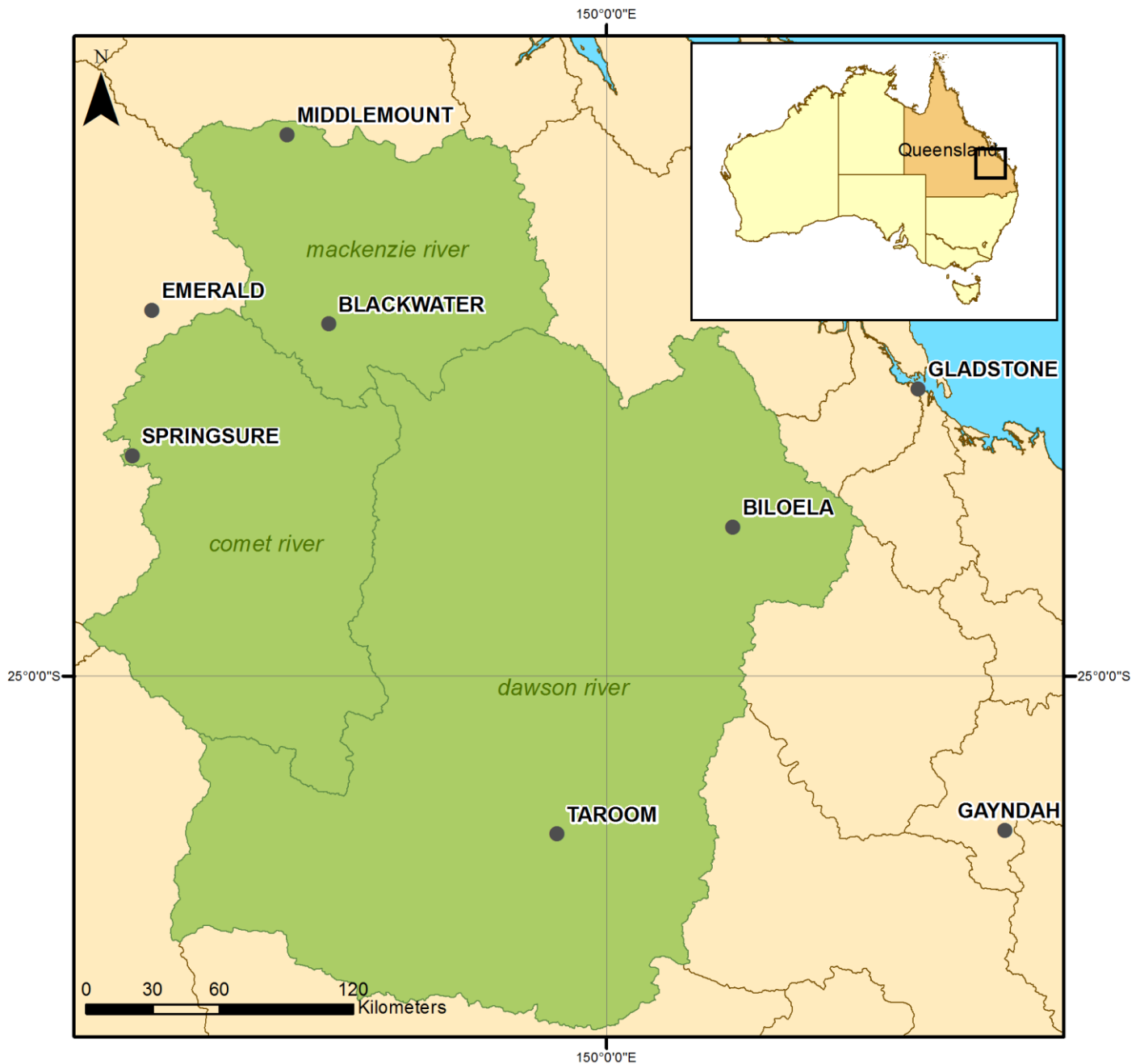


Groundwater dependent ecosystem mapping rule-sets for the Comet, Dawson and Mackenzie River catchments

Version 1.5

Comet, Dawson and Mackenzie River catchments



Groundwater dependent ecosystem mapping rule-sets

Groundwater dependent ecosystem mapping rule-sets are a combination of attributes (e.g. geology, rainfall, vegetation community, etc.) that describe the drivers, processes and interrelationships occurring between ecosystems and groundwater in a landscape based on local, expert knowledge. When applied to spatial data sets, these mapping rule-sets identify where ecosystems are or are potentially dependent on groundwater in a landscape.

Mapping rule-sets by catchment

Mapping rule-set	Drainage sub-basin		
	Comet River	Dawson River	Mackenzie River
<i>Alluvial aquifer mapping rule-sets</i>			
SURAT_RS_01A	X	X	X
SURAT_RS_01B		X	
SURAT_RS_01C	X	X	
SURAT_RS_01D		X	
SURAT_RS_01E			X
SURAT_RS_01F		X	
<i>Permeable rock (basalt) aquifer mapping rule-sets</i>			
SURAT_RS_02A	X	X	X
SURAT_RS_02B	X	X	X
<i>Permeable consolidated sedimentary rock aquifer mapping rule-set</i>			
SURAT_RS_03	X	X	X
<i>Fractured rock (metamorphic rock) aquifer mapping rule-set</i>			
SURAT_RS_04	X	X	X
<i>Permeable sandy plain aquifer mapping rule-set</i>			
SURAT_RS_05	X	X	X
<i>Fractured rock (igneous rock) aquifer mapping rule-set</i>			
SURAT_RS_07		X	X
<i>Low porosity sedimentary and igneous rock aquifer mapping rule-set</i>			
SURAT_RS_08		X	
<i>Other mapping rule-set</i>			
SURAT_RS_06	X	X	X

Groundwater dependent ecosystem mapping rule-set descriptions

SURAT_RS_01A—Quaternary alluvial aquifers overlying sandstone ranges with fresh, intermittent groundwater connectivity regime

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. This rule-set identifies potential GDEs associated with alluvial aquifers overlying sandstone ranges with fresh, intermittent connectivity regime.

- Potential surface GDEs dependent on these alluvial aquifers include lacustrine wetlands and palustrine wetlands.
- Potential surface GDEs dependent on these alluvial aquifers include riverine water bodies and second order or greater channels.
- Potential terrestrial GDEs dependent on these alluvial aquifers include riverine wetlands.
- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems.

SURAT_RS_01B—Quaternary alluvial aquifers near springs with fresh, permanent groundwater connectivity regime

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. Springs may transmit groundwater to overlying alluvial aquifers. This rule-set identifies potential GDEs associated with alluvial aquifers within one kilometre of an active, permanent spring from the Great Artesian Basin.

- Potential surface GDEs dependent on these alluvial aquifers near springs include riverine water bodies and channels.
- Potential terrestrial GDEs dependent on these alluvial aquifers near springs include riverine wetlands.
- Potential terrestrial GDEs dependent on these alluvial aquifers near springs include deep rooted regional ecosystems.
- Potential terrestrial GDEs dependent on these alluvial aquifers near springs include regional ecosystems containing *Eucalyptus camaldulensis*.

SURAT_RS_01C—Quaternary alluvial aquifers with fresh, intermittent groundwater connectivity regime

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. This rule-set identifies potential GDEs associated with fresh intermittently saturated alluvial aquifers.

- Potential surface GDEs dependent on these alluvial aquifers include lacustrine wetlands and palustrine wetlands in the eastern Dawson River catchment.
- Potential surface GDEs dependent on these alluvial aquifers include riverine water bodies and channels in the eastern Dawson River catchment.
- Potential terrestrial GDEs dependent on these alluvial aquifers include riverine wetlands in the eastern Dawson River catchment.
- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems.

SURAT_RS_01D—Quaternary alluvial aquifers with fluctuating, intermittent groundwater connectivity regime and neutral pH

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. This rule-set identifies potential GDEs associated with fluctuating intermittently saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems.

SURAT_RS_01E—Quaternary alluvial aquifers with fluctuating, intermittent groundwater connectivity regime and unknown pH

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. This rule-set identifies potential GDEs associated with fluctuating intermittently saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems.

SURAT_RS_01F—Quaternary alluvial aquifers supported by Precipice Sandstone with fresh, permanent groundwater connectivity regime

Alluvial aquifers form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels or on floodplains. These deposits store and transmit water to varying degrees through intergranular voids. This rule-set identifies potential GDEs associated with fresh permanently saturated alluvial aquifers supported by groundwater from Precipice Sandstone.

- Potential surface GDEs dependent on these alluvial aquifers include lacustrine wetlands and palustrine wetlands.
- Potential surface GDEs dependent on these alluvial aquifers include riverine water bodies and channels.
- Potential terrestrial GDEs dependent on these alluvial aquifers include riverine wetlands.
- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems.

SURAT_RS_02A—Permeable rock aquifers (basalts) greater than or equal to 100 ha in size with fresh, intermittent groundwater connectivity regime

Basalt weathers and oxidises relatively fast in comparison to other rock types. Basalt has highly variable porosity and may form aquifers which store and transmit groundwater through the vesicles, fractures and weathered zones of the basalt. Discharge of groundwater is common around the contact between basalt and less permeable underlying geologies including bands of rhyolite and mudstone. This mapping rule-set identifies potential GDEs associated with fresh, intermittently saturated basalt aquifers.

- Potential surface GDEs dependent on these basalt aquifers include lacustrine wetlands, palustrine wetlands and riverine waterbodies within 50 metres of the edge of or within 50 metres of a channel on basalt plains and hills greater than or equal to 100 hectares in size. Where there is a 70% probability of the area losing more water to evapotranspiration than it gains through precipitation, these are high confidence potential GDEs.
- Potential surface GDEs dependent on these alluvial aquifers include channels on or within 100 metres of basalt plains and hills greater than or equal to 100 hectares in size. Where there is a 70% probability of the area losing more water to evapotranspiration than it gains through precipitation, these are high confidence potential GDEs.
- Potential terrestrial GDEs dependent on these alluvial aquifers include riverine wetlands within 50 metres of the edge of or within 50 metres of a channel on basalt plains and hills greater than or equal to 100 hectares in size. Where there is a 70% probability of the area losing more water to evapotranspiration than it gains through precipitation, these are high confidence potential GDEs.
- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems within 50 metres of the edge of or within 50 metres of a channel on basalt plains and hills greater than or equal to 100 hectares in size. Where there is a 70% probability of the area losing more water to evapotranspiration than it gains through precipitation, these are high confidence potential GDEs.

SURAT_RS_02B—Permeable rock aquifers (basalts) less than 100 ha in size with fresh, episodic groundwater connectivity regime

Basalt weathers and oxidises relatively fast in comparison to other rock types. Basalt has highly variable porosity and may form aquifers which store and transmit groundwater through the vesicles, fractures and weathered zones of the basalt. Discharge of groundwater is common around the contact between basalt and less permeable underlying geologies including bands of rhyolite and mudstone. This mapping rule-set identifies potential GDEs associated with fresh, episodically saturated basalt aquifers.

- Potential surface GDEs dependent on these basalt aquifers include lacustrine wetlands, palustrine wetlands and riverine waterbodies within 20 metres of the edge of basalt plains and hills less than 100 hectares in size.
- Potential surface GDEs dependent on these alluvial aquifers include channels within 20 metres of the edge of basalt plains and hills less than 100 hectares in size.
- Potential terrestrial GDEs dependent on these alluvial aquifers include riverine wetlands within 20 metres of the edge of basalt plains and hills less than 100 hectares in size.
- Potential terrestrial GDEs dependent on these alluvial aquifers include deep rooted regional ecosystems within 20 metres of the edge of basalt plains and hills less than 100 hectares in size.

SURAT_RS_03A—Permeable consolidated sedimentary rock aquifers with fresh, intermittent groundwater connectivity regime

Sedimentary rocks are formed by the deposition of sediment which accumulates over time. Chemical, physical and/or biological processes compacts the sediment causing it to consolidate. The Great Artesian Basin is composed of sedimentary rock layers of varying thickness and porosity, forming a sequence of confined aquifers and aquitards. This mapping rule-set identifies potential GDEs associated with fresh, intermittently saturated sandstone aquifers.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies within 50 meters of a second order or greater channel on sandstone other than Springbok Sandstone.
- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies within 50 meters of a third order or greater channel on Springbok Sandstone.
- Potential surface GDEs dependent on sandstone aquifers include second order or greater channels on sandstone other than Springbok Sandstone.
- Potential surface GDEs dependent on sandstone aquifers include third order or greater channels on Springbok Sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands within 50 meters of a second order or greater channel on sandstone other than Springbok Sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands within 50 meters of a third order or greater channel on Springbok Sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include deep rooted regional ecosystems within 50 meters of a second order or greater channel on sandstone other than Springbok Sandstone.

- Potential terrestrial GDEs dependent on sandstone aquifers include deep rooted regional ecosystems within 50 meters of a third order or greater channel on Springbok Sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include regional ecosystems containing *Angophora floribunda*, *Angophora leiocarpa*, *Eucalyptus tetricornis* or vine thicket and microphyll rainforest.

SURAT_RS_03B—Permeable consolidated sedimentary rock aquifers with fresh, intermittent groundwater connectivity regime supporting surface expression GDEs

Sedimentary rocks are formed by the deposition of sediment which accumulates over time. Chemical, physical and/or biological processes compacts the sediment causing it to consolidate. The Great Artesian Basin is composed of sedimentary rock layers of varying thickness and porosity, forming a sequence of confined aquifers and aquitards. This mapping rule-set identifies specific potential GDEs associated with fresh, intermittently saturated sandstone aquifers.

- Potential surface GDEs dependent on sandstone aquifers include specific channels on sandstone.

SURAT_RS_04—Fractured rock aquifers (metamorphic rocks and metasediments) with fluctuating, intermittent groundwater connectivity regime

Groundwater is stored and transmitted in the fractures and weathered zones of otherwise relatively impermeable metamorphic rocks and metasediments. Groundwater may discharge from fractured metamorphic rock and metasediment aquifers typically along foot slopes and in channels.

- Potential surface GDEs dependent on metamorphic rock aquifers include third order or greater channels.
- Potential terrestrial GDEs dependent on metamorphic rock aquifers include mesic regional ecosystems.

SURAT_RS_05—Permeable old loamy or sandy plain aquifers with fresh, intermittent groundwater connectivity regime

Tertiary to Quaternary loamy and sandy plains typically develop permeable sediment that readily stores and transmits groundwater. Discharge of groundwater typically occurs around the contact between these sediments and less permeable underlying rock. This rule-set identifies potential GDEs associated with fresh intermittently saturated sandy plain aquifers.

- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems containing *Eucalyptus melanoploia*, *Corymbia tessellaris*, or *Eucalyptus tereticornis*.

SURAT_RS_07—Fractured rock aquifers (igneous rocks) with fresh, intermittent groundwater connectivity regime

Groundwater is stored and transmitted in the fractures and weathered zones of otherwise relatively impermeable igneous rocks. Groundwater may discharge from fractured igneous rock aquifers typically along foot slopes and in channels.

- Potential surface GDEs dependent on igneous rock aquifers include third order or greater channels.
- Potential terrestrial GDEs dependent on igneous rock aquifers include mesic regional ecosystems.

SURAT_RS_08—Low porosity sedimentary and igneous rocks with fresh, intermittent groundwater connectivity regime

Low porosity rocks store and transmit some groundwater through the intergranular pores, fractures and/or weathered zones. Groundwater may discharge from low porosity rock typically along foot slopes and in channels.

- Potential surface GDEs dependent on low porosity sedimentary and igneous rock aquifers include lacustrine wetlands, palustrine wetlands and riverine waterbodies within 50 meters of a first order or greater channel.
- Potential surface GDEs dependent on low porosity sedimentary and igneous rock aquifers include first order or greater channels.
- Potential terrestrial GDEs dependent on low porosity sedimentary and igneous rock aquifers include deep rooted regional ecosystems within 50 meters of a first order or greater channel.
- Potential terrestrial GDEs dependent on low porosity sedimentary and igneous rock aquifers include riverine wetlands within 50 meters of a first order or greater channel.

Other mapping rule-sets

Other mapping rule-sets are a combination of attributes (e.g. geology, rainfall, etc.) that describe the drivers, processes and interrelationships of groundwater in a landscape based on local, expert knowledge. When applied to spatial data sets, these other mapping rule-sets identify the where groundwater is likely to occur at significant depth (e.g. 50 or more metres) in a landscape or where groundwater is likely to be absent in a landscape.

SURAT_RS_06—Exclusion zones

For the Queensland GDE mapping program, exclusion zones are areas with low permeability surfaces. There is little or no infiltration in exclusion zones as water usually quickly runs off these areas. Consequently there is not enough groundwater in exclusion zones to support GDEs.

Citation

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