



A veined kalmar squid. Below, oysters, anchovies and a bluefin tuna. Above, a puffin and an arctic skua Main photograph: Reinhard Dirscherl/Ullstein Bild/Getty

With UK waters warming, squid swim in while puffins and razorbills feel the heat

Analysis reveals impact of climate change on wildlife

Sea bird colonies dwindle as fish populations move

Damian Carrington
Environment editor

Squid and anchovies, more commonly eaten by Britons when holidaying abroad, are being drawn into UK waters in large numbers by climate change, according to a report that suggests the nation's long-lost bluefin tuna is also returning.

However, global warming is harming sea birds, such as puffins, fulmars, terns and razorbills, as the fish they rely on are driven north or deeper as waters warm. The analysis of the UK's seas, which draws on the work of 400 scientists, found a steady increase in water temperature.

It also found a clear rising trend in sea levels, leading to much more frequent extreme high-water events. Improved defences and forecasting have prevented an increase in coastal floods, but the report warns that the rise in sea levels around the UK is likely to accelerate.

Squid used to be seen in the North Sea only occasionally but stocks have increased "dramatically", according to the report, with thousands of tonnes caught each year and mostly exported.

"It is an established summer trawl fishery - that is a clear change," said Matthew Frost, chair of the working group that produced the report for the UK Marine Climate Change Impacts Partnership (MCCIP). He said fishing boats had been quick to spot the new stocks.

Anchovies have followed the same path northwards. "You now have an anchovy fishery which is clearly linked to climate change - that is what the science is showing," said Frost.

The anchovies came from the Bay of Biscay, where there is a large Spanish and French fishery and the shift could have political ramifications, he said, especially after Brexit.

Bluefin tuna were common around the UK until the second world war. The decimation of mackerel and herring, which tuna eat, led to their disappearance. But shifting mackerel and herring populations and warming waters have seen the tuna return. Large shoals were seen off southwest England in 2015 and 2016.

The report is an update on the MCCIP's first analysis in 2006. At that time, it found sea bass was becoming more common as temperatures rose. But it had not become established because of overfishing, said Frost: "It is a very popular fish to eat."

However, as fish suited to warmer water move north into UK waters, cold water fish seeking cooler temperatures are moving out, including cod. A dramatic reduction in fishing helped North Sea cod recover to



0.5C

Increase in UK sea temperature per decade, affecting species such as oysters, anchovies and tuna

sustainable levels from near collapse in 2006, but that recovery might have been greater without warming of the sea.

The UK's waters are heating by about 0.5C per decade. "It is really significant in terms of the biology and ecology," said Frost. Part of the reason is that rising temperatures give a higher baseline, making hot spells even more extreme.

Many British sea birds are struggling to cope with climate change with populations of Atlantic puffins, fulmars, black-legged kittiwakes and common, Arctic and little terns all finding the fish they eat harder to come by. Severe summer storms are also having an effect, particularly on razorbills, whose nests can be damaged and whose chicks die more often.

The report also predicts that, over the next century, some species, such as the great skua, Arctic skua and Leach's storm petrel could become extremely rare or even extinct in the UK.

Sir David Attenborough, the naturalist, praised the scope of the report: "Concern about the state of our seas has caused them to be studied more intensively - and extensively - than ever before. They have never been more important."

The scientists also reported increasing acidification of the ocean, as seawater absorbs increasing amounts of carbon dioxide. This may harm the ability of animals to form shells but could benefit some algae and seagrasses.

England and Wales record warmest winter since 1910

Damian Carrington
Environment editor

The winter of 2016 was the warmest logged for England and Wales in records that stretch back to 1910, the Met Office's annual State of the UK Climate report revealed yesterday.

The average temperature from December 2015 to February 2016 was more than 2C above the long-term average across the southern half of the UK.

The report also found that, over the last decade, the number of air frosts has dropped by 7% and the number of ground frosts has dropped by 9%, compared with the average between 1981 and 2010.

The year 2016 was also the first since 1959 when no snow depths of 20cm or more (8 inches plus) were recorded. The winter of 2016 was the second wettest on record for the UK as a whole, just behind the winter of 2014 - which saw serious flooding.

Warmer air can carry more water



Percentage drop in the number of ground frosts recorded over the past decade, compared with the average recorded between 1981 and 2010

vapour and the government's climate change advisers rate increased flooding as the biggest impact of global warming on the country.

Storm Desmond, which flooded parts of Cumbria, Lancashire and the Scottish Borders in December 2015, was made 40% more likely by climate change, according to scientists.

On Monday, the Met Office warned that weather simulations on a supercomputer had shown the UK should increasingly expect record winter rains.

Forecasters predicted that a one-in-three chance that a new record would be set for monthly rainfall during coming winters.

Climate change driven by carbon emissions from human activities is driving temperatures up around the world.

In January, scientists declared 2016 the hottest year in records kept for a century, meaning that a new heat record had been set for the third year in a row.

Global measurements so far in 2017 put the year on track to be in the top three hottest ever recorded, along with 2016 and 2015.

However, in the UK alone, 2016 was only the 13th hottest year recorded during the century.

"The trend towards warmer temperatures is clear, but of course the large natural variations in our climate will mean that increases are not always even year-on-year," said Mark McCarthy, the head of the Met Office's National Climate Information Centre.

Most temperature records based on thermometer data stretch back only a century, but other scientific research indicates the world was last as warm as it is today about 115,000 years ago.

The planet has not experienced the current high levels of carbon dioxide in the atmosphere for four million years.

Study links sugar intake to male depression

Sarah Boseley
Health editor

Men who consume a lot of added sugar in drinks, cakes and confectionery run an increased risk of depression, according to a new study.

Researchers from University College London (UCL) looked at sugar in the diet and common mental health problems in a very large cohort of 5,000 men and 2,000 women recruited for the Whitehall II study, which has monitored the health of civil servants in England since the 1980s.

The researchers have found that men with the highest intake of sugar - more than 67g a day - had a 23% increased chance of suffering a common mental disorder after five years than those who consumed the lowest levels of sugar - less than 39.5g.

The researchers investigated whether men might be eating more sugary foods because they were depressed, but found that was not the case.

The lead author, Anika Knüppel of the UCL institute of epidemiology and health, said: "High sugar diets have a number of influences on our health but our study shows that there might also be a link between sugar and mood disorders, particularly among men ... The study found no link between sugar intake and

'This further supports evidence for action, such as the sugar levy'

Anika Knüppel, lead author

new mood disorders in women and it is unclear why.

"There is increasing evidence for the physical damage sugar has on our health. Our work suggests an additional mental health effect. This further supports the evidence for policy action, such as the new sugar levy in the UK."

People's sugar intake and mental health were measured through questionnaires. One of the problems with dietary studies is that people do not tell the truth about what they eat. But, she said, "it's quite unlikely that people over-report what they eat." So if anything, they would be seeing less of an effect than there really is.

The results in men were very strong, but not so much in women. One reason could be that women are under-represented in the study. But national dietary surveys also suggest that men consume more sugar than women, in spite of the popular assumptions about "Bridget Jones sitting there with her ice-cream bucket", said Knüppel.

Tom Sanders, professor emeritus of nutrition and dietetics at King's College London, had some reservations about the study, which is published in the journal *Scientific Reports*. "From a scientific standpoint it is difficult to see how sugar in food would differ from other sources of carbohydrate on mental health," he said.

Fracking company delivers rig overnight following road protests

Adam Vaughan

A company preparing to start large scale-UK fracking has breached its planning permission by delivering a drilling rig overnight, prompting the local authority to warn it is considering action.

Cuadrilla admitted that around 30 trucks had made deliveries to its Preston New Road site near Blackpool at 4.45am. It has permission to frack at the site later this year.

Campaigners accused the company of bringing in the rig "under the cover of darkness" to avoid protest, and said the move would only strengthen opposition.

The rig will be used to drill a 3,500-metre pilot well, taking samples to find the best spot to drill two vertical exploratory wells, from which the UK's first horizontal shale wells will be drilled.

But Lancashire county council said Cuadrilla had breached the terms of its

planning permission by delivering equipment on heavy vehicles outside of the permitted hours of 7.30am-6.30pm.

A spokesman for the council said: "We are writing to the operator requiring them to put measures in place to prevent a recurrence, as well as considering what further action to take." The council could not say what form that action might take.

Cuadrilla defended its decision to deliver outside of its permitted hours, saying it had done so in consultation with the police, with the aim of minimising disruption on the road outside the site. The company said the road has been closed or reduced to a single lane several times in recent weeks during protests.

The shale industry and ministers have repeatedly promised fracking operations in the UK are covered by strong regulations that will be enforced to avoid the mistakes and environmental damage caused in the US, where the technology took off.