



GRAYLING'S DEMISE

This is the last known record of fishing for the now-extinct grayling, on the Waiapu River on the East Coast in March 1923. The men are using a hinaki (trap), which is weighed down with a rock. On this occasion they caught 30–40 fish. Photo: Alexander Turnbull Library.

Poor water quality may have led to the grayling becoming extinct in 1923, according to new research published by the University of Auckland. By **Anne Beston**.

It is the only known New Zealand freshwater fish to have gone extinct, but the speed at which the upokororo disappeared forever has remained something of a puzzle.

Now a new study has shown the missing piece of the puzzle may have been poor water quality and degraded habitat from human activity around the time of European settlement.

The extinction of the New Zealand grayling (*P. oxyrhynchus*) was remarkably rapid ecologically speaking. Still common in 1860, the fish was being reported as scarce by the early 1900s, with the last-ever catch recorded in 1923.

Despite unverified sightings in later decades, there is no official record of the fish being seen again after that date.

"In ecological terms, this was fast," says University of Auckland PhD candidate Finn Lee, who, along with Professor George Perry from the School of Environment, has carried out the first-ever comprehensive study on why upokororo became extinct when other freshwater species managed to survive.

Up to now, it was widely assumed habitat degradation, over-fishing, and the introduction of trout, a key predator of larvae and juvenile upokororo, were the three drivers.



Finn Lee.

Because upokororo are a shoaling species, and numbered in the tens of thousands if not millions, they were easy prey for fishers who killed them in huge quantities, often chasing them into a confined space and scooping them up in nets. They were so abundant, they were used as fertiliser on market gardens – a similar story to whitebait.

But habitat degradation, fishing, and predation by trout don't fully explain the speed of upokororo's disappearance or why they disappeared from isolated pristine rivers.

After examining hundreds of historic records and using modern data modelling techniques, Mr Lee and Professor Perry say another factor may have been the nail in the coffin for upokororo.

That was the species dispersal strategy. Upokororo were amphidromous – they migrated from river to sea and back, spawning in freshwater and developing to maturity in saltwater – but it's believed they did not instinctively return to the place they were born.

This meant they returned to breed in rivers and streams of poor water quality or inhabited by trout, and this in turn led to what ecologists call population "sinks".

Sinks is the term used to explain a "sinking lid" ecological theory where once-healthy populations do not reproduce at a rate high enough to establish sub-populations and so populations slowly sink.

"Our modelling shows these population sinks could be the vital missing link," says Finn.

"We factored in over-fishing and predation by trout,



Upokororo: This anatomically correct drawing of the extinct grayling was created for Forest & Bird by Margaret Tolland with the assistance of freshwater ecologist Stella McQueen.

and, while those things made a big difference, once we factored in dispersal among rivers and lower breeding rates from poorer quality habitat, then it clearly showed how the fish became extinct so fast."

The researchers say the study has significant implications for other freshwater fish, 76% of which are at risk or under threat of extinction. In particular, there are concerns over whitebait, and whether current restrictions are enough to protect them.

Professor George Perry says New Zealand, like other countries, faces big challenges to protect its freshwater species, but, for history not to repeat itself, we need to know what happened in the past.

"Globally, freshwater ecosystems are under immense strain, facing habitat loss, invasive species, climate change, and over-exploitation, so understanding what happened in the past might allow us to stop extinctions of freshwater biota in future."

Forest & Bird's freshwater advocate Annabeth Cohen agrees, saying it's vital to end habitat destruction, protect spawning sites, and improve water quality.

"We are worried for the migratory galaxiids (whitebait) – four of these precious species are at risk or threatened with extinction. As with the grayling, being on the brink means a population can collapse without much warning," she says.

The study was published in *Freshwater Biology*.

India's dawn chorus

Join us for a fully escorted, small-group, bird-lovers and wildlife tour in north India. 20 days, departing 11 October 2020.

India's diversity of habitat types and altitudes give it a rich bird life. It has over 1200 bird species including 70 raptors, 30 duck and geese species, and 8 stork varieties.

We visit 5 magnificent National Parks: in the Himalayas, the Ganges Plains and on the Deccan Plateau. In this season we will also see masses of migratory birds from north Asia. And wildlife, including tigers, is a bonus.



Colour India

Contact: colourindia.co.nz | elight@kiwilink.co.nz
09 422 0111 | 021 235 3932

Della Premium property specialist
- RANDALL - DELLARANDALL.CO.NZ



Forest and Bird Paradise

42 Manu Grove, Waikanae - Priced to sell. Idyllic, tranquil, unparalleled.

This stunning *Kāpiti* building opportunity shares a valuable, covenanted remnant of coastal lowland forest with the renowned *Ngā Manu Nature Reserve* and bird sanctuary. Never have we had the privilege of marketing a site quite like this 1,138 hectare botanist's haven. The *Ngā Manu Nature Reserve* contains 700 different species of native plants; from grasses and ferns to 400 year old kahikatea trees. It is a sanctuary for up to 50 different bird species - the stepping stone for birds from *Kāpiti Island* and the *Tararua*s. As well as the glorious birdsong, this property has its own natural pond to attract native waterfowl. Yet, you can build your home only five minutes drive from *Waikanae*'s shops and schools - and the commuter train into *Wellington*.

Asking price \$698,000 View online www.dellarandall.co.nz/properties
Contact us call 0800 222 233 or email care@dellarandall.co.nz

DELLA REALTY GROUP LIMITED LICENSED UNDER REAA 2008