

## Report card for the Coastal Macleay Floodplain Alluvial Groundwater Source

Groundwater Source description	
<p>The Coastal Macleay floodplain alluvial deposits generally consist of fine grained sand, silts and clays. Bore yields are generally low to moderate and are typically only suitable for stock purposes, or small scale irrigation. The water quality of these areas can be variable with some areas being fresh and others being impacted by estuarine environments resulting in higher salinities. Coastal floodplain alluvials are underlain by acid sulphate soils. Dewatering of acid sulphate soils, via for example, groundwater extraction, can result in the acidification of groundwater and other adverse water quality impacts.</p>	
Area	
26 505 (ha)	Area of the Groundwater Source.
Recharge	
32 628 ML/yr	<p>The amount of water that percolates into the aquifer.</p> <ul style="list-style-type: none"> <li>Recharge from rainfall based on an infiltration rate of 10%.</li> </ul>
Groundwater dependent ecosystems	
<p>Two high value groundwater dependent ecosystems were identified during development of the draft plan. Others may be added to the plan as required when new information becomes available.</p> <ul style="list-style-type: none"> <li>Collombatti Swamp.</li> <li>Limeburners Creek Nature Reserve.</li> </ul>	
Planned environmental water	
31 029 ML/yr	<p>The volume of groundwater proposed to be reserved for the environment is:</p> <ul style="list-style-type: none"> <li>95% of recharge generated over remainder of the aquifer area (31 029 ML/yr). <i>Note.</i> Estimated by subtracting the long term average annual extraction limit (1 599ML/yr) from the estimated volume of recharge generated over the remainder of the aquifer area (32 628 ML/yr), plus</li> <li>The total volume of groundwater in storage.</li> </ul>
Long-term average annual extraction limit	
1 599 ML/yr	<ul style="list-style-type: none"> <li>The maximum volume of water available for extraction is equal to current entitlements plus estimated future water requirements for the term of this plan (includes consideration of possible increases in BLR, town water supply, dewatering, and agriculture).</li> </ul>
Upper extraction limit	
8 157 ML/yr	<p>The maximum volume of water available for all licensed and approved extraction including basic landholder rights. This is derived based on multiplying recharge by a sustainability factor which indicates the proportion of recharge available for extraction. More information on the sustainability factor is provided below (refer to Table 1 and Figure 1).</p> <p>The LTAAEL may be increased during the term of the plan up to this limit.</p> <p>The upper extraction limit is:</p> <ul style="list-style-type: none"> <li>25% of recharge generated over the aquifer area = 8 157 ML/yr.</li> </ul>

<b>Groundwater basic landholder rights</b>	
74 ML/yr	<p>The volume of groundwater set aside to meet all existing basic landholder rights (BLR). This volume may increase during the term of the plan if there is growth in access to BLR.</p>
<b>Total licensed groundwater entitlement</b>	
140 ML/yr	<p>The existing volume of groundwater licensed for extraction.</p> <ul style="list-style-type: none"> <li>• 100% is for aquifer access purposes.</li> <li>• 49 bore licences exist.</li> </ul> <p>This volume may increase as existing non-volumetric licences / applications submitted during amnesty periods / current aquifer interference activities have volume allocations resolved.</p>
<b>Unassigned Water</b>	
1 385 ML/year	<p>The volume of water currently not allocated within the long-term average annual extraction limit, a proportion of which may be made available for future extraction. The volume available will be reviewed periodically, based on updated recharge, environmental needs and current and future water needs.</p>
<b>Rules for managing connectivity</b>	
Not highly Connected	<p>Most alluvial aquifers have a relatively high degree of hydraulic connectivity with their associated surface water sources and are accordingly included in a water sharing plan that covers both surface water and its connected alluvial groundwater. However, the NSW Office of Water (NOW) recommended that the system should not be managed as highly connected because:</p> <ul style="list-style-type: none"> <li>• the risk to the groundwater source from extraction is minimal as there is only 140 ML of entitlement in the water source.</li> <li>• distance rules will apply and further restrictions will be imposed on the establishment of new works.</li> <li>• the alluvium is comprised mainly of silts and clays (less porous than for example gravels and sands).</li> </ul>

## Proposed rules

Plan provision	Proposed rules
<p><b>Limits to the availability of water</b> Assessment of average annual extraction against the long-term average annual extraction limit</p>	<p>Growth in extractions will be assessed against the long-term average annual extraction limit (LTAAEL) over a 3 year period with a 5% tolerance.</p>
<p><b>Limits to the availability of water</b> Available water determinations</p>	<p>Available water determinations (AWDs) will be made at commencement of each water year for:</p> <ul style="list-style-type: none"> <li>• Specific purpose access licences – 100% of share component.</li> <li>• Aquifer access licences – 1ML/unit of share component or lower amount as a result of a growth in use response.</li> </ul> <p><b>Note:</b> In critical water shortages, AWDs for specific purpose access licences for stock and domestic (subcategory domestic) may be reduced below 100%.</p>
<p><b>Rules for granting access licences</b></p>	<p>Granting of water access licences may be considered for the following categories:</p> <ul style="list-style-type: none"> <li>• Specific purpose access licences in clause 19 of the <i>Water Management (General) Regulation 2004</i>, including: local water utility, major water utility, domestic and stock licences.</li> <li>• Aquifer [Aboriginal community development] access licences and Aquifer [Aboriginal cultural] access licences.</li> <li>• Groundwater access licences in line with a controlled allocation order made in relation to any unassigned water in this water source.</li> </ul>
<p><b>Rules for managing access licences</b> Water allocation account management rules</p>	<p>No carryover of account water from one water year to the next is permitted.</p> <p>The maximum amount of water permitted to be taken in any one water year is the water allocation accrued in the water access licence account for that water year, adjusted for allocation assignments into or out of individual accounts.</p>
<p><b>Rules for managing access licences</b> Surface water and groundwater connectivity</p>	<p>N/A.</p>
<p><b>Cease to Pump</b></p>	<p>N/A.</p> <p><b>Note.</b> The Panel recommended no cease to pump due to the less connected nature of the aquifer.</p>

Plan provision	Proposed rules
<p><b>Rules for water supply works approvals</b> Rules to minimise interference between bores.</p>	<p>Water supply works (bores) are not to be granted or amended within the following distances of existing bores:</p> <ul style="list-style-type: none"> <li>• 200 m from a bore that is nominated on an aquifer access licence on another landholding.</li> <li>• 200 m from a bore that is used to extract basic landholder rights on another landholding.</li> <li>• 500 m from a bore nominating a local or major water utility access licence.</li> <li>• 100 m from a bore that is used by the NOW for monitoring purposes (unless agreed to in writing by the NOW).</li> <li>• 100 m from a property boundary (unless negotiated in writing with neighbour).</li> </ul> <p>These specified distances may be varied by the Minister after year four of the plan.</p> <p>These distances restrictions do not apply if:</p> <ul style="list-style-type: none"> <li>• the bore is used solely for basic landholder rights.</li> <li>• the bore is a replacement bore.</li> <li>• the bore is used for monitoring, environmental management or remedial works.</li> <li>• a hydrogeological study submitted by the applicant, and assessed as adequate by the Minister shows that the location of the bore at a lesser distance will have no more than minimal impact on existing extraction from the water source.</li> </ul>

<p><b>Rules for water supply works approvals</b> Rules to protect groundwater dependent culturally significant sites.</p>	<p>Water supply works (bores) are not to be granted or amended within the following distances of groundwater dependent culturally significant sites:</p> <ul style="list-style-type: none"> <li>• 100 m for bores used solely for extracting basic landholder rights.</li> <li>• 200 m for bores not used solely for extracting basic landholder rights.</li> </ul> <p>These distances restrictions do not apply if:</p> <ul style="list-style-type: none"> <li>• the bore is a replacement bore.</li> <li>• the bore is used for monitoring, environmental management or remedial works.</li> <li>• the bore replaces an existing bore that is part of a network for a major or local water utility used for the purpose of town water supply.</li> <li>• a hydrogeological study submitted by the applicant and assessed as adequate by the Minister shows that the location of the bore at a lesser distance will have no more than minimal impact on these water source and their groundwater dependent culturally significant sites.</li> </ul> <p><b>Note:</b> Culturally significant sites will not be specifically identified in the plan but a process for the NOW to undertake to identify these during the process of assessing and granting works approvals will be included.</p>
<p><b>Rules for water supply works approvals</b> Rules for bores located near contamination sources.</p>	<p>At the commencement of the Plan, there are no contamination sources identified in the water source.</p> <p>Contaminated sites may be added to or removed from the plan by the Minister based on results of a site inspection or other relevant information provided to the Minister on a contamination source.</p> <p>Water supply works (bores) are not to be granted or amended within:</p> <ul style="list-style-type: none"> <li>• 250 m of contaminated sites as identified within the plan.</li> <li>• between 250 m and 500 m of a contaminated site as identified within the plan unless no drawdown of water will occur within 250 m of the contamination source.</li> <li>• a distance greater than 500 m of a contaminated site as identified within the plan if necessary to protect the water source, the environment or public health or safety.</li> </ul> <p>These distances restrictions do not apply if:</p> <ul style="list-style-type: none"> <li>• the Minister is satisfied that the bore is used for monitoring, environmental management or remedial works.</li> <li>• a hydrogeological study assessed as adequate by the Minister shows that the distance is adequate to protect the water source, the environment and public health and safety.</li> </ul> <p><b>Note:</b> Due to the nature of managing contaminated sites, bores may be subject to restrictions as a result of local impact management.</p>

<p><b>Rules for water supply works approvals</b> Rules for bores located near sensitive environmental areas</p> <ul style="list-style-type: none"> <li>• Collombatti Swamp.</li> <li>• Limeburners Creek Nature Reserve</li> </ul>	<p>A water supply work approval must not be granted or amended to authorise the construction of a water supply work which, in the Minister’s opinion, is or is proposed to be located within:</p> <ul style="list-style-type: none"> <li>• 100m of a high priority groundwater dependent ecosystem listed in the schedules of the plan.</li> <li>• 400m of a high priority groundwater dependent ecosystem listed in the schedules of the plan, unless: <ul style="list-style-type: none"> <li>• the water supply work is authorised to take water pursuant to basic landholder rights only.</li> <li>• the water supply work approval includes a condition providing that the water supply work must not be used to take more than 20 ML in any water year.</li> </ul> </li> <li>• 800m of a high priority groundwater dependent ecosystem listed in the schedules of the plan, unless: <ul style="list-style-type: none"> <li>• the water supply work is authorised to take water pursuant to basic landholder rights only.</li> <li>• the water supply work approval includes a condition providing that the water supply work must not be used to take more than 100ML in any water year.</li> </ul> </li> <li>• 40m of the top of the high bank of a river.</li> <li>• 500m of a high priority karst system.</li> <li>• 100m from the top of an escarpment.</li> </ul> <p>These distances restrictions do not apply if the Minister is satisfied that:</p> <ul style="list-style-type: none"> <li>• no drawdown of water will occur at the perimeter of any GDE listed in the plan (excluding the 40m from the high bank of a river and 100m from an escarpment rules, which still apply).</li> <li>• the bore is a replacement bore.</li> <li>• the bore is used for monitoring, environmental management or remedial works,</li> <li>• the bore replaces an existing bore that is part of a network for a major or local water utility used for the purpose of town water supply.</li> <li>• a hydrogeological study assessed as adequate by the Minister shows that the distance is adequate to protect the water source, its dependent ecosystem and no more than minimal draw down will occur.</li> </ul> <p>High priority GDEs may be added or removed from the Plan based on further studies of groundwater ecosystem dependency undertaken by the Minister.</p>
--	--

<p><b>Rules for water supply works approvals</b> Rules for the use of existing bores within restricted distances</p>	<p>An existing water supply work (bore) will be able to continue extraction of groundwater with the maximum annual amount extracted equivalent to the access licence share components nominating that bore at the commencement of the plan within:</p> <ul style="list-style-type: none"> <li>• 500m of a contamination source listed in the plan.</li> <li>• any of the distance restrictions listed above.</li> </ul> <p><b>Note:</b> The water quality from any bore can be affected by land use activities and inherent water quality in the aquifer. Water quality cannot be guaranteed and may be unsuitable for human consumption and other uses. The quality of water extracted should be tested before being used and appropriately treated. Such testing and treatment is the responsibility of the licence holder.</p> <p><b>Note:</b> If the distance criteria in the plan are amended, the maximum amount of water that may be taken by a bore within the new criteria in one water year is equal to the sum of share components of access licences nominating that bore at the time of amendment.</p>
<p><b>Rules to mitigate the potential impacts of acid sulphate soil disturbance on water quality and ecological assets</b></p>	<p>Water supply works (bores) must not to be granted in areas identified as highly likely to contain acid sulphate soils if it is likely that the groundwater work would result in the acidification of groundwater, unless it can be demonstrated that the groundwater work would not result in the acidification of groundwater.</p>
<p><b>Rules for water supply works approvals</b> Rules to manage local impacts</p>	<p>Section 324 of the <i>Water Management Act 2000</i> provides for the management of local impacts in groundwater sources. The Minister may, for a specified period prohibit or restrict the taking of water from a water source, as the case requires to:</p> <ul style="list-style-type: none"> <li>• maintain or protect water levels in an aquifer.</li> <li>• maintain, protect or improve the quality of water in an aquifer.</li> <li>• prevent land subsidence or compaction in an aquifer.</li> <li>• to protect groundwater dependent ecosystems.</li> <li>• to maintain pressure, or to ensure pressure recovery, in an aquifer.</li> </ul>
<p><b>Plan provision</b></p>	<p><b>Proposed trading rules</b></p>
<p><b>INTO water source</b></p>	<p>Not permitted.</p>
<p><b>WITHIN water source</b></p>	<p>Permitted.</p> <p>Trades are permitted within the groundwater source, subject to assessment of potential impacts on other users and the environment.</p> <p>Conversion of access licence from one category to another in the groundwater source is not permitted.</p>
<p><b>Limits to the availability of water</b></p>	
<p><b>Assessment of average annual extraction against the long-term average annual extraction limit</b></p>	<p>Extractions are assessed on an annual basis against the LTAAEL. This assessment must account for the seasonal variability in usage from year to year, enabling past annual variations in usage to be repeated. The 3 year time over which the growth in extractions assessment is made will accommodate seasonal variations in usage.</p>

<b>Rules for managing access licences</b>	
<b>Rules for managing surface water and groundwater connectivity.</b>	While the NSW Office of Water recognises that all aquifers are connected to surface water to some degree, connectivity is only being actively managed for those groundwater sources where 70 per cent or more of groundwater pumped within an irrigation season is derived from stream flow. Advice from the NOW hydro geologists is that the water source should not be considered highly connected due to, the fine nature of the sediments and reduced potential for water exchange with the river, the minimal risk to the water source from extraction due to the small level of entitlement held in the water source and the application of groundwater rules developed by the State Groundwater Panel.
<b>Access licence dealing rules</b>	
<ul style="list-style-type: none"> <li>• no trades permitted into the water source</li> <li>• trading within the water source permitted</li> <li>• conversion to surface water licence is not permitted</li> </ul>	

## Background information

### Determination of the sustainability factor and the upper extraction limit

The risk assessment (refer to Table 1 and Figure 1) is used to determine the sustainability factor and is derived using the groundwater risk assessment methodology\*. The risk assessment considers environmental and socioeconomic factors and actions to mitigate risks to the groundwater source. The sustainability factor is used to determine the upper extraction limit. The upper extraction limit is determined by multiplying the sustainability factor by the volume of water that percolates into the aquifer. The upper extraction limit is the maximum volume of water available for all licenced and approved extraction. \*The risk assessment process is detailed in the Macro water sharing plans – the approach for groundwater – a report to assist community consultation (June 2011, NSW Office of Water).

Table 1. Risk assessment outcome summary.

Aquifer risk assessment for determination of the sustainability factor	
Environmental risk	<b>Moderate</b> (the area is susceptible to acid sulphate soils and there is potential for groundwater extraction to impact on groundwater dependent ecosystems).
Socio economic risk	<b>Low</b>
Sustainability factor	<b>25%</b>



Figure 1. Risk assessment matrix.

<b>Environmental risk</b>	<b>High</b>	5%	25%	50%
	<b>Moderate</b>	<b>Coastal Macleay Flood Plain Alluvial</b> <b>25%</b>	50%	60%
	<b>Low</b>	50%	60%	70%
		<b>Low</b>	<b>Moderate</b>	<b>High</b>
<b>Socio-economic risk</b>				

## Key factors, for decisions

### Access Rules

- No cease to pump rule is recommended due to groundwater in this water source is not considered to be highly connected to surface water due to the fine nature of the sediments which reduces the potential for water exchange with the river. Also low volumes of entitlement being held in the water source are a small risk to the water source from extraction.

### Trading Rules

- The recommended trading rules are based on standard state wide rules.

### Distance rules for water supply works approvals

- These rules were developed based on a statewide standard distance criteria and are tailored for local application in this groundwater source.

### Acid sulphate soils

- There are concerns over the potential for acidification of groundwaters via the construction and operation of bores and the disturbance of acid sulphate prone soils. Acidification of groundwater may lead to the mobilisation and speciation of contaminants such as heavy metals (for example aluminium and chromium). It is recommended including a provision to manage the risk of disturbing acid sulphate soils (refer to Rules to mitigate the potential impacts of acid sulphate soil disturbance on water quality and ecological assets above).

### Groundwater dependent ecosystems

- Whilst there are only a small number of groundwater dependent ecosystems identified in the plan area, the extraction of groundwater during the construction and operation of water supply works (bores) may lead to fluctuations in groundwater levels and thereby impact on groundwater dependent ecosystems.

© State of New South Wales through the Department of Trade and Investment, Regional Infrastructure and Services 2014. You may copy, distribute and otherwise freely deal with this publication for any purpose, provided that you attribute the NSW Department of Primary Industries as the owner.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (October 2014). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

Published by the Department of Primary Industries, a division of NSW Department of Trade and Investment, Regional Infrastructure and Services.

Document prepared October 2014