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The Western Dwarf Galaxias (*Galaxiella munda*), a recent addition to Australia's threatened species list

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The Western Dwarf Galaxias (*Galaxiella munda*) is endemic to the extreme south-western corner of Australia, where its biology is strongly influenced by the prevailing Mediterranean climate. The species was described in 1978 (McDowall, 1978) and was placed in the newly erected genus *Galaxiella* along with two other species, *G. nigrostriata* (Shipway, 1953), endemic to south-western Australia (see Morgan et al. 2024), and *G. pusilla* (Mack, 1936), distributed in mainland south-eastern Australia and surrounding islands (Coleman et al. 2010; Unmack et al. 2012). In 2015 an additional species of the genus was described (*G. toourtkoourt* Coleman and Raadik, 2015), from Mediterranean climatic environments of South Australia and western Victoria. *Galaxiella toourtkoourt* is the smallest of all the members of the Galaxiidae, although all *Galaxiella* species are diminutive, the largest being *G. munda*, which has a maximum total length (TL) of only 60 mm. *Galaxiella* species are generally short-lived, reaching maturity at the end of their first year of life to then perish (Humphries 1986, Pen et al. 1991). The four *Galaxiella* species are separated by the arid Nullarbor Plain, leaving two species on either side of the Australian continent. It is suggested that this separation could have occurred tens of millions of years ago (Unmack et al. 2012). The separation of *G. nigrostriata* and *G. munda* in south-western Australia was estimated at a mean age of 22.5 Ma, possibly resulting from the occupancy of different habitats (Unmack et al. 2012). *Galaxiella nigrostriata* aestivates in temporary lowland habitats whereas *G. munda* is more commonly associated with high order streams, many of which are perennial (Pen et al. 1991, 1993; Morgan et al. 1998; Morgan and Gill 2000).

The Australian Federal Government's Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) is Australia's main environmental law that provides a legal framework to protect and manage unique animals, plants, habitats and places. In 2018 *G. nigrostriata* was the first species of the genus to be listed on the EPBC Act, followed by *G. pusilla* in 2023 (both species listed as Endangered). In March 2025, *G. munda* was added to this list as Vulnerable. This species was assessed as Endangered under the IUCN Red List in 2019 as a result of a limited area of occupancy (AOO; 124 km^2) and its declining distribution, habitat and subpopulations (Beatty and Morgan 2019). Threats to the remaining populations include predation by alien species, such as Eastern Mosquitofish (*Gambusia holbrooki*), various introduced salmonids and Eurasian Perch (*Perca fluviatilis*), as well as loss of habitat due to declining rainfall as a consequence of ongoing climate change, river regulation and secondary salinisation rendering some environments uninhabitable (Morgan et al. 2002; Beatty et al. 2014; Allen et al. 2017; Beatty and Morgan 2019).

Image 1. The Western Dwarf Galaxias (*Galaxiella munda*), also commonly referred to as the Mud Minnow or Western Mud Minnow, is the newest freshwater fish to be listed as threatened under the Australian EPBC Act 1999. During the breeding season (July to October) individuals develop a coppery-brown lateral stripe. Photograph: Gerry Allen.

Image 2. The Western Dwarf Galaxias most commonly occurs in spring-fed headwater streams within intact Eucalyptus forests. Groundwater expression and shade buffers these streams from extreme temperatures during the warm-hot dry summers experienced in this region (Morgan et al. 1998; Beatty et al. 2014). Non-breeding individuals often possess a thin white lateral stripe. Photograph: Stephen Beatty.

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Image 3. Typical habitat of the Western Dwarf Galaxias (*Galaxiella munda*). Well-shaded perennial streams not only buffer against harsh summer temperatures, but also offer habitats for their prey, which include terrestrial fauna such as dipterans and their aquatic pupae and larval stages (Pen et al. 1991). Cladocerans, copepods, trichopterans and collembolans are also part of the diet of *G. munda*. Photograph: David Morgan.

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Image 4. The Western Dwarf Galaxias (*Galaxiella munda*) has not been recorded in Canebrake Pool in the upper reaches of Margaret River for several years. This coincided with the introduction of the alien Eastern *Gambusia* (*Gambusia holbrooki*); an aggressive fin-nipping species that, like *G. munda*, patrols just under the water surface searching for food. Photograph: Stephen Beatty.

Image 5. This artificial habitat, created as a water source for firefighting by the Western Australian government, was found to provide refuge for the Western Dwarf Galaxias (*Galaxiella munda*). Thousands of such water points are scattered throughout forested landscapes of south-western Australia, and they are likely to become increasingly important both as a water source for fighting wildfires and conservation of the region's increasingly threatened biodiversity. Photograph: Mark Allen.

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