

Underwater acoustic world of British ponds revealed in new study

April 25 2023



Old Sneed Park. Credit: Dr Jack Greenhalgh

The previously hidden and diverse underwater acoustic world in British ponds has been revealed by a team of researchers at the University of Bristol.

Ponds are magnets for life and a lot of that life is very noisy. Water beetles, bugs, fish, frogs, and even aquatic plants all produce sound creating a diverse underwater orchestra that scientists are only just starting to understand.

Acoustic monitoring has been shown to effectively survey birds and monkeys in rainforests, and marine mammals in the oceans. However, freshwater environments have remained largely unexplored despite their diverse soundscapes.

"Ponds are packed full of bizarre and mysterious sounds made by scratching [aquatic insects](#), booming fish, and popping plants. It's like an underwater disco," explained lead author Dr. Jack Greenhalgh from Bristol's School of Biological Sciences.

Water beetle



Water boatman



Freshwater life. Credit: Dr Jack Greenhalgh

To better understand these mysterious soundscapes, the team collected 840 hours of underwater sound recordings from five ponds in the southwest of England using an underwater microphone (a hydrophone). In findings published in the journal *Freshwater Biology*, analysis of the audio files revealed clear daily acoustic activity cycles in each pond.

Typically, a nocturnal chorus is made by aquatic insects that compete to attract mates by producing strange scratching sounds as they rub their genitals against their abdomens. During the daytime, however, [aquatic plants](#) dominate the underwater orchestra with rhythmic whining and ticking sounds produced as tiny oxygen bubbles are released by plants respiring in the hot sun.

Prof. Gareth Jones said, "Recording animal sounds has provided great advances for monitoring and surveying terrestrial animals remotely. Given the rich diversity of underwater sounds that is only now being revealed, the potential for assessing the health of freshwater ecosystems is great, especially with low-cost monitoring devices now becoming available."

Using this acoustic method, the presence of species, and a determination of ecological health, can be inferred simply by listening to the [natural world](#) without disturbing the environment or harming the plants and animals within it. This research is the first to provide a detailed description of [pond](#) soundscapes in the U.K. and will help inform the acoustic monitoring of freshwater ecosystems to help prevent irreversible species loss due to [climate change](#) and [habitat loss](#).

"Freshwater habitats such as ponds, lakes and rivers, are vitally important for biodiversity. This study shows how we can use soundscapes to learn more about the daily cycles of freshwater life, and gives insight into how we can use sounds to learn about the species that live within our [inland waters](#)," concluded Prof. Martin Genner.

More information: Jack A. Greenhalgh et al, Diel variation in insect-dominated temperate pond soundscapes and guidelines for survey design, *Freshwater Biology* (2023). [DOI: 10.1111/fwb.14092](https://doi.org/10.1111/fwb.14092)

Provided by University of Bristol

Citation: Underwater acoustic world of British ponds revealed in new study (2023, April 25)
retrieved 25 April 2024 from

<https://phys.org/news/2023-04-underwater-acoustic-world-british-ponds.html>

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