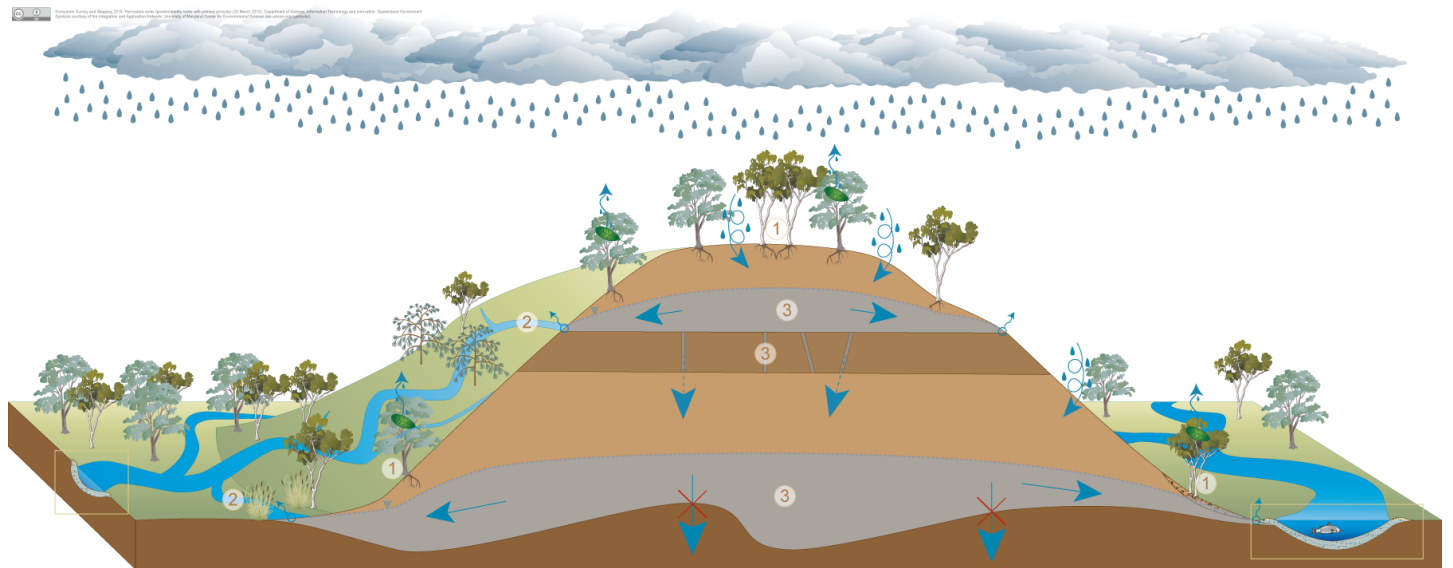# Groundwater dependent ecosystem pictorial conceptual model 'permeable rocks (rocks with predominantly primary porosity)'

Version 1.5

Permeable rocks (rocks with predominantly primary porosity)

Permeable rocks can contain one or more unconfined, permeable rock aquifers, where groundwater is stored and transmitted through intergranular pore space, fractures, vesicles and/or weathered zone of the rock. When permeable rocks overlie relatively less permeable or impermeable rocks vertical groundwater movement is restricted. While groundwater will often continue to leak through the less permeable rock to some degree (e.g. through fractures), typically, groundwater moves laterally and is commonly discharged to the surface along the contact between the two rock types.

- Unconfined, permeable rock aquifers may provide a range of ecosystems with water required to support their plant and animal communities, ecological processes and delivery of ecosystem services.

- Palustrine (e.g. swamps), lacustrine (e.g. lakes) and riverine (e.g. streams and rivers) wetlands located down-gradient of the contact between a higher permeable rock and lower permeable rock may depend on the surface expression of groundwater from these permeable rock aquifers.

- Terrestrial vegetation located up-gradient of the contact between a permeable and less permeable or impermeable rock may depend on the subsurface presence of groundwater in these permeable rock aquifers that is within their capillary zone.

- Aquifers in permeable rocks may also support ecosystems within the aquifer itself, which sometimes is indicated by the presence of stygofauna.

- This discharge of groundwater along the contact between two rocks may also support nearby channels, alluvium and associated aquatic ecosystems through prolonged flow or groundwater recharge.

Queensland Government

Geology legend

Alluvia
Unconsolidated sand, clay and gravel

Colluvia

Low permeability rock

Moderate to high permeability rock
Stores and transmits groundwater through void spaces in the rock

Basement of the model

Fracture
Stores and transmits groundwater through the spaces in the rock

Groundwater hydrology legend

Alluvia (saturated)

Alluvia (unsaturated)

Colluvia (saturated)

Colluvia (unsaturated)

Moderate to high permeability rock (saturated)

Moderate to high permeability rock (unsaturated)

Low permeability rock (saturated)

Low permeability rock (unsaturated)

Basement of the model (unsaturated)

Groundwater table

Direction of groundwater movement

Negligible groundwater movement

Groundwater leakage

Infiltration and percolation
Rain infiltrates through the soil to recharge the aquifer below

Spring
A hydrogeological feature by which groundwater discharges naturally to the land surface or cave

Flora legend

Casuarina spp.

Corymbia spp.

Evapotranspiration
Process whereby plants draw water up through their roots and move it out through their leaf pores

Eucalyptus spp.

Pennisetum spp.

Fauna legend

Fish

Groundwater dependent ecosystem legend

1 Terrestrial GDEs
Regional ecosystems and riverine wetlands may depend on the subsurface presence of groundwater within the capillary zone for some or all of their water requirements.

3 Subterranean GDEs
Aquifer and cave subterranean wetlands may depend on the subterranean presence or expression of groundwater for some or all of their water requirements.

2 Surface expression GDEs
Lacustrine wetlands, palustrine wetlands and riverine water bodies may depend on the surface expression of groundwater for some or all of their water requirements.

Citation

Queensland Government (2017) *Groundwater dependent ecosystem pictorial conceptual model 'permeable rocks (rocks with predominantly primary porosity)': version 1.5*, Queensland Government, Brisbane.