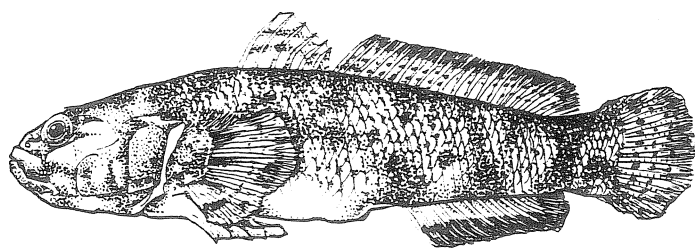
THE CURRENT STATUS OF THE GIANT GOBY, GOBIUS COBITIS PALLAS, IN THE BRITISH ISLES.

by

Geoffrey W. Potts and Silja E. Swaby
(Marine Biological Association, Citadel Hill, Plymouth. PL1 2PB.)



(Joint Nature Conservation Committee Contract No. 99 F2A 059. December, 1992.)

CONTRACT DETAILS

Contract Number: 99 F2A 059

Title:

Pilot study of the distribution, status and potential vulnerability of the giant goby, *Gobius cobitis*, in Devon, Cornwall and the Isles of Scilly.

Background:

Through the process of the second Quinquennial Review of Schedules 5 & 8 of the Wildlife and Countryside Act, 1981, the Joint Nature Conservation Committee recommended to the Government the addition of a number of potentially endangered species including the giant goby, *Gobius cobitis*. The basis of this recommendation was that the species appeared on the northern edge of its range in Britain where it was confined to high level rockpools in the South West of England. It was considered that in this habitat it is potentially vulnerable to damaging activities such as pollution and rubbish dumping. However, as there is very little recent information about the distribution, status and potential vulnerability of this species in Britain, the Government require that investigations are carried out and a more detailed case be made before it can be further considered for special protection.

Objectives:

By field survey, literature search and consultation with experts, to carry out a pilot investigation of the distribution, status and vulnerability of the giant goby in Southwest Britain and determine the requirements for further investigations.

CONTENTS

Plate 1. Giant goby (*Gobius cobitis*) from a high tide level rockpool.

Plate 2. Typical sheltered Cornish beach on which giant gobies were found.

ABSTRACT

A number of sites on the coasts of Devon, Cornwall and the Isles of Scilly, where the giant goby had previously been recorded were revisited during November and December, 1992 to assess its current status. Populations were found in the location of Portscatho, Falmouth, Helford, Porthleven and on St. Mary's, Isles of Scilly. Despite previous records for Wembury and West Looe none were found after thorough searches, and it must be assumed that these populations have declined or are absent. In recent years these shores have been regularly used by student groups in the study of shore fish ecology, and it is possible that regular rockpool sampling might have taken its toll on the giant goby. Other potential threats to rockpool communities are reviewed and recommendations made on further investigation and monitoring programmes.

1. INTRODUCTION

The giant goby, *Gobius cobitis* Pallas, is the largest British goby with a distribution restricted to the south west corner of the country, (Wheeler, 1960; Miller, 1974). However, its population centre is in the Mediterranean Sea and extends to the Caspian and Black Seas in the East, as far South as the Azores and Canary Islands, up the Spanish and French Atlantic coasts and reaching its northern limit on the south west peninsula of the British Isles. (Wheeler, 1969; Pinchuk, 1976; Miller, 1986) While over its wider range there is no evidence that the species is endangered, its preferred high shore habitat makes it potentially vulnerable to human interference, either by pollution and rubbish dumping or by other forms of habitat disturbance. These factors are particularly important for a species on the edge of its distribution and for this reason it is considered important to re-examine its biology and distribution in the British Isles to see whether there is any evidence that conservation measures might need to be taken to safeguard the current status of the giant goby.

2. BIOLOGY OF THE GIANT GOBY

2.1 Classification

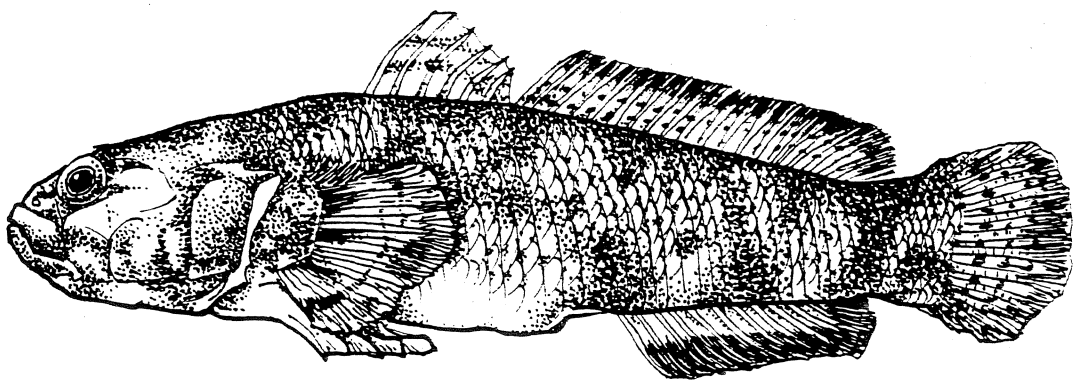


Figure 1. Giant goby, *Gobius cobitis*.

Authority:	Pallas, 1814
Synonyms:	Gobius capito Valenciennes, 1837.
Phylum:	Chordata
Class:	Osteichthyes
Order:	Perciformes
Family:	Gobiidae

Common names: Giant goby (En), Gobie cephalote (Fr), Ghiozo testone (It). Cabo de roca (Sp).

2.2 Diagnostic characteristics

Eyes relatively small and well spaced, the inter-orbital space between half and two-thirds of the eye diameter; scaly area of nape does not reach to the rear edge of eyes; sixty to sixty eight scales in a lateral series; pelvic fins with distinct lobe either side of anterior membrane. Nape scaled, cheek naked. Anterior nostril with long tentacle, often digitate. Pectoral free rays well developed. Pelvic disc short, rounded, anterior membrane with lateral lobes. Colour: brownish-olive 'pepper-and-salt' speckling, with dark mottling and blotches along and below lateral midline, the latter more distinct in juveniles; breeding males dark, with median fins edged white. Size: up to 27 cm. (Cantacuzene, 1956; Miller, 1986; Wheeler, 1969)(see Plate 1)

2.3 Distribution

2.3.1 Global distribution (see Figure 2)

Found in the eastern Atlantic, from western English Channel to Morocco; Mediterranean (described as "common" in Marseilles (Cunningham, 1906)) and Black Sea (except northwest). Gulf of Suez (Miller, 1986).

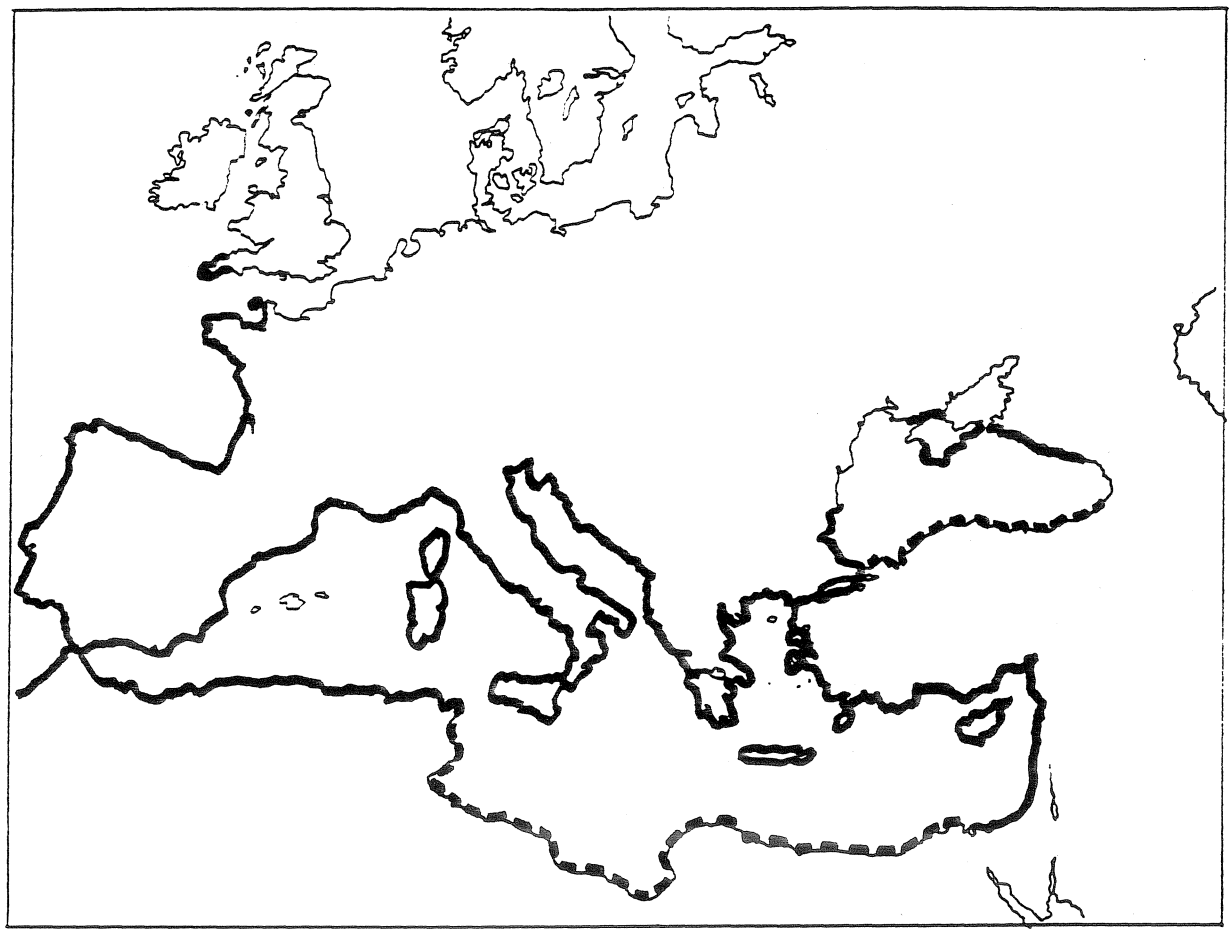


Figure 2. Distribution of the giant goby, *Gobius cobitis* in the north-eastern Atlantic, Mediterranean and Black Seas. [Intermittent line indicates expected distribution.] (Modified after Whitehead *et al.* 1984-1986)

2.3.2 U.K. Distribution

It is on the northerly edge of its distribution in Britain confined to the south coasts of Devon and Cornwall and the Isles of Scilly, with two records from the north coast of Cornwall.

2.4 Biology

Apart from casual observations of the giant goby in Britain (Couch, 1877 as G. niger; Wheeler, 1960) the most detailed study of the giant goby was carried out on the northern coast of Britanny, near Roscoff (Gibson, 1970, 1972), at Banyuls (Gibson, 1968), and the general biology of intertidal fishes (Horn & Gibson, 1988, 1990). The Brittany coast has already been described by Boulenger (1899) and the similarity in habitat to that found for Cornwall strongly suggests that the basic biology of the two populations of giant goby will be similar. Since the current work was to examine the distribution and status of the giant goby no systematic attempt was made to check whether there was any relationship between the pool size, the tidal level or the percentage cover and the size of the giant goby in the manner of Gibson (1972) in his study of the population of intertidal fishes on the coasts of Roscoff. However, observations during the present survey confirm his general findings. The present survey was restricted to November and December which prevented examination of the summer breeding populations. However, no major differences are anticipated between the British populations and those on the coasts of Brittany described by Gibson (1970).

From Gibson's (1970) account the fish is described as occupying upper level tidepools where they feed mainly upon algae and crustacea. It is recorded to reach a length of 230 mm and to live for about 10 years, maturing in its second year and with the females producing two clutches of eggs each season for a further 8 years. In Britanny the females are said to spawn twice during the spring and summer breeding season. Fecundity is reported to be dependent on size and varies between 2 and 12,000. The differences between the Atlantic and Mediterranean populations are given by Gibson (1968, 1970).

2.5 Diet

The giant goby is reported to feed on green algae (*Enteromorpha sp.*), crustaceans (amphipods, crabs, prawns, amphipods, isopods (*Idothea sp.* and *Ligia oceanica*), polychaetes, insects, and small fishes, particularly juveniles of the blenny (*Blennius pholis*), and its diet has been the subject of a special study by Gibson (1972). It has been found with its gut full of green algae. (Couch, 1877; Gibson, 1970). In captivity it will feed on *Ulva lactuca* (Gibson, 1990).

3. METHODS

3.1 Sources of information

A full literature and species record search was carried out using the Aquatic Sciences and Fisheries Abstracts (ASFA) CD-rom, BIOSIS (formerly Biosciences Information Service), the Environmental Recording in Cornwall Automated (ERICA) the database of the Cornish Biological Records Unit, and the information databases of the Marine Biological Association, in addition to extensive literature searches. Much of the recent information on the distribution of the giant goby has been an incidental component of other littoral surveys, and a number of records are contained in the unpublished field notebooks of fish biologists and naturalists.

3.2 Shore surveys

To maximise the search time on the beach, surveys were started two hours before low tide and continued until between one and two hours after low water. Where possible spring tides were chosen for the shore surveys, although in most cases this was not essential as the giant goby was found to live at high tide level and could generally be reached on even modest tides.

Upon arriving on a shore, notes were made of the intertidal fauna and flora, the aspect of the shore, potential threats to the shore, and other features that were considered relevant to the distribution of the intertidal fish fauna. A search was then made of rockpools which were drawn and measured, and the fauna and flora recorded. The type and extent of shelter in the pool was noted. Where possible the fish fauna was caught using hand nets. If the structure of the pool and its shelter made it impossible to adequately sample by turning boulders and by dip netting, and if it was suspected to contained giant gobies, then the pool was narcotised using Quinaldine and the method described by Gibson (1967). This was carried out using only the minimum of narcotic necessary to allow the fish fauna to be flushed from their crevices and caught. The fish were measured to the nearest millimetre and transferred to an adjacent pool of clean seawater where they quickly recovered. Narcotising pools was only carried out on the rising tide to ensure that they were flushed out with fresh sea water within half an hour of narcotising them. Adult giant gobies are sufficiently distinctive to be identified at the site of capture and no specimens were taken, although beaches, typical pools, associated faunas and gobies were photographed.

Care was taken not to harm the occupants of the pools and the boulders and stones were carefully replaced in their original positions.

3.3 Survey sites.

It was decided that the best way to assess the current status of the giant goby was to revisit sites where it had previously been recorded. The sites chosen where those mentioned in the literature and those recommended by fish biologists and naturalists who had, in recent years, found the giant goby. The following sites were selected for examination.

SITE	DATE	SOURCES
Prisk Beach,Helford	1980-1992	Gainey
Portscatho	1903, 1982	Pickard-Cambridge , Gainey
West Looe	1952,1953,1956,1958	Corbin, Wheeler
Wembury	1958	Wheeler
Porthleven	1976	Mattacola
Isles of Scilly	1952, 1973, 1990	Wheeler, Parslow, Mitchell
Gyllynvase, Falmouth	1907, 1983	Clark , Gainey
Swanpool Point, Falmouth	1990	Gainey

4. RESULTS

4.1 Rockpools and habitat specificity.

Figure 3 shows plans of rockpools at Newford Island, St. Mary's (A & B), and Swanpool Point (C), that were searched and where giant gobies were found. These pools were "typical" habitats (Gibson, 1972) of the giant goby which consisted of permanent pools in bedrock located between mid-tide level and extreme high water spring tide (Plate 2). The pools were characterised by having a clean bottom devoid of gravel or sand and containing a large boulder with a crevice large enough for the giant goby to shelter beneath. The upper pools are, in the course of a year, likely to experience extremes in temperature, light levels and in salinity. The pool size was generally about 2 to 3 square metres and usually contained one or two large stones or boulders (approximately 50 to 80 cm. in diameter) beneath which the gobies where found. The pool depth varied between 20 and 100 cm.. In some of the high level pools there was evidence of fresh water draining into them confirming previous observations (Couch, 1877) that the giant goby is tolerant of brackish water conditions, although this was not found at all sites.

Figure 4 shows a diagram based upon Prisk Beach, showing a beach section and "typical" rockpool section of the kind occupied by the giant goby.

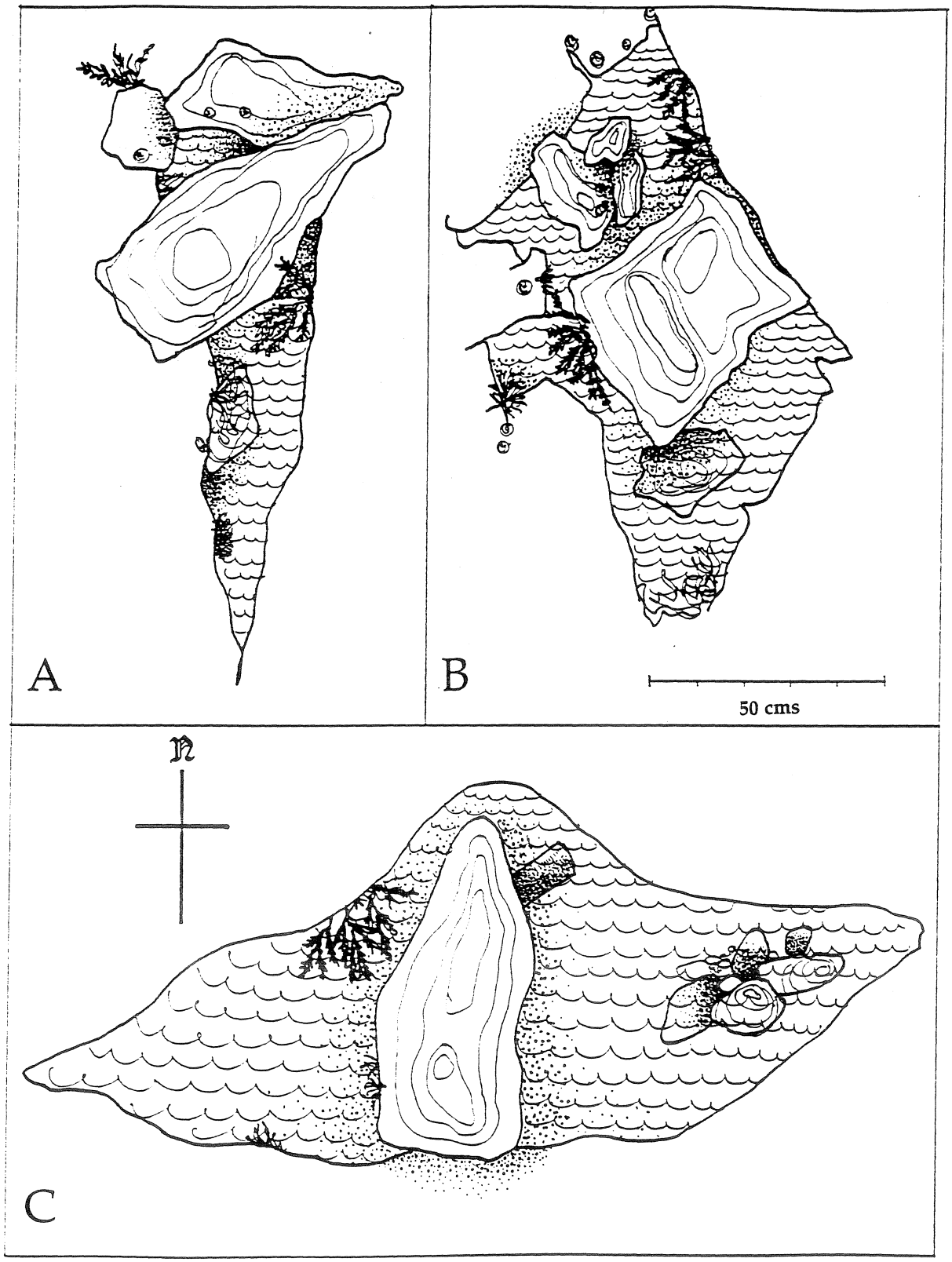


Figure 3. Plans of rockpools in which the giant goby (*Gobius cobitis*) was found. A & B - Newford Island, St. Mary's, C - Swanpool Point, nr. Falmouth.

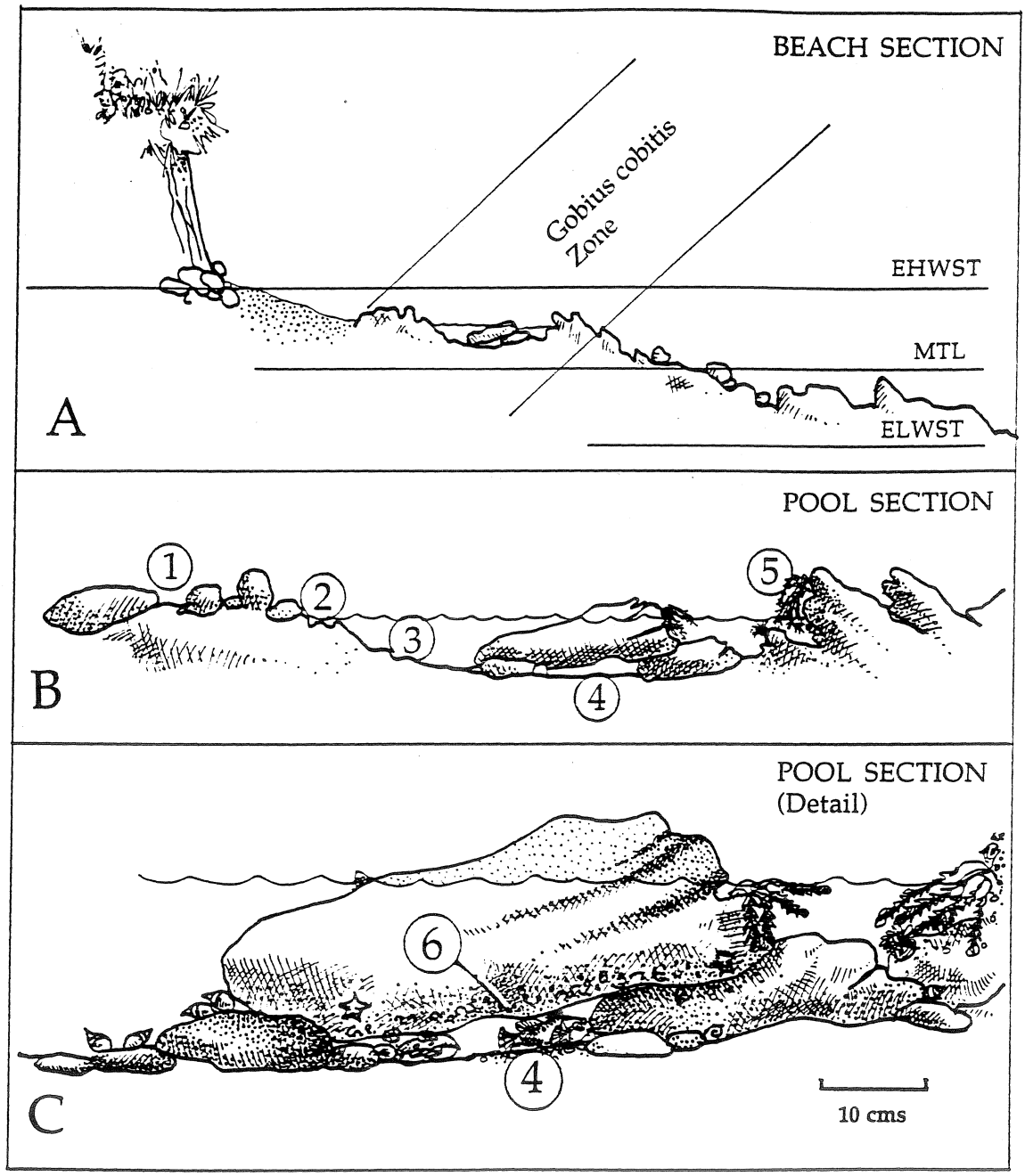


Figure 4. Diagrammatic sections of a beach and "typical" rockpool in which giant gobies, *Gobius cobitis*, were found. Based upon Prisk Beach, nr. Helford. (See text for further details).

A. Beach section showing *Gobius cobitis* zone.

B. Pool section showing distribution of macrofauna.

1. Adjacent bedrock: (*Patella vulgata, Littorina neritoides, Cladophora sp., Pelvetia canaliculata*)
2. Pool edge: (*Patella vulgata, Anemonia sulcata*)
3. Pool bottom: (*Corallina officinalis, Lithophyllum sp., Hildenbrandia sp.*, topshells)
4. Sheltered crevice: (Rockpool fishes, crabs, prawns, *Actinia equina, Littorina littorea, Gibbula umbilicalis*)
5. Sheltered ledge: (*Laurencia pinnatifida*, fucoids, *Littorina littoralis, Nucella lapillus, Monodonta lineata.*)

C. Pool crevice section showing *Gobius cobitis* habitat.

4. Sheltered crevice: (as above) where *Gobius cobitis* is found
6. Sub boulder fauna: (*Spirorbis sp., Asterina sp., Marthasterias glacialis, Pomatoceros triqueter, Botryllus schlosseri., Gibbula cineraria*, acidians, chitons).

4.2 Associated fauna and flora.

The high level pools in which the giant goby was found were characterised by the tide level, physical factors and the associated fauna and flora. These are depicted diagrammatically in Figure 4. The high level position of the pools put them in the littoral fringe (Lewis, 1964) on the shore with *Lichina pygmaea, Placodium sp.* and *Ramalina sp.* The algae adjacent to the pools included *Pelvetia canaliculata* and lower level pool often had *Laurencia pinnatifida,* and fucoids. The pools themselves contained rather little algae compared to mid tide level pools although, where fresh water drained onto the upper shore, *Ulva sp.* and *Enteromorpha sp.* were present. The pool bottoms were devoid of gravel or sand and were usually covered in calcareous algae, typical of the eulittoral zone, including; *Lithophyllum sp., Lithothamnion sp., Hildenbrandia sp.* with occasional tufts of *Corallina officinalis* on the sides of the pool. Other algae found attached at the edges of the pools included; *Fucus serratus, F. vesiculosus, Ascophyllum nodosum, Cladophora rupestris,* and *Bifurcaria bifurcata.* The molluscan fauna of the adjacent rocks included *Littorina neritoides, Patella vulgata, Littorina saxatilis, Nucella lapillus* and in the Isles of Scilly *Monodonta lineata.* The sides of the pools had *Actinea equina* and *Anemonia sulcata.*

The species found under stones and in crevices were of particular interest representing species that might normally be found in the upper and mid eulittoral zone of the shore and yet tolerant of the micro-climatic extremes that are a feature of high level rockpools. Beneath the boulders were found sheltering; *Carcinas maenas, Cancer pagurus, Galathea squamifera, Porcellana platycheles, Liocarcinas puber,* and on he undersides of the stones; *Spirorbis sp., Asterina gibbosa, Marthasterias glacialis, Pomatoceros triqueter., Calliostoma zyziphinum, Gibbula cineraria, G, umbilicalis, Littorina littorea,* and many amphipods. Also sheltering beneath the stones were the rockpool fishes which included; *Blennius pholis* (juveniles very abundant), *Gobius paganellus, Taurulus bubalis, Nerophis lumbriciformis, Ciliata mustela, Lepadogaster lepadogaster, Pholis gunnellus.* The relationship and range overlap between *G. paganellus* and *G. cobitis* is discussed by Gibson (1972). *Lepadogaster lepadogaster* was found on exposed shores not tolerated by the giant goby confirming Gibson's work at Roscoff.

4.3 Distribution of the giant goby in the U.K.

A number of sites on the south coast of Devon, Cornwall and the Isles of Scilly were visited and rockpools searched for the giant goby. No attempt was made to carry out a comprehensive survey of each beach, it being considered more important to record the presence or absence at many sites than to examine the total population at any one.

The following notes provide a brief description of the sites visited, whether or not giant gobies were found, and their measurements (total length in mm.) when taken.

PRISK BEACH (25.10.92)

Number found; 12 [163mm, 192mm, 164mm, 179mm, 110mm, 102mm. 6 not measured]

A remote beach approximately two miles from the nearest parking place. The beach is approached down low cliffs to a sand and shingle upper shore before reaching the gently sloping rocks that form the main area of the beach and sites of the rockpools (see Figure 4). Four of at least twenty pools examined contained the giant goby, and in all 12 specimens were seen and 6 caught and measured. Mostly the fish occurred as individuals, but in one pool a group consisting of 4 large individuals (>160 mm) and 3 small ones (<100mm) were found beneath one large boulder in the middle of the pool.

PORTSCATHO (22.11.92)

Number found; 3 [not measured]

Portscatho offers easy access to the beach and three sites were inspected. While none were considered prime sites, three fish were recorded from Pencabe to the west of the slipway. Generally the pools were too large for easy sampling and the close proximity of sandy beaches reduced the number of suitable pools to a limited area at Pencabe Point. The rockpools at Porthcurnick Beach were found to contain sand and particulate bottoms, had few crevices and were unsuitable for the giant goby, and none were found.

WEST LOOE (24.11.92)

None found

Approaching Hannafore Point from West Looe, the rockpools were found to contain sand which filled the crevices beneath boulders, where one would expect the giant goby to be found. The rough weather and strong S.W. winds over the days prior to the survey might also have caused mobile members of the shore fauna to move deeper into shelter, making them more difficult to find. Despite the giant goby being found at this site in the past (Wheeler, 1960) none were found on this occasion. The easy access to this site makes it a favourite sampling area for student courses, and it is reported that Quinaldine is regularly used to narcotise the pools and collect intertidal fishes from this area.

WEMBURY (24.11.92)

None found

Wembury has always been a popular collecting area by naturalists and students and it is possible that regular sampling and the excessive use of narcotics could selectively remove a small and sedentary population of a high tidepool fish, like the giant goby. The survey concentrated on two areas; to the west of the beach on the exposed rocks approaching H.M.S. Cambridge, and on Blackstone Reef. The western rocks contained many pools that were considered suitable for the giant goby, but none were found. By contrast Blackstone Reef had rather few high level suitable pools, most being filled with fine gravel and with a particulate base, again no gobies were found. Wembury is now a voluntary marine nature reserve, a status which should help protect the littoral fauna.

PORTHLEVEN (11.12.92)

Number found; 2 [not measured]

To the west of the Life-boat House there is a good rocky shore with abundant suitable pools. Many are of considerable size and too large and deep for non-destructive sampling techniques. Nevertheless, two were found under stones in the middle of two shallow pools.

ISLES OF SCILLY

ST MARY'S (12.12.92)

NEWFORD ISLAND

Number found; 3 [137mm, 166mm, 157mm]

The main part of Newford Island is made up of large (> 30cms) rounded granite boulders which do not form permanent pools, and it was only on the central bedrock that an area with suitable pools was found. Three gobies were found in two pools (See Figure 4), each containing standing water and with a central boulder which provided the shelter for the giant gobies. Pools nearer the sandy part of the beach contained particulate bottoms and no giant gobies were found, although *G.paganellus* and *B. pholis* were both present.

PORTH HARRY

None found

No suitable pools found for the giant goby although *G. paganellus* present.

HUGHTOWN SLIPWAY

None found

Few suitable pools found and those searched found to contain *G. paganellus* and *B. pholis*. *Fucus serratus* was abundant on the steep rocks.

PORTH CRESSA BAY

None found

The area to the west of the Pilchard Pool was examined and was found to consist mainly of rounded granite boulders similar to those at Newford Island. Very few suitable pools were present and those had sandy bottoms and few crevices. No giant gobies were found.

OLD TOWN BAY

None found

Two areas were examined in Old Town Bay; the area to the west which contained boulders similar to Porth Cressa, and Carn Leh where a number of pools were found that looked suitable for the giant goby. This point was rather too exposed for the preferred habitat and no gobies were found.

ST MARY'S (13.12.92)
PENDRATHEN

None found

The intertidal region was dominated by round granite boulders with sand or muddy sand beneath and very few rockpools. Adjacent areas of compacted sand and gravel provided temporary pools, but few crevices suitable for the giant goby. No giant gobies were found, but the shore cling fish (*Lepadogaster lepadogaster*) and the worm pipefish (*Nerophis lumbriciformis*) were common.

BAR POINT

None found

A large area of boulders similar to Porth Cressa with no pools adjoining an outcrop of bedrock with a few pools. Searches revealed only *G. paganellus* and *B. pholis* and no giant gobies. The pools had a rich fauna and flora.

INNISIDGEN

None found

Like Bar Point a number of rockpools considered suitable for gobies, but where the fish fauna was dominated by *Blennius pholis*. The pools lacked the necessary crevice shelter and at mid-tide level contained a dense covering of algae.

GYLLYNVASE (16.12.92)

Number found; 1 [not measured]

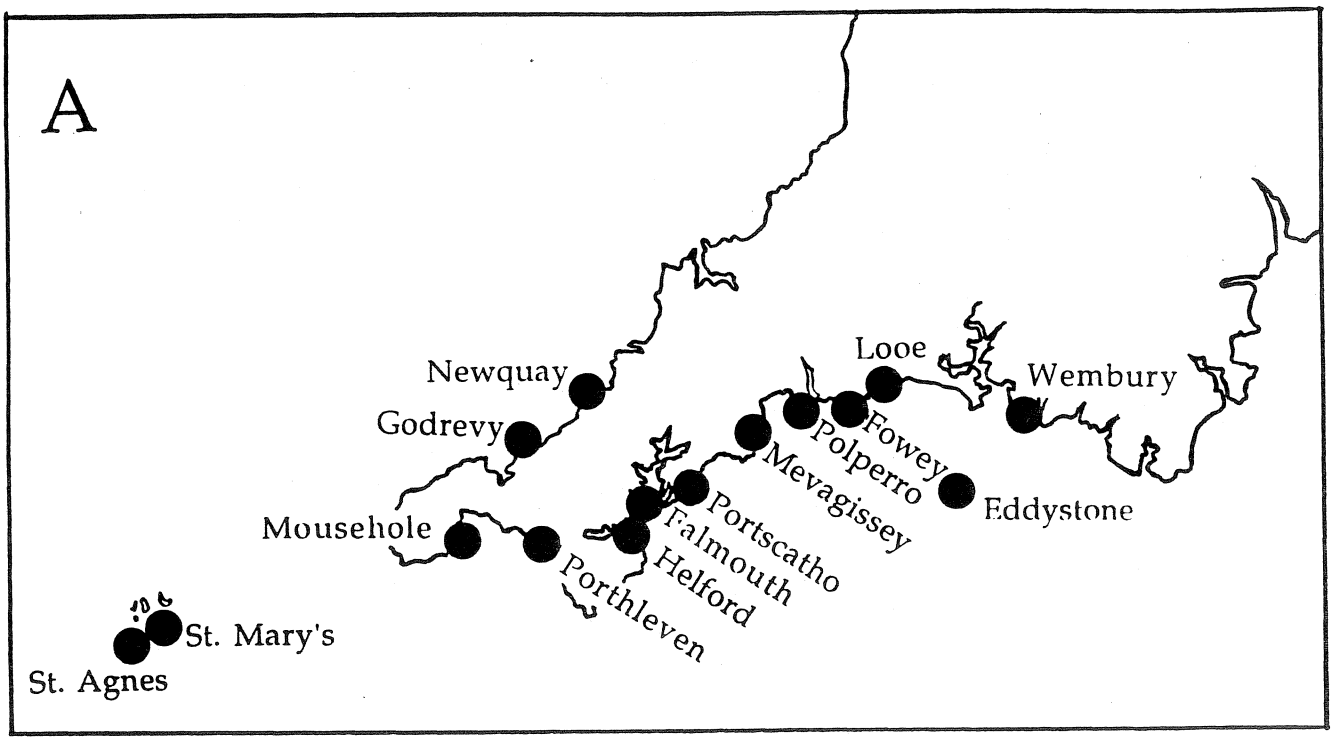
The beach had easy access and was found to have many suitable rockpools some several metres in extent and with boulders providing the necessary shelter for the giant goby. It is expected that a thorough search would yield a good population of the giant goby.

SWANPOOL POINT (16.12.92)

Number found; 1 [110mm]

Similar to Gyllynvase Beach, but a smaller area with smaller rockpools. The area was considered very suitable for the giant goby.

Figure 5 and Table 1 show the distribution of the giant goby in the U.K. including past records (A) and those obtained during the present survey (B). Sites inspected, but where no gobies were found, are also included.



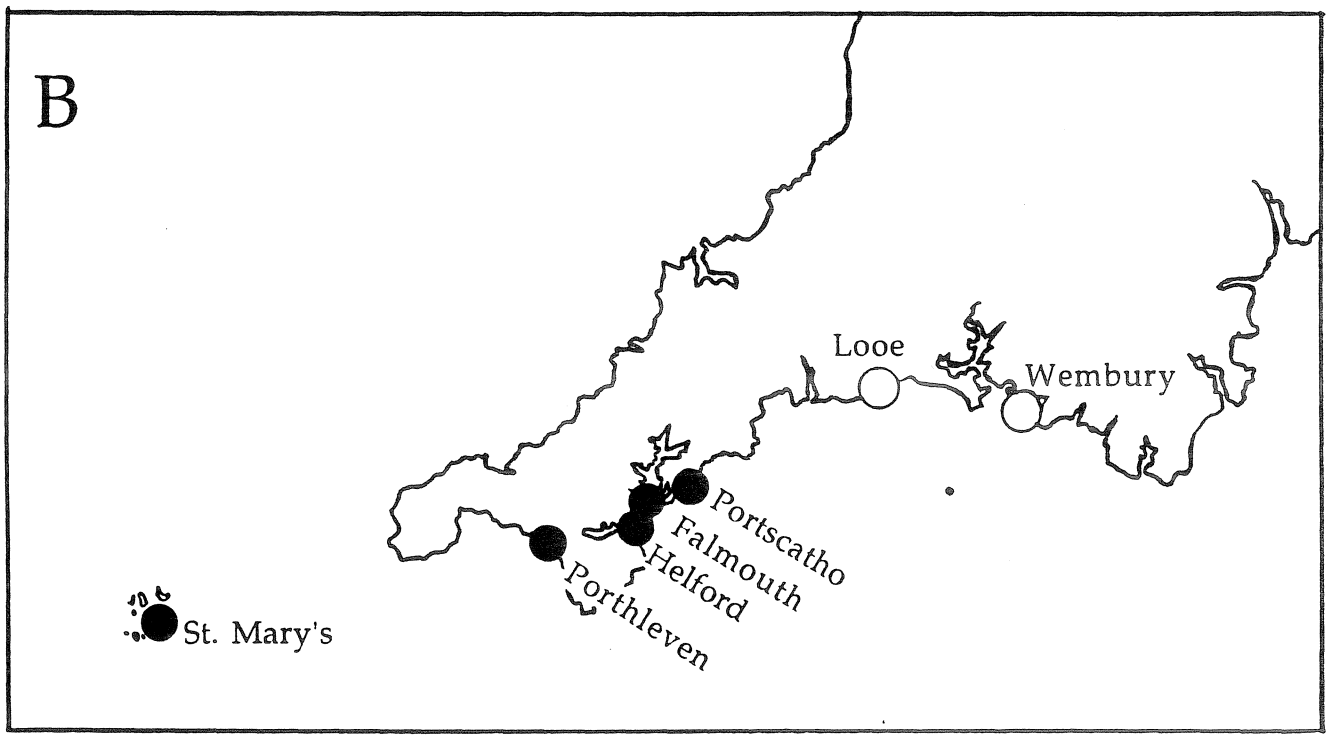


Figure 5. Maps showing records of the giant goby. A - previous records. B - present survey. Open circles indicate sites inspected, but where no *Gobius cobitis* were found.

Table 1. Records of the distribution of the giant goby (*Gobius cobitis*) in Great Britain and the north coast of Britanny.

YEAR	SITE	REFERENCE	
1850	EDDYSTONE	YARRELL, 1850 (SEE WHEELER,1960)	
1877	POLPERRO	COUCH,1877	
1898	BAY OF CONCARNEAU, BRITTANY	BOULENGER, 1899	
1898	FOUERNANT, FINISTERE	BOULENGER, 1903	
1899	ST CAST, GULF OF ST MALO	BOULENGER, 1899	
1899	BRITTANY, FRANCE	BOULENGER, 1899	
1903	PORTSCATHO, NR FALMOUTH	PICKARD-CAMBRIDGE, 1903a,b,c.	
1907	GYLLYNVASE, FALMOUTH	CLARK,1907	
1952	LOOE	PLYMOUTH MARINE FAUNA, 1957	
1952	PORTH CRESSA, ST MARY'S	WHEELER, 1960	
1952	PENINNIS HEAD, ST MARY'S	WHEELER, 1960	
1952	OLD TOWN BAY, ST MARY'S	WHEELER, 1960	
1953	LOOE	PLYMOUTH MARINE FAUNA, 1957	
1955	FOWEY PUBLIC AQUARIUM	WHEELER, 1960	
1956	HANNAFORE POINT, LOOE	WHEELER, 1960	
1958	HANNAFORE POINT, LOOE	WHEELER, 1960	
1958	POLPERRO	WHEELER, 1960	
1959	CHAPEL POINT, MEVAGISSEY	WHEELER, 1960	
1962	WEMBURY	MILLER, 1963	
1962	HANNAFORE POINT, LOOE	MILLER, 1963	
1967	GODREVY	MILTON, PERS. COMM.	
1968	MOUSEHOLE	MILTON, PERS. COMM.	
1968	NEWQUAY	MILTON, PERS. COMM.	
1968	FALMOUTH	MILTON, PERS. COMM.	
1969	SANTEC, ROSCOFF	GIBSON, 1970	
1969	GUERNSEY	WHEELER,1970	
1973	ST AGNES, SCILLY ISLES	PARSLOW, PERS. COMM.	
1974	ST AGNES, SCILLY ISLES	PARSLOW, PERS. COMM.	
1976	PORTHLEVEN	MATTACOLA, DEVONSHIRE ASSOCIATION,1977	
1980	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1982	PORTSCATHO	GAINEY, PERS. COMM.	
1983	GYLLYNVASE, FALMOUTH	GAINEY, PERS. COMM.	
1983	CASTLE BEACH, FALMOUTH	MILLER, PERS. COMM.	
1983	WEMBURY	WHEELER, PERS. COMM.	
1984	NARE POINT, HELFORD	GAINEY, PERS. COMM.	
1984	PENDENNIS POINT, FALMOUTH	GAINEY, PERS. COMM.	
1984	CASTLE BEACH, FALMOUTH	GAINEY, PERS. COMM.	
1984	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1984	GUERNSEY	BRITISH (ROD -CAUGHT) FISH COMMITTEE 1990	
1985	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1985	CASTLE BEACH, FALMOUTH	GAINEY, PERS. COMM.	
1986	ROSCOFF, FRANCE	HORN & GIBSON 1990	
1987	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1988	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1989	CASTLE BEACH, FALMOUTH	MILLER, PERS. COMM.	
1990	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1990	SWANPOOL POINT, FALMOUTH	GAINEY, PERS. COMM.	
1990	NARE POINT, HELFORD	GAINEY, PERS. COMM.	
1992	PRISK BEACH, HELFORD	GAINEY, PERS. COMM.	
1992	PRISK BEACH, HELFORD	POTTS & SWABY, PRESENT SURVEY	
1992	PORTSCATHO, NR FALMOUTH	POTTS & SWABY, PRESENT SURVEY	
1992	PORTHLEVEN	POTTS & SWABY, PRESENT SURVEY	
1992	NEWFORD ISLAND, ST MARY'S	POTTS & SWABY, PRESENT SURVEY	
1992	GYLLYNVASE, FALMOUTH	POTTS & SWABY, PRESENT SURVEY	
1992	SWANPOOL POINT, FALMOUTH	POTTS & SWABY, PRESENT SURVEY	

5. DISCUSSION

5.1 Review of past and present records

The first recorded specimen of the giant goby, *Gobius cobitis* was taken by Yarrell in about 1850, although at the time it was considered to be the rock goby *Gobius niger*. Further examination of his material identified one of five specimens to be *G. cobitis* (Wheeler, 1960). This specimen was caught in a crab pot at the Eddystone on the 7th March, 1850, and is now at the Natural History Museum. Couch (1877) also confused the giant goby with *G. niger*, and while no specimen remains of his material, his description of the diet and habitat, and the fact the specimen was 9.5 inches (24 cm.) long leave one in no doubt that it was infact *G. cobitis*. The fact that specimens have more recently been found at Polperro, close to where Couch lived also provide indirect evidence that he was dealing with the giant goby (Pickard-Cambridge, 1903a; Wheeler, 1960).

At the turn of the century Boulenger gives a description of the occurrence of the giant goby at Roscoff, Cape of St. Malo and on the Brittany coast (Boulenger, 1899), and describes them as occurring at high tide level or even into the splash zone and often associated with sluices and shallow ponds with some freshwater rills in them. As a result of these publications Pickard-Cambridge, (1899) predicted that it would not long before the giant goby was found in Cornwall and later went on to describe it from Portscatho (Pickard-Cambridge, 1903 a,b,c). Other records followed and in July of 1907 Clark published finding the giant goby at Gyllynvase near Falmouth. The present survey was able to confirm the presence of the giant goby at both Portscatho and Gyllynvase at high tide level, although not in the numbers mentioned by Pickard-Cambridge (1903a). Clark's (1907) specimens were said to have been caught at low water which causes Wheeler (1960) to cast some doubt on the accuracy of these records, since the giant goby is typically found at high tide level. A number of other records are given from a variety of sources (see Table 1) including rod caught specimens from West Looe in 1952 and 1953, at Porthleven in 1976 and a British rod-caught record from Bordeaux Headland Vale, Guernsey in 1984. Milton (pers. comm.) recorded the giant goby on its northern limit of distribution at Godrevy and at Newquay in 1968, as well as a new record at Mousehole in the same year. Wheeler (1960) found the giant goby at Hannafore Point, Looe; Polperro, Mevagissey, St. Mary's, Wembury (pers. comm.), and in Guernsey (Wheeler, 1970). Despite thorough searches at Wembury and West Looe during the present survey none were found. The Isles of Scilly were considered too exposed for the giant goby which is said to prefer sheltered shores (Gibson, 1970), nevertheless its presence was recorded by Wheeler in 1952 and Parslow (pers. comm.) at St. Agnes in 1973 and 1974. During the present survey of St. Mary's twelve sites in all were examined and of these only Newford Island showed the necessary habitat for the giant goby. Most sites inspected on the Scilly Isles consisted of large granite boulders without permanent rockpools, while others contained particulate shores with unsuitable pools. It was not possible to inspect St. Agnes. Further records were provided by Gainey (pers. comm.) for the Helford and Falmouth area between 1980 and 1992, and some were confirmed in the present survey.

5.2 Current status and distribution

The current status of the giant goby may be seen by examining Figure 5 A & B and Table 1 which show the positions of the previous records and those found in the present survey. Unfortunately lack of time prevented the examination of all previous sites which will need to be surveyed for completeness. Nevertheless, the current data indicates a reduction in the range of the giant goby to the east, as no specimens were found at Wembury or Looe. The reason for its disappearance at these sites is not clear as both localities had pools that seemed suitable at the right tidal level. It may have been a result of the lateness in the season of the shore surveys, although this seems unlikely as the giant goby was found at other shores during the surveys. Closer examination of the significance of these shores may provide the answer. Since the early 1970s both Wembury and Looe have been used regularly by students as a part of their courses in shore ecology. Part of those courses included biometric studies on inshore fishes which were selectively collected with the use of narcotic agents. Regular collecting of fish from rockpools could deplete vulnerable high shore species, such as the giant goby and it is suggested that this activity might have contributed to the reduction of the giant goby at these sites. Certainly the situation should be kept under review. Other potential threats to shore pool communities are discussed. (see 5.3 below).

There is no evidence that the population further west has undergone a reduction in numbers, although further monitoring would be needed to confirm this with further surveys carried out on the north Cornish coast.

5.3 Potential threats and vulnerability

Miller (1984) describes the giant goby as suffering relatively little predation, although its high tide habitat makes it vulnerable to human interference. The present survey noted a number of situations where human disturbance could adversely affect the giant goby. These are briefly summarised below.

5.3.1 Commercial exploitation and angling.

Reported to be "excellent eating" (Boulenger, 1898), but the numbers in the U.K. are too few to attract any form of commercial exploitation. Selective angling could reduce local populations, although it should be noted that relatively few anglers are interested in rockpool fishes despite the early record of angled specimens (Pickard-Cambridge, 1903 a,b,c, National Angler's Council, 1988/1989). An examination of the Mediterranean populations and the effect of the commercial exploitation on small inshore fish populations would be useful.

5.3.2 Destruction of the high shore habitat by urban development and other factors.

Improved access to the shore at Looe, Gyllynvase, Swanpool Point and Porthleven could affect the upper shore environment with the resultant threat to the giant goby. The ease of access also makes these beaches vulnerable to holiday makers. The situation needs to be monitored.

5.3.3 Industrial and agricultural pollution.

Mainly at sites near the mouths of estuaries and in particular in the Helford region. Not considered a major problem for the giant goby at the moment.

5.3.4 Disturbance of the habitat by tourists and holiday makers.

All sites are potentially vulnerable to holiday makers, but particularly Isles of Scilly, Portscatho, West Looe, Wembury, Gyllynvase, and Swanpool Point which have good access to the goby beaches. Not much can be done to reduce access, but some improved conservation message, administered by local conservation groups, might help.

5.3.5 Selective collecting by scientists in ecological and biometric surveys.

Wembury and West Looe and other sites have been sampled for many years by scientists and students from the near by research laboratories and the University of Plymouth. Despite the voluntary conservation area status of Wembury regular student courses collect rockpool fishes from these areas. Quinaldine is known to be used. The absence of the giant goby at Looe and Wembury suggests that selective sampling might be the cause of their absence. The problems associated with selective collecting by scientists was raised in the 1973 report on "Marine Wildlife Conservation". It is considered that research laboratories and educational institutes need to be targetted by the JNCC and other conservation agencies to be more conscious of their impact on sampling sites and adopt more responsible environmental policies.

5.3.6 Major environmental events (storms, climatic change etc.).

All sites, but particularly those exposed to the South West.

6. RECOMMENDATIONS

6.1 In view of the limited time scale for the present survey (November and December 1992), it is recommended that:

6.1.1 the work is extended to cover a spring and summer period when a better assessment of the population as a whole can be made.

6.1.2 additional sites on the north coast of Cornwall, further sites on the south coast and St. Agnes in the Scilly Isles are examined to complete the comparative series.

6.2 With an apparent decline in the population to the east of its range in Britain, it is recommended that:

6.2.1 the population is subjected to an intermittent monitoring programme over the next 3 years to check whether the apparent decline is real and whether conservation measures need to be taken.

6.3 Inshore fishes have been shown to be good indicators of environmental change (Swaby & Potts, 1990; Potts & Swaby, 1991) and with the accessibility of rockpool fishes, it is recommended that:

6.3.1 a detailed study is made of rockpools and their fish faunas with special attention to habitat specificity, life histories, species diversity, vertical and horizontal distribution, and their vulnerability to anthropogenic and natural factors.

6.4 In view of the implication that sites used by educational institutes and research laboratories are suffering from selective sampling and the depletion of certain vulnerable species, it is recommended that :

6.4.1 a review is made of the environmental policies, and collecting and sampling practices of research and educational institutes to see if safeguards need to be introduced to minimise the effect of selective and repeated sampling and the harmful effects they may have on the intertidal environment and on rockpool populations.

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