

Book review

A FIELD GUIDE TO THE FRESHWATER FISHES OF THE KIMBERLEY

By J. J. Shelley, D. L. Morgan, M. P. Hammer, M. C. Le Feuvre, G. I. Moore, M. F. Gomon, M. G. Allen, and T. Saunders
2018. Published by Murdoch University, Murdoch, WA, Australia. 262 pp.
Paperback, AU\$20, ISBN 9780648066712

This is the second field guide to the freshwater fishes of the biogeographic provinces of north-western Australia. The first described the fishes of the Pilbara Province, an area exceeding 500 000 km² in north-western Australia best known for its mineral resources, but also important to the conservation of Australia's biodiversity (Morgan *et al.* 2014; Recher 2015). The Kimberley Province (533 650 km²) is separated from the Pilbara, which lies further west, by the Great Sandy Desert. The Kimberley extends from the Fitzmaurice River in the Northern Territory, which flows into the Joseph Bonaparte Gulf east of Kununurra, west to the Fitzroy River that flows into King Sound near Derby, Western Australia.

The Kimberley Province falls within the broader biogeographic region of the Monsoonal Tropics, which extends east from the Kimberley to sub-tropical latitudes on Australia's east coast in Queensland. Shelley (2018) divides the Monsoonal Tropics into three regions; Kimberley, Northern, and Eastern Provinces. Each has a distinctive fish fauna and together account for 65% of Australia's freshwater fish species. The Kimberley has fewer species of freshwater fish (65 species) than the Northern (89 species), and Eastern Provinces (91), but a greater number of endemic species (32) compared with 13 species in the Northern and 9 species in the Eastern Provinces. More than half (50 and 51 species respectively) of the freshwater fish in these two provinces are shared with New Guinea.

Including 33 marine and estuarine species that enter freshwater, the Kimberley has a freshwater fish fauna of 98 species. By contrast, only 16 species of non-tidal freshwater fish are known from the Pilbara of which nine are endemic (Morgan *et al.* 2014). In all these regions, the number of known fishes is likely to increase in coming years as exploration of northern Australia's rivers extends to more remote areas and the taxonomy of the fishes found is refined. Within the Kimberley, the number of described species and those found, but waiting to be described have increased by 32% since 2000 (Shelley *et al.* 2018; p. 2).

Many widespread fish of northern Australia are absent from the Kimberley and Shelley (2018; p. 4) compares it to an island with only very mobile species able to move into or out of the Kimberley. Movement of fishes is also restricted within the province, with 27 species (22 species on p. 7) found only in one or two river catchments. This extensive narrow range endemism does not occur elsewhere on the continent. Shelley (2018) attributes this to the region's geomorphology, which presently isolates river systems and limits movement along the coast between catchments, and a history of rising sea levels during which fish spread, but were then isolated as sea levels fell, with

unique species evolving in each catchment. During times of drought, the topographical diversity of the Kimberly provides drought refuges for fish in the cooler and moister uplands facilitating the isolation of species.

The field guide opens with a series of short essays covering such topics as the evolution of Kimberley biodiversity, threats to Kimberley fresh waters, classification of fishes in Aboriginal languages of the Kimberley accompanied by a map of Aboriginal languages within the Kimberley, taxonomy in western science, and a nicely illustrated guide to the families of fish. The essays are well written and both trained scientists and lay people interested in nature will find them informative and interesting. These opening essays are supplemented by others throughout the text including one on Aboriginal fishing techniques and another on traditional ecological knowledge illustrated by three species, salmon-tailed catfish *Neoarius graeffei*, mouth almighty *Glossamia aprion*, and western sooty grunter *Hephaestus jenkinsi*. All of these are good to eat, so an awareness among Aboriginal people of their ecology and when to harvest them is not surprising.

Each species of freshwater fish is illustrated with a photograph and a map of their known distribution within the Kimberley. Additionally there is a detailed account of the general features for each species (e.g. number of fin rays, body shape, and maximum size) and how it can be recognised. These are supplemented with descriptions of the fish's biology and habitat, distribution and abundance, conservation notes, local Aboriginal names, and references. The detail is excellent and compares more than favourably with that provided by the best field guides to Australian birds. Species accounts are supported throughout the field guide by photographs of habitat that capture the ambiance of the Kimberley as a remote and wild landscape. Providing Aboriginal names is not only useful for naturalists visiting the Kimberley, but recognises the importance of the local fauna to Aboriginal people. In conservation notes, the status of each species is assessed in light of the species' distribution and abundance, and possible environmental changes, such as climate change, and the damming and diversion of rivers for human use. Similar information, but without maps, is provided for marine and estuarine vagrants, which are also illustrated. Almost all photographs are of live fish, with the quality adequate for identification of 'fish in the hand'.

The field guide to Kimberley freshwater fish opens with a foreword from Tim Winton who describes the Kimberley as 'one of the world's last great unspoiled places, a matrix of breathtaking biodiversity'. Although humans have been present in the Kimberley for more than 60 000 years (Clarkson *et al.* 2017), its remoteness and lack of infrastructure has spared the Kimberley from the impacts of European colonisation that have degraded most of southern Australia and put the continent's flora and fauna on the cusp of mass extinction (Recher 1999; Geyle *et al.* 2018). Unfortunately there are no guarantees that the Kimberley or anywhere elsewhere in Northern Australia will remain remote and unspoiled or that the north's unique biota will survive the rapacious greed of humanity any better than the flora and fauna of Southern Australia. It is common to hear politicians, farmers, graziers, and developers

lamenting the ‘waste’ of water flowing from northern rivers to the sea and calling the north to be opened and its waters put to human use. The essay by [Le Feuvre and Morgan \(2018\)](#) describes the impact of agricultural development and dams on the Ord River in the Kimberley and how these have already affected freshwater fishes. There are proposals for similar developments on the Fitzroy, Drysdale, Keep, and Victoria Rivers, which if implemented would have significant impacts not only on the freshwater fishes of those rivers, but on the entire Kimberley and its biodiversity. There are other threats to freshwater fishes that accompany development including the introduction of alien species (e.g. the cane toad *Rhinella marina* and eastern gambusia *Gambusia holbrooki*, which are already established in the Kimberley) and the degradation of riparian vegetation by cattle and wild pigs. The use of fire by graziers to clear land in north-western Australia, including the Kimberley, for pasture poses a threat to the region’s biodiversity and waterways comparable to the clearing of woody vegetation by farmers and graziers in southern and eastern Australia (pers. obs.). As for all of Australia, climate change is a pervasive threat to the north, but so is the opening of the land for tourism and recreation. [Le Feuvre and Morgan \(2018\)](#) point to the poaching of the critically endangered freshwater sawfish *Pristis pristis* simply to take the rostrum as a ‘souvenir’ as an example of the difficulty in regulating the behaviour of recreation fishers and tourists to the north. Increased access to remote waterways leads to a range of impacts that have adverse effects on freshwater fishes; trampling and cutting of vegetation, unplanned fires, taking of threatened species, and pollution through the lack of concern for the natural environment and its wildlife of people are common wherever tourists gain access (pers. obs.).

The Field Guide to the Freshwater Fishes of the Kimberley is a superb book and welcome addition to the natural history and biological conservation literature of Australia; well written, well illustrated, and comprehensive in its inclusion of Aboriginal culture and explanation of the ecology and evolution of Kimberley fishes. It is an excellent companion volume to the earlier guide to the fishes of the Pilbara Region. It will appeal to anyone with an interest in Australia’s unique and diverse flora and

fauna, but be quick if you want to experience it in its pristine glory.

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