Climate change: Migrant species do well in warm and wet UK in 2019

LONDON: It's been a good year for migrant butterflies, moths and dragonflies in the UK, according to a review of 2019 by the National Trust. The charity says warm and wet weather saw the biggest influx of painted lady butterflies in a decade. But the impacts of drought and wildfires in some parts mean it's not been a good year for natterjack toads and water voles.

The fires saw the habitats of mountain hares impacted as well. Robot maps weeds with 'absolute precision' Moorland barbecue ban welcomed by National Trust Climate change 'harming purple hillside heather'

The changeable nature of the weather in 2019 meant there were mixed outcomes for species around the country. The warm spells in the earlier part of the year saw lots of moths, butterflies and dragonflies from Europe arrive en masse.

Chief among them was the painted lady butterfly. This orange and black spotted species is commonly seen in the UK but the last mass arrival was in 2008. Some 420,000 of the creatures were recorded in this year's big butterfly count. This butterfly has quite the range, capable of

travelling 7,500 miles from tropical Africa to the Arctic Circle. mage copyright National Trust Images & Rob Coleman

Another exotic visitor was the long tailed blue butterfly with 50 seen across the south coast of England. It was the third time in six years that the numbers of this delicate creature appeared to be increasing but successive generations haven't yet made it through a British winter.

There were also large numbers of migrant dragonflies, while a rare moth, the Clifden nonpareil was recorded in Devon. It became extinct in the UK in the 1960s but has been trying to reestablish itself over the past few years.

"Sightings of migrant insects and birds are becoming more common. This is a result of our changing climate," said Ben McCarthy, head of nature conservation and restoration ecology at the National Trust.

"Although this can seem exciting, the obvious flipside is how these changes will start to affect some of our native species already under pressure from intensive land use, habitat fragmentation and climate change." Grey seals around the UK appeared to be doing well despite the 50% mortality rate of seal pups at National Trust locations. Image caption Seal pups have a high mortality rate but overall numbers are up

But some native UK species were under pressure due to the impact of drought and wildfire.

Fires on Marsden Moor at Easter destroyed around 700 hectares of habitats, including those of mountain hares, curlews and twites.

It was also a bad year for natterjack toads, who rely on pools of water in their dune habitats to survive. Many of these dried out in May and June resulting in spawn and tadpoles being lost.

Rangers also recorded the earliest and latest spawning dates of the last decade, perhaps indicating that natterjacks are trying to adapt to a changing climate. Water voles in the Yorkshire Dales also suffered due to the heavy and unexpected rainfall in June, July and September. Sudden flood events swept away many of their offspring who were too young to be able to swim. There were many other species suffering or benefitting from the changeable conditions

Historic England: 10 English archaeological finds of the decade

LONDON: The remains of a Shakespearean theatre, 17th Century shipwreck and bones of Britain's first rabbit have been named among the top 10 archaeological finds of the last decade in England. Historic England drew up the list to mark the imminent arrival of 2020.

Chief executive Duncan Wilson said: "This has been a truly remarkable decade of landmark archaeological discoveries. "The past never ceases to amaze us and there is always more to learn." Must Farm Bronze Age Settlement, Peterborough, Cambridgeshire.

Although archaeologists knew there was something important at this site, it was not until 2015 that a major excavation revealed the remains of a remarkably intact Bronze Age settlement, made up of timber roundhouses raised on stilts above the marshy ground. Shortly after being built, the settlement was destroyed in a catastrophic fire and the roundhouses, with most of their contents still inside, were preserved in the water-logged ground, giving a glimpse everyday life 3,000 years ago.

The excavation, carried out by Cambridge Archaeological Unit and jointly funded by Historic England and Forterra, also led to the discovery of the largest, earliest complete Bronze Age wheel in Britain. The Theatre was built in 1576-7 and is thought to have been the first place to show William Shakespeare's tragedy Hamlet and Christopher Marlowe's Doctor Faustus.

A popular venue, a number of playing companies were associated with it, such as the Lord Chamberlain's Company that included Shakespeare as an actor.

The remains of The Theatre were formally protected in 2016 to coincide with the 400th anniversary of Shakespeare's death.

New Roman graffiti was discovered in the remains of a quarry near Hadrian's Wall at Gelt Woods in February 2019.

Known as The Written Rock of Gelt, the inscriptions were made by the Romans while they were repairing Hadrian's Wall in AD207. It was thought they included a group of nine inscriptions, of which only six were legible, however more have been found including a caricature of the commanding officer in charge of the quarrying and another that proves the Romans were rebuilding their frontier in the early third century.

The graffiti were discovered during a project to record them before they were lost through erosion, work funded by Historic England and carried out by archaeologists from Newcastle University. The London accidentally blew up in 1665 and sank off Southend-on-Sea, where it lies in two parts on the sea bed.

Five years previously it had been part of the flotilla that brought Charles II back to Britain from the Netherlands to restore him to the throne.

It was excavated by Historic England, Cotswold Archaeology and licensed divers between 2014-15 to retrieve important artefacts before they could be lost forever through damaging currents and sea worms.

An array of items including musket balls, ingots and navigational tools were recovered.

An extremely rare and well-preserved wooden gun carriage was also brought to the surface - the only known example from this period in existence. The burnt and mutilated bodies discovered in the deserted village of Wharram Percy could be a sign of a medieval fear of the living dead, archaeologists said.

Medieval folklore held that the dead could rise from their graves, spreading disease and menacing the living.—**Reuters**

Satellite constellations: Astronomers warn of threat to view of Universe

NEW YORK: Astronomers are warning that their view of the Universe could be under threat. From next week, a campaign to launch thousands of new satellites will begin in earnest, offering high-speed internet access from space.

But the first fleets of these spacecraft, which have already been sent into orbit by US company SpaceX, are affecting images of the night sky. They are appearing as bright white streaks, so dazzling that they are competing with the stars.

Scientists are worried that future "mega-constellations" of satellites could obscure images from optical telescopes and interfere with radio astronomy observations. Dr Dave Clements, an astrophysicist from Imperial College London, told BBC News: "The night sky is a commons - and what we have here is a tragedy of the commons."

The companies involved said they were working with astronomers to minimise the impact of the satellites.

Why are so many satellites being launched?

It's all about high-speed internet access. Instead of being constrained by wires and cables, satellites can beam internet access down to the ground from space.

And if you have lots of them in orbit, it means even the most remote regions can get connectivity. To give you an idea of the numbers, there are currently just 2,200 active satellites flying around the Earth.

But as of next week, the Starlink constellation - a project by US company SpaceX - will start sending batches of 60 satellites into orbit every few weeks. This will mean about 1,500 satellites have been launched by the end of next year, and by the mid-2020s there could be a fleet of 12,000.

UK company OneWeb are aiming for about 650 satellites - but this could rise to 2,000 if there is enough customer demand. While Amazon have a constellation of 3,200 spacecraft planned.

Why are astronomers worried?

In May and November, Starlink sent 120 satellites into orbits below 500km.But stargazers were concerned when the spacecraft appeared as bright white flashes on their images. Dhara Patel, an astronomer at the Royal Observatory Greenwich said: "These satellites are about the size of a table, but they're very reflective, and their panels reflect lots

of the Sun's light, which means that we can see them in images that we take with telescopes.

"These satellites are also big radiowave users… and that means they can interfere with the signals that astronomers using. So it also affects radio astronomy as well."

She warns that problem will grow as the numbers of satellites in orbit increase.

What could this mean for research?

Dr Clements believes the satellites could have a real impact on observations. "They present a foreground between what we're observing from the Earth and the rest of the Universe. So they get in the way of everything. "And you'll miss whatever is behind them, whether that's a nearby potentially hazardous asteroid or the most distant Quasar in the Universe." He said it would be particularly troublesome for telescopes taking large surveys of the sky, such as the future Large Synoptic Survey Telescope (LSST) in Chile.

He explained: "What we want to do with LSST and other telescopes is to make a real-time motion picture of how the sky is changing..."Now we have these satellites that interrupt observations, and it's like someone's walking around firing a flashbulb every now and again."

But Prof Martin Barstow, an astrophysicist from the University of Leicester said some of the problems could be fixed. "The numbers of satellites do sound frightening, but actually space is big - so when you superimpose them all on the sky, the density of these things is not going to be very large," he said. "And because the satellites have known positions, you can mitigate. A satellite is going to be a dot in an image and it might appear as a transient burst of light - but you will know about it and can remove it from the image. —**AFP**

Why I spend my weekends ringing birds

LONDON: There is nothing quite like holding wild birds. Their beauty, colours and behaviour never fail to astonish: The blue tit, so common in the UK, turns out to be the most aggressive, pecky little bird imaginable; the goldcrest - the weight of a 20p coin (or a nickel for transatlantic readers) - so tiny; the sparrowhawk, quite a rarity to trap, with its murderous look and talons.

The chance of getting this close to wildlife was one of the factors that attracted me to the surprising and challenging world of bird ringing.

Long before dawn this winter morning, small groups of people all around Britain will wake up to spend several hours in the cold, in marshes, on beaches and sea cliffs. Their goal? To trap birds of as many species as possible in high nets, to measure them, age them, place a lightweight ring with a unique serial number on their right leg and release them, as part of a huge citizen science project which has lasted more than a century now.

Joining this project as a trainee, which I did a little more than a year ago, was a startling and rather humbling experience. It remains so. I've been a birder (not a twitcher, please) for many years, and thought I knew a fair bit about birds, at least in the British context. I could identify many dozens of different species by sight and by their song, even if there are always plenty of people in the bird hides who know more than me.

Actually I knew very little. The migration of birds to and from northern Europe from Africa, yes. The details of that migration, when, how they prepare for these extraordinary journeys, their numbers, how high they fly, no.

What was also a surprise to me was that hundreds of thousands of birds actually migrate to Britain in the winter - not just the geese that descend on Norfolk and other wetlands in such large numbers from even colder places such as Scandinavia, Iceland and Russia, but more everyday birds like robins and blackbirds.

We regard them as British birds, but actually their numbers swell considerably in the winter as their continental cousins come in from elsewhere in northern Europe. The reason why robins sing so much in the winter is because they're defending their territory from "outsiders".

The ringing scheme is intended to establish how these and other migration patterns are working, which birds are on the decline and on the rise. Retrapped birds provide important clues to the health of bird populations. The serial number on their rings is matched to the last time the bird was caught, yielding information about how their weight, wing size, fat and muscle depth has changed.—**AFP**

Are cities bad for the environment?

LONDON: Our cities are increasingly under scrutiny over their impact on climate change. But in terms of carbon dioxide - one of the greenhouse gases responsible for global warming - could life away from the UK's big towns be doing more damage?

According to the most recent government statistics, the UK's 63 largest towns and cities - defined here as built-up urban areas with 135,000 or more people - account for almost half of all of the country's carbon dioxide (or CO2) emissions. London alone makes up 11% of the total.

But are these headline stats masking a more nuanced picture about the role of cities as contributors to climate change?

If we look at carbon emissions on a per resident basis, it could be that life in smaller towns, villages and the countryside has a greater impact.

UK commits to 'net zero' emissions by 2050 BBC Bitesize: How cities are preparing for the future Climate change: Where we are in seven charts

The European Commission calculates UK emissions at 5.7 tonnes per person. That ranks the UK as one of the lowest carbon emitters per person among major economies. The US produces 15.7 tonnes per resident, while China - despite being the world's largest CO2 polluter - emits a mid-range 7.7 tonnes per person. UK government statistics for 2017 place the average slightly lower, at 5.3 tonnes per head.

All but 10 of our 63 largest towns and cities emit below that average, with Ipswich coming out as the greenest major town in the UK from a climate perspective. It emits three tonnes of CO2 for every resident.

Even London, despite valid worries about air quality, has the ninth-lowest carbon emissions per resident at 3.6 tonnes per person.

Meanwhile, energy-intensive steel and chemicals industries contribute to the Swansea area - including Neath Port Talbot - and Middlesbrough (combined with Stockton, and Redcar and Cleveland) having the highest carbon emissions per person in the UK, at 22.4 and 12.1 tonnes per head respectively.

CO2 emissions per person, 2017 (tonnes) Source: Department for Business, Energy & Industrial Strategy

Examining the sources of carbon emissions helps us understand why cities produce comparatively little CO2.

Though the differences are not huge, on average, homes in large towns emit slightly less CO2 per person than their more rural counterparts. They tend to be smaller, denser and easier to heat.

Twelve of the 20 local authorities with the lowest domestic CO2 emissions per person are London boroughs, with Tower Hamlets - which has the second smallest homes of any authority in England and Wales - emitting the least.

One of the biggest differences in carbon emissions comes from transport, with CO2 emissions per head 66% higher away from cities. This is probably because more people drive private cars and make longer journeys for work and leisure.

Just 20% of British city dwellers travel more than 10km (6.2 miles) to work according to the latest Census, compared with a third of those who live away from major towns. Clearly, a lack of comprehensive public transport outside cities is a major factor.

Another significant difference is that economic activity in major towns tends to be more office and service-based, with manufacturing plants largely outside the boundaries of areas classed as cities.

For more on the UK's efforts to tackle CO2 emissions, download the BBC Briefing on energy. Part of a mini-series of downloadable guides to the big issues in the news, it has input from academics, researchers and journalists and is the BBC's response to demands for better explanation of the facts behind the headlines.

As well as being lower emitters per resident, cities are also decarbonising at a faster rate, cutting carbon emissions by 36% between 2005 and 2017, against 31% for other areas.

Although it remains a big polluter, the area around Middlesbrough has seen the biggest fall in emissions - 64% since 2011. This is linked to economic changes, with the closure of its major steelworks likely to have brought down overall emissions.

In contrast, industrial emissions in Slough rose between 2005 and 2017, as a likely result of changes to its local economy. Providing high-quality job opportunities while keeping a lid on greenhouse gas production will be a difficult challenge for cities in the future. While emissions from industrial sources fell by 48%, and domestic sources by 36%, the reduction in emissions from transport lagged at just 11%. This has implications for another major environmental concern of our age: air quality. Transport on UK roads accounts for 32% of all nitrogen oxides, for example, which are linked to respiratory diseases, heart disease and lung cancer, according to 2017 figures. Of all roads that breach legal limits for nitrogen oxides, 88% are in cities.

Why so many people leave London

Exhaust fumes in cities, where traffic volumes are highest, are trapped in by tall buildings. This also causes nitrous oxides to build up, resulting in air quality that is much poorer than it is in more rural areas.

So far only London has taken the concrete step of introducing an Ultra Low Emissions Zone to penalise polluting vehicles in a bid to clear its air.

Other cities will need to confirm and implement similar clean air plans if they are to both improve the air that their workers and residents breathe, and continue the fight against climate change.

While carbon dioxide is a key focus of climate change policy, it is far from the only pollutant affecting cities. Others include: —**Reuters**