

Murky past of Britain's rarest duck revealed by Big Ben

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The downfall of Britain's rarest duck, the common scoter, could be written in the murky sediment at the bottom of lochs in the Flow Country, the UK's largest expanse of wetland.

To find out, scientists from WWT and UCL have been driving a giant sediment corer known as [Big Ben](#) into the bottom of the lochs. Big Ben removes cores made up of the layers that have built up over 30 to 50 years.

Like an archaeologist digging down through time, but in miniature, WWT's Hannah Robson painstakingly sliced the cores and is now analysing each layer for microscopic fossils. By looking at what food was available and other factors, she can reconstruct the ecological history of the lochs and compare those where scoters still nest with those that have been abandoned.

Over the same period, the number of common scoters breeding in the UK has fallen steeply and is down to just 40 pairs confined to remote parts of Scotland.

Hannah Robson said:

"The wetlands of the Flow Country are an incredible place. More than double the amount of carbon is stored here than in all the UK's forests combined. And many of the UK's most at-risk birds breed here. But the one that brings me here is the biggest concern of all: the inappropriately named common scoter.

"There's much speculation as to what has pushed the UK's breeding scoters so close to the edge, but so far no definitive answer. So we're taking a painstakingly detailed approach – analysing the sediment that builds up over decades at the bottom of the lochs for the microscopic fossilised remains of insects, aquatic plants and algae. We hope to reveal the causes of the scoter's decline and also, crucially, be able to recommend what needs to be done to help it recover."

One of Hannah's supervisors Dr Viv Jones of UCL explains:

"We use lake sediments to record pollution and climate change in locations around the world but this is an exciting opportunity to examine the reasons for species decline in one of the UK's most unique ecosystems."

The research into breeding scoters in the Flow Country is a partnership between WWT and UCL and is co-funded by the Natural History Museum and Scottish Natural Heritage and supported by Royal Society for the Protection of Birds.

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Notes:

- Scoters are stocky black ducks that spend most of the year at sea, coming inland for just a few months to breed on lochs and lakes.
- Scoters can dive several metres underwater to feed on shellfish and crustaceans.
- Relatively little is known about scoters compared to other ducks. More than 50,000 previously unknown scoters were found to be wintering at Shell Flat, a sandbank just off the coast of Lancashire, within the last 20 years.
- Though tens of thousands winter off UK shores, just 40 pairs come ashore to breed (the others head to other breeding grounds in Iceland and the Arctic). That number is declining fast. The few nests that remain are in the most remote parts of Scotland and Ireland.
- WWT is diagnosing the problem and looking for solutions to help the scoter.
- The "Big Ben" corer was designed and built by researchers and technicians at UCL [here](#), much wider than traditional corers it allows more material to be collected per slice which enables more fossil indicators to be examined per core. Two current and two historic breeding lochs were selected for coring. The process of analysing these cores is underway in the laboratories of both UCL and Slimbridge.
- Initially 18 lochs were analysed (nine actively used by scoters and nine recently abandoned)

using a small corer. Geochemical analyses (loss on ignition and X-ray fluorescence analysis) of samples along the core lengths were used to examine the stratigraphy (position of layers/sediment deposition) of the lochs. The tops and bottoms of these cores were analysed for Chironomid (non biting midge) and Diatom (algae) fossil remains. Diatoms are sensitive to shifts in water quality and habitat availability and are valuable indicators of ecosystem change especially changes in productivity and pH. Chironomids are useful for detecting trophic change and past changes in macrophyte structure and abundance. Chironomid abundance has also shown clear relationships with the breeding success of water bird populations at other sites (Slavonian grebe (*Podiceps auritus*) at Loch Ruthven [here](#)).

- The larger cores will be analysed at near annual resolution for a number of fossil indicators including diatoms, chironomids, cladocera (waterfleas), aquatic plants and invertebrate remains. This will help reconstruct each lochs recent history (the last 30-50 years). When examined in conjunction with annual scoter breeding records for the lochs this could provide insights into common scoter decline and identify potential conservation solutions.

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