

11 FISHERIES AND FISHING ACTIVITY

1. A programme of fisheries surveys has been undertaken throughout the estuarine system and in the Harbour for a number of years and this information has been used to provide an overview of the main fisheries resource of the potentially impacted area. The level of fishing activity in the Harbour area is also described.

2. The potential impacts of the proposed development on the fisheries resource itself and consequently of fishing activity is described. Such impacts include the temporary impacts that would arise during the construction phase (e.g. restriction to potential fishing areas) and the longer term impacts arising due to the impact on the fisheries resource and the habitat that supports this resource.

11.1 EXISTING ENVIRONMENT

11.1.1 Introduction

1. The fisheries resource of the lower estuaries and Harbour area is described based on routine trawls that have been undertaken over recent years. Monthly beam trawls within the Stour and Orwell estuaries commenced in June 1999 and initially ran for a year until June 2000. The surveys recommenced in December 2001 and, in 2002, Unicomarine reported on the findings of the surveys between December 2001 and August 2002 and made comparisons with the surveys undertaken between June 1999 and June 2000 (Unicomarine, 2002b).

2. Initially, 12 stations were sampled (6 in each estuary). In May 2002, additional stations were added in Harwich Harbour, the lower Orwell and at Bathside Bay. The location of the sampling stations is shown on Figure 11.1.1.

3. At each station, a 2m beam trawl with 8mm cod end was towed for a distance of approximately 350m. The catch was photographed and large fish were measured, identified and enumerated. Small fish and shrimps were often taken to the laboratory for identification. In addition to fish and shrimps, the relative abundance of other fauna and flora were recorded from December 2001.

4. In addition to the above, from April 2002 a series of pelagic trawls have been undertaken at 6 stations in the Stour and Orwell estuaries; the results from April to August 2002 are reported in Unicomarine (2002c) and summarised below.

11.1.2 Summary of fisheries resource within the vicinity of the proposed development

Beam trawl surveys

1. Over the course of the beam trawl surveys the most abundant commercially important species was the brown shrimp *Crangon crangon*. Fish and shrimp catches were generally higher in the Orwell estuary than the Stour estuary, with shrimp catches for the mid Orwell estuary being consistently high in terms of both abundance and diversity. It is difficult to draw conclusions from the data collected in the Harbour area given that these stations have been sampled for a limited period of time. However, catches of Dover sole (the most important commercially targeted species) and brown shrimp are comparable with those from other stations in most months. Therefore, it

appears that the Harbour area has a similar fisheries resource value to the remainder of the estuary system.

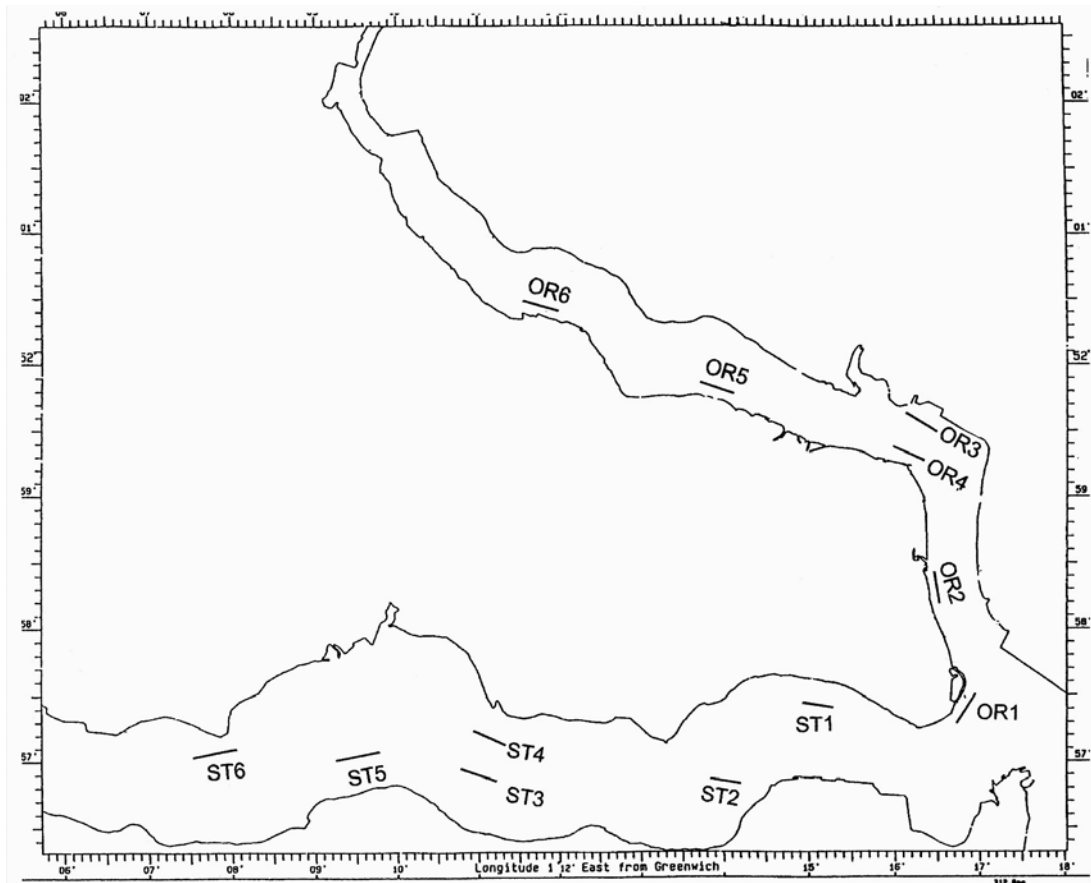


Figure 11.1.1 Locations of beam trawl stations

2. The most common fish species sampled in the beam trawl surveys were Dover sole *Solea solea*, plaice *Pleuronectes platessa* and bass *Dicentrarchus labrax*. At certain periods of the year, a large number of juvenile sole are recorded in the estuaries indicating that the area is a nursery area for this species; this is also the case with all east coast estuaries (Unicomarine, 2002b). The lower estuaries appear to of greater importance for this species than the mid and upper reaches of the estuaries.

3. The main nursery areas for plaice are sandy stretches of coastline but estuaries are also utilised. Plaice probably spawn on the open coast and the planktonic eggs and larvae drift into the estuaries which act as a nursery area. Young fish feed and grow within the estuaries and then migrate into deeper water offshore during the winter.

4. Bass also use the estuaries as a nursery ground, with young fish entering the system in search of food. During the beam trawl surveys, large bass were infrequently caught but high numbers of juveniles were caught at certain times of the year.

5. A number of other fish species which have a commercial value were also caught during the beam trawl surveys. It is important to note that commercial fishing activity is not focussed on certain species all of the time. Fishing effort is often targeted on those

species that may be particularly abundant at a certain time of the year or in particular years and, therefore, the commercial importance of different species varies. Other species with a commercial value include dab *Limanda limanda*, flounder *Platyichthys flesus*, whiting *Merlangius merlangius*, herring *Clupea clupea* and sprat *Sprattus sprattus*. In addition, other commercially important fish have been reported from the Stour and Orwell estuaries, although these species were not recorded in the beam trawl surveys. These species include brill *Scophthalmus rhombus*, skate *Raja clavata*, sea trout *Salmo trutta*, salmon *Salmo salar* and grey mullet *Mugilidae* indet. (Unicomarine, 2002b).

Pelagic trawls

6. Overall, fish catches over the period were low, with herring *Clupea harengus* being the most abundant species. The only other fish species recorded were sprat and the transparent goby *Aphia minuta*. The moon jellyfish *Aurealia aurita* and the comb jelly *Pleurobranchia pileus* considerably outnumbered fish catches with up to 1000 individuals (estimated based on a sub-sample) being recorded in May 2002 in the Orwell Estuary.

11.1.3 Fishing activity

1. A recent report on commercial fishing activity in the Stour and Orwell estuaries states that there are 21 full time vessels operating from the Harwich Harbour area. These vessels are based at Harwich, Shotley and Levington (Sage, 2000). There are also several vessels which fish part-time and these are based at a number of locations in the estuaries. While a few of these vessels fish the Harbour and estuaries on a regular basis, the majority spend most of their time fishing offshore, using the estuaries when adult fish are present in commercial numbers and during bad weather. Of the vessels based at Harwich, 6 under 10m vessels concentrate fishing effort on sole *Solea solea*, cod *Gadus morhua* and bass *Dicentrarchus labrax*. Eight vessels use the otter trawl method in the summer months, fishing mainly for Dover sole (Sage, 2000).

2. The sole *Solea solea* fishery is considered to be of most importance to local fishermen. The vessels mainly use the otter trawl method, although beam trawling for sole is also carried out in the middle of the Stour Estuary between Harwich International Port and Mistle. However, the uneven nature of the seabed in this area due to the extraction of gravel in the 1960's and 1970's causes problems for otter trawling for sole here. The main areas worked by the vessels are the contours of the deepwater channels and high water shoals of the lower Stour and Orwell Estuaries. Recently, the most popular areas have been the northern side of the Stour Estuary between Shotley and Erwarton and the west side of the Orwell Estuary (Shotley Spit to Collimer Point).

3. Historically, there has been a sizeable fishery for brown shrimp *Crangon crangon* and pink shrimp *Pandalus montagui*. However, since 1995, there has not been any full time shrimp fishery due to the low numbers of these species present (Sage, 2000). Nevertheless, the Harwich Fishermen's Association has indicated that the brown shrimp is targeted at certain times and therefore this species is considered to have some commercial importance despite not being targeted throughout the year. A variety of other species are occasionally targeted on a commercial basis. These species include eels, herring and cod.

4. Since the discovery of the native flat oyster *Ostrea edulis*, one fisherman has commercially fished the oyster bed within Holbrook Bay and over a 12 month period approximately 500kg were collected from this bed. In March 2002, the Eastern Sea Fisheries Joint Committee (ESFJC) applied for a temporary closure of mechanised exploitation pending an evaluation of conservation needs and exploitation potential (des Clers, 2003).

11.2 POTENTIAL IMPACTS DURING THE CONSTRUCTION PHASE

11.2.1 Effect of increased suspended sediment concentrations on fish physiology

1. The dredging that would be required as part of the construction phase would lead to a small increase in the concentration in suspended sediment. This can affect fish physiology, primarily through the blocking of gill structures. In addition, in more turbid conditions, fish are less efficient at hunting prey and also at avoiding predators.

2. Larvae and post-juvenile fish are more susceptible than more mature fish as they have less well developed sensory systems. Adult fish are simply likely to move away when they detect sufficiently elevated suspended sediment concentrations and are unlikely to be significantly impacted. Larvae and post-juvenile fish are more likely to be impacted as they may not be able to detect and avoid adverse conditions.

3. It should be noted that estuarine fish are tolerant to variable concentrations of suspended sediments that characterise the estuarine environment. However, the increase in suspended sediment concentrations that would arise from the dredging would be uncharacteristic of the normal variable estuarine conditions in that the concentrations generated are likely to be greater, particularly in the immediate vicinity of the dredger and also would persist for a longer period. Beyond this zone, dispersion would be expected to cause a rapid decrease in the suspended sediment concentrations at the dredge sites, particularly given that the Harbour is not an enclosed environment.

4. On the basis of the above, it is predicted that the overall impact would be of **minor adverse significance**.

Mitigation and residual impact

5. Measures that can be employed to mitigate the increase in suspended sediment concentrations during backhoe dredging are described in Section 6.2.3. When undertaking trailing suction hopper dredging, operational technique can also be optimised to limit sediment resuspension (e.g. optimising trailing velocity) although such techniques are adopted under normal circumstances.

6. In spite of the use of mitigation measures, sediment resuspension during dredging is inevitable and, therefore, the residual impact is of **minor adverse significance**.

11.2.2 Direct uptake of fish during dredging

1. Demersal fish species (those which live primarily on the seabed, such as sole and flounder) could potentially be taken up during dredging. The magnitude of this potential effect has not been extensively studied, but it is unlikely to be significant as the

majority of individuals would be disturbed by the physical presence of the back hoe or dredge head and would move away from the area. Therefore, significant direct uptake of fish would not be expected and a worst case impact of **minor adverse significance** is predicted.

Mitigation and residual impact

2. This impact is not possible to mitigate and a residual impact of **minor adverse significance** is predicted.

11.2.3 Effect of construction noise on fish

1. Noise can influence fish behaviour as fish detect and respond to sound, utilising its cues to hunt for prey, avoid predators and for social interaction. Therefore, activities that create underwater noise (i.e. dredging and piling) have the potential to have an impact on fish. High levels of mortality can occur when fish are exposed to excessive levels of underwater sound.

2. The most important factor to consider when assessing the potential impact of noise on fish populations is the existing noise environment. The low frequency noise produced by ships propagates extremely well through the water column and many fish are known to acclimate rapidly to background noise. Therefore, the Harbour area would experience significant levels of background noise due to the high intensity of shipping activity experienced. The noise levels generated by shipping exceed those from dredging, although piling is likely to generate higher underwater noise levels than both shipping and dredging.

3. In practice, the main response of fish to elevated underwater noise levels is avoidance. Therefore, during dredging and piling activity it is likely that fish would move away from the immediate source of the noise and, consequently, there may be some localised redistribution of fish during certain periods of the construction phase. However, it should be noted that existing noise generated by shipping is already likely to influence fish distribution in the Harbour. Given that the works would not take place in an enclosed environment, the redistribution of fish would not be impeded and, therefore, fish mortality would not be expected due to this effect and there would be **no impact** on the fish populations of the system.

Mitigation and residual impact

4. No mitigation is required and there would be **no residual impact**.

11.2.4 Restriction of access to potential fishing grounds

1. The majority of the estuary system is fished by local fishermen at different times of the year and in targeting different species. From previous discussions with the Harwich Fishermen's Association, the edges of the dredged channels within the system tend to provide good fishing grounds. During the construction works (reclamation and dredging) access to certain areas would not be possible due to the presence of construction plant and, therefore, fishing opportunity would be decreased.

2. This impact is short term in nature, except in the proposed reclamation area where there would be a permanent loss of potential fishing grounds; this is addressed as a separate operational phase impact (see Section 4.3.1). It is considered that the restriction of access would be of **minor to moderate adverse significance** as a significant area of the Harbour would be affected during the construction phase.

Mitigation and residual impact

3. The conflict between the presence of construction plant and fishing activity is not possible to mitigate and the residual impact would be of **minor to moderate adverse significance**.

11.3 POTENTIAL IMPACTS DURING THE OPERATIONAL PHASE

11.3.1 Potential for effect on the feeding resource of estuarine fish

1. Estuarine fish feed on a wide range of benthic invertebrates which live within and on the surface of the seabed, including worms and molluscs. Fish also feed on the siphons of molluscs which protrude above the sediment surface. Consequently, impacts on this invertebrate resource can lead to a reduction in the value of the impacted area as a feeding resource.

2. The proposed scheme is predicted to lead to a reduction in the diversity and total abundance of the invertebrate resource in the area of the proposed dredging. This arises through the initial removal of the resource through capital dredging and the consequent prevention of succession of the invertebrate community through maintenance dredging. This effect would be most significant in the area to the west of the existing channel as this area is currently not dredged and has the most diverse community of the potentially impacted areas. Elsewhere, the effect is less significant as the benthic community is already impacted due to maintenance dredging. An area of seabed would also be permanently lost due to the reclamation; this area is also currently impacted by maintenance dredging.

3. Although the area to the west of the channel represents a small proportion of the total subtidal area of the system, the dredging of this area adds to the significant area of the seabed within the Harbour and estuary system that is dredged. Consequently, taking into account the relative diversity of the benthic resource of the different areas that would be impacted by dredging and reclamation, the overall impact is predicted to be of **minor to moderate adverse significance**.

Mitigation and residual impact

4. It is not possible to mitigate the impact on the benthic resource that would arise as a result of the reclamation and dredging and, therefore, the residual impact would be of **minor to moderate adverse significance**.

11.3.2 Restriction of access to fishing grounds

1. During the operational phase, access to certain areas of the Harbour that are currently fished would be restricted. This situation is not unusual within the Harbour and, in particular, in the vicinity of the Port of Felixstowe given that the area in the

vicinity of the proposed reclamation is subject to a high level of use by container vessels and other traffic. The overall impact is considered to be of **minor adverse significance**.

Mitigation and residual impact

2. The impact is not possible to mitigate and the residual impact would be of **minor adverse significance**.

11.3.3 Potential effect of light on fish

1. Light from the operational port would enter the water column and has the potential to disturb fish. The important factors to consider in this respect are the existing lighting level entering the water column when compared with the existing situation and the turbidity of the water column.

2. The lighting design for the proposed development would result in a significant reduction in light spill into the water column from the operational port when compared with the existing situation. Therefore, the potential for impact on fish due to light would be reduced as a result of the proposed development.

3. The Stour and Orwell estuaries and the Harbour area are highly turbid environments due to sediment in suspension in the water column. It would be expected that a significant percentage of light incident on the water surface would be absorbed in the upper 1m or so of the water column, with almost all light being absorbed in the upper 2m. As a result, and when the amount of light spill that would arise from the proposed development is compared with the existing situation, it is concluded that light levels beyond 2m depth would be negligible and there would **no impact** on fish populations due to light entering the water column.

Mitigation and residual impact

4. No mitigation measures are required; there would be **no residual impact**.

