

THE BURBO BANK OFFHSORE WIND FARM

**IMPACTS ON THE HUMAN ENVIRONMENT
(MAIN REPORT ON COMMERCIAL FISHERIES)**

PREPARED BY



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1 EXISTING ENVIRONMENT – COMMERCIAL FISHING ACTIVITY

1.1 Introduction

This report examines fishing activities in a regional context as well as within the specific proposed area of the wind farm. The report describes:

- Data sources used in the study
- Catches made in ICES area VIIa, and catch data in the proposed area of the wind farm
- Information on vessel types and features, and
- Temporal patterns of fishing activity in the proposed wind farm area

1.2 Data Sources

Three principal sources of data have been used in this study:

- Catch data by value and volume provided by DEFRA
- Interviews with fishermen known to operate in the area
- Interviews with staff of statutory agencies involved with enforcement in the area (DEFRA and North Wales and North-West Sea Fisheries Committee)

An attempt was also made to obtain over-flight data from DEFRA. These data are collected on a regular basis by surveillance aircraft and vessels operating throughout the UK's Exclusive Economic Zone. Data is recorded for each fishing vessel and includes location, type of vessel, nationality and activity (fishing, steaming). However, due to the Data Protection Act, and the necessary notification to all license holders of the release of the data, unfortunately data could not be supplied in time for use in this study. The absence of this data does not affect the fisheries assessment of Burbo Offshore Wind Farm.

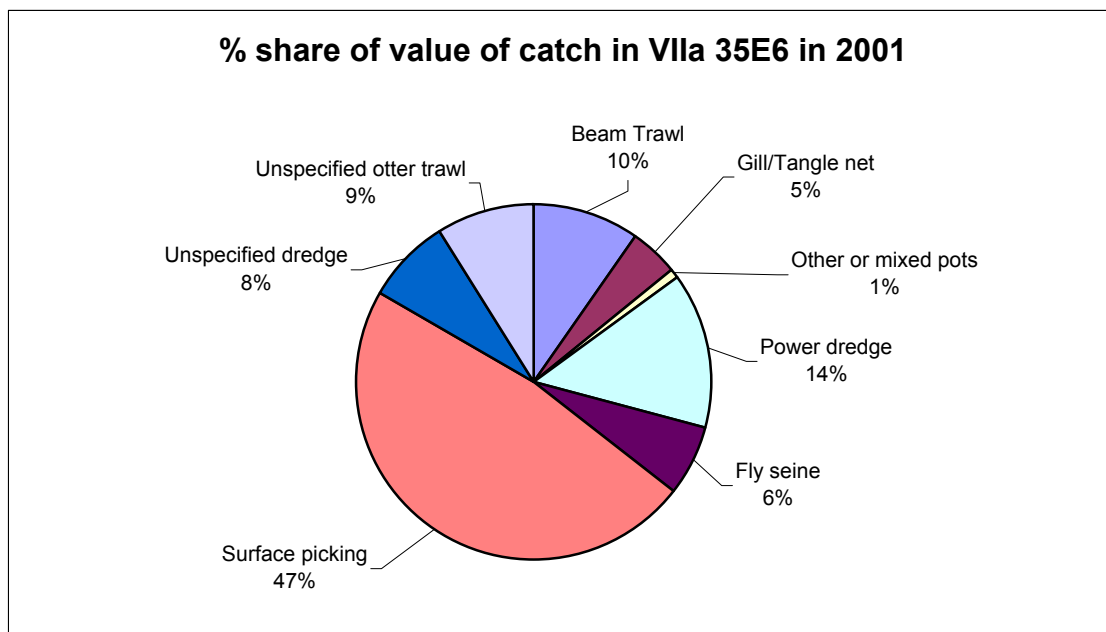
Interviews with both fishermen and enforcement staff were conducted using face-to-face discussions, and over the telephone. In both cases, a semi-structured interview format was employed.

1.3 Types, Characteristics, and Numbers of Vessels Fishing in the Area

Figure 1 shows the relative importance of different fishing methods in contributing to the value of catches recorded by DEFRA for rectangle 35E6 in ICES Area VIIa¹, in 2001.

¹ See Annex 1

Figure 1 – Percentage of volume of catches made by different fishing methods in 35E6, 2001



Source: DEFRA

Prior to some comment on vessel numbers, it is useful to provide a short description of the three main types of vessels operating in the wind farm area to the west of Burbo Bank.

Beam trawler (< 330 kW)

Beam trawlers operating in the area are indigenous to the English south coast and to Fleetwood, and are generally small. They are typically 9-12m in length, 30–60 GTs, with engine sizes of 200 – 220 kW. These vessels attach the nets to a derrick, which extends from the port and starboard side of the deck in the case of visiting beamers. Each net is separated by a beam, which is dragged along the seabed. Many of the smaller, and less powerful, local beamers use beams over the stern of the vessel. The distance of the net from the vessel is some 3 to 4 times the depth of water, with each beam around 6m metres in length. Visiting vessels use “stone mats” while many of the smaller local beamers use “open” gear. Vessels fish continuously for several days at a time before landing catches, and fish for a total of around 200-220 days per year. The main species caught are sole, plaice, turbot, brill, skate and monkfish.

Gill netting

Gill net, or tangle net, vessels anchor nets to the seabed and tend to fish in specific areas, with relatively little movement in search of fish. They have small engines to keep costs down, as they are not towing fishing nets and do not therefore require the extra power. Fishing gear is “passive” in that relies on capturing fish that try to swim through it. Gear can be left in the water for considerable periods with periodic checking, and is thus susceptible to damage by trawlers fishing through the area in which nets have been left. Target species are typically bass, skate, roker and cod, with some sole fishing using specialist sole nets. Full-time vessels fish for about 180 days each year.

Demersal/otter trawlers

All demersal trawlers in the area are single rigged trawls. Typically trawl nets are towed in a maximum of about 15m of water, 60m behind the boat, and with trawl doors about 25m apart keeping the mouth of the net open. In areas of seabed which are rocky/lumpy, or when the weather is bad, nets are towed closer to the vessel. Vessels tend to fish for 1-2 days before landing their catch, and typically fish for 180-200 days per year. Important target species are cod and whiting.

The table below summarises the composition of the indigenous licensed vessels in the North West region.

Table 1 – Indigenous vessels based in the NW region

Base port	Over 17 m	10-17 m	10 m & under	Total
Dee Estuary	0	0	8	8
Hoylake	0	0	8	8
Mersey Estuary	0	2	2	4
Liverpool	0	0	8	8
Southport	0	0	4	4
Lytham	0	0	7	7
Fleetwood	11	6	14	31
Glasgow Dock	0	0	1	1
Morecambe	0	0	14	14
Lancaster	1	0	9	10
Barrow	0	3	9	12
Whitehaven	5	4	19	28
Workington	0	3	23	26
Maryport	2	7	15	24
Silloth	0	1	6	7
Others	0	0	6	6
Total	19	26	153	198

However, it should be noted that many of these vessels are licensed but not currently operational, some only operate part-time or are now recreational craft, and others are located considerable distances from Burbo Bank and rarely fish there. Many use fishing methods that are not appropriate for the Burbo Bank or target species that are not to be found there in commercial quantities.

No vessels of over 13.7 metres are allowed to fish in the area under Sea Fisheries Committee byelaw regulations. Boats based in the Dee and Mersey Estuaries fish for bass, shrimp and cockles within the estuaries, and with the exception of one small beamer, do not fish in the area of the proposed wind farm. Only one of the under 10m vessels at Hoylake is a full-time commercial vessel, trawls all year, and is based for significant periods at Fleetwood. Vessels at Southport principally target shrimp, bass, cockles and mussels (i.e. not the Burbo Bank area). It is unlikely that many small vessels based further north than Fleetwood make the trip south to fish the Burbo Bank.

Based on interviews and discussions conducted as part of this study, fishing in the area of the proposed wind farm appears to be relatively low. It has proved difficult to gain detailed figures on the level of fishing activity. However, it is estimated that there is one indigenous vessel, a small “pocket” beamer, that depends heavily on the area (importantly for sole from March to June, skate and plaice from June to August, and brill June to July). This vessel spends as much as half its fishing time, and earns as much as 50% of its earnings, from the Burbo Bank area. It is also estimated that there are two indigenous vessels that regularly fish in the area for around 30 days per year on average, one from North Hoyle (an under 10m trawler) and one from Fleetwood (a “pocket” beamer/trawler), both targeting the sole fishery in particular. In addition there are perhaps an additional 10 vessels based in the region (mostly trawlers, but some netters and “pocket” beamers) which fish the Burbo Bank for an average of perhaps 3-5 days per year. The proposed wind farm area is fished most heavily from April for a period of 2-3 months when fishing for sole and plaice is good.

Of course making assumptions about the number of days spent on the Burbo Bank is very difficult given that fishing patterns change significantly and rapidly. While the vessels using the Burbo Bank for only a few days per year do not rely on the area for significant contributions to overall yearly income, the possibility of being able to fish there provides an important strategic opportunity when catches are found to be poor in areas in which they usually operate, or when prices for other species which they may be targeting start to fall. For example, a vessel netting for roker in another area, may decide to switch to sole nets in the Burbo Bank area if prices for roker fall significantly. The presence of the area as a possible fishing ground is therefore an important risk management tool in ensuring overall yearly incomes. . However the overall area of the wind farm is only a small proportion of the available fishing grounds. The ability to continue fishing within the site reduces the impact the wind farm would have were an Exclusion Zone put in place instead.

It is estimated that there are also three or four small beamers from the south coast (Plymouth and Brixham) that have been fishing for sole in Liverpool Bay for a few weeks each year over the last few years. Effort in the Burbo Bank area is difficult to accurately quantify, but it is thought that these vessels fish the Burbo Bank area for perhaps 5 days each a year, again, principally during May and June.

The larger Belgian trawlers operating in the area are prohibited from fishing within 6 nautical miles of the coast, and also do not therefore fish in the Burbo Bank area.

Finally, a comment is required on recreational angling. A request was made for a meeting with recreational boat anglers as part of this study. Safewater Training, the company that organizes licences for recreational boat anglers to launch from New Brighton, attempted to organize such a meeting. Last year about 250 licences were issued. However, the general feedback from boat angling clubs in the area was that a meeting was not necessary as the proposed wind farm would not have any an adverse effect on their activities, as they fish much further from the shore. The wind farm will be helpful as a land mark, as anglers mostly fish about 10-20 miles away.

1.4 Regional Overview

1.4.1 Methodological Note on DEFRA Catch Data for ICES VIIa

Some notes on the catch data provided by DEFRA are necessary. Fisheries data are mostly collected by officers in the Sea Fisheries Inspectorates and processed by officials of the various UK Fisheries Departments. Landings by vessels relates to landings on the DEFRA system i.e. vessels from England, Wales and Northern Ireland (EWNI). Data for Scottish vessels that have fished in the ICES area and landed back into Scotland are not included. This also applies to foreign vessels landing into ports in (EWNI).

Sources of data include logbooks, landing declarations, sales notes and personal contact with fishermen and merchants. Port harbour masters also provide details of individual vessels landings at main coastal locations. The method used for collecting data depends upon the size of vessel, species and location of landings. Legislation covers the supply of data on logsheets for all vessels over 17m overall length and vessels over 10m but not over 17m overall length which fish in more than one ICES area or which are at sea for more than 24 hours and land quota species. In addition, vessels over 10m and not over 17m overall length fishing for less than 24 hours are required to supply landing declarations for quota species caught.

Much information on the value of catches is provided by the industry. For vessels under 10 metres overall length, there is no statutory requirement under either EU or national legislation for fishermen to declare their catches. Information for this sector is collected with the co-operation of the industry. It comprises log sheets and landing declarations voluntarily supplied by fishermen and assessments of landings derived from market sources and by correspondents located in the ports. It is not thought that catch data is at all reliable with regards the inclusion of catches by the under 10m sector, and can therefore really only be used to examine the over 10m sector.

Full documentation is not required for most fishermen fishing for non-TAC species, including shellfish, and summary records are compiled using

information supplied voluntarily by the industry, from a variety of local sources and surveys run by local Sea Fisheries Committees.

The collection system for all vessels over 10m attempts a complete coverage of all main fishing activity. Assessments based on local knowledge are used to estimate uptake of some fishing activity by vessels under 10 metres and for some shellfishing. The reliability of the statistics is therefore dependent upon the veracity of the documentation provided by fishermen, and these additional assessments of catches made by the under 10m fleet. Information from surveillance using sightings by aircraft and by fisheries protection vessels is employed in checking the data.

1.4.2 Recorded Catch Data

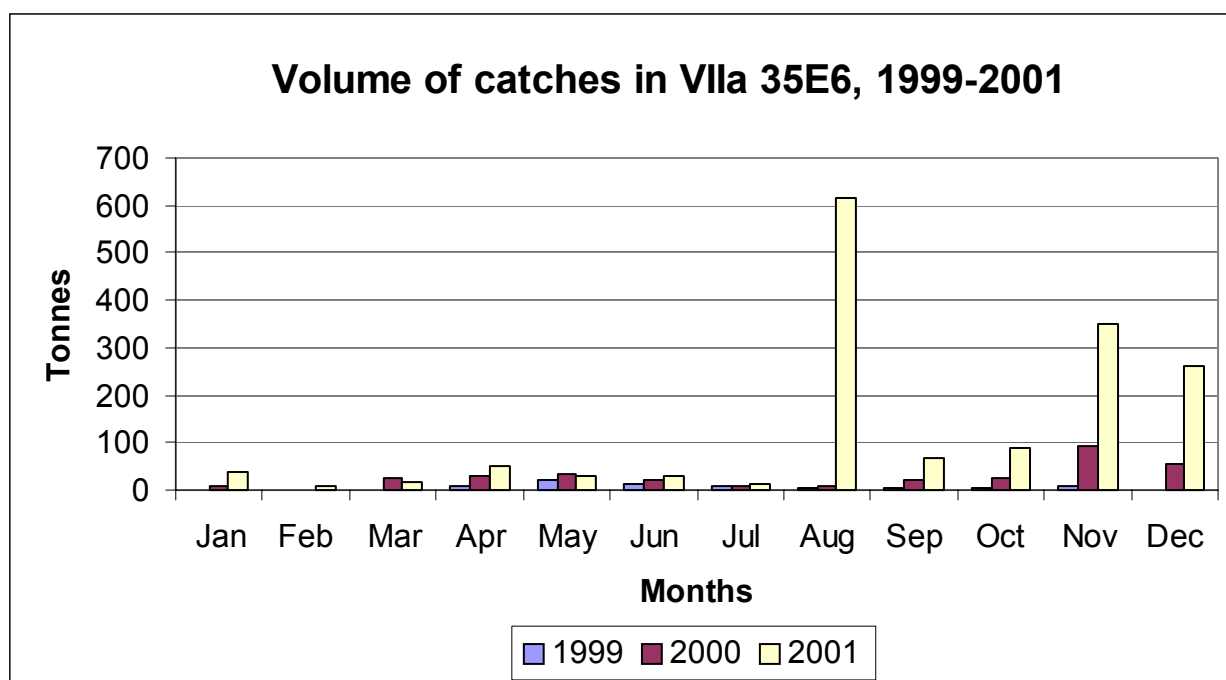
Fishing in ICES VIIa has historically targeted more than 40 species. Catches over the last three years have been 28,136 tonnes valued at £34 million (1999) 26,480 tonnes valued at £27 million (2000), and 38,782 tonnes valued at £38 million (2001). Catches by UK vessels have accounted for 86,232 tonnes of the total 93,398 tonnes caught over the period i.e. 92%.

Each ICES area is divided into rectangles of 4,116km² and recorded catches in VIIa are divided into those made in each rectangle. Non-UK vessels made recorded catches in 2001 in 33E3, 33E4, 33E5, 34E4, 34E5, 35E4, 35E5, 36E4, 36E5, 36E6, 37E4, 37E5, 37E6, and 38E4. UK-based vessels recorded catches in all these areas, but also in rectangles 33E2, 35E6, 36E3, 36E7, 37E3, 37E7, 38E5, and 38E6.

The proposed wind farm will be located in rectangle 35E6, approximately 50% of which includes dry land in North Wales. The northern boundary of the proposed wind farm area actually lies on the border between 35E6 and 36E6 to the north. The volume and value of catches by month for 35E6 for 1999-2001 are shown in Figure 2 and Figure 3 below. 1,968 tonnes were landed during 1999-2001 (i.e. 5% by volume and 4% by value of catches for VIIa as a whole), at a value of £1.4 million. Non-UK vessels caught only 8 tonnes, valued at £25,566. By comparison, 6,294 tonnes valued at £10.9 million were caught in rectangle 36E6 directly to the north during 1999-2001. Even allowing for the fact that a proportion of 35E6 is dry land, this comparison provides a strong indication (at least for the over 10m fleet) of the relative lack of fishing activity in rectangle 35E6. Given known catch rates of about 40 tonnes per year for under 10m vessels, these figures suggest that catches for the under 10m fleet are significantly under-represented in DEFRA catch data, even if vessels only spend part of the time fishing in 35E6.

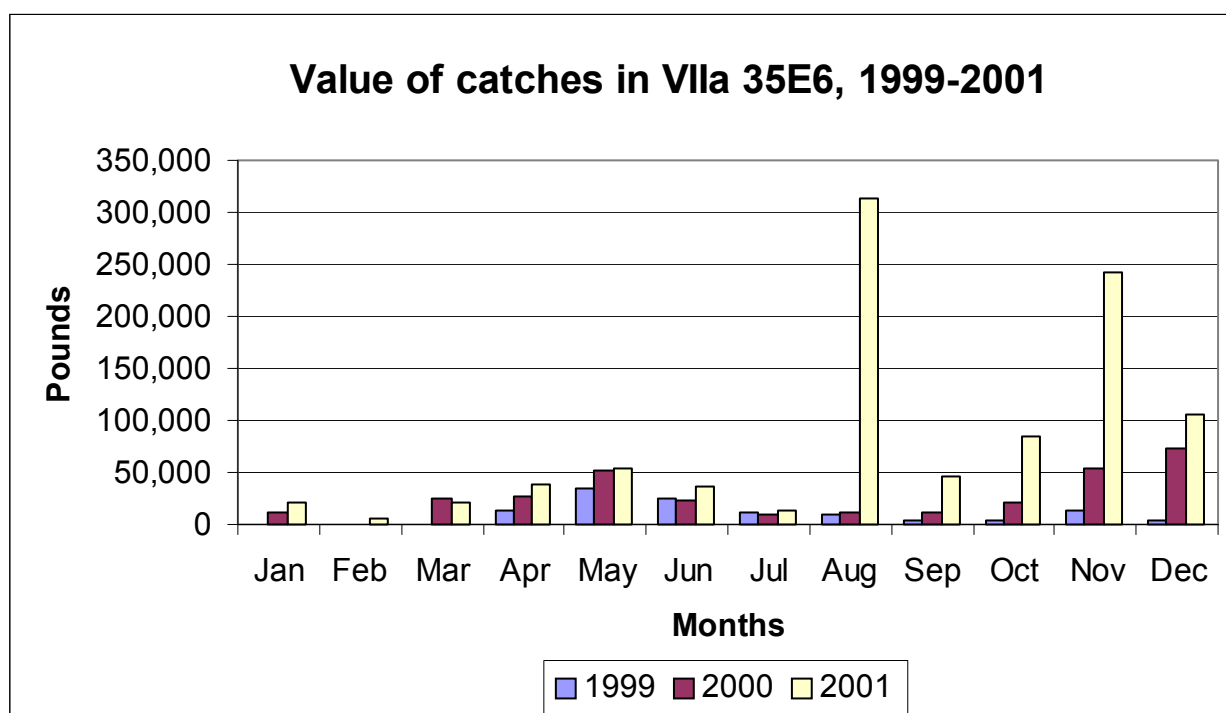
Figure 2 and Figure 3 indicate an increase in catches over the last three years, with the peaks in volume and values in 2001 being attributable to surface picking of cockles and mussels.

Figure 2 – Volume of catches by month in 35E6, 1999-2001



Source: DEFRA

Figure 3 – Value of catches by month in 35E6, 1999-2001



Source: DEFRA

Data in Table 2 show that the most important species in terms of the volumes of landings are cockles, mussels, queen scallops and skates/rays, which together accounted for 93% of catches in 2001. In value terms the picture is very similar, except that sole contributed an important 8% of the total value for

last year. Again, caution should be noted about relying on these data given the likely under-representation of the under 10m fleet.

Table 2 – Breakdown of catches by species in VIIa 35E6, 2001

35E6 2001	Volume (t)	% of Volume	Value (£)	% of Value
bass	5	0.3%	14,708	1.5%
brill	0	0.0%	3,303	0.3%
brown shrimps	0	0.0%	90	0.0%
cockles	599	37.9%	314,456	32.3%
cod	8	0.5%	12,253	1.3%
conger eels	0	0.0%	17	0.0%
crabs	1	0.1%	1,595	0.2%
dabs	0	0.0%	46	0.0%
flounder or flukes	0	0.0%	7	0.0%
gurnard and latchet	17	1.1%	8,071	0.8%
haddock	17	1.1%	28,066	2.9%
hake	2	0.1%	3,000	0.3%
john dory	0	0.0%	20	0.0%
lemon sole	0	0.0%	1,163	0.1%
ling	0	0.0%	86	0.0%
lobster	0	0.0%	5,304	0.5%
megrim	0	0.0%	193	0.0%
mixed demersal	0	0.0%	43	0.0%
mixed squid and octopus	0	0.0%	1,689	0.2%
monks or anglers	0	0.0%	3,874	0.4%
mullet	0	0.0%	160	0.0%
mussels	500	31.6%	153,750	15.8%
octopus	0	0.0%	89	0.0%
plaice	12	0.8%	15,158	1.6%
pollack	0	0.0%	68	0.0%
pout whiting	0	0.0%	152	0.0%
queen scallops	295	18.7%	212,396	21.8%
red mullet	0	0.0%	8	0.0%
saithe	0	0.0%	5	0.0%
sand sole	0	0.0%	62	0.0%
scallops	19	1.2%	43,400	4.5%
sea breams	0	0.0%	2	0.0%
skates and rays	74	4.7%	53,874	5.5%
sole	12	0.7%	75,971	7.8%
sprats	0	0.0%	71	0.0%
spurdog	14	0.9%	12,494	1.3%
squid	0	0.0%	674	0.1%
turbot	0	0.0%	3,534	0.4%
unidentified dogfish	0	0.0%	37	0.0%

Report on Commercial Fisheries by Poseidon Aquatic Resource Management Ltd

velvet crabs	0	0.0%	510	0.1%
whelks	0	0.0%	134	0.0%
whiting	5	0.3%	3,438	0.4%
witch	0	0.0%	7	0.0%
wrasses	0	0.0%	0	0.0%

Source: DEFRA

2 ENVIRONMENTAL IMPACT – EFFECTS ON COMMERCIAL FISHING

2.1 Operational Phase

2.1.1 Safety Impacts

Perhaps of greater concern than the financial impacts considered in the next section, are the possible safety impacts of the proposed wind farm. Fishermen consulted during this study have raised their concerns over operating within the area of the wind farm. Concerns are especially high in the event that turbine layout is random rather than evenly spaced.

With turbines evenly spaced 500m apart within the area of the wind farm, and with scour protection around the base of turbines being only 13 m in diameter, trawlers could technically operate within the area, and pick a straight line through the turbines. However, given seabed “fasteners” in the area, possible trawl lines could be reduced. In addition, the turbines are unlikely to be aligned exactly with tidal flows. Given the strength of tidal flows in the area, potential sea conditions in bad weather, and the likelihood that vessels would at times be drifting in the area while hauling nets, conducting emergency repairs, or idling for other reasons, serious questions are raised about the possibility of collision with the turbines. A number of fishermen consulted during this study thus feel that even if there was no Exclusion Zone around the area, they would probably chose to avoid it. This may also be the case for commercial fishing navigation, for those vessels wishing to pass through the area on their way to other fishing grounds.

Discussion has also taken place with the MCA as part of this study. While the MCA do not currently have a policy to recommend the imposition of Exclusion Zones around offshore wind farms, they have not ruled out such a policy in the eventuality that accidents involving fishermen and turbines appear to be frequent.

A separate issue is the potential of cables within the wind farm area, and from the wind farm to the shore sub-station, to become exposed due to changes in seabed conditions if they are not buried deep enough. There is the possibility that trawl gear could become caught on the exposed cables, which presents a safety risk for fishing vessels operating close to the wind farm and cable route.

On a positive note, safety concerns can be partially allayed given the proximity to the Crosby coastguard station, and the fact that the wind farm would be sited within a major port area, and would thus benefit from accompanying safety facilities and equipment. As the area falls under the authority of the Mersey Docks and Harbour Company, the Company would also have the ability to impose an Exclusion Zone on the whole area if they felt there was a safety risk of vessels operating there. In discussion as part of this study, they have stated that they have no plans to do so at the outset, but would reserve the right to do so at a later date if they perceived that there were unacceptable safety risks of vessels operating in the area.

2.1.2 Financial Impacts

An assessment of the financial impacts on fishermen operating in the area must consider both the direct and indirect costs of the proposed wind farm.

In the event that there is no Exclusion Zone around the wind farm, with fishermen able to operate within the area and trawl/net between the turbines, there are not expected to be any significant direct effects on fishermen's incomes (see also comment below on possible impacts of early hauling of nets).

In the event that there is an Exclusion Zone imposed around the area, then potential financial impacts become more likely. These can be calculated using the two alternative methodologies employed below, but must both be considered indicative only due the various assumptions that have to be made. This is particularly so for methodology 1 using DEFRA catch data, because of the likely under-representation of the under 10m fleet in these data.

Given that a number of fishermen have indicated that they would avoid the area due to safety reasons even if an Exclusion Zone was not imposed, an assessment of the impacts of not operating in the area becomes particularly pertinent. This is especially so, given statements by the MCA and the Mersey Docks and Harbour Company, which have not ruled out the possibility of an Exclusion Zone at some stage in the future.

2.1.2.1 Methodology 1 - Using DEFRA Catch Data

Rectangle 35E6 is 4,116km², while the area of the proposed wind farm is 10 km² i.e. 0.24% of 35E6. Given that approximately 50% of the rectangle is dry land, the area of the proposed wind farm can be estimated as accounting for 0.48% of the total fishable area of 35E6. We might assume that all unspecified otter trawl and gill/tangle net catches, and 50% of the beam trawl catches, are made by vessels which operate at some time in the proposed area. This is justifiable given that many beamers would be too large to operate in the area, and that dredging, pots, fly seining, and surface picking are not employed as fishing methods in the area concerned. Calculation of the effects of the wind farm can be estimated using DEFRA catch data for those fleet segments likely to be operating in the area of the wind farm. Making a further assumption that fishermen fish evenly across 35E6, an Exclusion Zone would therefore result in a reduction in the total value of landings for the three fleet segments concerned, as shown below.

Table 3 – Calculation of reduced value of landings using catch data

Fleet Segment	Value of 2001 landings (A)	% of vessels operating in area (B)	Wind farm as % of fishable area of 35E6 (C)	Total reduction in landings (AxBxC)
Otter trawl	£87,947	100%	0.48	£422
Gill/tangle net	£44,330	100%	0.48	£213
Beamers	£95,485	50%	0.48	£229
TOTAL	£180,020	-	-	£864

The analysis would suggest, based on catches for 2001, that reductions in the value of landings would amount to £864 per year. This could be considered the maximum possible damage, given that it assumes that fishermen would not be able to divert any fishing effort to other areas, and it takes the highest value of landings for the last three years i.e. 2001.

Historic assessments of economic loss through reduced access to fishing grounds have typically linked revenue losses to the proportion of area lost to exploitation, as per the methodology discussed above. However, this loss in revenue does not reflect the true loss to the fishing enterprise, or the costs to society in terms of lost “value-added”. Furthermore, given the uncertainty of published catch data, losses calculated as described above are likely to be an under estimate, particularly for the under 10m sector who are most likely to be fishing the Burbo Bank. This methodology is therefore not acceptable in assessing losses. What is required is an assessment of the loss in value-added, notably profit and income (crew wages) – see below - based on our understanding of vessel activity in the area.

2.1.2.2 Methodology 2 - Using Vessel Earnings, the Percentage of Earnings Perceived to be Made in the Area, Variable Costs Saved, and Lost Value Added

The Sea Fish Industry Authority has recently (2000) collected data on costs and earnings for the UK fishing fleet. This information is useful, but must be treated with caution given fluctuating costs that impact on earnings (e.g. fuel) and significant changes from year to year in earnings due to weather conditions. Interviews conducted during this study have also attempted to generate information on costs and earnings of vessels likely to be affected. However, fishermen are often understandably reluctant to divulge such information, and it is likely that variations between vessels (even of similar size and fishing technique) can be significant. It is acknowledged therefore that costs and earnings estimates are at best approximate. Nevertheless, the SFIA data and our interviews can be used together, to make some assumptions and estimations of total losses that would result if no fishing were to take place in the Burbo Bank area. These estimates are based on the lost value-added that would result from earnings that would be forfeited, noting that the variable costs of fishing in the area would not be incurred, and would thus be saved. The calculations shown below assume that fishermen would be completely prevented from fishing in the area, and would not be able to offset lost earnings by diverting effort to other areas. As such, the calculations can be considered an estimate of the maximum possible effect on value-added.

Table 4 – Summary data on effects on vessels fishing in Burbo Bank area

Vessels	Yearly earnings in £	Days fished /yr	Days in Burbo Bank area	% of earnings lost	lost earnings	Variable costs saved /1	Lost value added /2	No. of vessels	Total Losses /3
Liverpool beamer	125,000	220	110	50%	62,500	15,625	21,875	1	6,250
Hoylake trawler	100,000	200	30	15%	15,000	3,750	5,250	1	1,500

Fleetwood beamer	125,000	220	30	14%	17,045	4,261	5,966	1	1,705
Others local vessels /4	75,000	180	5	3%	2,083	521	729	10	2,083
Visiting beamers	250,000	220	5	2%	5,682	1,420	1,989	4	2,273

Notes:

1/ Variable costs of fishing are estimated at 25% of earnings for all vessels. The variable costs on lost earnings would be saved if fishing in the Burbo Bank area did not take place

2/ Value-added (i.e. crew earnings plus vessel owner profits) is estimated at 35% of turnover for all vessels

3/ Total losses = lost value added less variable costs saved, multiplied by the number of vessels involved

4/ Other local vessels include netters, trawlers and beamers

The calculations suggest that total losses (i.e. the lost value added, less the variable costs saved) in the event of an Exclusion Zone, or of all fishermen choosing not to fish in the area, would be £13,811 per year. At a discount rate of 6%, this would equate to losses with a Net Present Value of £176,546 over the next 25 years i.e. the lease period for the wind farm.

It is stressed that this is not a figure that is likely to be reflected in actual lost value-added, because some fishermen may continue to operate in the area, and those that do not will have some ability to fish in other areas to at least partially make up for lost earnings. This is especially true of trawlers which in any case tend to move widely in search of good fishing, but less so of netters. Netters have a smaller area of possible fishing grounds given that their gear is susceptible to damage by trawling operations. Exploration of new fishing grounds could be time-consuming, costly, impact on catch rates, and generate conflict with other static gear fishermen in other areas. However, the calculation of total losses is at least based on best estimates of known fishing activity in the area, and on recent costs and earnings data. As such, it is distinctly favourable to methodology 1.

2.1.2.3 Additional Comments

Some additional comments on potential financial impacts are also worth making.

- Firstly, consultation with the fishermen has drawn attention to potential problems associated with the wind farm for conventional fishing patterns as and when trawl lengths are reduced. Demersal trawls currently operating in the area, may tow for up to 4 hours. The assumption that vessels can simply alter course to avoid turbines, or the whole area in the event of an Exclusion Zone, is deemed by the fishermen to be impractical, especially if the layout of the turbines is random rather than evenly spaced. Trawls tend to follow specific trawl lines and extensive deviation could well cause damage to the trawl. Skippers are more likely to have to haul the gear if they perceive that their tow will take them into potentially dangerous territory within the wind farm, or to unfamiliar areas outside it.

- Secondly, is the potential impact on trawl operations of obstructions/“fastners” such as exposed cables, or items discarded by vessels belonging to the wind farm operators working in the area. Such items not only generate serious safety concerns, but also raise the possibility of possible gear damage and associated financial losses. Concerns about vessels becoming caught on exposed cables raises the risk of financial costs in terms of damage to both vessels and gear.²
- Thirdly, is the possible impact on gill net activity: Fines/sediments in the water introduced by scouring (if such scouring does indeed occur around the base of turbines), could settle on the nets and expose the net knotting to the fish. Fishing with multi-monofilament netting requires the nets to be transparent. The settlement of fines/sediments will, therefore, reduce the efficiency of the net. This issue was also raised with the Sea Fish Industry Authority’s Technical Development Unit. The Unit confirmed that the settlement of fines would affect efficiency. However, it is noted that the existing marine environment is already one of high dynamism, with considerable amounts of turbidity and sediments already in the water column. It is unlikely therefore that developments would result in any significant changes to the efficiency of fishing nets.
- Fourthly, the concerns raised over navigation through the wind farm area for vessels not fishing, but traveling to other fishing grounds, and the possibility of an Exclusion Zone, mean that some additional fuel costs, and costs associated with lost time, might result from vessels having to by-pass the area. These costs are thought to be minimal and difficult to quantify.
- Finally, some fishermen have raised the question as to whether their insurance will cover them for operating within the wind farm. This question has been raised with Sunderland Marine, a major shipping insurance firm that insures large numbers of fishing vessels. The firm stated that they do not currently have, nor do they have any plans to have in the future, any clauses in their policies to state that vessels will not be covered if operating within, or near, offshore installations.

Other possible indirect costs and benefits through scouring around the base of the wind turbines, increased sedimentation, turbines acting as FADs (Fish Aggregating Devices), etc. are considered elsewhere in this Environmental Statement.

² In the cable industry, if vessels have to cut gear off cables to avoid damage and disruption to cables, it is common practice for cable companies to pay appropriate compensation to the fishermen concerned.

2.2 Construction/Decommissioning phase

2.2.1 Safety

Safety risks will be present during construction and decommissioning from the presence of construction vessels and jack-up barges in the area. But it is expected that fishermen will have few problems in avoiding these vessels.

2.2.2 Cable Laying and Burying

Cable laying within the wind farm area, and along the cable route from the wind farm to the shore sub-station will impact on both static gear and trawl fishing, as fishermen will be forced to avoid these areas. Given the short time-period involved with laying cables, any significant impacts on fishermen are discounted.

2.2.3 Anchor Mounds and Construction Debris

The possibility exists for anchor mounds to form around anchors used during construction and decommissioning, and for debris to be discarded during the construction process. Both eventualities would impact on trawling operations, with debris providing both a safety and operational hazard. The presence of anchor mounds is however not thought to a major concern given the short time that jack-up barges and vessels will remain in any one place during construction and decommissioning.

2.2.4 Financial

There will need to be some form of exclusion area to fishing vessels during construction/decommissioning, to avoid the risk of collision with construction/decommissioning vessels and jack-up barges, and this will therefore involve some loss of access to fishing grounds. However, it is expected that it will not be necessary to exclude fishing vessels from the entire wind farm area at once. A small safety-zone could be declared around the construction/decommissioning vessels as they progress across the site. Given the comments made above about the likely reluctance of fishermen to operate in the area, the financial impacts will be essentially be those calculated above for yearly losses in value-added, except that the full yearly losses will not be experienced in the first year if construction can be rolled out across the site.

It is noted that construction (and decommissioning) is likely to take place from April to September to make use of good weather. This is unfortunate given that most fishing activity in the area takes place during these months.

3 MITIGATING MEASURES

3.1 General Procedures

SeaScape will inform fishermen in the area in advance of all works likely to have an impact on commercial fishing activities. Appropriate charts and information on safety zones will accompany notification of these works and activities. The Fleetwood Fish Producer's Organisation is prepared, and best placed, to act as a focal point for ensuring that information is passed to fishermen and to discuss any possible mitigating measures that can be taken by SeaScape. The Fleetwood PO has close contacts with the following fishermen's organisations in the area.

- The Fleetwood Fish Producer's Organisation
- Whitehaven Fishermen's Association
- Maryport Fishermen's Co-operative Society
- Hoylake Fishermen's Association
- Morecambe Bay Fishermen's Association
- Southport & North West Fishermen's Association
- South Western Fish Producer's Organisation (UK) (mobile beam trawlers)

Fishing vessels will also be used wherever possible, under contract and on agreed terms, to undertake any work required within the wind farm area during construction, operational and decommissioning phases.

3.2 Construction and Decommissioning Phase

3.2.1 Safety

A safety/buffer zone around vessels working in the area and around the jack-up barges will help to mitigate against accidents and collisions. All vessels and barges will be adequately lit and marked, and appropriate night-time lighting provided for work after dark. The programme of work will be fully communicated to all fishermen's representatives in the area, with sufficient notice, to allow fishermen to plan their fishing activities accordingly.

3.2.2 Anchor Mounds and Construction Debris

As stated above, anchor mounds are not thought to present a significant problem due to the use of jack-up barges being in place for short periods of time. The discarding of construction debris on the seabed, will be mitigated by the requirement for an audit of equipment brought onto, and off, the site by all contractors. Both possibilities (anchor mounds and debris) will also be mitigated by conducting a trawl sweep across the area following construction, with a vessel towing a chain between trawl doors across the area to flatten any anchor mounds and identify any discarded debris.

3.2.3 Financial from Loss of Fishing Grounds

A roll-out of the foundations and turbine installation being done together, rather than all the foundations first and then all the turbines, will help to minimise disruption to fishing activities and therefore financial losses. Consultation has already taken place with fishermen on this issue, and indicates that this would be desirable, but that no particular direction of the roll-out (e.g. east to west, north to south) would be especially beneficial or detrimental to fishing activities. It is not unfortunately possible to mitigate against disruption by construction/decommissioning during winter months due to the need to complete these phases during good weather.

3.3 Operational Phase

3.3.1 Safety

While SeaScape do not intend to enforce an Exclusion Zone around the proposed wind farm, it has already been discussed that some fishermen may chose not to operate in the area due to safety concerns. The ability to remotely shut down the turbines will be essential for the safe operation of the wind farm and in times of emergency. It would also be ensured that all turbines can be shut down so that helicopter rescue can be used if necessary.

Lighting will play a key part in reducing safety risks. All turbines will be fitted with downward sea-lighting to illuminate turbine foundations during night-time hours. The perimeter of the wind farm will also be lit, and steps will be take to ensure that each turbine can be fully lit if necessary in the event of sea-rescue.

3.3.2 Cable Laying

All cables within the wind farm, and from the wind farm to the shore sub-station, will be laid at a depth of 2-3 metres to avoid any possible exposure.

3.3.3 Financial Losses

The location of the wind farm in an area that is not heavily fished, is itself a mitigating measure to reduce the financial impacts on fishermen. The safety measures described above will also help to encourage fishermen that it is safe to operate in the area, as well as to travel through it. If fishermen do indeed operate in the area, and feel they are safe navigating through it, then financial impacts are expected to be minimal.

Ensuring that turbines are evenly spaced, rather than randomly placed will also reduce safety concerns, and thus possible financial losses if fishermen can be encouraged to operate in the area. This will ensure that tows can be made across the area.

4 CUMULATIVE EFFECTS

4.1 Impacts on Fishing Operations

It is noted that fishermen have expressed considerable concerns about the cumulative impacts of wind farm developments on their commercial activities. The presence of a wide range of possible fishing grounds is important to maintain fishing options, and thus earnings, in light of different seasons, weather conditions, use of alternative fishing gear, changing market prices for different species, and so on. Given that there are now six possible wind farm sites being discussed in the Eastern Irish Sea, the cumulative impacts on these developments could be considerable.

As SeaScape Energy is not proposing to enforce an Exclusion Zone around the site, fishing can continue within the area. Therefore Burbo wind farm will have little cumulative effect with other wind farms. The overall area covered by the wind farm is small in comparison to the size of the fishing grounds in Liverpool Bay.

The experience of the Oil and Gas industry suggests that it would be in everyone's interests for wind farm development companies to be pro-active, rather than re-active, with regards to appeasing the concerns of fishermen operating in the area about cumulative impacts. The Oil and Gas industry have in the past paid "co-operation" money (rather than "compensation") to avoid conflicts with the fishing sector, in the long run saving time and money for all concerned, by avoiding the need for extensive meetings and consultations to air and hear grievances.

4.2 Mitigation

SeaScape, either independently or in consultation with other developers in the area, will seek to address issues around the cumulative impacts of developments on fishermen. In particular, as a member of the British Wind Energy Association, SeaScape will continue to provide support for, and input into, the BWEA Workgroup on Fisheries which is investigating the potential cumulative effects of wind farms on fisheries, and BWEA participation in Fisheries Liaison Meetings which are already taking place to agree and discuss issues of best practice, co-operation, co-ordination, communication, minimization of disruption, navigation and exclusion zones, and health and safety. . SeaScape will uphold any agreements reached through the BWEA Workgroup to the benefit of local fishermen.

6.3.6 Conclusion

The proposed development of Burbo Offshore Wind Farm will not have a significant environmental effect on the fishermen and fisheries in Liverpool Bay. The lack of an Exclusion Zone ensures regular fishing can continue, so long as the fishermen personally feel it is safe to do so.

ANNEX 1 – MAP OF ICES AREA VIIA, AND SUB-RECTANGLES

