

Opportunities

There will be some opportunities arising from climate change in the North Sea. Already in west Scotland squid populations are increasing providing new and abundant catches. To decrease carbon emissions offshore wind farms and tidal barges will be used as a means of energy generation. These structures provide a site for reef settling similar to the rocky shore therefore will provide nursery grounds for commercial species especially whiting, crabs and lobsters. New fish species will appear in North Sea waters such as red mullet, John Dory, seabass and triggerfish and these will open new opportunities for local communities to taste different local fish. The economic downfall of recent years has seen people buying produce that has been locally sourced to support their local economy. Warmer summers will also mean an increase in tourism at coastal areas both from home and abroad. This will increase demand in restaurants for local produce.

Adapting to climate change

IMCORE will be looking at and investigating best practice for developing guidelines for adapting to climate change on the coast. These guidelines will be disseminated once the project has finished in November 2011. MCCIP will be releasing an annual report card at the end of 2011 which will outline the main impacts of climate change on commercial fishing. In addition to the Defra are developing a project called ACME that will look at developing climate change adaptation measures in the marine environment.

ForeSea Partners:



IMCORE is a trans-national, innovative and sustainable approach to reducing the ecological, social and economic impacts of climate change on the coastal resources of North West Europe. 17 partners from universities, research centres and local authorities from 9 North West European countries working together to produce capacity for good practice in the climate change adaptation process. More information on the project, the partners and the outputs to date are available online at:

www.imcore.eu



ForeSea is a coastal research and local authority partnership for the North East of England. The North East IMCORE partners comprise of Envision, a coastal consultancy company experienced in training and capacity building, and Durham Heritage Coast (Durham County Council). This partnership has led to the set up of the ForeSea initiative. Information on the ForeSea initiative and the outputs to date are available on the IMCORE website by going to:

www.imcore.eu/durham

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Impacts of Climate Change

Commercial Fishing in the North East of England



How will climate change impact your business and how can you adapt?



Background

There are many cases documenting climate change cases in the UK but very little is known about the impacts of climate change on the commercial fishers. There is an urgency to address these issues as the impacts of over-fishing are crossing boundaries with what may be impacts of climate change. These boundaries are difficult to define but those that are, are referred to in this short informative document. Fishermen need to be informed of the facts and impacts climate change may have on their industry.

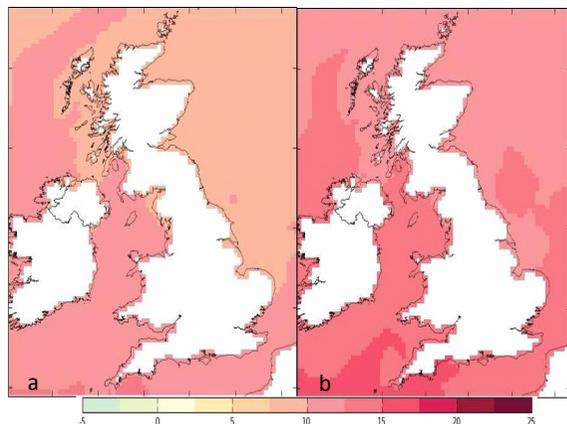
Commercial fishing will be affected economically through changes in fish recruitment, mortality, migratory patterns and growth rate. Some fishermen may be unaware of how these changes may affect their industry and of the options available for adapting to impacts on their business.

Main Impacts

Acidification: The acidity of the North Sea is increasing due to increasing levels of carbon dioxide (CO_2) in the earth's atmosphere. The oceans naturally absorb atmospheric CO_2 but, at present levels this is creating increased acidity in the North Sea. Increase in acidity causes the calcium carbonate (CaCO_3) concentration of the seas to decrease. Many marine animals rely on CaCO_3 for laying down skeletons and shells. With less CaCO_3 animals will be weaker, more prone to damage / mortality. Also they will require energy to lay down a strong carbonate skeleton / shell resulting less energy available for reproduction and feeding. The key commercial species directly affected by a reduction in CaCO_3 will be shellfish and molluscs.

Many marine animals have an internal pH (measure of acidity) which is regulated to a specific level depending on the animal and have some room for buffering any changes in pH outside their bodies. The level at which pH is decreasing in the oceans at present, if set to continue, will be too intense for these buffering systems causing damage to the animals. Experiments have shown that sea urchins and brittle stars are particularly sensitive to changes in pH and cannot maintain usual body function above a specific pH level (pH 7.4).

Temperature: In the North Sea alone the temperature has risen by 1°C over the last 30 years which doesn't immediately appear to be substantial but bear in mind that a change of even 0.2°C can cause



Mean sea water potential temperature for the UK in (a) 1960-1990 and (b) 2070-2090

stress in many commercial fish species. Records from Cefas and the RECLAIM project show that fish are migrating towards northwards to colder waters because of this. Warm water species such as red mullet, John Dory, seabass and triggerfish are increasing in waters and cold water species (such as cod) are declining. Other reports show how fish are moving to deeper depths where waters are colder. Adapting to these measures may mean a change in fishing technique and gear and the species targeted.

A key species in the food chain is plankton and research states that in the North Sea a warm water species is replacing the cold water species and not in the same abundance. This can be fatally detrimental to the survival and abundance of commercial fish species.

Also important in the food chain are sand eels and these are being replaced by pipefish. Pipefish are less easy to digest by chicks of important sea birds leading to increased mortality. This species change is thought to be related to warming sea temperatures but has not been verified.

Overall it will be difficult to forecast the economic impacts of temperature on commercial fishing as it will be dependent on public demand and willingness to change preferable fish type (the warmer species) and on how significant gear and fishing techniques will have to change.

Warmer temperatures may also enable some invasive species to colonise and outcompete native animals. In addition to this the warmer temperature can encourage the growth of pathogens in the water creating harmful algal blooms.

Extreme Events: An increase in wind and storminess will cause an increase in wave height and intensity. Smaller fishing vessels will be most affected as they will be less able to travel in such conditions.

This, inter-linked with the current fishing policies (allowable catches and days at sea) will further decrease the economic viability of the small fishing industry.

Increased intensity in storms can cause damage to fishing gear where more broken gear will be left at sea. There are many accounts of ghost fishing in the sea around the UK and it concerns both pot and net fishermen.

Increased wave strength may affect the breeding and feeding grounds of some fish. Waves may forcibly intrude up freshwater systems affecting the salinity of these areas thus disturbing the ecological balance of the area (i.e. feeding and breeding areas of some fish e.g. salmon, trout and eels). This is also a possible impact of rising sea levels.

Sporadic algal blooms are also a consequence of extreme events and can be toxic to marine life and decrease the amount of available oxygen in the water.