

Dr Jill Crossman

Hydro-ecologist working on water quality, climate-change adaptation and flood-risk assessment in the UK, Alaska and Canada

Wilderness survival training rarely features on the list of skills acquired during a PhD, but for Jill Crossman it was essential. She had to learn how to run a fieldwork programme in the challenging terrain of Alaska, where she was studying the hydro-ecology of streams. The training was invaluable when she was faced by a charging bear: “You just stand there and wave your arms and shout really loudly, and make sure the person you are with doesn’t run away.” The bear got within ten feet before it eventually stopped.



Today, Jill divides her time between continuing her research into groundwater-fed streams in Alaska, about which she is “passionate”, and applying her knowledge to address critical environmental problems. As a post-doctoral researcher at the University of Oxford, she uses the skills in ecology, taxonomy, hydrology, remote sensing and mathematical modelling that she gained on her PhD to work on methods of improving water quality and reducing flood risk.

Jill has worked with the UK water industry to improve the quality of **UK rivers** including the Thames and the Avon, demonstrating the importance of tackling sewage discharges and fertiliser run-off, which can cause algal blooms, threatening drinking water supplies and damaging ecosystems. She is now taking this a step further by working with farmers in Canada to develop best-practice guidelines that help them to find the best way of reducing the run-off of phosphorous from fertilisers, such as by applying less fertiliser at certain times of year, or by planting buffer strips of vegetation along river banks.

She is now helping to run the **Macronutrient Cycles Programme**, which is a broad research initiative working with the EA, DEFRA, and the Scottish and Welsh Governments, investigating the way that nitrogen, phosphorus and carbon move through the environment, taking into account the impacts of climate change. The results of this programme are helping policy makers to plan the best way to protect water supplies from the threats of acidification and eutrophication (nutrient overload).

In Alaska, Jill is assessing the **threat posed by melting glaciers**, which can wash away soil nutrients as well as posing a flood risk to people living downstream. “My flow gauging and modelling of the river was the first that has ever been attempted, and supported the Park Service in their case for flood protection funding,” she says.

As well as an impressive array of technical skills, including developing a new way of processing remote sensing data to identify groundwater-fed springs and streams, Jill found her PhD gave her

“the confidence to stand up in a room full of experts and assert your opinion”. She also gained a wide network of contacts through attending conferences, which is very helpful in her work today.

Perhaps more unusually, she learnt skills in people management and interviewing techniques through having to recruit field assistants for her trips to Alaska and Canada. “You go through CVs and interview people, then once you’re in the field you have four months of either sharing a hut with them, or camping in a tent next to them. You have to become a much more professional, patient and understanding person!”

NERC funded Jill’s PhD as well as her MSc in Catchment Dynamics and Management. Having only graduated from her PhD just over two years ago, she has already first authored six papers, with co-authorship on an additional three. She has been awarded four travel grants to present her work internationally, and Jill hopes that there is much more to come yet. “I couldn’t have done any of this without NERC,” she says, “and I’m incredibly grateful.”