



Arrowsmith groundwater allocation plan: Evaluation statement 2010–2011

This statement evaluates the extent to which the objectives of the *Arrowsmith groundwater allocation plan* were met since its release on 29 August 2010 until the 1 August 2011.

Evaluation statements are part the Department of Water's adaptive management process. They allow us to continually review and improve our management of water resources.

The objectives of the plan are:

- a. To maintain adequate groundwater levels to sustain the renewable capacity of the water resource.
- b. To manage the needs of the groundwater-dependent ecosystems by maintaining adequate groundwater levels in unconfined and semi-confined aquifers.
- c. To manage water quality (salinity) of both fresh and saline groundwater resources for fit-for-purpose use.
- d. To increase the efficiency of use of groundwater.

1 Allocation status

1.1 Changes in allocation status

There are eight subareas in the plan area. Depending upon location there are up to eight aquifers (unconfined, semi-confined and confined) accessible in each subarea.

Demand for water increased during the last year. Part of this increase was due to the need to transport water out of the groundwater area for use in mining and industry. Although the amount of water licensed for use increased, the increase was not significant enough to change the status of water available given in the plan when it was released in April 2010 (refer to Table 1 of the plan). Water is still available from all resources.

The following resources are currently more than 70% allocated and only limited water is available:

- Mingenew subarea – Parmelia aquifer
- Eneabba Plains subarea – Eneabba aquifer
- Eneabba Plains subarea – Yarragadee North aquifer
- Allanooka subarea – Yarragadee North aquifer.

In accordance with our local licensing policies for allocating water in the plan these resources will continue to be allocated using the first-in first-served approach.

For a full list of up-to-date water availability in all resources contact the Mid West Regional office in Geraldton or see our water register, www.water.wa.gov.au/ags/WaterRegister >

2 Resource evaluation

2.1 Evaluation of resources with more than 70% of available water allocated

A resource evaluation was carried out in the three subareas where licensed entitlements are greater than 70% of the allocation limit. We used monitoring data submitted by licensees and data collected from the department's monitoring network.

These resources were evaluated to assess the effects associated with high allocation levels. In general, areas of abstraction show stable or falling groundwater levels, while areas where abstraction eased seem to show recovery. A summary of the results is listed Table 1.

Table 1 Summary of the results of the resource evaluation, 2011

Subarea	Aquifer	Results
Mingenew	Parmelia	Despite this resource being more than 70% allocated, groundwater level monitoring is showing a stable or rising trend. This suggests that current abstraction is not affecting the water levels in this resource. However, some licensees are not yet using their full allocation and as use increases this situation may change.
Eneabba Plains	Eneabba	Groundwater levels are declining in the Eneabba aquifer and overlying connected Superficial aquifer (southern portion of the Eneabba Plains subarea). Recharge (including rainfall) and throughflow are not yet fully understood in this area and it is not known if abstraction is contributing to groundwater decline.
Eneabba Plains	Yarragadee	Groundwater levels in the Yarragadee aquifer are generally declining. It is difficult to determine if abstraction is causing the declining trend or if there are other contributing factors. In areas of reduced abstraction there was a recovery in water levels (southern portion of Eneabba Plains subarea – Yarragadee) but this needs to be verified over the next few years.
Allanooka	Yarragadee	Groundwater levels in the Yarragadee range from increasing to stable across the Allanooka subarea. Groundwater levels are declining along the western edge of the subarea. The majority of abstraction occurs in central and western areas of the subarea. Recharge (including rainfall) and throughflow are not yet fully understood in this area and it is not known if abstraction is contributing to groundwater decline along the western edge of the subarea. Investigations are underway to better understand the hydrogeology in this area.

The resource evaluation also noted that:

- There are historical gaps in the records for many monitoring sites and this restricts how the data can be used in reporting.
- Land clearing is likely to be the cause of increasing groundwater levels in some resources, due to the increased area of recharge and the reduction in transpiration and evaporation losses.
- Reduced rainfall recharge is causing a declining trend in groundwater levels, especially in unconfined and connected groundwater resources. This is likely to change water availability in the future.

The rainfall–recharge–time relationships in the plan area are complicated and as a result we will continue to monitor and manage abstraction adaptively.

As shown in Table 1 in a number of areas licensees are not using their full entitlements. This means that we are not yet testing the capacity of the resource to provide the water without having an adverse effect on groundwater-dependent ecosystems and users. As abstraction increases we will monitor water level trends to identify any adverse regional effects on the resources. Any local area monitoring information collected from licensees will continue to be used in resource evaluations.

2.2 Monitoring

As part of the resource evaluation we reviewed the monitoring program for the Arrowsmith groundwater area (Chapter 5 of the plan).

At present the spatial distribution of the monitoring network provides adequate information on regional groundwater levels and trends. However, on a local scale monitoring is sparse and restricts our ability to monitor the effects of use. To help address this issue we will improve our monitoring program by:

- adopting a consistent and regular monitoring frequency for regional monitoring bores
- installing continuous water level data loggers for collection of high resolution monitoring data in priority areas
- developing an appropriate monitoring regime to monitor the dynamics of the saltwater interface in coastal areas with licensees
- continuing to require monitoring by licensees to identify if abstraction is locally affecting a resource
- insisting on compliance with licence requirements for monitoring data from all licences, to enable effective use of the data in future resource evaluations.

Our evaluation of the monitoring program is on-going and will continue to be improved over time. This process may include the need to construct additional regional and localised monitoring bores. We will also improve our storage of data submitted by licensees as part of their reporting requirements. We use this information at a local scale in assessing compliance and in making decisions about a resource and its use.

3 New allocation issues

Since the release of the plan, and in association with a number of licence applications, several allocation issues continue to be raised by the community (Table 2). While these issues are not new¹ they are of importance to local stakeholders.

Table 2 Allocation issues that were raised during evaluation period

Issue	Our response	
Reserving water for future use	Community concerns were raised regarding the issuing of large licence applications that take a substantial portion of the resource leaving smaller users without water for future development.	We identify and consider if any proposed licence will prejudice other current and future needs for water and if it is in the public interest before we issue the licence (see Schedule 1 clause 7(2) of the <i>Rights in Water and Irrigation Act 1914</i>). If demand cannot be met from one particular resource it may be met using other sources (e.g. another aquifer; rainwater; recycled water) or through trading. Currently the department only reserves water for future public water supply and this is unlikely to change under current legislation.
Restricting the volume of water that one licensee can hold	Community concerns were raised regarding the lack of controls limiting the maximum amount of water a licensee can hold, as this could lead to water monopolies and create anti-competitive behaviour.	The department does not restrict the amount of water one licensee can hold. During the development of this plan the previous policy ² of capping the volume of water each licensee can hold (10% of an allocation limit) was removed because it was not consistent with the <i>Rights in Water and Irrigation Act 1914</i> .
Movement of water	Local stakeholders and various members of the Mingenew community were concerned that transport of water outside the plan area could restrict local use and future access to water for the local community.	Moving water out of a groundwater area or subarea helps to meet the demands of industries that cannot obtain sufficient volumes or quality of water locally. These industries, generally mining operations, are a large part of regional development in the Mid West. The department considers local, regional and state development needs during the licence assessment process. We make licensing decisions that involve transporting water in line with the plan. This involves consultation with both the prospective licensee and the affected community.

¹ Aspects of some of these issues were originally addressed as part of the plan for public comment process and documented in the statement of response. See Department of Water, 2010, *Statement of response – Arrowsmith and Jurien groundwater allocation plans*, Department of Water, Perth.

² Water and Rivers Commission, 2002, *Arrowsmith groundwater area WA – interim sub-regional allocation strategy*, Water and Rivers Commission, Perth.

Issue	Our response	
Reviewing the existing allocation limits	The department identified that the allocation limits that were set require updating to include the outcomes of recent groundwater investigations and groundwater-dependent ecosystem studies ('GDE vulnerability in the Mid West' project).	We will review allocation limits when appropriate information becomes available. This is likely to begin in mid 2012.

4 Plan performance

We evaluated how we are managing the water resources and how we are implementing the plan against the objectives, performance indicators and actions specified in the plan (tables 3 to 5).

We rated our performance using the following system:

Code	Description
	70 to 100% of performance indicators, objectives and/or actions met
	40 to 70% of performance indicators, objectives and/or actions met
	Less than 40% of performance indicators, objectives and/or actions met

4.1 Performance indicators

We evaluated the performance indicators in the plan against our current management using information collected from our licensing and monitoring databases (Table 3).

Table 3 Summary of performance indicators

Performance indicator	Objective	Status	Evaluation
1 Maintain groundwater levels in high use (>70% allocated) areas	a and b	Met	Resources where >70% of the allocation limit is licensed were evaluated to identify trends in water levels. A summary of the results is described in Section 2.1 above. The rainfall–recharge–time relationships in the plan area are complex and we will continue to monitor and adapt our management as use increases in the plan area.
2 Minimise the movement of the saltwater interface	c	Partially met	Salinity measurements, collected by licensees in the Superficial aquifer (particularly the Dongara subarea), indicate a localised seasonal movement of the saltwater interface as a result of abstraction. However, monitoring is sporadic and long-term trends are difficult to determine. We will increase the level of compliance where licences contain conditions for monitoring of the saltwater interface to ensure that all data requested and submitted is consistent and usable in determining trends across the resource. Water quality remains fit-for-purpose.

Performance indicator	Objective	Status	Evaluation
3 Groundwater is allocated to within the allocation limits	a, b and d	Met	<p>Groundwater within all resources is allocated to within the allocation limits. No resources are over allocated.</p> <p>Total of 1.3 GL/yr was recouped from the Twin Hills subarea–Yarragadee aquifer and made available for re-allocation.</p> <p>One licence was issued for 5.5 GL/yr from the Tathra subarea–Parmelia aquifer for transport outside the subarea to the East Murchison groundwater area in April 2011.³ The licence is used for mining and industry purposes (Extension Hill mining operation).</p>
4 Volume of water abstracted is less than or equal to the volume of licensed water entitlements	a, b and d	Met	<p>Of the 134 licences currently in force in the plan area 29 are required to be privately metered for commercial use (≥ 0.05 GL/yr licensed entitlements). Ninety per cent of the licensees who submitted their meter readings were not using their full entitlements yet (staged developments).</p> <p>We will improve our enforcement of metering (installation and submission of data) conditions on licences.</p> <p>Licensees who are consistently using lower volumes of water than their licence entitlement can trade or return the unused water for future licensing.</p>
Score:		3.5/4	

4.2 Implementation actions

In the plan we committed to completing the implementation actions identified in Table 4 during 2010 and 2011. The implementation actions, designed to aid in future planning, that are due for completion during 2012 and 2013 are also included in Table 4 with an update on their current scheduled date for completion. They are not included in the rating score.

Table 4 Summary of progress in implementing the plan

Action	Status	Evaluation
1 Assess the condition and performance of the groundwater resources	Met	<p>We carried out a resource evaluation for areas that are more than 70% allocated to determine how the resources are performing and if the management approach is appropriate (see sections 2.1 and 2.2).</p> <p>This process will be repeated for future evaluations.</p>

³ There was a 5.0 GL/yr licence from the Mingenew subarea – Parmelia aquifer which was issued (Karara Mining Limited) after the reporting period (31 August 2011).

Action	Status	Evaluation
2 Review, and amend where appropriate, the current groundwater monitoring program	Met	We reviewed the current monitoring program as part of our resource evaluation. We will amend the monitoring program as part of improving our implementation of this plan (see Section 2.2).
3 Develop appropriate threshold levels for groundwater levels at groundwater-dependent ecosystem (GDE) criteria sites	In progress	Our National Water Commission funded project to better understand groundwater-dependent ecosystems in the Mid West is nearing completion. We delivered our final report on 'GDE vulnerability in the Mid West' to the Commission in March 2012. This report is the first step towards establishing criteria sites and determining ecological water requirements. We are already using data collected during the project to inform licensing decisions.
4 Review the reserved allocations for public water supply	Scheduled for 2015	We reviewed the public water supply reserves during the development of the plan. There was no change to public water supply reserves during the reporting period. We will review the reserves again in the 2015 evaluation statement. In July 2011 the department released <i>Operational Policy 5.01 – Managing water reserved for use by drinking water service providers</i> . This state-wide policy complements the local policy listed in Table 2 of the plan.
5 Release an annual evaluation statement on the plan and its implementation	Met	We will meet this action with the release of this statement and any future evaluation statements.
6 Review and update the hydrogeological knowledge of the Northern Perth Basin following completion of current groundwater investigations and modelling	Due 2013	The Northern Perth Basin hydrogeological bulletin, 'GDE vulnerability in the Mid West' project and other groundwater investigations and modelling are close to completion. Outcomes of this action will be used in reviewing the allocation limits.
7 Investigate representative groundwater-dependent ecosystems and their water requirements for the review of this plan	Due 2013	We are currently using the information collected from the 'GDE vulnerability in the Mid West' project in our licence assessments and mapping. Investigations are now complete, with analysis ongoing.
8 Investigate social and cultural values of groundwater-dependent ecosystems for the review of this plan	Due 2013	We are currently using the information collected from the social and cultural values captured during the 'GDE vulnerability in the Mid West' project in our licence assessments and mapping. Investigations are now complete, with analysis ongoing.
Score:	4/5	

4.3 Objectives

Table 5 shows the extent to which the objectives of the plan have been met so far. It is based on the assessment of the performance indicators shown in Table 3 and of the implementation actions shown in Table 4.

Table 5 Objectives and their status

Objectives	Status	Evaluation
a To maintain adequate water levels to sustain the renewable capacity of the water resource	Met	Current abstraction appears sustainable at a regional scale. However, while total abstraction remains substantially below allocation limits, the effectiveness of these limits in protecting users and water dependent values from the effects of abstraction remains untested. We will continue to closely monitor the effects of reduced recharge and abstraction, adapting our management accordingly.
b To manage the needs of the groundwater-dependent ecosystems by maintaining adequate groundwater levels in unconfined and semi-confined aquifers	Unknown	There were no recorded abstraction effects on groundwater-dependent ecosystems. However, monitoring data that would capture these is sparse. While abstraction remains low, the effectiveness of allocation limits in maintaining GDE at a regional scale remains untested. We also delivered our final report on ‘GDE vulnerability in the Mid West’ to the National Water Commission in March 2012. This report is the first step towards establishing criteria sites and determining ecological water requirements for resources in the plan area. As part of this project we established monitoring of criteria sites between 2010–2011. For future plan evaluations the data collected from the GDE monitoring will assist in assessing our success in maintaining water levels. At a local scale, we require licensees to monitor and manage local effects on the resource or other users including groundwater-dependent ecosystems.
c To manage water quality (salinity) of both fresh and saline groundwater resources for fit-for-purpose use.	Met	Where licensee monitoring is undertaken along the coast there is some evidence that the saltwater interface moves seasonally with abstraction patterns. However, current data submitted by licensees on water quality shows that salinity remains at a level that is fit-for-purpose.
d To increase the efficiency of use of groundwater	Met	We encourage large water users to adopt efficiency measures by using best management practices. We are implementing the <i>Operational policy 1.2 – Policy on water conservation and efficiency plans: achieving water use efficiency gains through water licensing</i> . The reduction in volume of use due to implementing efficiency measures is not yet recorded. Licensees are in the process of implementing water efficiency plans or efficiency targets as part of their licence conditions. We will focus our compliance efforts on these licensees over the next reporting period.
Score:	3/4	

5 Evaluation of the management approach

The plan's objectives are generally being met as water is being allocated within allocation limits and in line with the licensing policies outlined in the plan. However, current abstraction from most resources remains well below allocation limits which means that the suitability of the limits and policies remains relatively untested. Additionally there is a complex relationship between rainfall, recharge, hydrogeology and land use that is not yet fully understood (see Section 2.1).

We are continuing to gather information and improve our understanding of resources in the plan area. Part of this process will be a review of allocation limits. This knowledge will be used to adapt our management in the future.

6 Response to this evaluation

Through this evaluation we identified management responses that aim to improve our performance in meeting the plan objectives. These responses are shown in Table 6. They will be progressively implemented over the next evaluation period.

Table 6 Management response to the 2009–2011 evaluation

Objective	Management response
a	Review and update our monitoring program in line with recommendations listed in the resource evaluation and Section 2.2 above.
	Review allocation limits using the outcomes of recent groundwater investigations and groundwater-dependent ecosystem studies ('GDE vulnerability in the Mid West' project).
b	Continue to gather data to inform an update of allocation limits using improved methods and the outcomes of the 'GDE vulnerability in the Mid West' project.
	Establish GDE criteria sites for use in developing appropriate threshold levels for groundwater using the outcomes of the 'GDE vulnerability in the Mid West' project
c and d	Prioritise and improve compliance and enforcement for licences where: <ul style="list-style-type: none"> • licensees did not submit metering data as per licence conditions • licensees did not install meters on bores as per licence conditions • licensees did not submit water quality monitoring as per licence conditions.
all	Improve our storage of data submitted by licensees as part of their reporting requirements. This information is used at a local scale in assessing compliance and in making decisions for a resource and its use.

6.1 Future planning

The plan identifies three actions relating to future planning (see Table 4; actions 6, 7 and 8) that due to be completed between the beginning of 2012 and the end of 2013. We are currently completing these actions.

We will consider when to replace the plan following completion of the:

- outstanding actions from Table 4
- management responses described in Table 6
- review of allocation limits.

We will report on when the plan is scheduled for replacement in the next evaluation statement.