A genetic lift puts perch back in the swim

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Four species of freshwater native fish brought to the brink of extinction by drought are being re-released into the lower Murray wetlands, and thanks to Flinders University research, they have an improved chance of survival.

The fish have been bred in captivity at Flinders University from animals rescued from their habitat before it dried out in 2007.

At the initial release of 1,ooo southern pygmy perch near Hindmarsh Island, the Premier, Mr. Jay Weatherill, said that their return is a significant milestone in the environmental recovery of the lower Murray and Coorong, Lower Lakes and Murray Mouth region.

Genetic research by Professor Luciano Beheregaray and his team has enhanced the prospects for reestablishment of the southern pygmy perch (pictured) and three other endangered species.

The research, which was funded by a Linkage Grant from the Australian Research Council (ARC), involves Dr James Harris and other researchers from Flinders with five industry partners: the SA Department of Environment and Natural Resources, the SA Murray Darling Basin Natural Resource Management Board, the SA Museum, Native Fish Australia and PIRSA Fisheries.

As Director of the Molecular Ecology Group at Flinders, Professor Beheregaray's research has attracted over $3 million in funding in the past two years, including four major projects funded by the ARC.

Professor Beheregaray said that using techniques similar to those used to establish paternity in humans enabled the fish to be bred so as to avoid inbreeding.

"We set up breeding groups separate from each other, and we are reintroducing equal numbers of the families from each group into the wild," Professor Beheregaray said.

"Because of the small numbers – up to 80 of each species – retrieved from the wild, this is really their only shot at reestablishment, so we have to get it right. Genetics plays a crucial role in informing how the captive breeding program is managed."

As well as their own intrinsic importance to biodiversity, the fish will act as a valuable indicator of the health of the water system, both in terms of water quality and flow.

A second, more complex part of the fish genome is being used to identify genetic lines that provide more natural resistance to environmental hazards such as disease.

"If you have fish that are unable to fight an outbreak of disease, then an

entire family can be wiped out in one season," Professor Beheregaray said.

And by sampling and analysing the fish that successfully survive in the wild, the researchers will gain a better understanding of the genetic variations that they want to preserve and promote in captive populations.

Professor Beheregaray said while most of his current ARC funding is focused on projects related to freshwater ecosystems, genetic and genomic research in the Flinders Molecular Ecology Group extends to marine creatures including sharks, dolphins and whales, as well as giant tortoises, lizards, wombats and butterflies.

"By comparing genetic patterns across several species from the same region, we can assess the impact of factors such as climate change and habitat fragmentation in the genetic diversity of populations," he said.

"This is critically important information for conservation efforts because genetic diversity is the fundamental level of biodiversity."

Provided by Flinders University