Welcome

The theme: Finding the balance: healthy environment, productive economy was agreed early on by the hard working organising committee.

As our State undergoes a focus on development, it is important to pay equal attention to the natural assets: abundant and unique biodiversity, healthy soils, fresh water, coasts and importantly active and engaged community members.

Operating in a world with of changing environment, economy and society, you will hear of groups who have been successful in undertaking long term programs that improve land and water management, actively involve communities, and conserve natural capital.

In these endeavours we can all play a role, from personal commitment to care to participating and playing important roles in community groups, regional NRM organisations, in industry and government.

NRM WA and the State Natural Resource Management Office and invite you to fully participate in ‘Finding the Balance’.

We encourage you to listen, engage and question and most importantly enjoy the conference.

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Pilbara freshwater fishes: field guide and documentary

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BIOGRAPHY:
David Morgan grew up in the Perth southern suburb of Rossmoyne, where he developed a passion for aquatic environments though chasing prawns, crabs and cobbler with his parents Robert and Faye. He has since specialised on threatened, introduced and native freshwater fishes throughout Western Australia. Over the last 24 years at the Freshwater Fish Group at Murdoch University he amassed more than 200 publications on Western Australian fishes in the south-west, Pilbara and Kimberley. He has developed an unparalleled knowledge of the distribution of inland fishes in Western Australia and his research has helped to shine a light on freshwater fishes in Western Australia and aided in their conservation and management. He has a passion for collaborating with Traditional Owners in his research such as developing the long running Team Sawfish project in the Kimberley. David has three children, Naomi, Charlie and Renee, and is currently the Acting Director of the Centre for Fish & Fisheries Research at Murdoch University. Away from fish research he enjoys fishing, crabbing, and coaching the Y5 Whites at the Jandakot Jet Junior Football Club in Atwell.

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Introduction
Covering nearly one-third of the Australian continent, Western Australia comprises five of Australia’s 10 ichthyological (fish) provinces and this includes the Southwestern, Pilbara, and Kimberley provinces, all of which are wholly contained within Western Australia, whereas the western edge of the Northern Province and the western portion of the Paleo Province also occur in Western Australia (see Unmack 2013, Morgan et al. 2014a, b).

The study focuses on the fish fauna of the Pilbara Province, and was a joint initiative of the Rangelands NRM Coordinating Group and the Western Australian Government’s State NRM Program and co-funded by the Australian and State Governments.
The Pilbara Province encompasses the Mid-west, Gascoyne and Pilbara regions of Western Australia and covers an area of over 500,000 km². Almost 10% of the Australian continent is drained by the rivers of the region, and despite its aridity, the Pilbara Province hosts Western Australia’s longest river, the Gascoyne, which has a catchment of almost 80,000 km² and is over 860 km in length. Other notable river systems include the Murchison, Ashburton, Fortescue and De Grey rivers.

The Pilbara Province includes all river basins from the Irwin River in the south to the De Grey River in the north (Morgan & Gill 2004) and the northern boundary abuts the Great Sandy Desert, which has largely isolated this Province from other parts of northern Australia. Consequently, the freshwater fishes in this province are either local endemics (6 species) or have extensive distributions across much of northern Australia (4 species). There are no shared freshwater fish species with the Southwestern Province, although some estuarine species are shared, such as Black Bream and Blue-spot Goby. Distinct patterns in the distribution of fish species in the Pilbara Province resulted in the recognition of three sub-provinces, namely the Southern Pilbara, Northern Pilbara, and North West Cape (Morgan & Gill 2004).

The most unusual endemic fishes of the Pilbara are found in the subterranean waters in North West Cape Sub-province. Two species of cave gudgeon occur in the region. The Blind Gudgeon occurs on the mainland at Cape Range Peninsula while the newly described Barrow Cave Gudgeon is restricted to Barrow Island (Humphreys & Adams 1991, Larson et al. 2013). Both species share their habitat with the Blind Cave Eel, although it is likely that the eels on Barrow Island also represent an additional endemic species given the isolation of the two blind gudgeon species.

The surface dwelling freshwater fish fauna is dominated by a relatively small number of species that can survive in the extreme environments of the Pilbara where rivers experience massive flooding following cyclones and limited water availability during dry times. The fauna consists of three fishes endemic to the province; Deep Hardyhead and Golden Gudgeon are primarily restricted to southern rivers, but with the former having a disjunct northern population in the De Grey River. The Fortescue Grunter is restricted to a few Northern Sub-province rivers (Morgan and Gill 2004). A possible new species of eel-tailed catfish from the Robe River may also be endemic although it has not been captured for a number of years and the Robe River is predicted to have the highest freshwater fish extinction rate on the planet under future climate change scenarios (Tedesco et al. 2013).

The remaining freshwater species are all widespread across northern Australia, although Pilbara populations tend to be distinct genetically, with some differences sufficiently large to suggest they represent distinct (and thus endemic) species (Unmack 2013). For example, Pilbara populations of Bony Bream and Hyrtl’s Tandan, two of Australia’s most widespread freshwater fishes, both appear to be new species (Unmack 2013; Morgan et al. 2014a, b), and warrant closer morphological examination. Pilbara populations Western Rainbowfish are also genetically distinct to populations elsewhere in northern Australia (Unmack et al. 2013).

In contrast to the Southwestern Province, there are more estuarine and marine vagrants occurring in the non-tidal waters of the Pilbara Province with at least 13 of these species found in fresh waters of the Province, and in some habitats they have been recorded to comprise between 5 and 10% of the total fish numbers. Diadromous fishes (fish that migrate between the sea and freshwater) of the Pilbara Province include Mangrove Jack, Tarpon, Bull Shark and Freshwater Sawfish. Catadromous species (fish which live in freshwater but breed in the sea) include the Indian Short-finned Eel, while Barramundi is considered to be semi-catadromous as it breeds within estuaries or may remain in the estuarine or marine environment.

Future impacts to the habitats and fishes of the region are likely to result from the impacts of climate change and from dewatering of habitats during mining and through water abstraction (Tedesco et al. 2013). As an example, Tedesco et al. (2013) predicted that freshwater fish extinction rates within river basins within the Northern Pilbara Sub-province will be amongst the highest on the globe. Incredibly, the authors predicted that six of the rivers within the Northern Pilbara Sub-province will be in the top 12 rivers globally to suffer the highest extinction rates due to water availability shrinkage from climate change. Furthermore, the impacts of introduced species are outlined within the field guide and documentary, and are an ever increasing threat to this unique fauna.

The field guide produced during this study, together with the associated documentary and additional publications, summarises the fishes in the inland waters of the Pilbara, and each represents a timely review of this often forgotten fauna.

**Methodology**

To further determine the distribution of fishes in the Pilbara Province, as well as to capture fish on film for the field guide and documentary, a number of field trips to most of the rivers of the Pilbara Province were conducted during 2013 and 2014. A review of all existing literature on the fishes of the Pilbara was performed in order to complete the field guide and for the narration of the documentary. ENVfusion Films completed the documentary at the end of 2014, at which time it was placed in the public arena (on youtube). The field guide was printed in December 2014.
Project Outcomes/Conclusion
The main outcomes of the project were the completion of a field guide and documentary on the fishes of the Pilbara Province. There was also considerable public involvement in the project.

The documentary can be viewed at:
https://www.youtube.com/watch?v=d9v5DMzm_1o

A total of 1000 copies of the field guide (Morgan et al. 2014a) were printed, and copies are available from:
fish@murdoch.edu.au

References


