Clay-rich landscapes mould unique wetland assemblages in the Pilbara's Fortescue Valley

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Background

Wetlands are distinctive elements of the Pilbara landscape, supporting a wide range of plants and animals and contributing to the physical and spiritual sustenance of people. River pools are the most common type of wetland in the Pilbara and familiar to most residents and visitors. Less well known are floodplain wetlands that hold water only after significant rainfall events and then dry over the following weeks to months. These wetlands support flora and fauna adapted to the often temporary and unpredictable presence of water. Water in these wetlands is usually turbid due to suspension of clay sediments and many such wetlands are referred to as claypans. Most of these types of wetlands, in the Pilbara, occur on the coastal plains or along the middle to upper Fortescue Valley and are poorly represented in the current conservation reserve system[1].

Recent conservation planning processes have recognised the important biodiversity values (including those associated with wetlands) present in the Fortescue Valley, however there was insufficient information on the distribution of wetland fauna and flora to make decisions about where to focus management.

Fortescue Valley wetland survey

To provide the information required to design spatially efficient wetland conservation programs, the Pilbara Corridors Project carried out a survey of aquatic invertebrates and flora inhabiting 47 wetlands between Mount Florence and Balfour Downs Stations. Data from this project were combined with data from the same area collected for the Pilbara Biological Survey[2,3] and analyses were undertaken to describe the distribution of the flora and fauna across the study area in relation to the occurrence of wetland habitats [4].

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Fortescue Valley wetlands

The combined surveys collected 590 species of aquatic invertebrates and 284 species of wetland associated flora. An additional 195 plant species were collected while mapping vegetation across Fortescue Marsh [5]: a 100km long salt marsh that dominates the study area. While most individual species were widespread in the study area, there was sufficient patterning in their occurrence to group wetlands into seven distinct types (illustrated below). Several new species of invertebrates were collected and some invertebrates and plants are more common in the study area than the rest of the Pilbara. More detailed analyses are available in Pinder *et al*. (2017) [4].

Mulga Downs Claypans

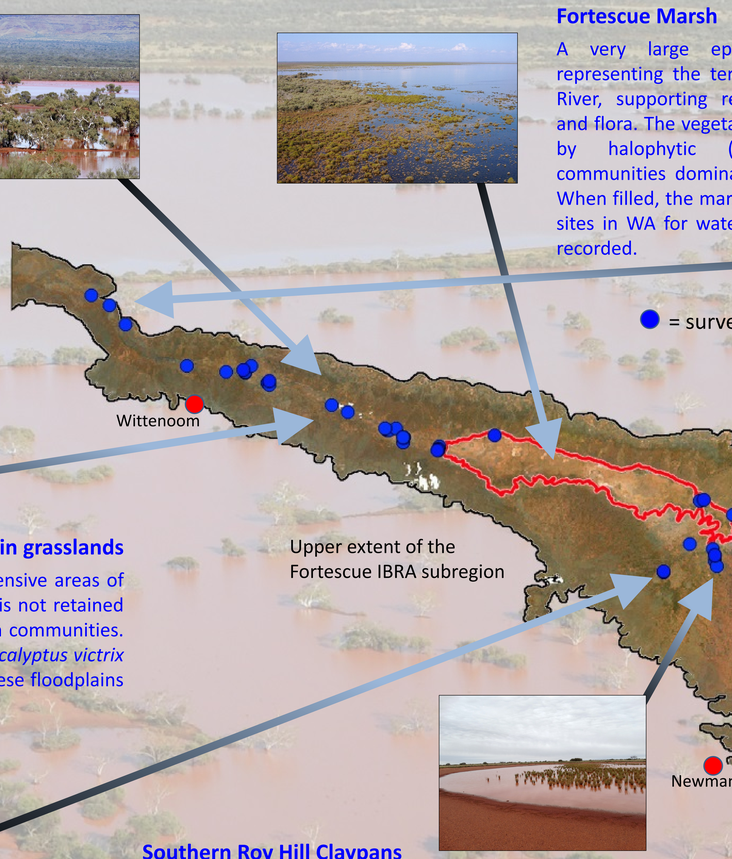
Mostly large open water claypans with hard substrates, including Gnalka Gnoona and Mungthannannie claypans. Their morphologically complex fringes create a greater diversity of wetland habitats compared to claypans upstream of the Fortescue Marsh. These wetlands support many of the rarer and more restricted species collected during the survey. Characteristic species include the copepod *Calamoecia baylyi* and a new species of *Anisops* water bug. Basin vegetation is dominated by *Eucalyptus victrix* and *Acacia stenophylla*.

Fortescue Marsh

A very large episodically filled salt marsh, representing the terminus of the Upper Fortescue River, supporting restricted aquatic invertebrates and flora. The vegetation of the marsh is dominated by halophytic (salt loving/tolerant) plant communities dominated by *Tecticornia* shrublands. When filled, the marsh is one of the most important sites in WA for waterbirds, with 100 000's of birds recorded.

Mulga Downs floodplain grasslands

The valley floor on Mulga Downs Station includes extensive areas of floodplains with some gilgai or crabhole areas. Water is not retained for long after floods but strongly influences vegetation communities. Vegetation is dominated by *Eriachne* grasslands and *Eucalyptus victrix* woodlands, but the diversity of vegetation types on these floodplains was not fully described by this project.



Coondiner Pool

This pool on Coondiner Creek rarely dries completely. Water clarity alternates between turbid and clear depending on submerged macrophyte growth. Coondiner Pool is notable for restricted wetland plant species including *Myriocephalus scalpellus*, and the only Pilbara occurrences of *Isolepis congrua* and *Lachnogrostis filiformis*.

Southern Roy Hill Claypans

Mostly small, isolated, shallow pans with little or no vegetation on their beds, occurring south of the marsh on Roy Hill Station. These have hard clay substrates and very high turbidity. Basin vegetation is near pure stands of *Eriachne benthamii* or *E. flaccida*. Aquatic invertebrate diversity is also low, but with some distinctive species such as the copepod *Calamoecia halsei* and fairy shrimp *Branchinella affinis*. These are fed mostly by local rainfall and runoff.

River Pools

Many of these have water for extended periods and some rarely dry completely. Flora composition was more uniform on the edges of river pools compared with claypans. Some river pools on Mount Florence Station are fed by groundwater and tended to have different invertebrate communities (including some groundwater species) than those on the Upper Fortescue.

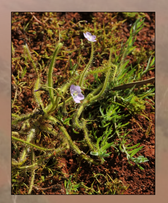
Claypans on the Jigalong Creek /Upper Fortescue floodplain

Interconnected claypans on Ethel Creek, Balfour Downs and the far east of Roy Hill Stations, with soft gilgaid clay substrates, moderate turbidity and vegetated floors (typically *Eucalyptus victrix* over sedges, especially *Eleocharis pallens,* and *Eriachne* grasslands. Like the larger Mulga Downs claypans, these support many of the species characteristic of the Fortescue Valley within the Pilbara such as the fairy shrimp *Branchinella lyrifera*. Other typical invertebrates include the ostracod *Ilyocypris spiculata* s.l. and the beetle *Berosus approximans*.

Ipomoea diamantinensis

Tecticornia verrucosa

Mimulus gracilis



Drosera finlaysoniana

undescribed Arrenurus (water mite)

Branchinella occidentalis (fairy shrimp)

Triops australiensis (shield shrimp)

Berosus approximans (scavenging beetle)

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