

# Groundwater dependent ecosystem pictorial conceptual model 'spring ecosystems of the Surat and southern Bowen Basins – type 4'

Version 1.5

**Type 4 Semi-permanent fresh riverine-to-palustrine wetlands with minor wetland soils and moderate vegetation cover, mainly connected to local groundwater systems.**

Type 4 Wetlands located within riverine environments with deep, sandy, alluvial deposits

Type 4 wetlands occur within active watercourses within deep sandy alluvial deposits. The wetlands receive groundwater inflows from local groundwater systems. Groundwater discharge from the wetlands is fresh and free-flowing. The lack of any clay substrate prevents any significant subsoil water storage and as a result, only very minor wetland soil can develop.

The wetlands contain an irregular distribution of wetland vegetation due to the lack of substrate and a dynamic landscape where the form of the wetland can be altered by stream bank erosion. Therefore, Type 4 wetlands are subtle features, only distinguishable from the surrounding landscape during dry periods due to greener vegetation. The fresh water and adjacent water bodies provide aquatic habitat suitable for sensitive macroinvertebrate species.

The wetlands fluctuate in extent and area and will be altered physically by bank erosion during flood events. They maintain free-flowing discharge all year round and are considered semi-permanent features of the landscape. The extent of the wetland area and associated flora appears constrained by the landscape position. However, the spatial distribution of terrestrial vegetation within the wetland varies, potentially reflecting changes in the distribution of saturation within the wetland.

Seasonal changes in groundwater discharge and climate appear to have little impact on the wetlands. There are no surface features that represent long-term or short-term changes in the wetland area and/or form.



**Examples of type 4 spring wetlands (Wambo complex)**

Local groundwater flow from surficial aquifers discharges at the wetlands due to the presence of a low-permeability layer underlying the surficial sediments, forcing groundwater to flow to the wetland, and discharges in the banks of the watercourse. The source aquifer for the wetland is recharged seasonally during rainfall events into the sandy surface soils. Therefore, the discharge zone is responsive to short-term rainfall patterns. Three focal zones are described that represent the variability across the wetlands driven by the groundwater and surface water regime.

1. Semi-permanent area of groundwater discharge. Dominated by sedges *Carex appressa*, grasses such as *Leersia hexandra*, forbs such as *Centella asiatica* and other species indicative of permanent saturation. These areas can be very restricted and intermixed with drier parts associated with terrestrial species including *Chloris gayana*, *Cynodon dactylon* and the invasive wetland species *Paspalum distichum*.
2. Permanent zone of groundwater discharge. On the lower slopes adjacent to drainage lines where saturation is more uniform, discharge supports similar species to Zone 1 with the tall grass *Phragmites australis* being prominent.
3. Adjacent permanent watercourse provides additional water supply for macroinvertebrates and, during high flow surface water events, will inundate the wetlands.

