15 FISHERIES AND AQUACULTURE

15.1 INTRODUCTION

This section considers potential impacts during construction and operation of the port on fisheries within Loch Ryan. Potential impacts are considered to come from three sources, capital dredging during construction, ferry manoeuvres during operation of the port and access to recreational fishing grounds.

15.2 ASSESSMENT METHODOLOGY

One of the major issues considered during the Public Inquiry for the Port of Cairnryan development was the impact of that development on the Loch Ryan oyster fishery. For this reason, large volumes of data were gathered and detailed ecological studies undertaken. The assessment of the impact of the Old House Point development presented references and draws upon this information and data presented at the Public Inquiry.

The impact of the proposed development on the hydrodynamic and sediment regime has been assessed using computational modelling techniques based on the MIKE 21 suite of coastal process modelling software developed by the Danish Hydraulics Institute. These models accurately predict the impact of development and dredging activities on the Loch. These have been employed to assist in identifying any potential impacts on coastal processes, as discussed in *Chapter 7*.

This chapter considers the impact of coastal processes on fisheries and aquaculture resulting from construction and operation of the port facility.

15.3 BASELINE

15.3.1 The Oyster Fishery

The native or flat oyster (*Ostrea edulis L.*) is a filter-feeding, bivalve mollusc. The typical life span of this species is 5-10 years, with the majority of individuals in populations aged at 2-6 years old, however, they may reach in excess of 15 years old. In the British Isles, the main growing season is from April to October.

The Loch Ryan fishery is the only remaining commercial native oyster (Ostrea edulis) fishery in Scotland. Loch Ryan is a designated Shellfish Water under EC Directive 79/923. The designated area comprises the waters of Loch Ryan lying south of a line from NX0181973675 (Milleur Point) to NX0454074091 (Finnarts Point) and extending to MHWS and is shown on *Figure 6.1*.

In compliance with the Royal Charter status of the Loch Ryan oyster fishery, fishing in the Loch is controlled under the Sea Fisheries (Shellfish) Act 1967 with a ban on all other mobile gear fisheries other than the privately operated oyster fishery.

The Loch Ryan commercial shellfish production area has a Food Standards Agency classification for native oysters of category B from April to December, category A for January and February and category B. Category A means that shellfish can go directly for human consumption, category B means that the shellfish must be depurated, heat-treated or re-laid prior to human consumption.

History of the Loch Ryan Fishery

In 1702, William III created a private oyster fishery by Royal Charter and granted it to the estate of Loch Ryan House. The rights to this royal charter fishery are currently exercised by the Wallace family of Loch Ryan House in Cairnryan.

The oyster fishery suffered a 'boom and bust cycle' of over exploitation in the twentieth century. Peak landings were made around 1913, when landings of over 1.3 million oysters were recorded, but the fishery went into severe decline thereafter. The fishery became uneconomical around 1954 and there was no fishing for a period of 13 years. The bed was handed over to the Scottish Marine Biological Association to carry out research to see if it would be possible to bring back the fishery. Since then there has been a slow recovery of the fishery.

In 1976, the Colchester Oyster Fishery took over the operation of the fishery, catching up to 61 tonnes per year using four boats. In 1987, B&B Shellfish took over the operation of the fishery and restricted their catch to 15 tonnes per year, mostly harvesting the larger oysters for the London market and relaying the small ones. In 1998 Loch Ryan Shellfish, took on the fishery and began to harvest about 10 tonnes per year of the larger oysters, again, relaying the smaller ones. In 2002, harvesting increased to 17 tonnes, approximately 98% of the official Scottish production and it is estimated that approximately 20 tonnes was landed in 2003. Further official landings data are not available, however, from the proceedings of the Port of Cairnryan HEO inquiry it is suggested that the fishery has landed between 8 and 16 tonnes of oysters annually and the annual turnover ranged from £19,600 to £56,700 between 2001 and 2005.

Location of the Fishery

Oysters (as spat) preferentially settle upon old oyster shell, other oysters or similar shell substrate. The area north of Leffnoll Point has a good supply of old oyster shell and other cultch (shell material). This area is shown on *Figure 15.1*. In other areas of the Loch, for example, near Stranraer, the bottom substrate is dominated by muddy habitats and less suitable for spat

settlement. Consequently, the areas north of Leffnoll Point and adjacent to the Scar are two of the main areas where oyster spat are known to successfully settle. Spat settlement success can be erratic and does not occur every year in Loch Ryan.

Figure 15.1 Main Oyster Beds

Current Status of the Fishery

As reported in the Port of Cairnryan Environmental Statement, the fishery currently lands between 8 and 16 tonnes of marketable oysters a year. Whilst oysters have historically been harvested from many areas of the inner loch basin; it is the area south of the Cairnryan ferry terminal around Leffnol Point where most of the native oysters are fished and managed.

Previous surveys

Three benthic surveys and drop video surveys were undertaken in order to inform the Port of Cairnryan EIA. Three separate benthic surveys were undertaken as part of this work and the results of the surveys highlight the presence of an oyster bed to the south of the P&O's ferry terminal at Cairnryan. The surveys undertaken confirm the known area of the commercial beds fished by Loch Ryan Shellfish as extending from the area around Leffnoll point northwards to a line roughly extending from Rosebank Cottage at southern limit of Cairnryan village.

The Fishing Process

Loch Ryan Shellfish currently operates the fishery with one boat, the Heamatopus. Following dredging from the Loch, the oysters of suitable size are landed and transported to Sussex where they undergo depuration prior to going to market. The oysters are then packaged and sold, with London being the main market.

Potential impacts

The oyster fishery is sensitive to a number of potential impacts during construction of the port facility. These are summarised below.

- Release of contaminants during dredging, including tributyltin (TBT).
- Degradation of habitat as suitable areas are covered in sediment released during dredging.
- An increase in total suspended sediment which can result in a reduced growth rate and potentially suffocation. As a rule of thumb, shellfisheries are advised to avoid sites with sustained suspended sediment concentrations which exceed 200 mg l [(1)].

Potential impacts during operation of the port facility relate to impacts on coastal processes including:

- tidal flow; and
- littoral current.

(1) Lockwood S. J. 1988, A provisional report on the potential impact of the proposed Severn tidal barrage on commercially exploited marine fish species. MAFF Direct. Fish. Research, Conwy (Mimeo).

15.3.2 Recreational Fishing

The fishing grounds within the Loch are subject to Inshore Fishing (Scotland) Act 1994 Sea Fisheries Prohibitions. Although the use of mobile gears within certain areas of the Loch is not permitted, static gears are used to catch crustacean species such as crabs and lobsters. These gears are predominantly used around rocky headlands at the Loch mouth. Most other fishing activity in this area comprises potting for lobsters and crabs.

Other than the oyster fishery, there is very little commercial fishing within Loch Ryan, the Loch being subject to the Inshore Fishing (Scotland) Act 1994 Sea Fisheries Prohibitions. Salmon netting is reported in Lady Bay in the north west of the Loch (1).

Recreational sea angling is popular around the Loch. Loch Ryan Sea Angling Association organises matches along the shorelines, with the Scottish Sea Angling championships held at Cairnryan in 2004. The main species caught by recreational fishermen include lesser spotted dogfish, codling, whiting, dabs, plaice, flounder, wrasse, pollock, bull huss, tope, conger eel, gurnards and bass. Angling is popular around the mouth of the Loch from April to November. The main fishing areas around the shore of Old House Point are described below.

- Old House Point – a shingle beach running out to weed and sand.
- Cairnryan Village - one mile of shoreline south of the village.
- Lighthouse Point, north of Cairnryan – a shingle beach running out to kelp beds then to clean gravel.

15.4 RESULTS AND IMPACT ASSESSMENT

15.4.1 Impacts during construction

This section considers the impact of the port facility on coastal processes in the context of fisheries within Loch Ryan. As Loch Ryan Shellfish is the only commercial fishery within the Loch, the impact assessment focuses on any impacts experienced at the main oyster beds from Leffnol Point north.

Chapter 7 Coastal Processes clearly demonstrates that the potential impacts of the proposed development at Old House Point on the Loch's hydrodynamic and sediment regime through construction and operational phases are restricted to impacts on the eastern side of the Loch. No significant impacts are considered likely to occur on the western side of the Loch. As a result, no further consideration is given to the oyster resources on the Scar or the west of the Loch.

(1) Port Port of Cairnryan Development Environmental Statement, November 2005

Capital Dredging

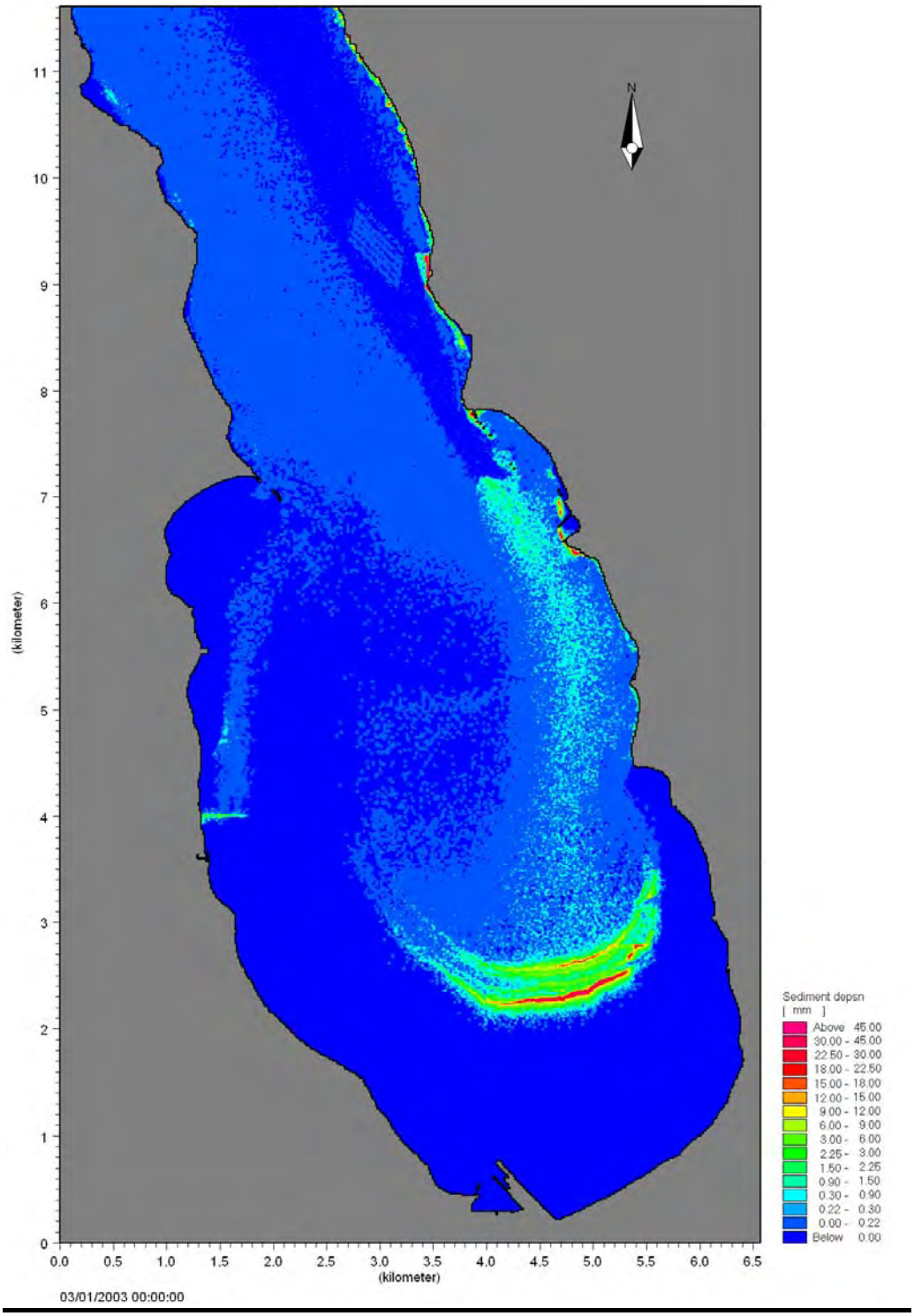
As discussed in *Chapter 2 Project Description*, *Chapter 7 Coastal Processes* and described in *Annex H*, sediment will be disturbed during the dredging of Areas 1, 2 and 3 (see *Figure 2.8*). Simulations were undertaken for two configurations of dredging activity, Areas 1 plus 3 and Area 2. This combination of simulations was used because of the dredging programme to reflect the 'worst case' situation in each case. Areas 1 and 3 were modelled together as there will be an overlap of approximately one week when both areas will be dredged simultaneously. It is important to note that the maxima values given for sediment deposition and suspended solids are calculated worst case. The reality is that it is unlikely that the maximum values will be reached and the peaks will be transitory and applicable for short periods of time.

The results of the hydrodynamic modelling of sediment deposition during dredging operations are shown on *Figures 7.1 to 7.4*. These show that during dredging at Area 1 and Area 3, the maximum depth of sediment deposited in the area between Leffnol Point and Cairnryan will be in the region of 0.45 – 0.90 mm. The average depth of sediment deposited will be less than 0.22 mm.

During dredging of Area 2 the maximum depth of sediment deposited on the oyster bed area will be less than 3 mm. The average depth of sediment deposited during dredging of Area 2 will be less than 0.30 mm. As shown on *Figure 7.5*, in the area between Leffnol Point and Cairnryan, the maximum deposition of sediment at the end of the dredging will not exceed 0.9 mm.

These results represent a small increase in the level of sediment deposited naturally in this area. This is not anticipated to result in a significant adverse impact on the suitability of the oyster habitat as oyster habitat over the dredge period.

Figure 15.2 *Depth of Sediment* **Deposition at the Completion of Dredging**



Figures 7.6 to 7.9 show the maximum and the average concentration of suspended sediment, in the bottom 0.5 metres of the water column, during dredging of Areas 1 and 3 and Area 2. During dredging of Areas 1 and 3, the maximum suspended sediment concentration around Leffnol Point will be below 200 mg l. The average concentration will be 40 – 60 mg l.

During dredging of Area 2, the maximum increase in suspended sediment will be below 200 mg l and the average concentration will fall between 40 – 60 mg l.

These high values are the result of re-suspension of previously deposited sediment and last for less than 30 minutes. A detailed assessment of the pattern of sediment deposition and suspended sediment concentrations over the tidal cycle is presented within the coastal process modelling report presented in *Annex H2.* Thus, the maximum concentration envelopes do not give an accurate assessment of the overall water quality during the dredging.

As discussed in *Chapter 7 Coastal Processes*, the natural level of suspended sediment in Loch Ryan was established through monitoring between February and April. This investigation found that the average value was around 9 mg l and that the maximum was 123 mg l.

During dredging, the level of the suspended sediment in the bottom of the water column in the area of the shell fish beds at Leffnol is generally less than 20 mg l above the back ground level with peak values of less than 150 mg l above the back ground level. These are values of suspended sediment concentrations which the oyster would experience naturally in the waters of the Loch. Dredging will be undertaken for a short duration of 20 weeks and temporary. The impact of increased suspended sediment in Loch Ryan is considered to be minor adverse.

Contaminants

A detailed analysis of contaminants contained within the Loch Ryan marine sediments has been undertaken and is set out in *Chapter 5 Sediment Quality*. These studies conclude that the quantity of contaminants within the areas to be dredged, are low and insignificant. No significant impacts to fisheries are expected to result from the release of contaminants.

15.4.2 Impacts during Operation

Tidal Regime

As discussed in *Chapter 7 Coastal Processes*, and described in *Annex H*, construction and operation of the port facility will not result in any significant impacts on the peak, mean or residual tidal flow conditions nor in the water levels around Loch Ryan. It is evident in *Figures 7.10 to 7.12* that the port facility will result in no impact on tidal velocity around the area around Leffnol Point and the main oyster fishery.

Waves

Impacts on the wave climate in Loch Ryan are fully discussed in *Chapter 7 Coastal Processes*, and in *Annex H*. From the results of the hydrodynamic modelling, shown in *Figures 7.15 and Figure 7.17*, it is evident that the new port

facility will result in no impact on wave height in the area around Leffnol Point and the main oyster fishery.

Littoral Current

Impacts on the littoral current in Loch Ryan are fully discussed in *Chapter 7 Coastal Processes,* and in *Annex H*. From the results of the hydrodynamic modelling, shown in *Figure 7.18*, it is evident that the new port facility will result in no impact on the littoral current in the area around Leffnol Point and the main oyster fishery.

Ferry Manoeuvres

The new port will eliminate the need for Stena Line's vessels to travel along the navigation channel to Stranraer harbour. As a result, the channel will no longer be maintained and will gradually infill. As the ferries pass along the channel the ships propulsion systems lift silt into the water column. When the ferry operation transfers to Old House Point there will be less sediment lifted into suspension in the southern part of Loch Ryan, which will mean that the sediment environment will return to a more natural state.

The Stena Line ferries will turn after leaving the new berths at Old House Point. These manoeuvres will be undertaken in an area where the seabed consists of coarse gravels which contain little or no fines. The impact of ferry manoeuvres at Old House Point on the level of suspended sediment in the waters of Loch Ryan which pass over the shellfish beds at Leffnol, will be insignificant.

The transfer of the ferry operations from Stranraer to Old House Point will have no detrimental impact on the water quality of the Loch and will have no significant impacts on fishing and aquaculture within the Loch.

Recreational Angling

As shown on *Figure 3.2*, the majority of the shoreline will be contained in the secure area to which members of the public will not have access. Anglers wishing to use Old House Point will no longer be able to reach this shoreline. Angling will still be possible to the south of the site.

Construction and operation of the port facility will result in the loss of a popular angling spot, however, other popular locations are available on the Loch including Lighthouse Point to the north of Cairnryan and to the south of Cairnryan village. The loss of access to the angling location at Old House Point is considered to result in a minor adverse impact.

15.5 MITIGATION

As discussed in *Chapter 2*, two types of dredger will be used, backhoe and trailer suction. The sediment in dredge Area 3 has a high percentage of sand

compared with Areas 1 and 2 which contain more gravel. The geological make up of the sediment in dredge Areas 1 to 3 is fully described in *Chapter 4, Ground Quality*. A backhoe dredger releases less sediment into the surrounding water than a suction trailer dredger. For this reason a backhoe dredger will be used whilst dredging the sandy material found in Area 3 and a trailer suction dredger used for Areas 1 and 2. This will result in the release of less sediment than if a suction dredger was used for all Areas and will minimise any potential adverse impacts on the shell fishery.

The dredging of Area 3, which contains soft silt and sand, will be timed to avoid the oyster spatfall season as far as practicable. Should dredging of this area be required during the spatfall season, appropriate mitigation measures will be agreed with SEPA and FRS and following consultation with relevant stakeholders, to ensure that there are no significant adverse impacts to the oysters.

The period of overlap, when Area 1 and Area 3 are being dredged at the same time, has been minimised in the construction programme. These measures will reduce the period during which high levels of suspended sediment are experienced during construction

Monitoring of suspended sediment, during and post construction, will ensure any potential impacts on the oyster fishery are identified and that suitable mitigation measures are implemented. The monitoring programme will be designed in consultation with FRS and SEPA. It is anticipated that as part of the FEPA conditions trigger limits will be set at which dredging will continue at a reduced rate, or be stopped.

15.6 RESIDUAL IMPACTS

Residual impacts are considered to be those that remain moderate or major after mitigation has been implemented. In the case of fisheries and aquaculture, the mitigation measures set out above will ensure that impacts on fisheries that remain are, at worst, considered to be minor adverse.

The modelling of the sediment disturbed during capital dredging works demonstrates that Old House Point is sufficiently far north to significantly affect the Loch Ryan oyster fisheries.