

Groundwater dependent ecosystem pictorial conceptual model 'spring ecosystems of the Surat and southern Bowen Basins – type 3'

Version 1.5

Type 3 Permanent to semi-permanent riverine wetlands with minor wetland soils and moderate vegetation cover, sourced from local and regional groundwater systems and significantly influenced by surface water flows.

Type 3 wetlands generally occur within active watercourses on exposed sandstone bedding planes. The wetlands have minor substrates, with the wetland soil forming through the accumulation of riverine sediment or bed sands, rather than exclusive development of wetland soil over time. The wetlands receive groundwater contributions from both regional and local groundwater systems and are predominantly actively discharging wetlands, with little soil water storage potential or evapotranspiration demand. The wetlands contain only minor wetland vegetation (due to lack of soil substrate).

Only minor seasonal changes occur to the spatial extent of the wetland as there is a constant supply from groundwater discharge. Long-term changes in wetland area will be influenced by stream erosion and deposition processes which are likely to alter the wetland area and location of discharge.

Discharge from the wetland is maintained all year and is either within, or adjacent to, permanent or semi-permanent watercourses. The shape and size of the wetland are controlled by the nature of the exposed sandstone and the geomorphology of the watercourse. The constant exchange of water due to discharge from the wetland and flow of low-salinity groundwater into the wetland generally maintains low-salinity water within the wetlands.

Only shallow wetland soils have developed at these wetlands. As a result, changes in groundwater discharge or a decline in evapotranspiration demand results in a change in the volume of discharge and minor changes to the wetland area. This is due to the wetlands having little regolith or wetland soil development and therefore limited water storage capacity to buffer the effects of an altered water balance.

Change to the wetland area is controlled by large-scale high flow surface water events rather than groundwater discharge. Within the current hydrogeological state, seasonal changes in groundwater discharge to the wetlands appear to have a negligible impact on the wetland. While it is expected that changes in groundwater discharge will have a negative impact on the wetlands, the condition of the wetlands is dominated by surface flow events.

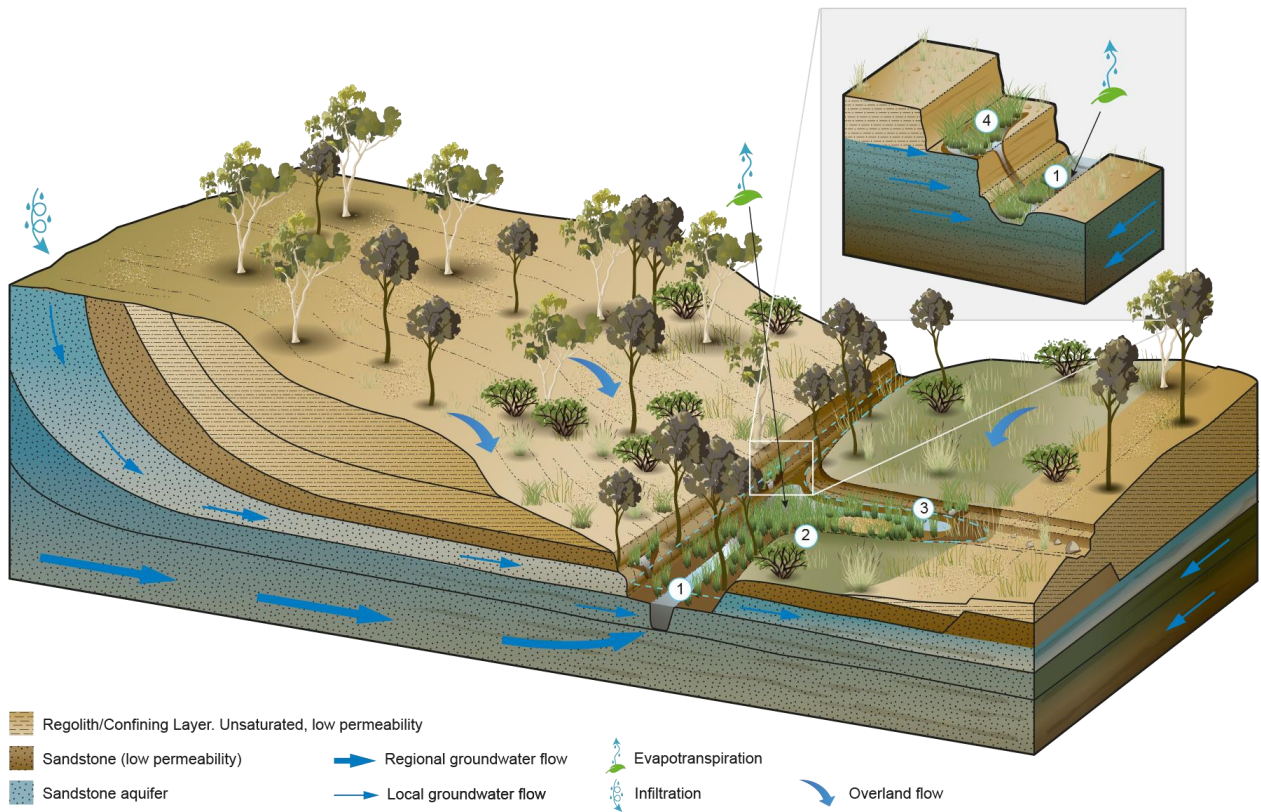
These wetlands are characteristically wet and do not have a dry cycle. During the wettest phase, they are inundated to a degree by surface flow. During the lower flow periods, the wetlands are maintained by groundwater. Smaller wetlands located upstream of the main watercourse vary in vegetation type, with terrestrial and weed species occurring. In contrast larger wetlands are generally dominated by aquatic vegetation assemblages.



Examples of type 3 wetlands (Barton (left) and 311 (right))

Type 3 wetlands have formed due to dissection of the landscape by riverine processes which results in the watertable being intersected within a sandstone aquifer. This creates zones of groundwater discharge (wetlands) adjacent to, or within permanently or seasonally flowing streams. Three focal zones have been proposed that represent the variability across the wetlands driven by the groundwater regime:

1. Area of permanent groundwater discharge which maintains saturation and pools of free water. Aquatic species include the Spangled Perch. Dominant plant species include the grasses *Isachne globosa*, *Leersia hexandra* and *Sacciolepis indica* indicative of permanent saturation, with species such as *Schoenoplectus mucronatus*, *S. validus* and *Persicaria hydropiper* prominent in wetter areas near the main points of groundwater discharge.
2. Terrestrial areas adjacent to the creek line. Dominant plant species include *Chloris gayana* and *Cynodon dactylon*. There may be a substantial amount of bare ground pugged by cattle.
3. Area of seasonal inundation and local groundwater discharge within the creek line. Aquatic species include midges and mayflies. Bare ground or fringing vegetation indicating saturation, including sedges *Juncus prismatocarpus*, *Gahnia aspera* and *Cyperus* spp., the bullrush *Typha* spp. and grasses such as *Paspalum* spp.
4. Within the creek line, there are areas of seasonal inundation and local groundwater discharge.



Citation

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