8

THE FISHES
of
CHICHESTER AND LANGSTONE HARBOURS

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8.1. Introduction

Chichester, Langstone and Portsmouth Harbours are three adjacent, bar-built estuaries situated on the coast of Dorset. They are interconnected at their northern extremities with discreet circulations that occur between Chichester and Langstone, and Langstone and Portsmouth. The channel between Portsmouth and Langstone is very narrow (25m wide and 100m long), and between Langstone and Chichester is short, and has a width of 300 m. At HW springtide there is a westerly flow from Chichester to Langstone. At high water, they represent one hydrographic unit with similar topography and ecology. The harbours are nearly fully saline and almost beyond influence of Solent tidal system. There harbours contain large areas of intertidal mud and sands, unusual in south of Britain, and which are unique in character. Chichester and Langstone are essentially dry only at low water. (Wright & Barnard, 1964; Portsmouth Polytechnic, 1976; Culley & Palmer, 1978).

Chichester Harbour is the most easterly of the three interconnected harbours and the largest, 2,946 ha. compared with 1,925 ha. for Langstone and 1,593 ha for Portsmouth. The freshwater input is very small. There are *Spartina* marshes, saltmarshes, shingle, and banks. The spring tide range is 4.1 - 4.8m. Chichester is considered of interest for its diversity of habitat types, but has not been studied as intensively as Langstone Harbour. Birds are the only vertebrates that have been examined in detail (Montgomery *et al.*, 1985). There is no separate study on the estuarine fishes of Chichester Harbour, although they are considered to be similar to those of Langstone Harbour.

Langstone Harbour is almost enclosed, with a narrow mouth with swift currents running through it. The tidal range is 4.27 m. at high water during the spring. Water circulation in the harbour is almost entirely owing to tidal action. It can be considered fully saline, with a number of small freshwater inlets, however, salinity does vary in the upper reaches, readings from 27 parts per thousand have been recorded. Apart from reclamation the configuration of water has changed little over the last few centuries. Langstone Harbour is included under the RAMSAR convention in 1971. (Tubbs, 1975, Portsmouth Polytechnic, 1976; Langstone Harbour Working Group, 1981)

Both Chichester and Langstone are of marine biological importance and have been designated as SSSIs (Montgomery *et al.*, 1985; Davies *et al.*, 1990; Davidson *et al.*, 1991). Little has been recorded of the fish species composition and that only as a by-product of other work (Culley & Palmer, 1978).

8.2 Estuarine habitats

Both Chichester and Langstone show a diversity and abundance of habitats. In the northern half there are mainly mud flats and salt marshes. The harbour mud is a mixture of clay, silt, sand and organic matter, whereas, the sea bed at the entrance is sand, gravel and shell. There is a wealth of invertebrates providing food for a wide range of fish and birds. There has been steady saltmarsh erosion, but causes remain unclear. The *Zostera* collapse in 1930 and other ecological changes are believed to be associated with increased effluent (Tubbs, 1975)

8.3 Fish lists

The most recent and comprehensive published fish lists are that of Culley & Palmer (1978) and Reay & Culley (1980). The number of fish species recorded from Chichester and Langstone Harbours is 62 (see Table 8.1)

8.4 Fish and fisheries

The data presented in this report is for Langstone Harbour as no data is recorded from Chichester Harbour. A total of 58 species of fish have been recorded since 1968. These have come from angling records, shore searches, seine netting, littoral collections, and commercial fishing returns. Sampling has been mainly from sand flats in the southern half of the harbour. Sandbanks were found to be populated by greater numbers and greater variety of fishes than other areas. Species numbers caught depends on substrate, time of year, numbers being higher in summer and autumn. The harbour is of local importance as a breeding and nursery ground. Large numbers of young sand eels (*Ammodytes sp.*) clupeoids (*Clupeidae*) and sand smelt (*Atherina presbyter*) are probably important as the food for sustaining populations of commercially important species such as mackerel (*Scomber scombrus*), bass (*Dicentrarchus labrax*), herring (*Clupea harengus*), pilchards (*Sardina pilchardus*), mullet (*Mugil sp.*) and sprat (*Sprattus sprattus*). Young sprat were noted to move into the harbour in June in very large numbers and were followed by schools of mackerel (*S. scombrus*) (Portsmouth Polytechnic, 1976; Palmer & Culley, 1978). Juveniles of common species collected by seining were sand goby (*Pomatoschistus minutus*), common goby (*Pomatoschistus microps*), greater pipefish (*Syngnathus acus*), 15 spined stickleback (*Spinachia spinachia*), plaice (*P. platessa*), flounder (*P. flesus*), sole (*Solea solea*), golden mullet (*Liza aurata*), and black bream (*Spondyliosoma cantharus*). Only one elasmobranch has been recorded, the thornback ray (*Raja clavata*) (Reay and Culley, 1980).

Reay and Culley (1980) indicate fishery statistics are of limited value because, landings take place at several points, landing statistics are inaccurate, there is no indication of where fish are caught and there are no data on fishing effort. However, they did have the personal records of Mr F Moore (Fishery officer) for catches in Langstone Harbour who indicated most species have declined, although numbers of grey mullet (*Mugil sp.*) have increased. The most dramatic decline is with herring (*Clupeas harengus*) which once accounted for 60-250 kg per tide between 1920-1940.

All five species of sand eel are recorded from Langstone Harbour, but only *Ammodytes tobianus* and *Hyperoplus lanceolatus* are common (Reay & Culley, 1980). *Ammodytes tobianus* made up 95% of total catch in Langstone Harbour and are exploited for bait. Studies on spawning groups, composition, spawning season, population structure in terms of length, sex, age, maturity, mortality, annual growth, seasonal growth have been investigated (Reay, 1973).

Of the two British sandsmelt only *Atherina presbyter* is present and formed part of a single species study by Palmer (1979). Palmer & Culley (1984) studied spawning, egg and embryonic development, and confirmed successful spawning in the central English Channel.

The grey mullet, *Liza aurata* in Langstone Harbour was studied by Reay (1987) who described its relatively abundance, seasonal occurrence, population structure and growth. The presence of small juveniles indicate possible spawning in British waters and the high salinity nursery ground may be optimum habitat for *L. aurata* which is apparently the least common mullet in Europe. The absence of large males in Langstone Harbour indicates that spawning takes place offshore. All three British species of grey mullet found in Langstone Harbour with almost equal numbers of golden and thick-lipped in commercial catches and thin-lipped only rarely being taken. Juvenile golden mullet were extremely abundant. The harbour is an important nursery ground for golden mullet. No eggs or running adults were found. (Reay and Culley, 1980).

A section of concrete within the harbour provides artificial reef conditions for corkwing wrasse *(Crenilabrus melops)*, ballan wrasse *(Labrus bergylta)*, and the two spot goby *(Gobiusculus flavescens)*.

Weed growth thought to have important bearing on fish distribution, and the colonisation of sandy areas, may provide more favourable habitats for inshore labrids. The increase in *Zostera* may encourage return of fish associated with it. The new record of the pipefish *(Syngnathus typhle)* may be an example of this.

Gasterosteus sp. has been recorded from a trawl sample from West Solent (Dixon & Moore, 1987)

There is a widespread opinion that catches in the Solent have declined (Clark, 1971), but there are no data on the threatened and less common migratory species, such as the sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), twaite (*Alosa fallax*) and allis shad (*Alosa alosa*) which have all been recorded in the Solent.

8.5 Impacts

Commercial fishing is regulated by Southern Sea Fisheries District Committee. Commercial fishing is one of the most important activities based in the Langstone Harbour. The commitee consider the inshore fishing industry is likely to expand because of the high quality and wide variety of inshore fish and as a result of the increasing restrictions being imposed on fishing in distant waters. Commercial catches involve 12 main species, of which mullet (*Mugil sp.*) and sand eels (*Ammodytes sp.*) are the most abundant, caught inside the harbour, and mackerel (*S. scombrus*) caught outside. Oyster farming was carried out until 1917 in Langstone Harbour, but declined. However, in recent years the Solent has become the largest oyster fishery in the country. Cockling and winkling provided a considerable export. (Portsmouth Polytechnic, 1976)

Neither harbours has been of major **commercial** or **industrial** importance as a port although Langstone Harbour has provided bases for small dredging fleets used for gravel production. Langstone has, in the past, supported industries including fishing, oyster farming and wild fowling.

The main form of **recreation** in Langstone Harbour is sailing with marina sites planned at three places, North Hayling, Kench (South Hayling), and Eastney Lake. Waterskiing is permitted, as are powerboats and SCUBA diving (mainly the Marine Laboratory and Portsmouth University). The Solent is a popular angling area for both shore and boat fishermen, with 40 registered angling boats (as well as private boats). In bad weather the harbour is extensively used by anglers (Portsmouth Polytechnic, 1976).

Bait digging is carried out on a commercial scale and by individuals. Local anglers claim a reduction of bait in accessible areas. There is no formal evidence on the affects bait digging has on infaunal populations and little work has been done on its influence on the local shore ecology (Portsmouth Polytechnic, 1976; Dixon & Moore, 1987).

Sewage. The chief source of effluent in the harbours comes from Budds Farm Sewage Works which is situated in the north east corner of Langstone Harbour. Sewage is released on the ebb tide twice a day. Storm sewage outfalls into Portscreek are expected to give high nutrient concentrations in vicinity of the outfalls. Fort Cumberland sea outfall discharges sewage, foul water drainage and storm water from Portsmouth to a point just outside the Langstone Harbour entrance. Discharge takes place on ebb tide for one and a half hours starting one hour after high water. This gives good mixing before the flood tide carries water back into Langstone Harbour. In certain localities high concentrations of effluent can occur, but in general concentrations are low (Portsmouth Polytechnic, 1976).

Chichester has two sewage outfalls, one from Chichester at Thornham or Thorney Island. Portsmouth, Chichester and Langstone developed extensive mats of green algae associated with organic enrichment (Southern Water Authority, 1983; Soulsby *et al.*, 1981; Lowthion *et al.*, 1985; Dixon and Moore, 1987).

Algal mats (*Enteromorpha* and *Ulva*) have caused some concern. The decline of birds and possibly fish, may be a reflection of low oxygen levels resulting from eutrophication and excessive algal growth (Portsmouth Polytechnic, 1976).

Industrial effluent enters Langstone Harbour from a number of small drains, and at least one small stream that is used as depository for a variety of chemicals from industrial estates. Lakes have been used as tips, and infilling continues in Storehouse Lake area. Effluent input is small in comparison to tidal volume (Portsmouth Polytechnic, 1976) and may have little effect.

Educational establishments including, 150 schools, three centres of higher education and two laboratories, use Langstone Harbour for education and research. It is also used for training for school children in water sports (Portsmouth Polytechnic, 1976).

Heavy metals levels are not high (Portsmouth Polytechnic, 1976). Although, see more recent work by Burt *et al.* (1992)

There is some **mineral exploitation** (Portsmouth Polytechnic, 1976).

Land reclamation of mudflats in Langstone Harbour has been achieved by refuse tipping during the recent past. A number of **refuse tips** have been established on the shores of Langstone Harbour, some were used to reclaim mudflats (Portsmouth Polytechnic, 1976).

8.6 Water quality

Langstone Harbour is a controlled body of water under the Clean Rivers, Estuaries and Tidal Waters Act 1960) and is under the jurisdiction of Southern Water Authority. Dissolved oxygen (DO) levels are satisfactory, but could decrease if effluent quality were to decline or sewage work to overload. This may override physical and climatic factors that are currently controlling the growth of *Entermorpha* sp. (Portsmouth Polytechnic, 1976).

Leachates from tips and sewage outflows result in high concentrations of nutrients, particularly ammonium. Elevated nutrient levels stay high for a number of years after tipping ceases. Langstone Harbour has the largest source of nutrients coming from seawater entering on flood tide, and nutrient concentrations derived from the water quality of Solent which itself has a high variability of composition. Langstone Harbour is unlikely to suffer ecological damage as it has a high changeover of water, and it is not a retentive system (Wright and Barnard, 1964; Portsmouth Polytechnic, 1976; Thomas *et al.*, 1978). Under the NRA (1991) classification the water quality is considered to be "Good" (see Figure 8.1). Water quality determinands for Chichester and Langstone Harbours are given in Edmondson & Watts, 1992.

8.7 Summary

Although considered together, the two estuaries have different tidal flow patterns which are likely to result in different fish populations. At the moment only Langstone Harbour has been studied in any detail.

The water quality of Langstone Harbour gives some cause for concern with leachates from local tips and the effects of sewage from the local communities.

8.8 Recommendations

It is recommended that;

1. a study of the fishes of Chichester Harbour comparable to that by Reay & Culley (1980) for Langstone is carried out. Both harbours should be examined with respect to the distribution of non-commercial fishes.

2. an assessment of water quality is needed for both harbours.

8.9 References

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Table 8.1 The Fishes of Chichester and Langstone Harbours

Raja clavata
Anguilla anguilla
Conger conger
Alosa fallax
Clupea harengus
Sardina pilchardus
Sprattus sprattus
Salmo salar
Salmo trutta
Apletodon dentatus
Ciliata mustela
Pollachius pollachius
Trisopterus luscus
Belone belone
Atherina presbyter
Gasterosteus aculeatus
Spinachia spinachia
Nerophis lumbriciformis
Syngnathus acus
Syngnathus rostellatus
Syngnathus typhle
Trigla lucerna
Myoxocephalus scorpius
Taurulus bubalis
Agonus cataphractus
Cyclopterus lumpus
Liparis liparis
Liparis montagui
Dicentrarchus labrax
Trachurus trachurus
Spondyliosoma cantharus
Chelon labrosus
Liza aurata
Liza ramada
Crenilabrus melops
Labrus bergylta
Echiichthys vipera
Lipophrys pholis
Parablennius gattorugine
Pholis gunnellus
Ammodytes marinus
Ammodytes tobianus
Gymnammodytes semisquamatus
Hyperoplus immaculatus
Hyperoplus lanceolatus
Callionymus lyra
Aphia minuta
Gobius niger
Gobius paganellus
Gobiusculus flavescens
Pomatoschistus microps
Pomatoschistus minutus
Pomatoschistus pictus
Scomber scombrus
Psetta maxima
Scophthalmus rhombus
Limanda limanda
Platichthys flesus
Pleuronectes platessa
Buglossidium luteum
Microchirus variegatus
Solea solea

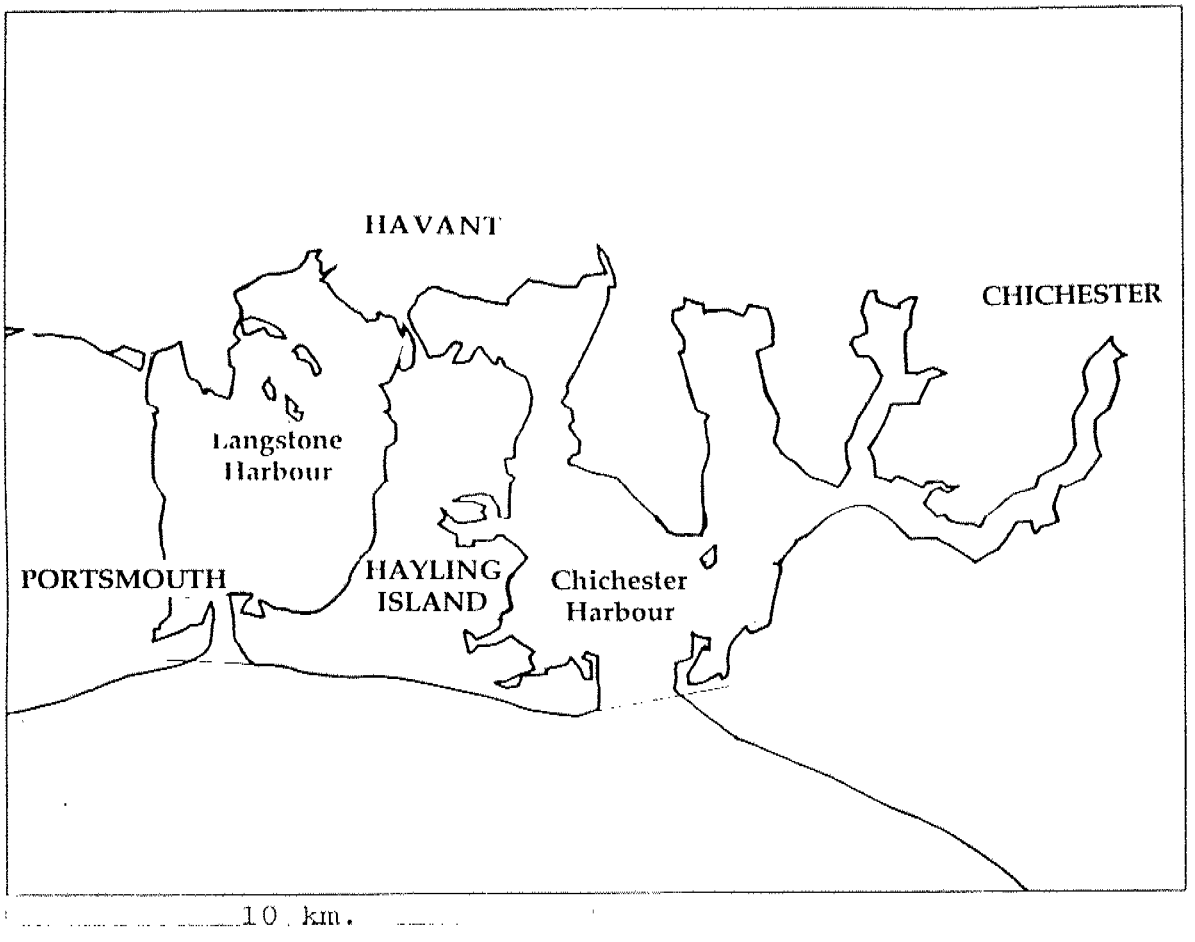

Figure 8.1 Map of the Chichester and Langstone Harbours showing the upper and lower extent of the estuary, the upper tidal limits, and the water quality according to the 1991 NRA Survey. Water quality is characterised as "good" [unmarked], "fair" [medium stipple], "poor" [dense stipple], and "bad" [solid infill].

9

THE FISHES of POOLE HARBOUR

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9.1 Introduction

Poole Harbour is one of largest natural harbours in Europe, with an area of 3805 ha. It has a narrow opening to the sea, and is entirely brackish. It has a small tidal range, only 2 m. on spring tides, and a very weak wave exposure. Many areas experience moderate to strong tidal currents. The main channel is narrow and fairly shallow with a minimum depth of 3.5 m. Freshwater inputs are from the Rivers Frome and Piddle. (Poole Harbour Management Group, 1979; Dyrynda 1987). The harbour is already a substantially changed environment, with human activities concentrated on the northern half of the harbour, leaving the southern half semi- natural. (Dyrynda, 1987)

The estuary is of established nature conservation importance for its wildfowl, waders, other wildlife, and diversity of habitats. It is an SSSI, classified as a Grade 1 site ("supreme national significance"), a Heritage Coast and Area of Outstanding Natural Beauty. The fringing terrain is protected by the largest concentration of nature reserves (Nature Conservancy, 1971; Dorset Naturalists' Trust, 1974; Poole Harbour Management Group, 1979; Dyrynda, 1987; Howard & Moore, 1988, Davies *et al.*, 1990, Davidson *et al.*, 1991).

9.2 Estuarine habitats

There are beaches, mud flats, sand gravel banks, saltmarshes and the intertidal area is dominated by *Spartina* (Dorset Naturalists Trust, 1974). Poole open mud beds are important grounds for commercial fish species. (Dyrynda 1987). Studies on the intertidal environment of Poole Harbour have concentrated on bird populations (Gray, 1985). Few other studies have been carried out on the intertidal and subtidal zones. (Howard & Moore, 1988).

9.3 Fish lists

In total 53 fish species have been recorded from Poole Harbour (Davis, pers. comm. 1993; Ladle, pers. comm. 1993). Thirty-six of which were recorded as part of other surveys by Dyrynda (1984, 1987)(see Table 9.1).

9.4 Fish and fisheries

The natural productivity of the harbour sustains fisheries of considerable importance including, bass (*Dicentrarchus labrax*), mullet (*Mugil sp.*), eels (*Anguilla anguilla*) and shellfish (Dorset Naturalists Trust, 1974; Poole Harbour Management Group, 1979), sole (*Solea solea*) and plaice (*Pleuronectes platessa*).

The harbour is an important nursery ground for estuarine fishes. This has been borne out by MAFF trawls in the area which have shown the proportion of undersized, unsaleable fish were far higher in the harbour than outside. Small bass (*D. labrax*), flounder (*Platichthys flesus*), plaice (*P. platessa*), mullet (*Mugil sp.*) and herring (*Clupea harengus*) are found in Poole Harbour (Howard & Moore, 1988).

Plaice *(Pleuronectes platessa)*. Transplantations from Dutch grounds to Poole Harbour, of juvenile plaice took place between 1926 and 1927. The fish immediately left the Harbour, though many were caught just outside. The survival rate was high, but their growth rate was low (Buchanan-Wollaston, 1933).

Eel *(Anguilla anguilla)* are trapped commercially in Poole Harbour. The burrows of eels (*A. anguilla*)were stated as occurring in local patches, and during a dive survey, at least 40% of burrows examined contained adult *Anguilla anguilla*. (Dyrynda 1987). Howard & Moore, (1988) also confirm burrows of *A. anguilla* as being common in firm mud. The trapping of eels is not considered enviromentally harmful although some other species are caught as a by-product of the operations.

Flounder *(Platichthys flesus)* is a widespread species and is the mainstay of the trawler fishermen. The flounder fishery is best in winter (Buchanan-Wollaston, 1933; Dyrynda, 1987)

Mullet *(Chelon labrosus)* is caught by netting at low tide in narrow creeks and is a common grazer on sublittoral muds, particularly in higher streams flanked by mud flats.

Sea bass (*Dicentrarchus labrax*) fishing was considered best in early spring (Buchanan-Wollaston, 1933). It is still caught commercially by seine and gill netting and rod fishing (Dyrynda 1987).

Salmon (*Salmo salar*) and sea trout (*Salmo trutta*) use Poole Harbour as an important migratory route into the rivers. (Poole Harbour Management Group, 1979).

Ammodytes tobianus (sand eel) is recorded as being the only common species of sand eel in the coarse sand community (Howard & Moore, 1988)

Other species present include *Gadus morhua* (cod) which are caught in negligible quantities. Very large numbers of individuals of non-commercial fish species, eg. gobies were observed in a cross channel transect (east to west), with less stable stones colonised by *Parablennius gattorugine* (Dyrynda 1987). Howard & Moore, 1988 also mention *P. gattorugine* as present in areas of slightly reduced water movement, along with many mobile species associated with fine sand beds, including *Gobius niger, Pomatoschistus minutus, Gobiusculus flavescens* and *Syngnathus acus. Pholis gunnellus* was identifed among mobile species present. (Howard & Moore, 1988)

Thin lipped grey mullet *(Liza ramada)* are abundant in the estuaries of the Frome and Piddle, smelt *(Osmerus eperlanus)* have been recorded in the Frome, as have transparent gobies *(Aphia minuta)*, sea lampreys *(Petromyzon marinus)* and river lampreys *(Lampetra fluviatilis)* (Ladle, pers. comm. 1993).

9.5 Impacts

Commercial fishing is by trawls, set, ring and eel (fyke) nets, pots, dredges and hooks. This ranges from casual to full time employment with up to three dozen commercial species landed at Poole. Trawling for fish is occasional and is only possible where there is greater than 1 fathom of water and a smooth estuary bed. Trawling is the most destructive kind of fishing and Buchanan-Wollaston (1933) identified a need to conserve and improve fisheries in Poole (and Beer) districts by imposing closed areas. The control of salmonids and eel (*Anguilla*) fisheries was exercised by Wessex Water Authority, but is now under the jurisdiction of Wessex NRA while other fishing is regulated by Southern Sea Fisheries Committee. However, the situation in respect of the inshore fishing industry is uncertain (Nature Conservancy, 1971; Poole Harbour Management Group, 1979; Dyrynda 1987; Howard & Moore, 1988). Maricultures were established for turbot (*Psetta maxima*) and salmon (*S. salar*). Licences are issued for oysters, mussels and clams (Dyrynda, 1987; Howard & Moore, 1988)

Oil is the most significant resource in Poole Harbour. It has the longest onshore oilfield in north west Europe, with production wellheads sited on Furzey Island that have been in production since 1979. The harbour suffers minor oil pollution and is at risk of damage should a major spillage occur. BP have made efforts to minimise the effects on environment, and has funded research and developed contingency plans in the event of a spill (Dorset Naturalists Trust, 1974; Gray, 1985; Dyrynda, 1987; Howard & Moore, 1988).

Commercial shipping in Poole Harbour consists of berthage for cargo ships. Passenger ships are in the form of roll-on roll-off ferries to the port of Cherbourg. Conventional cargo and bulk cargo carried consists mainly oil and petroleum. Channel and navigational **dredging** occurs. (Poole Harbour Management Group, 1979; Dyrynda, 1987; Howard & Moore, 1988).

The harbour is at risk from a variety of **fluid discharges** entering via rivers, outfalls and run offs. These include **sewage** effluent, **trade** effluent, discharges from reclaimed land, discharges from shipping and pleasure craft, accidental spillages of oil or other results from industrial activity. River borne sediments are thought to be relatively limited, confined mainly to periods of high run off (Gray, 1985). The major source of effluent is from the Poole Sewage Treatment Works (Poole Harbour Management Group, 1979) and also from works at Fleetsbridge, Keyworth, Lytchett Minster (Dyrynda, 1987; Howard & Moore, 1988). Industrial effluents from metal plating works is now diverted to sewers. There are also chemical wastes, leachates from landfill and overflows of storm drains (Howard & Moore, 1988).

Minerals and **sediments** extracted are oil, ball clay, sand and gravel (Poole Harbour Management Group, 1979; Howard & Moore, 1988).

Radioactivity has been recorded in oyster flesh from Poole Harbour (Mitchell, 1969).

Tourism and recreation are an important part of human activites. Poole is a holiday resort and both sailing and powerboats are popular. There is a yacht club, swing moorings, public launching sites and large marina present. High levels of TBT were detected related to the marina, but are now subject to government regulations. Recreation on the water also takes the form of board sailing, water skiiing, rowing, canoeing, angling, and SCUBA diving. The Poole Harbour Management Group encouraged recreational activities subject to safeguard of other interests. (Nature Conservancy, 1971; Dorset Naturalists Trust, 1974; Poole Harbour Management Group, 1979; Dyrynda, 1987; Howard & Moore, 1988).

SCUBA divers may cause local disturbance and damage to fish stocks if using speargun or fishing at night with torch. Reports of catches vary considerably (Dorset Naturalists Trust, 1974). However, it is not considered to have a significant effect on fish populations and has declined in recent years.

Bait digging occurs extensively on intertidal areas, with both commercial and recreational methods used. It is a problem and can lead to anaerobic conditions and death of organisms. (Dorset Naturalists Trust, 1974; Poole Harbour Management Group, 1979; Howard & Moore, 1988).

Collecting for **educational** (local schools) and **research** (University of Bournemouth) may occur, but access for ecological study is very restricted (Nature Conservancy, 1971; Dorset Naturalists Trust, 1974; Howard & Moore, 1988).

Other threats include **urbanisation** which is considered to be heavy, **land reclamation, heavy metals** and **organotins** (Dyrynda, 1987, Burt *et al.*, 1992), **agriculture** (Nature Conservancy, 1971), **thermal pollution** from Poole Power Station (which closed in the early 80's), and the **MoD landing craft base** at Hamworthy, although no encouragement is given for landing on southern shores (Poole Harbour Management Group, 1979)

9.6 Water quality

The water quality of Poole Harbour was considered generally high with problems being relatively localised (see Figure 9.1). The main freshwater inputs are from the Rivers Frome and Piddle which receive some sewage, but overall the water quality is high. The harbour is substantially flushed with clean water with relatively few discharges which are concentrated in the developed area. Only in Holes Bay is there evidence of discharges having a serious deleterious effect with the contamination of shellfish with toxic metals (particuarly cadmium). The shellfish fishery was closed, and this associated with eutrophication. Sewage and trade effluent are believed to cause excessive growths of *Ulva lactuca* (sea lettuce) (Poole Harbour Management Group, 1979; NRA, 1991). Water quality determinands for Poole Harbour are detailed in Edmondson & Watts (1992).

9.7 Summary

Poole Harbour is an interesting example where an enclosed body of water is subjected to intense human activities and yet appears to sustain them all without gross conflicts of interest. This is likely to result from good regional management and an active Dorset Naturalist Trust. The fishes of Poole Harbour are subjected to some commercial pressure, but non-commercial species are too poorly known to comment on their status.

Water quality is recorded as "good" despite the industrial use of the area and the potential for problems in the event of major pollution. The Harbour contains more juvenile benthic fish than in the adjacent Channel.

9.8 Recommendations

It is recommended that;

1. in view of the recorded large number of juvenile fishes, Poole Harbour must be considered an important nursery area for local marine and estuarine fishes. A detailed survey should be carried out to examine the impact that current fishing methods (especially trawling and trapping) have on fish stocks.

2. the Poole area has benefitted from an active Naturalist Trust and the early published report on Marine Wildlife Conservation in Dorset 1974. It is recommended they are encouraged to produce a detailed account of the progress made since this report.

3. the general knowledge of fish is slight and a survey needs to be carried out to identify the existing fish population with a view to establishing a faunistic baseline.

9.9 References.

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Table 9.1 The Fishes of Poole Harbour

Lampetra fluviatilis
Petromyzon marinus
Anguilla anguilla
Conger conger
Alosa fallax
Clupea harengus
Sprattus sprattus
Salmo salar
Salmo trutta
Osmerus eperlanus
Ciliata mustela
Gadus morhua
Gaidropsarus mediterraneus
Pollachius pollachius
Trisopterus luscus
Trisopterus minutus
Belone belone
Gasterosteus aculeatus
Spinachia spinachia
Nerophis lumbriciformis
Syngnathus acus
Taurulus bubalis
Agonus cataphractus
Cyclopterus lumpus
Dicentrarchus labrax
Trachurus trachurus
Pagellus bogaraveo
Spondyliosoma cantharus
Mullus surmuletus
Cepola rubescens
Chelon labrosus
Liza ramada
Crenilabrus melops
Ctenolabrus rupestris
Labrus bergylta
Labrus mixtus
Lipophrys pholis
Parablennius gattorugine
Pholis gunnellus
Ammodytes tobianus
Callionymus lyra
Aphia minuta
Gobius niger
Gobius paganellus
Gobiusculus flavescens
Pomatoschistus minutus
Scomber scombrus
Psetta maxima
Scophthalmus rhombus
Limanda limanda
Platichthys flesus
Pleuronectes platessa
Solea solea

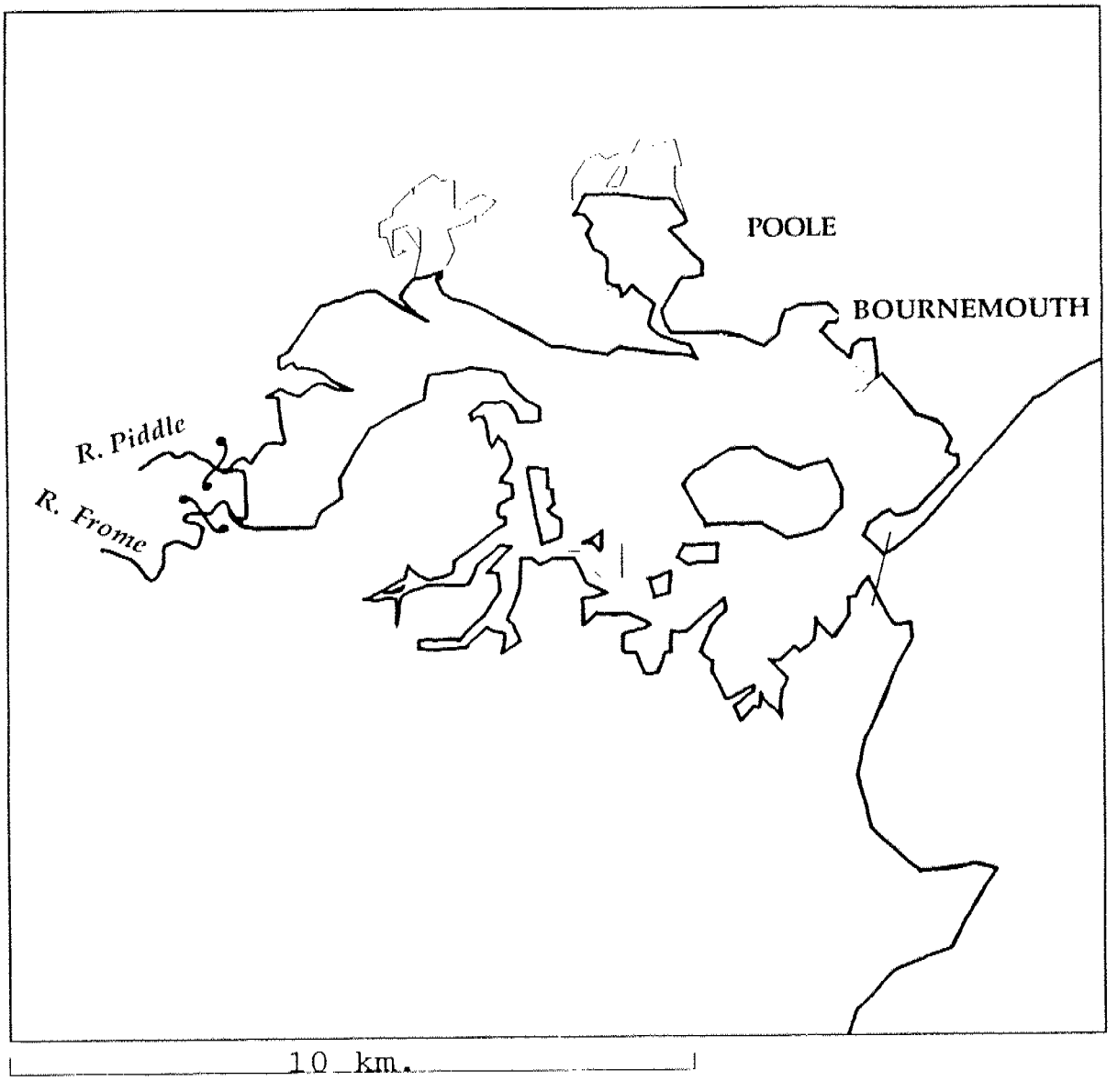

Figure 9.1 Map of Poole Harbour showing the upper and lower extent of the estuary, the upper tidal limits, and the water quality according to the 1991 NRA Survey. Water quality is characterised as "good" [unmarked], "fair" [medium stipple], "poor" [dense stipple], and "bad" [solid infill].