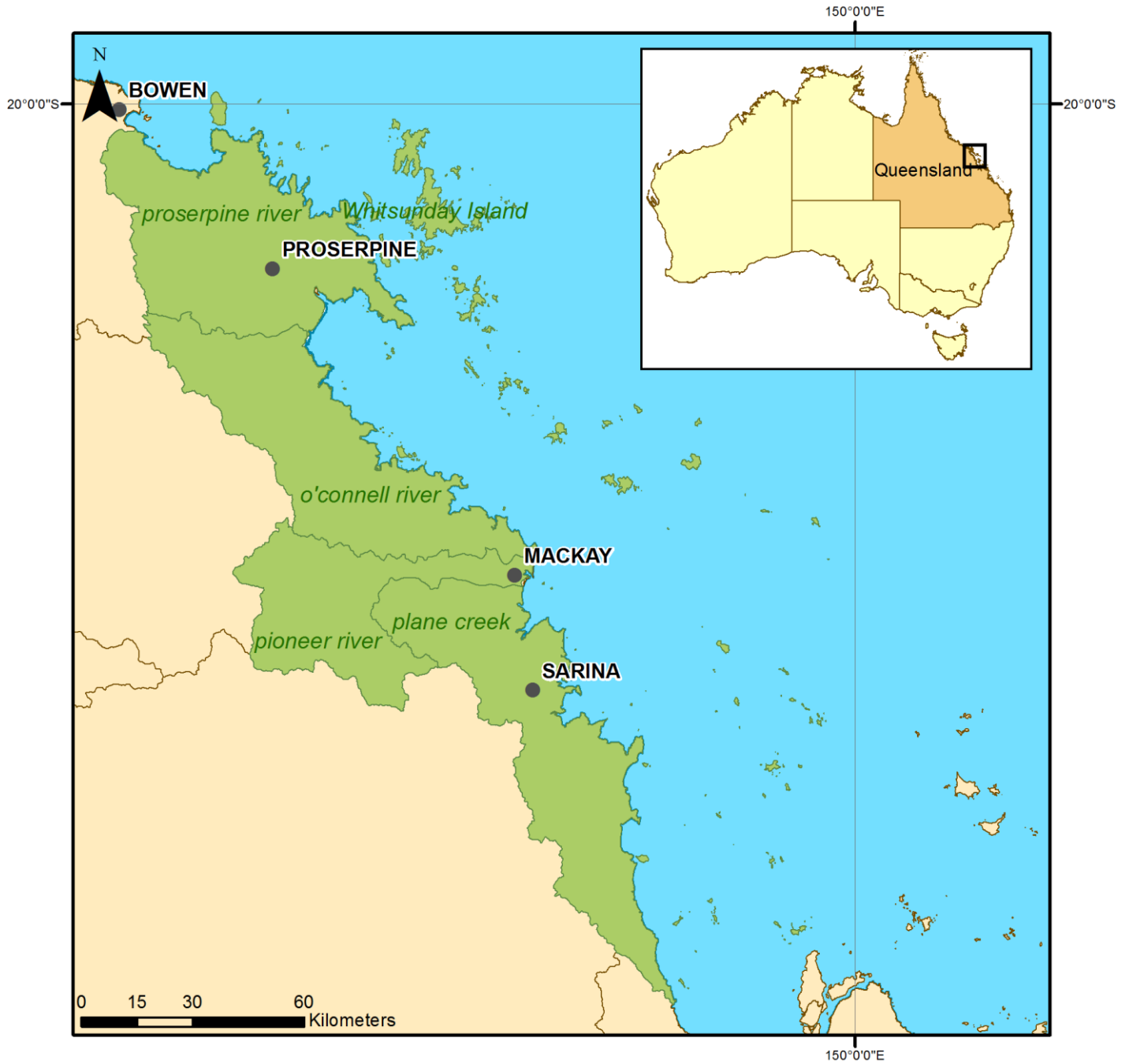


# Groundwater dependent ecosystem mapping rule-sets for Mackay-Whitsunday

Version 1.5

## Mackay-Whitsunday



## 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				
	O'Connell River	Plane Creek	Pioneer River	Proserpine River	Whitsunday Island <sup>1</sup>
<i>Low-lying coastal swamp mapping rule-set</i>					
MW_RS_01	X	X	X	X	X
<i>Alluvial aquifer mapping rule-sets</i>					
MW_RS_02	X		X	X	
MW_RS_03a	X	X	X	X	X
MW_RS_03b	X	X	X	X	
MW_RS_04	X	X	X	X	
MW_RS_05		X	X		
<i>Permeable rock aquifer (basalt) mapping rule-set</i>					
MW_RS_06	X		X		
<i>Fractured rock aquifer mapping rule-set</i>					
MW_RS_07	X	X	X	X	X
<i>Coastal sand mass aquifer mapping rule-set</i>					
MW_RS_08	X	X	X	X	X
<i>Catchment constriction mapping rule-set</i>					
MW_RS_09	X				

## Groundwater dependent ecosystem mapping rule-set descriptions

### MW\_RS\_01 (Low-lying coastal swamps-MW)

Aquifers associated with low-lying coastal swamps form from particles such as gravel, sand, silt and/or clay deposited by fluvial processes in river channels, floodplains, estuarine, delta and other near-shore environments. These deposits store and transmit water to varying degrees through inter-granular voids and are nearly permanently saturated.

- Potential surface GDEs on aquifers associated with low-lying coastal swamps include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on aquifers associated with low-lying coastal swamps include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted non-wetland ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

<sup>1</sup> Whitsunday Island includes other miscellaneous islands along the Mackay-Whitsunday coastline.

## MW\_RS\_02 (Alluvia with seasonal flows–MW)

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 seasonally saturated alluvial aquifers and alluvial aquifers subject to hydrological modification due to extraction or supplementation.

- Potential surface GDEs on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

## MW\_RS\_03a (Alluvia with groundwater connectivity to underlying fractured rock aquifers [high confidence]–MW)

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. In the mid to upper catchment areas there may be groundwater connectivity with underlying fractured rock aquifers. This rule–set identifies potential GDEs associated with near–permanent alluvial aquifers that have groundwater inputs from upper–catchment formations including the Urannah Igneous Complex.

- Potential surface GDEs on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

## MW\_RS\_03b (Alluvia with groundwater connectivity to underlying fractured rock aquifers [medium confidence]–MW)

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. In the mid to upper catchment areas there may be groundwater connectivity with underlying fractured rock aquifers. This rule–set identifies potential GDEs associated with seasonally saturated alluvial aquifers that have groundwater inputs from upper–catchment formations including the Urannah Igneous Complex.

- Potential surface GDEs on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

### MW\_RS\_04 (Alluvia with near permanent flows–MW)

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 near–permanently saturated alluvial aquifers.

- Potential surface GDEs on alluvial aquifers include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

### MW\_RS\_05 (Alluvia not supporting baseflow–MW)

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 that have shallowly incised channels that do not intersect the water table or anthropogenic regulation of baseflow/recharge.

- Potential surface GDEs on alluvial aquifers include lacustrine wetlands, palustrine wetlands or riverine water bodies.
- Potential terrestrial GDEs on alluvial aquifers include riverine wetlands and regional ecosystems containing deep rooted species. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

### MW\_RS\_06 (High rainfall permeable rocks [basalts]–MW)

Basalt weathers and oxidises relatively quickly 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 within the rock. Discharge of groundwater is common around the contact zone between the basalt and less permeable underlying geologies. High rainfall (>800 millimetres average annual rainfall) basalt uplands, and the gabbro associated with Mt Blackwood are included in this mapping rule–set.

- Within 50 metres of the contact between permeable rocks and other less permeable underlying geologies in high rainfall areas, the area may contain surface and/or terrestrial GDEs including lacustrine and palustrine wetlands or remnant regional ecosystems containing deep rooted species. Non–wetland shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.
- Channels on and flowing up to one kilometre away from the high rainfall permeable basalt are potential surface GDEs.

## MW\_RS\_07 (Fractured rocks–MW)

Groundwater is stored and transmitted in the fractures of otherwise relatively impermeable rocks. Groundwater may discharge from fractured rock aquifers typically along foot slopes and drainage lines. In the Mackay–Whitsunday region this mapping rule–set includes the Urannah Igneous Complex and all volcanics and intrusives that comprise the continental Islands.

- Potential surface GDEs on fractured rocks include lacustrine wetlands, palustrine wetlands and channels represented by drainage lines and riverine water bodies.
- Potential terrestrial GDEs on fractured rocks include riverine wetlands and regional ecosystems containing deep rooted species occurring in low parts of the landscape adjacent to streams. Shallow rooted ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

## MW\_RS\_08 (Coastal sand masses–MW)

Coastal sand masses including sand islands often have one or more sand mass aquifers where groundwater has formed a freshwater lens in the intergranular voids of the unconsolidated sand.

- Potential surface GDEs on coastal sand masses include lacustrine wetlands, palustrine wetlands, riverine water bodies and channels (represented by drainage lines).
- Potential terrestrial GDEs on coastal sand masses include regional ecosystems containing deep rooted species occurring below 50 metres in elevation. Shallow rooted non–wetland ecosystems such as grasslands, herblands, forblands or shrublands are excluded.

## MW\_RS\_09 (Catchment constrictions–MW)

Catchment constrictions are a narrowing in the width and/or depth of the catchment resulting in the formation of a ‘bottle–neck’ (Biggs et al., 2010). Often groundwater upslope of a catchment constriction is shallower due to the restriction of groundwater flow through the constriction point.

- Potential surface GDEs dependent on the surface expression of groundwater associated with catchment constrictions include lacustrine or palustrine wetlands, riverine water bodies and channels (represented by drainage lines) up to 500 metres upslope of an identified catchment constriction point.
- Potential terrestrial GDEs dependent on the subsurface expression of groundwater associated with catchment constrictions include riverine wetlands and regional ecosystems containing deep rooted species up to 500 metres upslope of an identified catchment constriction point.

## Citation

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