

Gate 3

Liverpool Cruise Terminal



LIVERPOOL CRUISE TERMINAL

Fishing Activity Technical Note

April 2019

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Fishing Activity Technical Note

Undertaken by
Brown & May Marine Limited

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Glossary

Term	Definition / Description
AIS	Automated Identification System
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries Conservation Authority
I-VMS	Inshore Vessel Monitoring System
NW-IFCA	North-western Inshore Fisheries Conservation Authority
MMO	Marine Management Organisation
VMS	Vessel Monitoring System

1.0 Introduction

This report has been prepared by Brown and May Marine Ltd (BMM) and provides a baseline characterisation of fishing activity in the River Mersey, with a particular focus on areas relevant to the redevelopment of the Liverpool Cruise Terminal (the Development). In addition, the report considers the potential for works associated with the Development to result in impacts on fishing activities.

For the purposes of this report only fishing activities undertaken by commercial fishermen (defined as fishermen that capture finfish and shellfish from a licensed fishing vessel to be sold for profit) and those carried out by charter boat operators are considered.

1.1 Project Background

The existing cruise terminal was opened as a “stop-off” only terminal in 2007, before being licensed for “turnaround” cruises with the addition of temporary facilities in (BBC, 2012). To cater for anticipated growth in the cruise sector (both in vessel size and passenger numbers), the temporary terminal is to be redeveloped with permanence in mind.

The following construction and maintenance activities are anticipated in relation to the Development:

- the demolition of the existing timber and concrete decked jetties (known as Princes Jetty);
- the construction of a reinforced concrete suspended deck together with the creation of a new terminal building, with a gross floor area of approximately 10,000m², for use as a baggage hall, passenger lounge(s) and other associated facilities;
- the construction of a vehicular and pedestrian linkspan bridge approximately 85 metres in length connecting the new terminal building with the existing landing stage;
- the construction of a new floating pontoon approximately 20 metres in length connecting the new linkspan bridge with the existing landing stage;
- modifications to the existing landing stage, including the removal and relocation of the existing pilot boat launch facility, works to the existing walkway cover, the existing lower terminal buildings and the existing linkspan bridge; and
- the removal of existing and the construction of new steel mono pile mooring dolphins.

1.2 Study Area

The Mersey is predominantly a sandy estuary, with fine sediment occurring in places along its inner margins (Ridgway *et al.*, 2012). The banks of the Mersey estuary are subject to major industrial centres (e.g., Liverpool, Birkenhead, Bromborough, Ellesmere Port, Runcorn), whilst further inland the river drains highly urbanised catchment areas such as Manchester and Stockport (amongst others).

The Development is located on the east bank of the Mersey, centrally in Liverpool’s UNESCO (World Heritage Buffer Zone Site) accredited waterfront. Figure 1 provides a view of the Development site (Figure 8 in Appendix 8.1 provides an alternative view). At this locality the river is approximately 970m wide (Aecom, 2017) and is considered to represent the narrowest part of the estuary.



Figure 1: Development area (image courtesy of Peel Land and Property (Ports) Ltd – provided by Liverpool City Council)

1.3 Data and Information Sources

The baseline characterisation of fishing activity presented in this report has been derived from a range of sources of data and information. These are described in Table 1 including information on the limitations/sensitivities of each data source used. Sources are listed in order of relevance to the report.

It should be noted that given the limitations of the available fisheries data and information to characterise fishing in discrete, small inshore areas such as that where the Development is to be located, the undertaking of direct consultation with fisheries stakeholders has been of critical importance to help inform the fisheries baseline.

The consultation undertaken is described in detail in Section 2.0.

Table 1: Data and information sources

Data	Year	Description
Fisheries Stakeholder Consultation	2018	Consultation with a range of fisheries stakeholders to gather site specific information on fishing activities undertaken by commercial fishermen and chartered boats in the Mersey.
Automated Identification System (AIS)	2017 – 2018	AIS for four of the charter boats operating on the Mersey has been used to inform the characterisation of the fisheries baseline. AIS data was sourced from Big Ocean Data by BMM. It should be noted that there is no requirement for small vessels to carry AIS transponders and as transmissions may be turned off, the data may only provide partial coverage of a vessel’s positions.
Marine Management Organisation (MMO) Landings Data	2012 - 2016	<p>The MMO records landings data at the ICES rectangle scale (c.30 x 30 NM at UK latitudes).</p> <p>Given the large geographical scale at which the data are collected and the comparatively small and localised area of the Development, MMO landings do not provide a representative indication of fishing activity in the area of the Development.</p> <p>The dataset is however useful to identify the principal species which are landed in the wider area surrounding the Development and the seasonality of the landings.</p>
North Western Inshore Fisheries & Conservation Authority (NW-IFCA)	2014 – 2018	Sightings of charter and commercial vessels recorded by IFCA Conservation Officers on the Mersey. Data does not provide a comprehensive overview of the level of activity as sightings are limited to times when officers are present in the area.
MMO Surveillance Sightings	2001 - 2015	A dataset based on MMO surveillance sightings from periodic flyovers and vessel inspections. Does not accurately describe the levels of fishing activity, but gives an indication of the overall distribution of fishing by fishing method. As shown in Appendix 8.2, the area where the Development is located does not appear to be surveyed by the MMO, hence this dataset does not provide useful information to characterise the baseline in the localised area of the Development.

2.0 Consultation

Consultation meetings were undertaken with a range of fisheries stakeholders in November 2018 to obtain information on preferred fishing areas and operating patterns and to discuss potential concerns relating to the Development. A list of consultees, along with dates of meetings is provided in Table 2.

Table 2: Consultation undertaken with fisheries and relevant stakeholders

Consultee	Role, Organisation	Date / Method
Charter Boat 1	Charter Boat Skipper	22/11/2018; Meeting in Rhyl
Charter Boat 2	Charter Boat Skipper	22/11/2018 Meeting in Rhyl
Charter Boat 3	Charter Boat Skipper	23/11/2018 Meeting in Liverpool
Charter Boat 4	Charter Boat Skipper	23/11/2018 Meeting in Liverpool
Charter Boat 5	Charter Boat Skipper	23/11/2018 Meeting in Liverpool
Fisherman 6	Commercial Fisherman	23/11/2018 Meeting in Liverpool
Fisherman 7	Commercial Fisherman	23/11/2018 Meeting in Liverpool
Fisherman 8	Former Commercial Fisherman / entering charter boat business	23/11/2018 Meeting in Liverpool
MMO	Marine Enforcement Officer	23/11/2018 Meeting in Liverpool
NW IFCA	Marine Officer	19/11/2018 Telephone conversation
Peel Ports	-	Contacted by both email and phone. No response received.
Liverpool Pilot Services	-	As above

3.0 Fisheries Baseline

3.1 Overview

Whilst the Mersey saw a decline in commercial fishing activity in the mid-1900s (Jones, 2006; Porter, 1973) due to pollution from industrial activity in surrounding cities (Potts & Swaby, 1993); significant improvements in water quality since the 1970/80s (NRA, 1995) have resulted in the recovery of fish populations which currently support commercial fishing and charter boat operations.

From consultation with fisheries stakeholders (Section 2.0) it is understood that up to ten charter boats are active in the area at varying degrees. Of these, six operate on a full-time basis. In addition, two commercial fishermen are known to operate in the Mersey.

The commercial fishermen primarily target cod, bass and flatfish (flounder, plaice, sole, dab, brill and turbot) within the bounds of the Mersey whilst some potting for shellfish occurs beyond the river mouth. In addition to the aforementioned species, charter boats frequently catch species such as ling, conger eels, pollack, gurnard, rays, tope, whiting, bull huss, lesser spotted dogfish, smooth hound, mackerel, and pouting.

3.2 Vessels and Operating Practices

3.2.1 Commercial Fishermen

The two commercial fishermen identified during consultation as active in the Mersey operate a range of fishing gears from small vessels (multipurpose vessels, 5 to 6 m in length). A summary of the specifications of the vessels used by these two commercial fishermen is given in Table 3.

Gear deployed within the Mersey includes hook and line, long line and gill nets; with pots/creels being deployed beyond the river mouth (see Appendix 8.3 for further information on these techniques).

Commercial fishermen reported that they had recorded 32 different fish species in the Mersey, whilst the majority of their earnings (from fish within the Mersey) come from cod, bass and flatfish. Flounder in particular constitute a significant proportion of their catch at present, with approximately 30 tonnes reported to have been caught in the river within the last year by one of the fishermen consulted.

Table 3: Vessel specifications and summary of fishing activity reported by commercial fishermen during consultation

Vessel Specifications	Fisherman 1	Fishermen 2
Length (m)	5	6
Beam (m)	2	2.4
Engine (HP)	28	80
Range (miles)	6	15
Crew	2	2
Fishing Activity		
Days spent fishing per year	c.200	c.130
Days fishing the Mersey per year	c.200	c.130
Days at sea allocation	212	130
Typical trip duration	4-12 hours	4-12 hours
Principal fishing methods	Drift/Static nets, rod & line	Nets, rod & line, pots

3.2.2 Charter Boats

From consultation with charter boat operators it is understood that there are six full-time charter boats operating in the area.

Of these, two operate from Liverpool all year round, whilst three only operate from Liverpool between November to March being based out of ports in North Wales for the rest of the year. The sixth boat has been operating from Plymouth and other UK locations in summer months in recent years, however the intention to operate all year round from Liverpool in future years was noted during consultation.

In addition to the full-time vessels noted above, up to 3-4 charter vessels are thought to operate out of Liverpool on a part-time basis. In addition, the intention for a new vessel to enter the charter boat market was noted during consultation.

Charter boat activity within the Mersey is constrained by tidal influences. Firstly, the tidal lock at Liverpool Marina dictates sailing times, whilst their ability to fish is limited to conditions below 29ft

tides due to the strength of tidal flow. As a result, trips usually run 9-10 days straight followed by a couple of days off. A stricter “week on: week off” schedule to work around the spring tides was reported by some of the skippers consulted.

Whilst from consultation it is understood that fishing occurs within the Mersey year-round, the level of dependency on the river estuary would be expected to be higher over the winter. As outlined on the websites of various of the charter boats active in the Mersey, during the summer, trips are offered for wreck and reef fishing and therefore outside of the Mersey. It is understood, however, that charter vessels based in Liverpool may stop off within the Mersey on the way out to/back in from offshore grounds.

The year-round activity of charter vessels in the Mersey was also noted by the MMO during consultation, as well as the fact that activity during the summer generally extends to Liverpool Bay, including areas near the wind farms and beyond. This is broadly supported by the observation data (Appendix 8.4) provided by the NW-IFCA which show that between 2014-2018 charter boats have been observed in the Mersey year-round but with marginally more activity observed over the winter months (Figure 15).

Vessel details and operating practices reported by charter boat skippers during consultation are summarised in Table 4.

Table 4: Vessel specifications and summary of fishing operations reported by charter boat skippers during consultation

Vessel Specifications	Vessel 1	Vessel 2	Vessel 3	Vessel 4	Vessel 5
Length (m)	10	13.5	10.5	10	8
Beam (m)	5	4.87	4.1	3.6	4
Engine (HP)	500	615	320	450	400
Range (miles)	/	60 mile-Cat2	60 mile-Cat2	/	/
Crew / Passenger Capacity	/	12 + 2 crew	12	12	12
Charter Operations					
Days spent fishing per year	c.150	c.180	c.85	c.180	c.180
Days fishing the Mersey per year	c.150	c.85	c.85	c.45	c.45
Typical trip duration	10 – 12 hrs	9 – 12 hrs	8 – 10 hrs	9 hrs	5 – 12 hrs
Principal fishing methods	Rod & Line	Rod & Line	Rod & Line	Rod & Line	Rod & Line

3.3 Principal Fishing Grounds / Fishing Locations

3.3.1 Commercial Fishermen

Fishing grounds in the vicinity of the Development, as derived from consultation with local commercial fishermen known to be active in the Mersey, are shown in Figure 2.

One of the commercial fishermen consulted reported that he fishes the entire geographical expanse of the Mersey Estuary – from Runcorn up to the river mouth. Potting is also reported to be undertaken beyond the river mouth.

The distribution of species making up the principal catches (bass, cod, and flatfish) were reported to be fairly even across the identified grounds, although flounder in particular is understood to be caught in greater numbers within the inner reaches of the estuary.

From consultation with the MMO, it is understood that fishing activity by these vessels, given their small size and associated operational range, is highly weather dependent and confined for the most part to inshore areas close to shore (i.e. within the 6nm limit and generally within the Mersey).

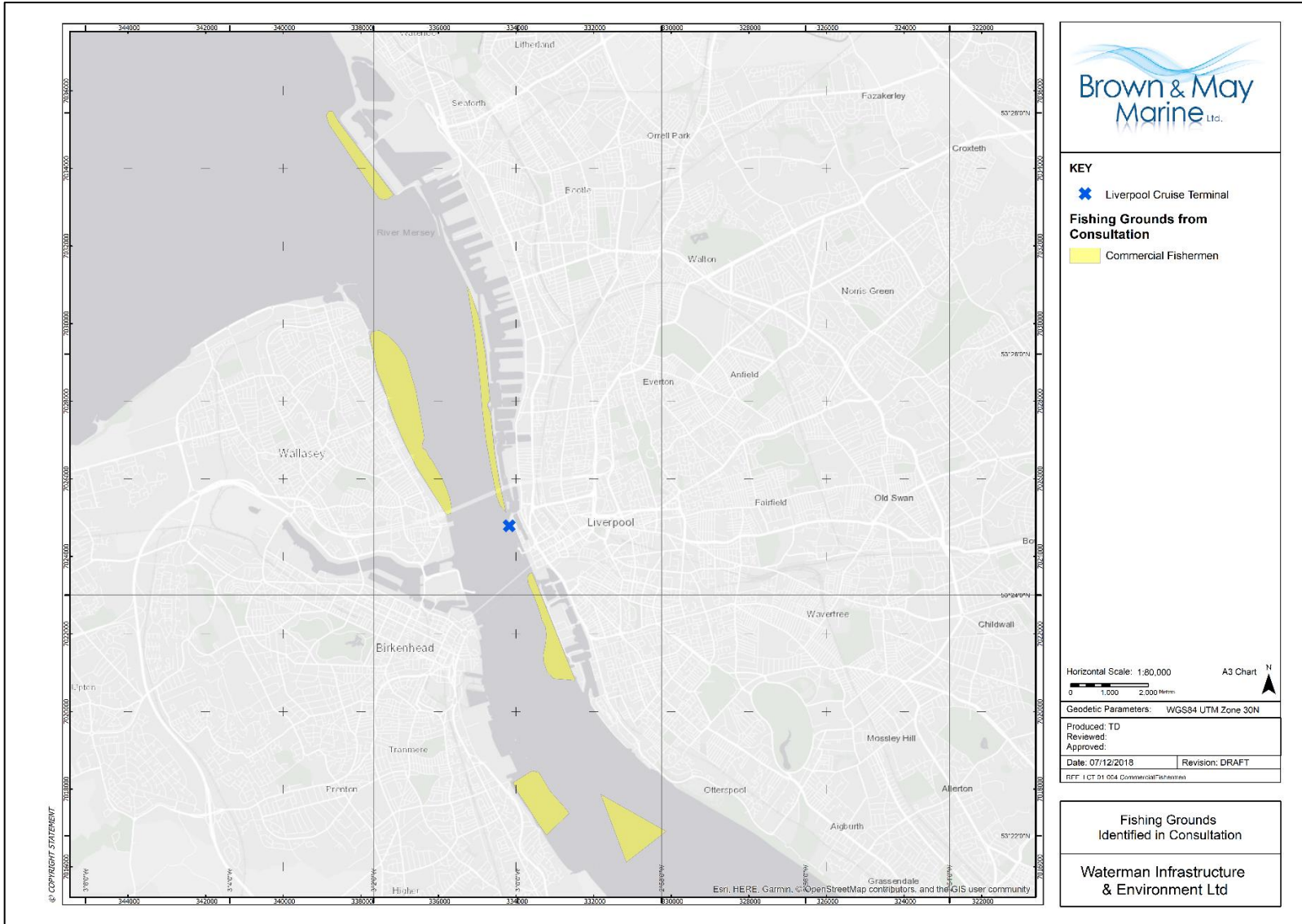


Figure 2: Main fishing grounds in the vicinity of the Development as identified by commercial fishermen during consultation

3.3.2 Charter Boats

Fishing locations in the vicinity of the Development, as derived from consultation with local charter boat operators, are shown in Figure 3. Weather permitting, summer trips (April – September) will typically go beyond the bounds of the Mersey, stopping off within the Mersey on route to or from these grounds. Trips may also operate within the Mersey during the summer, if requested by clients (it was noted that these are cheaper trips due to reduced fuel expenditure).

Charter boat skippers consulted noted that besides the increased availability of cod in the Mersey during the winter months (October – March), fishing within the Mersey at this time of year benefits from the ‘weather sanctuary’ provided by the geography of the estuary, which is also occasionally called on during the summer season.

An indication of the spatial patterns of operation of four of the charter boats known to be active in the Mersey are given in Figure 4 and Figure 5 based on AIS tracks for November 2017 – November 2018.

In correlation with the information gathered during consultation, the charts suggest a heavier reliance on / use of the Mersey Estuary over the winter months (October to March); particularly in the case of two of the vessels (Figure 5) which operate from Rhyl during the summer.

The AIS for one of the vessels can be seen to go off chart (Figure 4) which coincides with information imparted by the vessel’s skipper in consultation (operates elsewhere in the UK for periods of the year), whilst the blue line to the south-east relates to an AIS return ‘pinged’ from near Rostock in the Netherlands which is understood to be an error.

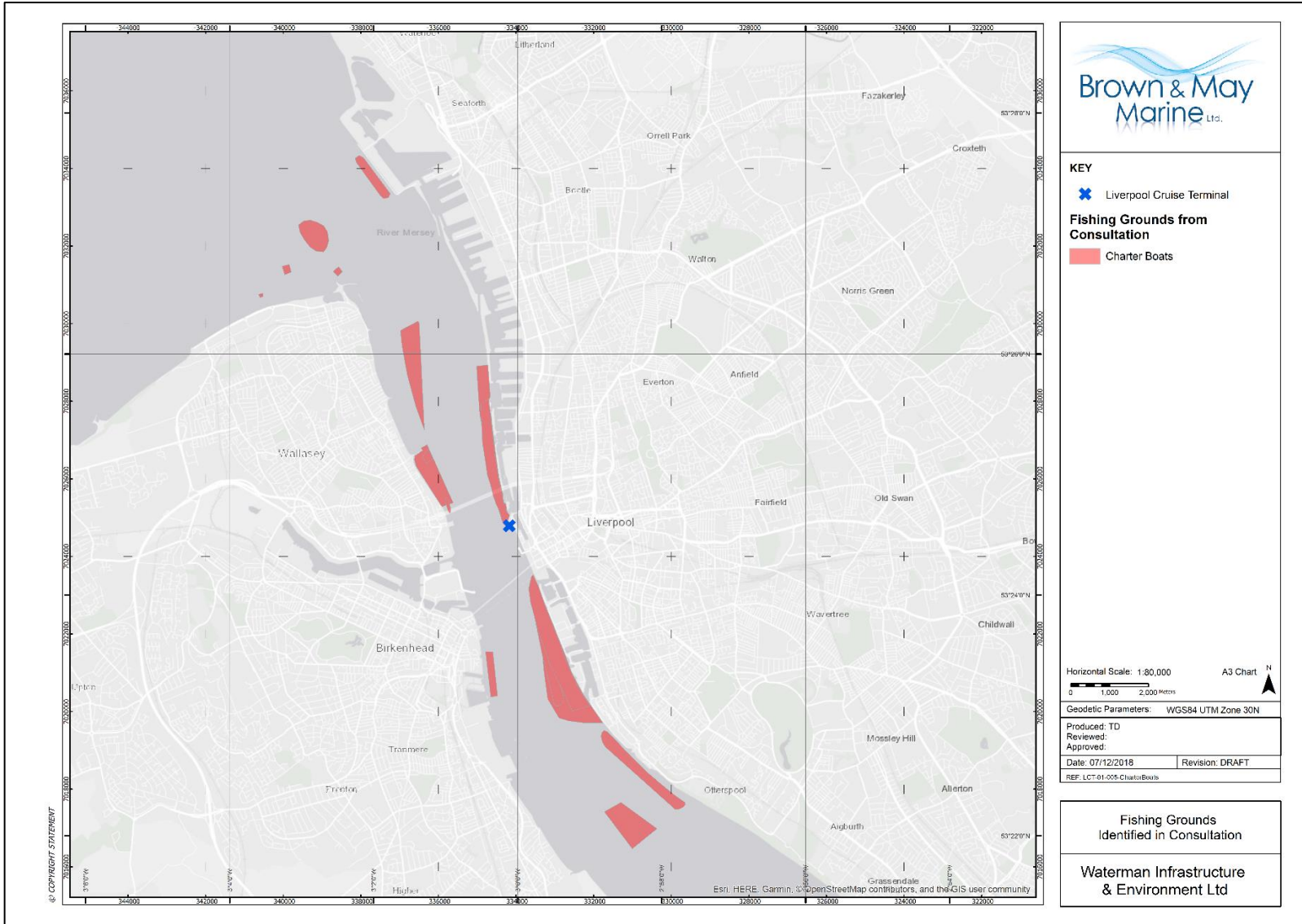


Figure 3: Main fishing grounds in the vicinity of the Development as identified by charter boat operators during consultation

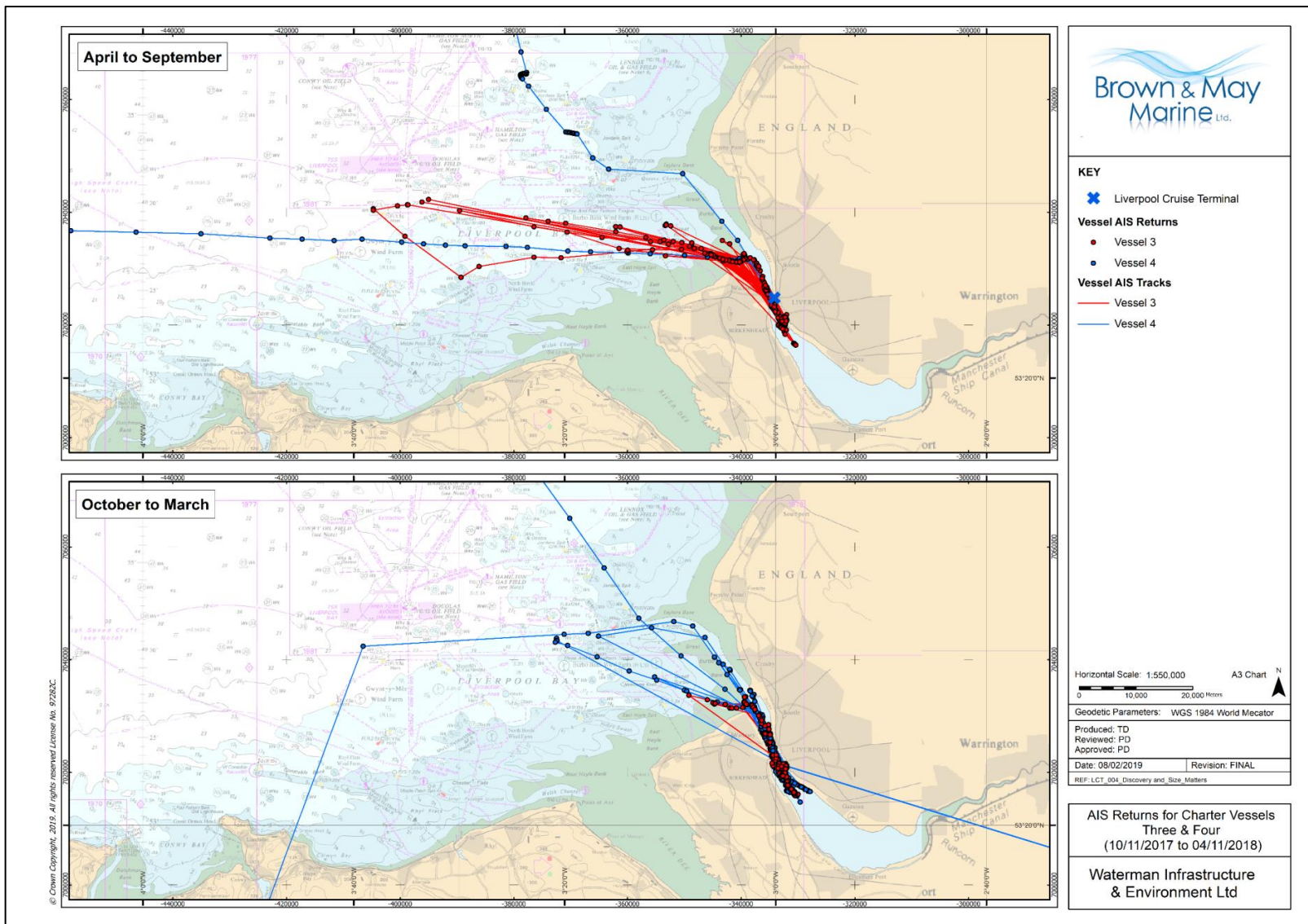


Figure 4: AIS returns showing operations of charter boats over the past year (Nov 17 – Nov 18)

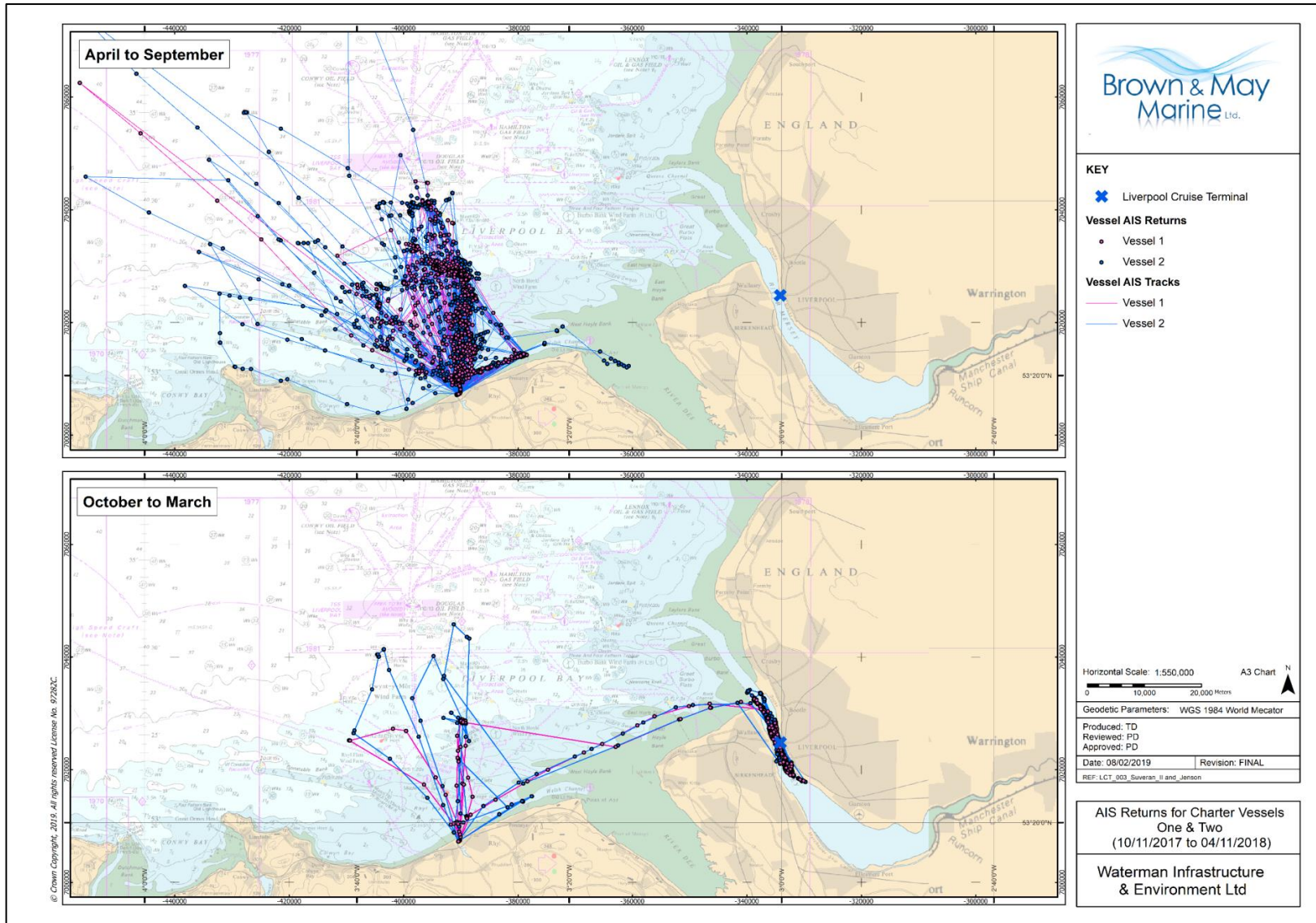


Figure 5: AIS returns showing operations of charter boats over the past year (Nov 17 – Nov 18)

3.4 Seasonality by Species

Commercial fishermen reported the following seasonality for their catches within the Mersey:

- Bass: March – November;
- Cod: October – May;
- Flatfish: March – January.

As previously mentioned, charter boat winter fishing (October – March) is primarily focused on cod within the bounds of the Mersey Estuary. A claim to fame is the European Cod Championship which is regularly held in Liverpool during this time. Other common winter catches include whiting, dabs and thornback rays.

Charter boat summer species can include: ling, conger eels, pollack, gurnard, rays, tope, whiting, bull huss, dogfish, smooth hound, dabs, plaice, turbot, bass, mackerel, pouting, coley, and flounder. It should be noted that this seasonality is not clear-cut and species may be caught outside of their primary season.

MMO landings data for the ICES rectangles where the Development is located (Figure 6; 35E6, 35E7¹) and adjacent rectangles (36E6, 36E7) have been analysed to provide an indication of the general seasonality of some of the key species targeted by both commercial fishermen and charter boats in the Mersey (Figure 7).

A clear correlation is evident in the presence of cod during the winter and the Mersey cod fishery with other species more broadly present over the summer months when they are also targeted outside the bounds of the Mersey Estuary.

¹ Note that no landings of fish species have been recorded in the MMO statistics in rectangle 35E7 in the period under consideration and therefore data for this rectangle has not been included in Figure 7.

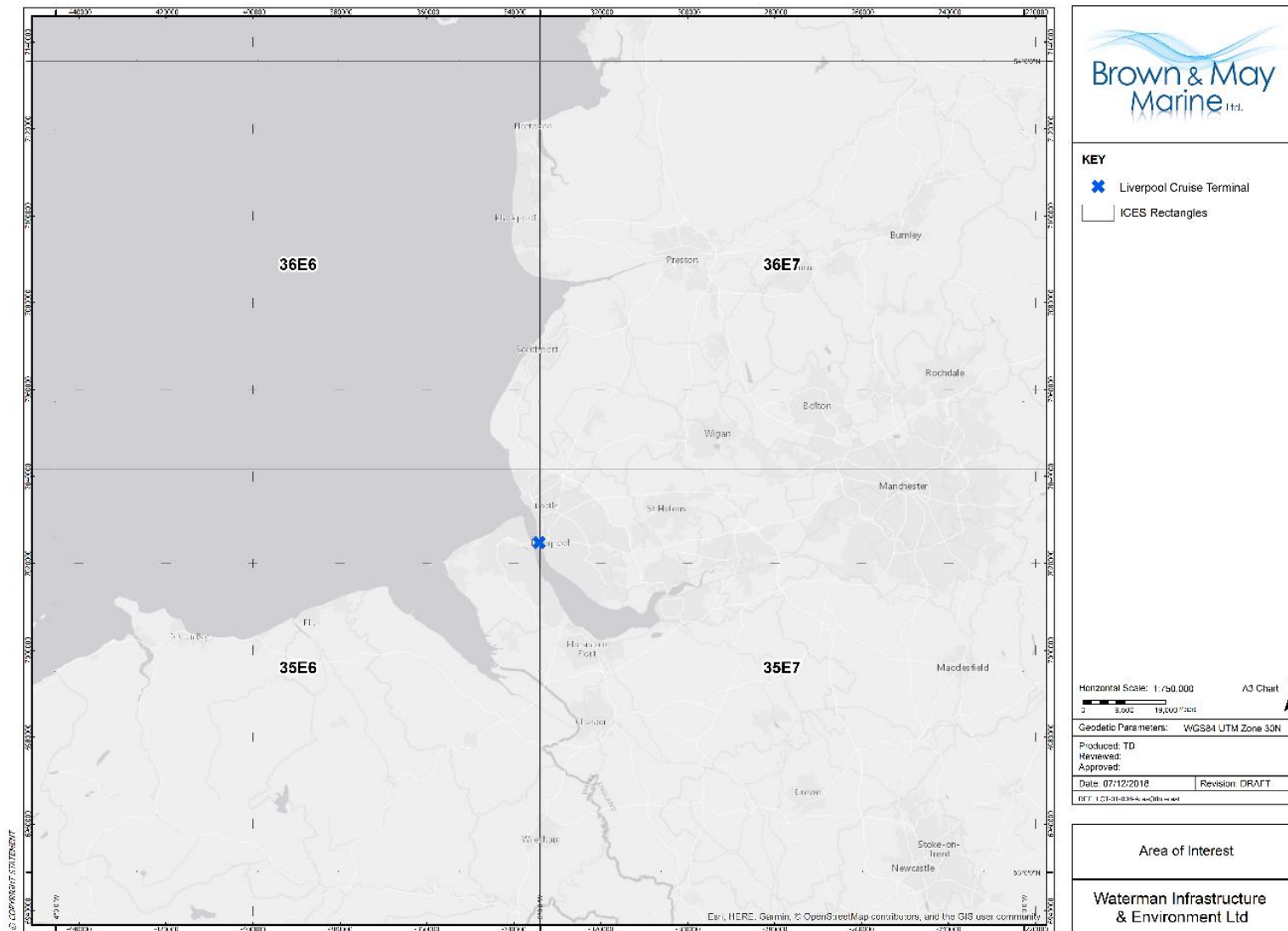


Figure 6: Area of interest showing ICES rectangles and location of the Development

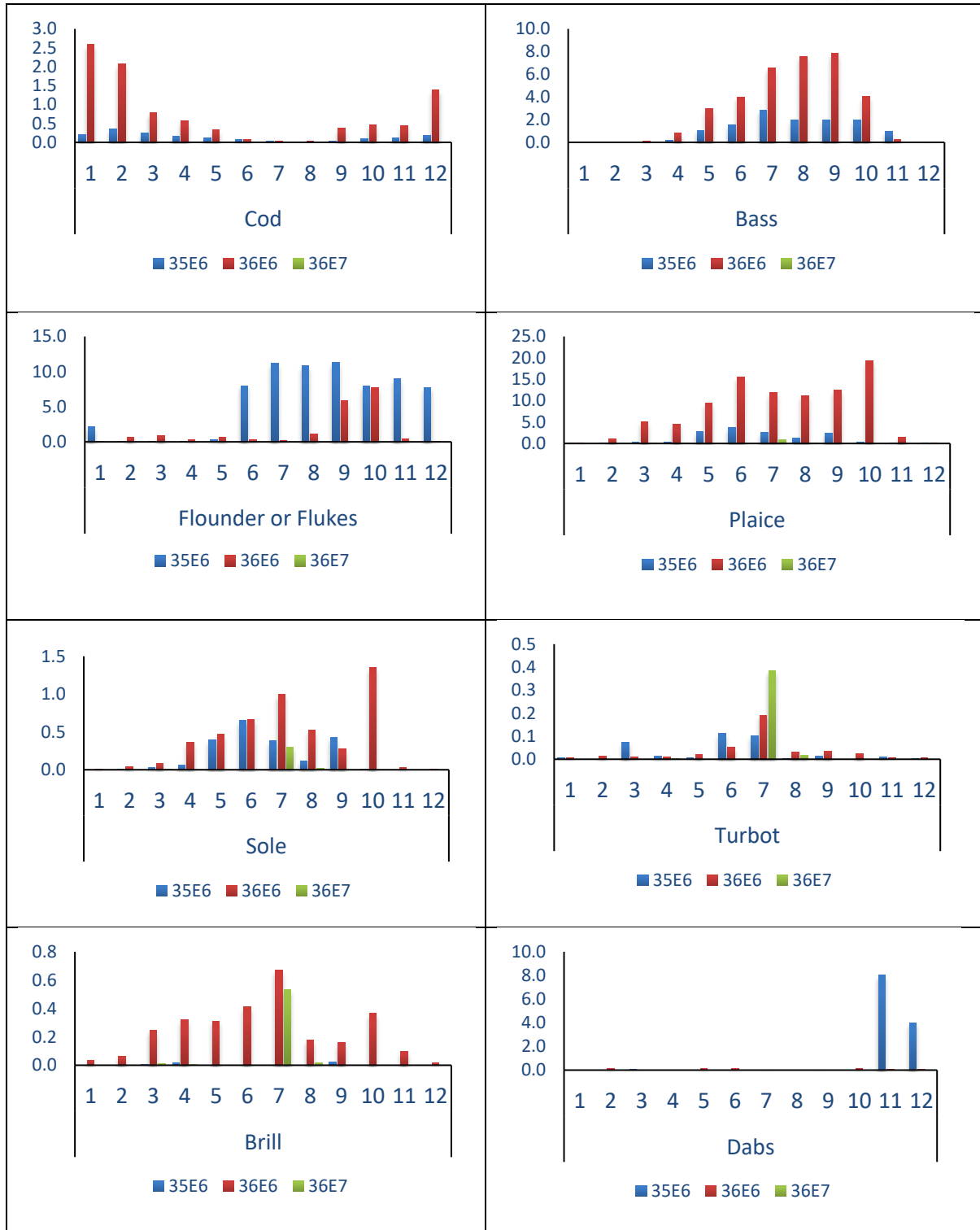


Figure 7: MMO average (2012-2016) monthly landings (tonnes) by ICES rectangle

4.0 Key Concerns Raised by Stakeholders

From consultation with commercial fisheries stakeholders, it is understood that the key issue of concern is piling noise, particularly that associated with impact piling which is perceived to have adversely affected fisheries in the wider area following other developments, particularly offshore wind farm developments such as Gwynt-Y-Mor and Burbo Bank and the L2 Seaforth Container Terminal.

A summary of the rationale for stakeholders’ concerns is provided in Table 5.

Table 5: Concerns raised by stakeholders during consultation

Impacts of Concern
Underwater noise could create a “barrier” across the extent of the Mersey that could stop fish penetrating further upstream.
Concern that piling noise can scare fish kilometres away – in line with studies on the effects of noise from impact piling, such as that associated with offshore wind farm construction activities.
Some of the best cod grounds are located in the immediate vicinity of areas where piling may take place. At the Development site, the seabed is made up of mussel beds, hard ground and sandstone which support spawning cod in an area considered to be one of the best fishing spots for cod in winter and fishing for smooth hound, rays and conger in summer.
It is perceived that if catches in charter boats are reduced as a result of underwater noise, word would get out (an effect amplified by social media) that fish are not being caught resulting in an impact on bookings and/or client satisfaction.

5.0 Potential Impact of the Development on Fishing Activity

As noted above (Section 4.0), of key concern to fisheries stakeholders is the potential for underwater noise associated with the installation of the piles at the Development. Concern regarding piling noise has resulted in a number of fisheries stakeholders taking objection to the Development.

In this context it is important to note that since the publication of the Development’s Environmental Statement (ES), and taking account of the concerns raised by fisheries stakeholders, the project construction design has been revised and impact piling is no longer considered an option in relation to the installation of the piles. Lower noise generating methods have been proposed instead and their impact on fish has been assessed in Chapter 13 of the 2019 ES Addendum. In addition to noise associated with pile installation, the updated Addendum chapter considers noise resulting from the removal of the current piles and from increased vessel traffic during the works.

In respect of pile installation, the method currently considered and included for assessment in Chapter 13 of the 2019 ES Addendum is rotary piling (drilling) of the steel tubular piles. It should be noted that this construction method is much quieter than either percussion (impact) piling or vibro-piling.

With regards to pile removal, for the purposes of the assessment presented in Chapter 13 of the 2019 ES Addendum, the assumption was made that piles may be removed using vibro-extraction. Pile removal using this method would generate noise levels lower than those resulting from pile installation, however, in the absence of available noise measurements for pile removal using this technique, and taking a conservative approach, the assessment in Chapter 13 was based on source noise levels for installation of piles by vibro-piling. Note that vibro-extraction of piles is only anticipated to be used for 50% of the piles or less. In addition, pile extraction would be expected to occur within a window from 1st May to 18th October 2019 (24 weeks) and therefore for the most part would avoid the main cod fishing season.

Considering the noise levels associated with the activities identified above (vessel noise, vibro-piling and rotary drilling) the assessment presented in the updated Chapter 13 concluded that the impact of underwater noise on fish would be of negligible significance. This took account of the localised areas where behavioural impacts are likely to occur as a result of noise from the proposed activities (i.e. the relative risk of behavioural effects would be highest within tens of metres from the noise source, with lesser risk of impact beyond this distance). In addition, it considered the intermittent and temporary nature of pile installation and removal activities, noting that there would be extensive windows each day where no vibro-extraction or drilling activity would be undertaken.

From the information provided above it is apparent that there would be little potential for noise associated with construction works to result in a significant impact on the commercial and charter boat fisheries active in the Mersey.

It is recognised that behavioural impacts on fish could result in changes in the distribution of target species and that this could in turn affect fishing operations. However, as described in Chapter 13 of the 2019 ES Addendum, the areas where it would be likely that the noise levels reached could trigger behavioural responses, would be very small. Furthermore, considering the localised area of impact and the width of the estuary in the area of the Development (approx. 970m) underwater noise would not be expected to result in a barrier to fish movement in and out of the estuary.

Taking the above into account together with the extent of areas that the charter and commercial fishermen target in the Mersey (Figure 2 and Figure 3) it is not anticipated that commercial or charter boat fishing activities would be affected significantly by the proposed works.

6.0 Mitigation and Monitoring

As discussed in Chapter 13 of the ES Addendum, rotary drilling has been implemented as an inherent mitigation measure to minimise the levels of noise and vibration during construction of the Development. Considering this, together with the information provided in Section 5.0 and in Chapter 13 of the 2019 ES Addendum, further mitigation measures in respect of potential impacts on fish species in the Mersey and on the fisheries that target them, are not deemed necessary.

With regards to monitoring the following is proposed:

- Conduct underwater noise monitoring during demolition/construction phases, as appropriate.

7.0 References

- Aecom (2017) *GI Survey Impact Assessment & Mitigation Planning Memo 14 November 2017*.
- AECOM (2018) *Liverpool Cruise Terminal Navigational Risk Assessment*.
- BBC (2012) *Cruise liners to start and end voyages in Liverpool - BBC News*. [Online]. 2012. BBC News. Available from: <https://www.bbc.co.uk/news/uk-england-merseyside-18152504> [Accessed: 16 November 2018].
- Jones, P. (2006) Water Quality and Fisheries in the Mersey Estuary: a historic perspective. In: *Breathing New Life into the Mersey*. p.
- Koschinski, S. & Lüdemann, K. (2013) *Development of Noise Mitigation Measures in Offshore Wind Farm Construction 2013*. [Online]. Available from: www.riffgat.de [Accessed: 4 December 2018].
- NRA (1995) *NRA-Water Quality Series 23: The Mersey Estuary - a report on Environmental Quality*. [Online]. Available from: <http://ea-lit.freshwaterlife.org/archive/ealit:4093/OBJ/20002960.pdf> [Accessed: 10 December 2018].
- Porter, E. (1973) *Royal Commission on Environmental Pollution 1973, Pollution in four industrialised estuaries: studies in relation to changes in population and industrial development: four case studies undertaken for the Royal Commission on Environmental Pollution*. In: H.M.S.O, London. p.
- Potts, G.W. & Swaby, S.E. (1993) The Fishes of the Mersey Estuary. In: *Review of the Status of Estuarine Fishes*. Issue 34 of English Nature research reports. p.
- Ridgway, J., Bee, E., Breward, N., Cave, M., et al. (2012) *The Mersey estuary: sediment geochemistry*. [Online]. (RR/10/02. ISBN 978 0 85272 711 9.). Available from: <http://nora.nerc.ac.uk/id/eprint/17065/1/RR10002.pdf>.

8.0 Appendices

8.1 Alternative View of Development Area

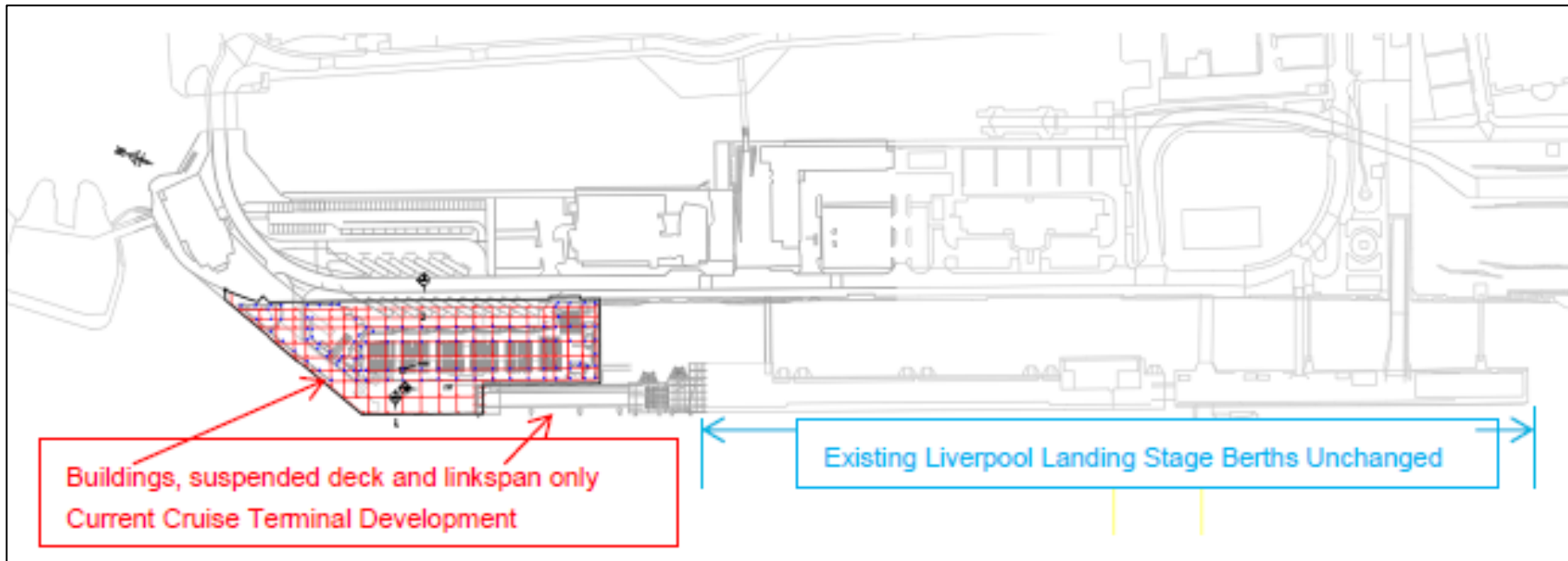
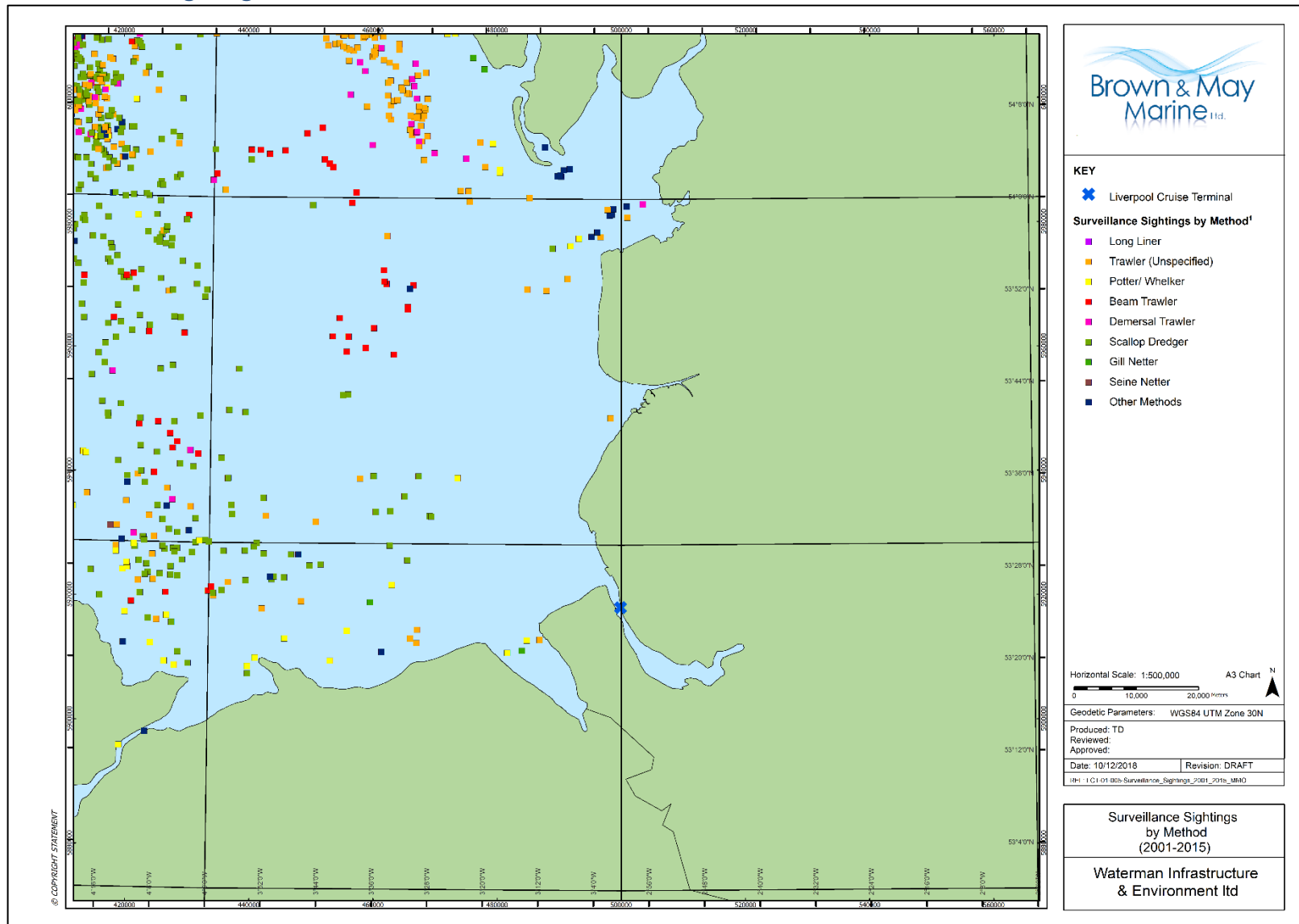


Figure 8: Development Area (image from Navigational Risk Assessment (Ref: LCT-ACM-XX-GE-RP-MT-00002))

8.2 MMO Surveillance Sightings



8.3 Gear Types and Operating Practices

8.3.1 Hook & line

This is fishing in its most basic form and most popular for angling (charter boat) use. A single baited (or imitation lure) hook is attached to a weighted monofilament line that is released or cast from a spool on a rod. Boat rods are typically shorter and stouter rods geared to the rigours (the fight) of course/game fishing whilst longer rods (beachcasters or pier rods) may be used for greater leverage when casting. Long range casting is not normally carried out from charter boats for safety reasons whilst the ability of the vessel to anchor / remain in the desired located reduces the need for long range casting.

8.3.2 Gillnets

Gillnets (Figure 9) which can be either fixed or drifting, are a series of monofilament nets joined together to form fleets which can be up to 1500 m in length. Fishermen in the Mersey reported that upto four nets are deployed per fleet which are soaked for 5-24 hours. Leaded lines are used attached to anchors at each end that are marked with floats/flags. These may be deployed at different heights within the water column.

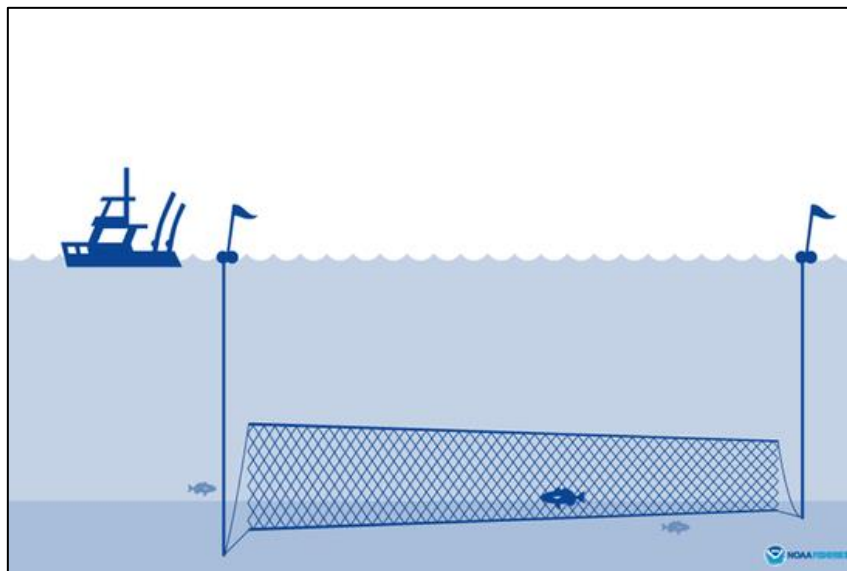


Figure 9: Gillnet (Source: NOAA Fisheries)

8.3.3 Longlining

Longlining involves a main line onto which a series of baited hooks are attached via snoods at set intervals (Figure 10). Longlines can be anchored or drifting and used to target demersal or pelagic species.

From consultation with Commercial Fishermen it is understood that 30 m main lines with c.10 m branch lines are deployed with the tide. These are baited with sandeels or razer fish and left to soak for 3-5 hours.

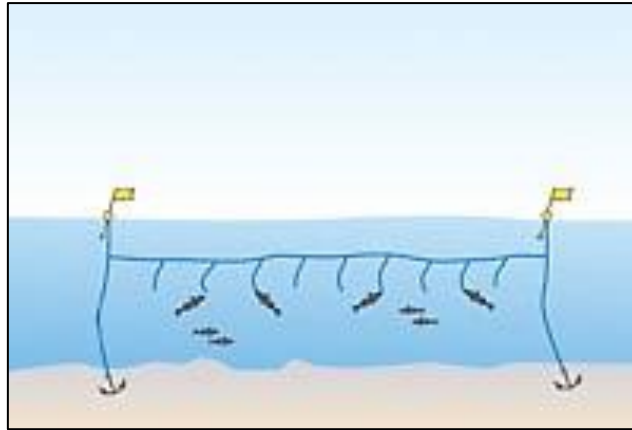


Figure 10: Longlining (Source: Sustain 2018)

8.3.4 Potting / Creeling

Potting and trapping for crab, lobster and whelks is understood from consultation to occur outside the mouth of the Mersey Estuary. Although the design of pots may vary depending on region and target species. In general, all pots have one or more “funnel” shaped entrances for the shellfish to enter.

Whilst multiple pots may be deployed on single lines (referred to as fleets), due to the small nature of the inshore vessels operating in the Mersey area, single weighted pots (measuring 1.2m by 0.5m) with floats tend to be deployed. From consultation it is understood that pots are typically deployed (soaked) for 3-4 days.

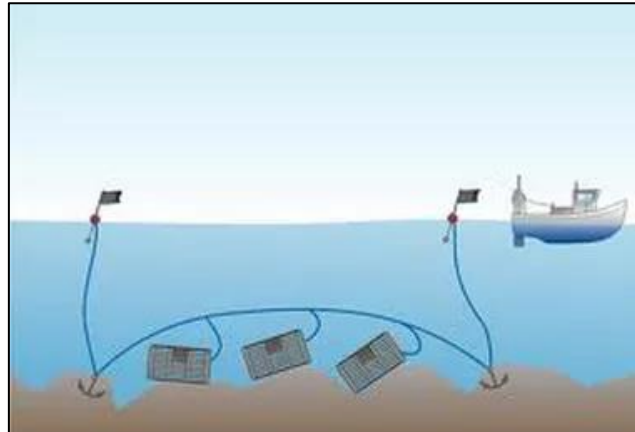


Figure 11: Creeling / potting (Source: Orkney Fisheries Association)

8.4 NW-IFCA Observation Data

Table 6: Monthly sightings of vessels in the Mersey for the period May 2014 – July 2018 (NW-IFCA, 2018)

Date	Number of vessels	Vessel type	No. of vessels fishing/steaming	No. moored	No. of the moored boats that are in Liverpool Marina	Estimated no. of anglers on board each vessels fishing
13/05/2014	5	Charter	0	5	3	N/A
17/06/2014	2	Charter	0	2		N/A
17/06/2014	1	Commercial	0	1		N/A
07/07/2014	3	Charter	1	2		Unknown
31/07/2014	5	Charter	0	5	2	N/A
04/08/2014	5	Charter	0	5	2	N/A
08/08/2014	1	Charter	1	0	1 (leaving Liverpool Marina)	8
10/10/2014	0	N/A	0	0		N/A
13/10/2014	0	N/A	0	0		N/A
27/10/2014	6	Charter	0	6	6	N/A
03/11/2014	6	Charter	0	6	6	N/A
10/11/2014	2	Charter	0	2		N/A
18/11/2014	3	Charter	3	0		Unknown
24/11/2014	6	Charter	0	6	6	N/A
28/11/2014	5	Charter	1	4	4	6
23/12/2014	5	Charter	0	5	6	N/A
20/01/2015	5	Charter	0	5	6	N/A
27/02/2015	4	Charter	0	4	4	N/A
08/04/2015	1	Charter	0	1		N/A
08/05/2015	1	Charter	0	1		N/A
13/05/2015	1	Commercial	1	0		N/A
14/05/2015	1	Charter	1	0		6
11/06/2015	2	Charter	2	0		Unknown
15/06/2015	1	Charter	1	0		7
29/06/2015	1	Charter	0	1		N/A
01/07/2015	1	Charter	1	0		8
11/08/2015	5	Charter	2	3	2	8-9
21/09/2015	6	Charter	0	6	5	N/A
21/09/2015	1	Commercial	0	1		N/A
03/10/2015	1	Charter	1	0		10
15/10/2015	3	Charter	3	0	1 (approaching Liverpool Marina)	Unknown

Date	Number of vessels	Vessel type	No. of vessels fishing/steaming	No. moored	No. of the moored boats that are in Liverpool Marina	Estimated no. of anglers on board each vessels fishing
09/11/2015	1	Charter	1	0		6
26/11/2015	9	Charter	0	9	9	N/A
04/12/2015	1	Charter	1	0		6
08/12/2015	7	Charter	6	1	2	Unknown
14/12/2015	2	Charter	2	0		11
06/01/2016	3	Charter	2	1	1 (leaving Liverpool Marina)	8-9
16/01/2016	4	Charter	4	0		9-11
17/05/2016	1	Charter	1	0		2
24/05/2016	4	Charter	0	4	4	N/A
04/06/2016	1	Charter	1	0		Unknown
09/06/2016	1	Charter	1	0		Unknown
14/08/2016	2	Charter	2	0	2 (leaving Liverpool Marina)	19
16/08/2016	1	Charter	1	0		Unknown
18/08/2016	6	Charter	0	6	6	N/A
27/08/2016	1	Charter	1	0		7
28/08/2016	2	Charter	2	0		2-8
13/09/2016	1	Charter	1	0		8
25/09/2016	6	Charter	0	6	6	N/A
06/10/2016	6	Charter	0	6	6	N/A
20/10/2016	6	Charter	0	6	6	N/A
23/10/2016	7	Charter	2	5	5	8-9
03/11/2016	8	Charter	0	8	8	N/A
06/11/2016	2	Charter	2	0		Unknown
11/11/2016	2	Charter	2	0		6-8
22/11/2016	4	Charter	4	0		6-8
24/11/2016	3	Charter	3	0		Unknown
28/11/2016	7	Charter	0	7	7	N/A
06/12/2016	2	Charter	2	0		6-8
07/12/2016	3	Charter	3	0		6-8
08/12/2016	3	Charter	3	0		6-8
12/03/2017	4	Charter	0	4	4	N/A
25/05/2017	1	Charter	0	1		N/A
05/08/2017	1	Charter	1	0		Unknown
27/08/2017	3	Charter	1	2		10
25/09/2017	3	Charter	0	3	3	N/A
25/10/2017	2	Charter	1	1		Unknown
13/11/2017	3	Charter	0	3	3	N/A
15/11/2017	3	Charter	3	0		10
17/11/2017	2	Charter	1	1		5

Date	Number of vessels	Vessel type	No. of vessels fishing/steaming	No. moored	No. of the moored boats that are in Liverpool Marina	Estimated no. of anglers on board each vessels fishing
19/11/2017	2	Charter	2	0		5
28/11/2017	5	Charter	5	0		8
30/11/2017	4	Charter	4	0		10
12/12/2017	3	Charter	3	0		10
12/01/2018	6	Charter	6	0		Unknown
13/01/2018	4	Charter	4	0		Unknown
14/01/2018	6	Charter	6	0		8-9
25/01/2018	1	Charter	1	0		5-8
26/01/2018	2	Charter	2	0		10-15
12/04/2018	3	Charter	3	0		Unknown
05/05/2018	2	Charter	1	1		3
15/05/2018	1	Commercial	0	1		N/A
15/05/2018	3	Charter	0	3	3	N/A
18/05/2018	1	Charter	0	1		N/A
02/06/2018	1	Charter	0	1		4
10/06/2018	2	Charter	2	0		7-10
14/07/2018	1	Charter	1	0		Unknown

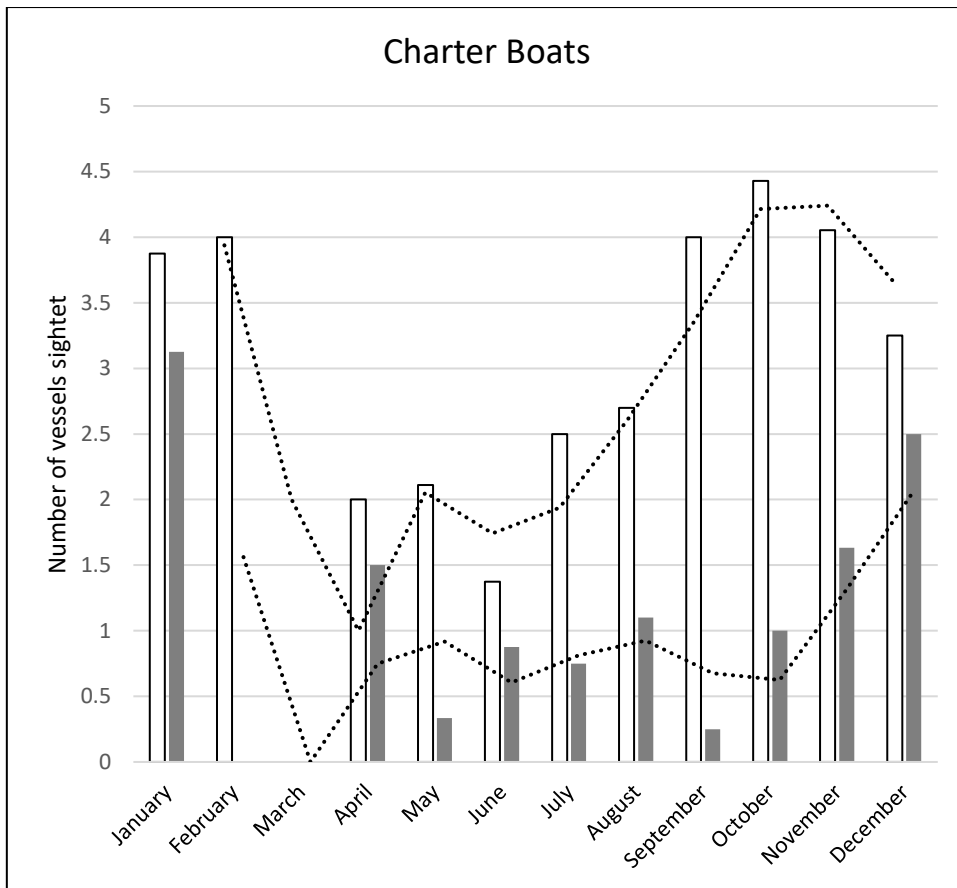


Figure 12: Average number of charter boat sightings (clear columns) per month 2014-2018 and number of vessels fishing/steaming (grey columns)