

Option 4: Increase in Mesh Size from 80mm to 90mm for UK Beam Trawlers



The Invest in Fish Bio-Economic Model

The IIF Bio-Economic model is designed to simulate the interactions between fish stocks, the size and effort of the fishing fleet and regional output and employment within the South West. The aim of the model is to provide a means of comparing the effects of different policy options for the management of the region's fisheries relative to the baseline of what is expected to happen if no action is taken.

It is important to recognise that the model is an 'OPTION COMPARISON' model NOT a forecasting model. The aim of the model is to compare what happens if a 'management' decision is taken to implement a particular policy and all other factors are assumed to stay the same. Thus the impacts of policies are examined 'relative to this FIXED baseline' where all variables are held constant over time.

IIF Bio-Economic Model of South West Fisheries

Option 4: Increase Mesh Size to 90mm

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One way in which to reduce the impact of commercial fishing upon fish stocks is to increase the size of the net mesh used by certain fishing vessels. Option 4 examines the likely impact of a policy to increase the minimum mesh size for beam trawlers from 80mm to 90mm. Within the model mesh size is modelled in terms of catchability and the amount of fish taken.

The likely effects of this option are evaluated against a number of key measures as follows:

- ❖ The level of spawning stocks (Demersal, Pelagic and Crustacea/Shellfish)
- ❖ Overall impact on the environment
- ❖ The value of revenue by port
- ❖ Boat profitability (overall and by gear activity)
- ❖ The value of recreational angling expenditure
- ❖ Regional output and employment.

The graphs show the outcomes of each alternative option. The outcomes are shown '*relative to the baseline*'. This means that rather than showing actual values year by year, the graphs show how each different option impacts upon outcomes compared to what would have happened if nothing had been done (i.e. the baseline). This means that if the values are positive, the outcome is better than the baseline and if negative worse than the baseline.

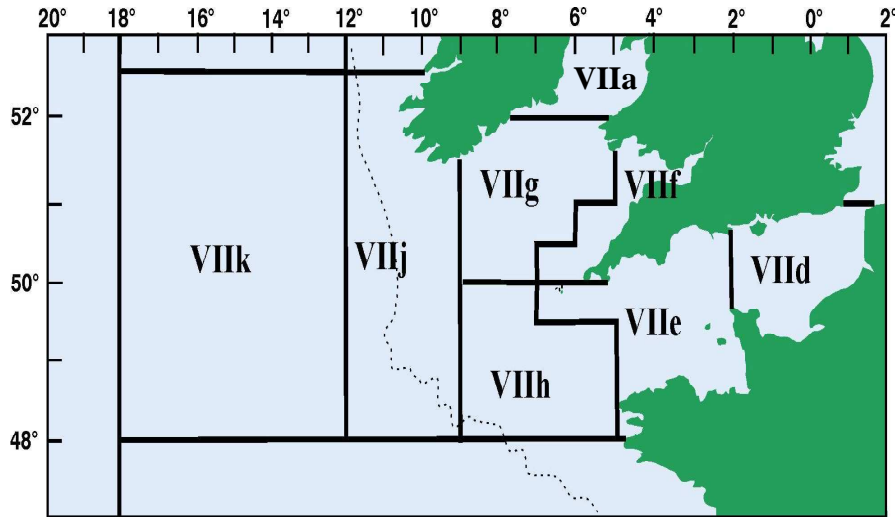
It is important to recognise that the option outcomes are based upon a number of key assumptions;

- ❖ In all cases (except where specified) options are applied 'unilaterally in the model' (thus most options are applied only to the UK fleet over which DEFRA has jurisdiction). It is therefore assumed that the effort of other EU fleets will remain at the level modelled in the baseline. The impact of the foreign fleet is modelled in terms of its effect on fish mortality/catch and this impact may be altered within the model as 'reduced effort' or days at sea (see option 3i), but technical changes cannot be applied to this fleet.
- ❖ Prices of all fish species caught and landed are 'fixed' so that changes in revenue are 'real' changes (due to catch size) rather than 'apparent' changes due to alterations in prices at sale.
- ❖ Estimates of spawning stock biomass are based on ICES data of recruitment observations over the past 20 to 30 years, which may be considered by some to be precautionary or pessimistic.
- ❖ Unless specifically stated as part of the option being considered, the size of the fleet is assumed to remain at its current level, with vessels continuing to fish even if they are unprofitable. (this assumption is modified in the 'natural attrition' modified baseline where unprofitable boats are assumed to leave the fleet.).
- ❖ Spawning stock to recruitment relationships were analysed in conjunction with CEFAS in order to determine the appropriate stock-recruitment relationships for the model.

Fish Spawning Stocks

The following graphs show how level of spawning stocks are forecast to change within the IIF Bio-Economic model if the number of days at sea of the fishing fleet is reduced by 20% (UK only). For a number of species the volume of spawning stocks is shown for specific fishing areas (metiers) within the South West region. These areas are referenced as 7a to 7g as shown in Figure 1 below:

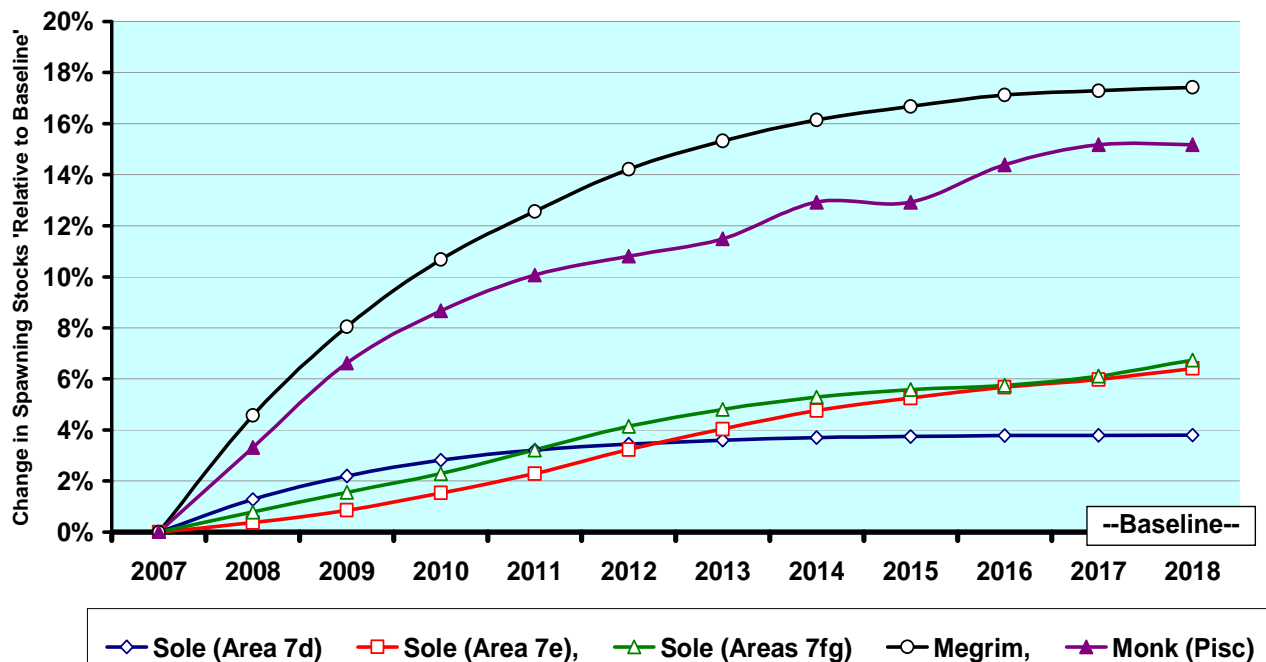
Figure 1 – ICES Fishing Areas Modelled



Spawning Stocks – Demersal Fisheries

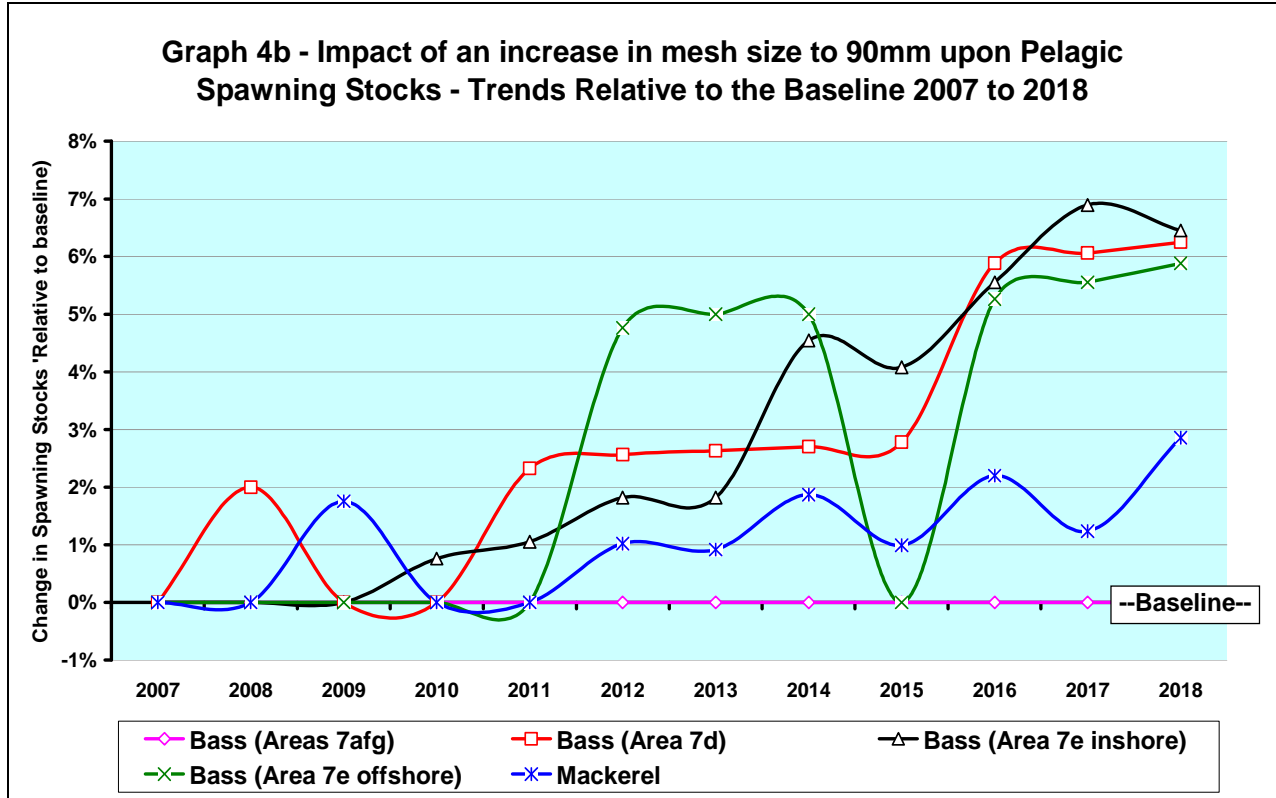
Graph 4a shows that spawning stocks in Demersal fisheries are forecast to increase ‘relative to the baseline’ as a result of an increase in mesh size from 80 to 90mm. Demersal spawning stocks are forecast to increase by between 4% and 18% ‘relative to the baseline’. The relative increases in stocks of monkfish and megrim would be slightly higher (between 14 and 18%) than for sole (between 4% and 7%).

Graph 4a - Impact of Increase in Mesh Size to 80mm upon Demersal Spawning Stocks - Trends Relative to the Baseline 2007 to 2018

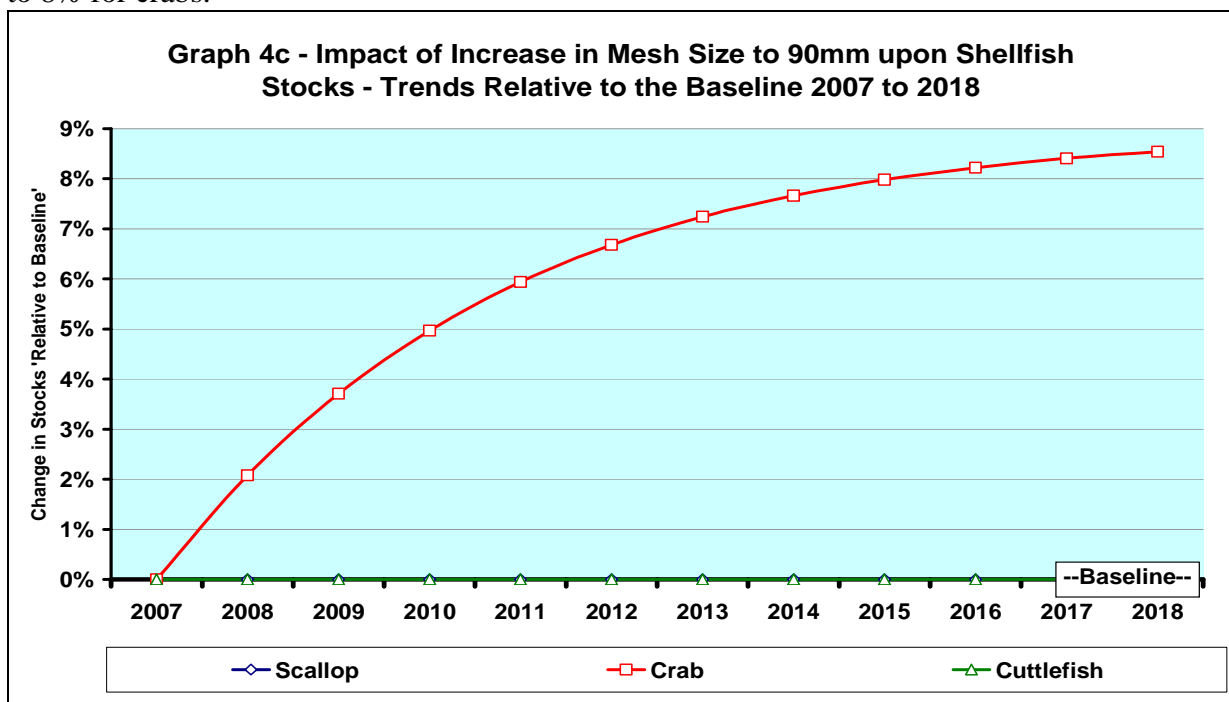


Spawning Stocks – Pelagic Fisheries

Graph 4b provides a summary of the impact of an increase in minimum mesh size to 90mm upon pelagic spawning stocks. The graph shows that these stocks are expected to increase ‘relative to the baseline’ as a result of this option. The range of increase is between 0% and 6%. The difference in these figures compared to graph 4a reflects the type of species targeted by beam trawlers which are the target of this policy option. As beam trawlers tend to concentrate their efforts more upon sole and other demersal species it is these that are likely to be most affected by any increase in mesh size



Stocks – Shellfish Graph 4c provides a summary of the impact of option 4 upon stocks of crustacean and shellfish. The graph shows that these stocks are expected to increase ‘relative to the baseline’ as a result of this option. The increase ranges between 0% for scallop and cuttlefish and up to 8% for crabs.



Environmental Impact Index

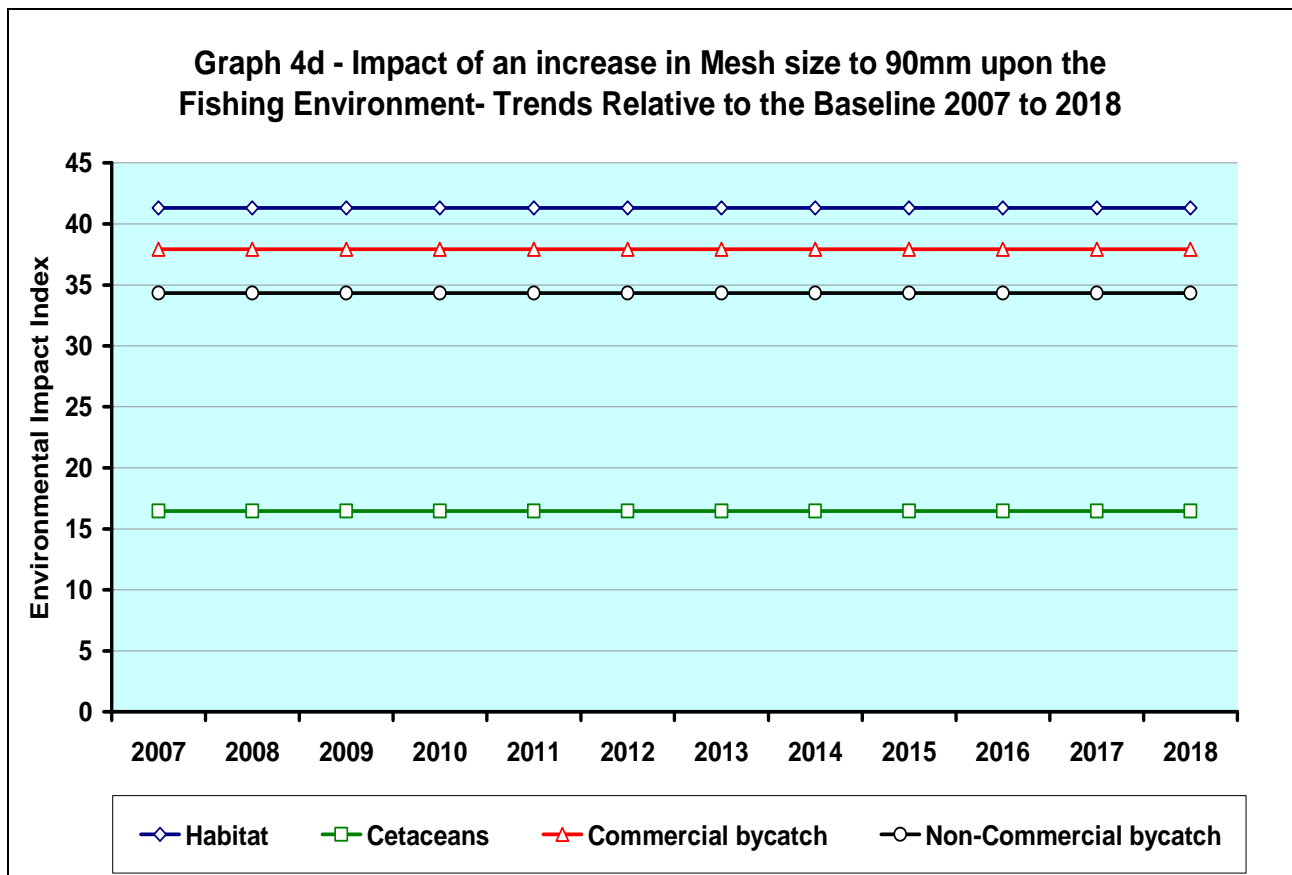
In addition to the impact of commercial and recreational fishing upon spawning stocks and the fish biomass, there are also impacts upon other aspects of the fishing environment. The four main measures analysed within the Environmental Impact Index (EIA) are :

1. Environmental Impact upon Habitat
2. Environmental Impact upon Cetaceans
3. Environmental Impact upon Commercial bycatch
3. Environmental Impact upon Non – Commercial bycatch

Graph 4d shows that an increase in minimum mesh size to 90mm would have no discernible impact upon the environmental measures tracked within the model. The graph shows that the impact upon the fishing environment would remain at baseline levels.

Important Note.

- ❖ This outcome suggests that environmental impact is more a function of the number of vessels fishing and fishing effort rather than technical measures such as mesh size.
- ❖ It is also important to recognise that this option does not apply to foreign vessels fishing in the area and thus they will still impact upon the environment at the same level as currently modelled.



Comments/Questions on the impact of Option 4 on Spawning Stocks and Environmental Impacts

Demersal Stocks

Pelagic Stocks

Shellfish Stocks

General Comments on Spawning Stocks and Environmental Impacts

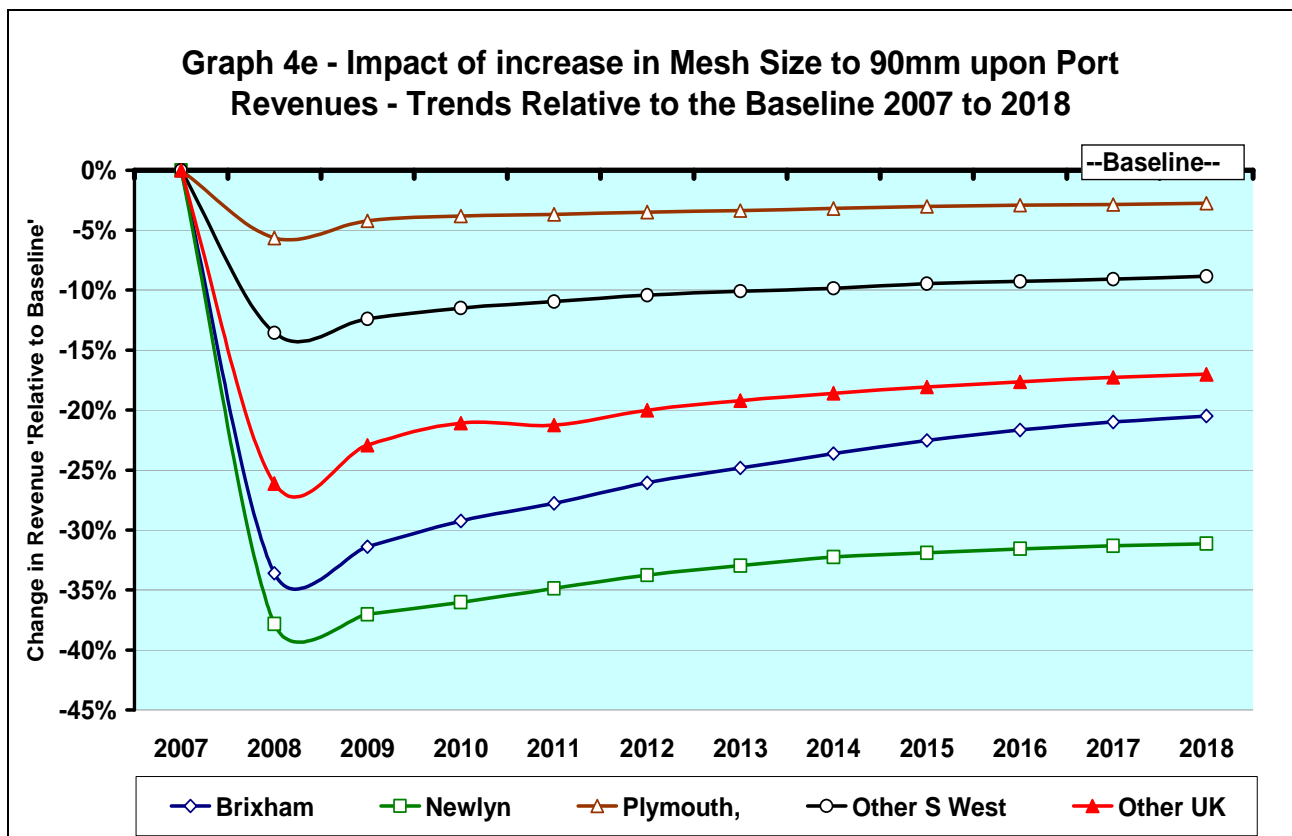
Revenue by Port – Baseline Trend

Graph 4e shows the effect of option 4 upon the value of revenue from landings generated at each of the main ports throughout the South West region ‘relative to the baseline’. The graph shows that relative to the baseline future revenues are forecast to decline at all ports. However, although initially revenues are forecast to fall by as much as 35 to 40%, they slowly pick up slightly as stocks and thus catch start to recover ‘relative to the baseline’. The amount of revenue reduction is forecast to end between 5% to 30% below the baseline forecast. The graph shows that the revenues taken in Plymouth would much less than those in Newlyn and Brixham..

The outcomes shown below are to be expected given an increase in minimum mesh size. However, there are some important points that need to be considered.

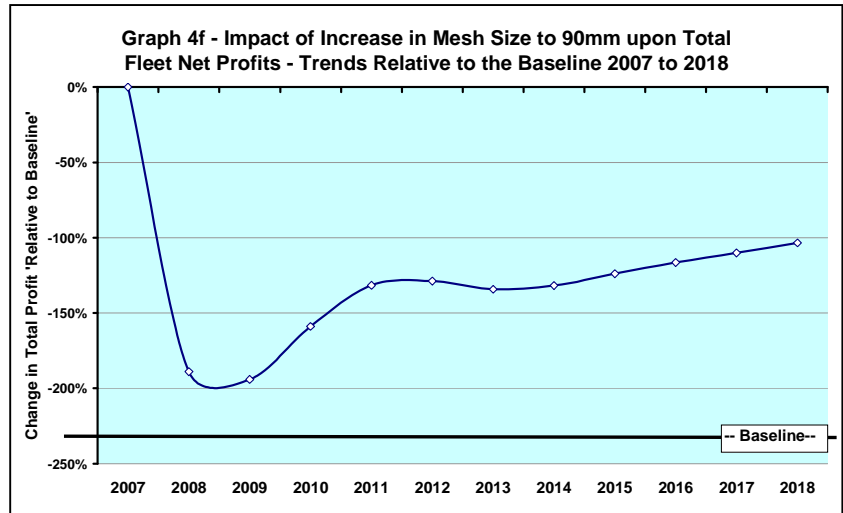
Important Notes:

- ❖ *These figures are estimated ‘relative to the baseline’ and assume fixed prices and costs. IF the sale prices of catch increase, the actual amount of revenue would of course increase. However, this would NOT affect revenue levels ‘relative’ to the baseline(e.g. if prices increased by 10% BOTH baseline and option 1 revenues would increase)*
- ❖ *The reason for the differences in the impact upon the various ports is a reflection of vessels operating out of different ports. Beam Trawlers which are the vessels this option is directed at operate mainly out of Newlyn and Brixham which therefore experience the greatest drop in revenues. In contrast Plymouth which has less of these vessels suffers less impact than the two other main South West ports.*



Profitability by Fleet and Gear Activity

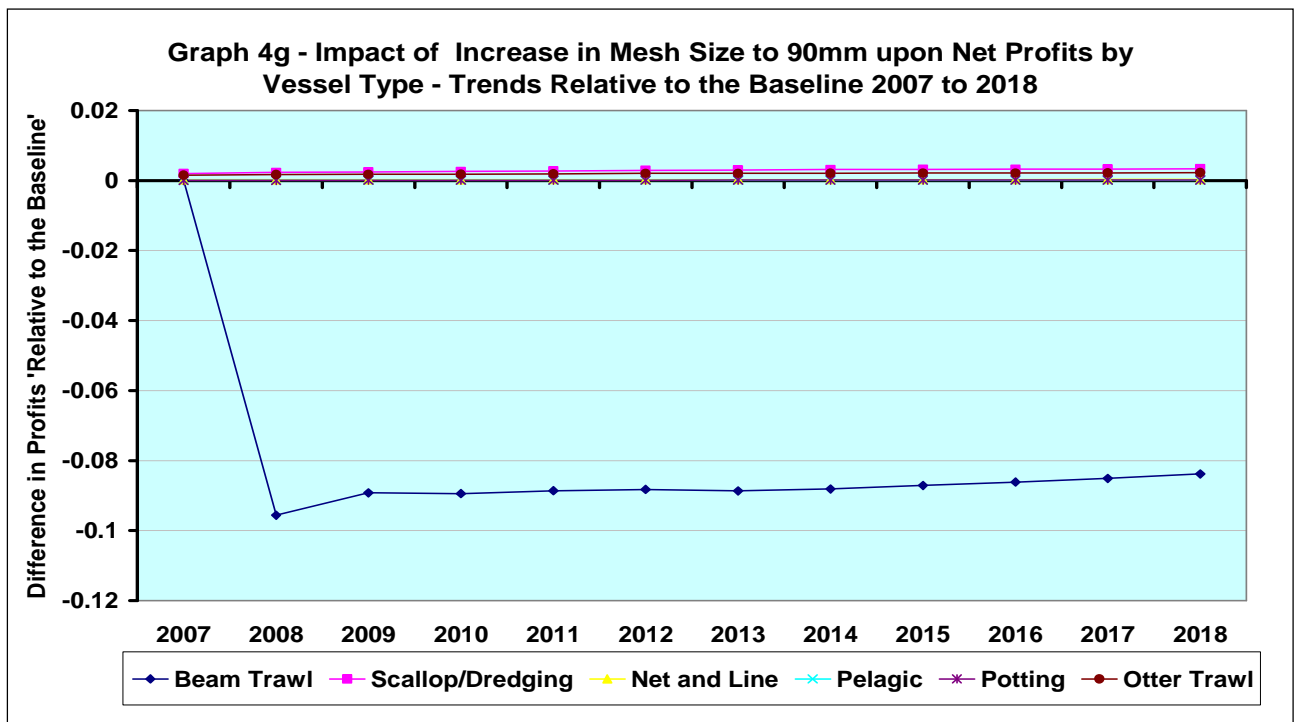
Graphs 4f and 4g show how an increase in the minimum mesh size to 90mm is estimated to affect fleet profits, both in terms of total profits and profit by type of fishing vessel. The graphs show that total net profit for the fleet as a whole is significantly impacted by this measure. The significance of beam trawling within the context of the whole fleet (accounting for just under half of all revenues) means that this option would have a major impact upon revenue and profits.



This impact is highlighted by graph 4g which shows profits by type of vessel activity. Graph 4g shows that it is the beam trawler fleet that is hit by this option. The net profits made by beam trawlers fall in the year of implementation and then level out at this lower level whilst the remainder of the fleet are relatively unaffected remaining at around baseline levels. The impact upon beam trawlers reflects the reduction in catch that a larger mesh size would have upon this type of fishing activity

Important Notes:

- ❖ As with revenues these figures are 'relative to the baseline' and assume fixed prices and costs. IF the sale prices of catch increase and/or costs (e.g. fuel) decrease, net profits would of course increase, however, this would NOT affect future profit levels 'relative' to the baseline (e.g. if prices increased by 10% BOTH baseline and option 3 profits would increase).



Comments/Questions on the impact of Option 4 on Port Revenues and Boat Profitability

Port Revenues

Fleet Profits

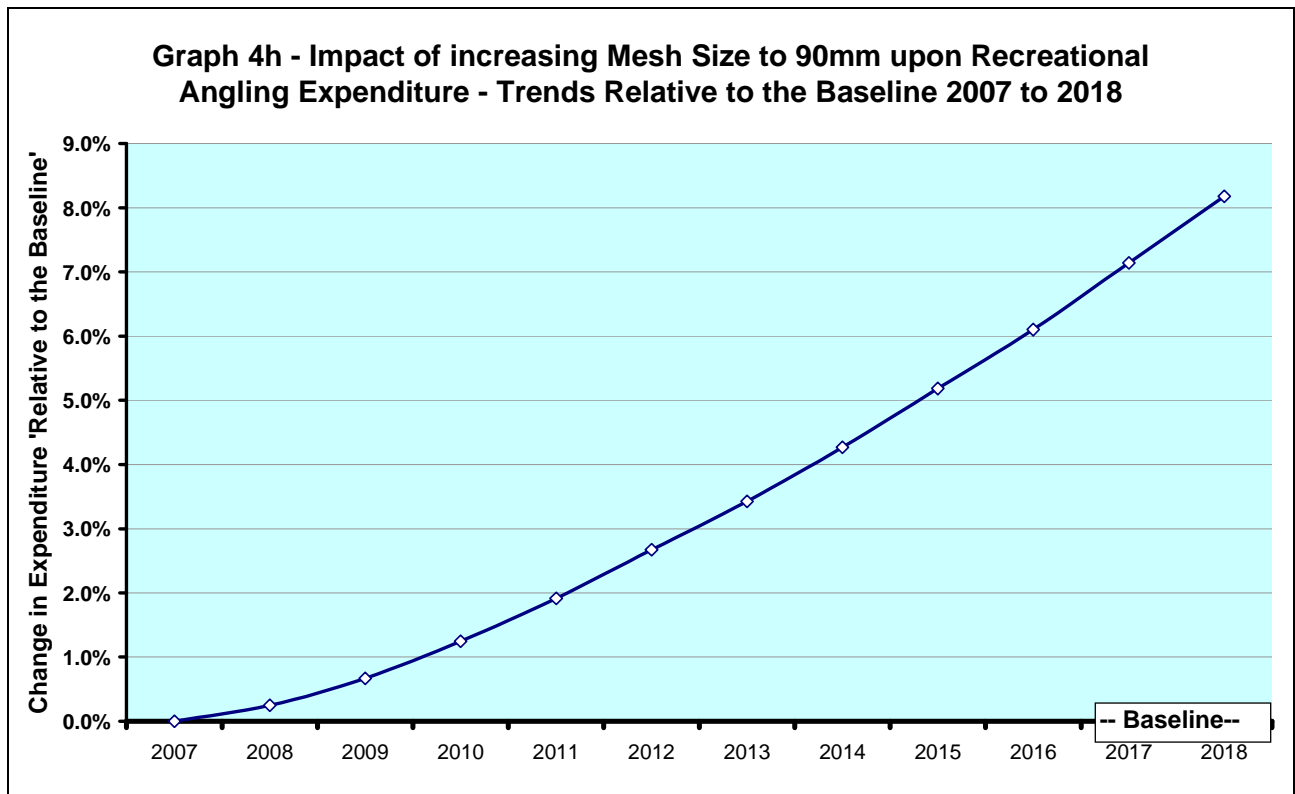
Profitability by Boat Type

General Comments on Revenues and Profitability

Recreational Angling

Graph 4h shows the impact that option 4 is estimated to have upon recreational angling expenditure. The graph shows that expenditure increases gradually '*relative to the baseline*' reaching a level around 8% above the baseline forecast. The reason for this increase is that recreational angling is assumed to be a function of the fish biomass. As per the findings of the Nautilus report the model assumes that more and bigger fish will attract more demand for recreational angling. The outcome of an increase in mesh size to 90mm is that although '*relative to the baseline*' stocks do improve slightly, the degree of improvement is relatively minor compared to more stringent policies.

The likely reasons to explain this are twofold. Firstly, as the option is only directed at the UK fleet, foreign vessels are assumed continue to catching at current levels thus continuing to deplete fish stocks and secondly the option does not have a significant enough impact in itself to substantially improve fish stocks to a level that would impact upon the demand for recreational angling.



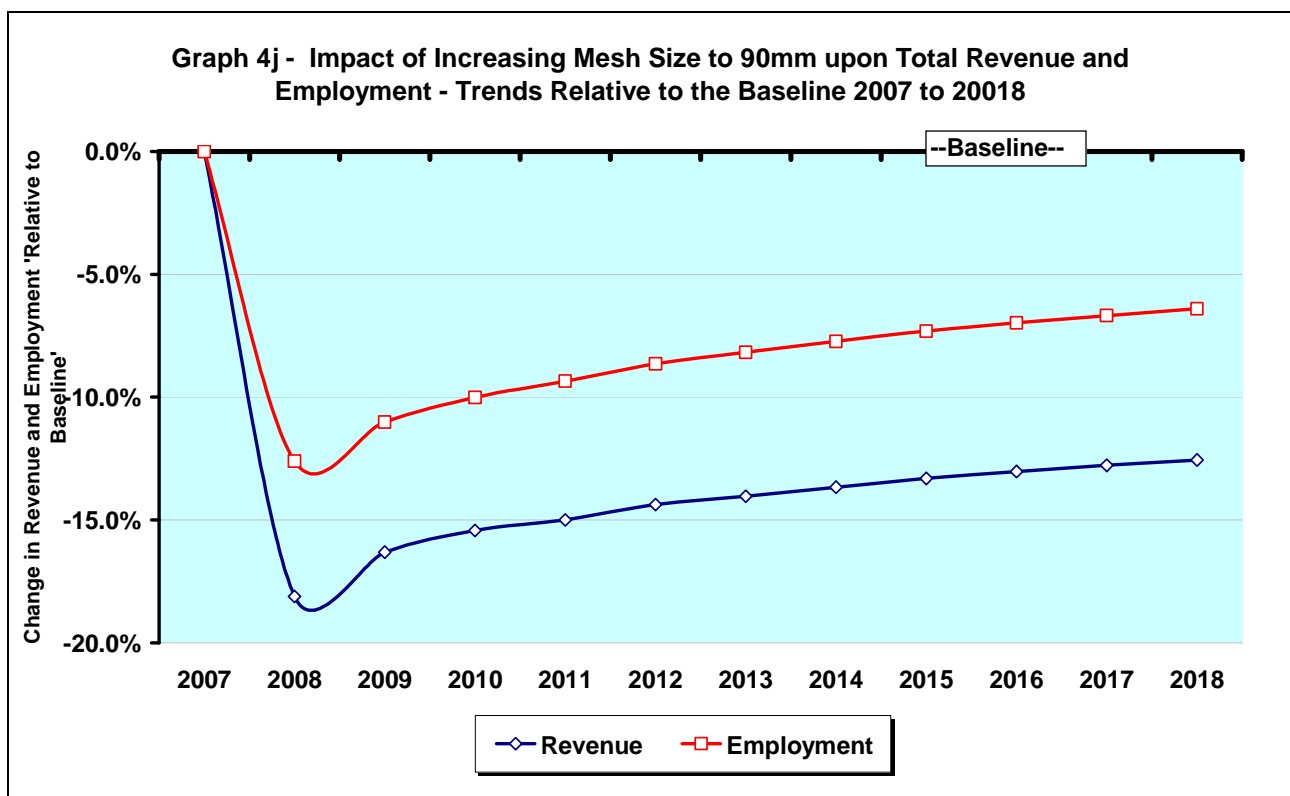
Regional Output and Employment

Commercial and Recreational fishing both create and support output and employment throughout the South West Region. In addition to the ‘direct’ jobs on fishing vessels, there are also many ‘indirect’ jobs in supporting industries up and down the industry supply chain. This would include jobs in sectors such as fish processing, boat repair, retail etc. As vessel catches change over time, these will be translated into changes in direct and indirect revenue and jobs.

Graph 4j shows that an increase in mesh size to 90mm will lead to a loss of both revenue and employment relative to the baseline scenario. In addition to the direct jobs lost on boats there will also be an impact on the wider regional economy as suppliers, merchants and processors are affected by reduced landings. It is difficult to be precise about the extent of these impacts as they are subject to external factors such as fuel costs, productivity changes, improvements in technology etc. What the graph shows is that ‘relative to the baseline scenario’ output would initially fall to around 18% below baseline end up at around 12% below. Employment it is estimated would initially fall to about 12% below the baseline level and end up at around 6% below the baseline. .

Important Note:

- ❖ *It is important to recognise that the graph shows that the impact of this option is a ‘one off’ hit on revenue and employment. It is possible that some vessel owners may be able to withstand this impact and pick up employment in future years as catch revenues and profits recover. In addition, if sale prices for catch increase and costs decline, this may be translated into further increases in profits and possibly employment.*
- ❖ *The extent of this impact reflects the fact that the option is directed only at the beam trawl fleet. The beam trawl fleet is very important in the South West accounting for around half of all commercial fishing revenue. In addition, this sector has a particularly high employment multiplier. This means that although some direct jobs would be lost on beam trawlers, the majority of jobs lost would actually be in the wider regional economy as knock effects from the reduced revenue impact knock on to the rest of the region.*



Comments/Questions on the impact of Option 4 on Recreational Angling and Regional Output and Employment

Recreational Angling

Regional Output and Employment