12 COMMERCIAL FISHERIES

12.1 INTRODUCTION

12.1.1 This section addresses the potential impacts of the proposed development on commercial fisheries and recreational angling. The chapter sets out the methodological approach to assessing the direct impacts on fishing activities in the Humber Estuary and the impact pathways that may be relevant to fisheries elsewhere.

12.1.2 The Humber supports a fish assemblage characteristic of a southern North Sea macro-tidal estuary, with 86 species having been recorded (Rogers *et al.*, 1998; Allen *et al.*, 2003). Commercial species, or those with recreational angling relevance, that are routinely recorded in the Humber include whiting (*Merlangius merlangus*), sprat (*Sprattus sprattus*), common (or Dover) sole (*Solea solea*) and flounder (*Platichthys flesus*). Less common but still relevant are cod (*Gadus morhua*), saithe (*Pollachius virens*), pollack (*Pollachius pollachius*), dab (*Limanda limanda*), plaice (*Pleuronectes platessa*) and eel (*Anguilla anguilla*).

12.1.3 Shellfish populations are also typical of the estuary typology with commercial interest focusing on: large decapod crustaceans (brown shrimp, *Crangon* sp.; lobster, *Homarus gammarus*; and brown crab, *Cancer pagurus*), bivalve molluscs (cockles, *Cerastoderma edule*; mussels, *Mytilus* sp.) and whelk (*Buccinum undatum*).

12.1.4 The Humber Estuary is an important spawning and nursery ground for some commercially important species, including common sole, lemon sole (*Microstomus kitt*), herring (*Clupea harengus*), flounder, plaice and sprat (Rogers *et al.*, 1998). The location of the proposed reclamation area covers a highly turbid tidal environment characterized by intertidal mudflats and shallow subtidal zones recognized as having important nursery value.

12.1.5 Ecological function and fisheries resources, even for the most sedentary species found in the area, rely on processes operating over a wider geographical zone. Reproduction, juvenile nursery migration, and recruitment dynamics (ie the factors and processes leading to successful recruitment of juvenile individuals in the adult population) are important variables relevant at the scale of the North Sea eco-region for all target species.

12.1.6 Due to connectivity across a wider area, exploited stocks elsewhere may be indirectly affected or equally, impacts on local fishery resource may

be moderated by supply from external source areas. The impact evaluation considers this and looks at the local and wider fishery impacts.

12.1.7 Commercial fishing methods in the Humber include long-lining, trawling, netting and potting. Target species and effort varies considerably across the year (temporally) and in location (spatially) with fishermen often taking up alternative or additional fisheries and fishing methods to increase profits. However, the overall fishing effort has been going through a period of slow decline in recent years and it is comparatively low at present.

12.1.8 Recreational angling activities in the Humber Estuary are conducted by both shore and boat anglers throughout the year, and target species such as common sole, sea bass (*Dicentrarchus labrax*), cod, codling (*Molva molva*), whiting, salmon (*Salmo salar*) and sea trout (*Salmo trutta*). Populations of shore crabs (*Carcinus maenas*) and sand eels (*Ammodytes* sp.) are also targeted for bait. Angling is widespread in the Humber and the effort appears to have remained stable over recent years.

12.1.9 Among direct consequences of the works proposed in the foreshore and immediate subtidal area, habitat alteration or destruction, underwater sound pollution and alteration to food webs are widely acknowledged sources of disturbance to ecosystems in relation to similar port developments. Additional effects may result from water quality alterations and smothering. Some of these changes can also be attributable to natural change.

12.2 LEGISLATION, POLICY AND GUIDANCE

General

12.2.1 The various nature conservation designations within the Humber Estuary and the relevant environmental legislation are covered in earlier chapters and will not be repeated here. At present, fisheries regulation in the form of national law and Byelaws and their enforcement in the Humber Estuary comes into the remit of The Marine Management Organisation (MMO), North Eastern Sea Fisheries Committee (NESFC)[1] (marine fisheries), the Eastern Joint Fisheries

[1] NESFC was replaced on 1st April 2011 by an inshore fisheries and conservation authority, the North Eastern Inshore Fisheries Conservation Authority (NEIFCA), as defined in the Marine and Coastal Access Act 2009 and under MMO jurisdiction.

Committee (EJFC) and the EA - North East Region (salmon [1] and freshwater fisheries).

12.2.2 Permits and licenses granting the right to fish are issued by each of these agencies. The Fisheries Committees are empowered to make bylaws and regulate through permitting, make assessment of stock levels, and advise on technical matters including minimum fish landing sizes and minimum mesh sizes.

12.2.3 A comprehensive overview of UK, European or international marine fishing regulations and programmes are not within the scope of this evaluation, it will instead focus on directly relevant legislation and fishing byelaws operating in the area which are of relevance to the commercial fisheries and shellfisheries or recreational angling activities occurring at or within the area which may be influenced by the development.

12.2.4 From the establishment of the MMO and the Marine and Coastal Access Act 2009 (MCA) it was clear that a number of further policy initiatives will be necessary to sanction the envisaged MMO roles. This has resulted in statements and guidance documents that if adopted will define the legislative framework in which fishing activities will be conducted in the future.

Legislation

12.2.5 UK marine fisheries are regulated by The Sea Fish (Conservation) Act 1967, The Sea Fisheries (Shellfish) Act 1967, and The Sea Fisheries Act 1968 with latest amendments introduced by the MCA). Of additional relevance is the EC Shellfish Waters Directive (2006/113/EC).

EC Shellfish Waters Directive – codified version (2006/113EC)

12.2.6 The Shellfish Directive is designed to protect the integrity of shellfish fisheries by means of designating waters for quality protection. It applies to those coastal and brackish waters designated by the Member States as needing protection or improvement in order to support shellfish (bivalve and gastropod molluscs) life and growth and thus to contribute to the high quality of shellfish products directly edible by man.

[1] Salmon in this context means fish of the species (*Salmo salar*) and migratory trout means fish of the species (*Salmo trutta*) which migrate to and from the sea.

12.2.7 The impacts of the proposed development on the water quality requirements of this directive are considered in *Chapter 9*, and the impacts on protected fish species populations in *Chapter 10*. This chapter examines the impacts on populations of commercially fished species and the further impacts on the fishing industry.

Marine and Coastal and Access Act (2009)

12.2.8 This Act established the MMO as the planning body for the UK's marine environment, and launched a comprehensive review of the UK's marine planning framework discussed next. This new legislation will also modify freshwater fisheries regulation.

12.2.9 The relevant legislation concerning the salmon and freshwater fisheries activities in the area are the Salmon and Freshwater Fisheries Act 1975, the Salmon Act 1986, and the EA - North East Region (Yorkshire Byelaws Area) Fisheries Byelaws, April 2006. Furthermore, the MCA has amended former legislation and introduced new regulations. More importantly it has provided the foundations for the National Eel Fishing (Net and Trap) Byelaws 2010, resulting in plans for the introduction of a complete ban on elver (glass eel) fishing and the application of a fishing authorization scheme for eel fishing with closed seasons and no fishing above the tidal limit.

12.2.10 Importantly, the MCA gives the power to authorize, rather than license, fishing activities regulated by the EA. The important distinction is that authorizations can be subject to revocation and it is expected that the authorization system will be used in future EA Byelaws to regulate netting and trapping for other freshwater species except for the conventional T and J net salmon fisheries.

National Policy Statement

12.2.11 The draft NPS for Ports notes that,

'*Sea ports are necessarily located on coasts and estuaries. These areas are often of fundamental importance to biodiversity, particularly to bird and fish life, acting as the prime nursery grounds for a range of commercial species and as critical migration pathways for other species*.'

12.2.12 The potential for port developments to impact on fisheries resources is noted, and the draft NPS indicates that such impacts should be considered in any EIA undertaken.

12.2.13 The document states the requirement for any developer proposing to promote a ports-related development to consult with the MMO, as having subsumed the role formerly discharged by the Marine Fisheries Agency (MFA).

Planning Policy Guidance/Statements

12.2.14 The UK's marine planning framework is in the process of being comprehensively restructured under the auspices of the MMO.

Draft UK Marine Policy Statement (2010)

12.2.15 This draft statement of policy will, if adopted, empower the MMO to develop regional Marine Plans for UK waters, codifying in detail the high-level policies it sets out. Where a relevant NPS has been designated, NSIPs must be decided in accordance with the NPS (subject to certain exceptions), and having regard to the Marine Policy Statement (MPS); in other circumstances (ie if the NPS for Ports is not designated), the decision is for the secretary of State. Any Marine Plan to be developed must also have regard to any relevant NPS.

12.2.16 The boundaries of the MPS and the Marine Plans which will arise from it are defined thus:

'*As the Marine Plan area boundaries will extend up to the level of mean high water spring tides while terrestrial planning boundaries generally extend to mean low water spring tides, the Marine Plan area will physically overlap with that of terrestrial plans. This overlap ensures that the marine and land planning will address the whole of the marine and terrestrial environments respectively, and not be restricted by an artificial boundary at the coast*' (Draft UK Marine Policy Statement, HM Government, 2010).

12.2.17 The MPS gives advice on taking decisions concerning the management of fisheries, noting that good environmental status will involve better management of fisheries, and mitigating their impact on the wider marine environment.

12.2.18 The *Statement* identifies that,

'*marine developments have the potential to prevent, displace or encourage fishing activities. There are potential social, economic and environmental impacts of displacement of fishing activity caused by other sea uses. (...) Interactions between fishing activity and marine developments and their consequent impacts on fish stocks and the environment are complex and need to be considered*' (Ibid.)

12.2.19 This statement has informed the conduct of the EIA with regard to commercial fisheries.

12.2.20 The Statement notes the requirements for impact assessment in drawing up Marine Plans thus:

'*Marine plan authorities should consider the potential socio-economic impacts of other developments on fishing activity, as well as potential environmental impacts. They should, for example, have regard to the impacts of displacement and whether it is possible for vessels to relocate to other fishing grounds. They should also consider the potential impacts of this displacement on the viability of fish stocks in the alternative fishing grounds. They will also wish to consider the impacts on local communities of any reduction in fishing activity or redistribution of fishing effort as the result of a marine development*' (Ibid.)

12.2.21 Until a Marine Plan is drawn up, formalizing these concerns into regional policy, it is considered that the EIA should take them into account as representing the desirable standard for EIA.

Local Plan Policy

12.2.22 Neither the North Lincolnshire Local Plan nor the East Riding of Yorkshire Local Plan contains policies relating to commercial fisheries – this is an acknowledgement that these matters are dealt with at national level because of the continuity of the marine environment. The policy-making body at the level of the application is the MMO.

12.3 ASSESSMENT METHODOLOGY AND CRITERIA

Overview

12.3.1 To evaluate impacts on the fisheries, and in agreement with current EIA guidance, it is necessary to gather an accurate picture of fishing effort, methods of fishing and target species. Information on these aspects and opinions on any potential impacts has been sought from local skippers operating from Grimsby port, recreational anglers, as well as formal request for fisheries statistics to the MMO and NESFC. In addition to this, we have reviewed former research conducted in the Humber on species of fishery interest, ecological services underpinning sustainable fisheries and on spatial uses of the estuary and the wider coastal environment.

12.3.2 It was evident from the consultation with the local MMO district inspector office at Grimsby, NESFC, local skippers and angling clubs that there has been a marked decline over recent years in commercial

fishing activities affecting all traditional Humber fisheries. For example, the eel fishery has not been active for over a decade now and others like the cockle fishery are almost non-existent. Therefore, significance criteria have been further weighted by the fishing effort.

12.3.3 Indirect effects on fishery resource can arise from effects on juvenile fish, fishery species or their food resources or both, as direct impacts on or indirectly by alterations of their habitat.

12.3.4 Impacts will differ significantly between construction and operational phases so the assessments will be conducted independently. The facility is considered to be a permanent development and therefore there is no need to assess decommissioning impacts.

Construction Phase

12.3.5 The impact analysis in this phase emphasizes acute impacts as the effect is likely to be short term and reversible (permanent habitat loss has been dealt with in the assessment of impacts arising from the operational phase). The impacts have been scored taking account of the final engineering plan, information from the various other assessments (hydrodynamic and sediment regime, noise, water quality, navigation, expected dredging needs, etc) and opinions from interested parties.

12.3.6 The analysis has been conducted according to the fishery quality feature or features likely to be affected by the presence of exclusion and safety zones. The main focus has been placed upon interferences with fishing effort, access and gear damage.

Operational Phase

12.3.7 The assessment of the operational phase has been conducted using the same criteria of affected fishery quality impacted by the presence of the functioning quay and the associated increased vessel traffic.

12.3.8 The impact analysis focuses on chronic pressures such as routine vessel traffic and permenant habitat loss rather than acute effects that comparatively would be less prominent to this phase.

Sensitive Receptors

12.3.9 Activities associated with the development and operation of the proposed facility could affect fisheries activities by altering the access to fishing grounds and operation of fishing gear.

12.3.10 Indirect impacts on fisheries are also expected. These might be ascribed to 1- direct effects on the target fish stocks (ie avoidance behaviour and mortality), and 2- indirect effects mediated by ecological processes originating from impacts on non-target life stages (ie juvenile or breeding individuals), food resource and food webs and habitats (both intertidal and subtidal). Essential ecological processes underpinning the integrity of the fishery resource are for example the successful recruitment of juvenile individuals to adult stocks, feeding relationships and predation, nursery usage and settlement, etc. All these ecological aspects have been dealt in detail in *Chapter 10 Aquatic Ecology*.

Significance Criteria

12.3.11 Potential impacts are to be evaluated according to the likelihood of occurrence as a direct consequence of the development. The severity of the impacts on the fisheries has been assessed by considering the magnitude and duration of the disturbance.

12.3.12 Overall, current fishing effort is much diminished from historical levels or has shifted to more profitable fisheries in the North Sea. The number of vessels conducting commercial fishing is small and the few vessels still fishing commercially take up alternative fisheries in different areas and seasons to maximize catch rates and profits. Therefore the potential for direct impacts of the reclamation on commercial fisheries as a whole is considered to be relatively low.

12.3.13 Recreational angling is, on the other hand, more widespread and could be affected to a greater extent. To ensure a fair evaluation, recreational angling is to be considered independently from commercial fisheries.

12.4 CONSULTATION

12.4.1 The Scoping Opinion evaluated very favourably the initiative to consult with both the commercial fishing industry and the recreational angling community. The latest round of consultation, specific to the fisheries section, has included fishermen operating from Grimsby port, recreational anglers, the MMO, the NESFC and the EA. These and the responses from stakeholders summarized in the Scoping Opinion by the IPC have been positive to the approach and methodology presented for the evaluation of potential impacts on fisheries.

12.4.2 Furthermore the Scoping Opinion highlighted the need to inform and cross-reference with the socio-economic section of the EIA to respond to

this specific request we have asked for information on fishing effort as well as landings. This information, along with previous Humber user maps, has been used to produce a valuation of economic revenue and direct employment from current fishing activities.

12.4.3 Special attention has been paid to the evaluation of impacts on the ecology underpinning the fishery resource (target species, non-target and food resource) during maintenance dredging after the engineering plan is finalized. Potential sensitivities of ecological attributes identified in *Chapter 10* have been then further interrogated in relation to the fisheries.

12.5 BASELINE

12.5.1 Commercial fisheries in the Humber Estuary are conducted by vessels (all under 10 m) operating from Grimsby or Hull, and small beach-launched vessels operating mainly from the north bank. At the present time, the size of the fleet fishing inside the estuary is small as most of the vessels from Grimsby and Hull operate offshore along the Holderness and Lincolnshire coasts. The outer estuary is also visited on a seasonal basis by vessels from other ports targeting brown shrimp.

12.5.2 Fishing methods use a combination of mobile and fixed gears such as beam and otter trawls, gill nets and long lines for fish, and beam trawls and pots for shellfish. Trawling focuses on areas in the middle and outer estuary, main channel and along the south bank to the estuary outer boundary at Donna Nook as well as the immediate coastal area. Fixed gear is employed throughout the middle and outer estuary mainly along the banks on suitable grounds away from the navigation channels.

12.5.3 Almost all of the marine fish commercially targeted in the Humber are common sole and cod. Common sole is captured on fixed nets and by trawling along suitable grounds on the south bank from Immingham to Grimsby and down to Donna Nook. Cod and other whitefish are captured with trawls, gill nets and by long-lining. Nets and lines for cod are worked seasonally during winter and along areas on the south bank from East Halton (next to the proposed development) down to Donna Nook. Marine finfish fisheries occur during most of the year although are most active during the colder months. There are no significant commercial fisheries targeting herring, sprat, salmon or sea trout.

12.5.4 Shellfish fisheries concentrate on brown shrimp. Most of the fishery does not take place in the Humber but along the Lincolnshire coast down to the Wash. This is a highly seasonal fishery restricted in the Humber to the outer estuary and practically restricted to the autumn months.

12.5.5 A few small beach-launched vessel target lobster, brown (edible) crabs and whelk on the north bank in the outer estuary during summer and early autumn. However, in 2010 this fishery employed only five boats and 11 men from the home ports in the outer and middle estuary (Spurn Point, Cleethorpes, Grimsby and Hull), with a fishing effort of 3750 hauled pots. These accounted for 3 percent of the total employment and effort in the NESFC district (5 percent when considering only the southern sector, from Scarborough to Cleethorpes).

12.5.6 Cockles are not currently taken from the Humber in any significant quantity.

12.5.7 With regards to freshwater fisheries, eels have been traditionally targeted in the middle and upper Humber Estuary. At present there is no active eel fishery. Eel populations have sharply declined across Europe in the last 25 years prompting proposals to set strict conservation goals for the species. It is almost certainly the case that these measures, and the decreasing stocks, will preclude the return of the eel fisheries to the Humber and to most other estuaries in the UK.

12.5.8 In 2008, approximately 30 commercial licences for salmon and sea trout fisheries were issued by the EA to operate along the Yorkshire coast however there is no commercial netting for salmon in the Humber Estuary.

12.5.9 Recreational angling is conducted from small private boats or from the foreshore at high tide. In addition, some skippers take anglers on fishing trips although most of these target known wrecks in the North Sea. Current Byelaws (NESFC) specify minimum landing size and set limits on the number of fish and shellfish that can be legally landed for all target species.

12.5.10 Recreational angling from the shore targets mainly flounder and common sole in summer months, and flounder, whiting and cod in winter months. Cod and whiting are also targeted by boat anglers in winter months, although the run of cod can be quite variable. Other occasional target species are sea bass, codling, salmon, sea trout and other large marine fish that seasonally enter the outer Humber Estuary.

12.5.11 Recreational angling appears to be more widespread than commercial fisheries occurring from Spurn Head at the mouth of the estuary to sites in the upper Humber Estuary, upstream of the Humber Bridge. Consultation with local anglers, and previous studies summarizing users of the estuary, indicate that angling is more intense in the outer estuary and along the north bank up to the city of Hull. Angling is also carried out with increasing frequency on the south bank between Grimsby Docks and East Halton.

12.5.12 To inform the evaluation process, two dedicated fish surveys (summer and autumn 2010) have been undertaken in the immediate area of the development. The survey work assessed the use by fish in the area to be reclaimed and its surroundings, with stations identified in the intertidal and immediate subtidal zones. The assessment was carried out with fyke (eel) nets and beam trawl hauls in the intertidal and subtidal area, respectively. Survey data is presented in *Annex 10.1*.

12.5.13 Small-bodied gobies of the genus *Pomatoschistus* and whiting made up the majority of the beam trawl catch (subtidal) while whiting, common sole, five-bearded rockling (*Ciliata mustela*) and flounder dominated the fyke net catches (intertidal).

12.5.14 Common sole juveniles were present in both gears and seasons, with increased abundances in the autumn. Juvenile whiting were also very abundant in both surveys. No other commercial fish species were noted in great numbers, however, pollack, saithe and witch (*Glyptocephalus cynoglossus*) juveniles were recorded.

12.5.15 Brown shrimp and shore crabs (*Carcinus maenas*) were recorded regularly in the beam trawl catches. No other shellfish of commercial relevance was recorded during the surveys.

12.5.16 The results of the surveys highlighted the importance of the proposed development area as a nursery habitat especially for common sole and whiting. It also confirmed the presence of brown shrimp which has a dual fishery importance; as a target fishery species and a key element of the local fish food webs.

12.6 IMPACTS

12.6.1 This section identifies the significant impacts associated with the construction and operational phases of AMEP. The impacts are analysed and reported in a table format, separately for the two phases (*Table 12.2* and *Table 12.3*).

Construction Phase

Table 12.1 Impacts with relevance assessment to fisheries during the Construction Phase of AMEP.

Pressure	Sensitive receptors	Possible effects	Sensitivity of receptors	Severity of impact on fisheries
Water-borne noise disturbance (notably piling but also vessel traffic)	Fishery resources (through impacts on target and non-target fish stocks, and on food resource)	Fisheries dependent, with those targeting hearing specialists fisheries (i.e. herring) being the most vulnerable but likely to affect other species. Linked to nursery habitat disturbance (assessed in *Chapter 10*) & affecting recruitment of commercial stocks with possible effect also on fisheries elsewhere.	Low to Medium	Minor significant impact on local estuarine fisheries(*), as: - no significant fisheries targeting hearing specialists (ie herring) occur in the area; - flatfish have low hearing sensitivity (*Chapter 10*); - fisheries in the area (including those targeting other species potentially affected by noise disturbance, eg cod) are limited.
Land reclamation	Fishery resources (through impacts on habitats, target and non-target fish stocks, and on food resource)	Habitat loss or degradation. Fisheries dependent. Linked to nursery habitat loss & affecting recruitment.	Low to Medium	Minor significant impact on local estuarine fisheries(*), due to the low fishing effort in the area.
Dredging	Fishery resources (through impacts on habitats, target and non-target fish	Habitat loss or modification. Direct fish mortalities.	Low to Medium	Minor significance, due to the low fishing

Pressure	Sensitive receptors	Possible effects	Sensitivity of receptors	Severity of impact on fisheries
	stocks, and on food resource)	Fisheries dependent. Linked with noise disturbance, dispersion of re-suspended dredge/deposition material (*Chapter 8*), mobilization of possible contaminants and entrapment in the dredges. Effects likely on both dredging and spoil dumping locations.		effort in the area.
Introduction of hard substrata and armour	Fishery resources (through impacts on habitats and food resource)	Habitat replacement. Encourage settlement of sessile species and effects on local food webs.	Negligible to Low	Negligible, due to the low fishing effort in the area.
Safety and exclusion zones	Access to fishing grounds (either for commercial and recreational fishery)	Reduction of fishing ground, or displacement of effort to other areas.	Negligible to Low	Negligible, due to the low fishing effort in the area.

(*) A possibly moderate significant impact is anticipated on fisheries elsewhere, provided that a significant impact on the nursery function of the estuarine habitats is assessed (see *Chapter 10*).

Operational Phase

Table 12.2 Impacts with relevance assessment to fisheries during the Operational Phase of AMEP.

Pressure	Sensitive receptors	Possible effects	Sensitivity of receptors	Severity of impacts on fisheries
Water-borne noise disturbance (vessel traffic noise & vibrations)	Fishery resources (through impacts on target and non-target fish stocks)	Fisheries dependent, with those targeting hearing specialists fisheries (ie herring) being the most vulnerable but likely to affect other species.	Negligible to Low	Negligible, as: - no significant fisheries targeting hearing specialists (ie herring) occur in the area. - flatfish have low hearing sensitivity (*Chapter 10*). - fisheries in the area (including those targeting other species potentially affected by noise disturbance, eg cod) are limited.

Pressure	Sensitive receptors	Possible effects	Sensitivity of receptors	Severity of impacts on fisheries
Habitat loss/ degradation or habitat replacement	Fishery resources (through impacts on habitats, target and non-target fish stocks, food resource)	The seabed habitat will be lost or replaced by underwater hard structures. Fisheries dependent. Linked to nursery habitat loss (assessed in *Chapter 10*) and affecting recruitment of commercial stocks with possible effect on fisheries elsewhere. Shift of fishing effort to other zones leading to secondary impacts.	Low to Medium	Minor significant impact on local estuarine fisheries(*), due to the low fishing effort in the area.
Maintenance dredging	Fishery resources (through impacts on habitats, target and non-target fish stocks, and on food resource)	Habitat loss or modification. Direct mortalities. Fisheries dependent. Linked with noise disturbance, mobilization of possible contaminants and entrapment in the dredges.	Negligible to Low	Negligible, due to the low fishing effort in the area.
Permanent alterations of the hydrodynamic regime	Fishery resources (through impacts on habitats)	Habitat loss or modification. Linked to nursery habitat availability and quality (assessed in *Chapter 10*) with possible indirect effects on fisheries through altered recruitment of commercial stocks.	Low to Medium	Minor significant impact on local estuarine fisheries(*), due to the low fishing effort in the area.

Pressure	Sensitive receptors	Possible effects	Sensitivity of receptors	Severity of impacts on fisheries
Designation of approaches and turning zones	Access to fishing grounds (either for commercial and recreational fishery)	Reduction of fishing ground, or displacement of effort to other areas.	Negligible to Low	Negligible, due to the low fishing effort in the area.
Loss or damage to gear	Operation of fishing gear	Loss or damage to mainly static gear left at or in the vicinity of safety exclusion zones or resulting from navigational mistakes/gear poor marking.	Negligible to Low	Negligible, due to the low fishing effort in the area.

(*) A possibly moderate significant impact is anticipated on fisheries elsewhere, provided that a significant impact on the nursery function of the estuarine habitats is assessed (see *Chapter 10*).

12.7 MITIGATION MEASURES

Construction Phase

12.7.1 Most of impacts on commercial fishing or angling activities in the Humber estuary are of negligible to minor significance primarily due to the low fishing effort in the immediate area around the development. Hence no mitigation measures are required.

12.7.2 However, this does not necessary imply that the impact on fish and shellfish assemblages is not significant (see *Chapter* 10 for details). Maintaining viable fish populations, diverse fish assemblages and the ecological functioning of estuarine habitats (eg as nursery grounds) is important not only for the ecology of the system, but for the present and future provision of ecological goods, such as food resources exploited by fishery.

12.7.3 Furthermore, possible impacts on the local ecology (eg nursery functioning) might have indirect effects on fish stocks elsewere, hence on the fisheries exploiting them. A possibly moderate impact on nursery functioning has then been anticipated in this chapter, mainly resulting from piling noise and vibration and habitat loss and disturbance during construction works. The significance of these impacts has been assessed in *Chapter 10*, where also the need and appropriateness of any mitigation measure has been discussed.

Operational Phase

12.7.4 The completion of AMEP will result in the loss of a substantial area of intertidal mud flats and shallow subtidal habitat. This impact cannot be mitigated.

12.7.5 Most of impacts on commercial fishing or angling activities in the Humber estuary are of negligible to minor significance primarily due to the low fishing effort in the immediate area around the development. Hence no mitigation measures are required.

12.7.6 However, as described for the construction phase, possible moderate impacts might affect fisheries elsewhere. These impacts might arise from habitat loss and degradation and permanent alteration of the hydrodynamic regime and will strictly depend on the possible impairment of the nursery functioning of estuarine habitats (assessed in detail in *Chapter 10*). In case this is recognized as an issue for the aquatic ecology of the system, appropriate mitigation measures are suggested in *Chapter 10*.

12.8 RESIDUAL IMPACTS

Construction Phase

12.8.1 Given the expected transitory and acute nature of the impacts in this phase, it is unlikely that residual impacts will be of minor to negligible importance.

Operational Phase

12.8.2 Permanent intertidal and subtidal habitat loss under the footprint of the reclamation area and further disturbances to habitats during dedging or altered sedimentary regime would be the main residual impact.

12.9 CUMULATIVE IMPACTS

12.9.1 The assessment aims to conduct the cumulative impact evaluation focussing on pressure types with potential effects on sensitive fishery receptors. Cumulative impacts may result from additional pressures (eg noise, vessel operation, dredging and land reclamation) arising from surrounding projects and future development plans (*Annex 2.3*).

12.9.2 The main concern raised by the evaluation of cumulative impacts regarded the additional loss of intertidal habitats or subtidal habitat changes, having a potential significant impact on the estuarine fishery. Such a pressure may arise from other projects in the area. These include the Able UK Northern Area between East Halton Skitter and Chase Hill Road (North Killingholme), the ABP RO-RO Terminal at the Immingnham Outer Harbour, the additional berths at the Humber Sea Terminal located at North Killingholme, the Hull Riverside Container Terminal (formerly known as Quay 2005), the ABP Hull Riverside Bulk Terminal near the eastern boundary of the Port of Hull, the ABP RO-RO Berth at Grimsby docks and the proposed dredging of the Sunk Dredged Channel and Chequer Shoal as part of the proposed deepening of the approaches to Immingham Oil Terminal. A loss of intertidal habitat would result also whereby the existence of flood defences in an environment of relative sea level rise entail a gradual loss (squeeze) of the intertidal zone, as highlighted also by the Humber Flood Risk Management Strategy.

12.9.3 However, the provision of new intertidal habitat is planned for the next 50 years by the Environment Agency's Coastal Habitat Management Plan (CHaMP), and a series of sites have been identified by ABP to

ensure that compensatory intertidal habitat is created in the estuary to address current and planned port expansion. As a result, some of the above mentioned projects have been already provided for compensation, as in the case of the Immingham Outer Harbour and the Hull Riverside Container Terminal (Quay 2005), compensated by the Chowder Ness and Welwick realignment sites. In addition, no or minor significant implications to fisheries were identified during the environmental impact assessment process carried out on the above mentioned projects, mainly due to the current low fishing activity in the Humber.

12.9.4 The proposed compensation scheme for the present project will realign the current flood defences to allow for the development of a mosaic of intertidal habitats. However, as highlighted also elsewhere in this ES (*Chapters 8, 9* and *10*), this will create a low energy pocket where sediments will fall out of the water column leading to quick rates of siltation. The land within the Compensation Site will likely develop into saltmarsh, resulting in a compensation of intertidal habitat loss. A residual impact will then remain, as the realignment scheme is unlikely to effectlively compensate for the permanent loss of subtidal habitat (and therefore fishing ground) unless it is dredged to allow permanent inundation. Although this may not be a direct issue for the fisheries (ie direct loss of fishing ground) since the area to be reclaimed has negligible fishing activity at present, it may be relevant for the ecology of fisheries-relevant species (feeding or nursery habitat) and to the general ecology of the area (*Chapter 10*).