

UK chalk-stream salmon genetically unique

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The Frome -- a chalk stream. Credit: University of Exeter

Salmon from the chalk streams of southern England are genetically unique, researchers have discovered.

The fish are classified as Atlantic [salmon](#) (*Salmo salar*), but research by the University of Exeter and the Game and Wildlife Conservation Trust shows their genes are distinctly different from others of the species.

The researchers studied five chalk streams in Hampshire and Dorset - habitats they said were under "massive pressure" from human activity.

Classifying chalk-stream salmon as a separate sub-species could make it easier to protect them.

"Our study provides evidence of the genetic distinctiveness of chalk-stream Atlantic salmon in southern England," said Dr Jamie Stevens, of the University of Exeter.

"They are as different from their non-chalk cousins as the salmon of the Baltic are, and people have suggested the Baltic fish should be classified as a sub-species.

"While we found distinct differences between chalk and non-chalk salmon, we found little genetic differentiation within chalk-stream populations."

Chalk streams - which originate in chalk hills and are generally wide and shallow with clear water - are fed by underground aquifers and have steadier flow rates and more stable temperatures than most other rivers, and are less acidic.

Of the 161 rivers classified as chalk streams by the Environment Agency, only five contain significant populations of salmon. These - the Frome, Piddle, Avon, Test and Itchen - were the focus of this study.

Chalk-stream salmon - like other salmon - spend long periods at sea and swim hundreds of miles, but return to breed.

Some salmon return to the exact river where they were born, but Dr Stevens said genetic evidence suggested that may not be the case for chalk-stream salmon.

"We found evidence of quite a bit of mixing of genes between the rivers we studied," he said.

"Rather than coming back to a specific river, they may just home to the chalk rivers generally.

"We can't be sure of that, but the level of similarity suggests that there's ongoing gene flow between these rivers."

Dr Rasmus Lauridsen, of the Game and Wildlife Conservation Trust, said: "Fish research at the Trust is centred around the river lab at East Stoke, Dorset, where we have been monitoring Atlantic salmon numbers in the River Frome since 1973.

"We know that chalk streams are very productive and [juvenile salmon](#) in these rivers generally migrate to sea after just one year, whereas young salmon in other river types typically leave freshwater at 2-3 years.

"Chalk-stream salmon are adapted to fast freshwater growth and it is unlikely that they could be replaced if anthropogenic stressors were to drive them to local extinction."

So should chalk-stream salmon be classified as a sub-species?

Dr Stevens says yes.

"They certainly fit the criteria for being a sub-species - they are a genetically unique group with a well-defined distribution, associated with a distinctive habitat," he said.

"About 85 per cent of the world's chalk streams are in the UK, and the fish we studied are in an area of southern Britain that's under massive pressure from human activity.

"These streams begin in agricultural areas, which brings a threat from pollution, and they pass through major urban areas to reach the sea around places such as Southampton, Portsmouth and Poole.

"This is a precarious position for these salmon, and classifying them as a sub-species could aid efforts to protect them."

The paper, published in the *Journal of Fish Biology*, is entitled: "Atlantic salmon *Salmo salar* in the chalk streams of England are genetically unique."

More information: Atlantic salmon *Salmo salar* in the chalk streams of England are genetically unique, *Journal of Fish Biology* (2018). [DOI: 10.1111/jfb.13538](https://doi.org/10.1111/jfb.13538)

Provided by University of Exeter

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