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Meet our June meeting's presenters: Dr Lauren Veale and Lachlan Farrington

Restoration of coastal wetlands assisting in the recovery of threatened native fish

By Dr Lauren Veale

In the South East of South Australia, extensive artificial drainage and subsequent habitat loss, coupled with periods of extended drought, has led to the decline in several key native species, including the nationally vulnerable dwarf galaxias (*Galaxiella pusilla*) and Yarra pygmy perch (*Nannoperca obscura*). These species are endemic to south-eastern Australia, and typically favour the densely vegetated habitats of freshwater wetlands.

The role of hydrological restoration of wetlands is now recognised as a key activity for improving habitat availability and long-term recruitment opportunities for many of these native fish species. Perhaps the most pertinent example comes from Pick Swamp, a former grazing

Aquatic ecologist, Dr Lauren Veale (Nature Glenelg Trust)
Photo: Nick Whiterod

Dwarf galaxias habitat at Pick Swamp in 2014.
Photo: Lauren Veale

property which was rehabilitated through the regulation of artificial drainage outflows. Fed by the rising springs of the Piccaninnie Ponds Karst Wetland system, this restoration program resulted in a recreation of shallow, seasonal habitat across a much wider wetland complex and greatly aided population recovery of dwarf galaxias in particular.

Over the past twelve months, ecologists at Nature Glenelg Trust have been undergoing a series of restoration works to restore the natural hydrology of Long Swamp; another important coastal wetland over the border in south-western Victoria. In partnership with key community groups and with the funding support of the Victorian Government, the final phase of restoration has just been completed and aims to achieve similar ecologi-

A male and female Dwarf galaxias (*Galaxiella pusilla)*
Photo: Michael Hammer

cal outcomes for aquatic species like dwarf galaxias. Historic flows from the continuous chain of wetlands that constitute Long Swamp and the Glenelg River estuary (where it flows into) were interrupted several decades ago by two artificial ocean outlets. While one of these outlets closed naturally during the Millennium drought, the current restoration phase aims to partially or wholly restrict flows out of the second outlet at Nobles Rocks.

The final structure, which consists of just under 7000 sandbags, was built with substantial community volunteer support and completed over nine days during April in 2015. Ecologists at NGT, along with community members, now excitedly await the response of native flora and fauna in Long Swamp. Increases in available aquatic habitat and enhanced connectivity achieved through restoration are expected to allow dwarf galaxias and other important native species the opportunity to colonise new areas of the wetland and further contribute to the recovery of these species.

Deakin University students, Liam Turner and Callum La Spina, setting fyke nets in Oxbow lake, east south east of Long Swamp. *Photo: Lauren Veale*

The first fish assessment of Long Swamp was undertaken only recently (2012) by Nature Glenelg Trust and highlighted the ecological significance of this freshwater wetland. Subsequent monitoring in autumn and spring of 2014 was undertaken prior to restoration by aquatic ecologist, Lauren Veale. Monitoring in 2015 is currently underway and will soon provide crucial insight into the short-term native fish responses to restoration.

A concomitant study, undertaken in association with Deakin University, will provide the first detailed account of fish communities in the conjoining estuarine and marine environments of Oxbow Lake and the Glenelg River estuary. Since recent restoration works have led to the almost complete closure of the last remaining artificial outlet, the study will specifically assess the degree to which key diadromous species penetrate into lower Long Swamp from nearby estuarine and marine waters and thereby utilise Eel Creek - the reinstated but original migratory route.

The phase 3 trial structure (foreground) has begun to regulate wetland levels in Long Swamp (background) by restricting flows from the Nobles Rocks outlet. *Photo: Mark Bachmann*

Burrowing crayfish of Victoria's far South West

The Hairy Burrowing Crayfish *Engaues sericatus* and burrow
Photo: Lachlan Farrington

Discovering the hidden secrets of the cryptic burrowing crayfish

By Lachlan Farrington

Ecologists Lachlan Farrington and Lauren Veale at Nature Glenelg Trust have been working with community groups, landholders and regional schools to unlock some of the mysteries surrounding two of western Victoria's least known wetland species, the Hairy Burrowing Crayfish (*Engaeus sericatus*) and the Portland Burrowing Crayfish (*Engaeus strictifrons*). While both species are listed as vulnerable in Victoria, very little is currently known of their ecology.

To address this large knowledge gap, the Trust was awarded grant funding by the Department of Environment and Primary Industries, Victoria and Glenelg Hopkins Catchment Management Authority to determine the current distribution, threats and habitat requirements of these species and increase community awareness on the importance of their conservation. While these critters are known to play vital roles in ecosystems through aerating soils and recycling nutrients, they're trademark burrows also provide a window into past and present wetland extents and areas of groundwater interaction.

Students from Port Fairy Consolidated School getting involved in crayfish surveys at a local freshwater wetland
Photo: Lachlan Farrington

Over the wetter periods, crayfish are busy maintaining their intricate underground homes. Like engineering masters, they bring soil pellets to the surface of their burrows and form 'chimney-like' structures, which can be visible along roadside drains or in low-lying pastoral or wetland areas. These damp habitats allow crayfish to burrow down to the water table (sometimes up to 2 m below ground).

The hairy claw of the Hairy Burrowing Crayfish *Engaeus sericatus Photo: David Mossop*

The Trust has been working with students at Hawkesdale P-12 College, who have been keeping a watchful eye on a colony of crayfish burrows spotted along a nearby creek. Students at Port Fairy Consolidated School have also been actively taking part in surveys along a freshwater wetland on a nearby private property. These students have become citizen scientists by recording the location and number of crayfish burrows they see along their bus routes, taking notes on adjacent land-use and helping to formulate ideas on threats and threat management.

While previous monitoring has used sampling methods that have either been inefficient or destructive, the Trust has recently teamed up with researchers at La Trobe University to explore alternative methods to extract DNA from soil samples (collected from burrows). These new techniques offer great potential for determining if a crayfish is present, and indeed which species it belongs to, without the need for capture. This will make monitoring easier and ultimately improve our understanding of these lesser known but fascinating wetland species.