE, A.A. 1985. The biology and management of an inland saline lake. *Biological Conservation*, 31: 107-123.
- SEAWARD, D.R. 1985. Survey of coastal saline lagoons. Dorset and south Devon. (CSD Report, No. 570) Peterborough: Nature Conservancy Council.
- SHEADER, M., & SHEADER, A. 1988. A lagoon survey of the Portsmouth area. Portsmouth to Selsey. (CSD Report No. 1177). Peterborough: Nature Conservancy Council.
- SHEADER, M., & SHEADER, A. 1989. *The coastal saline ponds of England and Wales: an overview*. CSD Report, No. 1009. Peterborough: Nature Conservancy Council.
- STEWART, N.F., & CHURCH, J.M. 1992. *Red data books of Britain and Ireland: stoneworts*. Peterborough, Joint Nature Conservation Committee.

- THORPE, W.H. 1927. The fauna of brackish pools on the Sussex coast. *South-Eastern Naturalist and Antiquary*, 32: 27.
- VALLEJO, S.M.A. 1982. Development and management of coastal lagoons. In: *Proceedings International Symposium on coastal lagoons, Bordeaux, France, 8-14 September 1981*, ed. by P. Lassere & H. Postma, *Oceanologica Acta*, 397-401.
- WILLIAMS, R.B. 1972. Notes on the history and invertebrate fauna of a poikilohaline lagoon in Norfolk. *Journal of the Marine Biological Association of the United Kingdom*, 52: 945-963.
- WILLIAMS, R.B. 1973. The significance of saline lagoons as refuges for rare species. *Transactions of the Norfolk and Norwich Naturalists' Society*, 22: 387-392.
- WILLIAMS, R.B. 1976. Conservation of the sea anemone *Nematostella vectensis* in Norfolk, England and its world distribution. *Transactions of the Norfolk and Norwich Naturalists' Society*, 23: 257-266.
- WILLIAMS, R.B. 1987. The current status of the sea anemone *Nematostella vectensis* in England. *Transactions of the Norfolk and Norwich Naturalists' Society*, 27: 371-374.
- WILLIAMS, R.B. 1988. The current status of the sea anemone *Nematostella vectensis* in England. A correction. *Transactions of the Norfolk and Norwich Naturalists' Society*, 28: 50.
- WOLFF, W.J. 1972. Origin and history of the brackish water fauna of north west Europe. In: *5th European marine biology symposium, Venice, 5-11 October 1970*, 11-18.