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Responsibility

Equipping fish with sensors may improve climate change monitoring and weather forecasting

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By Responsible Seafood Advocate

'We can literally turn animals into flying, swimming and walking weather stations,' say researchers

Equipping fish, birds, seals and other creatures with sophisticated sensors can offer localized and timely data on environmental conditions impacted by climate change that current technology cannot, a new study concludes.

"We can literally turn animals into flying, swimming and walking weather stations," said Diego Ellis Soto, a Ph.D. student at Yale University. "Animals equipped with modern sensors could be seen as the 21st-century version of the canary in the coal mine."

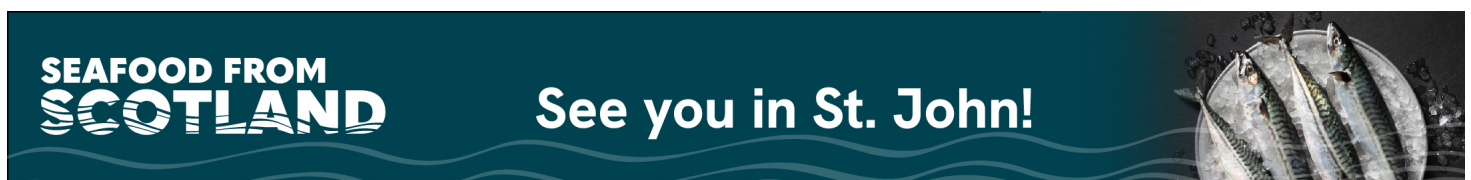
The study, which was published in *Nature Climate Change* (<https://www.nature.com/articles/s41558-023-01781-7>), describes the shortcomings of current methods of collecting weather and climate data and the benefits of equipping animals with sensors. Currently, scientists rely on an elaborate network of satellites, ocean buoys, weather stations, balloons and other technologies to help predict the weather and assess the global effects of climate change on terrestrial landscapes, oceans and the atmosphere. But the researchers say that this overlooks some of the most sensitive and informative instruments of



Equipping fish and other animals with sensors can provide localized and timely data on environmental conditions impacted by climate change. Photo by [Guryan \(https://www.pexels.com/photo/underwater-view-of-swimming-sharks-13476998/\)](https://www.pexels.com/photo/underwater-view-of-swimming-sharks-13476998/).

all – the world’s animals.

By tagging animals with such technologies, researchers at Yale’s Center for Biodiversity and Global Change (BGC Center) and the Max Planck Institute of Animal Behavior say that scientists can improve their measurements of air temperature, ocean salinity and air pollution as well as the animals’ own metabolism. In doing so, animals can help scientists fill critical data gaps, particularly in remote parts of the planet.



(<https://events.seafoodfromscotland.org/>).

“Animals can be our fine-tuned biological weather stations,” said Martin Wikelski, co-author and director of the Max Planck Institute of Animal Behavior.

Using animals to monitor conditions also offers the opportunity to collect data that is more localized and comprehensive. Satellites, for instance, can give a rough approximation of conditions in sub-Saharan Africa at a resolution of one square kilometer.

“[But] a white stork with sensors can give us a bird’s eye view of conditions on the ground in seconds,” Ellis Soto said.

Can artificial reefs in seagrass meadows help protect the ocean against climate change?



A new study finds that artificial reefs can bolster seagrass growth in the tropics and help mitigate climate change.



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Another example: Ocean seagrass is one of nature’s crucial ways to capture carbon emissions that fuel climate change. Scientists have been able to find many concentrations of oceanic seagrass by following the movements of sensor-carrying tiger sharks, which are known to be attracted to mangroves and sea grass. Thus, by combining knowledge of animals’ ecologies with technological advances, researchers can remotely monitor hard-to-access regions across the world.

Benefits extend beyond the purely wild areas of the world. With many regions enduring extreme heat this summer, carrier pigeons helped identify dangerous urban heat islands – urban areas that are significantly warmer than surrounding regions – and air pollution levels in heavily populated areas.

“We are advocating for an existing byproduct of many modern GPS tracking devices that few meteorologists and biologists are using,” Ellis Soto said. “It is an untapped gold mine of detailed meteorological information with relevance for weather forecasting and biology alike.”

[Read the full study here \(https://www.nature.com/articles/s41558-023-01781-7\)](https://www.nature.com/articles/s41558-023-01781-7).

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