SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

ESTUARY PROFILE FOR MOLLUSC PRODUCTION

SOLENT - SOUTH COAST

Internal Report No. 1279

August 1986

Dr. Eric Edwards
Shellfish Association of Great Britain

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SUMMARY

The Solent

The Solent is one of the largest areas of sheltered water around Britain and it is a major shipping and yachting centre. The whole area is heavily populated and parts are industrialised (e.g. Southampton Water), it, therefore, suffers from massive discharges of trade effluents and domestic sewage wastes. Contamination from toxic (TBT) yacht antifouling paints also adds to the pollution problem.

Stocks

The area has a large natural stock of flat oysters (O.edulis), which forms part of the public fishery managed by the Southern Sea Fisheries Committee under a regulating order. Stock levels have declined in the past decade due to heavy fishing, but MAFF surveys show the situation is improving in the eastern end of the Solent where spatfalls have occurred.

There are also oysters on three Several Order areas in the Solent but these are regulated by the fishermen grantees themselves.

There are fears that the disease Bonamia, which is now infecting oysters in Beaulieu River, Poole and Emsworth, will eventually spread to the Solent stocks causing massive mortalities.

American hard shelled clam (Mercenaria) have established themselves in Southampton Water and the present population is estimated to be about 1,750t - a massive reduction since the stock was first surveyed by MAFF in 1979. Heavy, uncontrolled fishing, plus poor irregular spatfalls, has led to this decline.

Shellfish Cultivation

Shellfish Cultivation in the Solent public oyster fishery is limited to the scattering of culch shell to encourage oyster spatfall and some control on pests (e.g. tingle). No attempts are made to cultivate the clam stock which might benefit from efforts to increase spatfalls and maintain a spawning stock.

Mussels are being grown by private companies in Newtown River and Poole Harbour but production is small.

Future Potential

Apart from the natural oyster and clam stocks (which need strict management if their yields are to continue at a productive level) the Solent offers little scope for large-scale mullusc cultivation - mainly because of the lack of seabed space, competition with the yachting industry and the poor water quality in the area.

However, there are other valuable shellfisheries in areas adjacent to the Solent and ports such as Portsmouth, Poole, Weymouth and Portland are amongst the most important for crab, lobster and scallops which are caught in the waters of the English Channel.

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1. GEOGRAPHICAL DESCRIPTION

1.1 Location

The Solent is a large Y-shaped estuary and extends for approximately 20 miles along the South Coast of England, protected to the south by the Isle of Wight (Figure 1). There is a relatively narrow entrance at the western end, near Hurst Fort, and a complicated system of channels and shallow banks at the eastern end between the Isle of Wight, Portsmouth and the entrance to Southampton Water.

Main towns in the area are the City of Southampton and its suburbs, Lymington, Cowes on the Isle of Wight, and Portsmouth and Emsworth on the eastern boundary.

The region includes major shipping and naval establishments and is the main yachting centre in Britain. there is also a large oil terminal at Fawley in Southampton Water.

1.2 Topographical and Environmental Features

The Solent is one of the largest areas of sheltered water in England covering about 100 square miles. Leading into the main part of the Solent, both from the mainland to the north and from the Isle of Wight, are a number of rivers, notably Beaulieu River, Newtown River, Southampton Water, Hamble River and the harbours of Portsmouth, Langstone and Chichester.

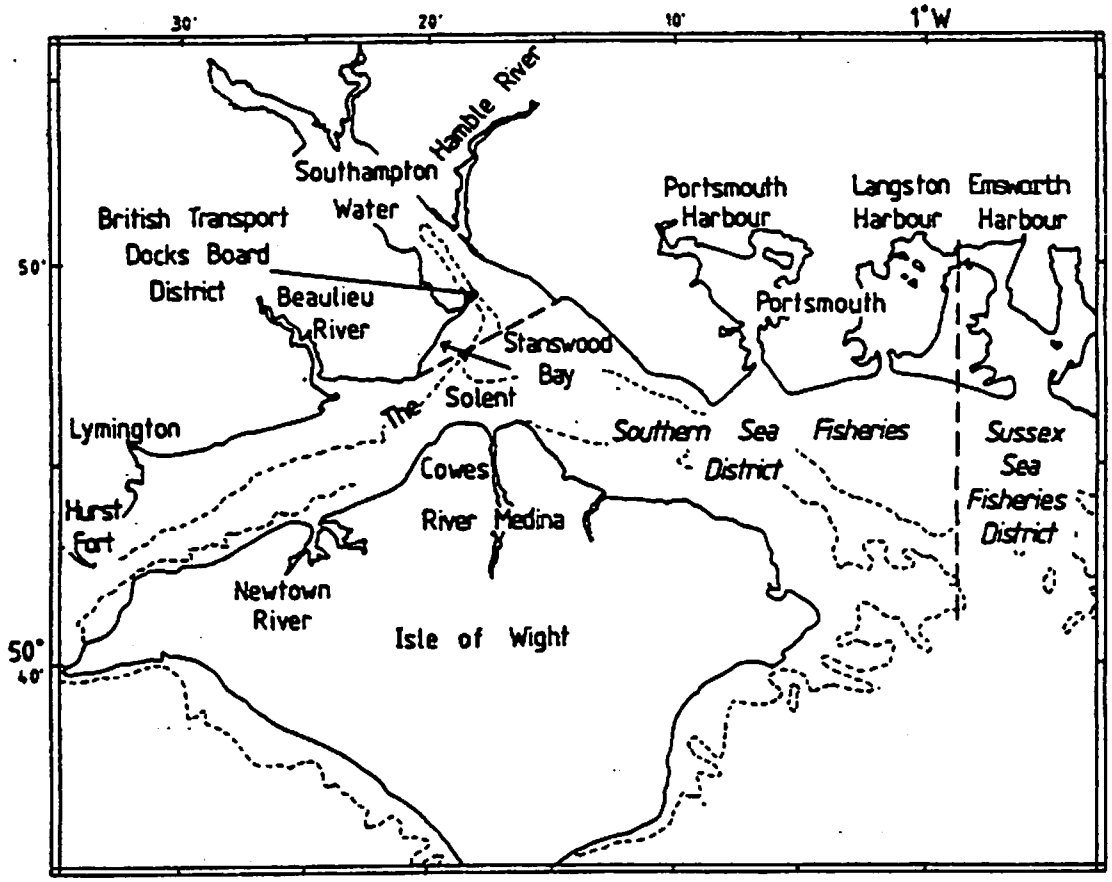

Figure 1. The Solent with areas mentioned in the text.

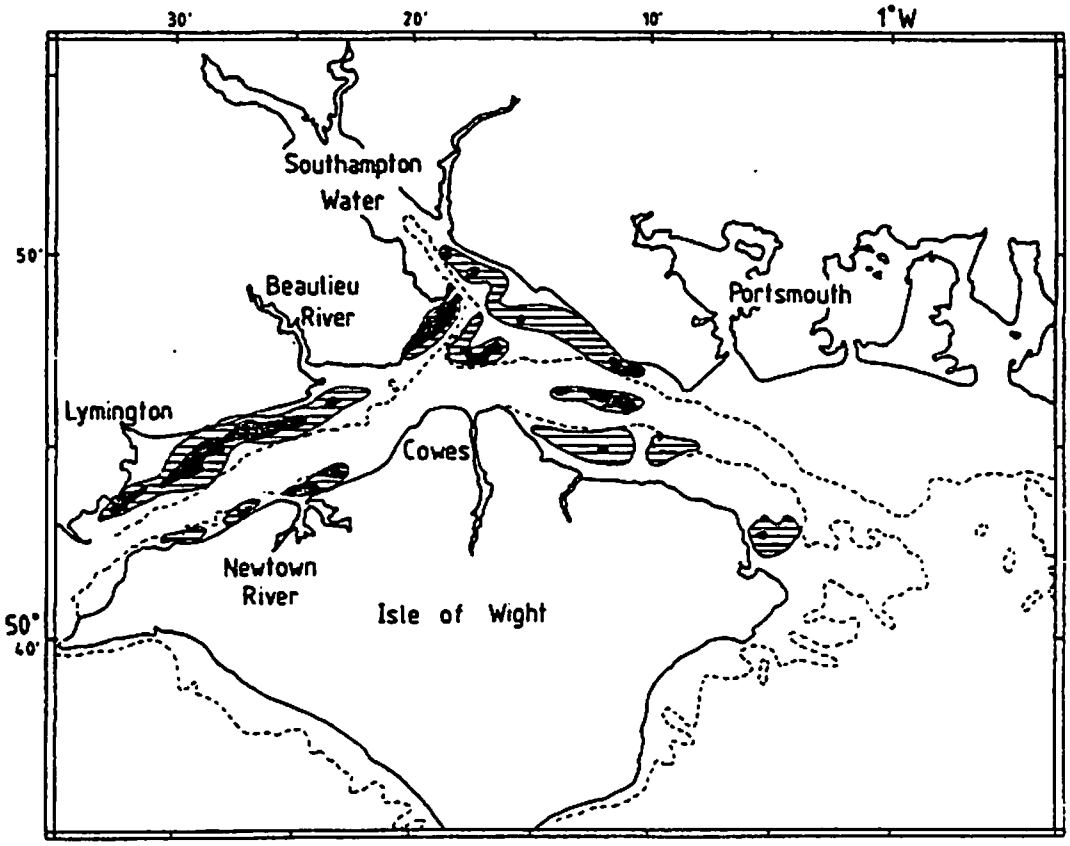

Figure 1A. The main oyster producing areas in the Solent fishery, 1979. 1-15 oysters per dredge haul ; greater than 15 oysters per dredge haul .
(Source MAFF)

The Solent is unusual in that it has two high tide periods every 24 hours and water temperatures slightly above the mean for the English Channel.

In many channels throughout the Solent strong tides occur; 2 knots at neap tides and 3½ knots on spring tides being common. However, in the shallower regions tides are not always strong and over many of the inshore banks large eddies tend to re-circulate water slowly during part of the tidal cycle.

This feature of slow or re-circulating water movements, which tends to warm up in the summer, has benefitted oyster producing areas in the Solent (see later). The massive water exchanges with the English Channel also ensure a high salinity level above 30 parts per thousand.

2. SEABED RIGHTS AND MANAGEMENT REGIMES

2.1 Fisheries Legislation

The authorities with Sea Fishery Committee responsibilities for the area are the:

i. Associated British Ports
(Southampton Water and part of Stanswood Bay)

ii. The Southern Sea Fisheries Committee
(District extends from Hayling Island to the Dorset-Devon border, including the waters around the Isle of Wight and the Solent, but excluding Southampton Water)

Both authorities have byelaws controlling fishing activities under the Sea Fisheries Regulation Act 1966. The Southern Sea Fisheries Committee also has regulatory powers under the Solent Oyster Fishery Order to licence fishermen and manage the natural oyster fishery for

flat oysters (Ostrea edulis) in the Solent (Figure 1A). Management measures include a closed season and restrictions on the ring size[1] in the dredges.

Several Order[2] rights have also been granted to three groups of fishermen:

Standswood Bay Oystermen Ltd.
Calshot Oyster Fishermen Ltd.
Brownwich Reach Oystermen Ltd.

The Newtown River on the north side of the Isle of Wight is fished by one private company. A private fishery for oysters also exists in the Beaulieu River and is part of the Beaulieu Estate.

2.2 Closing Orders

The Solent is an area badly affected by industrial and domestic waste disposal.

Local Closing Orders under the Public Health (Shellfish) Regulations 1934 and 1948 cover:

i. Southampton Closing Orders 1971 and 1972
(Issued by City of Southampton Port Health Authority covering all of Southampton Water and parts of the Solent placing restrictions on the removal of clams and oysters)

NOTES: 1 Ring size 2.5 inches and Fishery opened for period 1st November to 31st March during daylight hours.

2 A Several Order granted by MAFF gives these groups sole rights for fishing for molluscan shellfish in a defined area.

ii. Fareham Urban District Council 1960
(Restrictions on the taking of cockles, "butterfish" and mussels)

iii. Gosport Borough Council 1960
(Restrictions on the taking of certain molluscs)

iv. Cowes Port Health Authority 1923 and 1938

v. Portsmouth City Council Notice and Regulation 1985

vi. Poole Borough Council Closing Order
(All shellfish)

Controls on shellfish by the Southampton Port Health Authority are strict. All exports of clams and oysters require health certificates and certificates of origin from the Authority. The shellfish must be purified by an approved process, which includes the relaying of clams for 21 days in waters free of hydrocarbon (oil) contamination.

2.3 Nature Conservation

There are no areas in the actual Solent or Southampton Water designated as Sites of Special Scientific Interest (SSSI) by the Nature Conservancy. They do claim the whole of Langstone and Emsworth harbours and the mud flats, marshes and islands in Poole Harbour.

The Shellfish Association and MAFF have queried the NCC designation of any areas below low water mark as SSSIs since they consider this an attempt to by-pass Marine Nature Reserves, which properly cover subtidal coastal areas.

3. MOLLUSC RESOURCES AND THEIR UTILISATION

3.1 Species

The Solent has the largest natural stocks of the flat oyster (Ostrea edulis) left in European waters. Catches of oysters from the public and Several Order grounds in the area have provided the greatest impetus for the United Kingdom flat oyster fishery for many years and provided a valuable resource for local fishermen.

Stocks of American hard shelled clam (Mercenaria mercenaria) occur in Southampton Water following their accidental introduction from transatlantic liners berthing at this major port in the 1930's. This clam spawns in these enclosed waters and provides a valuable fishery specific to Southampton Water.

There is a small bed of cockles at Netley beach and wild mussels attach themselves to rocks and piles in the region. Neither forms any worthwhile fishery.

Experimental trials with mussel relaying and Manila clam culture (Tapes semi-decussata) are underway, mainly in the Newtown River, Isle of Wight and Beaulieu River, but commercial production remains very small.

i. Oysters

Along the South Coast, the complex of inlets from Chichester Harbour to Pool Harbour, including the Solent, is among the most active oyster-producing areas in the country at the present time (Figure 2). The Langstone/Emsworth Harbour complex was once a major oyster-producing area and at present it includes the Emsworth Harbour Fishermen's Several Order (with over 100 members) and the Langstone public fishery controlled by the Southern Sea Fisheries Committee.

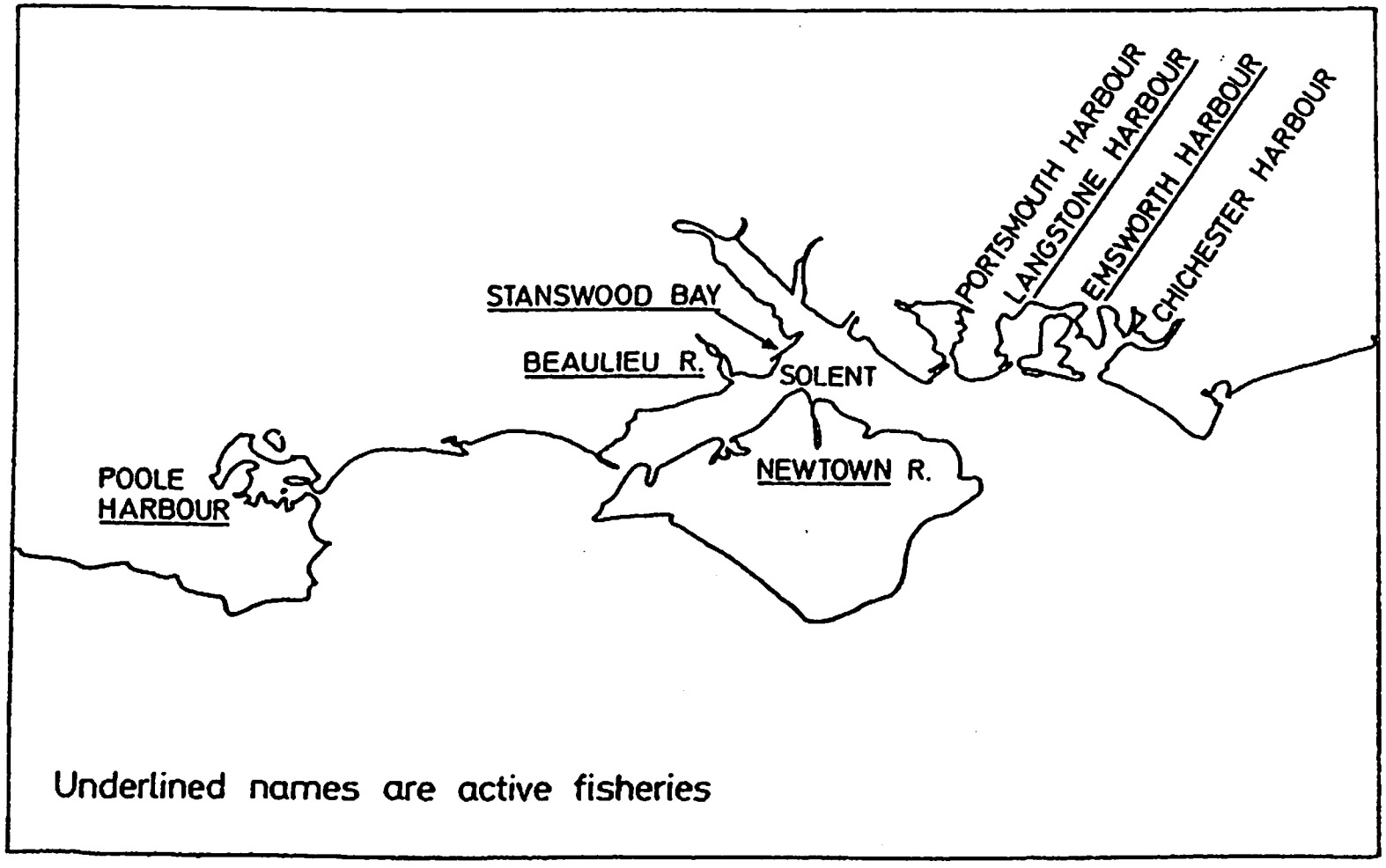

Figure 2. Oyster fishery areas of the south coast of England.

In recent years the stock has declined in these harbours and earlier in 1986, the oyster disease Bonamia was found by MAFF in Emsworth Channel in the Several Order area. Samples from the Langstone beds were negative, but it is expected that this virulent disease will also affect these oyster stocks soon.

The main oyster producing areas in the Solent include 14 widespread beds, including Lymington Bank, Sowley Ground, Bramble Bank, Lepe Middle Shoal and others in the Solent Oyster Fishery Order area, plus the Several Order grounds of Calshot, Stanswood Bay and Chilling/Browndown. As reported earlier, there are private oyster grounds in Newtown River and in Beaulieu River.

Farther west, in Poole Harbour, there is another regulated fishery with oyster plots leased to fishermen by the Southern Sea Fisheries Committee under an Order. Both native oysters, Pacific oysters and mussels are grown at Poole by a private company and local fishermen, but the disease Bonamia has also infected the Poole flat oyster stock and despite a clearance programme, mortalities are expected.

The oyster stock situation in the Solent Fishery is surveyed annually by scientists from the Fisheries Laboratory, Lowestoft. Their last report (August 1985) shows a continuing increase in the catch rate of commercial-sized oyster in the eastern Solent with good stocks of recruit oysters. The MAFF survey concluded that prospects for the fishery in the eastern Solent for the next two years appeared promising, catch rates overall being comparable with those of 1977, which was a good year. In the western Solent (Lymington and Sowley Banks), the situation is less satisfactory. Catch rates of all sizes of oysters remain poor, continuing at the low levels experienced over the last two years. The main point to note is that natural spatfalls still occur in the Solent but they seem heavier in the eastern area where most fishing is now concentrated during the open season (17th February-28th March 1986).

ii. Clams

MAFF surveys on the stocks of American hard shelled clams have been undertaken intermittently since 1979. Results show that the stock has been subjected to a high degree of exploitation and that spatfalls are absent most years. The initial survey in 1979 estimated tonnages on the Netley and Gymp beds near Southampton as 13,400t and 1,300t respectively, a total of almost 15,000t. Two years later the stock had declined to 9,000t, 62% of the 1979 level. The latest survey in 1985 gave a stock figure of 1,750t, only 12% of the estimate made in 1979.

The population shows three features:

a. a great decline in number,
b. a change in size to larger, older clams as the stock has grown and declined,
c. absence of spatfall between 1980 and 1983 but signs of a small spatfall in 1984.

The Associated British Ports have no conservation controls on the size of clam landed or fishing effort. The immediate future for the fishery is bleak: natural recovery depends on regular spatfalls to the stock which now appear to be irregular and infrequent.

iii. Mussels

A scattering of mussels is found on piles, mooring chains, etc., in the area but they are not exploited commercially.

Beds of seed mussels have been reported at certain offshore sites in the English Channel (off Shoreham, Portland and West Bay) but are not used. Newtown Oyster Company have relaid seed from the Burry Inlet on their private 'lays' and there is a growing interest in mussel culture in Poole Harbour.

3.2 Utilisation

Oysters

The Solent Oyster Fishery opened on the 16th February 1986 for a six-week season agreed by the Solent Oyster Working Group, organised by the Southern Sea Fisheries Committee.

Last season 54 fishery licences were issued but only 45 were actually used by boats dredging the stock. Catch levels last season ranged from an average of 750kg on the first day, and maintained at approximately 190kg a day per boat in the eastern Solent and about 120kg in the western end.

The price paid stabilised at £1,200 per tonne during 1985. The catch was either exported to France or used to restock grounds along the east coast of England. A few oysters were sold direct for market after purification.

Clams

Dredging of clams in Southampton Water began in the mid-1970's. There is no official season and between 20-30 boats harvested the resource depending on market demand.

At present most of the landings are purchased mainly by one shellfish buyer who has the proper facilities to grade and purify the clams. This process also includes a 21-day relaying period, to remove oil taint, at a site at Sowley approved by the Southampton Port Health Authority. Few clams are eaten in the UK and most are exported to France. A ban on their export to the USA in 1983 was due to a claim by the US Health Authorities that they caused public health problems.

4. POTENTIAL FOR INCREASING MOLLUSC PRODUCTION

Production of bivalve molluscs in the Solent is based on the exploitation of natural stocks. There are valuable fisheries for oysters and clams, but the potential for expanding future production is restricted by:

a. varying levels of natural spatfalls,
b. growing problems of water pollution (including TBT),
c. lack of shore or seabed space for bivalve culture,
d. lack of security from theft for cultured shellfish.

Indeed, the future survival of these two fisheries depends on maintaining a strict conservation regime. The problem centres around the fact that the area has become the major UK yachting centre. Possible shellfish sites such as Hamble River, Beaulieu and Cowes, are full of moored craft. Even a small scale attempt by the SSFC to propagate oysters has suffered because there are no free, safe, shore areas to grow-on the seed.

Oyster racks or mussel rafts pose navigational problems to the extensive shipping and yacht traffic in the region and would be opposed by the Port Authorities. While it is possible that small-scale culture operations will continue on private 'lays' in Newtown River and elsewhere, the possibility of large-scale mollusc developments in the Solent area must be considered poor.

Adjacent to the Solent, Pool Harbour is growing as a shellfish centre (oysters, mussels and clams) and Langstone and Emsworth Harbours still produce flat oysters. The question whether the disease Bonamia will limit flat oyster production at these three sites has still to be answered.

5. WHAT ACTIONS ARE NEEDED TO BENEFIT THE LOCAL INDUSTRY?

5.1 Mariculture

Oysters

Future production from the Solent fishery will depend on the level of spatfalls, whether the disease Bonamia introduces a high level of mortality, and the continuation of the present strict management policy by the SSFC.

Opportunities to increase stock in this large area by culture methods are limited to culch laying to improve spatfall and conservation to ensure a breeding population.

It is important that the Ministry of Agriculture, Fisheries and Food provides the SSFC and the local industry with a 'code of practice' with guidelines to help control the spread of Bonamia in the several order and public oyster grounds along the south coast.

Clams

MAFF surveys show the stock in Southampton Water is declining due to over-exploitation and despite a recommendation by MAFF in 1979 that a minimum size of 50mm should be introduced, the British Transport Docks Board (Southampton)* did not act and this unique stock is not protected in any way.

Efforts must be made to manage the clam fishery more effectively. The possibility that the SSFC might take over the fishery responsibility for Southampton Water could result in a management regime which would benefit this stock.

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*now the privatised Associated British Ports.

Mussels

There seems little likelihood of any action which could result in the establishment of a major mussel fishery in the Solent.

Encouragement could be given to establish small mussel lays in areas such as Poole Harbour and Newtown River. Experiments with the reported offshore seed might be a start but the extent and size of these seed beds need to be evaluated.

General

While it has been explained why the expansion of mollusc production in the actual Solent is hindered by various constraints, it must be recorded that the coastal area between St. Albans Head and Selsey Bill - extending into the English Channel - is one of the most productive shellfishing areas in the UK.

Reports by the Chief Fishery Officer of the SSFC describe the lobster, crab, scallop and whelk fisheries in the district and show that shellfish landings were valued at over £1.2 million in 1985 (Table 1).

The SSFC is one of the most active committees in the country. They recognise their development role and liaise well with the 15 different fishermen's associations via their District Fisheries Council. Shore enforcement is backed by the Committee's 33ft patrol vessel SOUTHERN TRIDENT and their Chief Fishery Officer, Major A. J. Parker (RM), is active on many fronts in this important inshore fishing area.

It was pointed out by Major Parker that the district could best be assisted by improving the general facilities available for the industry. These could include:

i. Upgrade and modernise the fishing fleet.

ii. Improve berthing and landing sites at Portsmouth (Camber Dock) and Pool Harbour.

iii. Continue the Seafish training programme.

iv. Advise on improved live crab storage methods to reduce mortalities.

v. Advise on better selection and handling of shellfish at sea.

vi. Aid local mariculture developments in the area.

vii. Aid shellfish purification problems.

6. GENERAL

6.1 Water Quality

The Southern Water Authority is responsible for the quality of the discharge of trade and sewage wastes into the Solent.

Statistics taken from the Royal Commission on Environmental Pollution (1972) show that the area had 195 million gallons/day of these effluents discharged - by far the highest level on the south coast of England - and recorded as one of the most polluted regions in the UK.

Discharge/millions of gallons/day		
Tyne	....	400m
Tees	....	400m
Thames	....	200m
Solent	....	195m
Wash	....	11m
S.Wales	....	20m

(data published in 1972)

Southampton Water has also suffered a high level of hydrocarbon (oil) pollution over a period of years from accidental spillages, the presence of oil in the cooling water discharged from Fawley refinery and leakages from motor vessels. The result is that mollusc shellfish (especially clams) in Southampton Water are tained by oil.

There is also growing concern about TBT (tributyltin) anti-fouling paint contamination leached from the thousands of yachts and boats which are moored in the area. The effects of TBT on mollusc larvae and the breeding cycle of oysters may be detrimental to local fisheries.

The Southern Water Authority has a biological monitoring study under way examining the effects of all main pollutants on the fauna and sediments of the Solent. Leicester University has been contracted to test for TBT build-up in sediments and MAFF check oysters and clams for contamination.

The severe effects of sewage contamination has resulted in closing orders under the Public Health (Shellfish) Regulations (see 2.2). However, six oyster areas in the Western Solent have been designated under the EEC Directive on Quality of Shellfish Water, they include:

Calshot/Stanswood Bay
Lepe Middle Ground
Sowley Ground
Yarmouth Roads
Newtown Bank

Reports on the water quality of these and other areas in the Solent are available from the Southern Water Authority.

6.2 Pests and Diseases

The area is lightly infected with the red worm Mytilicola, which is found in the gut of the mussels. The oyster disease Bonamia, which kills flat oysters (O.edulis), was recorded at Poole, Emsworth, Langstone and Beaulieu River in the Spring of 1986. To date (August) oysters in the main Solent fishery are believed to remain uninfected.

Under the Molluscan (Control of Deposit)(Variation) Order 1983, the Solent is designated Area 12A - from Selsey Bill to the Needles Lighthouse. Poole Harbour is in Area 12B.

TABLE 1.

Recorded Shellfish landings Southern S.F.C.District

	Weight(tonnes)		Value (£)	
Species	1984	1985	1984	1985
Lobsters	58	49	312,068	334,194
Brown crab	318	237	211,522	172,908
Clams	236	251	75,914	116,639
Spider crabs	131	167	67,216	120,751
Scallops	170	74	132,832	80,208
Prawns	1	1	3,240	3,281
Bass	18	19	67,663	85,647
Soles	26	22	73,959	74,305
Other (43 species)	180	188	138,150	127,604
	1138	1008	£1,082,564	£1,115,537

TABLE 1A

FISHING EFFORT

Vessels registered and working in the District

Poole	159
Lymington	24
Hythe	9
Hamble	46
Gosport	23
Portsmouth	64
Langstone	88
Cowes	23
Yarmouth	40

Source

Annex to Chief Fishery Officer's Report - 28th February, 1986.