FISH AND FISHERIES IN THE SOLENT

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Introduction

Fish in the Solent area have to date received very little attention. Beach seining between 1968 and 1973 in Langstone Harbour provided general information on the fish fauna of the area as well as specific data for sand eels (Ammodytidae) (Reay, 1972, 1973), sand smelt (Atherinidae) (Palmer, unpublished) and grey mullet (Mugilidae) (Reay, in prep.). In addition, a longer term survey has recently been carried out by Culley and Palmer (1978), and daily records of species composition and quantities of fish retained on the intake screens of the Fawley Power Station have been kept since 1973 (Holmes, 1975). The Ministry of Agriculture, Fisheries and Food have also sampled within the Solent as part of their national survey of young fish distribution. A comprehensive species list of fish from the Solent is given in Table 1.

Apart from the shore work, most information must be derived from fisheries statistics which for the Solent region are far from comprehensive. However, these data can provide an insight into the commercial and recreational importance of fish in the Solent and possible evidence of changes in the fauna which can be attributed to human activity. Within the region there are three relevant fisheries, viz; commercial, sport and anadromous sport fisheries.

Commercial sea fisheries

The Solent comes within the jurisdiction of the MAFF Fisheries Inspector for the South East District which extends from the shore to the territorial limit and is administered at Hastings. Within this District the Southern Sea Fisheries District Committee (SFDC) and the Sussex SFDC provide data on the landings of the main commercial sea fish species from the major ports of Portsmouth, the Isle of Wight, Lymington and Keyhaven, and Emsworth respectively. Southampton is administered by the British Transport Docks Board and the fishery statistics are kept directly by the MAFF Inspector.

Fishery statistics, despite back-up discussions with fishermen and fishery officers, are of limited value because:

(i) Landings take place at several points along the coast in addition to those listed above, and there are a number of separate landing places around the Isle of Wight and on the Channel and Solent coasts which are not distinguished separately in the statistics.

(ii) The official landing statistics are admitted to be inaccurate as estimates of the total landings taking place (Major M.H. Benton, Chief Fishery Officer, pers. comm.). This is largely due to the difficulty of obtaining information from fishermen who are dispersed along the coastline, and who include a large proportion of part-timers who are reluctant to advertise their earnings.

(iii) The statistics refer to landings at the ports and give no indication of the areas where the fish were caught. Many of the landings recorded in the Solent refer to catches made outside the area.

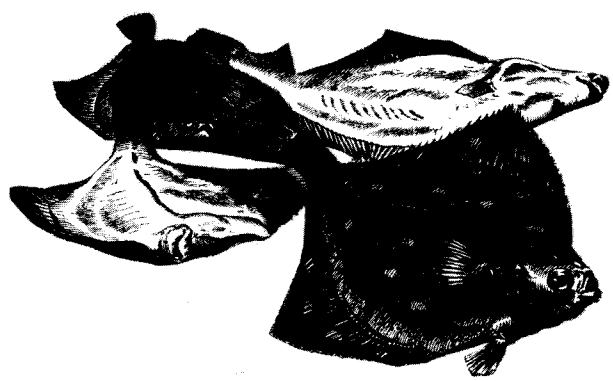
(iv) No data are provided on fishing effort so that changes in catches from year to year cannot readily be related to fish abundance.

However, attempts are now being made to obtain catch per unit effort and catch per area estimates which will greatly increase the value of the data.

The main species landed at the Solent ports are the mackerel, which is taken during a limited period during the summer from beach seines and hand lines when shoals move close inshore, and the trawl caught common sole, plaice and thornback ray which are present throughout most of the year. Other species appearing in the statistics are cod, whiting, dogfish, dab, sprat, turbot, herring and "others". The latter sometimes achieve prominence and include bass, grey mullet, flounder and eels which are caught in the trawls, seines, trammels and other nets typical of the harbours and estuaries.

Landings of fish at Portsmouth, Lymington and the Isle of Wight have gradually increased over the last ten years totalling approximately 820 tons in 1978. The figure for Southampton in this year, however was insignificant. Although the above tonnage can probably be regarded as an indication of the fish landed in the region, it may well either underestimate the total Solent catch, as some ports are not included in the returns, or over estimate it, as some fish landed in the ports have been caught outside the area. The most important port is Portsmouth which accounted for over 500 tons of fish in 1978. Although large quantities of lobsters and crabs were also landed here for several years after 1968, negligible numbers are now caught actually within the Solent. On the other hand, hand-gathering of winkles and cockles in the harbours and the dredging of oysters in Stanswood Bay are important fisheries.

Although fishery statistics are of no value for monitoring trends in fish abundance, private records of individual fishermen can provide some insight into the situation. Mr F. Moore, fishery officer, has kept records of his family's fish catches in Langstone Harbour since the 1920's. In terms of seine net catches per tide, although most species appear to have declined, numbers of grey mullet have increased. The most dramatic decline has been in the herring which accounted for 60-250 kg per tide between 1920 and 1940. Since the war, however, none have been taken apart from the occasional small catch around the Isle of Wight, and this appears to parallel the situation in the western Channel in the 1930's when the herring was replaced by the pilchard (Cushing, 1961; Culley, 1971).



Plaice and flounder

Sport sea fisheries

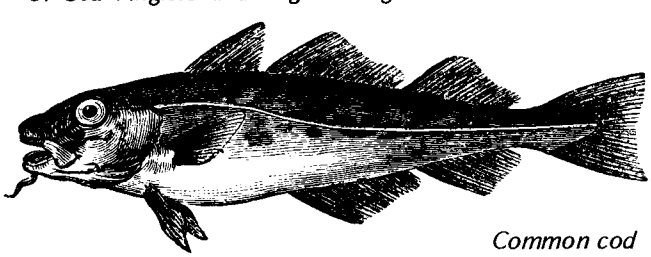
Although no statistics are published, records are kept by clubs and individual anglers and an estimate, based on the number of clubs, the probable number of anglers and the catch-rates, suggests that the total quantity of fish caught by rod and line in the Solent probably equals that taken by commercial fishermen. From a national point of view, the area is at present more important for its sea angling than for its commercial fishing.

In a recent survey of anglers' data, undertaken in conjunction with the Wessex Division of the National Federation of Sea Anglers (Reay, unpublished), it was concluded that competition results could provide a most useful method of monitoring fish availability. Some club records go back to the 1940's, and an indication of relative abundance can be obtained from data on the numbers and weight of each species per angler per unit time (ie catch per unit effort).

Approximately fifty species of fish have been caught by rod and line in the Solent, with twenty seven appearing in the records of the Elmore Club competitions during the 1965-72 period. The main species caught by anglers include lesser spotted dogfish, smooth hound, thornback ray, common eel, conger eel, whiting, pollack, pouting, cod, bass, mackerel, dab, flounder, plaice and common sole. Fishing from the shore, particularly in the harbours, results predominantly in common eel, pouting, bass and flounder, with mackerel for a restricted period during the summer. A much wider variety of species is available offshore, with pouting usually dominating and considered as a pest, and bass, plaice and thornback ray fairly common and highly prized. Several species of elasmobranch are caught, probably more frequently in the western arm of the Solent where sting ray and smooth hound are regularly taken close inshore and large numbers of juvenile rays are found in the sand eel nets off Hurst Spit.

Angling takes place throughout the Solent at all times of the year, with predictably less boat fishing and more shore fishing during the winter, and there has been a marked tendency in recent years for commercial fishermen to charter their boats for anglers. Most of the charter boats fish outside of the region as long as the weather permits, particularly with respect to shark fishing south of the Isle of Wight for which the ports of Yarmouth and Portsmouth have become important bases. Associated with the angling has been beach seining for sand eels and digging for polychaetes both of which are used as bait. Little research has been done into the ecological effects of bait digging but large quantities of sand eels and *Nereis virens* are taken, and data for Langstone Harbour, the chief source of bait for the Portsmouth area are available (Portsmouth Polytechnic, 1976; Pilcher, 1979).

Both the Wessex Division of the National Federation of Sea Anglers and anglers in general are alert to the possible harmful effects of pollution and over-fishing in the region. However, although there is a widespread opinion that catches have declined over the years, Clark (1971) concluded in his national survey based on questionnaires sent to angling clubs, that, apart from plaice, dab and bass, the abundance of most species on the mid-south coast had not changed appreciably. Even if such declines were present, the adverse effect of man would be hard to quantify since natural fluctuations are common, as demonstrated by the appearance of large numbers of cod in the 1960's which could almost certainly be attributed to the widespread lowering of winter sea temperatures in the Channel at that time.



Common cod

Anadromous sport fisheries

Although freshwater sport fisheries for salmon and sea trout exist in the rivers Itchen, Test, Beaulieu and Lym, no commercial netting takes place in the Solent system. Records of rod and line catches and population studies are maintained by the Wessex Water Authority and summaries of catches since 1935 can conveniently be found in the Seventh Annual Report of the now defunct Hampshire River Authority (1972). From these data, catches of salmon in the Itchen and Test have remained relatively stable (R.G. Templeton, pers. comm.) indicating no major changes in recent years. However, Peters *et al.* (1973) have suggested that there is no clear correlation between angling returns and the total run of fish. About 1000 salmon are caught each year on the Test between May and September, the mean weight being 5kg. Numbers taken in the Itchen are about half those on the Test, although the position is reversed for sea trout. The total number of sea trout taken over the whole of the Solent region is approximately equal to that for salmon.

In addition to the above salmonids, anadromous sea lamprey, river lamprey, smelt, twaite shad and allis shad have also been recorded from the Solent.

Fawley Power Station intake screens

Counts and/or weights of the fish collected on the cooling water intake screens of the power station at Fawley have been taken since 1973 (Holmes, 1975; Langford *et al.*, 1978). A total of 73 species has been recorded and the ten most abundant species, estimated from the cumulative totals over a year are the sand smelt, sprat, pouting, bass, great pipefish, sand goby, herring, golden mullet, flounder and whiting. Although a single smelt was recorded by Reay in April 1973, none have since been found. This species is rare in the British Isles and, until found by Dando in appreciable numbers in the River Tamar in Devon, there were no records outside of the east coast apart from the specimen noted for the Solent by Morey (1909). Some species, such as the common goby, which are known to be present in the area, do not appear on the intake screens as a result of their demersal habit.

Langstone Harbour

Although all five species of sand eels have been recorded from the Harbour only lesser and greater sand eels are common; the former comprising 95% of the catch and clearly forming the basis of the bait fishery. The biology of the lesser sand eel has been studied in detail for this area by Reay (1973). Of the two British sand smelt species, only *Atherina presbyter* is present locally and recently, the growth, feeding, fecundity and factors relating to the phenology of this species have been investigated (Palmer, 1979).

All three British species of grey mullet have also been 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, however, extremely abundant within the Harbour in contrast to Wheeler's (1969) conclusion that this fish was uncommon in British waters. In fact the Harbour represents an important nursery ground and all the juvenile fish identified have been golden. However, no eggs or running adults were found and the spawning area which requires deeper water than found in the Harbour was not located.

During the course of seining in Langstone Harbour, 57 other species have been recorded (Culley and Palmer, 1978). Most of these were juvenile fish of the species commonly found in the area (sand eel, sand smelt, sand goby, common goby, greater pipefish, 15 spined stickleback, bass, plaice, flounder, common sole, golden mullet), while others were the young of fish not normally entering the harbour (sprat, pilchard, black bream). In addition, young sprat moved into the Harbour in June in very large numbers and were followed in by shoals of mackerel. Only one elasmobranch *(Raja clavata)* has been recorded in the Harbour.

MAFF young fish survey

As part of their investigation into the distribution and abundance of young fish around the coasts of England and Wales, the Lowestoft Fisheries Laboratory took sporadic samples in the Solent area in 1970 and 1973. Using a 30cm encased high speed townet, repeated vertical oblique hauls were taken in April 1970 off the Spithead, Lee-on-Solent, Fawley and the Needles, and pelagic eggs of sole, flounder, dab, turbot, sprat, whiting and rockling with larvae of sole, flounder, pilchard, sprat and sea scorpion were found. In August, 1970, eighteen species of young fish were recorded from Horse and Dean Sand, Beaulieu Spit, Lymington and Lee-on-Solent using a 2m Lowestoft pattern beam trawl. Although only of a preliminary nature, these data suggested that the Solent was lower in diversity of species and catch per unit effort than elsewhere in the survey. For example, the mean catch of 0 - group fish per 1000m^2 was 72; approximately 30% lower than areas to the east and the west. The plankton samples showed that the Solent, whilst having the greatest density of sole eggs on the south coast, was poor for other flatfish eggs. In other respects, however, it was similar to neighbouring areas as far as Rye Bay to the east and Start Bay to the west.

Acknowledgements

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TABLE 1

Fish Species	Sources of Information				
	MAFF	Anglers	Fawley	Langstone	Other
Class Agnatha					
sea lamprey *(Petromyzon marinus)*			x		
river lamprey *(Lampetra fluviatilis)*			x		x1
Class Chondrichthyes					
nurse hound *(Scyliorhinus stellaris)*		x	x		
lesser spotted dogfish *(Scyliorhinus caniculus)*		x	x		
porbeagle shark *(Lamna nasus)*		x			
thresher shark *(Alopias vulpinus)*		x			
tope *(Galeorhinus galeus)*		x			
smooth-hound *(Mustelus mustelus)*			x		
stellate smooth-hound *(Mustelus asterias)*		x	x		
spurdog *(Squalus acanthias)*		x			
monkfish *(Squatina squatina)*		x			
electric ray *(Torpedo nobiliana)*		x			
undulate ray *(Raja undulata)*		x			
spotted ray *(Raja montagui)*	x	x	x		
thornback ray *(Raja clavata)*		x	x	x	
painted ray *(Raja microocellata)*		x			
blonde ray *(Raja brachyura)*		x			
sting ray *(Dasyatis pastinaca)*		x	x		
Class Osteichthyes					
allis shad *(Alosa alosa)*					x1
twaite shad *(Alosa fallax)*			x	x	

Fish Species	Sources of Information				
	MAFF	Anglers	Fawley	Langstone	Other
anchovy *(Engraulis encrasicolus)*			x		
pilchard *(Sardina pilchardus)*	x		x	x	
sprat *(Sprattus sprattus)*	x		x	x	
herring *(Clupea harengus)*		x	x	x	
salmon *(Salmo salar)*		x	x	x	
sea-trout *(Salmo trutta)*		x	x	x	
smelt *(Osmerus eperlanus)*			x		x7
common eel *(Anguilla anguilla)*		x	x	x	
conger eel *(Conger conger)*		x	x	x	
garfish *(Belone belone)*		x	x	x	
deep-snouted pipefish *(Syngnathus typhle)*			x	x	
greater pipefish *(Syngnathus acus)*	x		x	x	
Nilsson's pipefish *(Syngnathus rostellatus)*	x		x	x	
snake pipefish *(Entelurus aequoreus)*			x		
worm pipefish *(Nerophis lumbriciformis)*			x	x	
straight nosed pipefish *(Nerophis ophidion)*			x		
whiting *(Merlangius merlangus)*	x	x	x		
pouting *(Trisopterus luscus)*		x	x	x	
poor-cod *(Trisopterus minutus)*	x	x	x		
pollack *(Pollachius pollachius)*		x	x	x	
coalfish *(Pollachius virens)*		x			
cod *(Gadus morhua)*		x			
haddock *(Melanogrammus aeglefinus)*		x			
shore rockling *(Gaidropsarus mediterraneus)*		x			
3-bearded rockling *(Gaidropsarus vulgaris)*		x			
5-bearded rockling *(Ciliata mustela)*	x	x	x	x	
John Dory *(Zeus faber)*		x	x		
bass *(Dicentrarchus labrax)*		x	x	x	
scad *(Trachurus trachurus)*		x	x		x6
red mullet *(Mullus surmuletus)*		x	x		
gilt head *(Sparus aurata)*			x		
black bream *(Spondyliosoma cantharus)*	x	x	x	x	
red band fish *(Cepola rubescens)*			x		
corkwing wrasse *(Crenilabrus melops)*	x	x	x	x	
goldsinny *(Ctenolabrus rupestris)*			x		
ballan wrasse *(Labrus bergylta)*		x	x	x	
smooth sand eel *(Gymnammodytes semisquamatus)*				x	
lesser sand eel *(Ammodytes tobiannus)*			x	x	
Raitt's sand eel *(Ammodytes marinus)*				x	
greater sand eel *(Hyperoplus lanceolatus)*		x	x	x	
Corbin's sand eel *(Hyperoplus immaculatus)*				x	
lesser weever *(Trachinus vipera)*		x	x	x	
mackerel *(Scomber scombrus)*		x	x	x	
transparent goby *(Aphia minuta)*			x	x	x2
two-spot goby *(Gobiusculus flavescens)*	x			x	
painted goby *(Pomatoschistus pictus)*	x			x	
common goby *(Pomatoschistus microps)*				x	

Fish Species	Sources of Information				
	MAFF	Anglers	Fawley	Langstone	Other
sand goby *(Pomatoschistus minutus)*	x		x	x	
black goby *(Gobius niger)*	x	x	x	x	
rock goby *(Gobius paganellus)*		x		x	
common dragonet *(Callionymus lyra)*	x	x	x	x	
common blenny *(Blennius (Lipophrys) pholis)*		x	x	x	
tompot blenny *(Blennius gattorugine)*			x	x	x[3]
gunnel *(Pholis gunnellus)*	x		x	x	
thick-lippped grey mullet *(Crenimugil labrosus)*		x	x	x	
thin-lipped grey mullet *(Liza ramada)*			x	x	
golden grey mullet *(Liza auratus)*		x	x	x	
sandsmelt *(Atherina presbyter)*		x	x	x	
red gurnard *(Aspitrigla cuculus)*		x	x		
grey gunard *(Eutrigla gurnardus)*			x		
tub gurnard *(Trigla lucerna)*		x	x	x	
bull rout *(Myoxocephalus scorpius)*			x		x4
long-spine sea scorpion *(Taurulus bubalis)*	x	x		x	
armed bullhead *(Agonus cataphractus)*	x		x	x	
sea snail *(Liparis liparis)*			x		
Montagu's sea snail *(Liparis montagui)*			x	x	
lumpsucker *(Cyclopterus lumpus)*		x	x	x	
3-spined stickleback *(Gasterosteus aculeatus)*			x	x	
15-spined stickleback *(Spinachia spinachia)*	x		x	x	
turbot *(Scophthalmus maximus)*	x	x		x	
brill *(Scophthalmus rhombus)*		x	x	x	
dab *(Limanda limanda)*	x	x	x	x	
plaice *(Pleuronectes platessa)*		x	x	x	
flounder *(Platichthys flesus)*	x	x	x	x	
common sole *(Solea solea)*	x	x	x	x	
solenette *(Buglossidium Inteum)*				x	
thickback sole *(Microchirus variegatus)*				x	
trigger fish *(Balistes carolinensis)*		x	x		
small-headed clingfish *(Apletodon microcephalus)*				x	x5
angler fish *(Lophius piscatorius)*		x	x		

Sources of information

MAFF	plankton and trawl surveys by the Fisheries Laboratory (Lowestoft) of the Ministry of Agriculture, Fisheries and Food.
ANGLERS	data from questionnaires sent to local anglers and some club competition results.
FAWLEY	intake screens of Fawley Power Station (CERL Marine Lab., Fawley)
LANGSTONE	seine-net (fine mesh) catches in Langstone Harbour 1968-79 (Portsmouth Polytechnic)
OTHER	[1]from Maitland (1972)
	[2]plankton tow, Langstone Harbour, April 1972
	[3]Southampton Docks (Portsmouth Polytechnic)
	[4]Beam-trawling, Emsworth Harbour (Portsmouth Polytechnic)
	[5]Beam-trawling, Langstone Harbour (Portsmouth Polytechnic)
	[6]Beam-trawling, Langstone Harbour (Cotgrave pers. comm.)
	[7]see Morey (1909)

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