



Survey of the brackish pools  
on the King's Marshes  
Orfordness, Suffolk - 1994

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**Survey of the brackish pools on the King's Marshes  
Orfordness, Suffolk - 1994**

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# Summary

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In 1994 English Nature commissioned a survey from Dr RSK Barnes, St Catharine's College, Cambridge to report on the aquatic fauna of the series of large brackish pools on the King's Marshes, Orfordness, Suffolk. The information was gathered during a visit to the site in September 1994.

English Nature identified a series of nine pools to be investigated. All pools supported submerged stands of the tasselweed *Ruppia*, with which, as in lagoons in general, many of the animals were associated. A number of specialist lagoonal species after JNCC (1996) were found including the Starlet sea anemone *Nematostella vectensis*.

# Survey of the brackish pools on the King's Marshes

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## 1. Introduction

### 1.1 Background

Saline lagoons are listed as a priority marine habitat type under Annex I of the EC Habitats Directive (Council of the European Communities 1992). Although a survey of the saline lagoon resource in England had been carried out for the NCC and reported in the Saline Lagoon Directory (Smith & Laffoley 1992) little was known about the lagoons on the King's Marshes. Therefore, in 1994 English Nature contracted Dr Richard Barnes, St Catharine's College, Cambridge to report on the aquatic fauna of the series of large brackish pools on the King's Marshes, Orfordness, Suffolk.

The whole of the East Anglian coast is noteworthy for the number of saline lagoons found there (Barnes 1985). Several natural and artificial lagoons are located along the north Norfolk coast in the vicinity of Blakeney Point. And also along the Suffolk coast at Benacre, Covehithe, Easton Broads and from Orfordness to Havergate. The shingle structure of Orfordness is of great physiographic interest, being one of only three such structures in Great Britain (Duncan 1992). Behind the shingle are a series of lagoons stretching from Studborne Beach south of Aldeburgh to just north of Bawdsey. The importance of the site was recognised by its inclusion in a list of 27 sensitive marine areas (SMAs) drawn up by English Nature in 1994 (English Nature 1994).

Orfordness shingle spit covers an area of some 500 ha, the southern end of which has been a National Nature Reserve (NNR) since 1954. The southern end of the spit is regarded as being 'intact' but the rest of the sites has been used by the Ministry of Defence (MoD) since the First World War. In 1993 Orfordness was acquired by the National Trust (NT). They inherited a semi-industrial landscape of bare shingle crossed by concrete roads and dotted with derelict buildings some of which were designed for the testing of nuclear weapon triggers. Where military use had been less intensive there is secondary vegetation and a breeding colony of some 15,000 pairs of herring and lesser black-backed gulls. The property also includes saltmarsh, grazing marsh and brackish lagoons of which little was known (pers comm D. Rogers).

The site in question is now protected by a number of conservation designations being a SSSI (Site of Special Scientific Interest), NNR (National Nature Reserve) and a candidate SAC (Special Area of Conservation). In addition to all these it is also a National Trust reserve.

## 1.2 Aims and methods

The aim of the survey was to report on the aquatic fauna of nine pools as identified on a map supplied by English Nature (see Map 1): these nine pools being the largest of the pools on the site although many small pools also occur.

In addition to investigating the fauna, salinity measurements were to be taken. The idea being to provide information for use in any future management of these lagoons. The survey work was carried out by Richard Barnes during a single site visit in September 1994.

## 2. Results

### 2.1 Site information

King's Marshes, Orfordness, Suffolk is located behind a shingle spit which stretches from Studborne Beach south of Aldeburgh to just north of Bawdsey. The OS Grid Ref for the site is TM 445 450. The lagoons are located in saltmarsh behind the shingle and backed by the Rivers Ore and Alde and they are regarded as percolation pools after JNCC (1996).

Of the nine pools that were identified in the contract brief, two which were shown as separate on the map (see Map 1) and on OS maps, were at the time of Dr Barnes' visit (September 1994), one single pool with no sign of any division into two. These are marked '5' and '7' on Map 1. The pool marked '10' was also surveyed, although it was not marked for attention in the contract brief.

All the pools are connected to each other to a greater or lesser extent via the numerous drainage ditches that criss-cross the Marshes. The sides of the pools are straight-cut so that they descend more or less vertically some 0.5m to the lagoonal beds.

### 2.2 Salinity results

At the time of the visit, the salinity of the surveyed pools varied between 11 and 20 ‰, ie 31-57 % seawater. This, however, will vary seasonally with the evaporation/precipitation ratio and also with the extent of the sea-water incursion, and hence these September values should only be taken to be indicative of prevailing salinities. The freshwater component was found to be clearly derived from rainfall and it is most likely that the sea-water component enters continually by seepage through the shingle substratum and from Stony Ditch.

Because the pools are all connected to some extent salts can flow or diffuse through the whole system. The order of increasing salt concentration in the pools at the time of the visits runs:

- 9 & 10 (11‰)
- 3 (14-15‰)

- 2 (16‰)
- 5/7 (17-18‰)
- 1,4,6 & 8 (19-20‰)

### 2.3 Species sample results

The faunas of the individual pools are very similar, and it is likely that all the species recorded in Table 1 occur in all the pools. Where a species appears to be particularly abundant in only a few of the pools, however, such is noted parenthetically. The list is unlikely to be exhaustive, but it certainly includes the dominant elements in the fauna.

All pools supported submerged stands of tasselweed *Ruppia*, with which, as in lagoons in general, many of the animals are associated.

**Table 1. Species associated with the King's Marshes pools**

#### Plants

*Ruppia*

#### Sea anemones

*Nematostella vectensis*<sup>\*\**e,f*</sup> (particularly pool 9)

#### Worms

*Hediste diversicolor* (particularly pool 8)

#### Molluscs

*Hydrobia ventrosa*<sup>*a,f*</sup> (much the commoner of the two *Hydrobia* species)

*Hydrobia neglecta*<sup>*a,f*</sup> (particularly pool 8)

*Littorina saxatilis lagunae* (particularly - only? - pool 1)

*Cerastoderma glaucum*<sup>*a,f*</sup>

#### Crustaceans

*Idotea chelipes*<sup>*f*</sup>

*Sphaeroma monodi* (particularly pools 1, 2 & 4)

*Jaera albifrons*

*Gammarus deubeni*

*Gammarus oceanicus*

*Corophium volutator*

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

*Palaemonetes varians*

#### Bryozoans

*Electra crustulenta* (particularly pools 1 & 4)

#### Insects

*Sigara selecta*

chironomid larvae

## Fish

*Gasterosteus aculeatus*

### Key:

The following list of categories is used to identify those species which fall within defined categories of conservation interest, after Downie (in prep).

- \*\* Protected by the Wildlife & Countryside Act
- a In Britain known only from saline lagoon-like habitats (after JNCC 1996)
- e Rare marine benthic flora and fauna in GB (Sanderson 1996)
- f Specialist species after JNCC (1996)

### 3. Discussion

The sides of the pools were noted to be straight-cut descending more or less vertically to the lagoonal beds. These pools could be graded so that the angle is reduced which should not be detrimental to the contained lagoonal faunas, provided (to minimise disturbance) that the grading is carried out by cutting back the surrounding land rather than by infilling (R. Barnes pers comm.). It could even be beneficial in that a marginal fringing vegetation would then establish itself (most of the lagoons are currently without this vegetation), thereby increasing habitat diversity and providing refuges for swimming and attached animals. There would be no potential problems should saltmarsh vegetation establish itself, although reed-swamp development would need to be monitored because of the ability of reeds to spread vegetatively out into the lagoons themselves and to reduce the area of free water and bare sediment, which would have detrimental effects on the fauna.

Most of the lagoons are approximately rectangular in outline and, in the light of the potential reed-encroachment problem, it may be safer to grade only two or three banks of any lagoon (which two or three sides does not matter).

The existing straight sides of the lagoons are not in any way responsible for the precise species present in them (R. Barnes pers comm.) and so if grading is deemed to be desirable for other reasons there is no reason why it should not be carried out to all the lagoons. The same suite of species is also present at lagoonal sites to the north and south of Orfordness, and these lagoons have more or less gently sloping margins.

The species found are a typical of brackish-water/lagoonal assemblage, although the presence of all of them together in the King's Marshes pools makes the site one of the richer ones in the country. That being said, however, the King's Marshes fauna is almost identical to that of the lagoons of the onland shingle at the south end of Orfordness (from Shingle Street to Bawdsey), just to the south, and to that of the lagoons landwards of the Walberswick to Dunwich shingle ridge to the north (Downie in prep; Smith & Laffoley 1992). The presence of *Sphaeroma monodi*, absent from the other two sites, is presumably indicative of the estuarine conditions along the western margin of Orfordness.

Of the six specialist lagoonal species found during this survey (see Table 1) three *Hydrobia ventrosa*, *Hydrobia neglecta* and *Cerastoderma glaucum* are only known in Britain from saline



lagoon-like habitats (JNCC 1996). However, more importantly the Starlet sea anemone *Nematostella vectensis* was also found. Previous records for *Nematostella* in Suffolk include Aldeburgh P8 and Shingle Street P3 and P6 (Smith & Laffoley 1992). However, recent investigations suggest that the Shingle Street lagoons have been badly affected by shingle movements (Downie in prep.). Additionally Cobb's lagoon 0 (Cobb 1958) at Shingle Street is regarded as being another Suffolk site for *Nematostella* as is the Reedland Marshes Lagoon System (pools north of Dunwich) (R. Barnes pers comm.) where recent studies have been carried out on *Hydrobia/Nematostella*.

The starlet sea anemone receives protection in under the Wildlife & Countryside Act 1981 and is not only regarded as being a specialist lagoonal species but also regarded as being rare in Great Britain (Sanderson 1996). A species action plan has been drawn up for this species under the Biodiversity Action Plan (Anon 1995) and the World Wildlife Fund UK has recently taken on the role of champion for this species.

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5. Map 1. The brackish pools on the King's Marshes, Suffolk.

