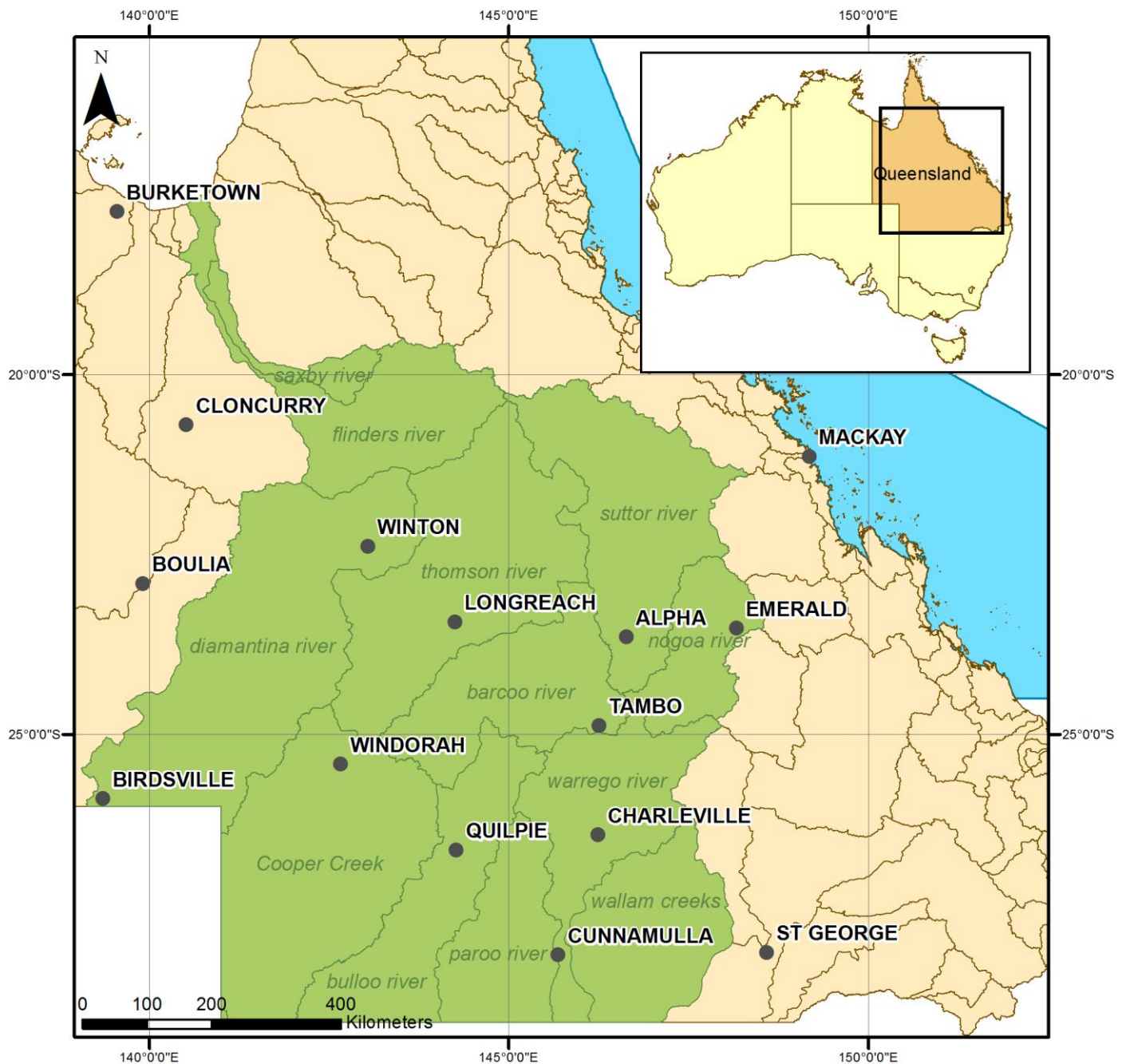


Groundwater dependent ecosystem mapping rule-sets for the Lake Eyre Basin and surrounding catchments

Version 1.5

Lake Eyre Basin and surrounding 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												
	Barcoo River	Bulloo River	Cooper Creek	Diamantina River	Flinders River	Lake Frome	Nogoa River	Paroo River	Saxby River	Suttor River	Thomson River	Wallam Creeks	Warrego River
<i>Alluvial aquifer mapping rule-sets</i>													
LEB_RS_01A					X				X				
LEB_RS_01B										X			X
LEB_RS_01C					X			X					
LEB_RS_01D										X			X
LEB_RS_01E		X											X
LEB_RS_01F		X						X					X
LEB_RS_01G								X				X	X
LEB_RS_01H												X	
LEB_RS_01I										X	X		
LEB_RS_01J								X					
LEB_RS_01K								X					
LEB_RS_01L			X										
LEB_RS_01M			X			X							
LEB_RS_01N										X	X		
LEB_RS_01O											X		
LEB_RS_01P							X						
LEB_RS_01Q	X										X		
LEB_RS_01R				X									
LEB_RS_01S							X						
LEB_RS_01T													X
LEB_RS_01U	X												

Mapping rule-set	Drainage sub-basin												
	Barcoo River	Bulloo River	Cooper Creek	Diamantina River	Flinders River	Lake Frome	Nogoa River	Paroo River	Saxby River	Suttor River	Thomson River	Wallam Creeks	Warrego River
<i>Permeable sandy plain aquifer mapping rule-sets</i>													
LEB_RS_02A					X				X		X		
LEB_RS_02C													X
LEB_RS_02D				X									
LEB_RS_02E			X										
LEB_RS_02F												X	
LEB_RS_02G	X										X		
LEB_RS_02H										X			X
LEB_RS_02I							X						
LEB_RS_02J								X				X	X
LEB_RS_02K		X						X					X
LEB_RS_02L		X											X
<i>Sandstone aquifer mapping rule-sets</i>													
LEB_RS_03A											X		
LEB_RS_03B	X									X	X		
LEB_RS_03C								X					
<i>Melaleuca tamariscina mapping rule-sets</i>													
LEB_RS_04A	X				X		X			X	X		
LEB_RS_04B	X				X		X			X	X		
LEB_RS_04C	X				X		X			X	X		
<i>Permeable rock aquifer (basalt) mapping rule-sets</i>													
LEB_RS_06A					X						X		
LEB_RS_06B							X			X			X
<i>Permeable rock aquifer (sandstone) mapping rule-sets</i>													
LEB_RS_07A					X				X				
LEB_RS_07B	X						X			X	X		X
LEB_RS_07C												X	X
<i>Wind-blown inland sand dunefield aquifer mapping rule-sets</i>													
LEB_RS_08B								X					
LEB_RS_08C	X	X	X	X				X			X	X	X
<i>Catchment constriction mapping rule-sets</i>													
LEB_RS_09A								X					
LEB_RS_09B				X									
<i>Permeable rock aquifer (metamorphic rock) mapping rule-sets</i>													
LEB_RS_12							X			X			
<i>Permeable rock aquifer (igneous rock) mapping rule-sets</i>													
LEB_RS_13							X			X			
<i>Coastal sand mass aquifer mapping rule-sets</i>													
LEB_RS_14					X								

Mapping rule-set	Drainage sub-basin												
	Barcoo River	Bulloo River	Cooper Creek	Diamantina River	Flinders River	Lake Frome	Nogoa River	Paroo River	Saxby River	Suttor River	Thomson River	Wallam Creeks	Warrego River
	<i>Other mapping rule-sets</i>												
LEB_RS_10	X	X	X	X	X		X	X	X	X	X	X	X
LEB_RS_11		X	X			X							

Groundwater dependent ecosystem mapping rule-set descriptions

LEB_RS_01A—Quaternary alluvial aquifers with fresh, seasonal 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 seasonally saturated alluvial aquifers.

- Potential surface GDEs dependent on alluvial aquifers include lacustrine wetlands and palustrine wetlands.
- Potential surface GDEs dependent on alluvial aquifers include riverine water bodies and channels below 300 metres elevation.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystem containing *Eucalyptus* spp. and *Melaleuca viridiflora*.
- Potential terrestrial GDEs dependent on alluvial aquifers include riverine wetlands below 300 metres elevation.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems within 50 metres of the contact between alluvia and old loamy and sandy plains in the Flinders River catchment.

LEB_RS_01B—Quaternary alluvial aquifers overlying sandstone ranges with fresh, intermittent groundwater connectivity regime

Alluvial aquifers overlying sandstone ranges 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 overlying sandstone ranges.

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

LEB_RS_01C—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 nearby alluvial aquifers.

- Potential surface GDEs dependent on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within one kilometre of an active, permanent spring.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species within one kilometre of an active, permanent spring.

LEB_RS_01D—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 alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels in the Warrego River catchment.
- Potential surface GDEs dependent on alluvial aquifers include riverine water bodies and channels below 300 metres elevation in the Suttor River catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species in the Warrego River catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include riverine wetlands below 300 metres elevation, regional ecosystems containing *Eucalyptus* spp., and regional ecosystems containing *Livistona lanuginosa* in the Suttor River catchment.

LEB_RS_01E—Quaternary alluvial aquifers with fresh, episodic 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 episodically saturated alluvial aquifers.

- Potential surface GDEs dependent on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels in the Warrego River catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species in the Warrego River catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species in the Bulloo River catchment.

LEB_RS_01F—Quaternary alluvial aquifers with brackish, episodic 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 brackish episodically saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species.

LEB_RS_01G—Quaternary alluvial aquifers with saline, episodic 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 saline episodically saturated alluvial aquifers.

- Potential surface GDEs dependent on alluvial aquifers include lacustrine and palustrine wetlands in the Wallam Creeks catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species in the Wallam Creeks catchment.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species in the Wallam Creeks and Warrego River catchments.

LEB_RS_01H—Quaternary alluvial aquifers with fresh, ephemeral 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 ephemerally saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species.

LEB_RS_01I—Closed alluvial systems 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 in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Cauckingburra Swamp, Lake Dunn, Lake Webb and Lake Huffer wetlands.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species near Cauckingburra Swamp, Lake Dunn, Lake Webb and Lake Huffer.

LEB_RS_01J—Closed alluvial systems with fluctuating, near 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 fluctuating near permanently saturated alluvial aquifers in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Lake Numulla, Lake Wombah and Lake Thorlinda wetlands.

LEB_RS_01K—Closed alluvial systems with hypersaline, near 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 hypersaline near permanently saturated alluvial aquifers in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Lake Wyara wetlands.

LEB_RS_01L—Closed alluvial systems with fresh, ephemeral 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 ephemeral saturated alluvial aquifers in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Lake Yamma Yamma wetlands.

LEB_RS_01M—Quaternary alluvial aquifers with brackish, ephemeral 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 brackish, ephemeral saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species.

LEB_RS_01N—Closed alluvial systems with brackish, 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 brackish intermittently saturated alluvial aquifers in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Lake Buchanan wetlands.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species near Lake Buchanan.

LEB_RS_01O—Closed alluvial systems with fluctuating, 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 fluctuating intermittently saturated alluvial aquifers in closed depressions.

- Potential surface GDEs dependent on alluvial aquifers include Lake Galilee wetlands.
- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing deep rooted tree species near Lake Galilee.

LEB_RS_01P—Quaternary alluvial aquifers with fluctuating, 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 fluctuating intermittently saturated alluvial aquifers.

- Potential surface GDEs dependent on alluvial aquifers include riverine water bodies and channels below 300 metres elevation.
- Potential terrestrial GDEs dependent on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species below 300 metres elevation.

LEB_RS_01Q—Quaternary alluvial aquifers with brackish, 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 brackish intermittently saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing *Eucalyptus* spp.

LEB_RS_01R—Quaternary alluvial aquifers with saline, ephemeral 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 saline ephemeral saturated alluvial aquifers.

- Potential terrestrial GDEs dependent on alluvial aquifers include regional ecosystems containing *Eucalyptus* spp.

LEB_RS_01S—Quaternary alluvial aquifers overlying sandstone ranges with fluctuating, intermittent groundwater connectivity regime

Alluvial aquifers overlying sandstone ranges 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 overlying sandstone ranges.

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

LEB_RS_01T—Quaternary alluvial aquifers overlying sandstone ranges with fresh, episodic groundwater connectivity regime

Alluvial aquifers overlying sandstone ranges 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 episodically saturated alluvial aquifers overlying sandstone ranges.

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

LEB_RS_01U—Quaternary alluvial aquifers overlying sandstone ranges with brackish, intermittent groundwater connectivity regime

Alluvial aquifers overlying sandstone ranges 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 brackish intermittently saturated alluvial aquifers overlying sandstone ranges.

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

LEB_RS_02A—Permeable sandy plain aquifers with fresh, seasonal 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 seasonally saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains in the Flinders and Saxby River catchments.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains in the Flinders and Saxby River catchments.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Corymbia* spp. in the Flinders and Saxby River catchments.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems containing *Eucalyptus microtheca* in the Flinders River catchment and specific woodland regional ecosystem in the Saxby River catchment.

LEB_RS_02C—Permeable sandy plain aquifers with saline, 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 saline intermittently saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine and palustrine wetlands.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems containing *Corymbia tessellaris* or *Eucalyptus intertexta*.

LEB_RS_02D—Permeable sandy plain aquifers with saline, ephemeral 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 saline ephemerally saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Corymbia* spp.

LEB_RS_02E—Permeable sandy plain aquifers with brackish, ephemeral 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 brackish ephemerally saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Corymbia* spp.

LEB_RS_02F—Permeable sandy plain aquifers with fresh, ephemeral 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 ephemerally saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Eucalyptus* spp.

LEB_RS_02G—Permeable sandy plain aquifers with brackish, 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 brackish intermittently saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups in the Thomson River catchment.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups in the Thomson River catchment.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Corymbia* spp. in the Barcoo and Thomson River catchments.

LEB_RS_02H—Permeable 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 surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups in the Warrego River catchment.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups in the Warrego River catchment.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Eucalyptus* spp. in the Warrego River catchment and regional ecosystems dominated by *Corymbia* spp. in the Suttor River catchment.

LEB_RS_02I—Permeable sandy plain aquifers with fluctuating, 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 fluctuating intermittently saturated sandy plain aquifers.

- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Corymbia* spp.

LEB_RS_02J—Permeable sandy plain aquifers with saline, episodic 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 saline episodically saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Eucalyptus* spp.

LEB_RS_02K—Permeable sandy plain aquifers with brackish, episodic 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 brackish episodically saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Eucalyptus* spp.

LEB_RS_02L—Permeable sandy plain aquifers with fresh, episodic 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 episodically saturated sandy plain aquifers.

- Potential surface GDEs dependent on sandy plain aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of old loamy and sandy plains and ironstone jump-ups.
- Potential terrestrial GDEs dependent on sandy plain aquifers include regional ecosystems dominated by *Eucalyptus* spp.

LEB_RS_03A—Sandstone aquifers with fresh, permanent groundwater connectivity regime associated with discharge springs

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, permanently saturated sandstone aquifers associated with discharge springs.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 100 metres of a discharge spring.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 100 metres of a discharge spring.

LEB_RS_03B—Sandstone aquifers with fresh, permanent groundwater connectivity regime associated with recharge springs

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, permanently saturated sandstone aquifers associated with recharge springs.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 100 metres of a recharge spring.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 100 metres of a recharge spring.

LEB_RS_03C—Aquifers associated with springs that form saline scalds

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. The evaporation of groundwater discharge by springs can form saline scalds in the landscape. This mapping rule-set identifies potential GDEs associated with permanently saturated sandstone aquifers associated with springs that have formed saline scales.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species.

LEB_RS_04A—*Melaleuca tamariscina* situated on old loamy and sandy plains

Melaleuca tamariscina has a very strong association with groundwater discharge in the Lake Eyre Basin landscape. This mapping rule-set identifies potential GDEs associated with old loamy and sandy plains.

- Potential surface GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.
- Potential terrestrial GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.

LEB_RS_04B—*Melaleuca tamariscina* situated on ironstone jump-ups

Melaleuca tamariscina has a very strong association with groundwater discharge in the Lake Eyre Basin landscape. This mapping rule-set identifies potential GDEs associated with ironstone jump-ups.

- Potential surface GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.
- Potential terrestrial GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.

LEB_RS_04C— *Melaleuca tamariscina* situated on sandstone ranges

Melaleuca tamariscina has a very strong association with groundwater discharge in the Lake Eyre Basin landscape. This mapping rule-set identifies potential GDEs associated with sandstone ranges.

- Potential surface GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.
- Potential terrestrial GDEs dependent on groundwater include regional ecosystems containing *Melaleuca tamariscina*.

LEB_RS_06A—Permeable rock aquifers (basalts) with fresh, seasonal groundwater connectivity regime

Basalt weathers and oxidises relatively fast in comparison to other rock types. Basalt is permeable 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, seasonally saturated basalt aquifers.

- Potential surface GDEs dependent on basalt aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of basalt.
- Potential surface GDEs dependent on basalt aquifers include lacustrine wetlands, palustrine wetlands, and riverine water bodies within 50 metres of a channel on basalt.
- Potential terrestrial GDEs dependent on basalt aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of basalt.
- Potential terrestrial GDEs dependent on basalt aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of a channel on basalt.

LEB_RS_06B—Permeable rock aquifers (basalts) with fresh, intermittent groundwater connectivity regime

Basalt weathers and oxidises relatively fast in comparison to other rock types. Basalt is permeable 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 basalt aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of basalt.
- Potential surface GDEs dependent on basalt aquifers include lacustrine wetlands, palustrine wetlands, and riverine water bodies within 50 metres of a channel on basalt.
- Potential terrestrial GDEs dependent on basalt aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of the edge of basalt.
- Potential terrestrial GDEs dependent on basalt aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of a channel on basalt.

LEB_RS_07A—Permeable rock aquifers (sandstones) with fresh, seasonal groundwater connectivity regime

Fine to medium grained sedimentary rocks may store and transmit groundwater through fractures and weathered zones of what is otherwise a relatively low porosity rock. Groundwater may discharge typically along foot slopes and channels. This mapping rule-set identifies potential GDEs associated with fresh, seasonally saturated sandstone aquifers.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, and riverine water bodies within 50 metres of a channel on sandstone.
- Potential surface GDEs dependent on sandstone aquifers include channels.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of a channel on sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include regional ecosystems containing *Corymbia tessellaris* (Moreton Bay Ash).

LEB_RS_07B—Permeable rock aquifers (sandstones) with fluctuating, intermittent groundwater connectivity regime

Fine to medium grained sedimentary rocks may store and transmit groundwater through fractures and weathered zones of what is otherwise a relatively low porosity rock. Groundwater may discharge typically along foot slopes and channels. This mapping rule-set identifies potential GDEs associated with fluctuating, intermittently saturated sandstone aquifers.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, and riverine water bodies within 50 metres of a channel on sandstone.
- Potential surface GDEs dependent on sandstone aquifers include channels.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of a channel on sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include regional ecosystems containing *Corymbia tessellaris* (Moreton Bay Ash).

LEB_RS_07C—Permeable rock aquifers (sandstones) with fluctuating, episodic groundwater connectivity regime

Fine to medium grained sedimentary rocks may store and transmit groundwater through fractures and weathered zones of what is otherwise a relatively low porosity rock. Groundwater may discharge typically along foot slopes and channels. This mapping rule-set identifies potential GDEs associated with fluctuating, episodically saturated sandstone aquifers.

- Potential surface GDEs dependent on sandstone aquifers include lacustrine wetlands, palustrine wetlands, and riverine water bodies within 50 metres of a channel on sandstone.
- Potential surface GDEs dependent on sandstone aquifers include channels.
- Potential terrestrial GDEs dependent on sandstone aquifers include riverine wetlands and regional ecosystems containing deep rooted tree species within 50 metres of a channel on sandstone.
- Potential terrestrial GDEs dependent on sandstone aquifers include regional ecosystems containing *Corymbia tessellaris* (Moreton Bay Ash).

LEB_RS_08B—Inland sand dunefield aquifers with fresh, near permanent groundwater connectivity regime

Inland sand dunefields are composed largely of unconsolidated sand. These inland sand dunefields may store and transmit water to varying degrees through intergranular voids. This mapping rule-set identifies potential GDEs associated with fresh near permanently saturated sand aquifers.

- Potential terrestrial GDEs dependent on sand aquifers include regional ecosystems containing deep rooted tree species.

LEB_RS_08C—Inland sand dunefield aquifers with fresh, episodic groundwater connectivity regime

Inland sand dunefields are composed largely of unconsolidated sand. These inland sand dunefields may store and transmit water to varying degrees through intergranular voids. This mapping rule-set identifies potential GDEs associated with fresh episodically saturated sand aquifers.

- Potential surface GDEs dependent on sand aquifers include lacustrine and palustrine wetlands within 100 metres of the edge of an inland sand dunefield.
- Potential terrestrial GDEs dependent on sand aquifers include regional ecosystems containing deep rooted tree species within 20 metres of a water body.
- Potential terrestrial GDEs dependent on sand aquifers include regional ecosystems containing *Eucalyptus camaldulensis* in the Diamantina River catchment.

LEB_RS_09A—Alluvial aquifers with brackish, episodic groundwater connectivity regime associated with catchment constrictions

Catchment constrictions are a narrowing in the width and/or depth of the catchment resulting in the formation of a catchment throat which acts as a 'bottle-neck'. Often groundwater upslope of a catchment constriction is shallower due to the restriction of groundwater flow through the constriction point. There may also be a widening of the floodplain upslope of a catchment constriction due to the restriction of sediment flow through the constriction point. This mapping rule-set identifies potential GDEs associated with brackish alluvial aquifers influenced by a catchment constriction.

- Potential surface GDEs dependent on aquifers influenced by catchment constrictions include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels.
- Potential terrestrial GDEs dependent on aquifers influenced by catchment constrictions include riverine wetlands and regional ecosystems containing deep rooted tree species.

LEB_RS_09B—Alluvial aquifers with saline, ephemeral groundwater connectivity regime associated with catchment constrictions

Catchment constrictions are a narrowing in the width and/or depth of the catchment resulting in the formation of a catchment throat which acts as a 'bottle-neck'. Often groundwater upslope of a catchment constriction is shallower due to the restriction of groundwater flow through the constriction point. There may also be a widening of the floodplain upslope of a catchment constriction due to the restriction of sediment flow through the constriction point. This mapping rule-set identifies potential GDEs associated with saline alluvial aquifers influenced by a catchment constriction.

- Potential surface GDEs dependent on aquifers influenced by catchment constrictions include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels.
- Potential terrestrial GDEs dependent on aquifers influenced by catchment constrictions include riverine wetlands and regional ecosystems containing deep rooted tree species.

LEB_RS_12—Permeable rock aquifers (metamorphic rocks)

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

- Potential surface GDEs dependent on metamorphic rock aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of igneous rock.
- Potential terrestrial GDEs dependent on metamorphic rock aquifers include riverine wetlands and regional ecosystems within 50 metres of the edge of metamorphic rock.

LEB_RS_13—Permeable rock aquifers (igneous rocks)

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 lacustrine wetlands, palustrine wetlands, riverine water bodies and channels within 50 metres of the edge of igneous rock.
- Potential terrestrial GDEs dependent on igneous rock aquifers include riverine wetlands and regional ecosystems within 50 metres of the edge of igneous rock.

LEB_RS_14—Coastal sand masses (beach ridges)

Coastal sand masses often have one or more aquifers where groundwater has formed a freshwater lens in the intergranular voids of the unconsolidated sand. Groundwater may occur above low-permeability strata within the sand mass, for example coffee rock.

- Potential surface GDEs dependent on coastal sand masses include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels.
- Potential terrestrial GDEs dependent on coastal sand masses include riverine wetlands and regional ecosystems containing deep rooted tree species.

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.

LEB_RS_10—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.

LEB_RS_11—Recharge zones

For the Queensland GDE mapping program, recharge zones are areas of permeable rocks where water infiltrates the surface and is transported away from the local area. In recharge zones groundwater is usually occurs at a substantial depth. Recharge zones do not support GDEs locally, but may support GDEs where discharge occurs some distance away.

Citation

Queensland Government (2017) *Groundwater dependent ecosystem mapping rule-sets for the Lake Eyre Basin and surrounding catchments: version 1.5*, Queensland Government, Brisbane.