

# Bembridge and St Helens Harbour Association



## APPRAISAL OF THE ENVIRONMENT OF BEMBRIDGE HARBOUR

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### PART 3 MARINE ECOLOGY

This version DOES NOT contain maps, illustrations and some tables from the 1995 edition.

Please be aware that the report describes the situation in 1994/5, and has not yet been updated. This pdf publication is intended to form the basis of a re-appraisal project.

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## **3 MARINE ECOLOGY**

### **3.1 SUMMARY AND AIMS**

#### **3.1.1 SUMMARY**

Investigation of marine flora and fauna, including core sampling, at four sites yielded information about species representation for comparison with published sources, and was linked to information about fish species distribution and personal observation of changes over time. While there appears to be low species diversity, marine fauna is important to birds feeding in the area. The adverse effects of sand encroachment and bait digging on various habitats are considered.

#### **3.1.2 AIMS**

- 1.1 To undertake a literature survey of the marine biology/ecology of Bembridge Harbour with particular emphasis on work carried out in the last twenty five years.
- 1.2 To investigate different areas/habitats in the Harbour with reference to species type, numbers and relationships with other species including man.
- 1.3 To contact other interested groups such as fishermen, anglers and ornithologists.
- 1.4 To relate the findings to the overall appraisal of the Harbour.
- 1.5 To produce a report which can form a basis for future work.

### **3.2 LITERATURE REVIEW**

Few studies of the marine ecology of Bembridge Harbour exist. Morey (1909) provided a guide and species lists of terrestrial and marine flora and fauna of the Island. This remains a useful resource for comparison. The Isle of Wight Natural History and Archeological Society (IWNHAS) founded in 1919 has continued the work of the guide and since 1922 has regularly published specialist articles in their *Proceedings* (Hutchinson 1969).

Although Bembridge Harbour has attracted little intensive study, it is surrounded by areas which have been designated Sites of Special Scientific Interest (SSSI) (See Map 5:1 in Bird Life), i.e.

- Whitecliff Bay and Bembridge Ledges (1955),
- St Helens Ledge (1977),
- St Helens Duver (1951) and
- Brading Marshes (1971).

The Bembridge Ledges, with a great diversity of habitats and species present, have attracted considerable research from educational establishments such as Portsmouth and Southampton Universities. Collins, Herbert and Mallinson (1989) undertook a study of the marine flora and fauna of Bembridge and St Helens, but concentrated on the limestone ledges and tidal (eulittoral) lagoons. Bembridge Harbour received only brief reference as containing typical estuarine communities. The presence of the estuarine form of Channelled Wrack *Pelvetia canaliculata* in the Old Mill Pond where there is developing saltmarsh is noted of interest.

The Natural Environment Research Council's review (NERC 1980) of the Solent estuarine system provides useful background information. Subsequently, the Nature Conservancy Council (NCC) commissioned surveys from the Field Studies Council. The first was *Survey of harbours, rias and estuaries in southern Britain, the Solent system, vol.1* (Dixon and Moore 1987).

Following this, Howard Moore & Dixon (1988) focused specifically on Newtown and Bembridge Harbours. To date this is the only general survey of the Harbour undertaken. The report reviewed current information and undertook field work between 24th and 28th April 1987. Twelve intertidal sites were investigated in Newtown and nine in Bembridge. Newtown Harbour, designated SSSI in 1951 and in part managed as a nature reserve, attracts considerable educational interest. Annual surveys have appeared in the Proceedings since 1959. In both the NCC studies and that of Howard et.al (1989) flora and fauna nomenclature follows Howson (1987). Five intertidal and one subtidal habitats in Bembridge Harbour are described. Both quantitative and qualitative lists of species found are presented and estimates made of the scientific interest and conservation importance of the two harbours. The

criteria applied to assess conservation importance are those outlined in the NCC *Handbook for the preparation of management plans* (NCC 1983). Features of the littoral and sublittoral ecosystems are evaluated in terms of their international, national, regional or local importance. Only one rarely recorded algae species, *Chondria tenuissima*, was found to be common in the subtidal outer entrance channel of Bembridge Harbour and was provisionally recorded as of local/ regional importance. The report concludes that:

'Bembridge is affected by boating, dredging and shorebased operations. The marine and estuarine habitats and communities are similar to those of Newtown and many other inlets, but they are not used by many birds. There are no intrinsic reasons for recommending that this Harbour be given any protection except that the surrounding natural habitats including the intertidal ledges at Bembridge and St Helens are of considerable conservation importance'.

This conclusion is at variance with that of Frazer (1990) who maintains:

'an extensive area of marsh, however, does support more birds, particularly in winter, than all the others put together'.

Light and Killeen (1989) have undertaken a survey to record the marine mollusca of the Isle of Wight. Bembridge Harbour is included in one of their map figures illustrating the distribution of *Littorina littorea*, the Edible Periwinkle.

Herbert (1993) makes an annual Isle of Wight marine biology report in the *Proceedings of the IWNHAS*. Species found in Bembridge are most frequently reported from the Bembridge Ledge area, but confirmation of the presence of the rare Starlet Anemone, *Nematostella Vectensis* in the brackish lagoons behind the harbour was noted in 1987 and 1991.

### **3.3 SPECIES REPRESENTATION**

#### **3.3.1 INVESTIGATION MATERIALS AND METHODS**

Sampling work was carried out between May and August 1994. The group, which varied between 3 and 7 people, met once a month. Low water Spring tides were preferred to maximize the time available for field work. The sites investigated are shown numbered on Map 3:1 in order of study. Table 3:1 shows the time and height of high water at the various locations. A visual assessment was made at each site and two methods of investigation employed:

##### **3.3.1.1 Core samples**

This was appropriate for substrata of mud/silt, sand or fine gravel. The core was taken using a tube made of hard plastic (plastic down pipe). The diameter was 5 cm. and the length 50 cm. The aim was to obtain a core of 15 cm. and to have uniformity of samples at different sites so an attempt at quantifying each species could be made.

The core was removed from the tube by pushing it out with a blunt wooden object (which fitted the inside of the tube exactly) and placed in a metal sieve (mesh diameter = 1.0 mm).

Sea water was poured through the sieve to remove mud and debris. The contents of the sieve were transferred to a white photographic dish to facilitate counting and identification. To aid the latter, specimens were removed and placed in 70% alcohol or opresol. These preserved the specimens so they could be worked on at a later date.

##### **3.3.1.2 Quadrat samples**

This was the preferred method when the beach was of a more rocky nature. However some quadrats were also carried out on sand and mud. The quadrat frame measured 50 x 50 cm. The quadrat was placed randomly on the area to be examined and the numbers of each species present were counted. In the case of seaweed, an estimation of the percentage cover within the quadrat was agreed by two persons.

**TABLE 3:1 SAMPLING DATES/ TIMES**

site no,	date of visit,	time HW Portsmouth,	height,	time survey started
1,	9 May 94,	11.33,	4.3,	17.33
2,	6 June 94,	12.16,	4.4,	18.00
3,	7 July 94,	11.15,	4.3,	17.15
4,	16 Aug 94,	07.08,	4.0,	13.30

### 3.3.2 RESULTS

#### **SITE 1: Bembridge embankment shore by Bembridge Outboards, Grid reference SZ636884.**

The shore in this area is muddy. Small stones and gravel are present at H W. These progressively become fewer towards L W until almost 100% mud is present. *Fucus vesiculosus* (Bladder Wrack) was present attached to stones.

Two cores were removed, the first close to the end of the slipway; the second from an area of pure mud in an area close to the first line of mooring buoys opposite the slipway. The slipway was covered with *Enteromorpha*. The first sample of mud was dark grey in appearance and had an unpleasant odour. The following species were present in the first sample:

#### **Mollusca:**

- 2 valves of *Cerastoderma edule* (Edible Cockle)
- 13 *Hydrobia ulvae* (Laver Spire Shell)
- 8 *Hydrobia sp.* (Spire Shells)
- 1 *Rissoa sp.* (Tall Spired Shell)

#### **Annelida:**

- 56 small (<<1cm) segmented worms. These belong to two species:
  - Oligochaeta: *Tubificoides benedeni* (Bristle Worm)
  - Polychaeta: *Streblospio shrubsolii* (Segmented Worm)

No plant material

The following species were present in the second sample:

#### **Mollusca:**

- 1 *Littorina saxatilis* (Rough Periwinkle)
- 16 *Hydrobia ulvae*
- 7 *Hydrobia sp.*
- 19 fragments of *Hydrobia sp.*
- 2 *Rissoa sp.*
- 5 fragments of *Cerastoderma edule* (Edible Cockle)

#### **Annelida:**

- 1 polychaete worm, *Ampharete acutifrons* (Segmented Worm)

No plant material

#### **SITE 2: Bembridge embankment shore 37 metres west of Bembridge Outboards' slipway.**

The beach has some sand and gravel mixed with the mud and there are larger (10-15 cm.) stones present. There is a distinct fucoid zone. *Enteromorpha* was growing on the larger stones and on top of some of the fucoids.

The first quadrat was 120 cm. from the top of the fucoid zone, 6.4 metres from the embankment. The following species were present:

#### **Algae:**

- Fucus spiralis* (Flat Wrack) 20% coverage
- Ascophyllum nodosum* (Egg or Knotted Wrack), small amount
- Fucus vesiculosus* (Bladder Wrack) << 10% coverage
- Ulva sp.* (Sea Lettuce) very small amount attached to stone

#### **Annelida:**

- 1 small polychaete worm, unidentified

**Mollusca:**

- 8 *Hydrobia* sp. empty shells
- 3 *Littorina* sp. (Periwinkle)

**Crustacea:**

- 2 *Carcinus maenas* (Common Shore Crab), small specimens

**Insecta:**

- small insect (unidentified)

The **second quadrat** was 180 cm. from the lower edge of the furoid zone. The substratum was similar to the first quadrat but the stones were larger (25 cm.) and fewer in number. The following species were present:

**Algae:**

- Fucus spiralis*, small amount
- Ascophyllum nodosum* 80% coverage
- Ulva* sp. small amount
- Fucus vesiculosus*, small amount

**Annelida:**

- Several groups of tube-living polychaetes beneath stones (unidentified)

**Mollusca:**

- 1 *Cerastoderma edule*
- 2 *Littorina mariaae* (Flat Periwinkle), small old shells
- 3 *Littorina saxatilis*
- 1 *Nucella lapillus* (Common Dog Welk)
- 1 *Rissoa* sp.
- 1 *Ostrea edulis* (Native Oyster), old flat valve
- 2 very old valves, possibly *Venerupis* sp. (Banded Carpet Shell)

**Crustacea:**

- Gammarus locusta* (Sandhopper) several
- 2 *Carcinus maenas* (Common Shore Crab)

A small wooden wreck a few metres north of the second quadrat was examined. The following species were noted:

**Algae:**

- Ascophyllum nodosum*
- Fucus vesiculosus*
- Enteromorpha* sp.

**Mollusca:**

- Littorina littorea* (Common or Edible Periwinkle) live
- Littorina mariaae* live

**Crustacea:**

- Balanus balanoides* (Acorn Barnacle): heavy settlement with some large specimens
- Elminius modestus* (Australian Barnacle): young settlement, recent
- Gammarus locusta*
- Carcinus maenas*

**SITE 3: The foreshore beside the first section of the causeway, adjacent to the channel entrance to the Millpond, SZ633888.**

This shore is mostly mud with 80% coverage of *Enteromorpha* on the date visited. Small stones are present nearer

the causeway. The remains of the old sea wall consisting of large rocks, runs between the causeway and the channel. The sides of the channel consist of small to medium-sized pebbles.

The first core was removed at LWN, 19 metres from the causeway. It consisted of mud. The following species were present :

**Annelida:**

1 Polychaete (unidentified)

**Mollusca:**

11 *Hydrobia* sp.

1 *Littorina mariae*

**Crustacea:**

1 *Balanus balanoides* (Acorn Barnacle)

**Insecta:**

49 small black Coleoptera (beetles)

The second sample was removed 4.5 metres from the causeway. It consisted of mud and fine gravel. The following species were present:-

**Annelida:**

5 *Hediste diversicolor* (Ragworm)

**Mollusca:**

134 *Hydrobia ulvae*

**Algae**

On the large rocks, *Ascophyllum nodosum* was the predominant weed followed by *Fucus spiralis* (Flat Wrack). Smaller amounts of *F. vesiculosus* and *Ulva* were present.

Unidentified species include a hydroid and a sponge. *Actinia equina* (Beadlet Anemone), *Hydrobia ulvae*, *Cerastoderma edule* and *Gammarus locusta* were present.

**SITE 4: St Helens Foreshore, between buoys 11 and 9a, near the main channel.  
Grid reference SZ639888**

Sample 1 was removed from an area between Western entrance groyne and No. 1 sea wall groyne at LWN. This is a heavily dug area and consists of a mixture of sand and gravel.

There was a <10% cover of *Enteromorpha*, <10% *Ulva* and a sparse amount of *Fucus vesiculosus*. It was difficult ground to core-sample. the core obtained was 10cm. in length. The only species found in the sample was represented by a few cockle fragments. A local bait digger, working close by with a fork, had collected a bucket two-thirds full of *Hediste diversicolor* (ragworms). He said that the worms were not found near the surface in winter and there had been a depletion in the last two years.

Sample 2 was removed at a slightly higher level in an area which consisted of more sand and darker pebbles. A core of 22cm. was obtained but it did not contain any species. Shallow pools formed by the incoming tide contained many small fish fry.

Sample 3 was removed from a sandbank 12 metres westward of buoy 9a. A 15cm. core was obtained but no species were present. Casts of *Arenicola* sp. (Lugworm) were seen on the surface of the sand and 3 quadrats sampled in this area gave counts of 2, 6 and 2 casts respectively.

Sample 4 was removed 2 metres higher up on the sandbank. Core obtained was 5cm. It contained 4 *Gammarus locusta* (Sandhopper).

Several small worm casts were present on the surface and when the tide came in it was possible to identify *Lanice conchilega* (Bristle Tube Worm) extending its tentacles and top of tube from the surface of the sand.

Sample 5. Quadrat MLW in between sea wall groynes 1 and 2. The substratum was sand with mainly small to medium stones. The following species were present:-

**Algae:**

- 10% cover of *Fucus spiralis* (Flat Wrack)
- 20% cover of *F. vesiculosus*
- < 5% cover of *Enteromorpha sp.*
- Ulva sp.* (Sea Lettuce) on one stone

**Annelida:**

- 4 casts of *Arenicola sp.* (Lugworm)

**Mollusca:**

- 9 *Littorina neritoides* (Small Periwinkle)
- 1 *Littorina littorea*
- 2 *Hydrobia ulvae*

**Crustacea:**

- 1 *Carcinus maenas* (Common Shore Crab)

### 3.3.3 DISCUSSION OF FINDINGS

As only 4 sites have been investigated so far, only tentative conclusions can be made. Certain points are worth mentioning. It was difficult to obtain uniformity of core samples. Some substrata were difficult to sample due to the presence of small stones in the mud. The use of a manufactured core-sampler made of metal was no more effective. This means that accurate quantitative work is difficult.

Previous work (Shearer, 1987; Howard Moore & Dixon 1988) records only *Hydrobia ulvae* present in the Mill Pond and Harbour respectively. We have found *Hydrobia ulvae* and await expert identification to find out if a second species is present in our samples. The large number of *Hydrobia sp.* adjacent to the causeway is probably due to a gradual accumulation of the shells close to the structure. The specimens were mostly empty shells. However, this species appears to be present in the Harbour in relatively large numbers.

It was also interesting to note the large number of *Tubificoides benedeni* (Bristle Worm) and *Streblospio shrubsolii* (Segmented Worm) in the mud near Bembridge Outboards.

No attempt has been made to record results in terms of abundance scales. This will be done when more data is available.

Howard Moore & Dixon (1988) sampled lower shore rather than upper shore and their work was carried out over a two-day period in April. Our samples include both upper and lower shore and we hope to study the Harbour over a longer time period.

In their assessment of the scientific interest and conservation importance of Bembridge harbour, Howard Moore & Dixon (1988) concluded that there are no species within the harbour which are rare, and that diversity of species is fairly low. The present work appears to substantiate this view.

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### Map 3:1 Sampling Sites and Fish Species

Outline map showing positions of catches of various fish species and the position of sampling sites referred to in the text.

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### **3.4 REPORT OF FISH SPECIES AND HABITATS FOUND IN BEMBRIDGE HARBOUR AND ESTUARINE WATERS**

Bembridge Harbour and its estuary with its sandy and shingle beaches, mud-flats, sandbanks and tidal channels, provides ideal feeding grounds for a variety of fish species. There is an abundance of mud-living worms, crabs, shrimps and other crustaceans, to supply an interesting diversity of fish food.

‘An estuary is usually a confluence of fresh and salt water and how these waters mix is crucial to the ecology of the area and therefore to fish life’. (Calcutt 1977).

In the brackish water resulting from the outflow of the Eastern Yar river Flounder, Mullet and Silver Eels are attracted in large numbers to the inner harbour. Towards the estuary mouth where the salt water dominates and the salinity is high one finds the truly marine species: Bass, Plaice, Pollack, Garfish and, occasionally, Dab and Sole.

In the rock pools, particularly on St Helens beach, there are Wrasse, Goby, Blennies and a variety of smaller fish and invertebrates, all of which provide food.

#### **3.4.1 NOTES ON FISH SPECIES TO BE FOUND IN THE AREA (Map 3:1)**

##### **Flounder *Platichthys flesus***

Early in the new year these fish migrate from the estuary to spawn in the open sea, returning in large numbers in late Spring. Moving up the estuary on the rising tide they explore the tidal edges of beach, sand banks and mud-flats feeding on lugworm, ragworm, small peeler crabs, molluscs and invertebrates.

On the falling tide they favour keeping to deeper channels and depressions in the Harbour where eddying currents deposit food. These fish are in best condition late in the year, providing good angling sport on light tackle and reasonable tasting.

Bembridge Angling Club (BAC) recently recorded a specimen flounder of 2lb. 11.5 oz. caught on rod and line in the Harbour.

##### **Grey Mullet *Mugil labrosus***

This is the thick lipped species often found in small shoals on the inner Harbour bed or filtering out invertebrates, etc. from the hulls of moored boats. A thick lipped Mullet of 5lb. 1oz. tops BAC records to 1993, but larger fish have been seen. The thin lipped Mullet, *Liza ramada*, is equally numerous locally: a much faster fish, feeding more on smaller fish. Gold Mullet *Liza auratus*, are also occasionally caught.

##### **Bass *Dicentrarchus labrax***

This much sought-after fish moves inshore in May onwards to November. More often found on those parts of the beach where breakers release shrimps, sand-eels, crabs and other crustaceans. But they are attracted to brackish water and Bass up to 8 lb. have been caught in Bembridge Harbour and several 4 pounders in the Mill Pond exit channel. Bass are to be found at the mouth of the Harbour on the very first of the flood tide where the rising water releases food from sandy bays and rock crevices. On a fast receding tide which carries down crab, worms and a variety of invertebrates, the Bass will be waiting in the estuarine depressions. The larger specimens tend to confine themselves to the deeper channels. In the Summer large shoals of School Bass are seen in the shallows. Bass have been scarce in recent years, but are now increasing in numbers, possibly due to Government restrictions limiting the minimum landing size to 36 cm.

##### **Common Eel *Anguilla anguilla***

Mainly a river fish, but found in large numbers in the Harbour where they are very active in the Summer. The small eels, or elvers, appear early each year in the estuary before migrating into fresh water, many via the Eastern Yar river. On maturity, ‘which can be up to ten years’ (Bagenal 1972) the Eel turns from green to silvery in colour and returns to the sea to breed in the far off Sargassa Sea area. A Silver Eel of 3lbs. has been taken in the Harbour (BAC 1993). Feed usually consists of worms, crabs, shrimps, molluscs and invertebrates.

##### **Mackerel *Scomber scombrus***

Normally found in shoals at sea are at their best in July to September, but occasionally venture into the deeper channels of the estuary and inner Harbour feeding on plankton and small fish.

## **Wrasse**

Both Ballan, *Labrus bergylta* and Cuckoo, *Labrus mixtus* are to be found foraging in the seaweed and rocky shore off St Helens and towards the Fort. Main diet is crustaceans, shellfish and worms.

## **Smelt *Osmerus eperlanus***

This small silvery fish (average 20 cms) lives in the sea and enters fresh water to spawn in March. Found in the brackish water around moorings in the inner Harbour. Generally regarded as an estuarine fish. Semi-transparent in appearance, having a characteristic smell similar to cucumber. These voracious predators feed on small fish and crustacea. Good eating when fresh.

## **Common Goby *Pomatoschistus microps***

This small fish grows to approx. 6 cms. having a large head and tapering body, commonly found in the rocky pools and under stones in St Helens shore, but also on the sandbanks and muddy shores in the Harbour. Feeds on crustacea, small crabs and shrimps.

## **Blenny *Blennius pholis***

Another small fish, growing to 15 cms. found in large numbers in rocky pools of the Harbour, hiding in crevices or under stones. Diet consists of crustacea, barnacles, mollusca and algae.

Other species occasionally found in the Harbour and estuary, although their normal habitat is at sea are :

- Black Bream *Spondyliosoma cantharus*
- Pollack *Pollachino pollachius*
- Garfish *Belone belone*
- Dab *Limanda limanda*
- Sole *Solea solea*

## **3.4.2 NOTES ON BAIT DIGGING**

St Helens foreshore within the estuary is rich in worm bait. Local anglers recognise their good fortune in this and are aware that this advantage has to be respected and safeguarded. Accordingly, the majority of local anglers adhere both to local bye-laws and angling club rules in confining digging to certain designated areas and by back filling their diggings to reduce the disturbance of the foreshore environment.

Unfortunately, this particular area is being abused by the influx of many commercial bait diggers, including groups from the mainland who turn over large tracts of foreshore from receding high tide to advancing low water (upwards of 7 hours digging).

Obviously, there is a need for some control of commercial bait digging. Hollis (1992) examines all aspects of the bait-digging problem in St Helens, and relates previous attempts to tackle the problem in 1974 and 1986.

## **3.5 DISCUSSION AND CONCLUSION**

The literature search revealed that only one survey of the marine ecology of Bembridge Harbour has been undertaken (Howard Moore & Dixon 1988). During the present study within the Harbour, we have noted the quantity rather than the diversity of species found. The diversity of habitat is beneficial to the variety of fish which frequent the Harbour. It is interesting to note that certain species, notably flounder, mullet and silver eels, actively seek the lower salinity of the outflow of the Eastern Yar. The identification of the feeding preferences of individual fish species highlights the importance of each organism contributing to the food chain.

The members of Bembridge Angling Club have a proper concern for conservation of fish stocks and have strict rules to be followed regarding bait digging. Map 3:1 illustrates the locations in the Harbour where specific fish species have been caught and recorded, and the locations where samples have been taken.

Reference to changes observed in the Harbour during the past 35 years (Appendix 1) indicate the effects of silting-up, particularly the encroaching of the sandbank near Coombes slipway and, conversely, the loss of sandy beach area at St Helens.

Commenting on the fragility of the Harbour, Howard Moore & Dixon (1988) says 'the habitats and communities are not likely to be sensitive to disturbance'. This is a broad view and does not include specific points of concern such as bait-digging. Local opinion is that this has increased in recent years, is being exploited for commercial

gain, and has already resulted in habitat disturbance in the bait-digging area. Cleave (1984) describes the detrimental effect of bait-digging on worm populations and food chains. Clark and Hill (1991), have pointed out the importance of such communities in providing food for birds. We believe that the situation with regard to bait-digging needs to be carefully monitored.

Preliminary investigations and observations suggest that despite human pressure, the Harbour and its marine life do not appear to have been dramatically damaged. The recent introduction of full treatment at St Helens sewage works, the current building of new marina sanitary facilities, and the improved river sluices to be incorporated in the new Yar Bridge will improve river quality. These measures, coupled with today's more environmentally aware attitudes and management can help maintain a healthy harbour ecosystem.

## **3.6 RECOMMENDATIONS**

3.6.1 To continue to sample different areas and habitats within the Harbour to determine possible seasonal and annual variation. We see this as a long term project.

3.6.2 To continue to monitor conditions in the harbour that may affect habitats and species.

3.6.3 To investigate in depth the relationship between the plant and animal communities of the Harbour and its bird life

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# **APPENDIX 1: Bembridge harbour: personal observations of trends affecting marine habitats during the last 35 years (Arthur Robinson)**

## **1. Area in front of St Helens sea wall (bait digging area)**

At one time clean beach sand covered this area and it was considered a children's holiday beach.

Initially it was only suitable for lugworm, but ragworm was dug near the channel in the rougher tide-swept area. Possibly due to a normal cycle, the beach has been lowered over the years. At one time cockles were abundant in the sandy shingle stage, however the whole area is now a stony beach with ragworm throughout.

Intensive bait digging has caused the light sand to be lifted and washed away by the tide (largely into the Harbour) and hastened the conversion from sand to shingle. The habitat for ragworm is now probably past its best due to over digging and will deteriorate further due to the shingle becoming robbed of the sand and vegetable matter suspended in it.

## **2. Point Beach, sands in front of dunes and Silver Beach**

This sand is increasing in quantity but the habitat has not changed significantly. It provides poor feeding, but near low water mark worm life improves with pipe worms and razor fish etc.

## **3. Areas of foreshore adjacent to the Harbour entrance, BSC and Attrill's Point**

Sand has encroached covering a large area of foreshore and seabed reducing the quality of habitat.

## **4. Area in front of Redwing Quay**

Formerly, this was an area of mud permanently covered by a depth of water. It has, over the past 15-20 years, been completely encroached and covered by a sandbank up to 12 feet deep, which is still enlarging. This has robbed a large area of Harbour of rich mud and habitat for a variety of marine life and food for wading birds and fish.

## **5. The mud/ silt covered areas**

This has largely remained at a similar depth which varies according to weather conditions -- in quiet wet weather with southwesterly winds silt builds up. Heavy rain and northerly winds break up and carry away this soft top layer.

Some area was lost with the dredging of the Fisherman's Wharf which attracts silt and may be responsible for some loss of surface silt but marginally on the Bembridge side only.

## **6. Embankment old foreshore**

Little change has taken place between the area from Nelson's Yard to BHYC. The houseboat area now has an increased number of houseboats with year-round occupancy. Formerly these were only used as holiday accommodation. This increases the need for improved access to services.

Recently, a new trend has been observed along the old foreshore. Groups have been witnessed regularly collecting bucketfuls of baby crabs, probably for sale as bait. This will rob the food chain for birds and fish.

## **7. St Helens mill pond and adjacent mill wall**

Some depth of water has been lost due to tide carried gravel/grit material.

## **8. Disturbing trends**

- (a) Sand encroachment on rich habitats.
- (b) Bait digging needs controlling, especially commercial digging for gain, whether for ragworm or baby crabs.
- (c) On-shore facilities should be provided for the disposal of sewage effluent from the houseboats and visiting yachts.