Economic Regulation Authority

Effectiveness and Efficiency Review of the Department of Water

28 September 2010

PRICEWATERHOUSECOOPERS

Contents

1 Executive summary

Background

In April 2009, the Treasurer of Western Australia requested the Economic Regulation Authority (the Authority) to conduct an inquiry into the recovery of expenses incurred by the Department of Water (DoW) in delivering water resource management and planning services. Under the terms of reference for the inquiry, the Authority was requested to develop a range of options and recommendations for

- the recovery of the water resource planning and management expenses incurred by DoW; and
- the most appropriate regulatory arrangements for the setting of service standards for the water resource manager, the setting of the charges and the recovery of those charges from water users.

In doing so, the Treasurer requested the Authority to consider and develop findings on what constitutes the efficient cost of managing the State's water resources and the share of these costs that DoW should appropriately recover from water users.

On 3 December 2009, the Authority published its draft report on the inquiry. The draft report did not propose any indicative fees or charges to recover water resource and planning costs as the Authority concluded that it needed further information from DoW before fees and charges could be determined.

The Authority engaged PricewaterhouseCoopers (PwC) to establish the effectiveness of DoW in providing each of the services and to determine the efficient costs of providing the services. The results of this review will inform the Authority's inquiry into the efficient revenue requirement of DoW. In addition, the terms of reference called for a review of DoW's existing performance indicators and to recommend alternative indicators where necessary.

The terms of reference did not extend to providing:

- recommendations on the appropriate cost-shares for government and water users;
- recommendations on appropriate allocations of costs to users in different regions of the state and/or to users holding licences to different water sources;
- critical assessment of DoW's decisions to include or exclude particular activities from its regulated cost base (as this was determined by the Authority in consultation with DoW prior to this review); or
- recommendations on the efficient cost path for future years.

The Department's expenditure

For 2008-09, DoW had a reported expenditure of $55.5 million for the sum of activities representing those identified by the Authority as cost-recoverable (partially or fully), which represents the cost base that is the subject of this review. These costs are presented in a disaggregated form in Table 1, noting that:

- Direct costs funded using budget appropriations account for 68 per cent of the proposed cost base (49 per cent operating, 17 per cent capital and 2 per cent internal branch support costs).
- Approximately 12 per cent of expenditure is funded with revenue from external sources. External funding amounted to $6.4 million in 2008-09 and mostly related to capital.
- Overheads (including on-costs and executive support) comprise 28 per cent of total operating expenditure.

Depreciation of assets is excluded from the costs.

Table 1: Components of expenditure in DoW's submission

Component	2006-07	2007-08	2008-09	2009-10 (budget)
Direct operating expenditure	$21,715,296	$26,852,245	$26,997,400	$25,226,414
Direct capital expenditure	$2,827,510	$5,272,175	$9,646,704	$11,326,554
Externally funded projects	$691,792	$3,771,094	$6,415,629	$8,941,298
Internal branch support costs (internally funded)	$683,169	$1,154,115	$1,248,521	$1,493,914
Internal branch support costs (externally funded)	$0	$288,957	$196,969	$710,450
Regional on-costs	$2,805,691	$4,207,278	$4,114,372	NA
Corporate on-costs	$4,413,702	$5,131,797	$6,066,127	NA
Division executive support	$840,288	$1,106,124	$857,962	NA
Total	$33,977,449	$47,783,784	$55,543,684	NA

Breakdown prepared on the basis of supplementary information provided to PwC by DoW.

Expenditure growth

In recognition of the need to improve water resource management in Western Australia, DoW has been successful in securing additional budget appropriation from state Treasury and funding from the Commonwealth Government over the past three years to invest in a number of activities across its portfolio. Of the eight activities examined in detail in this report, six have experienced a significant increase in total expenditure (including overheads) between 2006-07 and 2008-09 (Table 2).

Table 2: Percentage increase in total cost for eight activities examined in detail

Activity	Percentage increase in total cost 2006-07 to 2008-09
Groundwater assessment, investigation and review	159%
IWSS licensing	-9%
Metering	42%
Statutory referrals	202%
Water allocation planning	79%
Water information collection	41%
Water licensing and compliance	30%
Water source protection planning	-15%

Over the 23 activities identified for cost recovery, total expenditure has increased by 63 per cent over the three year period from 2006-07 to 2008-09.

- Direct operating expenditure, including internal branch support costs, has increased by 27 per cent. This increase corresponds with a 25 per cent increase in planned FTEs from 235 to 294.
- Capital expenditure has increased from $3.1 million to $17.2 million, which is funding capital programs in water information collection, meter installation (on licensed extractions) and

groundwater investigation (drilling observation bores). External funding from the Commonwealth has been responsible for much of this increase, having grown from $0.7 million in 2006-07 (of which approximately $0.3 million related to capital) to $6.4 million in 2008-09 (of which approximately $5.3 million related to capital).

- Overheads (or on-costs) have increased in absolute terms, but remain approximately constant as a ratio of total operating costs (rising by two percentage points from 26 per cent to 28 per cent).

This increased expenditure has produced a corresponding rise in outputs including, for example, seven water allocation plans completed, an expansion of the observation bore network by 102 bores, 1109 meters installed, an increase in the number of surface water gaugings from 391 to 580 per year and a reduction in the licence application backlog by almost two thirds.

Becoming more strategic

There is evidence to demonstrate that DoW is becoming more strategic in its investment decisions. For example, it has developed a risk framework for determining the level of assessment effort to apply to processing licence applications. Similarly, it uses a systematic process for prioritising the areas in most need of a water allocation plan and the required sophistication of the plan (again based on risks posed by water extraction and the percentage of the available water already allocated). A third example is the conscious decision taken by DoW, in collaboration with the Western Australian Planning Commission, to increase its level of advice and input to developing/reviewing strategic urban plans with a corresponding reduction in the number of statutory referrals relating to lower-level subdivision proposals. The adoption of these strategic approaches to prioritising investment should yield efficiencies over time.

Balancing these positive developments are several concerns about gaps in DoW's corporate and business planning.

- Budgets do not always reflect cost drivers or align to strategic priorities. Budgets for some activities are heavily influenced by the availability of external funding, and there is a risk that this is driving priorities instead of the other way around. PwC could not find evidence of any cohesive plan to show how staff resources are reallocated across activities to reflect changing priorities.
- Business plans, where developed for activities, are rarely underpinned by a rigorous cost-benefit analysis. There is no evidence that 'stress-testing' is performed as a matter of routine in evaluating alternative investment strategies (for example the impact of increasing/decreasing funding to an activity by 10 per cent, or the pay offs from investing in higher quality outputs as opposed to a larger number of outputs). While these evaluations may be occurring informally, it was difficult to discern any formal evaluations of this nature in the business plans.
- Despite pending new water legislation, there was limited evidence that DoW had incorporated the consequences of the new legislation in the agency's planning for delivery of its services.
- A strong feature of DoW's submission is the mapping of its 23 activities to 8 service areas. This provides a valuable insight to how activities are aligned to the strategic objectives of the agency. However, this 'thinking' does not appear to be embedded in DoW's people and systems. The mapping appears to be an output of the process of preparing the submission as opposed to being a well established tool within DoW.
- DoW's existing set of performance indicators mostly fall short of measuring the quality of its services and outcomes. Most indicators relate to inputs or intermediate outputs. For example, there is a general lack of measures relating to whether (or to what extent) DoW's services are meeting stakeholder needs. Nor is there any obvious link between the water management activities, the performance indicators and the organisational strategic objectives of DoW. Staff interviewed as part of this review acknowledged that many existing indicators are not regarded as particularly useful for tracking progress or implementing adaptive management strategies.

Effectiveness review

Effectiveness refers to the extent to which DoW is delivering the services required under its legislation, which includes aspects of quality commensurate with agreed services standards and 'fitness for purpose' to meet the demands of its customers. PwC assessed the effectiveness of DoW against the following criteria:

- To whom is DoW delivering products and services? (Individual licensees? General public?)
- Is DoW effective in delivering the services required under its legislation?
- In fulfilling its legislative responsibilities, is DoW carrying out any activities that are not necessary?
- Are there activities that DoW is not carrying out that it should be carrying out in order to fulfil its legislative responsibilities?
- Is DoW meeting the service standards required under its legislation or requested by its customers?

In most instances, the activities identified in the submission have been mapped to beneficiaries and in each case DoW has identified a proportion of costs that it believes should be passed through to water users. What is less clear is the value generated by DoW's services and outputs in terms of beneficial outcomes such as improved security of water entitlement to users, business confidence, reduced transaction costs, improved decision making and water quality benefits. While tangible outputs are being delivered, it is not always clear how these feed into outcomes or the value of these outcomes. A notable exception is the case put forward by DoW to support its investment in 'proving up' groundwater sources, where, in the case of Cowaramup aquifer, it was reported that 1.5 GL of additional water valued at approximately $1.5 million was identified as a result of its drilling program.

We did not uncover any areas where DoW was falling short of its legislative obligations, although the legislation under which DoW operates is typically non-prescriptive and there is substantial latitude for interpretation. However, there are a number of areas where DoW may be applying greater levels of effort than needed for effective outcomes. Examples include, but are not limited to, the following.

- In the case of licence processing, a disproportionate number of licence applications deemed to pose some degree of risk appear to be categorised as requiring "high" level of assessment as opposed to a "medium" level. This is an outworking of DoW's framework, which is biased toward elevating applications to the high assessment category. Further, for those applications that DoW is likely to reject, DoW is applying high levels of effort to avoid successful appeals against its rulings. It would seem that this cost could be avoided if DoW had sufficiently strong legal grounds to reject an application – such as statutory water allocation plans or policies with legislative backing. This will become increasingly important as water management areas become fully allocated.
- DoW has been progressively increasing the proportion of public water supply areas covered by a 'water source protection plan'. Currently 77 per cent of areas are covered. The plans are developed to standards set out in the Australian Drinking Water Guidelines 2004 and are endorsed by the Department of Health and the Water Corporation. While planning measures and land use controls may yield future benefits in terms of reduced water treatment costs, it is not evident that cost-benefit analysis has been undertaken to establish the efficient level of planning.
- We were unable to get a clear understanding of the way DoW determines the balance of effort assigned to groundwater investigations (principally bore drilling projects) and assessment/ modelling activities, the latter which utilises data from the observation bores. While these activities are complementary, there may be higher pay-offs at the margin from investing in improving the quality of assessment using existing bore information rather expanding the observation network.

Efficiency review

Efficiency has a number of dimensions. Productive efficiency refers to the utilisation of a least-cost combination of inputs to produce the target output or service. Allocative efficiency refers to the optimal allocation of resources across activities to maximise net benefits for DoW's stakeholders. Dynamic efficiency refers to the tactical and strategic reallocation of resources over time to account for factors such as changing technology, business drivers, demand for services and production costs.

Operating efficiency

For most of the activities examined, strategic and risk-based decision making tools have been employed to enable priorities to be identified – although, as noted, above cost-benefit analysis is seldom used.

There is tangible evidence that DoW has made efficiency gains in some areas of its business or is developing initiatives that should yield future efficiency gains. Examples include, but are not limited to:

- a decline in processing times for Category 4 licence applications
- measures to improve the quality of information received from licence applicants, which is expected to reduce costs for DoW and improve turn-around times
- investment in training and recruitment of hydrographers, which is expected to produce productivity improvements in water information collection and measurement
- rationalisation of the frequency of meter readings taken by DoW in the Gnangara area from monthly readings to twice per year
- the number of surface water gaugings has increased from 391 measurements in 2006-07 to 580 measurements in 2009-10, without a corresponding increase operating cost
- a significant reduction in the time taken to process water measurement information
- investment in telemetry and data loggers should yield additional operational efficiency improvements, as it there will be less requirement to visit monitoring stations.

However, there are areas where there is room for further efficiency gains. There have been budget over-runs in the administration of drilling projects, symptomatic of less than adequate project planning and cost control. For example, the final cost of the North Gnangara was over four times the initial estimate.

DoW's licensing administration costs are assessed to be high relative to those of the New South Wales Office of Water (NOW). Our analysis finds that DoW's average cost of processing a licence application (across all instrument types) is about $1,000 more than that reported by NOW. Similarly, the cost of processing a permanent trade of groundwater licence is significantly higher in Western Australia than New South Wales. NOW's full administrative cost of this transaction, including basic assessment, is $951 per trade.[1] By comparison, DoW estimates the average cost to process an application to trade or transfer a licence to take water is $3,611. The maximum fee proposed by NOW for a comparable transaction with a high level of assessment is $2,926.

In the case of water allocation planning, DoW has completed only four out of the nine plans identified in the 2007 State Water Plan for completion by 2010. A further three are in preparation.

[1] This cost is the published $761 fee proposed by NOW in its 2010 submission to IPART, plus a 25 percent loading for overheads.

These examples suggest that there is scope for efficiency improvements to be made and that current expenditure levels may not be delivering optimal outcomes. It is difficult to be definitive about the scale of inefficiency in DoW as there is only limited time-series information relating to performance levels. For example, DoW was not able to identify the level of effort expended on each type of statutory referral, which prevented analysis of the increase in expenditure that had resulted from DoW's focus on higher level strategic planning. The inability of DoW to report this information adds to our concerns that not all activities being undertaken by the agency represent optimal investments.

Overheads

DoW's overheads (or on-costs) are not excessive relative to those carried by NOW. These two agencies are reasonably comparable because they both have a similar number of FTEs dedicated to water management and planning activities (294 in the case of DoW and 308 in the case of NOW).

DoW's total overheads are $11.0 million, or 28 per cent of total operating costs, which is similar to the level of overheads carried by NOW ($13.6 million or 25 per cent of total operating costs). The ratio of corporate overheads to total operating expenditure is also similar — 11 per cent for DoW and 13 per cent for NOW.

Furthermore, based on guidelines published by the NSW Government's Council on the Cost and Quality of Government, corporate overheads in the range of between 10 to 12 per cent of operating costs are regarded as acceptable for a medium sized government agency of 350 to 1,000 FTEs.

Capital programs

DoW has been increasing the size of its capital works program in the last three years, and plans to spend, including external funding, approximately $16.62 million in 2009-10 (Table 3). With the advent of these large programs, it becomes critical to establish satisfactory capital planning frameworks and asset management plans. It is understood that DoW has these frameworks in place to a limited extent in accordance with Treasury requirements. However, it is evident that these are primarily for accountability and probity purposes as opposed to strategic planning and investment appraisal. Nor do the capital plans adequately examine the implications of new capital works on the operating costs and staffing needs of related activities, which may increase or decrease as a consequence of the program.

In the course of this review, DoW was unable to provide a complete set of plans and budgets for each of its three major capital programs — metering, groundwater investigations and information collection. In its submission, capital costs were reported in aggregate with operational expenditure and it took considerable time to tease these apart.

PwC assessed the efficiency of DoW's three main capital programs on the basis of three criteria:

- Was the investment prudent? That is, was the decision to invest prudent based on available information at the time and based on a sound analysis of benefits and costs?
- Did the program deliver the planned outputs?
- Were the outputs delivered at least cost? That is, has the program been appropriately managed, were materials and labour competitively sourced etc?

The results of this assessment are summarised in Table 4. We are generally satisfied that the projects undertaken have been necessary to enable DoW to meet its strategic objectives and legislative requirements. However, the absence of detailed business cases for most of the projects has meant that we have been unable to confirm with certainty that all of the decisions to invest have been prudent and have contributed to the delivery of DoW's services and water management objectives.

The metering pilot program in Gnangara has mostly delivered on its targeted number of installations and the average cost per meter for installation appears to be reasonable compared to cost estimates from NOW, although it is difficult to be conclusive because the metering technologies are different.

Table 3: Capital expenditure (including external funding) ($million)

Program	2006-07	2007-08	2008-09	2009-10 (budget)
Meter installation	NA	2.02	2.10	1.87
Bore drilling	1.21	3.31	6.05	5.76
Information collection	1.51	2.40	4.03	5.95
Land acquisition	0.00	0.03	2.72	3.04
Total	**2.72**	**7.76**	**14.90**	**16.62**

Note: 2006-07 capital expenditure does not include metering as it is not possible to accurately distinguish between operational and capital expenditure for that year.

Table 4: Efficiency assessment of capital programs

Assessment criteria	Meters	Observation bores	Information collection
Was the investment prudent? (i.e. expected benefits outweigh costs).	**Yes.** Meters were installed for users of Gnangara groundwater – a fully allocated aquifer. Metering is critical.	**Not possible to assess**. DoW has a 15 year plan in which it has prioritised areas for drilling, which undergoes periodic reviews. The drilling program aligns to DoW's strategic objectives, but no rigorous cost-benefit analysis has been undertaken.	**Not possible to assess**. Capital investment in this activity has not been set out in a capital planning framework, so it is difficult to assess whether the costs are prudent. At face value, a case for better surface water monitoring exists, but there is no evidence of rigorous cost-benefit analysis having been performed. Priorities are set by the 'Measurement and Monitoring Steering Committee'.
Did the program deliver the planned outputs?	**Yes,** close to target. 1,109 meters were installed over the 4 year program. The plan was to install 25 to 30 per month (equal to 1,200 to 1,440 over four years).	**Not entirely.** Priorities have changed slightly over the last five years. 102 bores have been drilled in the three years from 2006-07. Seventy-one bores were planned for 2008-09 but only 18 were drilled. Four out of 16 projects have been delayed, 4 were proposed but not completed and 6 projects were commenced that were not originally proposed.	**Not possible to assess**. The planned outputs of this program have not been adequately articulated. It is understood that the expenditure has purchased new instruments, recommissioning of monitoring sites, and maintenance work.
Were the outputs delivered at least cost?	**Inconclusive.** Based on 2008-09 data, the average cost per meter installed was $5,828. This is below the cost of meters proposed for NSW, which are costed at $14,500 each – although these are fitted with telemetry which is not the case for WA's meters.	**No**. The lack of satisfactory project planning has contributed to budget over-runs, which may have been negated if better cost-control processes were in place. It was not possible to benchmark the costs of this activity against NSW costs.	**Not possible to assess**. Owing to the fact that planned and actual outputs are not documented, it is not possible to determine whether the program has been cost-effective.

The groundwater investigation program is falling short of planned outputs due to delays and cost over-runs, partly attributed to labour shortages but also due to project management deficiencies. Only limited

information is available from NOW on the average cost of drilling an observation bore in New South Wales, so it was not possible to determine a satisfactory benchmark.

Similarly, it was not possible to assess whether the water information collection program is meeting all its milestones and deliverables because these have not been adequately documented by DoW in a capital planning framework.

Recommended efficient level of expenditure

Recommended adjustments to DoW's proposed level of expenditure for the purposes of establishing a regulatory cost base are summarised in Table 5. Separate adjustments have been made to direct operating expenditure, overheads and capital expenditure.

Due to the nature of the services, the limited information available for the production of this report and the absence of directly comparable benchmarks, it is difficult to provide a precise estimate of the efficient level of costs for delivery of a particular service. Acknowledging these limitations, we have recommended an adjustment in circumstances where we are not confident that the costs incurred result in outputs, services and/or service levels that are efficient and effective. Our recommendations are necessarily based on a degree of judgement about the 'reasonableness' and prudency of expenditures relative to evidence of the outputs delivered, the processes used by DoW to determine the value of the investment and cost-effectiveness of project delivery.

With reference to Table 5, a 20 per cent reduction on proposed operating expenditure (relative to 2008-09) is recommended, which reflects the seriousness of the shortcomings in business planning, budgeting and performance tracking reported above. This sets the efficient level of operating expenditure at $23.69 million.

Overheads appear to be within acceptable range for an organisation of DoW's size. We therefore recommend an adjustment of just 5 per cent to reflect scope for ongoing efficiency gains. This sets the efficient overhead component of expenditure at $10.49 million.

Table 5: Recommended efficient level of expenditure (including external expenditure)

			Recommended		
	2008-09 ($mill)	2009-10 budget ($mill)	% change to 2008-09	Adjustment ($mill)	Recommended cost base
Direct operating expenditure – including internal branch support costs	29.61	31.08	-20%	-5.92	23.69
Overheads – indirect costs or on-costs	11.04	NA	-5%	-0.55	10.49
Subtotal	**40.64**				**34.18**
Capital expenditure	14.90	16.62	-15% (or -18%) over four years[1]	-7.57 over four years	See text
Total	**55.54**				

[1]Four year period from 2006-07 to 2009-10

Capital

It is anticipated that the Authority will look to establish a charging regime for capital that is based on a regulatory asset base (RAB) approach. This method allows for the recovery of capital costs by establishing a regulatory asset base that reflects the initial value of assets, plus efficient increases in this asset base, reflecting capital expenditures on new infrastructure, that are capitalised into the value of the asset base over the regulatory period. A regulatory depreciation amount is netted off the value of the asset base. The capital cost that the regulator allows the regulated entity to pass through to users via charges is a percentage return on the asset base and the depreciation allowance.

Based on our assessment of the capital programs undertaken by DoW over the past three years, we recommend against capitalising the full value of expenditure into the RAB. The following principles apply:

- If outputs have not been delivered, capital expenditures should not be incorporated into the RAB.
- If outputs have been delivered but are not contributing to beneficial outcomes (that is, not a prudent investment), capital expenditures should not be incorporated into the RAB.
- If outputs have been delivered, but at higher than efficient cost, only the efficient cost of supplying the asset should be incorporated into the RAB.

On the basis of these principles, and our assessment above, we recommend an adjustment of $7.57 million to the total capital spent over the period 2006-07 to 2009-10. This is calculated as the sum of individual adjustments to the bore drilling program (25 per cent reduction) and information collection expenditure (25 per cent reduction). The dollar adjustment equates to an 18 per cent reduction in total capital expenditure over the last four years. No adjustment is recommended for meters as we assess this program to date as being prudent and has delivered on planned outcomes.

When establishing a RAB and forward revenue requirement for DoW, attention will need to be given to determining an appropriate level of depreciation (or a return of assets). DoW has not included a depreciation allowance in its submission, so we cannot provide recommendations on this cost component.

Adjustment for external funding

Once DoW's efficient costs are established, revenue from external sources should be subtracted from the cost base before determining fees and charges. This is to ensure that costs that have been funded by other revenue sources are not also recovered through prices. As most external revenue is used to fund DoW's capital programs, it will be critical to ensure that this is factored in when setting the RAB and capitalising subsequent expenditures into the RAB.

2 Introduction

2.1 Background

In April 2009, the Treasurer of Western Australia requested the Economic Regulation Authority conduct an inquiry into the recovery of expenses incurred by the Department of Water (DoW) in delivering water resource management and planning services. Under the terms of reference for the inquiry, the Authority was requested to develop a range of options and recommendations for:

- the recovery of the water resource planning and management expenses incurred by DoW; and
- the most appropriate regulatory arrangements for the setting of service standards for the water resource manager, the setting of the charges and the subsequent recovery of those charges from water users.

In doing so, the Treasurer requested the Authority to consider and develop findings on what constitutes the efficient cost of managing the State's water resources and the share of these costs that DoW should appropriately recover from water users.

To date, the Authority has published an issues paper (on 30 April 2009) to help interested parties understand the matters under review and to facilitate public comment and debate. The Authority also published a discussion paper (on 6 August) on the principles that should be applied in determining how the costs of water resource management and planning activities should be recovered. On 3 December 2009, the Authority published its draft report on the inquiry.

The draft report did not propose any indicative fees or charges to recover water resource and planning costs as the Authority concluded that it needed further information from DoW before fees and charges could be determined. In particular, it was not possible to determine the efficiency of DoW's costs based on information available at the time.[2] The Authority subsequently requested that DoW provide suitable cost estimates by the end of May 2010 for the purpose of a detailed efficiency and effectiveness review.

[2] This conclusion was informed, in part, by a report prepared by Marsden Jacob and Associates (2009) for the Authority

In the draft report for the Inquiry, the Authority recommended that costs be recovered from users based on an 'impactor pays' principle. The activities identified as being cost-recoverable from users (in part or whole) are summarised in Figure 1. The Authority has recently completed a process review with the aim of establishing how DoW carries out these activities (Quantum Consulting, 2010).

Figure 1: DoW's water resource management and planning functions and activities

1) Assess, Allocate and Licence Water Resources

- Licensing, Compliance and Enforcement
- Allocation Planning
- Environmental Water Planning
- Groundwater and Surface Water Assessment, Investigation and Review
- Water Measurement and Information

2) Water Metering

3) Urban Drainage, Assessment and Land-Use Coordination

4) Water Source Protection

5) Executive and Corporate Services (where allocated to the above activities)

Business drivers

DoW is responsible for planning, allocating and licensing functions for water sources in Western Australia. It undertakes these functions under provisions contained in 13 pieces of legislation. The *Rights in Water and Irrigation Act 1914* is the principal legislation for the allocation and management of use of water resources. DoW's responsibilities for drinking water source protection and management are set out in the *Metropolitan Water Supply Sewerage and Drainage Act 1909* and *Country Areas Water Supply Act 1947*. DoW has a role to manage environmental water quality under the *Waterways Conservation Act 1976.*

It is widely accepted that the legislation under which DoW works is outdated, inconsistent and does not facilitate contemporary principles of effective water resource management contained in the National Water Initiative (NWI).[3] In 2006, Western Australia became a signatory to the NWI. In doing so, it has a commitment to implement a number of reforms, including — but not limited to — the development of statutory water allocation plans, the installation of meters on water extraction and unbundling water licences (involving the separation of water use rights from water access entitlement).

Western Australia has lagged behind some other Australian jurisdictions in implementing water reforms, partly due to the constraints of the existing legislation and partly due to the various structural changes that DoW has undergone in the last decade. The National Water Commission's second biennial assessment of progress in implementation of the NWI (2009) points out a number of areas where Western Australia has not conformed to the NWI. Dating back further, the Auditor General published a public sector performance report in 2003 that identified a number of failings of the Waters and Rivers

[3] Department of Water (2009) Discussion Paper Water Resources Management Options, November 2009.

Commission (as the agency with DoW's functions was then known) including lack of information for decision making, poor coverage of allocation plans and drinking water source protection plans.

DoW is therefore 'playing catch-up' in some respects. It is currently under instruction to draft new water legislation that will consolidate the existing disparate pieces of legislation and modernise the way water is governed in the State. Since 2006-07 it has also begun investing heavily in water allocation planning, urban water planning, metering and groundwater investigation.

In addition to these institutional drivers, DoW's core business is being influenced by climate change, rapid population growth, the emergence of new water sources (desalination and recycling) and the transition of some water sources from a 'developing' status to full allocation. DoW has also had to comply with the state government's 3 per cent public sector efficiency dividend measures, which commenced in 2008-09.

2.2 Purpose of this study

The Authority engaged PricewaterhouseCoopers (PwC) to establish the **effectiveness** of DoW in providing each of the services in Figure 1 and to determine the **efficient** costs of providing the services. The review is based on:

- information contained in a submission provided to the Authority and PwC on 1 June 2010;
- cost model spreadsheets provided to the Authority and PwC on 11 June 2010;
- consultations with DoW staff during May to July 2010;
- supplementary reports, business plans and other documents provided to us by DoW, together with information obtained from independent sources such as the Budget papers, stakeholder submissions to the Authority's draft report for this inquiry and other relevant reports commissioned by the Authority as part of this inquiry[4]; and
- actual expenditures and service levels made over a three year period from 2006-07 to 2008-09. Budget information for 2008-09, 2009-10 and 2010-11 was available for the review. The review includes direct operating costs, overhead costs and capital.

This is the first time that DoW has been asked to prepare cost information for the purpose of a regulatory economic review. We therefore dedicate a section of this report to reviewing the adequacy of the information provided in DoW's submission to the Authority and the methods used to assemble the data. Our observations are intended to be constructive rather than critical, as we accept that there are limitations to DoW's financial system for reporting costs against activities.

To understand how DoW is performing against efficiency and effectiveness criteria, PwC undertook a strategic review of the way DoW carries out its functions and makes decisions about alternative investment options – for example, decisions to prioritise funding for one set of activities over others. We examined the extent to which DoW has adequately considered its business drivers and aligned its expenditures to meet the demands of its customers and its legislative obligations. Attention was given to what processes are employed for controlling expenditure, which is central for understanding whether

[4] Two related reports have been commissioned, including Marsden Jacob Associates (2009) and Quantum Management Consulting and Assurance (2010)

there is adequate budgeting, business planning, cost-benefit analysis, and suitable project management in place to administer funds effectively and efficiently. We examined outputs and outcomes against planned targets and used performance indicators, where available, to determine whether DoW has made efficiency gains over the last three to four years.

The results of this review will inform the Authority's inquiry into the efficient revenue requirement of DoW and thus the charges that should be set to recover costs from users of DoW's services.

Effectiveness review

Effectiveness refers to the extent to which DoW is delivering the services required under its legislation, which includes aspects of quality commensurate with agreed services standards and 'fitness for purpose' to meet the demands of its customers. Specific questions examined as part of this review include the following:

- To whom is DoW delivering products and services? (Individual licensees? Groups of licence holders? General public?)
- Is DoW effective in delivering the services required under its legislation?
- In fulfilling its legislative responsibilities, is DoW carrying out any activities that are not necessary?
- Are there activities that DoW is not carrying out that it should be carrying out in order to fulfil its legislative responsibilities?
- Is DoW meeting the service standards required under its legislation or requested by its customers?

This part of the review is informed by an assessment of DoW's performance indicators – that is, do the indicators show a history of ongoing improvement in service delivery? Are the indicators adequately defined? In addition, where possible, PwC has compared DoW's costs per unit of service or output against other comparable water resource management agencies. Where appropriate, PwC recommends alternative or additional indicators.

Efficiency review

Efficiency has a number of dimensions. Productive efficiency refers to the utilisation of a least-cost combination of inputs to produce the target output or service. Allocative efficiency refers to the optimal allocation of resources across activities to maximise net benefits for DoW's stakeholders. Dynamic efficiency refers to the tactical and strategic reallocation of resources over time to account for factors such as changing technology, business drivers, demand for services and production costs.

These elements of efficiency, and the degree to which DoW's services meet the criteria, are examined using a variety of methods including (but not limited to):

- benchmarking against comparable water agencies;
- assessments of whether adequate business cases have been prepared;
- whether project monitoring and evaluation frameworks have been developed;
- whether consideration has been given to alternative ways of delivering the service; and
- whether there is evidence of 'valued outcomes' being produced with current levels of investment.

To understand how DoW is performing against efficiency criteria, PwC undertook a strategic review of the way DoW carries out its functions and makes decisions about alternative investment options – for example, decisions to prioritise funding for one set of activities over others. PwC used this assessment

to draw conclusions about the extent to which DoW has adequately considered its business drivers and aligned its expenditures to meet the demands of its customers and its legislative obligations.

PwC also reviewed DoW processes for controlling expenditure, which is central for understanding whether there is adequate budgeting, business planning, cost-benefit analysis, and suitable project management in place to administer funds effectively and efficiently.

In order to draw conclusions about DoW's efficient level of expenditure, PwC has selected eight of DoW's activities (out of 23) and subjected these to a detailed analysis against the above criteria. The activities represent approximately two thirds of DoW's total budget that DoW has nominated as forming its cost base for recovery from users, in part or full. The selected activities cover most, but not all, of the functions listed in Figure 1. Where the Authority has indicated its intention to determine a fee or charge for a particular service (comprising one or more activities), an assessment is made of the efficiency of costs incurred in delivering this service.

Our assessment is based on a review of actual expenditures and service levels made over a three year period from 2006-07 to 2008-09. Budget information for 2008-09, 2009-10 and 2010-11 was available for the review. The review includes direct operating costs, overhead costs and capital costs.

Matters beyond scope of this review

The terms of reference for this review exclude the following:

- recommendations on the appropriate cost-shares for government and water users;
- recommendations on appropriate allocations of costs to users in different regions of the state and/or to users holding licences to different water sources (although the review does examine how DoW prioritises its costs between regions and water sources);critical assessment of DoW's decisions to exclude particular activities from its regulated cost base; and
- recommendations on the efficient cost path for future years.

2.3 Report structure

This report is structured as follows:

Chapter 3 contains an explanation of the costing and accounting methods used by DoW in developing their submission to the ERA, and an assessment of the adequacy of the methods for purposes of establishing a regulated cost base. It also includes a description of how the cost information provided by DoW has been re-organised for the purposes of this review.

Chapter 4 presents key elements of DoW's submission. Where necessary, costs are reorganised using the framework set out in chapter 3.

Chapter 5 describes the detailed analysis of eight activities undertaken by DoW. For each activity, PwC describes the activity and costs trends associated with the activity. The efficiency and effectiveness of each activity is then analysed, with recommendations made as to what the efficient cost base for the activity should be taken to be.

Chapter 6 benchmarks the performance of DoW against other water resource management agencies in Australia. PwC developed a number of indicators, with reasons for any divergence from the performance of other agencies discussed.

Chapter 7 contains a review of the performance indicators used by DoW. PwC assessed each of the indicators used by DoW for utility, with recommendations made as to what indicators DoW should be tracking to assist the delivery of effective and efficient services.

3 Accounting methods

3.1 Introduction

This chapter contains a summary of the costing and accounting methods used by DoW in developing their submission to the ERA, and an assessment of the adequacy of the methods used for the purposes of establishing a regulated cost base. Where inadequacies are noted, PwC provides a recommended alternative method.

The chapter is structured as follows:

- an overview of the methods used by DoW to assemble the costs reported in its submission;
- a review of any problems and limitations of the methodology used by DoW in preparing cost information suitable for the purposes of a regulatory set of accounts and price determination, including identification of information gaps; followed by
- a description of how the cost information provided by DoW has been re-organised for the purposes of this review.

3.2 Overview of DoW's methods

3.2.1 DoW's finance system

DoW's structures its finance system around an outcome based management approach. All primary financial records are contained within the Oracle financial system, which was the primary source of financial information for DoW's submission.

DoW addresses accounting issues and principles within the Oracle Financial system at an entity level, which allows DoW to meet all compliance requirements for capitalisation of expenditure and external reporting. However, DoW allocates all of its expenditure to project codes aligned with the outcome based management system.

As of late 2009, DoW's financial system shifted to the Shared Services model.

Capital costs

Before the roll into the DTF Shared Services model, external projects and capital items were capitalised at an entity level within the Oracle financial system using a manual review process. Under that system, DoW could separate capital and operational costs at a project level with existing reporting tools, although this requires some effort. This reflected the system's primary function as a financial reporting tool, rather than as a sophisticated cost management tool.

With the move to the Shared Services environment, DoW codes and reports all information in a manner that allows identification of capital and operational costs within projects. Capital items above $5,000 are capitalised to the Fixed Assets Sub Ledger and items below $5,000 are tracked using the Portable and Attractive Assets register. DoW reports capital works in progress at the agency level on an annual basis.

The cost data provided in DoW's submission largely relates to the period before the shift to the Shared Services model. This limited DoW's ability to identify capital expenditure easily at the project level. As a

result and reflecting the information that DoW was requested to provide, the costs provided in DoW's submission are an amalgam of capital and operational costs.

For this report, DoW provided further information to PwC on the capital expenditure. DoW assigns distinct project codes for externally funded and capital projects, which allows an approximate identification of capital expenditure. However, under the accounting and expenditure guidelines utilised by DoW, capital projects may include operational costs associated with implementation of the capital funding and some projects of an operational nature may contain a minor capital component. Externally funded projects can be a mix of capital and operational expenditure.

Given the constraints of DoW's financial system before the shift to the Shared Services model, DoW was not able to provide, within the required timeframe more detailed information on the split between operational and capital expenditure (with the exception of for the metering activity). This poses difficulties for establishing a set of cost accounts for the purposes of regulated price determination – as discussed in section 3.3.

3.2.2 Activity level costs

DoW's submission to the Authority contains cost information for 23 water resource management and planning activities. At the time of DoW's submission, DoW was able to report actual expenditure for 2006-07, 2007-08 and 2008-09, plus the first eight months of 2009-10. DoW typically defined these activities at a lower-level to those contained in Figure 1 (see section 2.1 and Appendix B for how the 23 activities map to those in Figure 1)

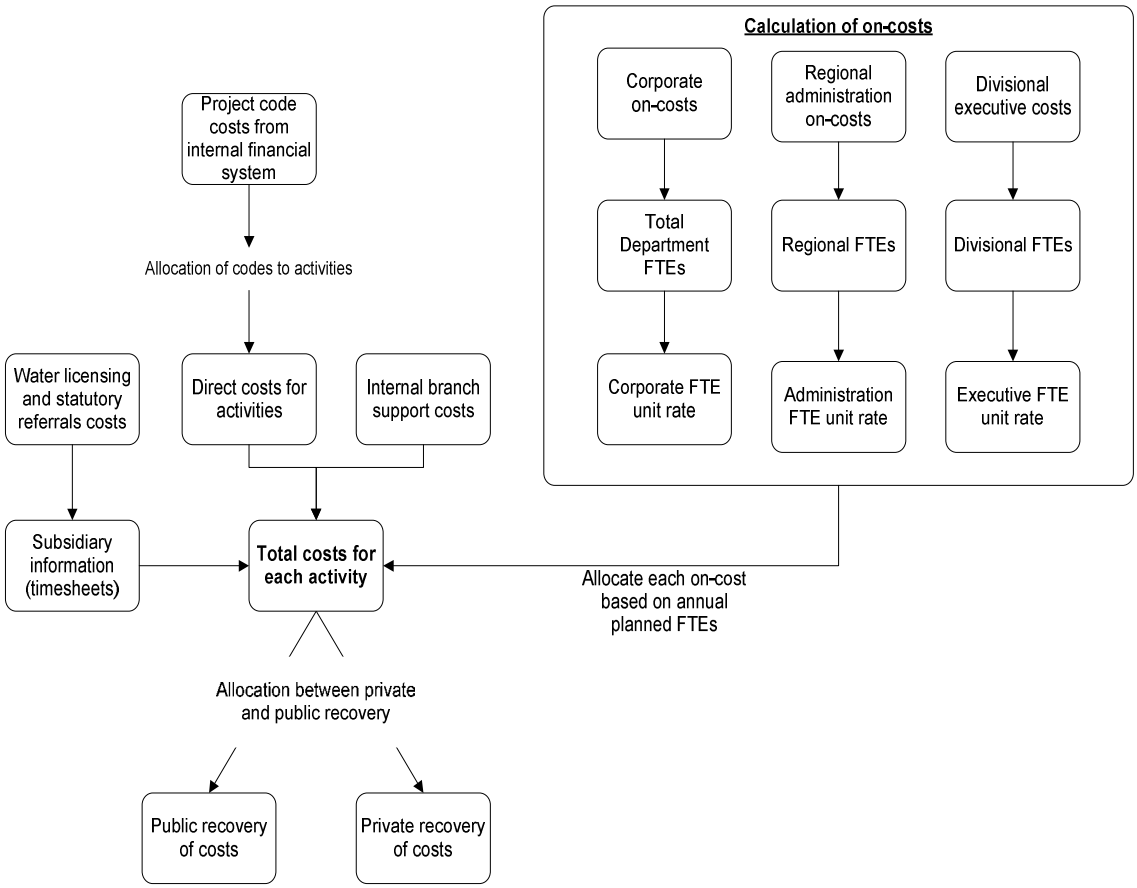
For each activity, DoW's submission sets out:

- a description of the activity;
- the direct cost of conducting the activity;
- the on-costs associated with the activity;
- annual revenue received from external sources; and
- the factors influencing activity costs.

DoW further provided annual planned full time equivalent employees (FTEs) to PwC.

DoW has allocated project costs, on-costs and internal branch support costs to each activity using a method that is depicted in Figure 2.

Figure 2: Allocation of costs to activities by DoW



Direct costs

Direct costs are primarily made up of salary costs, which include the full cost of employee remuneration (wages plus superannuation, annual leave, long-service leave etc). The number of FTEs allocated to the activity is the main determinant of the direct costs of an activity. To determine direct costs for each activity, DoW allocated projects contained in the finance system to each of the 23 activities. In circumstances where this process did not provide sufficient detail to allocate costs, alternative sources of data, such as time sheets, service logs and work plans, were used to guide cost allocation. For example, DoW used time sheets to determine staff time allocation to different types and categories of water license and for the provision of advice on statutory referrals.

While direct costs reflect the actual number of FTEs assigned to each activity (through the allocation of projects), the FTE information provided by DoW corresponds to *planned* FTEs not actual staffing levels. DoW advised PwC that planned FTEs differ from actual staffing levels for some activities due to high vacancy rates. This means that FTE information provided in the submission does not necessarily provide an accurate measure of the amount of actual effort DoW dedicates to each activity.

In allocating projects to activities, DoW, with guidance from the ERA, has exercised its discretion in excluding a number of projects from its reported cost base because DoW considered that these did not constitute water planning and management activities or were undertaken wholly for public beneficiaries,

and thus were not candidates for cost recovery. Of DoW's 2008-09 expenditure of $107,974,000, only $55,543,684 (51 per cent) has been included in the submission.

Internal branch support costs

The direct costs provided in DoW's submission include what DoW terms internal branch support costs. The project codes classed as internal branch support costs generally relate to a number of activities within a branch of DoW. An example is "licensing sub-program management which supports licensing branch activities such as licensing policy, licensing and compliance and enforcement.

DoW allocated a share of internal branch support costs across activities on a planned FTE basis. These internal branch support functions also have corporate, regional and divisional on-costs allocated to them.

The FTE estimates for each activity in DoW's submission do not include FTEs associated with the internal branch support projects.

On-costs

DoW allocated three classes of overheads (or on-costs) to activities. These are:

- corporate on-costs, which include finance and administration, human resources, information technology and the corporate executive;
- regional administration on-costs, which relate to the cost of administrative activities and accommodation in each regional office; and
- divisional executive costs, which relate to the executive costs for the Water Resource Use, Water Resource Management and Regional Management and Water Information Divisions.

It is noted that the costs of the Office of the Director General are not included as an overhead and therefore do not form part of DoW's proposed cost base.

DoW identified on-cost project codes and summed them across the appropriate corporate division, regional office or divisional executive. DoW then divided these totals by the number of departmental, regional or divisional FTEs to give an FTE on-cost rate. DoW added these FTE on-cost rates to the costs for each project within each activity based on the number of planned FTEs allocated to that project.

DoW has used planned rather than actual FTEs for the on-cost allocations.

DoW's external funding

DoW has included externally funded projects in the activity costs where it considered that the external funding contributed directly to the delivery of services or its inclusion was required in order to give a 'full picture' of costs. Where DoW used external funding to cover on-costs, these costs have not been included in on-cost calculations. Twelve per cent of DoW's costs were funded by external sources of revenue in 2008-09. The share of external revenue used to fund activities varies from one activity to the next (see Chapter 5).

3.2.3 Budgets

The cost information presented in DoW's submission represents actual expenditures. DoW did not provide budget for each of these past years in the submission. However, DoW supplied PwC with

additional spreadsheets that contained budgeted direct costs for 2008-09, 2009-10 and 2010-11 at a project level. This enabled PwC to compare direct costs for activities to budgets for those periods.

DoW also provided budget data for on-costs for 2007-08, 2008-09 and 2009-10.

3.3 Limitations of methods and information gaps

This section identifies any limitations of the data provided by DoW as being suitable for the purposes of a regulatory set of accounts and price determination.

Project detail

The project codes are set at a relatively high level, with the average project budget for 2009-10 for those projects allocated to activities in the submission being $379,000.

The high level at which the project codes are delineated has limited the ability to differentiate between different activities or portions of activities. For example, DoW generally costs licensing and compliance under a single project code for each region. This has limited the ability to examine licensing matters at a finer scale.

Scope of expenditure

Of DoW's 2008-09 expenditure of $107,974,000, only $55,543,684 (51 per cent) was included in the submission. DoW determined the scope of the activities to be included in DoW's submission through liaison with the Authority. DoW then allocated individual projects to these activities. It is beyond the terms of reference of this review to assess decisions around the appropriateness of excluding particular projects from the proposed cost base.

Planned versus actual FTEs

DoW provided *planned* FTEs to PwC and used these planned FTEs to allocate costs in its submission. If there is a small or uniform level of vacancies across DoW, this is unlikely to present any problems for the analysis. However, there is significant variation in vacancy rates between business units. For example, the water allocation branch had vacancy rates of 49 per cent in 2009-10, and metering had only one third its planned position filled for the last 5 months of 2009-10. Conversely, the licensing area has close to full occupancy (although agency staff fills many positions).

One implication of this is that in assessment of the efficiency of agency activities for previous periods, a high or varying vacancy rate for an activity may distort the link between operational expenditure and the actual workforce.

Further, DoW has then used these planned FTEs for the on-cost allocations. The use of planned FTEs for allocating a share of overheads to each activity would not distort the cost shares if the vacancy rate was uniform across DoW. However, for the activities with high vacancy rates, this will have the effect of inflating the level of overhead costs assigned to those activities. The above observation also gives rise to the question as to whether the efficient level direct costs would increase if DoW filled all vacancies to meet planned FTE targets.

Identification of capital costs

As noted above, DoW's allocation of capital projects to their own code has enabled PwC to disentangle capital costs from total costs presented in the submission to the extent that they are included in distinct codes. However, DoW has not been able to provide complete separation of operational and capital costs, such as IT infrastructure costs included in on-costs. Further, some operational costs and FTEs associated with implementation of the capital expenditure are included in the capital project codes.

There is also difficulty in quickly distinguishing between capital and operational costs that DoW covers with external funding at the project code level. A number of externally funded projects such as those funded by the Bureau of Meteorology and under the National Water Initiative include significant capital components such as measurement instrumentation, installation of gauging sites and for establishment of new monitoring wells, while others such as National Water Commission funding for allocation planning comprise solely of operational costs.

PwC's inability to identify capital expenditures completely apart from operational costs presents two problems. First, it makes it difficult to determine the efficiency of DoW's costs because different drivers underpin the two types of costs. Capital expenditures are characterised as being 'lumpy' and are associated with specific capital works projects – either new infrastructure of upgrading of existing assets. The assessment of the efficiency and effectiveness of capital expenditure should be based on the quality and rigour of DoW's capital planning framework and asset management plans.

Figure 3: An effective capital planning framework

An effective capital planning framework provides the context and strategic direction for capital planning/investment decision making. It should provide detail on how an organisation aims to achieve its strategic objectives and manage its key risks. The capital planning framework should define the process, principles and accountabilities for developing the capital plan, and it should provide transparent and robust principles to ensure alignment between strategic objectives and investment priorities, incorporating customer and stakeholder requirements (e.g. as identified in willingness to pay surveys). In addition, it should provide a reasoned method of allocating capital and prioritising programs/projects, thereby optimising the selection and delivery of the capital program.

An effective asset management framework provides a key input to the capital planning process. Sound asset management practices are critical for maintaining effective and efficient long-term system performance standards. Key characteristics of effective asset management frameworks include clear linkages between an organisation's asset management strategy, its capital investment framework, its approach to asset planning, maintenance, condition assessment and the disposal of assets.

A second problem that can arise where there is no separable estimate of annual capital expenditure is the difficulty of establishing a charging regime based on a regulatory asset base (RAB) approach. The RAB method is commonly used for regulatory pricing (for example, it is used by IPART in the regulation of water charges by the New South Wales Office of Water). The method allows for the recovery of capital costs by establishing a regulatory asset base that reflects the initial value of assets, plus efficient increases in this asset base, reflecting capital expenditures on new infrastructure, that are capitalised into the value of the asset base over the regulatory period. A regulatory depreciation amount is netted off the value of the asset base. The capital cost that the regulator allows the regulated entity to pass through to users via charges is a percentage return on the asset base and the depreciation allowance.

A further limitation of the presentation of capital costs by DoW is that depreciation of assets is not included in the costs. DoW calculates depreciation at a Departmental level only, and it has not been possible to allocate this depreciation to activities contained in its submission.

Capital comprised approximately 29 per cent of DoW's cost base in 2008-09, including capital funds from external sources. The main capital assets held by DoW that relate to water resource management and planning are:

- meters for measuring groundwater extraction;
- streamflow gauging stations and other water measurement equipment;
- groundwater monitoring bores; and
- land purchased for the protection of drinking water supplies.

Cost data for 2009-10

Due to the submission due date of 31 May 2010, the submission only contains a report of costs incurred for the first eight months of 2009-10. While this provides an indication of expenditure for that year, a number of factors reduce the usefulness of this information.

First, DoW invoices most of the external funding at the end of the financial year, outside of the eight months for which DoW provided cost data. As a result, revenue figures are considerably below that which DoW will receive for the full financial year.

Second, lumpiness in the timing of costs reduces the reliability of the 2009-10 data. Where there are significant capital costs, timing of expenditure can inflate the costs. For the metering activity, DoW undertook no capital expenditure after January 2010, resulting in any extrapolation of costs for that activity to be an overestimation of actual expenditure.

Budget data for 2010-11

DoW provided PwC with budget figures for each activity for 2010-11. At the time of provision of the data, the budgets for externally funded projects were not available. DoW indicated that it expects it will receive significant external funding for the 2010-11 financial year. As such, the budget expenditure provided is significantly below expected actual expenditure. This limits our capacity to assess DoW's true level of planned expenditure in 2010-11.

3.4 Organisation of cost information for this report

This section describes how PwC has treated the cost information provided by DoW for the analysis in this report.

3.4.1 Capital and operational expenditure

Capital and operational expenditure are separately analysed for each activity. For this submission, PwC has assumed that the delineation of capital projects by project code provides an approximate indication of capital costs, except for the metering activity where DoW provided further information on the capital expenditure based on their capital accounts.

PwC allocated externally funded projects between capital and operating costs based on advice received from DoW and on an assessment of whether DoW allocated FTE positions to the externally funded project. Projects that have FTEs assigned to them are categorised as being operational.

3.4.2 Treatment of external funding

PwC examines DoW's costs of performing activities both with and without external funding. For most of the activities, outputs are generally not differentiable based on whether they were externally funded or not. Thus, when assessing the effectiveness and efficiency of service delivery, PwC considered external funding when comparing the level of output with the level of expenditure.

However, in making a recommendation on the level of efficient costs for cost recovery purposes, PwC has considered the principle that activities funded with external revenues should not form part of the regulated cost base as this would result in DoW being funded twice for those activities – once from the external revenues and once from the user charges.

3.4.3 Direct costs and overheads

DoW's submission divided activity expenditure between what it terms direct costs and on-costs. The direct costs included both the direct costs of projects allocated directly to activities and the internal branch support costs allocated across those branches activities.

DoW considers that internal branch support costs are integral to activity delivery and are part of the direct costs of the activity. As a result, where this report refers to direct costs, those direct costs are exclusive of internal branch support costs unless otherwise specified.

3.4.4 Period for analysis

The base year selected for detailed analysis is 2008-09. While DoW provided expenditure for the first eight months of the 2009-10 financial year, PwC's consultations with DoW have indicated that for many of the activities the expenditure over the first eight months may not be representative of expenditure for the full financial year. This is a result of factors such as lumpy capital costs and DoW invoicing external funding at the end of the year. Consequently, PwC has excluded the 2009-10 actual expenditure information from its analysis and where an indication of the trend is required, have used the 2009-10 budget figures instead.

For the analysis of the 2010-11 budget, PwC has examined the internally funded direct costs only due to the unavailability of externally funded project budgets.

3.4.5 Projects excluded from cost base

Consistent with the terms of reference for this review, PwC has not analysed the decision criteria used by DoW to exclude projects that it considers are not water management and planning activities that are suitable for cost recovery.

4 The Department of Water's submission

4.1 Introduction

This chapter presents key elements of DoW's submission. Where necessary, costs are reorganised using the framework set out in section 3.4.

For 2008-09, DoW has reported a total expenditure of $55.5 million for the sum of activities representing those identified by the Authority as cost-recoverable (partially or fully), and thus forming the cost base that is the subject of this review. Costs are disaggregated in Table 6.[5] It can be noted that:

- Direct costs funded using budget appropriations account for 68 per cent of the proposed cost base (49 per cent operating, 17 per cent capital and 2 per cent internal branch support costs);
- DoW funds approximately 12 per cent of its proposed cost base with revenue from external sources. External funding amounted to $6.4 million in 2008-09 and mostly related to capital; and
- On-costs comprise the other 20 per cent of the proposed cost base.

Depreciation of assets is excluded from the costs.

Table 6: Components of expenditure in DoW's submission (2008-09)

Component	Cost
Direct operating expenditure	$26,997,400
Direct capital expenditure	$9,646,704
Externally funded projects	$6,415,629
Internal branch support costs (internally funded)	$1,248,521
Internal branch support costs (externally funded)	$196,969
Regional on-costs	$4,114,372
Corporate on-costs	$6,066,127
Division executive support	$857,962
Total	**$55,543,684**

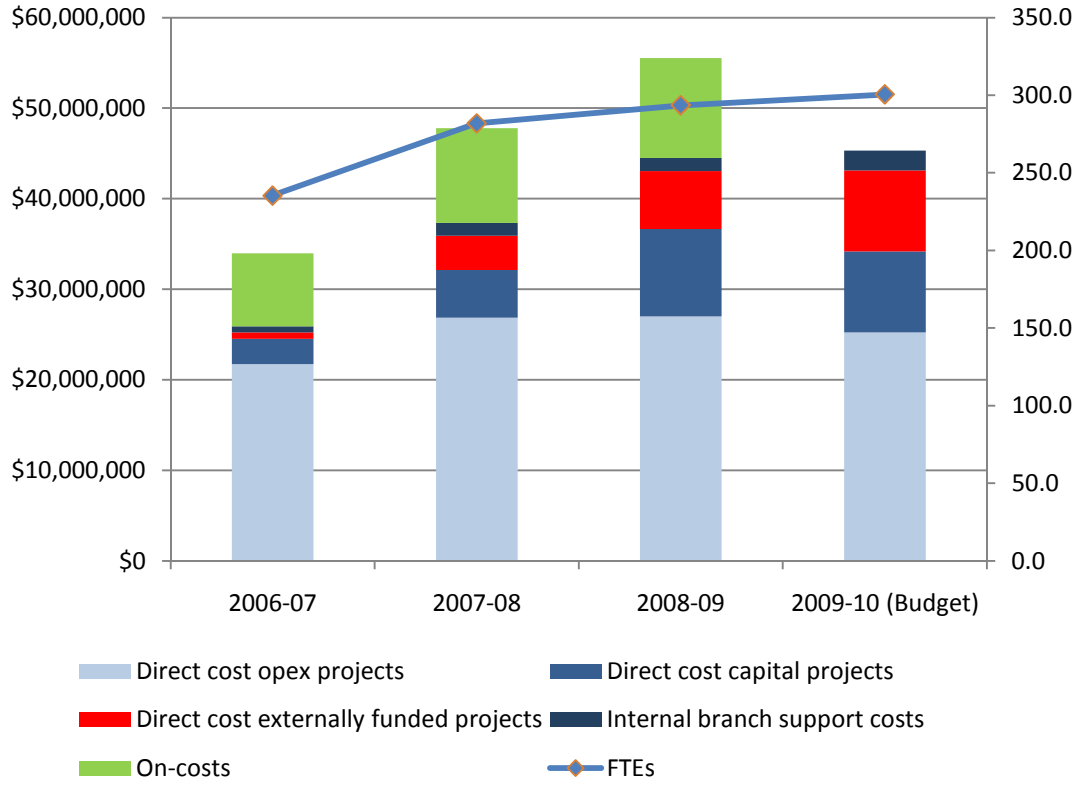
[5] PwC developed this breakdown based on information provided by DoW. It does not appear in DoW's submission.

4.2 Cost trends

DoW's total expenditure on water management and planning activities increased by 63 per cent over the three year period from 2006-07 to 2008-09 (Figure 4). The largest annual increase was in 2007-08, in which costs rose by 41 per cent relative to 2006-07. All cost components increased over the three years:

- *Operating expenditure* — increased by approximately 24 per cent, mostly in 2007-08. The increase corresponds with a 25 per cent increase in planned FTEs from 235.4 to 293.5. The activities that had the largest proportional increase in operational expenditure were enforcement (521 per cent), statutory referrals (214 per cent) and water licensing policy (153 per cent). The largest magnitude increases were for water licensing and compliance, water licensing policy and groundwater assessment, investigation and review.
- *Capital expenditure* — increased threefold, with large growth in all three of the activities that received capital funding in 2008-09: water information collection, metering and groundwater assessment, investigation and review.
- *External funding* — increased by 827 per cent, which largely consisted of Commonwealth grants. The main activities that drove this increase were groundwater investigation, assessment and review, water information collection, water information management and water allocation planning.
- *On-costs and internal branch support costs* — have increased, but mostly in 2007-08 in line with increased operating expenditure.

Figure 4: Total expenditure for the activities (including overheads) described in DoW's submission[6]



Budgeted expenditure for 2009-10 (excluding on-costs, for which budget data was not available) was also planned to increase, although this was largely a function of an increase in external funding, with operational expenditure exclusive of external funding budgeted to decrease.

In 2009-10, budgeted expenditure shows costs stabilising at 2008-09 levels (noting that the budget excludes on-costs, which were not available). Operating costs are budgeted to decline slightly. DoW is planning to cut its operating expenditure by around 11 per cent by 2010-11 compared to the 2008-09 budget. The budget reductions are largely a function of Treasury decisions.

Budgeted capital expenditure for 2009-10 is approximately equal to that incurred in 2008-09, primarily due to carryovers of the 2008-09 funding. The only cost component with a budgeted increase in 2009-10 are activities funded with external revenues.

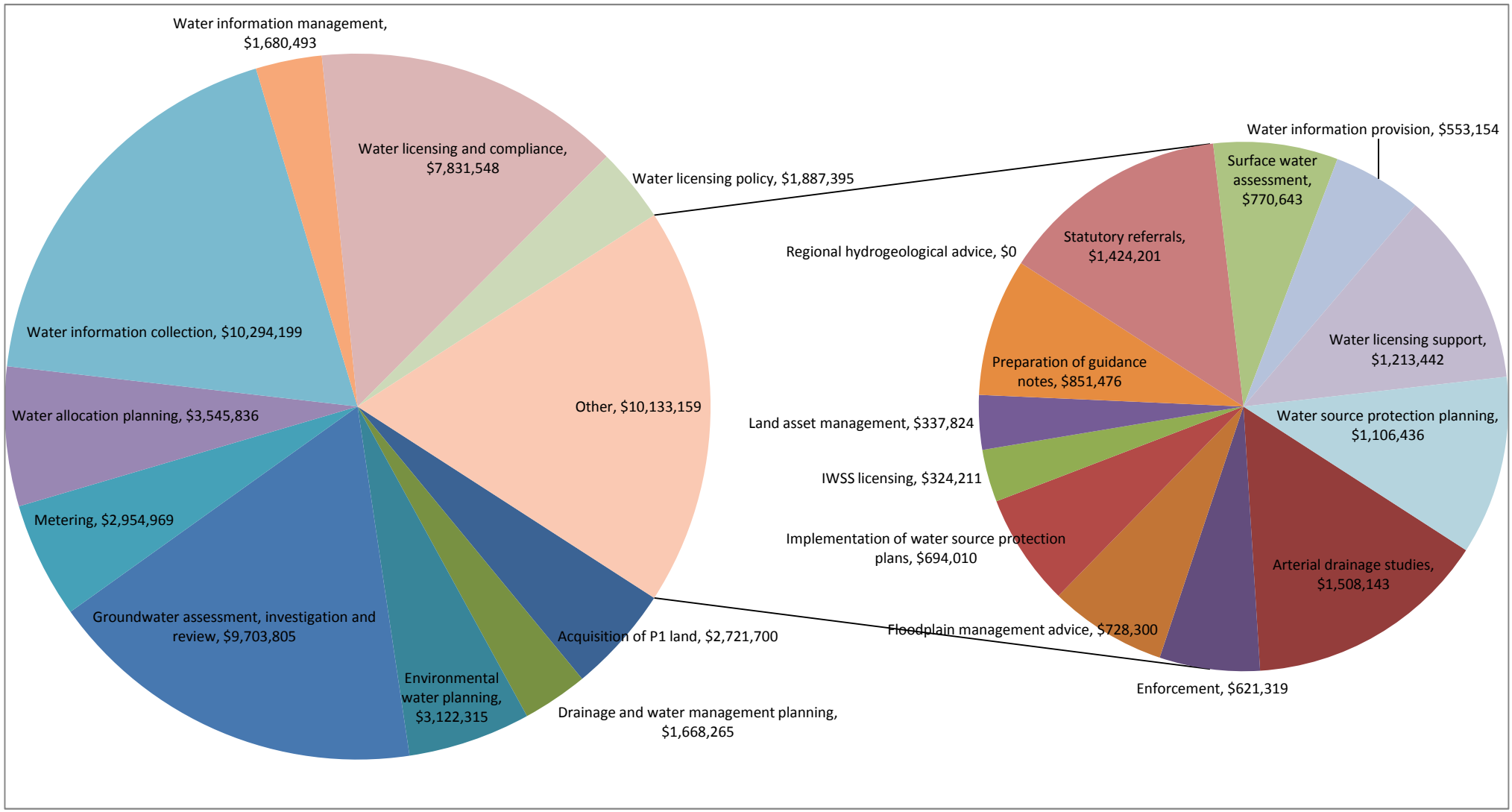
If DoW is operating effectively and efficiently, the increase in expenditure should be driven by a commensurate increase in demand for services provided by DoW. PwC expects that DoW should be delivering a corresponding increase in output or improvement in the effectiveness or quality of outcomes. PwC examines this in the next chapter.

[6] On-cost budgets were not available for 2009-10

4.3 Activity level costs

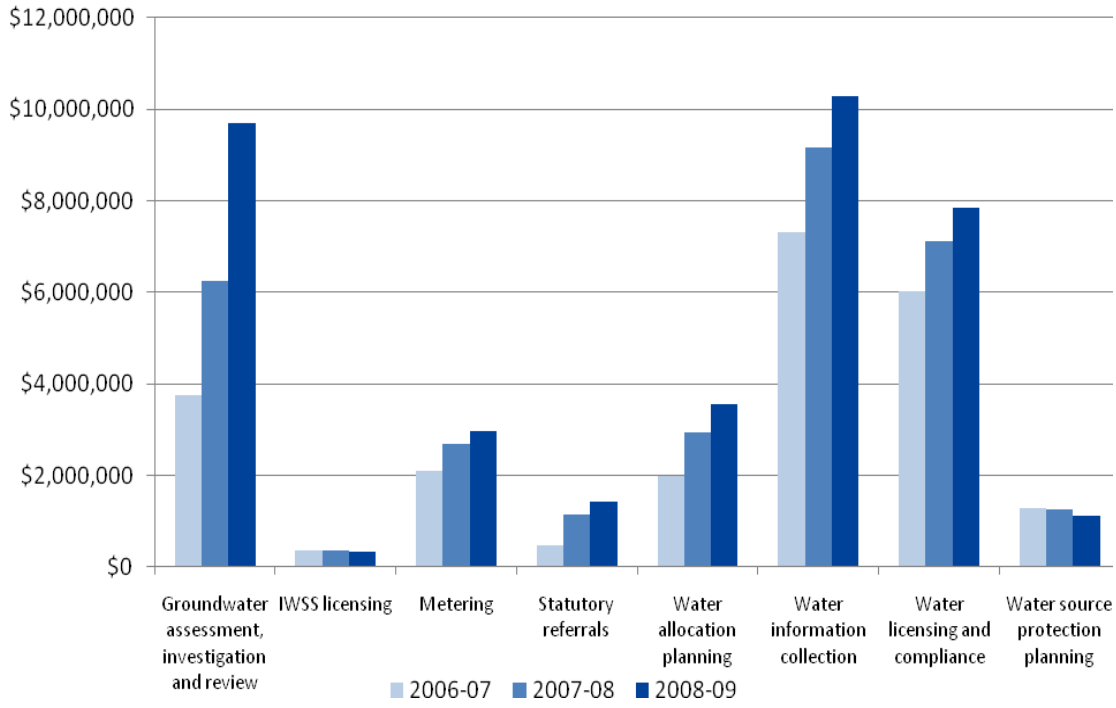
The disaggregation of 2008-09 water management and planning costs across 23 activities is shown in Figure 5. A small number of activities make up the majority of the proposed cost base described in DoW's submission. For example, just three activities make up 50 per cent of total costs — water information collection (19 per cent), groundwater assessment, investigation and review (17 per cent) and water licensing and compliance (14 per cent).

Figure 5: Breakdown of 2008-09 expenditure by activity (including capital expenditure, on-costs and externally funded projects)



In the case of water information collection and groundwater assessment investigation and review, these activities have undergone substantial increases in expenditure over the time period examined (Figure 6). Their proportion of total expenditure has increased considerably since 2006-07. Total expenditure for water licensing and compliance, after undergoing a significant increase in 2007-08, has started to decline.

Figure 6: Total costs for eight activities selected for detailed analysis 2006-07 to 2008-09



Share of external revenue used to fund activities

The $6.4 million of external revenue received by DoW in 2008-09 formed a major part of the funding of some activities, and a lesser share of others. With reference to the table below, the activities most dependent on external funds were groundwater assessment, investigation and review; water allocation planning and water information collection. Activities for which DoW made expenditure on external projects in 2008-09 are listed below in Table 7. External direct expenditure includes external funding of internal branch support costs.

Table 7: External project direct expenditure 2008-09

Activity	External project direct expenditure	Proportional of direct expenditure from external projects
Groundwater assessment, investigation and review	$4,193,432	46%
Water allocation planning	$966,580	35%
Water information collection	$1,059,523	14%
Water information management	$124,372	11%
Implementation of water source protection plans	$27,764	6%
Environmental water planning	$104,008	4%
Metering	$40,000	2%
Floodplain management advice	$2,222	0.4%

4.4 Service level costs

The 23 activities form an input to one or more of DoW's services. DoW has identified eight services that deliver benefits to private parties. DoW estimated the cost of delivering these services in 2008-09 by apportioning a share of each relevant activity to each service. Consistent with the way DoW assembled costs the activities, the services include a mix of operating expenditure, overheads and capital expenditure.

The sum of costs over the eight services is less than the total cost of the 23 activities as DoW considered that expenditure for some activities did not contribute to any of the services. For example, only 21 per cent of the cost of the water information collection activity is allocated to services.

The services identified by DoW and the main activities allocated to each service (defined in terms of cost allocation) are summarised in Table 8. Some services comprise many contributing activities. For example, "Providing water allocations and managing the ongoing use of water" has input from nine activities. This service is also the most expensive of the eight services, at $24 million.

DoW's submission allocates the private share of costs to users. As the focus of PwC's review is the efficiency of total costs, Table 8 contains the total cost of each service (government plus user share).

Table 8: Services delivered by DoW

Service	Number of contributing activities	Three activities that contribute greatest proportion of service cost in 2008-09	Cost of service in 2008-09
Processing and assessment of application for water licences and permits	4	Water licensing and compliance (86%) Water licensing support (13%) Surface water assessment (1%)	$9,122,055
Licensing of the Water Corporation for the IWSS	1	IWSS licensing (100%)	$324,211
Providing water allocations and managing the ongoing use of water	9[7]	Water allocation planning (15%) Environmental water planning (13%) Groundwater assessment, investigation and review (36%)	$24,096,232
Protecting public drinking water sources	6	Water source protection planning (22%) Groundwater assessment, investigation and review (10%) Acquisition of P1 land (55%)	$4,945,431
Providing advice on statutory referrals	3	Statutory referrals (59%) Implementation of water source protection plans (23%) Preparation of guidance notes (18%)	$2,405,147
Guiding urban drainage and water management	3	Drainage and water management planning (46%) Arterial drainage studies (41%) Groundwater assessment, investigation and review (13%)	$3,661,599
Providing floodplain management advice	1	Floodplain management advice (100%)	$728,300
Providing water information	1	Water information provision (100%)	$553,154
Total			**$45,836,128**

[7] Groundwater information collection and surface water information collection are counted as a single activity, as they are costed together in the description of activities

Appendix A contains descriptions of each service and further detail on the allocation of activities to services.

4.5 On-costs

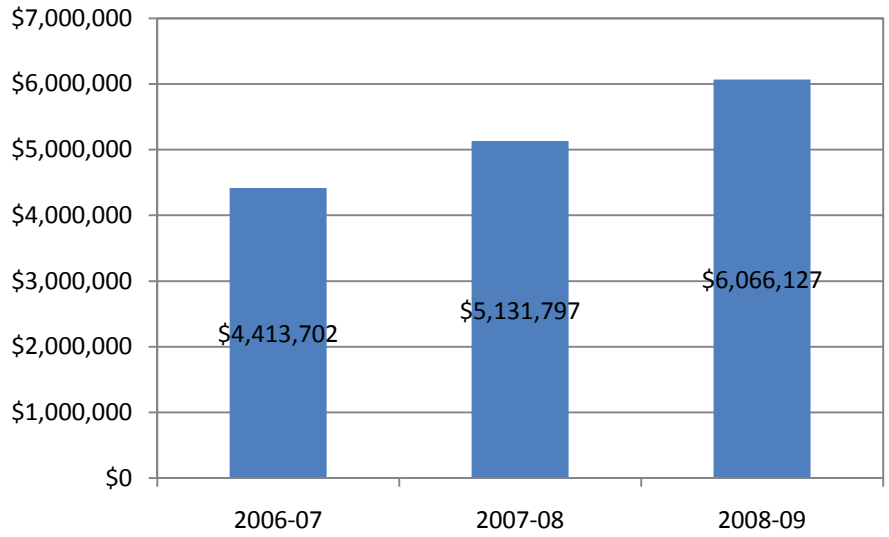
DoW's overheads (or on-costs) comprise approximately 20 per cent of its total proposed cost base, and a higher proportion of its operating expenditure (estimated to be 39 per cent if branch support costs are included in operating expenditure). It is difficult to determine whether this represents a reasonable level of overheads relative to other agencies of similar size because different organisations use different methods to define their overheads and have different operational models. However, some benchmarks are available for corporate service overheads, and PwC examines these below.

The on-costs shown in Figure 4 can be disaggregated into corporate on-costs, regional administrative costs and division executive support costs. This section describes trends in each of these areas and comments on the efficiency of costs.

Corporate on-costs

Corporate on-costs included in DoW's submission increased by 37 per cent between 2006-07 and 2008-09, with the budget for corporate on-costs growing by a similar amount (Figure 7). This contrasts with the Department wide increase of 21 per cent. The Department wide increase was less than that for the activities in the submission as the proportion of Departmental FTE positions contained within the activities described in DoW's submission increased over that period.

Figure 7: Corporate on-costs



The components of corporate on-costs included in DoW's submission are executive services, finance and administration, human resources and information services. Human resources drove most of the increase in corporate on-costs, with executive services decreasing over that same period.

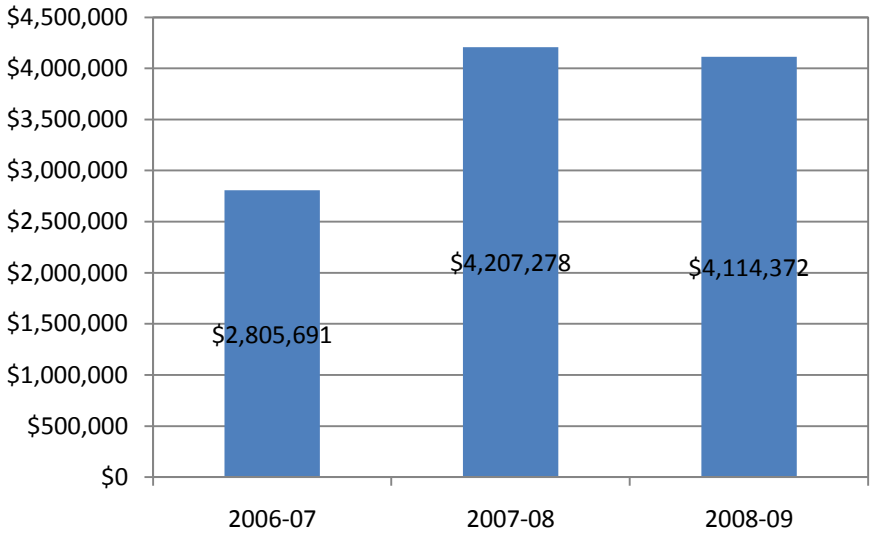
Corporate overheads are equivalent to15 per cent of DoW's operating expenditure (as contained in the submission) and overheads, which is slightly above the accepted benchmarks for an agency the size of DoW (see section 6.7).

Regional on-costs

Regional on-costs refer to the overheads across eight regions: Kimberley, Kwinana Peel, mid-West, Perth, Pilbara, South Coast, South West and Swan Avon.

Regional on-costs increased by 46 per cent between 2006-07 and 2008-09 (Figure 8), considerably above the Department wide increase of 19 per cent. As for corporate on-costs, this difference in the size of the increase is attributable to a larger number of FTE positions falling within the scope of the activities in the submission. The South West was the only region with a decline in actual expenditure amongst the regions, while Kimberley and Pilbara expenditure increased considerably.

Figure 8: Regional on-costs



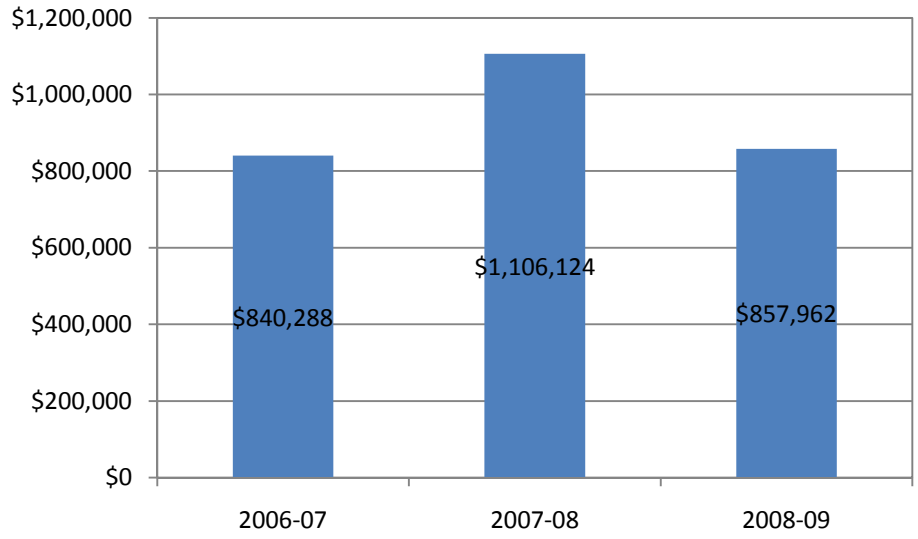
There have been variations between the budget and actual costs with the incurred expenditure for most regions exceeding the planned expenditure in at least one year. Actual expenditure in Kwinana Peel, Mid West and South Coast exceed budget allocations across all three years examined. DoW consistently underspent the budget for the Pilbara and Kimberley regions between 2006-07 and 2008-09.

Division executive support costs

Division executive support costs relate to overheads for the three DoW Divisions responsible for delivery of the activities described in DoW's submission: Water resource use, Water resource management and Regional management and water information.

Division executive support costs decreased in 2008-09 following an increase in 2007-08 (Figure 9). Overall the costs increased by 2 per cent, compared to a Department wide decrease of 6 per cent.

Figure 9: Division executive support costs



The 2007-08 cost increase was driven by a growth in costs associated with the regional management and water information division.

4.6 Internal branch support costs

The direct costs in DoW's submission include what are termed internal branch support costs. DoW allocated these support costs across the activities within each branch to which the support costs relate. The branches that incur internal branch support costs and the activities within those branches are listed in Table 9.

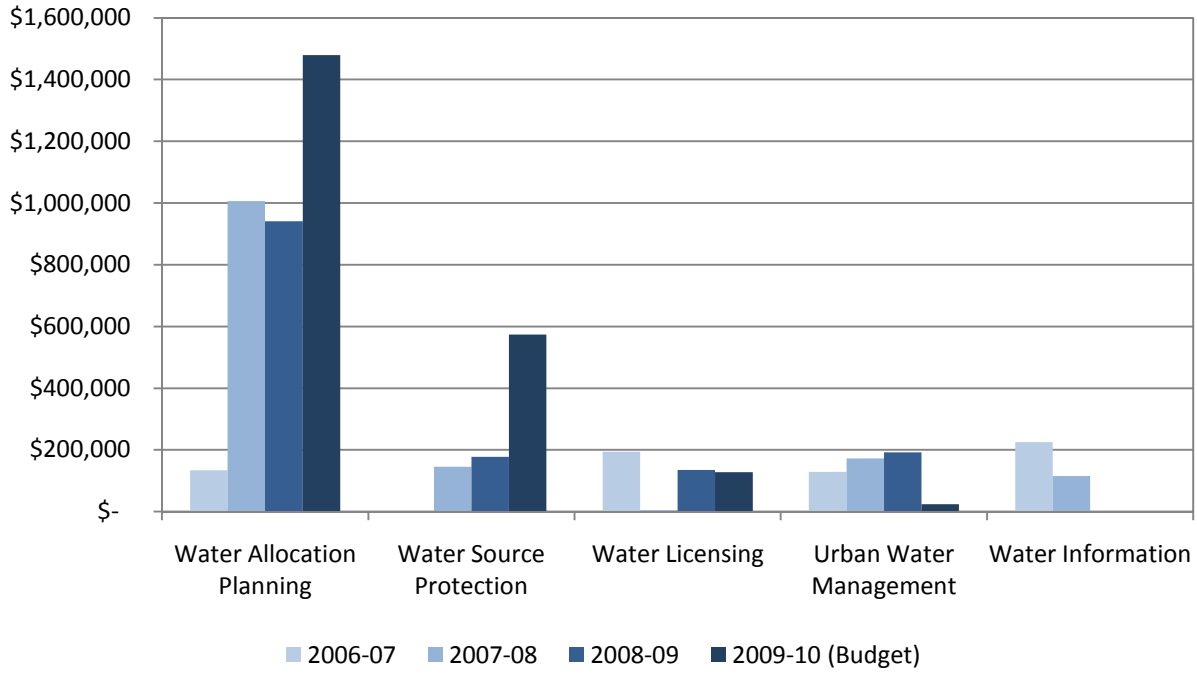
Table 9: Departmental branches and related activities

Branch	Activities
Water allocation planning	Water allocation planning
	Environmental water
Water source protection	Implementation of WSP
	Preparation of guidance notes
	Water source protection planning

Branch	Activities
Water licensing	Water licensing
	Water licensing support
	IWSS licensing
	Compliance and enforcement
	Water licensing policy
Urban water management	Drainage and water management planning
	Arterial drainage studies
	Statutory referrals
Water information	Water information collection
	Water information management
	Water information provision

As was shown in Figure 4, internal branch support costs have increased considerably since 2006-07, more than doubling in that time. The majority of the increase has been in support for the water allocation area, with water source protection expenditure also seeing significant increase (Figure 10).

Figure 10: Internal branch support direct costs by branch



DoW considers that internal branch support costs are integral to the activity and that they are effectively direct costs. Accordingly, PwC has assessed the internal branch support costs as components of the

direct costs. However, where internal branch support costs are externally funded, these costs are excluded whenever external funding is removed from the cost base.

5 Detailed assessment of activities

5.1 Introduction

This chapter documents the findings of PwC's detailed efficiency and effectiveness analysis of eight water management and planning activities undertaken by DoW. PwC selected the eight activities based on one, or a combination of, the following criterion:

- The activity accounts for a significant share of DoW's proposed cost base in 2008-09.
- The activity has experienced cost variations from one year to the next.
- The activity corresponds to the services that Authority may consider establishing a separate fee for a particular user or group of users.

Table 10 lists the selected activities and their respective shares of; (i) direct operating and capital costs and (ii) the total cost base, including direct costs plus overheads. In total, the selected activities account for 67 per cent of DoW's 2008-09 cost base.

In order to facilitate an assessment of the efficiency of each activity, we have removed corporate, regional and divisional executive on-costs from the figures presented in the subsequent sections (but retained internal branch costs). The efficiency of the on-costs are analysed separately. For activities that have a significant capital component, we have analysed trends in both total costs (direct operating and capital) and just the direct operating component of costs.

In all activities, PwC has retained externally funded projects in the cost base for assessing the efficiency and effectiveness of service delivery.

Table 10: Activities selected for detailed analysis

Activity selected for detailed analysis	Share of direct costs	Share of total cost base
Water licensing and compliance	11%	14%
IWSS licensing	1%	1%
Water allocation planning	6%	6%
Groundwater assessment and review	20%	17%
Water information collection	17%	19%
Metering	6%	5%
Water source protection	2%	2%
Statutory referrals	2%	3%
Share of expenditure covered by selected activities	66%	67%

5.2 Water licensing and compliance

5.2.1 Description

This activity includes all the direct costs of processing licence applications, setting licence conditions, and the ongoing costs of compliance monitoring (involving water use surveys, compliance checks, assessing monitoring reports and responding to complaints). It excludes a number of related licensing activities:

- *Water licensing support* — defined as the maintenance of licensing systems, provision of training, guidance on complex licensing issues and management of appeals (the direct cost of this function was $878,658 in 2008-09 and accounted for 11.2 FTEs);
- *Water licensing policy* — defined as the development of operational level policy and rules to ensure the equitable sharing of water resources (the direct cost of this function was $1,695,837 in 2008-09 and accounted for 5.6 FTEs); and
- *Compliance enforcement* — defined as the conducting of investigations into breaches of statutes and gathering evidence to support the required enforcement actions (the direct cost of this function was $482,004 in 2008-09 and it accounted for 4.8 FTEs).

Effective licensing systems are a fundamental element of effective water management. The regulations and supporting administrative processes associated with licences, and licence transfers, provide the necessary integrity to ensure the entitlements of licence holders are protected from third parties, whilst also maintaining environmental objectives. The beneficiaries of DoW's licensing activity are therefore existing licence holders (whom benefit from the resource security that a licensing system offers), new licence applicants (whom benefit from getting access to the resource, subject to meeting regulatory and planning requirements) and water traders who participate in the water market and enjoy the flexibility of purchasing or selling water in the knowledge that trade is secure and has legal effect.

Processing of licence applications and setting conditions of use

DoW has a legislative obligation to assess licence applications and issue a notice of approval or refusal. Applications are required for a range of licence transactions including the issue of a new licence for taking water, licence renewals, amendments, transfers, trades and agreements. In addition, DoW processes applications for permits to interfere with bed and banks of surface water systems, permits to construct or alter wells.

The *Rights in Water and Irrigation Act 1914* prohibits water extraction from a watercourse or aquifer without a licence. DoW issues licences to users of water from proclaimed surface and groundwater sources under this legislation. As part of the licence assessment and approval process, DoW may stipulate particular use conditions on the licence.

Currently there are over 13,000 water use licences in force in 759 groundwater resources and 181 surface water resources throughout the State. Licences typically have a life of ten years. Upon expiry, licences are assessed for eligibility for renewal. This activity accounts for approximately 30 per cent of DoW's licensing effort (in terms of hours) and accounts for a similar proportion of the total number of applications processed over a 12-month period (Table 11). About 35 per cent of DoW's licensing effort is involved in the processing of new licence applications. The other significant component, responsible for 19% of effort, is the processing of applications to construct or alter a well. Applications to trade licence account for only five per cent of total processing activity.

Table 11: Number of applications processed in 2008-09 by type

Application type	Number processed	Proportion of total processed	Proportion of effort[8]
New licences to take water	934	28%	35%
Renewal of licence to take water	940	28%	30%
Amendment of a licence to take water	534	16%	11%
Trade or transfer of a licence to take water	160	5%	4%
Licence to construct or alter a well	726	22%	19%
Permit to interfere with bed or banks	52	2%	1%
Total	3,346	100%	100%

Compliance

Licensees must meet conditions placed on the licence when using water, such as timing of water use, the location from which water can be extracted and amount of water the user can take. DoW is responsible for monitoring compliance with licensing conditions. DoW assesses compliance against the terms of a licence prior to licence renewal and through active checks. Activities include water use surveys and compliance checks, assessment of monitoring reports and responding to complaints (DoW, 2010).

DoW aims to spend approximately 10 per cent of the budget for this activity on compliance. Actual costs for compliance activities were not available separately for this review as these costs are grouped with licence processing costs in DoW's submission. For this reason, we have focused our analysis on the licence processing and assessment part of this activity.

As expenditure on compliance is modest relative to expenditure on application processing and assessment, PwC has reviewed the total combined cost of the licensing and compliance activity. That is, we have not attempted to remove the cost of compliance when calculating the unit cost of licence processing.

5.2.2 Cost of activity

Water licensing and compliance is one of the major areas of expenditure in DoW's submission, accounting for 11 per cent of direct costs in 2008-09 (approximately $5 million). There are no identified capital costs for this activity. The activity is staffed by 67 FTEs (in 2008-09), which equates to 22 per cent of DoW's FTEs that are assigned to the water management and planning activities identified in DoW's submission. There are no inputs of external funding for this activity.

[8] Based on time sheet records over a nine week period in 2008-09, totals may not add to 100% due to rounding of individual figures.

As shown in Figure 11, costs rose year-on-year over the period 2006-07 to 2008-09, with a forecast stabilising of expenditure in 2009-10. There are three potential factors that could be responsible for the cost increases:

- an increase in the number of licences processed;
- an increase in the cost per licence processed, for example, due to a relatively higher proportion of licence applications being received that required more complex assessment, or due to declining processing efficiency; and
- an increase in the amount spent on efficiency measures – for example, staff training, project management, licensing systems (although on the basis of DoW's definition, these investments should be allocated to the licensing support activity).

Of these factors, the main cost driver appears to be the number of applications received and processed. For example, the number of applications received for processing has increased in each of the three years since 2006-7. The number of applications received in 2008-09 is 54 per cent higher than that in 2006-07. The number of instruments issued has kept pace with the rise in demand and in 2007-08, the number of instruments issued exceeded applications (Figure 12), reflecting a clearance of backlog.

Figure 11: Direct costs and full time equivalents for water licensing and compliance

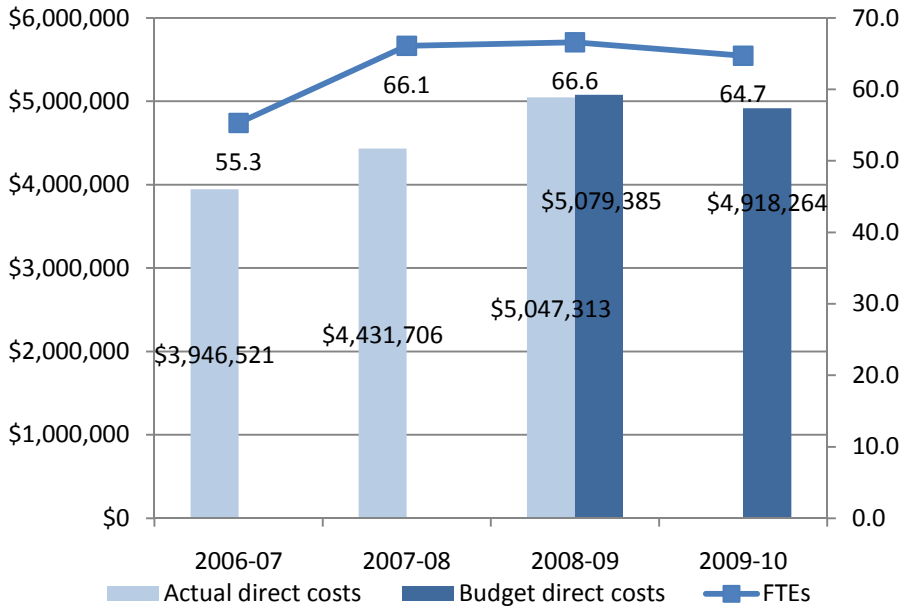
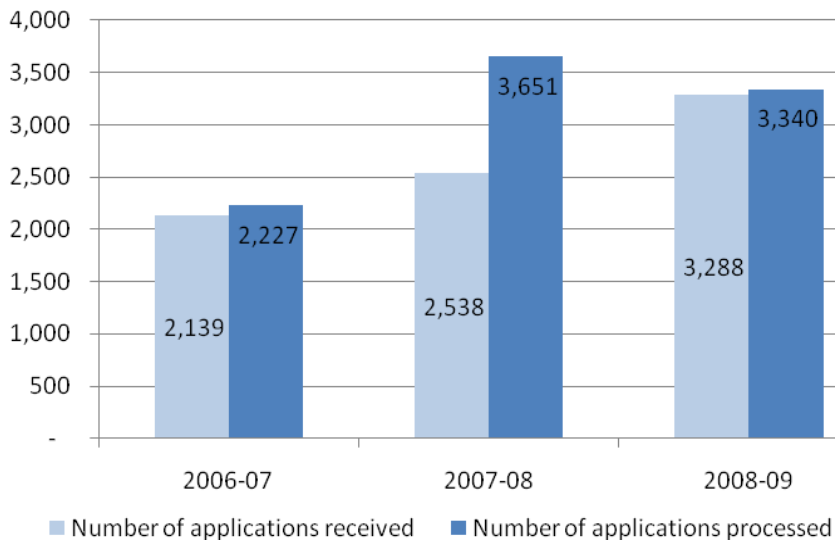


Figure 12: Number of applications for instruments received and processed



There has been no significant change in the proportion of applications processed that belong to different complexity categories for different instrument. Table 12 shows the stock of licences in effect by category. DoW defines the categories as follows:

- Category 1 (C1) – resource is less than30 per cent allocated;
- Category 2 (C2) – resource is between 30 per cent and 70 per cent allocated;
- Category 3 (C3) – resource is between 70 per cent and 100 per cent allocated and
- Category 4 (C4) – resource is more than 100 per cent allocated.

Table 12: Total number of licences in effect by category grouping

Category	2007-08 Actual	2008-09 Actual	2009-10 Estimate	2010-11 Budget
Category 1	1,203	1,049	1,200	1,200
Category 2	2,372	2,271	2,300	2,350
Category 3	5,063	4,513	4,900	4,900
Category 4	5,148	5,051	5,000	5,000
Total	13,786	12,884	13,400	13,450

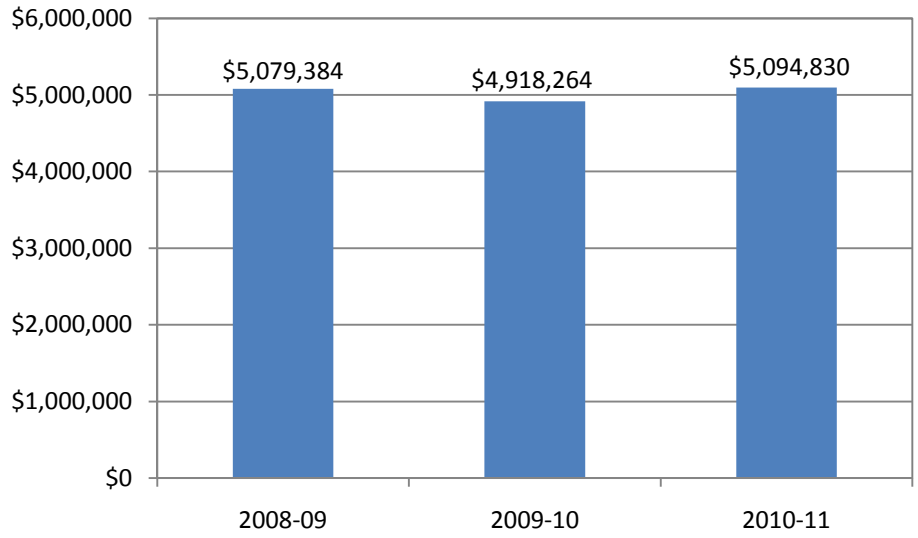
Source: Budget papers

The number of licences in each category provides a crude measure of the level of processing complexity. However, some licences in the C3 and C4 categories receive less assessment because they are low volume licence applications.

Budgeted forward costs

The 2008-09 through 2010-11 budgets for the water licensing and compliance are relatively constant. DoW has advised this is due to public sector efficiency dividend measures (Figure 13).

Figure 13: Budgeted direct operating expenditure for water licensing and compliance activity



DoW expects the number of licence applications to continue to grow due to the proclamation of new water areas, growth associated with economic activity and as areas become fully allocated, increased applications for trades and transfers. DoW also expects average effort per licence to grow with increasing complexity of assessing licence applications as more areas become close to full allocation. Some of this increased effort may result in increases in expenditure for ancillary activities. For example, water trading will be associated with increased compliance and enforcement, with trading facilitated by confidence in the operation of the existing water licences.

Partly offsetting this increased demand for effort is the notable decline in backlog of applications waiting for processing, which is an outcome of DoW's recent strategy of clearing the backlog (see next section for details). Once DoW clears the backlog, this should free up some resources to manage the additional applications received and/or the additional complexity of those applications. However, DoW expects there will remain a requirement for a net increase in effort.

The budget allocation for 2010-11 does not reflect the anticipated long-term growth in application lodgement and the expected increase in complexity of assessments. To the extent that DoW's forecasts are accurate, a stable budget allocation to licensing implies that DoW is intending to meet the additional costs through efficiency gains. DoW does not have a formal demand forecasting model, with forecasts currently based on projections of demand based on current trends and its understanding of likely sources of demand. This may have implications on DoW's ability to estimate future expenditure requirements.

5.2.3 Effectiveness

Our review of this activity examined several elements of effectiveness. A key focus is on DoW's effectiveness in meeting its statutory obligations to implement a licensing system that is administratively fair and is capable of preventing unacceptable impacts on other water users or the environment. One of the main cost drivers in licence processing is the amount of assessment effort required to 'optimally'

inform the approve/refuse decision and, in cases where an application is approved, the terms and conditions that should accompany the licence. We have therefore examined this aspect of licensing in some detail.

DoW has a statutory obligation to assess all applications prior to making a decision to accept or reject an application for a new licence/permit, renewal or transfer. The process by which DoW assesses applications is determined primarily by its legislation, which requires consideration to be given to a range of factors. However, within this general framework, DoW has some discretion in choosing the appropriate level of assessment of each application.

Risk assessment

DoW has developed a strategic framework for prioritising the level of effort it assigns to each application. This framework involves an evaluation of the level of risk a particular application presents to the security of entitlements held by existing licence holders and the risk of adverse environment outcomes. Applications are categorised into one of three risk groups (low, medium and high). A corresponding level of assessment effort is determined in proportion to the level of risk identified. The three categories are defined as follows:

- Low risk: is unlikely to be a measureable impact on the aquifer, environment or other users;
- Medium risk: DoW can manage any impacts on the aquifer, environment or other users through conditions placed on the licence / permit; and
- High risk: there is likely to be measureable impact on the aquifer, environment or other users.

Several considerations guide which risk category the application falls in. One is the level of allocation in the management area before and after consideration of the application. Another is the size (volume). A third is the type of application.

DoW uses a decision matrix as a tool for determining the level of risk and, thus, the level of assessment (Table 13). DoW assesses applications that would move the allocation level from one category to another at the higher level. The design of the matrix and the volume and location of licence applications results in a lower number of medium level assessments than either low or high level.

Table 13: Matrix for determining the level of assessment based on size of application and management category status

Volume of licence (kL per annum)	C1 – resource is <30% allocated	C2 – resource is between 30% and 70% allocated	C3 – resource is between 70% and 100% allocated	C4 – resource is >100% allocated
<50,000	Low	Low	Medium	High
50,000 – 500,000	Low	Medium	High	High
>500,000	High	High	High	High

DoW also uses a number of triggers for refining the level of assessment (Quantum Consulting, 2010). Triggers that are used to move from a medium to a high risk rating include:

- the operation of complex schemes involving many wells;
- where local environmental values or other users are likely to be significantly affected;
- where underground and surface water is proposed to be taken conjunctively; and

- any other issue identified that increases the level of risk to DoW.

The adjustment triggers tend to reduce further the number of medium risk applications. For example, in 2008-09 there were 422 low risk, 198 medium risk and 314 high-risk applications for new licences.

In instances where there are issues of any concern (that is, not low risk), the above framework has a natural tendency to classify applications in the high-risk category. As the chosen level of assessment is a major factor in determining the effort involved in processing the application, this may result in increasing the cost of assessments, although as indicated in the efficiency assessment, it is not clear what magnitude of savings could obtained by a change in assessment level.

DoW recognises that there may be potential for improvement in the risk matrix. As the existing allocation plans increase in coverage and quality, there is potential to amend the matrix to allow lower levels of assessment for some applications and to increase the level of granularity of the matrix. This could increase the number of applications DoW assesses at the low and medium risk level of assessment.

The level of effort also differs between applications for surface water licences and groundwater licences. Assessment of the applications to abstract water from groundwater sources is more complex. However, the information about the cost differentials involved was not available for this review as DoW does not record costs at this level of granularity.

Licence refusals and appeals

In addition to considering the risk that an application may pose for the environment and other users, DoW also takes into consideration the risk, to the agency, that an applicant will successfully appeal a refused application to the State Administrative Tribunal. Depending upon the complexity of the licence application, the appeal process can be lengthy and costly. There is also concern that a successful appeal to the Tribunal may create a precedent that may increase the number of future appeals.

Typically, DoW refuses around 15 licences per year. Most of these refusals tend to be in similar areas. Of the 15 refusals in 2008-09, 11 were in the Perth Superficial Swan and three in the Perth Leederville area. All were groundwater licence applications. The number of appeals received each year for the past six years is shown in Table 14. The data suggest that around one quarter to one third of refusals is appealed.

Table 14: Number of appeals against licence decisions

Year	Appeals
2005	3
2006	3
2007	5
2008	5
2009	5
2010	1

On receipt of an application that DoW is likely to refuse, DoW sends a letter to the applicant advising of the proposed refusal, together with the grounds for that refusal. The applicant has 30 days to respond. If the applicant accepts the refusal, DoW refuses the application with limited effort expended.

Otherwise, DoW undertakes a more intensive assessment of the application to ensure that the decision is robust in respect to the potential for appeal. In order to reduce its exposure to legal risk, DoW has adopted the following principle: “where the assessment suggests that the application should be refused, the level of assessment should be high regardless of other considerations”.

This strategy has been formulated in response to recent past experience, where between 2000 and 2003, there were 25 appeals against decisions not to allow additional licences in areas that the Water and Rivers Commission (DoW’s predecessor) considered to be fully or over-allocated. The Water and River’s Commission did not win any of the appeals. Since adopting the above principle in 2004, there have been no successful appeals over the last six years against DoW’s licensing decisions. This is a decrease in the number of successful appeals from three successful appeals a year between 2000 and 2003 and one successful appeal in 2004 (Western Australian Auditor General 2009).

Against this background, DoW’s strategy is entirely understandable. However, it would seem that inefficient levels of assessment effort are being expended on building a robust scientific basis for rejecting licence applications, when all that should be required is a strong set of statutory guidelines (or a statutory water plan) that gives DoW the legal mechanism to reject an application because the area is fully allocated.

As DoW progressively completes allocation plans for water management areas and these areas near full allocation, DoW should be able to phase out the costly and inefficient strategy of allocating high levels of effort assessing applications that are likely to ‘fail the eligibility test’.

Effectiveness conclusions

The evidence of risk aversion in the licensing statistics suggests that there may be some over processing of licence applications. Given that only 15 licences are rejected each year (of the 3,000 or so licences processed) with around one third of these rejections appealed, changes in the level of attention given to licences likely to be rejected is unlikely to significantly change the overall level of effort. However, the low level of rejection may suggest the level of assessment of other licences may be overly conservative. The issue then becomes the portion of assessment effort required to formulate appropriate licence use conditions. Further, this may change as DoW fully allocates more resources and licence refusals increase.

We observe that the risk-averse behaviour displayed by DoW with respect to having its decisions appealed may be causing it to spend inefficient levels of effort on licence assessment. If true, this would be a perverse outcome of current legislation, which does not provide DoW with sufficiently strong legal grounds upon which to reject applications. That is, the potential success of an appeal could be reduced considerably if DoW could draw on statutory guidelines and/or statutory water plans.

PwC also expects that there should be an inverse relationship between the level of resource assessment and planning undertaken by DoW and the amount of effort required to assess individual licence applications on a case-by-case basis. For areas receiving large numbers of licence applications, we would expect that high levels of investment in case-by-case assessment would be a relatively inefficient way of determining whether the granting of a new licence would cause adverse impacts. A more efficient approach would be to invest in adequate levels of resource assessment more generally across the area and undertake effective planning, with an associated reduction in effort for licence applications. This would provide a satisfactory level of base knowledge for assessing subsequent applications.

5.2.4 Efficiency

A range of performance indicators were examined in our assessment of the efficiency of licensing costs. These included:

- average costs per application, for applications of differing complexity;
- average costs per application, by instrument type; and
- processing times and the size of backlog.

Where possible, DoW's performance is benchmarked against that of the NOW. We also examine the specific issue of recruitment constraints in this part of the DoW's business.

Unit costs of processing by level of assessment

DoW's submission includes calculations of the average cost per instrument by risk category for new and renewed licences. The average costs are as follows in Table 15:

Table 15: Average cost per instrument by risk category (2008-09)

Assessment level	New 5c licence	Renew 5c licence
Low	$2,586	$2,541
Medium	$4,753	$3,234
High	$4,127	$3,061

Table 15 shows that while low-level assessments result in the least cost, medium level assessments had the highest costs. DoW considered that this was the case due to differences in applicant types. High volume applicants, for which DoW conducts a high level of assessment, such as mining companies, typically provide a high level of information with their application. High volume applicants often use private consultants to prepare their applications. This reduces the level of effort required by DoW. Medium-to-high volume applicants that more often fall under the medium level of assessment, such as individual farmers, tend not bring an associated level of information with their applications. This increases departmental effort.

The distribution of effort indicates that there may be scope for lower processing costs through ensuring that applicants provide appropriate information. In the absence of this information, it is likely that cost recovery could result in applicants that provide appropriate levels of information, effectively subsidising those that do not.

DoW is developing measures to improve the quality of the received applications. Publicly available documents available on this include:

- Pilbara water in mining guideline;
- the water allocation plans, allowing users to know available water;
- Operational policy 5.08: Use of operating strategies in the water licensing process; and
- licensing FAQs and factsheets.

DoW is planning to develop an on-line interactive mapping system. The system will show property related information, such as location of the property, water sources available and current usage.

DoW is also implementing a number of measures to reduce the investment in applications in C1 and C2 areas. DoW proposes to trial a 'fast track' plan for renewals in these areas, whereby DoW will automatically approve renewals that meet a number of criteria with standard terms and conditions. Criteria may include the application being below a certain size, that there is access to the property and there is a water allocation plan in place to the required standard. If the trial is successful, there will be scope to extend this to other application types in C1 and C2 areas.

Insights from benchmarking

In section 6.5, we compare DoW's costs of licensing, administration and compliance against the New South Wales Office of Water's cost for this activity. Costs are expressed in terms of three unit measures:

- dollars per FTE;
- dollars per licence on issue; and
- dollars per transaction (averaged across all transaction types).

The results demonstrate that DoW's cost per FTE is lower than that for NOW. But NOW has a higher cost per licence on issue. We observe that the higher cost per licence may be a function of the fewer licences on issue in Western Australia, possibly resulting in poorer economies of scale – given that there is an element of fixed costs in the licensing function. Arguably, though, licences on issue are a poor proxy cost driver for licence processing, administration and compliance because most of the costs are incurred only for a subset of licences – those on which a transaction is made.

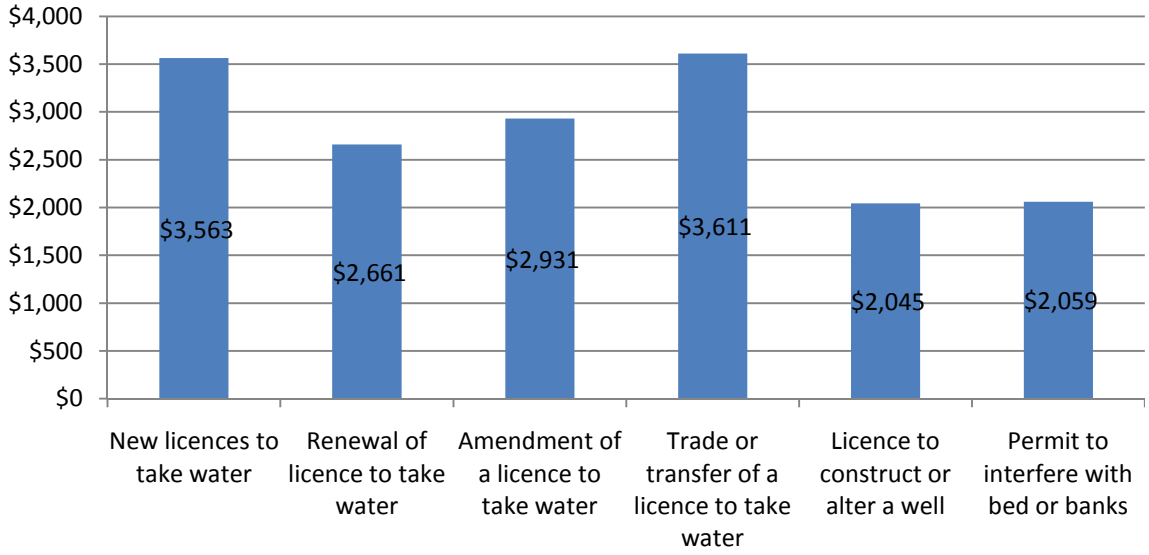
Cost per transaction provides an interesting comparison. DoW's average cost of processing a transaction is about $1,000 more than that reported by NOW. We suspect that this could be because DoW processes a larger proportion of applications that require complex assessment (for example, issue of new groundwater licences) although we have not undertaken a detailed examination of the NOW data to determine whether this is in fact the case. Western Australia is predominantly groundwater (compared to New South Wales, which is mostly surface water). Groundwater has more complex hydrological characteristics than surface water and thus it could be more be more difficult to manage licensing assessment in Western Australia.

NOW publishes information on its variable costs per transaction type, and it is this information that is used to structure its fees. However, this fee is based on just the "water consents transaction" component of costs, which does not include overheads or administrative costs. By way of example, the fee proposed by NOW based on its costs of processing a permanent trade in unregulated rivers and groundwater is $761 per trade. By comparison, DoW estimates the average cost to process an application to trade or transfer a licence to take water is $3,611 (see Figure 14). Some of this cost differential is possibly due to the fact that the DoW figure includes a component of overhead costs. But even after taking this into account, the DoW cost appears to be excessively high relative to the NOW figure, possibly indicating some inefficiencies in DoW's operation.

Unit costs by type of application

The level of effort varies between the different types of application. The average cost per instrument (as estimated in DoW's submission) is shown in Figure 14. Note that this information is only available for 2008-09 and was collated over a period of three months as part of a trial in which DoW required staff to record their time, by licensing activity, on timesheets.

Figure 14: Average cost per instrument-by-instrument type in 2008-09



In 2008-09, the processing of trade/transfer applications had the highest cost. DoW attributes this to most trades occurring in fully allocated areas. DoW is required to assess the potential impacts of each trade (which are typically trades of groundwater licence allocations). The assessment of a trade application in a fully allocated resource is usually a more complex consideration than the simple granting of a new licence in an area that DoW has not fully allocated.

The costs of renewals are relatively high in comparison to the cost of an application for a new licence. This is particularly the case for the low-level risk assessment category, as is shown in Table 15 above. Despite a licence having been in place for a number of years and DoW having previously assessed the licence, the costs are similar for low risk licence renewals and new applications, while high-risk renewals cost around three quarters of the cost of a new licence.

DoW considers that the relatively high cost of renewal is due to, firstly, the inclusion of on-ground compliance surveys in the cost of licence renewals, which is a cost not incurred in the granting of a new licence. Secondly, a higher proportion of licence renewals are dealt with at the low risk level of assessment (80 per cent for renewals compared to 45 per cent for new licences). As a result, a higher proportion of C3 and C4 category applications at the low level of assessment for renewals, increasing the average cost of renewal assessments compared to low-level assessments for new licences. A basic underlying administrative cost is also associated with all licence processing.

Evidence of efficiency gains over time

Performance against targets relating to the cost of administering water licences has generally been poor, with most targets exceeded, whether performance is measured by the figures reported in the Budget

papers or in DoW's annual report (Table 16). In particular, costs per licence appear to be increasing, despite the increasing volume of licences that DoW has processed. However, this does not match the pattern of increased output that is apparent in the information provided by DoW in its submission. If direct costs are divided by the number of licences processed by year for the period 2006-07 to 2008-09, an improvement in efficiency is evident. Differences in quantum can be explained through differences in the scope of costs covered by the submission and the exclusion of overheads from the direct activity costs. However, this leaves the difference in the trend unexplained.

Table 16: Costs per water licence

Source	2006-07 Actual	2007-08 Budget	2007-08 Actual	2008-09 Budget	2008-09 Actual	2009-10 Budget	2009-10 Estimate	2010-11 Budget
Average administration cost (Budget papers)	$868	$917	$1,710	$1,684	$2,066	$1,829	$2,097	$1,790
Average administration cost (Annual reports)	NA	NA	$1,302	$891	$1,258	NA	NA	NA
Average costs per licence (submission activity costs)	$1,772	NA	$1,214	NA	$1,511	NA	NA	NA

Processing times

Since 2007-08, there has been a decline in processing times for Category 4 licence applications (Table 17). DoW attributes this partly to the new practice of quickly sending letters to applicants proposing refusal, immediately resolving the licence application if the proposed refusal is accepted. DoW also prioritised other C4 licences as it considered there was benefit in the prompt treatment of applications in C4 areas, such as prompt refusal (if determined), and the ability to recoup or make available water resources in areas of scarcity.

There has been no improvement in processing times for the other licence categories. As with many of DoW's performance indicators, collection of this data has commenced relatively recently, resulting in only a few data points for analysis.

Table 17: Average time taken (days) to process a license by water category grouping (Budget papers)

	2007-08 Actual	2008-09 Budget	2008-09 Actual	2009-10 Budget	2009-10 Estimate	2010-11 Budget
Category 1	58	50	59	50	70	50
Category 2	66	50	82	60	70	60
Category 3	71	60	72	65	80	65
Category 4	94	70	81	75	70	75

The New South Wales Office of Water has similar approval times for new licences under the Water Management Act 2000 (NSW), with an average of around 68 days for processing between 2005-06 and 2008-09. The processing of transfers takes around 30 days (down from 144 days in 2004-05). Volumes for NOW are lower than that for DoW (and of a significantly different composition), with 197 new licences and 641 transactions in 2008-09. Processing statistics by type are not available for DoW. However, we

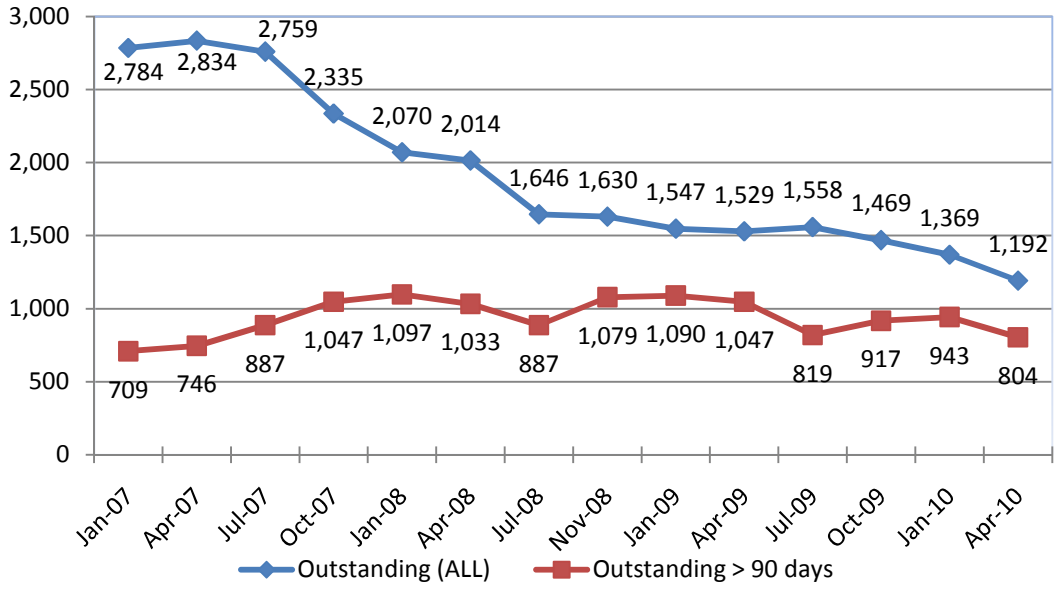
would expect that transfer assessments would take longer for DoW as most applications to DoW relate to groundwater transfers, as opposed to surface water transfers in NSW.

Reducing backlog

DoW has recently been focusing its efforts on reducing the size of backlog in licence applications waiting for processing. At the commencement of 2007, the backlog was about 2800 applications of which 700 were outstanding for more than 90 days. While a proportion of these applications were in the hands of the lodging parties – and thus outside DoW's control – there was still an unacceptably large number of applications in the processing queue. As at April 2010, DoW had reduced the backlog to 1192 applications, although about 800 of these applications remain outstanding for greater than 90 days. The number of applications processed by DoW in 2007-08 and 2008-09 was significantly above that for 2006-07. This has led to the number of applications processed by DoW exceeding the number of applications received in each of the last three years (as was shown in Figure 12 above).

The increase in the number of licences processed followed the increase in budget in 2007-08, although the actual cost of processing these additional applications exceeded the size of the budget and staff increase. The gap between processed and received applications continued into 2009-10, leading to the decline in application backlog. These backlog figures relate to new licence applications and licence renewals only.

Figure 15: Licence backlog



If DoW's predicted increase in applications does not materialise, DoW will eliminate the licence backlog and therefore DoW will process fewer licences each year. In such circumstances, PwC would expect a reduction in expenditure. The public sector efficiency dividend measures this activity is subject to are only appropriate if the number of licences processed continues to be maintained at the current level, and further reduction may be appropriate if the volume of licences processed is reduced.

Furthermore, it is worth considering what would be the size of the optimal backlog of licences. Many licence applications are on hold for obtaining information from the applicant or other parties. A certain level of backlog ensures that all staff can maintain full utilisation at all times, despite delays in some applications. Alternatively, the prompt grant of a licence holds some value to the applicant. In such

circumstances, DoW should consider whether a smaller backlog with quicker turnaround times delivers more additional value than the cost incurred through staff experiencing lumpy work demands.

Recruitment constraints

Staff retention has been poor with DoW using recruitment agencies to maintain staff numbers. DoW is experiencing issues with staff skills and experience because of the need to use agency staff to fill the vacancies. DoW implemented ongoing training to improve skills.

Efficiency conclusions

While the increased volume of licence applications processed (and reduced backlog) associated with the increased budget indicates an improved level of efficiency, a continuation of current funding levels beyond processing of the backlog down to target levels should be dependent on the predicted increase in licence volume and/or complexity being realised.

There may be some scope for DoW to reduce assessment costs by addressing the high cost of medium risk applications and by testing and implementing its proposed fast track program. The fast track program is one area where there should be evidence of the inverse relationship between investment in allocation planning and licence assessment. This may also result in some reductions in assessment times, which over the last three years have only occurred for applications in C4 areas.

The increase in administrative costs associated with licence processing reported in the Budget papers and DoW's annual report is of some concern. The costs provided by DoW for the purposes of this review do not demonstrate this pattern, with an improvement in efficiency over the three years examined and reflected in future budgets.

5.3 IWSS licensing

5.3.1 Description

DoW has a statutory obligation under the *Rights in Water and Irrigation Act 1914* to license the water sources that support the Integrated Water Supply Scheme (IWSS), which the Water Corporation operates. The IWSS delivers water to 1.6 million people in metropolitan Perth, the Goldfields and some towns in the wheat belt.

The IWSS comprises 11 dams, groundwater aquifers and a desalination plant, delivering 280 GL of water a year. In addition, the Water Corporation is allowed to buy water from sources other than those reserved for public drinking water supply under DoW's allocation plans. For example, the Water Corporation has been purchasing water from Harvey Water to feed into the IWSS. The Water Corporation cannot sell its water, although temporary trading sometimes occurs.

DoW issues approximately 30 licences under the IWSS to the Water Corporation annually (the Water Corporation also obtains licences for areas outside of the IWSS, but DoW costs these under the licensing and compliance activity). DoW reviews all IWSS licences annually, with the licences based on the dam water levels at the end of winter. Review is undertaken annually as annual extraction limits are dependent on annual inflows and water resource levels. As part of the licensing process, DoW negotiates a schedule of use with the Water Corporation, which contains a timeline of water use and amounts of water the Water Corporation can abstract.

DoW also advises the Water Corporation on the preparation of operating strategies as part of the licence renewal process. The Water Corporation prepares all documentation, with DoW advising it on scope and context. Planning is required up to two years in advance of a licence renewal. The effort peaks when the licences have to be renewed. In addition to these cyclic activities, DoW is engaged in on-going activities, for example, meetings with the Water Corporation to address possible high-risk areas, such as Pilbara and Albany, for which desired extraction levels may be an issue.

5.3.2 Cost of activity

In 2008-09, expenditure on IWSS licensing amounted to $237,139, all of which is operating expenditure. This accounted for less than 1 per cent of direct costs included in DoW's submission for 2008-09. There are no capital costs or external funding associated with this activity. The activity was staffed by 3 FTEs in 2008-09, which equates to less than 1 per cent of the FTEs assigned to the water management and planning activities identified in the submission.

Figure 16: Direct costs and full time equivalents for IWSS licensing

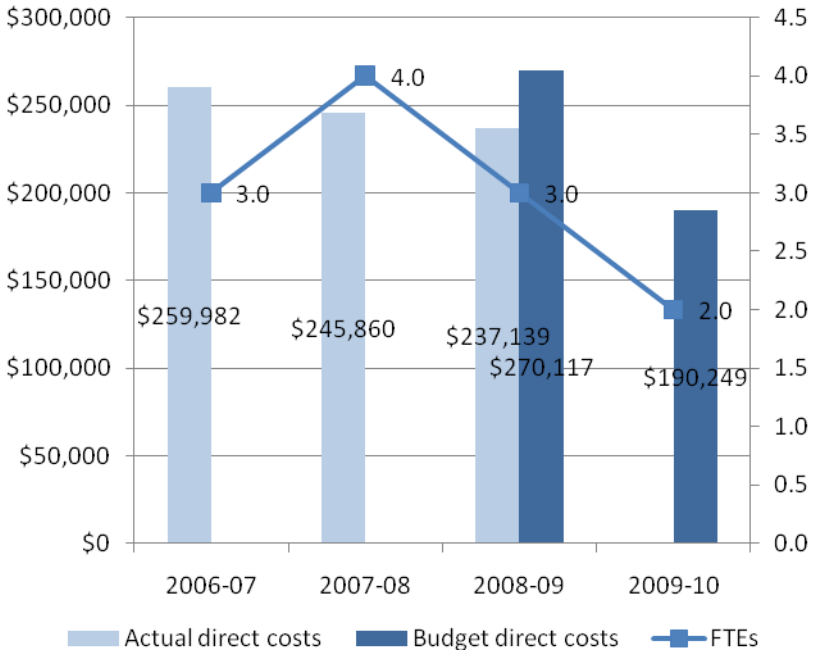


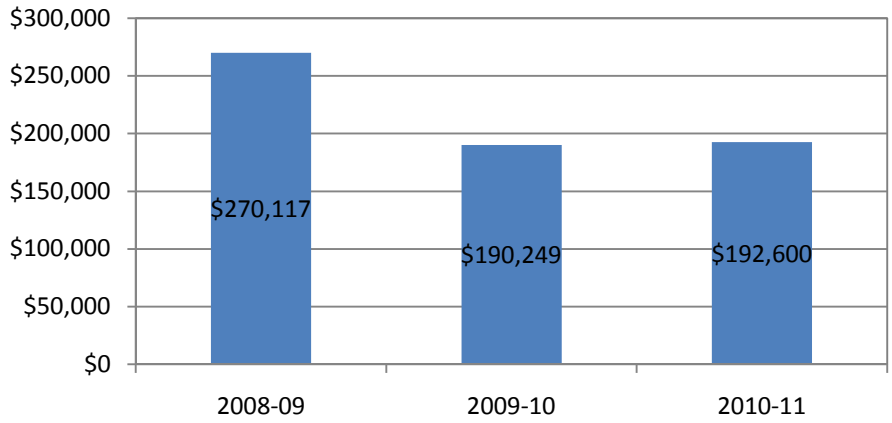
Figure 16 shows that expenditure and staffing for this activity has been steadily declining. DoW attributes the downward trend to a number of reasons, including:

- the development of higher quality operating strategies (reflecting increasing strategy maturity);
- completion of the Gnangara Mound allocation plan, removing ambiguity as to the amount of water available for extraction;
- the desalination plant has eased pressure on the dams and groundwater, with the second desalination plant expected to further ease pressure. This has eased the risks associated with the IWSS licensing process; and
- the success of winter sprinkler bans.

Budgeted forward costs

Expenditure on IWSS licensing is budgeted to remain at 2009-10 levels in 2010-11 (Figure 17).

Figure 17: Budgeted operating expenditure for IWSS licensing



In the immediate future, DoW expects that the number of licences required for renewal/review will remain relatively constant.

5.3.3 Effectiveness

A test of whether DoW is being effective in this area is to examine its recent past decisions and/or licensing determinations, and the effect these have had in protecting the sustainability and/or quality of water resources from extractions by Water Corporation. There is some evidence of DoW making decisions in the interests of sustainability and water source protection, such as not issuing a licence for a South West Yarragadee proposal in 2008 and reductions in licensed allocations under the IWSS.

DoW's effectiveness as a regulator in this activity is dependent in part on information provided by the Water Corporation. For example, the Water Corporation submits annual monitoring reports to DoW that include information on impacts on the environment, the water resource and other users. Noting the incentives faced by the Water Corporation to push for higher extraction volumes, this reliance may affect DoW's effectiveness as an independent regulator.

Another indicator of DoW's effectiveness would be the Water Corporation's level of satisfaction with the service it receives – for example, timeliness of licence renewal and 'quality' of the decisions and advice made by DoW on operating strategies (recognising of course the limits to which DoW can fulfil the needs of the Water Corp, given DoW's regulatory role). There are also some administrative or process elements of effectiveness. For example, is DoW following due process in reviewing the licences as set out in legislation? Does DoW publicly report its decisions to change the licence volumes and/or operating strategy, and the basis for these decisions?

5.3.4 Efficiency

It would appear that there is a need for periodic reviews of extraction levels and conditions of use attached to the licences in the interests of resource sustainability. However, it is not immediately clear what level of effort or assessment is appropriate, particularly given the improvements in allocation planning that provide a framework for the grant of these licences. For example, DoW notes that the level of effort involved in the IWSS activity is expected to diminish in the future, partly due to the Gnangara water allocation plan being completed. While this is evidence of one of the good efficiency outcomes

from investment in water allocation planning, it is unclear how this dynamic plays out across the range of licences and water resources within the IWSS.

It is not possible to benchmark the grant of these specific licences against any other measure, so in this context, it is difficult to determine what the efficient cost should be.

From our investigations, it is not clear how the budget for this activity is prepared. While DoW is able to determine renewal requirements from the term of the licence, DoW does not have a forward schedule of new licences it expects to be required to assess. For PwC to determine the efficiency of the forward costs, we would need to understand how DoW is planning to vary its level of service and activity inputs in response to the factors outlined above. DoW is working with the Water Corporation to better understand future needs.

5.4 Metering

5.4.1 Description

The metering of surface water and groundwater use is fundamental for managing water resources. It provides a means of monitoring water use against extraction limits, which is valuable information for both the water user and the resource manager. Water use information is required for effective water accounting, resource assessment and allocation planning. It is also a necessary prerequisite for water trading. Metering also provides a mechanism for charging users on a volumetric basis for the cost of water planning and management services.

In Western Australia, a mix of privately owned and publicly owned meters exists. Licence holders with water allocations greater than 500 ML a year must install and maintain a meter at their expense. Licensees are required to submit meter readings to DoW annually, with a sample of these readings audited. There are approximately 1788 privately owned meters for groundwater licences that have a condition requiring submission of meter readings.

In addition, DoW owns and maintains a network of 1266 meters (DoW, 2010a). This network is mostly confined to two priority groundwater areas — the Gnangara Mound and the Carnarvon Groundwater Area. DoW is responsible for installing the meters, reading the meters and maintenance works on the installations. Readings are taken twice a year (at the start and finish of water year), although they are taken monthly in Carnarvon. As part of this activity, DoW also:

- assesses sites for meter installation;
- manages contractors for the design, supply, installation and maintenance of water meters;
- develops metering information, policy, guidelines and legislation; and
- trials different types of metering technology.

The Gnangara mound meter installation project

Over the four year period commencing in 2006-07, DoW fitted 1109 meters across 18 groundwater sub-areas on the Gnangara mound. The installation of water meters on the Gnangara mound was part of a pilot project driven by obligations under the National Water Initiative to implement water metering. DoW installed meters for users with abstractions between 5,000 kL and 500 ML. As a result, approximately 26 per cent of water use by volume is now metered in the Gnangara mound (compared to less than 20% of licence by number).[9] DoW completed the project in January 2010. It is not possible to determine the total capital cost of the project from the data available for this submission due to meters not being capitalised in the 2006-07 accounts and 2009-10 data not being available in time for this report.

5.4.2 Cost of activity

In 2008-09, direct expenditure on metering activity, including capital and operating, was $2.6 million. This represents approximately 6 per cent of DoW's total expenditure on water management and planning activities identified in its submission. Most of the cost in this year constituted capital for the installation of meters ($2.14 million). The planned number of FTEs allocated to this activity in 2008-09 was 13.3 FTEs, which equates to 4 per cent of the total FTEs for water planning and management activities.

The cost of this activity has increased since 2006-07, largely due to increased capital investment associated with the installation of meters on the Gnangara mound (Figure 18).

The number of planned FTEs has undergone a moderate decline after a steep increase in the 2007-08 financial year. The planned FTE positions, however, are substantially higher than actual FTEs, particularly when DoW ceased capital expenditure at the end of January 2010 on the expiration of meter installation funding. At the end of the 2009-10 year, DoW had filled only 4 to 5 positions, compared to the 11.5 FTE positions planned for this activity.

When capital expenditure is removed from the cost base, it can be seen that operational expenditure has undergone a moderate increase (Figure 19). A split between capital and operational expenditure is not available for the 2006-07 financial year as metering was not capitalised in DoW's accounts at that time (due to each meter falling below the threshold of $5,000).

[9] For Carnarvon, DoW meters almost 98 per cent of water use by volume.

Figure 18: Direct costs and full time equivalents for metering activity

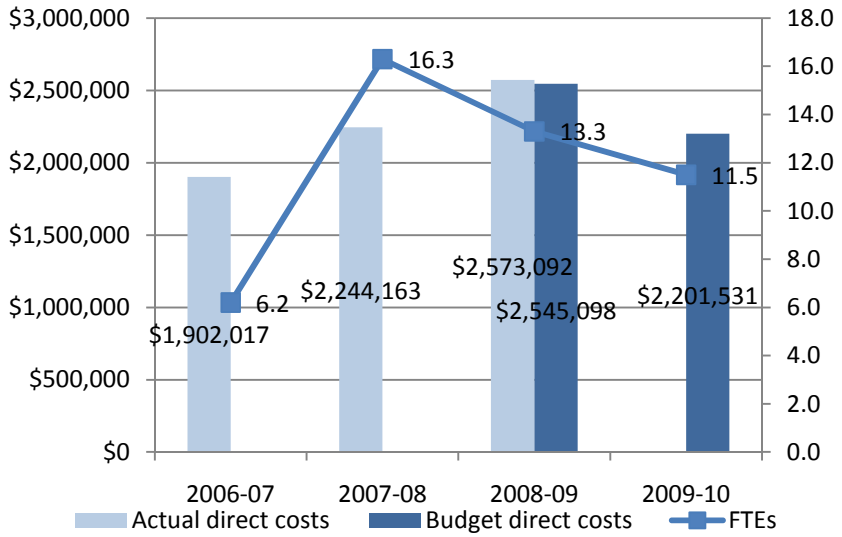
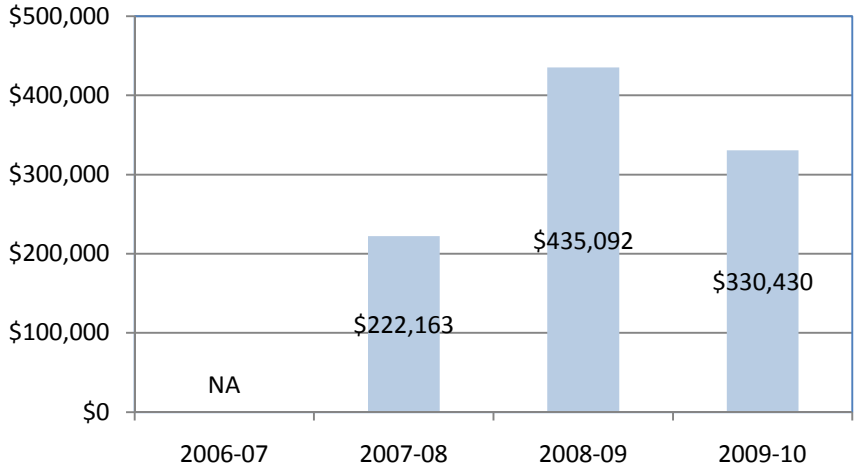


Figure 19: Direct operational expenditure for metering activity



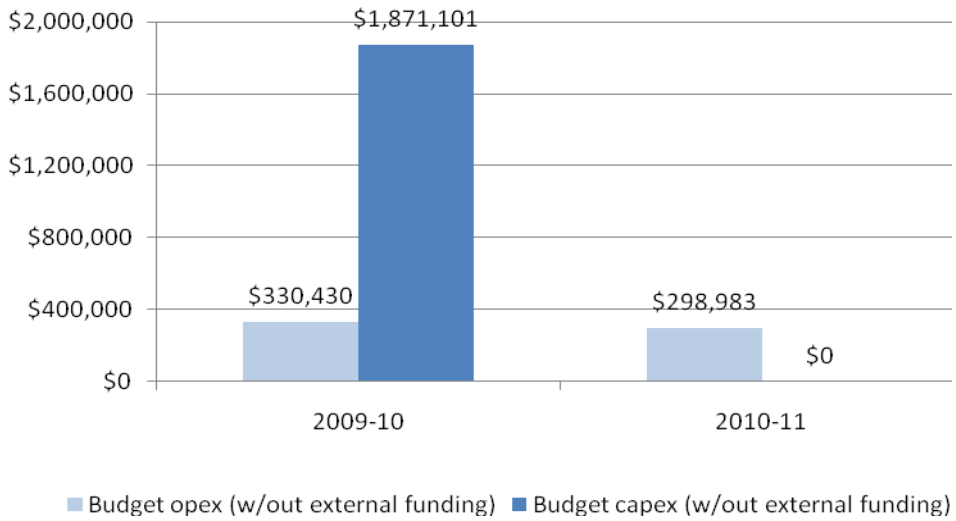
On the exhaustion of the capital budget for the Gnangara meter installation project in January 2010, the metering activity has moved to a focus on meter reading and maintenance. The low number of planned FTE positions filled reflects this. According to DoW, further installation of meters is dependent on the success of external funding applications. It has a planned schedule of future installations, but this will only go ahead if DoW can secure external funding from the Commonwealth.

Budgeted forward costs

Scenario 1

In the absence of any external funding, the 2010-11 budget for the metering activity is focused purely on maintenance and measuring. This is shown in Figure 20.

Figure 20: Capital and operational budget for metering activity



In addition to the initially budgeted funds, a capital carryover from 2009-10 of $431,654 will be added to the 2010-11 budget.

Scenario 2

DoW has sought a further $12.2 million of funding from the Commonwealth to install meters on the remaining unmetered bores between 5,000kL and 500ML in the Gnangara area and to commence rollout to other parts of the State. Scenario 2 represents funding for the remaining unmetered bores which were not targeted in the initial round of funding for the pilot project. The program is budgeted to cost $12 million over the next four years, with an average cost per meter of $8,165 (Table 18).

Table 18: Proposed metering installations and expenditure if externally funding obtained

Year	Area	Number of meters	Installation cost ($000)	Total cost ($000)	Cost per meter
2010-11	Gnangara mound and Gingin	325	$2,226	$2,449	$7535
2011-12	Gingin	350	$2,517	$2,769	$7911
2012-13	Gingin	400	$3,021	$3,323	$8308
2013-14	South West	425	$3,370	$3,707	$8722
	Total	1,500	$11,135	$12,248	$8165

Gingin and the South West follow the Gnangara mound on the priority list for metering due to the high use in the areas and risk to sustainability of groundwater and surface water in these areas.

Scenario 3

DoW has a made a further application for $99 million of funding (comprising $69,614 179 in capital funding and $30,016,623 in operating funding) over eight years to roll out up to 10,000 meters in priority resource areas of the State. DoW will prioritise meter installation with this funding under the following criteria:

- areas that are close to over-allocation or are over-allocated;
- taking over ownership of private meters, which are largely within the priority water resource planning areas; and
- new licence applications.

5.4.3 Effectiveness

The need for increased metering of water use is well recognised as a fundamental component of national water reforms. Under the NWI, which Western Australia has signed, metering is required to be undertaken in the following circumstances:

- for categories of entitlements identified in a water planning process as requiring metering;
- where water access entitlements are traded;
- in an area where there are disputes over the sharing of available water;
- where new entitlements are issued; and
- where there is a community demand.

In Western Australia's NWI implementation plan, Western Australia committed to, among other things, complete a metering pilot project on the Gnangara mound. The implementation plan also committed to broader implementation of metering, with DoW to prioritise by areas of highest demand and pressure on water sources and demand for trade. This expansion of metering is contingent on further funding.

The effectiveness of DoW's metering program should be evaluated in terms of whether metering is promoting effective water management outcomes – for example, through the provision of information to assist decision making. In the remainder of this section, we examine the extent to which metering is delivering benefits.

Water users

Metering data provides value in a number of forms to water users. First, metering allows water users to monitor their water abstraction. They can use that information to guide efficiency measures or if water use is below the allocated amount, the user may expand the irrigation area if approved under the licence. Accurate metering can save significant cost. For example, in Carnarvon, licensees use scheme water once they exhaust groundwater allocations, with scheme water expensive.

Second, metering provides water users with a more secure entitlement to the resource as it enables DoW to detect and prevent illegal extraction. Increased security gives rise to an asset that is of higher value than one that is subject to the risk of eroding reliability.

Third, metering is a requirement for trading and the establishment of a water market. For example, trading increased on the Gnangara Mound subsequent to implementing meters. Trading provides water

users with increased flexibility in production decisions and enables a financial return on water licences that are underutilised in a particular season. The capacity to trade also places an 'opportunity value' on water, which provides users with a financial incentive to save water and use it more efficiently.

Department of Water

Given the limited coverage by meters and the short time for which the meters have been installed, it is not possible to estimate the value of the water information obtained through metering to DoW. However, DoW considers there to be a number of areas for which it will have value.

First, meter readings can assist in water accounting, resource assessment and allocation planning as actual water consumption is superior to estimates of water use. For example, DoW has contracted SKM to convert readings collected so far into datasets to determine water availability. DoW may revise water allocations because of this work (increased or decreased). This has value in terms of ensuring resources are not over-exploited or allowing DoW to grant further licences. In the absence of meter readings, DoW estimates water usage based on licence allocations and factors such as the type of crop and type of infrastructure used. However, DoW advises that it is too early to assess the value of any metering data inputs into allocation planning.

Metering data also serves a compliance purpose, as it provides a means of detecting breaches in allowable extraction against licences. DoW verifies and enters all meter readings into DoW's water licensing database. At the conclusion of each water year (June 30), DoW assimilates annual water use data and transfers it to licensing for their records and action if required.

Given the relatively small and focused deployment of meters to date and the obligations under the National Water Initiative, PwC assesses that the installation of meters has been an effective means of providing information for better resource management.

5.4.4 Efficiency

There are both capital and operating components of the metering program. We first examine the efficiency of the capital works program associated with the Gnangara project. Next, the efficiency of ongoing maintenance and operations is examined.

Installation

DoW selected the Gnangara mound for the pilot project due to a need for more information on water use in the Gnangara mound area, particularly in the context of concerns of sustainability of the resource. DoW will use data from this metering program for the 2012 Gnangara allocation plan.

The pilot metering project for the Gnangara mound had a number of performance indicators. The first of these was a plan to install 25 to 30 state-owned water meters per month on private licensed production bores across the Gnangara area.

Table 19, which shows the number of meters installed by financial year over the last four years, shows that this target was generally met, with State owned meter installations ceasing at the end of January 2010.

Table 19: Number of state owned meters installed per year

Year	Number
2006-07	278
2007-08	311
2008-09	360
2009-10	160
Total	1109

The meters installed are approved under the Approved Meters Order (2009) and are installed in accordance with DoW's Guidelines for Water Meter Installation (2007, 2009), which comply with the National Standards for Non-Urban Water Metering.

In an effort to minimise cost, DoW seeks notification about planned bore construction and seeks to install meters during the construction process.

Unit costs of installation

In 2008-09, DoW had capital expenditure of $2,098,000 for the installation of 360 meters. This equates to $5,828 per meter. This compares well against the estimated $14,500 per meter proposed by NOW. However, NOW's meters are telemetry enabled and would be expected to involve larger capital cost (see section 6.4 for more detail). The low cost per meter incurred by DoW suggests that DoW is not installing meters incorporating unnecessary features or cost.

DoW installed state owned meters rather than requiring individual licence holders to install privately owned meters to ensure that the meters were fit for purpose, of an approved type and installed in accordance with national standards. State owned installation also allowed the initial pilot project meters to be installed in a timely manner. DoW considered that legislative limitations constrained its ability to achieve comprehensive coverage across the Gnangara Mound under a privately owned metering framework. There may also be some efficiencies of scale (such as purchasing power) that could be achieved through DoW maintaining responsibility for meter installation.

Meter reading

A Departmental metering officer reads state-owned water meters in the Gnangara area twice per year. This is a reduction from the monthly meter reading conducted in 2006-07 and 2007-08. DoW initially carried out monthly metering reading to analyse temporal variation of water use across the area and to determine the optimal rate of meter reading. DoW now considers that it is too resource intensive to read all meters on a monthly basis and sufficient information for water management requirements is obtained from the twice-yearly readings. Further, many of the licensees with state owned meters have had their licence terms amended to include conditions that they undertake monthly meter readings and submit them annually to DoW. In these circumstances, an annual reading conducted by DoW serves as a check on the licensee readings and on the condition of the meter.

The number of readings carried out each year is shown in Table 20. Despite the lower number of meter readings in 2008-09 compared to the previous year, operational expenditure increased. However, as noted above, this may be associated with increased meter installations and the development of metering policy and the metering implementation plan. It is not possible to draw this distinction from the data.

Table 20: Number of meter readings / condition inspections completed per year

Year	Number
2006-07	3424
2007-08	6565
2008-09	2488
2009-10	2758

Maintenance and asset management

DoW undertakes corrective maintenance works as required for state-owned water meters installed across the Gnangara mound. When DoW reads the meters, the condition of meters is also examined. DoW may be liable for damages (loss/costs) resulting from faulty meters. Table 21 shows the number of maintenance jobs required to be performed each year under the flowing classifications:

- Urgent: meter or headworks fault is compromising the performance of the irrigation system;
- High priority: meter or headworks fault is compromising the meters capacity to accurately measure flow; or
- Low priority: meter or headworks fault may compromise the meters capacity to measure flow accurately.

Table 21: Completed corrective maintenance jobs per year

Year	Total	Urgent	High	Low
2006-07	5	0	1	4
2007-08	64	10	15	39
2008-09	76	6	21	49
2009-10	38	2	4	32

Each maintenance job level has a target repair time: one to three days for urgent jobs, three days to one week for high propriety jobs and greater than one week for low priority jobs. All corrective urgent and high priority maintenance jobs were resolved within these timeframes. The reduced number of maintenance jobs in 2009-10 reflects the lower number of meter installations. Most faults occur shortly after installation. However, maintenance requirements may increase again as the meters age. Maintenance contract costs are relatively small ($78,670 in 2008-09), although this does not include management of the contract.

As noted in section 6.4, the average operational cost per meter incurred by DoW ($385 per meter) is slightly below the estimated expenditure by NOW ($426 per meter). This is despite a higher level of meter reading by DoW and some of the operational expenditure being incurred in relation to the meter installation program.

Efficiency conclusions

DoW has only recently commenced preparing an asset management plan for its existing network of meters.

While operational expenditure increased in 2008-09 despite less frequent readings, it was associated with an increased number of meter installations and the development of strategic policy and a metering implementation plan. DoW's costs compare favourably with those NOW estimates it will incur in its proposed metering program.

At present, the availability of external funding is driving DoW's metering program. The future prospect to recover from users the efficient costs of meter installation, operation and maintenance means that targets and strategies should be set on the basis of what represents an efficient level of metering – not what can or cannot be achieved on an opportunistic basis with external funding. This being the case, DoW's future implementation plan may be too conservative, with further installation also to be proposed in association with the availability of funding through cost recovery.

5.5 Statutory referrals

5.5.1 Description

This activity involves DoW providing advice to the Western Australian Planning Commission (WAPC) and local governments on planning and development proposals that have water management implications. DoW responds to statutory referrals for subdivision and development applications and strategic local, district and regional scale schemes or planning proposals. Approximately 2,000 referrals are received from the WAPC and local government authorities each year.

The main types of referrals received by DoW are shown below, listed in order of least to most complex. Thus, management plans require higher-level, strategic assessment and advice than sub-division and development applications:

- sub-division and development applications;
- local planning proposals;
- district planning proposals;
- regional planning proposals; and
- management plans.

DoW reports in its submission that it has begun to invest more effort in strategic scale schemes and proposals, as this effort will reduce the need for it to be involved in local scale proposals and subdivision applications in the future. DoW believes that this strategy will enhance its effectiveness in promoting better urban form and preserving the health of ecosystems.

The statutory referral activity excludes expenditure incurred in the following related activities:

- *Drainage and water management planning*: defined as undertaking technical assessment and developing drainage and water management plans for proposed future urban development areas (the direct cost of this activity was $1,541,744 in 2008-09 and accounted for 4.4 FTEs);

- *Arterial drainage studies*: defined as implementing the better urban water management framework in existing drainage areas (the direct cost of this activity was $1,237,649 in 2008-09 and accounted for 9.3 FTEs); and
- *Floodplain management advice*: defined as providing advice to decision-making agencies on floodplain areas and flood levels, generally related to specific planning and development proposals (the direct cost of this activity was $580,409 in 2008-09 and accounted for 5.3 FTEs).

5.5.2 Cost of activity

In 2008-09, the direct costs of the statutory referral activity were just under $1 million, accounting for approximately 2 per cent of direct costs detailed in DoW's submission. There is no capital expenditure associated with this activity. Nor are there any externally funded projects in this activity. In 2008-09, the activity had a planned staff complement of 11.2 FTEs, which equates to 4 per cent of DoW's FTEs assigned to water management and planning activities.

In the four years since 2006-07, the cost of responding to statutory referrals has increased substantially from $326,000 to a budgeted $1.4 million in 2009-10 (Figure 21). DoW advises in its submission that this increased expenditure is due to the receipt, from government, of five years of 'new resource proposal' funding to meet the costs of increased demands on its advisory functions relating to statutory referrals. The increased demand is being driven by rapid urban expansion in Perth and regional cities and the consequent need to address the impact of this expansion on water resources.

DoW's submission noted that in 2009-10, some of the additional expenditure on statutory referrals has come from diverting funds out of its waterways management activity. This is in recognition that investing in preventative strategies through its statutory referrals advice is likely to be a better, more cost-effective way of promoting better environmental outcomes than investing in management of waterway problems after they arise.

Despite the higher costs, the total number of referrals dealt with by DoW on an annual basis has remained relatively stable at about 2,000 per year (Figure 22). This would suggest that the higher costs incurred in statutory referrals must be related to the level of assessment being applied – possibly reflecting the aforementioned shift in strategy toward investing more intensive effort on the higher-level, management plans (refer to efficiency assessment for evidence of this).

Figure 21: Direct costs and full time equivalents for statutory referrals

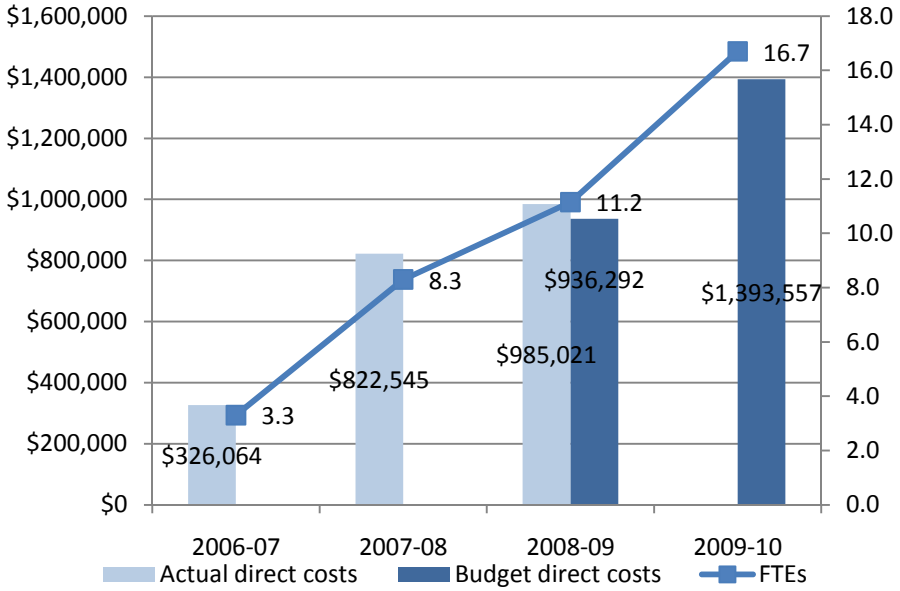
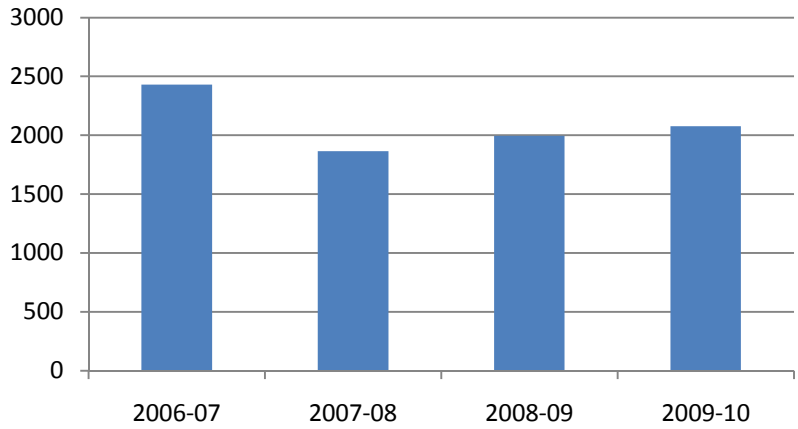


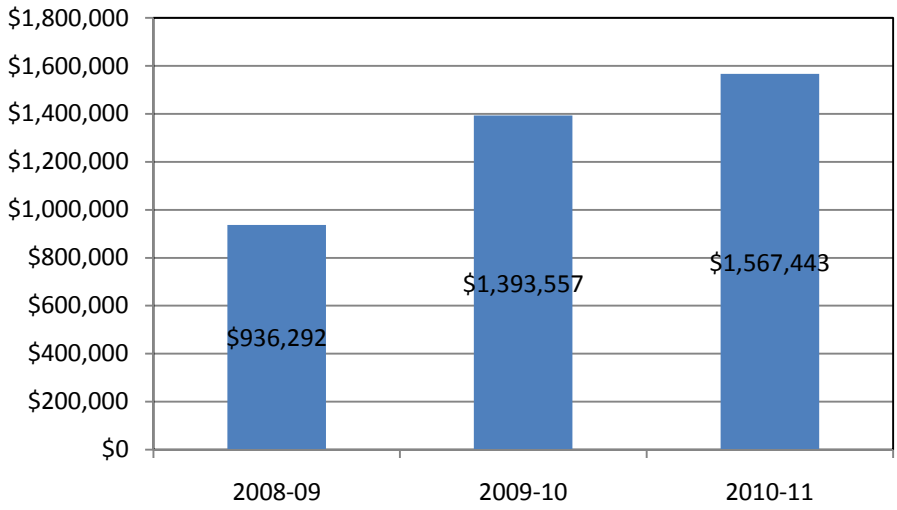
Figure 22: Total number of referrals completed



Budgeted forward costs

Expenditure for statutory referrals is budgeted to continue to rise, increasing to just under $1.6 million in 2010-11 (Figure 23). One extra FTE has also been added to the 2010-11 budget. DoW advises that this further increase is due to the change in strategic focus.

Figure 23: Budget for operational costs for statutory referrals activity



5.5.3 Effectiveness

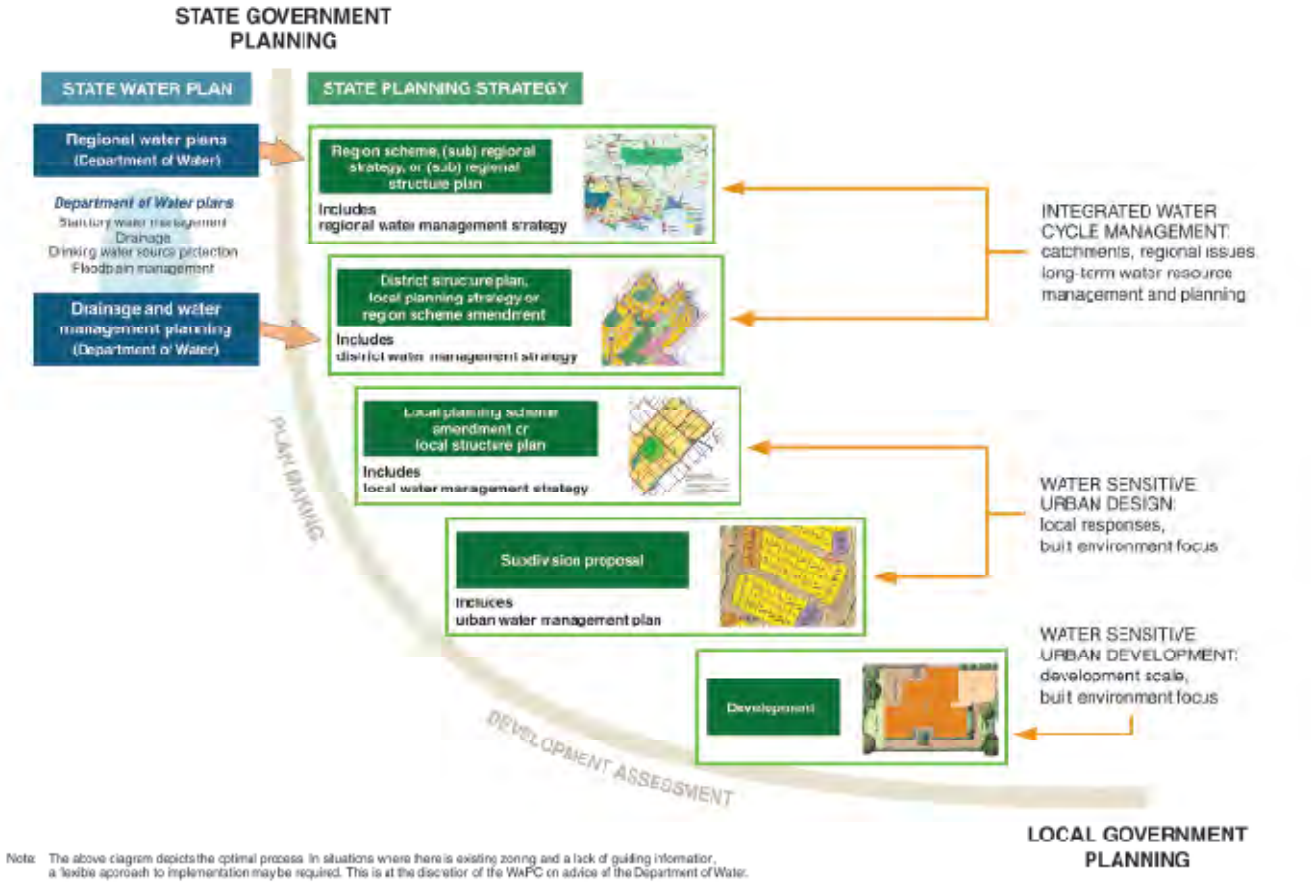
DoW has taken a number of steps, in collaboration with the WAPC and Department of Planning, to improve its effectiveness in this area.

- DoW has negotiated administrative agreements with the WAPC and Department of Planning that have reduced the number of sub-division proposals it receives. Prior to 2006-07, approximately 5,000 statutory referrals were received each year. This agreement reduced the number of sub-division proposals to about 2,000, so that it can affect better water resource management outcomes at a strategic level as opposed to a sub-division level.
- Upon receipt of a referral, DoW has a degree of discretion about the level of detail with which a sub-division proposal is treated. A number of cabinet decisions and policy papers shape the manner in which DoW treats statutory referrals. *Better Urban Water Management 2008*, published by the WAPC, details the need for better integration of water planning into the urban planning system.
    - Before the adoption of the *Better Urban Water Management* policy, DoW did not provide detailed water information for strategic or higher level proposals as this was dealt with at a sub-division level. Detailed water management reports are now prepared in response to strategic planning proposals, with the focus moving from stormwater management at the sub division stage to water sensitive urban design that considers the full water cycle. With more fully allocated water sources, project proponents at the district level are now required to demonstrate water supply options.
    - Figure 24 shows the early stage of the planning process at which it is anticipated regional water plans and drainage and water management planning takes place. One of the main reasons for DoW's desire to have input at a higher level in the planning process is that, from experience, effort expended at the sub-division level is less effective. The *Better Urban Water Management* policy reflects this desire.

- DoW has adopted a risk-based approach for determining how much assessment effort it allocates to referrals received. DoW reviews the level of assessment it gives to referrals on an annual basis.

These steps appear to be sensible measures for improving effectiveness. PwC has examined a number of indicators to assess whether the measures have yielded benefits.

Figure 24: Integrating water planning with land planning processes (*Better Urban Water Management 2008)*



Evidence of changing strategic focus

DoW does not routinely keep records of the types of the amount of effort (staff time) expended on each referral. This makes it difficult to assess whether the higher-level, strategic focus adopted by DoW has translated into a change in the distribution of staff time across different types of referrals.

Nevertheless, there is some evidence of change in the types of referrals dealt with (Table 22). For the Kwinana Peel and Swan Avon regions, there has been an increase in the number of strategic level plans dealt with between 2006 and 2009. There has also been an increase in the number of management plans in the Swan Avon region.

Table 22: Number of referrals processed by type

Region	Type of referral	2006	2007	2008	2009
Kwinana Peel	Statutory (subdivision)	375	228	242	222
	Strategic (Regional, District and Local)	24	31	33	44
	Management plans	6	0	0	2
Swan-Avon	Statutory (subdivision)	1216	719	846	732
	Strategic (Regional, District and Local)	54	101	105	87
	Management plans	0	4	9	16

Source: Department of Water

While this provides evidence of a readjustment to the mix of referral types, it is not tangible evidence of adjustment to the effort level applied to each type of referral. DoW has presented a limited set of effort information in its submission on the different types of referrals received over an eight-week period in April to May 2010 and the staff time allocated to each. DoW has cautioned that this is not necessarily representative of its work program because DoW typically assesses higher-level proposals over extended periods. In the absence of time series data on the level of effort given to particular referrals, it is difficult to see how DoW can adaptively manage and review its work program.

DoW maintains that the major driver of increased expenditure for the statutory referral activity relates to increased effort per plan for the higher level, management plans. However, as DoW's internal systems for managing statutory referrals do not record the time or resources spent on assessing and responding to referrals, it is not possible to assess the extent to which DoW's reported shift in strategic focus is the underlying cause for the large increase in costs associated with this activity.

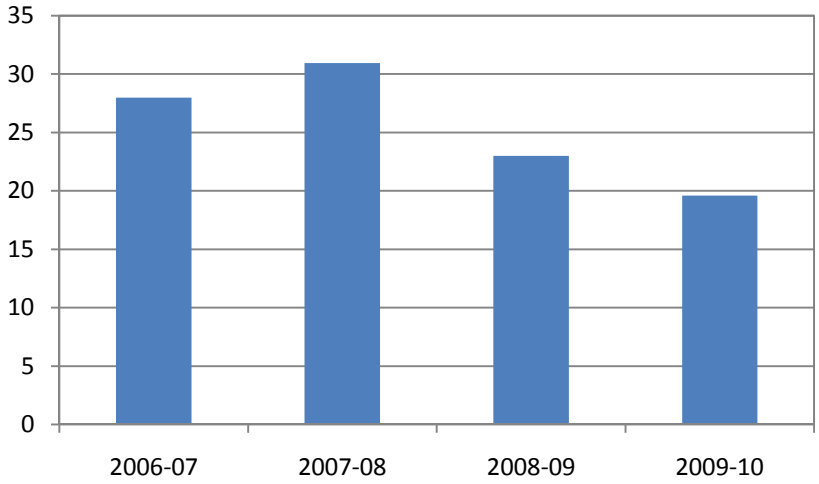
Is the change of focus leading to better outcomes?

Since the release of *Better Urban Water Management*, the implementation of district/regional drainage and water management plans has become an integral part of the planning process. For example, in June 2009 the WAPC resolved to defer all Peel Regional Scheme urban rezoning amendments (with three exceptions) pending the release of the draft Murray drainage and water management plan. While the long term benefits of this are not clear in the form of water management and urban form, the effort of DoW in developing these plans is being incorporated into planning decision making.

5.5.4 Efficiency

DoW's increased effort at the strategic level should ultimately deliver cost reductions for sub-division level applications in areas where DoW has completed strategic planning. There is some evidence of reduced processing time, with the average processing time now less than the target 28 days (Figure 25).

Figure 25: Average time in days for referral processing (of those completed in that year)



The average cost per statutory referral decreased between 2007-08 and 2008-09 (Figure 26). DoW noted in its annual report that the reduced cost was a result of the implementation of *Better Urban Water Management*, development growth and better information management. Between those same two years, the unit cost per regional plan increased. At a higher level, the average cost per regional plan increased (Figure 27).

Figure 26: Average cost per statutory referral processed (2008-09 Budget paper, DoW Annual Report (2009))

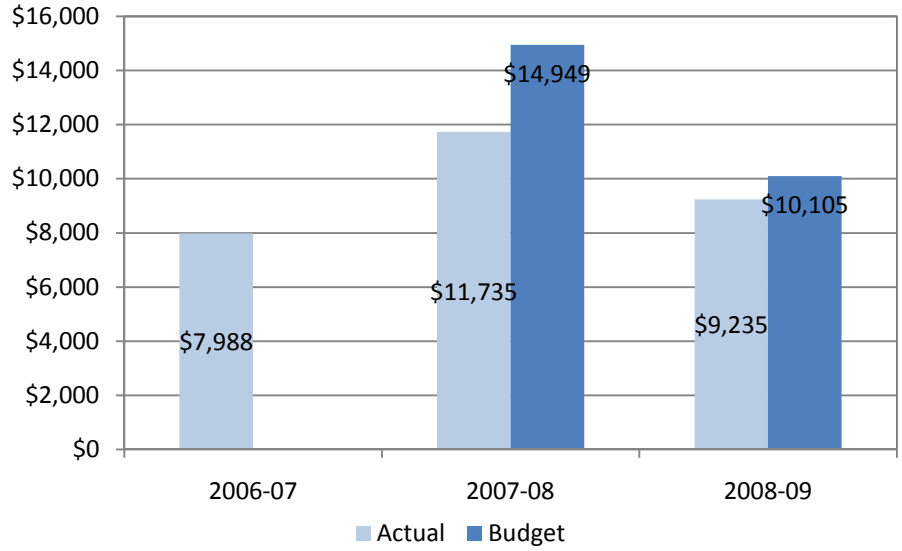
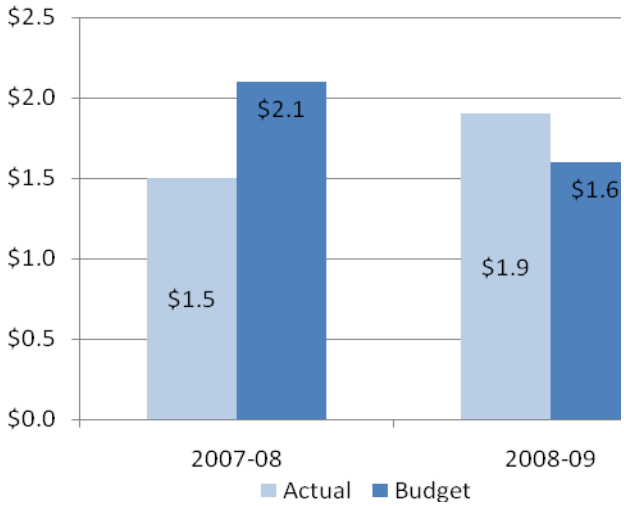


Figure 27: Unit cost per regional plan ($ m) (2008-09 Budget paper, DoW Annual Report (2009))



Efficiency conclusions

In the absence of further data on the processing of statutory referrals, and particularly in the context of significant increases in expenditure, it is difficult to draw definitive conclusions about the efficiency of costs involved in responding to statutory referrals. DoW's internal systems do not record the level of effort expended on different types of referral, preventing validation that the level of increased expenditure is appropriate for the increased effort expended.

It is also not possible to say at this stage whether DoW's increased level of effort at the strategic level is yielding any efficiency in the assessment of sub-division level proposals.

In future, the presence of a price is likely to elicit from the WAPC and local government authorities (and whomever the WAPC passes on the costs) a signal as to whether they consider the level of effort expended by DoW to be appropriate.

5.6 Water source protection planning

5.6.1 Description

DoW is responsible for drinking water source protection and management under the *Metropolitan Water Supply Sewerage and Drainage Act 1909* and *Country Areas Water Supply Act 1947*. Currently there are 149 water sources used for public water supply (DoW, 2010a), the majority of which are groundwater sources, with approximately one additional drinking water source added each year.

DoW prepares and implements drinking water source protection plans for new and existing water sources. The plans are prepared to a standard consistent with the *Australian Drinking Water Guidelines 2004.* The plans provide guidance on appropriate land use activities and identify actions necessary to protect the quality of the resource. The economic rationale for investment in planning is the concept that preventative measures are more cost effective than addressing water quality problems 'after the event'.

Plans are currently in place for 120 of the 149 public water supply sources, which equates to coverage of 80 per cent of all drinking water sources. DoW completes 10 to 15 plans each year, and it generally takes approximately 12 months to produce a plan. DoW is expected to review the plans once every five years. Prioritisation is given to those areas experiencing rapid growth in water demand or land use change.

The plans mostly cover drinking water sources that are used by the Water Corporation. Only two of the existing plans cover water sources that are licensed to other water suppliers — AQWEST and Busselton Water Board. In addition to planning, DoW's water source protection activity also includes advice given to local government authorities, indigenous communities and mining companies. Approximately 300 indigenous communities and about 500 mines do not have access to water supplied by licensed water service providers (DoW, 2009b).

This activity does not include the following related activities:

- *Implementation of water source protection plans* – defined as implementation of the water source protection plans through DoW's regional offices, by providing advice on land use planning and development proposals in drinking water supply catchments and implementing other activities such as signage (the direct cost of this function was $447,096 in 2008-09 and accounted for 4.6 FTEs);
- *Preparation of guidance notes* – defined as preparing policy, guidelines and advice to guide industries, agriculture and other land uses undertaken in drinking water supply catchments (the direct cost of this function was $657,067 in 2008-09 and accounted for 6.5 FTEs); or
- *Land acquisition and land management*. DoW purchases land in drinking water catchments and groundwater areas for the purpose of water source protection. One or two properties are typically purchased each year. In 2008-09, total expenditure on land acquisition was $2.7 million. The associated annual cost of land management activities in catchments operated by the Water Corporation is about $70,000.

5.6.2 Cost of activity

In 2008-09, the direct cost of water source protection planning was $849,024, accounting for approximately 2 per cent of direct costs detailed in DoW's submission. There is no capital expenditure or external funding associated with this activity. DoW planned to staff the activity with 8.6 FTEs in 2008-09, which equates to 3 per cent of DoW's FTEs assigned to water management and planning activities.

In 2006-07, additional funding was provided to DoW to complete 24 new protection plans over a period of four years. This funding was made available following the Office of Auditor General's 2003 report on the management of water resources (The Auditor General was critical of DoW's past effort in this area and recommended additional investment). The 'new resource proposal' (NRP) funding was front-loaded in the first two years, with progressively smaller tranches spent in 2008-09 and 2009-10, as depicted in Figure 28.

Over the last four years up to and including 2009-10, 54 new plans have been completed – five less than the 59 plans that were scheduled for completion over this period (Table 19). The reason cited by DoW for the shortfall on the targeted number of completed plans is the allocation of resources to work associated with a current parliamentary inquiry into Recreation Activities in Public Drinking Water Source Areas is underway. The inquiry is due to report in September 2010.

Figure 28: Direct costs and full time equivalents for water source protection planning

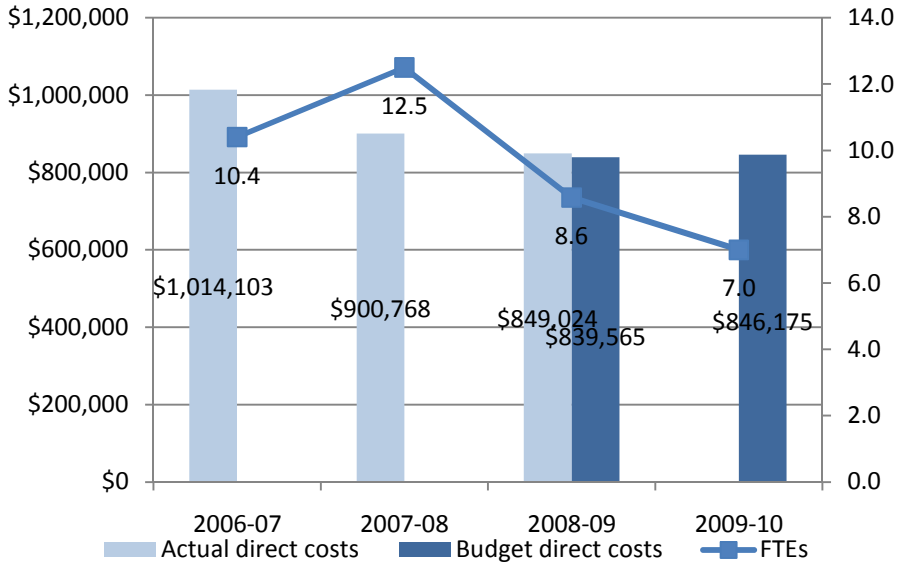


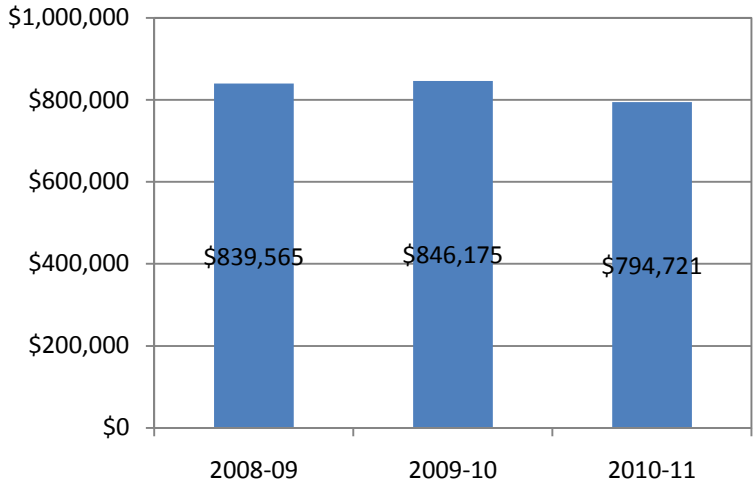
Table 23: Number of water source protection plans scheduled and completed

	2006-07	2007-08	2008-09	2009-10
Plans proposed	18	16	10	15
Plans completed	18	16	10	10

Budgeted forward costs

DoW expects the budget allocated to this activity to be relatively stable over the foreseeable future, despite the NRP funding coming to an end (Figure 29). In its submission, DoW states that it "will continue to develop new plans for those areas that do not have plans in place, on a priority basis, and plans will be reviewed and revised for those areas experiencing rapid growth or land use change." An additional 12 plans are proposed for completion in 2010-11.

Figure 29: Budget for direct operational costs for water source protection activity planning



5.6.3 Effectiveness

In our review of effectiveness we have examined:

- how water supply sources are prioritised for planning;
- the proportion of water supply sources that are covered by a protection plan;
- how decisions are made on the level of effort that is assigned to developing a plan; and
- evidence of whether planning has reduced future risks to water quality and/or reduced the need for expensive water treatment.

Planning coverage

The proportion of drinking water sources covered by a water source protection plan has increased steadily since 2006-07 from 54 per cent of supply sources to almost 80 per cent (Table 24). On the basis of this measure, DoW has been effective in establishing plans over much of the State's public water sources. Apart from in 2009-10, DoW met its annual plan completion targets.

Despite the improvement in planning coverage since 2003, the Western Australian Auditor General (2009) considered that DoW had not ensured adequate planning for all public drinking water sources and noted that DoW had not completed plans in some areas. According to DoW, the Parliamentary inquiry into recreation activities in water source areas has effectively reduced its planning output by one third in 2009-10 (thus accounting for the shortfall in plan coverage relative to the targeted 80 per cent coverage for 2009-10). DoW also cites limited staff resources as a constraint to its planning activities.

Table 24: Proportion of public water supplies covered by a drinking water source protection plan (Budget papers)

Year	Budget	Actual
2006-07	NA	54%
2007-08	65%	63%
2008-09	73%	70%
2009-10	80%	77% (estimate)
2010-11	86%	NA

Priority setting

In developing water source protection plans, DoW consults with the Department of Health and the Water Corporation to help guide planning priorities, particularly identifying which of the water sources without a plan should be prioritised for planning attention. The Department of Health often requests that there be an examination of drinking water sources for mining sites and indigenous communities.

Both the Department of Health and the Water Corporation support investment in water source protection planning. The Department of Health has a responsibility to maintain public health, and is therefore concerned with minimising risks to drinking water supplies. The Water Corporation shares this public interest but also has a commercial objective of minimising the risk of future water treatment costs – that is its cost of fulfilling its licence obligations with respect to water quality standards. To the extent that the Water Corporation does not bear the cost of restricting land use activities in catchments, for example housing development or recreational activities (in terms of foregone benefits of these activities), but gains from minimising water treatment costs, there could be an incentive for the Water Corporation to be overly risk-averse in its advice to DoW.

Effort per plan

The level of effort in preparation of a plan is largely guided by the *Australian Drinking Water Guidelines 2004* (and standard Australian risk assessment processes). However, DoW also notes a number of other factors explain the amount of effort expended on a plan, including:

- quality and amount of available information;
- complexity of land uses;
- geographic location of the water source;
- the level of community interest in the area;
- existing land and water use policies, such as recreational policy; and
- the risk of the plan being appealed.

While DoW uses the above criteria to explain, retrospectively, the differential levels of effort it has assigned to its protection plans, there is no evidence of a systematic framework being employed in advance to determine how much effort should be expended on each plan. Such a framework would be beneficial for budgeting purposes and ensuring that available resources are deployed in the most cost-effective manner.

Effectiveness of the plans

In line with the *Australian Drinking Water Guidelines 2004*, DoW takes a multiple barrier approach to protecting drinking water. The first of those barriers is effective drinking water protection planning. DoW considers that the costs associated with the absence of an appropriate plan are far in excess of the costs of plan development. For example, the Water Corporation estimated a total cost to government of $140 to $180 million (net present value) over 30 years to install a treatment system if multiple use activities were permitted in Logue Brook Dam (Department of Health, 2009). The cost of preparation of a water source protection plan to control those activities is several orders of magnitude less than this treatment option. On this basis, DoW considers that water source protection plans should be in place for all drinking water sources.

PwC notes that the real effectiveness of the plans at preventing adverse water quality outcomes is only as good as the success of plan implementation and enforcement. Despite allocating approximately $0.5 million to plan implementation each year, DoW does not have an explicit performance indicator to measure the success of plan implementation. Further, DoW does not appear to undertake much in the way of enforcement, as there is an agreed delegation in place to the Water Corporation to undertake catchment surveillance and by-law enforcement. DoW's role is limited to provision of signage and advice on development proposals in drinking water catchments.

The need to complete drinking water source protection plans has come from a number of directions, including the Department of Health and Water Corporation. PwC considers that due to the high cost of treatment and other options that are required in the absence of water source protection, demand for the completion of plans is likely to remain high even where these customers are required to pay for the plans.

The level of effort invested in the plans is also largely a result of external factors such as the *Australian Drinking Water Guidelines 2004* and the requirements that DoW must follow to achieve a plan that DoW can defend against challenge.

5.6.4 Efficiency

Average cost per plan

The budget papers show that the average unit cost of completing the plans has more than doubled over the period 2006-07 to 2008-09, although unit cost declined in 2009-10 to $500,000 per plan (Figure 30). It is important to note that the costs reported in the budget papers are an order of magnitude higher than those calculated based on direct costs and plans completed (reported in DoW's submission). This is because the budget papers include overheads and a suite of other, related activities (implementation, preparation of guidelines and a share of groundwater assessment costs).

DoW considers that average cost per plan is not a useful measure, as it does not capture the complexity of plans, which can vary considerably across the small number of plans dealt with each year. For example, in 2008-09, DoW classed four plans as 'simple' and six plans as 'complex'. In its submission, DoW has provided additional information about the split of costs between these two classes of plans in 2008-09 — complex ($291,000) and simple ($102,000). The cost differentials are based on an estimate that simple plans require only about 35 per cent of the effort used to produce a complex plan. The resulting cost estimates are lower than the budget paper costs – possibly due to a different treatment of overheads, although the difference cannot be completely explained.

To provide an additional insight to DoW's unit cost of preparing plans over time, PwC has calculated the ratio of annual total direct costs divided by number of plans completed in each year (Figure 31). This chart shows a rising cost trend, from $56,000 per plan in 2006-07 to $77,000 per plan in 2008-09. Therefore, while total costs have reduced over this period, unit costs per plan have increased. A

plausible explanation is that a portion of costs are fixed, thus resulting in higher average costs in 2008-09 when only 10 plans were completed, relative to 2006-07 when 18 plans were produced.

Figure 30 Average cost per drinking water source protection plan (Budget papers)

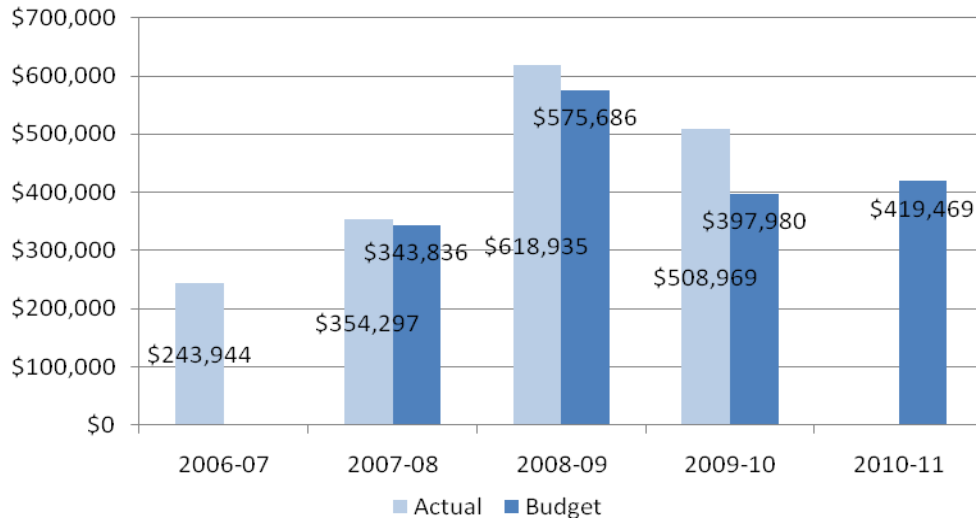
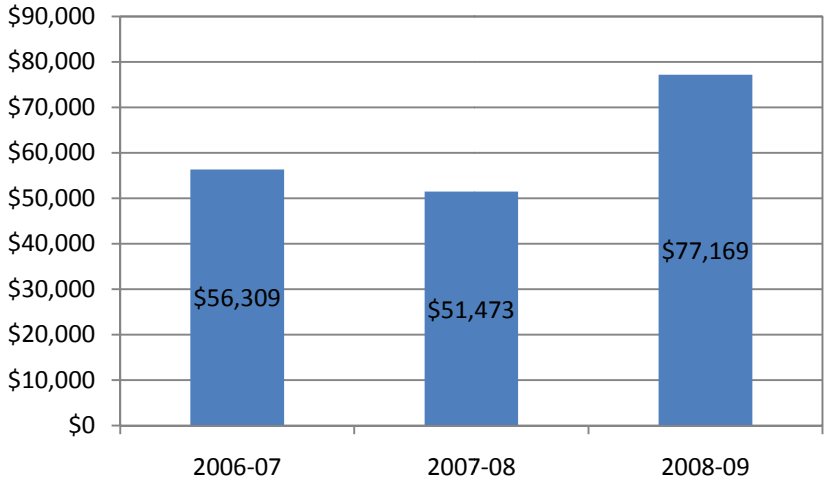


Figure 31: Average cost per drinking water source protection plan (based on direct costs from DoW's submission)



Conclusions

PwC observes that there is a potential for DoW to over-service this area in the form of increased quality of plans and possibly plan coverage of public water sources. The potential for over-servicing arises because:

- plans are produced to a standard set out by the *Australian Drinking Water Guidelines 2004*, which may not necessarily reflect the most efficient level of planning;
- neither the Water Corporation nor the Health Department face the costs of the demands they place on DoW for this activity – that is, the economic costs of restricting activities (in terms of

welfare reduction) are not necessarily factored into the cost-benefit assessment of protecting water quality through preventative planning measures as opposed to addressing quality problems as they emerge;

- in particular, the Water Corporation has a commercial interest to minimise the potential future costs of treating contaminated water, and will therefore have an incentive to use the planning process to restrict catchment activities that could have adverse impacts on water quality and/or yield; and
- there is an untested assumption that high-quality protection plans are required for all water sources – whereas, there may be scope for reducing the quality of these plans to meet a 'fit for purpose' criterion.

To our knowledge, DoW has not tested the question of what level of planning effort or coverage is optimal within a cost-benefit framework. Furthermore, it is not clear that the potential benefits of better planning have been balanced against the costs of preparing a plan, noting that not all water sources are the subject of equal risks. This is not a direct criticism of DoW, as it faces demands from various stakeholders for additional investment in water source protection planning. But from a wider social perspective, it is important to determine the efficient level of planning (and related enforcement) as opposed to other measures for achieving safe water supplies.

5.7 Groundwater assessment, investigation and review

5.7.1 Description

This activity forms a major part of DoW's business, as Western Australia has expansive groundwater aquifers and many users rely on groundwater as a primary water source. Many groundwater areas are yet to be fully described and investigated. There is a less than complete understanding of the size of some of these aquifers, recharge rates or the behavioural response of the aquifer to extraction. In other cases, some groundwater areas such as Gnangara Mound are subject to high levels of development pressure and there are concerns that yields are declining. For areas with these characteristics, DoW undertakes a monitoring program to determine the need for restrictions on extractions and/or the issue of new licences.

There are three components of DoW's groundwater program:

- *Investigations*: investigation of groundwater systems through a groundwater drilling and measurement program. DoW owns approximately 9,000 observation bores, although only a subset of these (about 2,500) are routinely maintained and monitored as part of its bore network. DoW is currently expanding its network;
- *Assessment*: undertaking technical groundwater assessment (modelling) to provide advice on the availability, distribution and quality of the State's groundwater resources. The 'raw' data collected from the observation bores is used as an input in the modelling activity; and
- *Review*: review the response of groundwater systems in response to groundwater use and land use change.

There are a number of related activities that are excluded from 'Groundwater Assessment, Investigation and Review'. These include 'Regional Hydrological Advice' — which is information tailored specifically for assessing groundwater licence applications, renewals and transfers — and 'Water Information Collection', which includes the cost of maintaining the bore network.[10]

Outputs from the groundwater assessment, investigation and review activity input into three service areas. DoW attributes the majority of the activity cost (90 per cent) to 'providing water allocations and managing the ongoing use of water', with the remainder allocated to 'protecting public drinking water sources' (5 per cent) and 'guiding urban drainage and water management' (5 per cent).

While not explicitly stated in DoW's submission, knowledge developed through this activity would also form an indirect input to the processing of licence and trade applications, because presumably the 'Regional Hydrological Advice' would draw on information from this area of DoW's business.

5.7.2 Cost of activity

In 2008-09, the direct costs of the groundwater assessment, investigation and review activity were $9 million, accounting for approximately 20 per cent of direct costs detailed in DoW's submission. This expenditure included a significant capital component (of approximately $2 million from internal sources and a further $2.5 million from external sources). The activity was planned to be staffed by 22.2 FTEs in 2008-09, which equates to 8 per cent of DoW's FTEs assigned to water management and planning activities.

The direct cost of this activity increased almost three fold in the three years from 2006-07 to 2008-09. Budget costs were forecast to stabilise in 2009-10 (Figure 32). This increase was primarily due to a large capital works program involving the drilling of new bores. DoW's submission does not breakdown the costs involved in investigations, assessment and review. However, information on the cost of 'investigations' can be determined from the cost information DoW provided to PwC. This information is summarised below.

Investigation component

Of the total $9 million of expenditure in 2008-09, approximately 60 per cent (or $5.4 million) was spent on groundwater investigation (Table 25). The capital works program has delivered 102 new bores over the three years since 2006-07 at a total direct cost of $9.95 million. DoW funded just under half of this cost ($4.35 million) with external revenue sources. This included funding through the National Water Commission's Watersmart Australia project to undertake groundwater assessment activities in support of the preparation of allocation plans consistent with the requirements of the National Water Initiative.

DoW advises that actual expenditure on this activity can be subject to significant fluctuations due to factors such as delays in tendering processes, technical problems, the timing of external funding and lumpy capital costs. As an example of the first factor, delays in drilling in the Allanooka Yarragadee will result in direct costs falling below budget in 2009-10. DoW has transferred the capital costs associated with this delay to 2010-11.

[10] See next section for a review of DoW's 'Water Information Collection' activity. It is understood that approximately 90 per cent of the cost of this activity relates to surface water quantity and quality information collection. Only a small component relates to groundwater.

Figure 32: Direct costs and FTEs for groundwater assessment, investigation and review

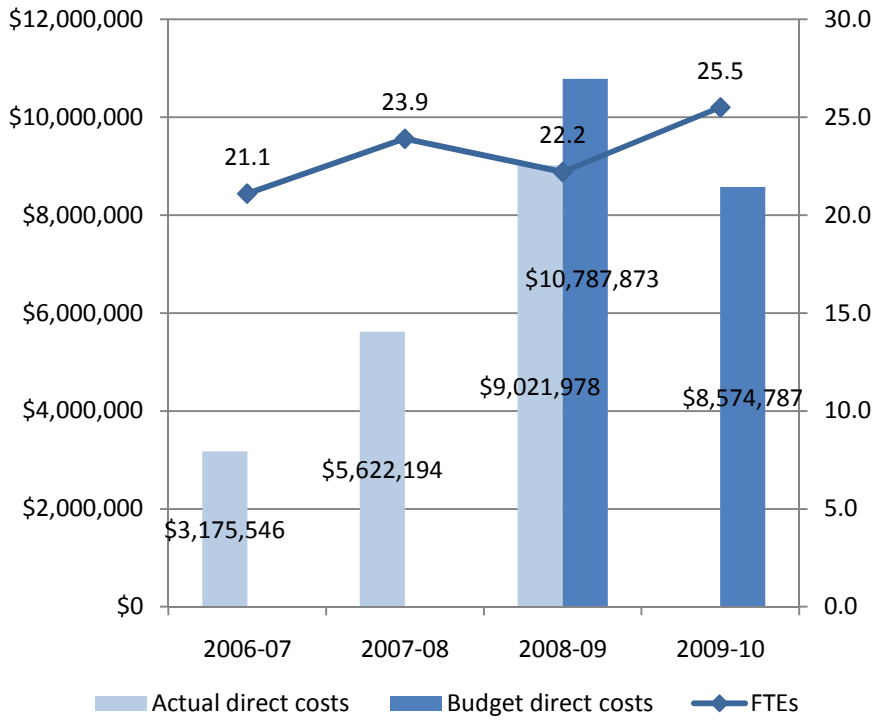


Table 25: Total groundwater investigation project costs ($000)

	2006-07	2007-08	2008-09	2009-10 (budget)	2010-11 (budget)
Direct opex (excluding external funding)	$677	$729	$933	$936	$1,219
Direct capex (excluding external funding)	$935	$982	$1,965	$1,004	$2,625
External funding	$96	$1,749	$2,510	$767	NA
Total expenditure	**$1,708**	**$3,460**	**$5,408**	**$2,707**	**NA**
Bores installed	5	79	18	NA	NA
Metres drilled	365	6,125	2,961	NA	NA

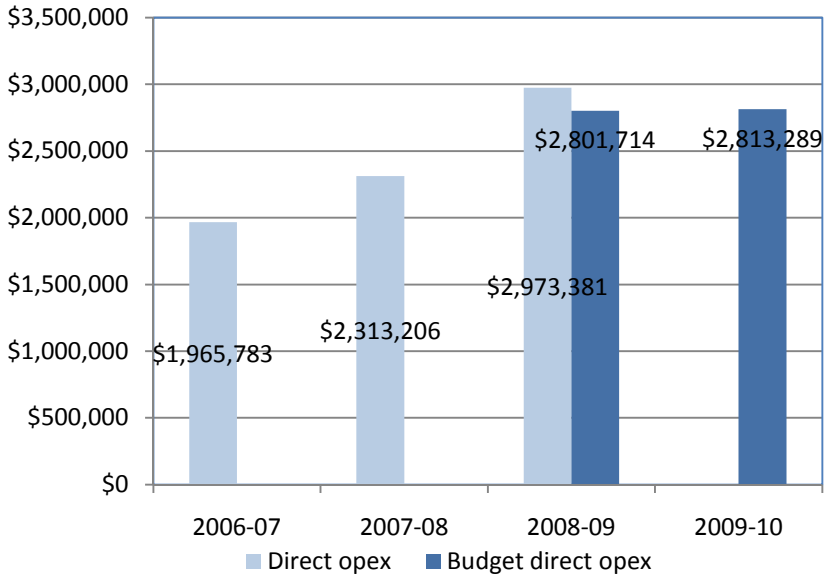
Assessment and review component

The balance of the $9 million that was not spent on investigation activities in 2008-09 is mainly incurred in relation to assessment and review activities – which represent approximately $3.6 million in expenditure.

Operating costs – entire program

After the removal of capital costs and external funding, the increase in expenditure on groundwater investigation, assessment and review is less pronounced, as shown in Figure 33. Expenditure has increased steadily, largely reflecting additional effort in administering capital contracts. Significant work is required in the period leading up to a drilling program (often two to three years ahead), which results in relatively constant staff demands even at times where no drilling is carried out.

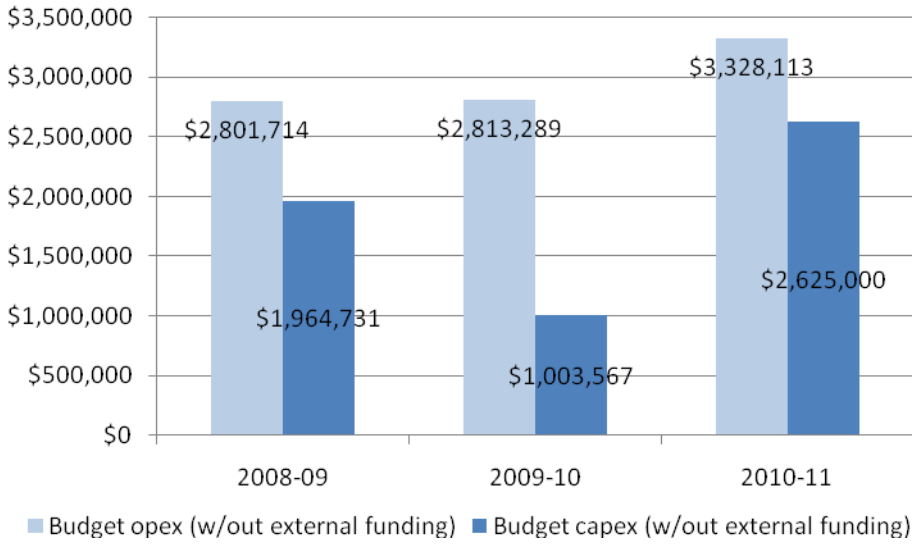
Figure 33: Direct operational costs for groundwater assessment, investigation and review



Budgeted forward costs

Budgeted operational and capital expenditure are both forecast to increase in 2010-11, even without the inclusion of external funding (Figure 34). The groundwater investigation, assessment and review activity has not been subject to the efficiency dividend, as have budgets for many other activities, due to DoW's continuing prioritisation of this activity.

Figure 34: Budget for direct operational and capital costs for groundwater assessment, investigation and review



In addition to the initially budgeted funds, a capital carryover from 2009-10 of $401,850 will be added to the 2010-11 budget.

5.7.3 Effectiveness

PwC observes that the main cost-drivers for the groundwater investigation, assessment and review activity are:

- information demands of water allocation planning, groundwater licensing, urban planning and water source protection – which in turn are influenced by development pressures being placed on groundwater sources, political priorities and a changing climate;
- the efficiency and effectiveness with which DoW is able to manage a large capital works program;
- the cost of contract labour for the bore drilling program; and
- the opportunistic use of external funding when and where it becomes available.

Our review has focused on the degree to which DoW is making strategic investment decisions, particularly with respect to its groundwater investigation program.

Evidence of strategic decision making – the 2005 plan

The Western Australian Auditor General's 2003 report noted that the WRC had drilled only three bores since 1996, that the WRC considered that 90 per cent of Perth's groundwater had inadequate monitoring and that the National Land and Water Resources Audit (2000) found that the WRC lacked the information necessary to manage 25 per cent of the groundwater sub-areas.

In 2005, the Department of Environment (which at the time was responsible for this activity) prepared a plan of groundwater investigations for the period 2005 to 2020 (Johnson et al (2005)). The plan included a schedule of groundwater investigations for DoW to conduct each year and estimated costs for those investigations. The Department of Environment estimated that the 15-year program would require the drilling of 374 bores.

The Department of Environment prioritised projects in the 2005 report on the following basis:

- C3 or C4 resources that warranted further investigation (where C3 includes resources that are between 70% and 100% allocated, and C4 are resources that are more than 100% allocated);
- metropolitan resources likely to be under increasing demand;
- proactive investigation of regions of which little was known; and
- the need to provide regional assessment.

PwC would expect that the pay-off from investing in additional bores would stem from two main sources. First, there is the value of 'proving up' a groundwater resource and being able to allocate 'new' water for consumptive use confidently. Second, there is value in being able to better manage resources that are nearing full allocation (the C3 and C4 resources referred to above). In the absence of adequate knowledge about the resource there is a risk of over-allocating water and/or failing to implement restrictions on use, resulting in falling groundwater yields and possible environmental damage.

Lack of a robust cost-benefit analysis and business plan

While the two pay-offs above are implicit in DoW's 2005 prioritisation process, there has been no explicit cost benefit analysis of alternative investment strategies. There has been no deliberate effort to analyse the financial value of proving up new groundwater resources and there is little information about the market value of groundwater entitlement as there is only thin trade in these licences.

However, in our consultations with DoW, the agency considers that the value of finding additional groundwater for allocation is high and far outweighs the capital cost of establishing bores. For example, in its 2010 review of the groundwater investigation program, DoW reported that drilling in the Cowaramup sub-area confirmed an extra 1.5 GL of water available for extraction, which DoW valued at $1.5 million per year (at $1 per kL). DoW considered that this compared favourably to the project cost.

Notwithstanding these observations, for the size of capital works program we would expect more rigorous cost-benefit analysis and business planning across the entire program. In the absence of cost-benefit analysis, there is little information to support the economic justification of the selected projects. In addition, DoW has not always defined expected deliverables and outcomes. Without a robust business case, it is difficult to assess the prudence of investment decisions.

Divergence between planned priorities and actual works

There has been some variation between the proposed works and the works actually completed between 2005 and 2010, in respect of both timing and the particular investigations carried out (Table 26). The green bars in the table below show that some investigations were delayed and/or more protracted, relative to the proposed schedule. The red bars show that in four cases, aquifers originally scheduled for investigation did not eventuate (due to change in priority), while the blue bars show that six separate investigations have been undertaken (or commenced) that were not originally planned (also due to changes in priority).

Despite these divergences from the 2005 plan, DoW advises that it has commenced all those investigations considered to be of a high priority and that were originally scheduled for commencement during that timeframe.

Table 26: Actual groundwater investigation programs tracked against programs proposed in *Groundwater investigation program in Western Australia (2005 to 2020)*

	2005-06	2006-07	2007-08	2008-09	2009-10
Cowaramup Leederville					
Monitoring – Superficial					
Eucla Basin					
Gingin Superficial					
Scott Coastal					
North Gnangara					
Perth Basin – synthesis					
Monitoring - Yarragadee & Leederville					
Monitoring Review					
Gingin Brook					
Deep Yarragadee					
Allanooka Yarragadee					
Parmelia stratigraphy					
Busselton – Capel Yarragadee					
Blackwood Leederville / Lesueur					
Kings Park Formation					

Based on Johnson et al (2005) and Johnson (2010). DoW highlighted a number of errors in Johnson (2010), with the table reflecting those corrections.

	Proposed
	Proposed but not completed
	Conducted
	Not initially proposed but conducted

The Auditor General noted in its 2009 report that the level of groundwater investigation had increased since the 2003 report, with 47 new bores having been drilled at the time of the 2009 report, with 71 planned for 2008-09 and 256 in total planned to 2020. While the 2008-09 total fell short of that planned, due to DoW shifting drilling proposed for 2009 into the next year, the increase since 2005 can be seen in Table 27.

Table 27: Drilling statistics

Year	Bores installed	Metres drilled
2005-06	37	1,984
2006-07	5	365
2007-08	79	6,125
2008-09	18	2,961
Total	139	11,435

The 2010 internal review

An internal review of the groundwater investigation program in 2010 reprioritised the remaining groundwater investigations and confirmed the lower priority of those programs scheduled for earlier completion but since put on hold.

The 2010 report prioritised projects by rating the groundwater resource against five factors, with each factor rated from low to high priority. These factors were:

- environmental water planning priority;
- regional priority;
- political priority;
- water resource assessment level of priority; and
- level of planning priority.

DoW considered that it obtained a similar result from this process to the priorities determined in 2005.

In our consultations with DoW, we have been advised that investigation projects are chosen on basis of:

- whether it is one of the priorities under the 5 year sub plan;
- the level of information or knowledge about water sources in the area; and
- opportunistic drilling - sometimes undertake drilling in areas where demand is anticipated to grow in the future (i.e. the area may become a priority area in the future).

Impact of external funding

DoW used external funding in this activity to both speed up planned work and undertake additional investigation projects. The work completed with external funding largely depends on purpose of funding, although DoW considered that it does not apply for external funding if not a departmental priority. As an example, external funding formed a significant proportion of the North Gnangara investigation project,

with the project expanded in scope due to the receipt of $1.35 million in funding from the Federal Government.

Effectiveness conclusions

DoW has detailed planning and prioritisation processes around developing its groundwater investigation, assessment and review plans. However, as for many other activities, this prioritisation process does not utilise cost-benefit analysis of the payoffs at the margin from undertaking further investigations. This cost-benefit analysis would allow explicit consideration of factors such as the value of drilling new bores relative to the value of allocating more investment to harness the knowledge from the network of existing bores through assessments and modelling.

DoW does not have any performance indicators to measure the 'value' and effectiveness of its groundwater investigations. While DoW may examine the benefits of individual projects (such as the additional allocation facilitated by the Cowaramup groundwater investigation), it does not systematically collect or prepare indicators to enable measurement of the value of the investigations to its allocation decisions or licensing decisions.

5.7.4 Efficiency

As part of our review, we sought to understand the processes and systems DoW has in place to develop its capital plan, to assess whether they are transparent and robust, and to confirm whether there is alignment between strategic objectives and investment priorities, incorporating customer and stakeholder requirements. In addition, we sought to understand whether the selection and delivery of the capital program had been optimised. Based on our review, it appears that there are a number of weaknesses within DoW's capital planning framework. This has resulted in significant budget over-runs on groundwater investigation projects.

Disparities between planned and actual costs

Since 2007-08, DoW has spent more on groundwater investigation than was planned in the 2005 plan (Table 28). This was principally due to a combination of two factors:

- The unforseen availability of additional external funding, which has allowed projects to be expanded. DoW advises that this allowed it to drill more bores at greater depth and undertake higher quality modelling and assessment. However, the actual quantum change in outputs attributable to the availability of additional external funding could not be defined in all cases; and
- A number of projects experienced budget over-runs, meaning that it cost more to deliver the planned outputs than was budgeted.

To understand the rationale behind the divergence between planned and actual expenditure, two projects reviewed by DoW in its 2010 review provide illustration: the Cowaramup and North Gnangara groundwater investigations. In both cases, DoW incurred significant expenditure over that proposed in the 2005 plan, with this expenditure shown in Table 29.

Table 28: Proposed and actual annual groundwater investigation expenditure

Year	2005-06	2006-07	2007-08	2008-09	2009-10
Proposed expenditure ($'000)	$915	$2,069	$1,995	$2,097	$1,961
Actual expenditure ($'000)	NA	$1,708	$3,460	$5,408	$2,707
Divergence from planned (%)	NA	-17%	73%	158%	38%

Source: Proposed expenditure data from *Groundwater investigation program in Western Australia (2005 to 2020).* Actual expenditure data from cost information supplied by DoW

Table 29: Groundwater investigation project costs ($000)

Groundwater investigation	Proposed Total[1]	Actual total	Proposed drilling	Actual drilling
Cowaramup	$591	$898	$347	$334
North Gnangara	$704	$3,315	$565	$2,030

[1]Includes drilling costs plus related project costs such as environmental approvals etc.

The increased expenditure for the Cowaramup investigation was due to an *extension of scope* to include groundwater age dating and modelling. Drilling costs were as planned, with only an 18-month lag between the estimates and the date of the drilling contract.

The variation associated with the North Gnangara project was considerably larger and represented budget over-runs as opposed to extension of scope. Final costs were over four times the initial estimate. DoW considered a number of factors accounted for this:

- an initial delay of two years associated with access permissions to the Yeal Reserve;
- preparation of an Environmental Management Plan at a cost of $25,000, not including staff time;
- the need for access improvement, costing DoW $600,000;
- unforeseen poor drilling conditions, requiring an additional $400,000 and delaying the project a further year; and
- increases in drilling costs of 25 per cent per year between 2006 and 2008.

While some of these factors are beyond the control of DoW, others (such as insufficient resourcing and the need for an Environmental Management Plan) might have been reasonably foreseen. In these instances, more robust project planning may have resulted in more realistic delivery timeframes and costing.

Conclusion

The consistent exceeding of estimated costs for groundwater investigations may be an indicator of either operating inefficiencies or an inability to plan and estimate costs accurately. In the case of the former, the efficient cost base would be lower than actual expenditure. In the case of the latter, while not highlighting inefficiency, it would undermine any attempt to perform cost-benefit analysis of a groundwater investigation. Unless the benefits were significantly above estimated costs, cost over-runs could potentially result in DoW undertaking inefficient projects.

5.8 Water information collection

5.8.1 Description

DoW collects quantity and quality information about surface water and groundwater resources through its network of surface water gauging stations and groundwater monitoring bores (the State Reference Network). The network comprises around 350 surface water gauging stations and approximately 3,000 groundwater monitoring bores located throughout the State.

Most of the expenditure is incurred in surface water information collection. In its submission, DoW estimates that 90 per cent of the costs are surface water related. The network utilises sophisticated instrumentation and telemetry to collect and download data. Data collection costs relating to groundwater are less, partly because some of the functions are costed under the 'groundwater investigation, assessment and review activity'.

Specific activities undertaken by DoW include site visits to gauging stations and bores, facility maintenance, instrument purchases and the recommissioning of gauging stations.

In its submission, DoW has allocated 21 per cent of the costs of the water information collection to water allocation planning. DoW did not allocate the remaining 79 per cent of expenditure under this activity to any of the services identified as being eligible for part or full cost recovery. In our efficiency and effectiveness analysis, we examine the entire costs irrespective of the fact that DoW has nominated less than 100 per cent for passing through to private beneficiaries.

In relation to surface water information, DoW determined that only 15 per cent of the cost of this activity was attributable to water allocation planning. This reflects the relatively low dependence on surface water resources for consumptive use in Western Australia. DoW allocated the remaining costs to services that DoW delivers for public benefit — i.e. addressing matters such as salinity, waterways management (nutrient loads, eutrophication, wetland and estuary management etc.), flood information and climate change.

In the case of groundwater information collection costs, DoW allocated 70 per cent of this expenditure to the 'providing water allocations and managing the ongoing use of water' service. This was done based on the results of a review contained in '*Improved groundwater resource management through better groundwater monitoring – a review of groundwater monitoring',* which identified that 67 per cent of the groundwater monitoring network contributed to groundwater assessment.

The water information collection activity excludes expenditure on the following related activities:

- *Water information management*: defined as the management of all water information collected by DoW as a central repository of major datasets, quality assurance and water accounting under the requirements of the *Water Act* (Cth) (the direct cost of this activity was $1,175,926 in 2008-09 and accounted for 16.7 FTEs).
- *Water information provision*: defined as the extraction and provision of water information for users, and the development of tools, maps and models for accessing and displaying information (the direct cost of this activity was $393,022 in 2008-09 and accounted for 5.3 FTEs).

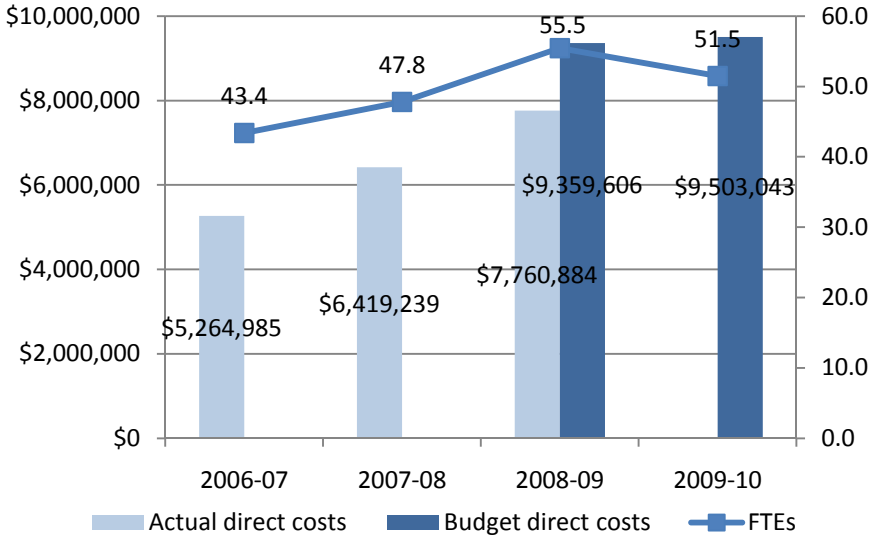
5.8.2 Cost of activity

In 2008-09, the direct costs of the water information collection activity were $7.8 million, accounting for approximately 17 per cent of direct costs detailed in DoW's submission. This expenditure included a significant capital component ($4.0 million in 2008-09). DoW receives external funding for information

collection activities. DoW staffed the activity with 55.5 planned FTEs in 2008-09, which equates to 19 per cent of DoW's FTEs assigned to water management and planning activities.

Total expenditure and FTEs for the water information collection activity have been increasing over the past three years (Figure 35).

Figure 35: Direct costs and full time equivalents for water information collection



Capital costs

The growth in expenditure is mainly a result of increasing capital costs.

The impetus for this capital expenditure was the Auditor General's 2003 report on the management of water resources in Western Australia, which noted that the agency then responsible for water management (the Water and Rivers Commission - WRC) considered that 90 per cent of Perth's groundwater had inadequate monitoring. The Auditor General also noted that the National Land and Water Resources Audit (2000) found that the WRC lacked the information necessary to manage 10 per cent of Western Australia's surface water sub-areas and 25 per cent of the groundwater sub-areas. As a consequence of these findings, priority was given to investing in an improved surface and groundwater monitoring network. Instruments for information collection were part of this upgrade program.

Since 2007-08, DoW has been receiving around $2 million in external funding annually from the Bureau of Meteorology for measurement program improvement. DoW is required to provide BoM with information under the *Water Act* (Cth). DoW has primarily used these funds for instrument upgrades and recommissioning gauging stations to enable DoW to meet the BoM's information requirements.

Operating expenditure

When external funding and capital expenditure are excluded from the analysis, it can be observed that operational expenditure has declined slightly since 2007-08 (Figure 36). Annual operating expenditure is in the order of $3.7 million.

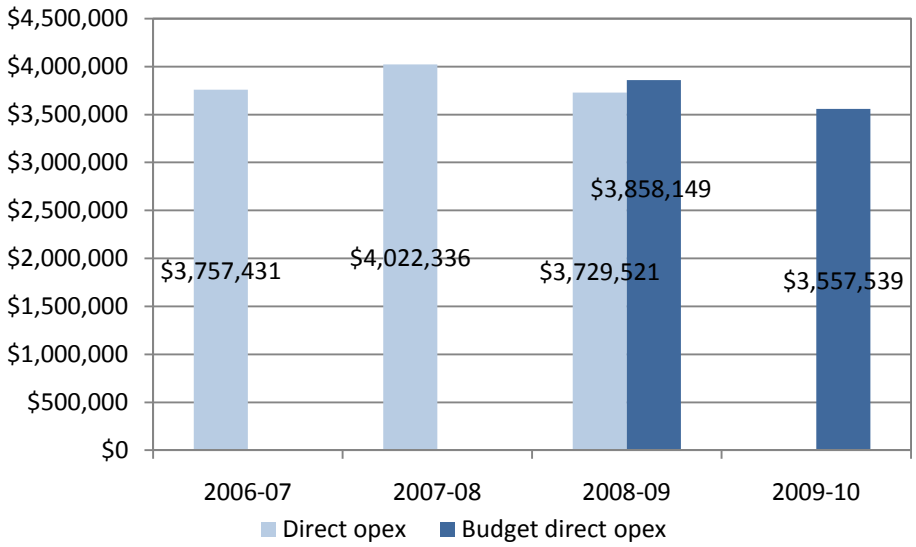
A large portion of the operational costs has been associated with a training and recruitment program developed to secure adequately trained staff to collect water information. This initiative was driven by the Auditor General's 2003 report on the management of water resources in Western Australia. DoW has

now reduced the training budget, with most of the trainee hydrographers retained and distributed to DoW's regional offices, increasing the number of trained FTEs.

Other operating expenditure includes:

- Visits to surface water gauging stations to take 'rating' measurements. DoW has historically undertaken 1.3 rating measurements per station each year compared to the three measurements required for good quality data. The average number of surface water flow measurements increased from one per year in 2003-04 to 1.8 in 2007-08 (Western Australian Auditor General (2009)). DoW has maintained this level of readings over the past two years;
- Visits to observation bores to take readings. DoW has increased the level of groundwater information that it collects. The Western Australian Auditor General (2009) found that the number of bore readings had increased, reaching an average of 5.3 readings per bore in 2007-08; and
- Preparation of strategic asset management plans and financial models to manage the monitoring network.

Figure 36: Direct operational costs for water information collection



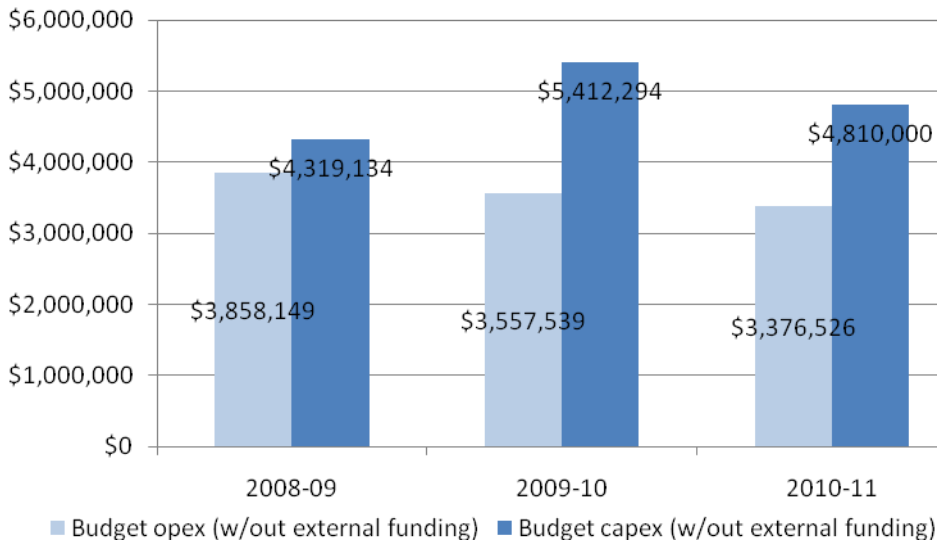
Budgeted forward costs

Budget operating expenditure is expected to decline slightly in 2010-11, continuing the downward trend since 2007-08 (Figure 37). This is in part associated with the winding back of the training and recruitment program. Budgeted capital expenditure varies from year to year largely because of carryovers in the capital replacement program. The constrained availability of contractors in Western Australia is causing delays in spending funds allocated to capital works.

Longer term, DoW anticipates that water information collection will continue to be a 'growth area' within its business as demand for water information will be driven by:

- population growth;
- a drying climate; and
- areas becoming closer to being fully allocated.

Figure 37: Budget for operational and capital costs for water information collection



In addition to the initially budgeted funds, a capital carryover from 2009-10 of $1,859,345 will be added to the 2010-11 budget.

5.8.3 Effectiveness

The frequency and quality of water information collection must align with the demand for such data and be sufficient to meet data needs in the future. As information is an 'enabler' of better water management, a key measure of DoW's effectiveness is whether the information is improving its decision making capacity, particularly with respect to water allocation planning, and the quality of its advice to customers. In order to assess 'effectiveness' against these criterion we have examined the extent to which investment in information collection activities are strategic, coordinated and integrated into the decision making functions of DoW.

Measurement and Monitoring Steering Committee

The Measurement and Monitoring Steering Committee is responsible for coordinating and prioritising collection, validation, and delivery of water information in line with departmental priorities. Under the terms of reference, the responsibilities of the Committee include:

- establishing and approving DoW's measurement plan to include components covering groundwater levels, surface water level and flow, flood warning, meteorological, water quality;
- establishing processes and governance for defining and changing the approved measurement plan;
- establishing rules around how measurement will be undertaken within DoW;
- reviewing how measurement is delivered across the state;
- reviewing budget expenditure on measurement and establishing what is being delivered for these resources; and
- ensuring there are appropriate communication forums for those delivering the function.

DoW advises that priorities for the water information collection activity are determined in consultation with the other departmental areas, most importantly with the allocation and ground water assessment branches. DoW then reflects the agreed plan in regional service delivery agreements.

We have also been advised that DoW has developed a strategic asset management plan for its State Reference Network and has recently completed a strategic financial model to undertake capital planning in the future.

Data collection and processing

Groundwater

DoW has a target of four readings per year for each bore. DoW considers that more frequent data collection allows better groundwater model calibration, which can be used to confirm aquifer performance and response to determine connectivity between aquifers and groundwater dependent ecosystems.

DoW has increased the level of groundwater information that it collects. The Western Australian Auditor General (2009) found that the number of bore readings had increased, reaching an average of 5.3 readings per bore in 2007-08. The Auditor General also found that processing times of collected groundwater data improved from 35 days in 2003-04 to 25 days in 2007-08.

DoW must also select which bores it will monitor. In 2009, DoW reviewed the 9,000 groundwater bores owned by DoW. Using results from the review, DoW ranked and prioritised areas for their groundwater monitoring needs. DoW considered the Swan Region to be the highest priority in the State, followed by the South West, Mid -West (Geraldton and Carnarvon), Pilbara, Kimberley and then the South Coast region. DoW selected 2,461 bores for inclusion in the Groundwater Assessment Network, with DoW to assess another 586 bores to determine exclusion. DoW also proposed 194 bores for removal from the network based on overlap with water supply bore fields.

Surface water

The average number of surface water flow measurements increased from one per year in 2003-04 to 1.8 in 2007-08 (Western Australian Auditor General (2009)). DoW has maintained this level of readings over the past two years. DoW aims for three rating measurements per year necessary for accurate data extrapolation. The Auditor General noted that although improved, surface water information collected by DoW still lacks accuracy and timeliness. The NSW Office of Water conducts an average of 3.5 gaugings per site and is aiming to increase this to 6 per site, consistent with national standards (NSW Office of Water 2009).

Further, the Attorney-General noted that DoW still had not determined whether surface water measurement network was sufficient for its information needs. In response to this, in August 2009 DoW completed a strategic review of the surface water monitoring network. The review determined the desired surface water monitoring sites and reasons for monitoring as well as a set of recommendations. Further reviews of the network are in progress to determine whether the network meets Departmental priorities.

Water information customers

A broad range of customers uses DoW's water information, including:

- private users;
- internal users; and

- local and Commonwealth Governments.

Private users make approximately one third of the requests for information collected by DoW. Based on survey information DoW estimated that the information provided to private companies was worth $30 million, helping to generate around $1 billion of new projects. Individuals also used water information. For example, landowners may request information to check groundwater levels in the area or the risk of flooding.

Another one third of the requests for water information are internal. The information supports modelling work and allocation and environmental planning activities. Common purposes where the information is used include (Aquaterra, 2009):

- water resource assessment;
- flood studies;
- waterways and drainage management;
- salinity management;
- water source protection; and
- infrastructure planning and urban water management.

The main water information users at the Commonwealth level are the Bureau of Meteorology and the CSIRO. DoW is obliged to provide ongoing water information to the Bureau of Meteorology under the *Water Act 2007*. The CSIRO has used DoW's data to undertake national water assessment similar to the assessment completed for the Murray Darling Basin.

5.8.4 Efficiency

Performance indicators used within DoW for the water information activity include:

- number of surface water gaugings (physical measurements) a year;
- number of days taken for surface water calculations; and
- number of bore readings.

Gaugings

The number of surface water gaugings increased from 391 measurements in 2006-07 to 580 measurements in 2009-10 (Table 30). While DoW achieved this increase in readings with a steady operational budget, indicating efficiency improvements, there would expect to be some efficiency gains from the capital expenditure and externally funded projects undertaken by DoW.

Table 30: Number of gaugings per year

Year	Number of Gaugings
2006-07	391
2007-08	574
2008-09	616
2009-10	580

Following a two-year trial, in April 2010 DoW developed a proposal to implement Internet Protocol telemetry to allow data transfer directly from a gauging station to a regional server. DoW assessed the costs of the proposal against savings from reduced staff requirements for metering and determined that savings would cover the proposal costs within one year. If implemented, DoW expects that the operational cost of future gaugings would decline (although there would be some offsetting operational costs in maintaining this new equipment).

Data processing times

Once DoW conducts the gaugings, DoW processes the data to calculate water information. There has been a significant reduction in time taken for calculations over the last four years. The average time for trace calculations has reduced from 413 days in July 2006 to 284 days in May 2010, short of DoW's 183 day target. The average time taken for development of ratings curves (the relationship between flow and height) calculations dropped from 1253 days in July 2006 to 691 days in May 2010, compared to a target of one year. These improvements build on those noted by the Western Australian Auditor General (2009).

Groundwater bore readings

The number of bore readings each year has increased moderately over the last three years (Table 31). As for gaugings, the number of readings is consistent with the level of operational expenditure.

Investment in technologies such as data loggers has the potential to reduce significantly the cost of bore readings to DoW and to obtain higher frequency bore data. However, DoW plans to carry out further cost benefit analysis to determine whether the increased data frequency justifies the capital costs associated with installing data loggers. Completion of this cost benefit analysis is required to determine the most efficient approach to collection.

PwC notes that the NOW is currently installing telemetered data loggers at 206 groundwater sites across NSW and establishing an internet interface that will allow NOW to monitor groundwater levels in real time (NSW Office of Water, 2009)

Table 31: Number of bore readings per year (of bores owned by DoW)

Year	Number of readings
2007-08	16,547
2008-09	16,837
2009-10	17,188

Conclusions

This activity forms a large part of DoW's business, currently accounting for about 17 per cent of its total direct expenditure on water management and planning functions identified in its submission. There is a clear need for ongoing investment in this activity – both in terms of upgrading monitoring sites with the equipment needed to facilitate accurate water quality and quantity measurement, and in terms of the ongoing maintenance of these assets.

It is apparent that DoW is beginning from a relatively low base in regards to the level of monitoring it has done in the past, so the investments it is currently making represent 'catch up' to put DoW on a footing recognised as national best practice.

DoW has demonstrated that it is beginning to put in place a number of strategic planning processes to assist with the prioritisation of investment in capital upgrades, rationalisation of the State Reference Network and ensuring that the frequency of information from monitoring sites meets customer needs.

The investment in new data loggers should yield efficiency improvements in this activity, and it would be expected that this be reflected in future operational costs – as there should be less requirement to visit sites. Trends in operational outputs such as the number of readings and gaugings and time for the processing of information all show improvement against declining operational cost, indicating improving efficiency.

As with other areas of DoW's business, improved performance indicators would be beneficial to monitor the agency's effectiveness at using water information for better water management decisions and the quality of its plans. The linkages between the water information collected, its quality attributes and the pay-offs of investment in this activity through better decision making are not sufficiently transparent to be definitive about DoW's effectiveness and efficiency in this area.

5.9 Water allocation planning

5.9.1 Description

DoW prepares water allocation plans to determine the amount of water that can be taken by water users in groundwater and surface water management areas around the State (i.e. allocation limits). DoW sets limits to maximise the amount of water available for consumptive purposes while leaving enough water to ensure sustainability of the resource and protection of in-situ volumes. Allocation planning involves deciding how much water can be taken for consumptive uses while leaving enough water in the environment to meet ecological, recreational and cultural needs.

In addition to setting allocation limits, the plans identify water resource management objectives, specify licensing policies and rules, and identify management triggers and responses. They include measures to ensure that the 'take' of water by users does not affect other users and that the reliability of water supplies for future years is taken into account. Thus, the plans have the objective of ensuring:

- security of supply for individual users;
- that users do not impact unacceptably on each other or the environment; and
- that the viability of the resource is maintained for future years.

It is important to note that allocation planning should allow efficiencies in other areas of DoW, such as licensing and trade approvals, by providing a sound framework for making regulatory decisions.

In areas where there are many small and medium scale users, such as the South West, DoW undertakes most or all of the work to support planning. Where use is isolated (such as the central Pilbara) or in areas dominated by one or two large private users (such as water service providers), DoW requires the private users to undertake a high level of investigation of their proposed water use and resource management. In these cases, DoW retains responsibility for determining the water availability but the management obligations are imposed on users through licence conditions.

Plans are developed under the rights in *Water and Irrigation Act 1914*. Under this legislation, DoW is responsible for setting allocation limits in all aquifers and catchments of proclaimed management areas. Section 4 of the R*ights in Water and Irrigation Act 1914* lists the objectives of the preparation of allocation plans. These include:

- to provide for the sustainable use and development of water resources to meet current and future user needs;
- to promote the orderly, equitable and efficient use of water resources; and
- to assist the integration of the management of water resources with the management of other natural resources.

There is a legislative requirement to review allocation plans every seven years.

The form and content of water allocation plans is also guided by the principles set out in the NWI, to which the Western Australian Government is a signatory (as at 2006). In the NWI, it is recognised that water allocation plans are fundamental to effective water management. Clause 25 lists the outcomes that are to be delivered through effective water planning. Clauses 36 to 40 set out the actions that signatories agree to undertake with respect to planning. Schedule E provides guidance on what plans should contain. DoW has advised that it 'aims to achieve the intent of Western Australian and Australian Government water reforms as far as possible under current legislation'.[11]

Under current legislation, once plans are completed, they do not attain the status of a statutory instrument – which is contrary to requirements under the NWI. In the National Water Commission's second biennial assessment of progress in implementation of the NWI, published in 2009, it was noted that: "Western Australia has improved its water planning with the aim of delivering key outcomes of the NWI within the existing legislative framework. However, Western Australia is yet to prepare legislation to enable statutory water plans and deliver the complete set of outcomes promoted by the NWI. Continuing delay in the passage of this legislation will prevent Western Australia from meeting its commitment to have all scheduled plans in place by 2011."

Supporting activities

Our analysis focuses on the core functions undertaken by DoW to prepare a plan. This includes

- project management of the planning process;
- the sourcing, commissioning and coordination of information needed for plan development;
- the setting of priorities for water allocation plans;
- drafting the plans; and
- stakeholder consultation

The costs presented below do not include related, supporting activities such as environmental water planning, surface water and groundwater assessment, water information collection or water information management.

[11] Department of Water (2009) Economic Regulation Authority inquiry into water resource management and planning charges – Response to the Issues Paper, June 2009.

5.9.2 Cost of activity

In 2008-09, the direct cost of the water allocation planning was $2.8 million, accounting for approximately 6 per cent of the direct costs detailed in DoW's submission. There are no capital costs incurred in this activity. Approximately one third of the cost of water planning in 2008-09 was met with external funding from the Commonwealth Government (DoW has received three years of funding from the National Water Commission's Watersmart Australia program, commencing 2007-08).

The activity has a planned staff complement of 16.2 FTEs (in 2008-09), which equates to 6 per cent of the FTEs assigned to water management and planning activities identified in DoW's submission. However, DoW is finding it difficult to recruit staff with the necessary skills to prepare plans. Consequently, only 49 per cent of FTE positions were filled over the past year. This explains the gap between budgeted and actual expenditure in 2008-09.

Expenditure on water planning has substantially increased over the four years since 2006-07 (Figure 38). This has been partly due to the success in securing funding from the Commonwealth. It also reflects the priority assigned to improving the coverage of water allocation plans across the State. The Western Australian Government has also increased its funding of this activity, as shown in Figure 39 in which external funds are netted off the costs. DoW has attained two years of funding (for 2008-09 and 2009-10) through two new resource proposals, which is being used to complement the funds received from the Commonwealth.

Figure 38: Direct costs and full time equivalents for water allocation planning

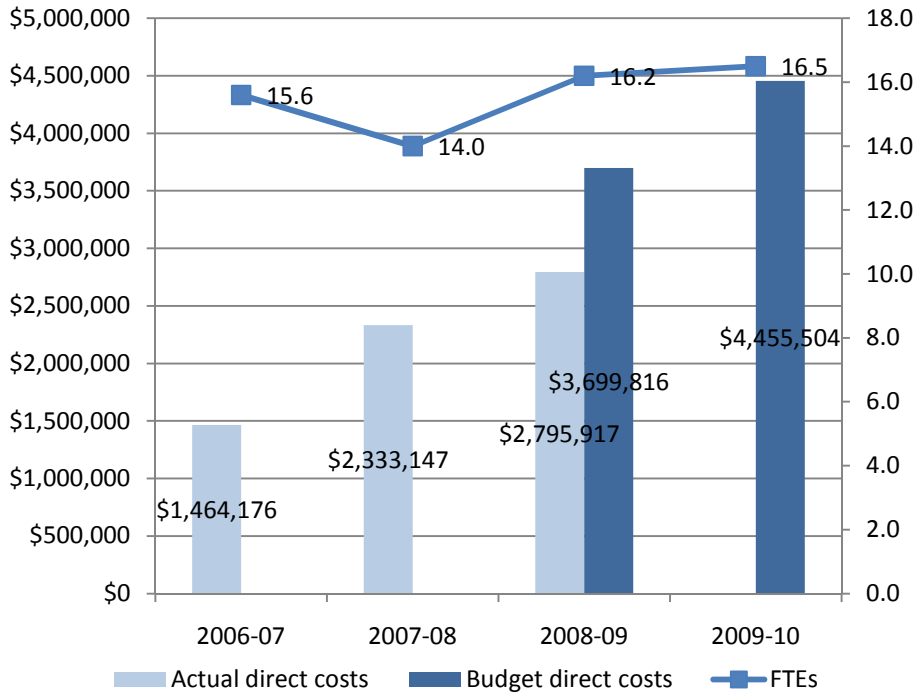
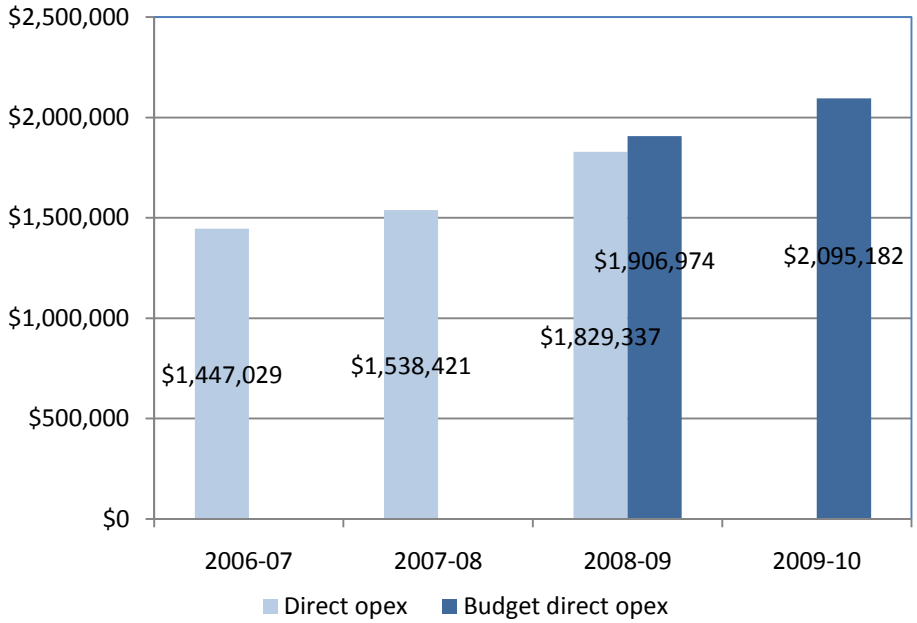


Figure 39: Direct costs (excluding external funding) for water allocation planning



Achievements over the past three years

There has been a marked improvement in the proportion of management areas that have been planned "appropriately to their water resource category."[12] In budget papers it is reported that in 2007-08 only 48 per cent of management areas had appropriate water management plans. This figure has risen to 60 per cent in 2009-10.

Prior to 2006-07, very few water allocation plans were being developed. The 2003 Western Australian Auditor General's *Second Public Sector Performance Report* found that 17 out of 24 groundwater allocation plans were out of date; with a further three to expire in 2004. The Auditor General also noted that the Water and Rivers Commission (WRC) had developed only two surface water plans.

Since 2006-07, with the increased investment targeted to this activity, the number of plans being drafted and finalised has increased substantially (Table 32). Dow completed fourteen plans over the four years to 2009-10. DoW has advised that these plans are also prepared to a higher quality standard. DoW has largely used the external funding to increase level of detail in the plans completed.

By 2008, DoW had reduced the number of out-of-date plans to one and had increased the annual plan completion rate from two in 2003 to eight in 2007-08.

[12] A performance indicator that has been calculated by DoW since 2007-08.

Table 32: Number of plans and published reports completed

Year	Draft plans for public comment	Final plans	Total published reports (including plans)
2004-05	0	0	0
2005-06	2	0	3
2006-07	2	2	6
2007-08	5	3	10
2008-09	1	2	4
2009-10	6	7	18
2010-11 (target)	6	4	11

Source: Department of Water

Budgeted forward costs

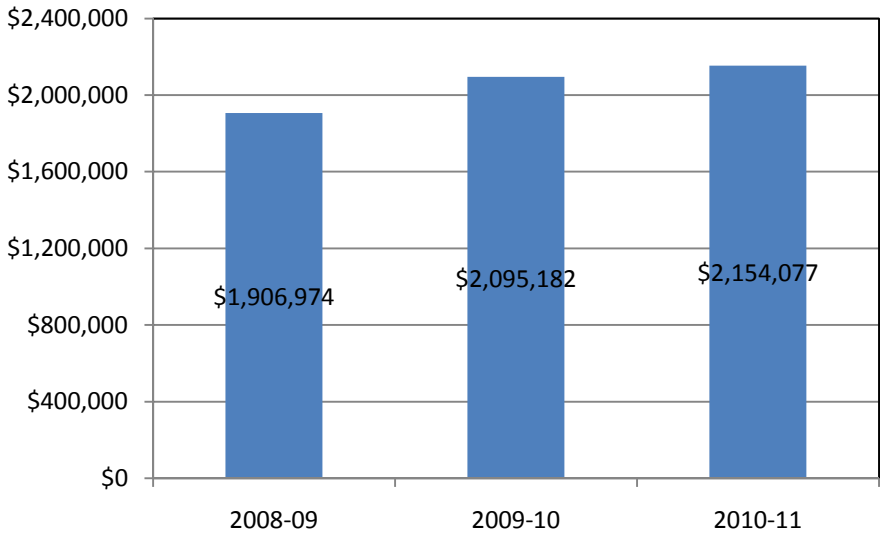
The budgets for direct costs for 2008-09 to 2010-11 are shown in Figure 40. Before external funding, DoW's budget allocation to this activity is approximately $2 million per year. External funding from the Commonwealth will cease in 2010-11, thus reducing budgeted expenditure from $4.5 million in 2009-10 to just $2.1 million in 2010-11.

The reduction in forward expenditure is not consistent with the outstanding demand for water allocation plans. Despite the increase in the number of plans completed, there are still some plans outstanding and a deficit in the adequacy of allocation plans for some areas. The Auditor General (2009) found that allocation plans for nine of 16 groundwater resources with over 70 per cent allocation were inadequate, with six of those inadequate plans being for areas with over 100 per cent allocation.

The budget papers indicate that as at 2009-10, only 60 per cent of water resource management areas have an adequate water allocation plan, which implies that DoW still has some way to go to achieve its NWI target of achieving adequate planning for all management areas.

DoW has advised that the major constraint on completing further plans was staff rather than funding availability, with any further applications for external funding being dependent on the availability of staff to conduct the work.

Figure 40: Budget for direct costs (without external funding) for water allocation planning



5.9.3 Effectiveness

Our assessment of DoW's effectiveness in developing water allocation plans examined a number of factors:

- Is DoW using a strategic framework to prioritise areas for planning and to determine the level of planning sophistication required?
- Is DoW achieving the targets that DoW sets for completing plans? and
- Are the plans meeting the legislative requirements and expectations of water users?

Strategic framework

A blueprint for water reform in Western Australia (2006) recommended how DoW should prioritise water management plans, with criteria including:

- that the water source is under significant pressure due to use of the resource, particularly where over-allocated;
- that the water resource is at risk as a result of demand;
- that there are significant benefits in proactive planning to preserve environmental and social values;
- where the benefits of more secure water access entitlements and water trading can be easily realised; and
- where existing non-statutory plans can be easily converted into statutory water management plans.

The Western Australian Government supported the recommendations.

A framework for determining plan complexity

DoW has developed a 'risk-response' framework for determining the appropriate level of planning detail for different classes of water management areas (Table 33). The classes (C1 to C4) are defined on the basis of the degree to which the water source is allocated and the associated level of risk to users and the environment if water extraction was to increase.

With reference to Table 29, the level of effort assigned to a water plan is a function of the resource management category (C1 to C4) and the choice of risk response. However, DoW expends no extra effort into an R4 plan. Instead, an R3 plan is developed and a recovery approach incorporated into that plan.

Table 33: Risk response for water allocation planning activity

Risk Category		Risk Response	
C1	Relatively low use, 0-30% of allocation limit used Low risk to environment Low consequences of current and short-medium term use	**R1**	Allocation limits reviewed and updated within the last ten years in line with rainfall and recharge data and available resource information
C2	Medium use, 31-70% of allocation limit used Medium risk to assets and users, or medium consequences if use changes Potential to jump quickly to high use	**R2**	Allocation plan based on the most current investigation and assessment work Risk based allocation limit maximises water availability while protecting in situ values at a broad scale
C3	High use, 70% to less than 100% allocation limit used High risk or high consequences if level of use increases without improvements to management	**R3**	Allocation plan based on newly commissioned investigation and assessment work Plan applies State-wide policy on a local scale and specifies new local area policy to manage impacts between users and the in situ values
C4	100% or greater than 100% allocation limit used (fully or over-allocated) for any management area in a plan area	**R4**	A recovery approach specified within an R2 or R3 plan for management areas that are over-allocated Level of recovery response depending upon the circumstances

Source: Quantum Consulting (2010)

2010 Strategic Plan

In February 2010, DoW prepared a revised Strategic Plan for water allocation planning. Actions noted in the plan included the need to complete allocation plans for highly allocated and over-allocated areas and to revise allocation limits in all areas to underpin a level of management appropriate to the risk class of each management area. DoW maintains and regularly reviews its schedule of allocation plans in the light of these priorities and has selected its 2010-11 priorities on this basis.

Meeting of targets

The *State Water Plan 2007* set out what DoW then considered were the priority Statutory Water Management plans, together with an approximate timeframe for completion. In most cases, plans were expected to take four years to develop. The proposed schedule is documented in Table 34, together with a summary of actual delivery of plans against this timeline.

Table 34: Schedule of allocation plans proposed in *State Water Plan 2007*

Plan	Proposed timeframe	Actual timeframe
South West Groundwater Area Water Management Plan	2007-08	Completed 2009
Whicher Surface Water Areas Management Plan	2007-09	Completed 2009
Collie Surface and Groundwater Areas Water Management Plan	2007-09	Upper Collie Allocation Plan completed 2009. Lower Collie area plans - high priority
Canning River Surface Water Management Plan	2007-08	In preparation – medium priority
Albany Groundwater Area Management Plan	2007-08	Pre-planning – low priority
Pilbara Surface and Groundwater Areas Water Management Plan`	2008-10	In preparation – high priority
Serpentine Groundwater Area Management Plan	2007-08	Not progressed
Perth South and Jandakot Groundwater Area Management Plan	2007-10	Not progressed
Gnangara Statutory Water Management Plan	2007-09	Completed 2009

As can be seen, DoW has commenced or completed seven out of the nine plans identified in the 2007 State Water Plan. However, DoW has completed only four, as most plans have taken longer to complete than planned. In some cases, DoW has lowered in the priority of plans.

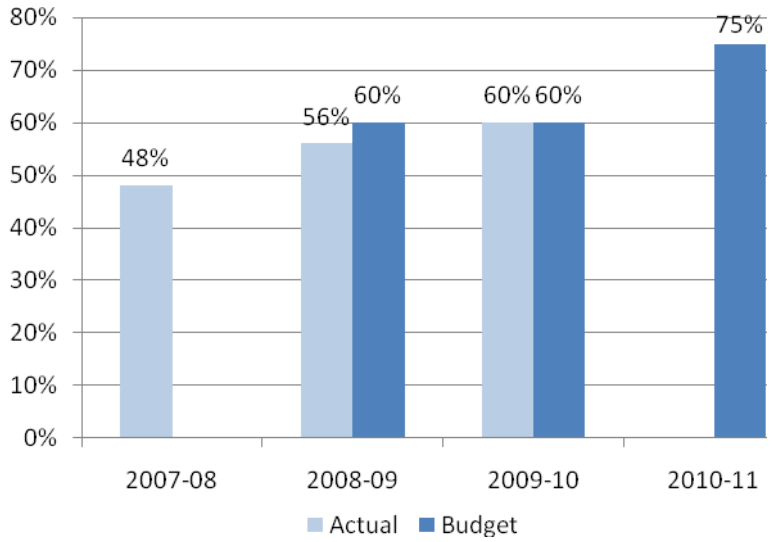
DoW has advised that one of the reasons for the delays is that the detail and quality of the plans have increased considerably relative to what DoW originally planned. The availability of Commonwealth funding made this possible.

The Western Australian Auditor General's *Public Sector Performance Report 2009* found that the prioritisation process DoW had undertaken and the increased plan completion rate has resulted in significant improvement.

Figure 41 shows that the proportion of water resources planned appropriately has increased since 2007-08. The planned increase to 75 per cent in 2010-11 reflects the anticipated completion of a further nine water allocation plans appropriate to their water resource category.

DoW also reports the number of licensed allocations that are within the allocation limit (i.e. areas that are not classed C4). This measure has remained, as targeted, relatively constant at around 85 per cent.

Figure 41: Proportion of water resource management areas planned appropriate to their water resource category (Budget papers)



Adequacy of plans

Of the plans that DoW has produced, indicators of their adequacy could include whether they meet customer demands and expectations and whether they are consistent with the NWI. These relevant sections of the NWI that relate to water allocation planning are clauses 25 and 35 to 40. With reference to Figure 42, Clause 25 of the NWI sets out the fundamental 'qualities' and requirements of water plans for the purpose of effective water management. At minimum, plans are expected to remove ambiguity with respect to water allocation shares between environment and consumptive use and provide satisfactory guidance and rules on how water allocations should vary under different circumstances – for example, drought, new 'science', changing land use etc.

It is beyond scope of this review to assess the extent to which DoW's plans comply with the NWI principles.

Figure 42: Clause 25 of the National Water Initiative

25. The Parties agree that, once initiated, their *water access entitlements* and planning frameworks will:

i) enhance the security and commercial certainty of water access entitlements by clearly specifying the statutory nature of those entitlements;

ii) provide a statutory basis for *environmental and other public benefit outcomes* in surface and groundwater systems to protect water sources and their dependent ecosystems;

iii) be characterised by planning processes in which there is adequate opportunity for productive, environmental and other public benefit considerations to be identified and considered in an open and transparent way;

iv) provide for adaptive management of surface and groundwater systems in order to meet productive, environmental and other public benefit outcomes;

v) implement firm pathways and open processes for returning previously overallocated and/or overdrawn surface and groundwater systems to *environmentally-sustainable levels of extraction*;

vi) clearly assign the risks arising from future changes to the consumptive pool;

vii) in the case of water access entitlements, be compatible across jurisdictions to improve investment certainty, be competitively neutral and to minimise transaction costs on water trades (where relevant);

viii) reflect regional differences in the variability of water supply and the state of knowledge underpinning regional allocation decisions;

ix) recognise indigenous needs in relation to water access and management;

x) identify and acknowledge surface and groundwater systems of high conservation value, and manage these systems to protect and enhance those values; and

xi) protect the integrity of water access entitlements from unregulated growth in interception through land-use change.

Case study in determining allocation limits in the Manjimup area

The Authority commissioned Resource Economics Unit to undertake a case study into water allocation in the Warren and Donnelly river basins. The case study included an assessment of whether the activities undertaken by DoW in determining allocations are appropriate and efficient (Thomas (2010)).

The study concluded that DoW's allocation planning system gave priority to the appropriate areas, which resulted in a more efficient outcome than had all areas been treated with similar effort. It was also concluded that the level of cost incurred in the Warren-Donnelly basins were commensurate with the economic and environmental values at risk in the area.

Qualitatively, Thomas stated that it was difficult to see how allocation limits could be set without the thorough assessment that had been undertaken. On a costs basis, Thomas compared an estimated annual value of irrigation water in the basin of $13 million to the $0.13 million in annual costs incurred by DoW (of which half was assumed to be for public interest purposes). As a result, any costs incorporated into licence fees would be a very small portion of the value of the water. Thomas also considered that increased allocation limits of 13,503 ML across the basins, with an estimated value of $6.75 million per year, compares favourably to the scale of the costs.

5.9.4 Efficiency

DoW has assembled cost information pertaining to each of the 21 water allocation plans it has developed over the past 10 years. This information is presented in its submission to the Authority on pages 49 to 53. Cost information for the period 2006-07 to 2009-10 is used to calculate the plan costs. For those plans that commenced prior to 2006-07, average annual costs incurred post 2006-07 in developing the plan is extrapolated to the years in which cost information is not available.

DoW presents the results of this analysis for each individual plan. We have summarised this information further by calculating the average cost of plans developed for each of two risk categories (R2 and R3) noting that no plans have been developed for R1 areas. Twelve and 9 plans have been developed, respectively, for R2 and R3 categories. The costs include 'water allocation planning' activity costs and 'environmental water planning' activity costs, but exclude supporting activities.

With reference to Table 30 it can be seen that R3 plans cost, on average, $1.39 million each – although there is considerable variation around this estimate, ranging from $0.31 million to $3.14 million. R2 plans are much cheaper to develop, averaging $0.33 million each. Again, there is considerable variation around this estimate, with the most expensive being $1.2 million and the least expensive being $0.1 million. DoW attributes the high variance in costs within categories to the widely different scope and complexity of the water resources and the level of investigations required. It is not possible to determine whether some of the variation is due to differences in efficiency in planning process.

Table 35: Average cost of developing allocation plans, by risk category – 2000-01 to 2010-11 ($million)

	R1	R2	R3
Number of plans completed	Nil	12	9
Average cost	NA	$0.33	$1.39
Lowest cost	NA	$0.10	$0.31
Highest cost	NA	$1.20	$3.14

Source: Table developed based on information contained in the DoW's submission to the Authority, pages 49-53 (some costs updated in subsequent communications with DoW.

As time goes by, DoW should become more efficient at preparing water allocation plans, as some processes could be streamlined and efficiencies would be gained with greater familiarity with the process. However, there is only limited time-series information on the cost of completing successive plans. The budget papers contain some estimates of planning costs based on a three year rolling average. This shows that, for the short time period for which data is available, the average cost per allocation plan is relatively stable (Table 36). The estimated average cost in 2009-10 was significantly below the budget for that year.

Table 36: Average cost per allocation plan completed (three year rolling average) (2008-09 Budget papers)

	2008-09	2009-10	2010-11
Budget	$1,309,950	$1,916,626	$1,405,951
Actual	NA	$1,424,480 (estimated)	NA

When benchmarked against NOW, DoW has a slightly higher cost per FTE engaged in the water allocation activity (when external funding is included) (see section 6.2). DoW's cost per FTE for water allocation planning is $218,879, compared to NOW's costs of $204,411 per FTE.

Of the external funding obtained, DoW advised they generally supplemented plan quality with this funding rather than accelerated completion of other allocation plans. This raises the question of whether this expenditure is efficient, with the additional funding not used for work previously identified as requiring completion. This focus on improved quality is reflected in some plans remaining behind schedule despite the increased funding.

As for many of the other activities, expenditure on allocation planning by DoW could benefit from cost-benefit analysis of whether expenditure on additional quality is delivering value at the margin.

Conclusions

DoW's expenditure on the allocation planning activity has undergone a significant increase over the period examined in this report. The increased expenditure has been matched by an increase in the number of plans produced and the quality of plans produced.

Despite this increased output, completion of many plans remains behind schedule, and as was noted by the Western Australian Auditor General (2009) and the National Water Commission's second biennial assessment (2009), plans for some areas are not yet at the required standard. In this case, it must be asked whether this funding is being directed to the most efficient use or whether the original prioritisation was appropriate.

As indicated in the case study by Resource Economics Unit, the allocation plans that DoW is preparing are probably delivering benefits in excess of costs. However, in the absence of cost-benefit analysis of the benefits of additional plan quality on the margin, there is inadequate information to confirm that the level of expenditure by DoW on this activity is efficient.

6 Benchmarking

6.1 Introduction

This chapter presents the results of a benchmarking analysis performed to assist in assessing the efficiency of DoW's water resource management and planning activities.

Purpose of benchmarking

In setting prices, the Authority must establish that the operating and capital costs incurred by DoW are efficient. The Authority may determine costs by reference to actual costs previously incurred by DoW, or a review of forecast costs for the regulatory period.

In regulatory processes, a benchmarking approach is typically used to assess the technical efficiency of a regulated business' activities. It is generally assumed that the regulated business will employ ground up or performance improvement assessments to improve the efficiency of service delivery. These assessments consider not only the costs of inputs, but the way in which activities are undertaken and the potential to improve their delivery (e.g. by changes to business processes or the adoption of new technology).

PwC uses benchmarking in this chapter to ascertain whether DoW has comparable input costs to other water resource management agencies for like activities.

Approach to benchmarking

Benchmarking of water management activities/costs can be undertaken at various levels:

- at an aggregate level, for instance, by comparing DoW's total costs in undertaking water planning and management activities with the costs incurred by other jurisdictions in undertaking similar activities;
- at a functional or output level, such as comparing the costs involved in preparing a 'typical' water allocation plan with the costs incurred by another jurisdiction in the preparation of a similar water plans; and
- at an activity level, by breaking down functions/outputs into more generic sub-activities, and then comparing DoW's costs against those of comparable activities. These may be completely unrelated to water planning and management activities, but have other general similarities to the specific sub-activity in question.

PwC explored possibilities for adopting each of the above approaches; however, PwC encountered a range of practical difficulties.

Primarily, finding reasonable and relevant comparator organisations, functions and activities has been difficult. While all state and territory governments and some water businesses undertake water resource management activities, the type and mix of activities undertaken to deliver services can vary. This reflects the unique water resource management issues in each state, as well as the varying legislative/regulatory requirements and policy responses adopted and subsequently the planning and management processes in place.

These variations are most apparent at the aggregate/functional level. For example, in water resource planning processes where the types of activities, level of effort and types of outputs can vary significantly between jurisdictions. Such variations persist down to the more detailed functional and activity levels,

although there are some activities that can be considered to be more similar than others (e.g. licence transaction processing and administration).

Many jurisdictions do not collect and report water resource management activity cost data in a form that can be used for a benchmarking analysis (often reflecting system limitations). Where this data is collected, some jurisdictions will not allow it to be used in a benchmarking analysis. Where data is available, it is often specified differently (e.g. activity codes vary, different levels of aggregation / disaggregation) which makes the comparison of the costs of activities between jurisdictions difficult.

Activity cost data can also vary from year-to-year reflecting the priorities of the water management agency (and broader whole-of-government budgets), planning cycles (i.e. review of water resource plans) and the provision of special and external funding for specific projects. This makes the estimation of 'typical' benchmark costs difficult.

This benchmarking analysis has focused on comparing a selection of DoW's activities with those of the NOW. Disaggregated cost data are available for NOW's 41 activities, as this agency was recently subject to a pricing review by the Independent Regulatory and Pricing Tribunal (IPART). This benchmarking analysis has sought to identify costs for discrete, 'like' activities undertaken by the two agencies. The base year for the analysis is 2008-09.

NOW's cost data for activities of an operational nature include:

- direct costs; and
- a share of overhead costs.

and exclude:

- capital costs, unless otherwise specified (NOW has separate activity codes for capital projects such as meter installation and its network of observation bores. Separate activity codes are used to represent the operational costs these programs); and
- external funding.

The activity cost information published by NOW in its submission to IPART for the 2010 pricing review excludes external projects and the output levels reported by NOW have been, to the extent possible, adjusted to reflect this (IPART requires externally funded projects to be filtered out of the regulated cost base). The cost and output information published by DoW includes external funding and it is difficult to separate the outputs attributable to external funding and those attributable to internal revenue sources. Owing to the difficulty of establishing benchmark costs that use common treatment of external funding, two benchmarks were calculated for DoW — one with external funding included and the other without.

As part of the analysis, we have also reported two FTE numbers for each of DoW's benchmarked activities to reflect the proportion of staff positions funded with and without external funding.

Activities selected for benchmarking

Benchmarking analysis was performed for the following activities:

- water allocation planning;
- environmental water planning;
- water metering;
- information collection and management;
- water licence transaction processing, licensing administration and compliance; and

- corporate support activities (a component of overheads).

The results of this analysis for each activity are presented below.

Interpretation of benchmarking results

Care needs to be taken in interpreting the benchmarking results. The benchmarks presented below are comparisons of unit input costs as opposed to cost per unit of outcome delivered. Therefore, no allowance is made for differences in the standard of outcomes delivered. For example, the effectiveness of the compliance system at reducing water theft, the turnaround time for processing transactions or the quality standard to which meters are maintained. Notwithstanding this, if one agency has a comparatively high unit input cost for an activity, this would signal the possibility that the agency is performing the activity inefficiently – all else being equal. Further investigation would then be needed to determine the cause of the high unit costs and to check whether higher quality outcomes are responsible for the higher costs.

Another limitation of the benchmarks presented below is the possibility that both agencies are performing equally poorly. That is, if unit costs of DoW are approximately the same as NOW, this does not necessarily mean that DoW is efficient. The comparison of these benchmarks against external benchmarks (for example, non-water agencies) and the results of ground-up cost efficiency assessments would be required to cross-examine the overall efficiency of DoW's activities.

It must also be remembered that the benchmarks represent 'point in time' estimates of input costs. A longitudinal assessment of benchmarks over time would be more instructive to understand how DoW ranks against other agencies. Unfortunately time series data could not be obtained for this analysis.

6.2 Water allocation planning

DoW develops water allocation plans to determine the amount of water that can be taken by water users in groundwater and surface water management areas around the State. This involves the following activities:

- developing standard processes for water allocation planning;
- project managing water allocation processes;
- sourcing, commissioning and coordinating information needed for planning;
- setting the prioritising program for water allocation plans;
- drafting of plans; and
- stakeholder consultation.

The equivalent activities for NOW are those relating to water sharing plan development, involving:

- interagency and stakeholder negotiations relating to development of water sharing provisions policies;
- preparation of statutory documentation preparation of initial implementation programs for each water sharing plans;
- detailing deliverables and associated timetable post commencement scientific and socio-economic studies required to support water sharing plan development; and
- spatial data layer compilations and cartography.

As the costs of these activities are mostly determined by labour inputs, PwC undertook benchmarking against FTEs numbers (Table 37).. The FTEs used for the DoW benchmark are 'planned' FTEs. We know for water allocation planning that actual FTEs dedicated to this activity are substantially less (a 49 per cent vacancy rate existed in 2009-10). However, this overstates the staffing shortfall relative to planned resourcing because DoW substitutes some of its vacant positions with support staff, which form part of the internal branch support cost pool. For this reason, we have opted to use planned FTEs for the purpose of calculating the benchmark.

Table 37: Comparison of water allocation planning costs (2008-09)

	DoW		NOW
Base data	**Without external funding**	**With external funding**	
Actual cost including overheads	$2,458,496	$3,545,836	$5,229,928
Number of plans completed in period 2005-2009	—	14	14
Number of FTEs	15.2	16.2	26.6
Analysis			
Cost per FTE	$161,743	$218,879	$204,411

Despite a large variation in aggregate expenditure for water allocation planning activities by each department, cost per FTE is approximately equivalent, with DoW having a slightly higher cost per FTE when external funding is included.

In order to provide an indicator of the size of the water planning program being undertaken by each agency, and thus standardise in a crude fashion the cost differentials, we have reported the number of plans completed over a five year period (2005 to 2009). By coincidence both agencies have completed 14 plans over this period. While this provides some basis for understanding the scale of planning programs, it is far from perfect because it does not take into account any differences in plan complexity. We have therefore refrained from comparing the agencies on an 'average cost per plan' basis.

Water allocation planning costs are difficult to benchmark because:

- different levels of effort are applied to particular water allocation plans depending on:
  - the nature of the resource;
  - the level of allocation; and
  - the associated regulatory requirements.
- the costs depend on the phase of the planning cycle each Department is in (for example, initial plan development, plan finalisation, plan review and remake).

The higher unit cost per FTE for DoW (when external funds are included in the cost base) may be attributed to the higher level of complexity associated with predominantly groundwater sources of water, compared to most of the plans in New South Wales being for on surface water. DoW is also still preparing allocation plans for many water sources for the first time.

6.3 Environmental water planning

Environmental water planning is a component of the allocation planning process in which DoW identifies water required by the environment to maintain values. Relevant activities include:

- managing projects to investigate environmental water dependency and understand potential impacts of water use;
- establishing water resource objectives to maintain groundwater and surface water systems;
- establishing water regimes which will maintain renewability of supply and maintain in-situ social, cultural and environmental values to the resource objectives;
- monitor water resources and dependent systems to inform environmental water planning, and to meet compliance criteria; and
- provide advice to support licensing to reduce impacts of water use on environments.

The equivalent activities for NOW involve:

- planning processes directed at addressing specific hydrological environmental impacts;
- preparation of wetland recovery plans for water recovered for environment via improved efficiencies in delivery system;
- wetland policy implementation to assist in protection of wetlands in good condition, rehabilitate degraded wetlands where feasible & support appreciation of wetlands by implementing various principles and actions;
- Groundwater dependent ecosystem studies, investigations and identification for development of water sharing plan provisions river health and water quality plans;
- provision of advice to water users and other stakeholders to assist and influence their management of surface water quality to achieve outcomes sought under management plans and policies; and
- development and maintenance of internal hydrological environmental assessment procedures required for project assessments under Environmental Protection Act and for water licensing.

With reference to Table 38, it can be seen that DoW spends considerably more on environmental water planning than NOW. It also has a higher staff complement. Even after allowing for the different staffing levels, when costs are expressed on a per FTE basis, DoW has a more expensive operation than NOW. In the case of DoW, its cost ranges between $192,000 to $208,000 per FTE (depending on the exclusion or inclusion of external funding), while NOW's cost is $172,000 per FTE.

The cost differentials are even more pronounced when costs are expressed on a "dollar per water licence on issue" basis. DoW's cost ranges from $209 per licence to $227 per licence, compared to just $47 per licence for NOW. It should be noted that NOW has more than double the number of water licences under management, so there could be some efficiencies of scale in New South Wales.

It is reasonable to expect that licence numbers are a proxy cost driver for environmental water planning. We observe that both DoW and NOW's expenditure on this activity has been relatively stable over the past three years, suggesting that this might represent the annual 'maintenance' spend deemed necessary.

Table 38: Comparison of environmental water planning costs (2008-09)

	DoW		NOW
Base data	**Without external funding**	**With external funding**	
Actual cost including overheads	$2,877,214	$3,122,315	$1,720,007
Number of FTEs	15.0	15.0	10.0
Number of licences[1]	13,769	13,769	36,969
Analysis			
Cost per FTE	$191,814	$208,154	$171,994
Cost per licence	$209	$227	$47

[1] Licence numbers for NOW were obtained from the Australian Water Markets Report 2008-09, published by the National Water Commission. Licences include regulated and unregulated surface water sources and groundwater licences in 'highly managed' areas. Stock and domestic licences are excluded. For Western Australia, licence numbers were provided by DoW. They include both surface and groundwater.

While the cost differences between the two agencies may be evidence of inefficiency (in the case of DoW), it is difficult to draw definitive conclusions from the analysis. As was the case with the water allocation planning activity, environmental water planning costs are highly contingent on factors such as the complexity of the environmental issues under investigation and the stage of plan development. PwC has not undertaken detailed analysis of this activity, so we are not able to confirm the degree to which these underlying factors are responsible for the cost differences.

6.4 Water metering

Water metering involves both operating and capital costs. The existing metering activities in New South Wales, together with cost estimates from future planned roll out of new meters in this state, provide useful benchmark information against which to compare DoW's metering activities. Table 39 summarises the various benchmarks.

Operating and maintenance costs

DoW currently incurs operating and maintenance costs in servicing its network of 1266 state-owned meters on groundwater extraction bores. The costs involve reading meters twice per year (requiring a site visit) and undertaking routine maintenance on the meters. In 2008-09 DoW's operating expenses were $475,091 (including external funding), which equates to $375 per meter.

In New South Wales, under present arrangements, NOW does not have responsibility for reading or maintaining meters. While there is a network of about 5,500 meters across the state (mostly on regulated rivers), these are privately owned. State Water Corporation (the bulk water supplier) is

responsible for taking readings and monitoring compliance/validation for these meters. The customers are responsible for maintaining the meters. In 2008-09, State Water Corporation's cost of metering and compliance was $3,613,000 (or $657 per meter) and was fully recovered through water charges. [13]

These meters are soon to be replaced with State Water owned meters connected via telemetry. Responsibility for maintaining the meters will transfer to State Water. In a recent pricing submission to IPART, State Water has estimated that the ongoing, annual meter reading, maintenance and data processing costs — before compliance — will range from $214 per meter (for an electromagnetic meter with basic data logger) to $604 per meter with satellite telemetry coverage.[14]

In the near future NOW will also take on the role of maintaining and reading meters. Approximately 9,000 meters are to be installed with Commonwealth funding. These meters will be used to measure licensed extractions from unregulated rivers and groundwater bores. In NOW's submission to IPART for the 2010 Bulk Water Pricing Review (pages 54-56), the agency has published cost estimates for the ongoing meter reading, validation and maintenance activities for these 9,000 meters. The average annual cost is expected to be $426 per meter, with costs ranging from $262 to $835 per meter per year — the higher costs being associated with sites equipped with an electromagnetic meter and logger, with telemetry capability being obtained through satellite technology. These cost estimates are based on the following assumptions. Meter maintenance will involve:

- annual maintenance visits, including routine replacement of consumables such as batteries;
- two-yearly validation inspections to certify compliance with national water metering standards;
- repair of faults, detected via telemetry, site visit or water user report;
- meter readings will be collected via telemetry systems where available or by site visits. Where telemetry equipment is in place, no site visits solely for meter reading will occur, with NOW taking a single annual reading in conjunction with the maintenance visit; and
- all site meter readings, inspections, maintenance and repairs will be undertaken by a qualified contractor, engaged through a competitive tender.

Based on the above estimates, DoW's average metering costs of $375 per meter appear to be well within the range of costs budgeted by NOW and State Water Corporation.

Capital costs of metering programs

Capital costs are incurred periodically for upgrading meters and installing new meters. In 2008-09 DoW incurred $2.098 million in capital expenses (with funding assistance from the Commonwealth) for the installation of 360 meters. This equates to $5,828 per meter (Table 39). DoW currently has a funding proposal before the Commonwealth Government to install a further 1,500 meters at a cost of $12.2 million over four years. According to the schedule for this proposal, DoW would install 325 meters in 2010-11 at a cost of $2.4 million. This equates to $7,535 per meter. These meters would not be equipped with satellite telemetry equipment.

NOW's plans to install approximately 9,000 meters at a cost of $131 million (fully funded by the Commonwealth Government). These will be telemetry-enabled meters for groundwater and unregulated rivers. This gives an average capital cost of $14,500 per meter.

[13] State Water Corporation submission to IPART – Review of 2010 Bulk Water Prices, Appendix 3.

[14] State Water Corporation submission to IPART – Review of 2010 Bulk Water Prices, page 10-17

Therefore, DoW's capital costs per installation are substantially less than NOW's estimated costs. However, this differential is probably explained by the telemetry and data logger equipment that will be installed as standard on the NSW meters (but not the DoW meters). It is not clear whether telemetry-enabled meters would be more efficient in the long term.

Table 39: Comparison of operating and maintenance costs for water metering costs

	DoW (2008-09)	DoW (planned for 2010-11)	NOW (planned over several years commencing 2010-11)[1]
Operating			
Annual operating cost, including overheads	$475,091	$300,000	—
Number of meters operating	1,266	1,266	9,000
Cost per meter	$375	$237	$426 [2]
Capital costs			
Total capex	$2,098,000	$2,449,000	$131,000,000
Number of meters installed	360	325	9,000
Capital cost per meter	$5,828	$7,535	$14,500

[1] NSW Office of Water Submission to IPART – Review of 2010 Bulk Water Prices

[2] Average cost estimated at $426 per meter. Costs range from $262/meter to $835/meter depending on equipment fitted to the meter.

6.5 Water licensing and compliance

The activity identified by DoW as "Water licensing and compliance" includes a suite of activities and costs that do not align neatly with the way NOW classifies its licensing costs. Thus, for the purposes of benchmarking, we have grouped multiple activities to obtain satisfactory alignment. The groupings are as follows:

For DoW, the following activities are included in the benchmark:

- *Water licensing and compliance* – includes the processing of licence applications, trading applications, setting licence conditions and the ongoing costs of compliance monitoring (but not enforcement).
- *Water licensing support* – defined as the maintenance of licensing systems, provision of training, guidance on complex licensing issues and management of appeals.
- *Compliance enforcement* – defined as the conducting of investigations into breaches of statutes and gathering evidence to support the required enforcement actions.

For NOW, the following activities are included in the benchmark:

- *Water consent transactions* – processing of licence applications for various dealings, assessments, change of conditions and new applications for water licences and approvals undertaken on a fee for service basis (NOW only includes direct operational costs in this activity. Overhead costs relating to licensing are included in licence administration).

- *Licence administration* – systems development and maintenance of procedures and guidelines for access licence dealings, approvals. Maintaining the Licensing Administration System.

- *Licence conversation and specification* - cleansing of licences for conversion to WMA volumetric conversions transcribing water sharing provisions into licence conditions

- *Compliance* – administration of monitoring activities and surveillance to check compliance with consent conditions.

Table 40 contains the results of the analysis. Costs have been expressed in terms of three unit measures:

- dollars per FTE;

- dollars per licence on issue; and

- dollars per transaction (averaged across all transaction types)

Table 40: Comparison of water licensing and compliance costs (2008-09)

	DoW		NOW
	Without external funding	**With external funding**	
Actual cost, including overheads	$9,609,150	$9,666,310	$18,672,706
Number of FTEs	82.6	82.6	104.8
Number of licenses[1]	13,769	13,769	36,696
Number of transactions (all instrument types)	3,346	3,346	10,177
Analysis			
Cost per FTE	$116,334	$117,026	$178,217
Cost per licence on issue	$698	$702	$505
Cost per transaction	$2,872	$2,889	$1,835

[1] Licence numbers for NOW were obtained from the Australian Water Markets Report 2008-09, published by the National Water Commission. Licences include regulated and unregulated surface water sources and groundwater licences in 'highly managed' areas. Stock and domestic licences are excluded. For Western Australia, licence numbers were provided by DoW. They include both surface and groundwater.

The three measures provide contrasting indications of DoW's level of efficiency. DoW has a lower cost per FTE for this activity, whereas the cost per licence is higher. The higher cost per licence may be a function of the fewer licences on issue in Western Australia, possibly resulting in poorer economies of scale. Arguably, licences on issue are a poor proxy cost driver for licence processing, administration and

compliance because most of the costs are incurred only for a subset of licences – those on which a transaction is made.

Cost per transaction provides an interesting comparison. DoW's average cost of processing a transaction is about $1,000 more than that reported by NOW. A possible explanation for this cost differential is that DoW processes a larger proportion of applications that require complex assessment relative to NOW, although we have not undertaken a detailed examination of the NOW data to determine whether this is in fact the case. Western Australia has a larger proportion of groundwater sources compared to New South Wales, which is mostly surface water. Groundwater has more complex hydrological characteristics than surface water and thus it could be more difficult to manage licensing assessment in Western Australia.

NOW publishes information on its variable costs per transaction type, and it is this information that is used to structure its fees. The fee proposed by NOW based on full recovery of its costs of processing a permanent trade in unregulated rivers and groundwater is $761 per trade, administration plus basic assessment. If additional assessment is required, NOW recovers this cost to a maximum of $2341 per transaction. By comparison, DoW estimates the *average* cost to process an application to trade or transfer a licence to take water is $3,611 (implying that there will be some transfers that are more expensive than this).

Some of this cost differential could be explained by the fact that the DoW figure includes a component of overhead costs, whereas the NOW cost does not (in New South Wales, the overhead costs associated with licensing are recovered through water charges on all license holders as opposed to transaction fees). But even after taking this into account, the DoW cost appears to be excessive. If a 25 per cent overhead component is added onto the NOW transaction fee, this would increase the cost to $951 for the basic assessment to a maximum of $2926.

6.6 Water information collection and management

This analysis incorporates the following activities undertaken by DoW:

- water information management – the management of all water information collected by DoW in a central repository of major datasets relating to water quality and quantity, spanning the last 100 years;
- water information collection – the operation and maintenance of the network of surface water gauging stations and groundwater monitoring bores to provide information on the state's surface water and groundwater resources; and
- water information provision – the extraction and provision of water information for users, and the development of tools, maps and models for accessing and displaying information.

The equivalent activities for NOW include:

- surface water quantity monitoring;
- surface water quantity data management and reporting;
- surface water quality monitoring;
- surface water ecology, biology and algal monitoring; surface water quality and biological database management;
- surface water monitoring assets management;

- groundwater quantity monitoring;
- groundwater quality monitoring;
- groundwater database management; and
- groundwater monitoring assets management

For this benchmarking analysis, PwC undertook benchmarking against FTE numbers and measurement station numbers (gauging stations and observation bores) with these being significant cost drivers for this activity. PwC also benchmarked the costs against licence numbers, with this being an indirect driver of the level of effort required in managing resources. The results of this analysis are presented in Table 41.

On the basis of cost per gauging station, the two agencies have reasonably similar costs — approximately $3,000 per station. This benchmarking is rather crude though because about $4.0 million of DoW's costs are capital-related, while most of NOW's costs are operating.

Table 41: Comparison of water information collection and management costs (2008-09)

	DoW		NOW
Base data	**Without external funding**	**With external funding**	
Actual cost, inclusive of overheads (excluding capex)	$8,211,978	$9,407,959	$13,376,916
Number of FTEs	72	72.6	68
Number of measurement sites (gauging stations and bores)	3,002	3,002	3,833
Number of licenses	13,769	13,769	36,696
Analysis			
Cost per FTE	$114,055	$129,586	$196,651
Cost per measurement site	$2,736	$3,134	$2,940
Cost per licence	$596	$683	$362

6.7 Corporate overhead costs

Overheads are difficult to benchmark because there is no common standard for differentiating between direct costs and indirect costs. Indirect costs are a combination of (i) support services that provide specific support to business units delivering core services; and (ii) corporate costs, which include activities such as IT, human resources and finance functions.

Corporate costs are more amenable to benchmarking because they tend to be reasonably generic across government organisations. In the analysis below we have therefore focused on corporate overheads, although a measure of total overheads is also presented for each organisation as a means of comparison. The results are summarised in Table 42.

New South Wales Office of Water

NOW is an organisation with 796 FTEs. A sub-set of these (308) are assigned to water management and planning activities that are identified in NOW's proposal as being eligible for cost recovery through pricing.

Total overheads, for the whole of NOW, including indirect costs and corporate overheads, equate to $29.6 million in 2009-10. A share of these overheads ($13.6 million) is allocated to the sub-set of 308 FTEs. This share represents:

- 25 per cent of total operating costs;
- $44,950 per FTE; and
- $29 per FTE hour[15].

Of the $13.6 million, about half (52 per cent) are corporate overheads, equating to $7.1 million. This overhead component represents 13 per cent of NOW's total operating costs, or $23,052 per FTE. NOW includes the following items in its calculation of corporate overheads:

- Finance;
- Strategic Corporate Development;
- Corporate Counsel; and
- Information services and IT (provided through a contract with Services First)

Department of Water

In the 2008-09 financial year, DoW employed 592 FTE across the whole agency (after allowing for a 10% vacancy rate). A sub-set of these FTEs (294) are identified as working on water management and planning activities eligible for part or full cost recovery. DoW's total overhead cost is $11.0 million, or 28% of total operating costs, which is similar to the level of overheads carried by NOW ($13.6 million or 25% of total operating costs).

However, when corporate overheads are itemised separately, DoW has lower corporate overheads than NOW (11 per cent of DoW's total operating costs as opposed to 13 per cent of NOW's operating costs). On an FTE basis, the difference is even more pronounced. This could be due to the way NOW reports its FTEs, as we understand that the 308 refer to personnel whose time is directly attributable to one or more activity codes. Indirect FTEs (those working on generic support roles) are excluded from the 308 figure.

PwC is confident that the suite of items included in NOW's corporate overhead costs are reasonably comparable to DoW's items. The main point of difference is the way vehicle fleet costs are treated. DoW

[15] NOW assumes 1550 hours per FTE per year.

includes these as a corporate expense in its submission. We have therefore removed these costs from corporate overheads so as to obtain a meaningful comparison with NOW's benchmark.

Table 42: Comparison of corporate overhead costs (2008-09)

	DoW	NOW
Base data		
Total overheads and indirect costs	$11,038,461	$13,598,721
Corporate overheads (water management and planning activities)	$4,234,140[3]	$7,100,000
Operating expenditure (including all overheads)	$39,156,476	$54,600,000[1]
Total FTEs	294	308[2]
Analysis		
Total overheads as a percentage of total operating costs	28%	25%
Corporate costs as a percentage of total operating costs	11%	13%
Corporate costs per FTE	$14,401	$23,052

[1]Includes $5.8 million for processing of water consent transactions and $48.8 million for other core activities that do not involve license transactions.
[2]Includes 57 FTE for water consent transactions and 256 FTE for other core activities that do not involve licensing transactions.
[3]Vehicle fleet costs have been removed from DoW's corporate overheads so as to produce a benchmark that is comparable to the way NOW calculates its corporate overheads.

Acceptable levels for corporate overheads

The level of corporate overheads can be assessed against public benchmarks on efficient overhead costs. Amongst these reference points, the NSW Government's Council on the Cost and Quality of Government has reported overhead cost benchmarks for agencies of different sizes, as measured by FTEs. The Council identified an overhead cost range between 8-16 per cent of total agency operating expenditure, as shown in Table 43.

Table 43: Corporate overhead benchmarks, as a percentage of total operating expenditures

Agency size	Low	High
Large (>1,000 FTEs)	8%	10%
Medium (351 to <1,000 FTEs)	10%	12%
Small (100 to <350 FTEs)	12%	14%
Very small (<100 FTEs)	14%	16%

Source: Council on the Cost and Quality of Government (2006), *Annual Report*, cited in Greater Taree Council, Governance Report to Council, May 2009.

Looking only at DoW's activities directly related to water management and planning functions, DoW would be a 'small' agency using the categorisation above. DoW's overhead cost share, of approximately 11 per cent marginally is under the range for similar 'small' agencies. However, as DoW's water management and planning functions are part of a larger agency with over 600 staff, it should be considered a medium agency for the purpose of comparing agency wide corporate overheads. In this case, 11 per cent falls within the benchmark range.

7 Performance indicators

7.1 Introduction

Performance indicators provide a mechanism to assess the degree to which DoW delivers its services to an agreed standard and within a defined budget. This chapter provides a broad overview of the purpose of performance indicators and some important aspects of best practice in the selection and reporting of these measures. It then provides an assessment of DoW's performance indicators in light of this discussion.

7.2 Purpose of performance indicators

The use of performance indicators to measure and report on the performance of public entities is now commonplace in developed economies. Performance indicators are measures that allow their users to assess the extent to which an organisation has achieved, or made progress towards achieving, its specified aims and objectives.

The popularity of performance indicators represents a departure from the historical approach to public sector accountability, which focussed primarily on budgets and the managing of inputs. The Organisation for Economic Co-operation and Development (OECD), for examples, notes:

> *'Over the past fifteen years, the majority of OECD governments have sought to shift emphasis of budgeting and management away from inputs towards a focus on results, measured in the form of outputs and/or outcomes. While the content, pace, and method of implementation of these reforms varies across countries and over time, they share a renewed focus on measurable results* (Curristine, 2005).

The purpose of performance indicators is to two-fold: assisting an organisation's management with strategic and operational decision-making and providing appropriate information to stakeholders. The Australian National Audit Office (ANAO) (2007) defines the purpose of performance indicators as:

> *'to provide information (either qualitative or quantitative) on the extent to which a policy, programme, initiative or output is achieving its objective.*

Performance indicators typically concern one or more of three elements of an organisation's performance: its inputs (e.g. staff resources), outputs and/or outcomes. 'They may be quantitative or qualitative, so long as they are measurable, and should rely on a range of financial and non-financial information.

7.3 Considerations of best practice

An organisation should design its performance indicators to meet the needs of management and stakeholders. The measures should provide a balanced, accurate and reliable reflection of the organisation's performance that is meaningful, both to the organisation's management and to external stakeholders.

To assist the performance monitoring of public sector organisations, the ANAO has developed seven characteristics of best practice performance indicators (outlined in Table 44).

Table 44: Best practice characteristics for performance indicators

Specific	Clear and concise to avoid misinterpretation of what is to be achieved.	These five characteristics are collectively known as "SMART criteria'
Measurable	Can be quantified and results can be compared to other data and able to show trends if measured over time	
Achievable	Practical, reasonable and credible given available resources and expected conditions	
Relevant	Informative and useful to stakeholders having regard to the context in which the agency operates	
Timed	Specifies a timeframe for achievement and measurement	
Benchmarks	Reference to appropriate standards for comparison where possible	
Targets	Includes an indication of the desired level of achievement	

In addition, the following considerations are important to ensure indicators are fit for purpose.

- Data or other information required for the measures should be easily collected, monitored and recorded within the organisation's existing reporting frameworks.
- A range of information sources should be used, including quantitative and qualitative, financial and non-financial information.
- Indicators should be clearly communicated and be well understood by the organisation's management, staff and stakeholders.
- Where relevant, indicators should assist in comparing performance across organisations. This is particular relevant in the water sector.

Organisations should also be conscious of 'lead' and 'lag' indicators. A lead indicator can encourage organisational behaviour or processes that enhance the probability of a positive outcome. A lag indicator measures the actual outcome after it has occurred, providing an indication on how the organisation has performed against a stated target. An appropriate balance of such indicators ensures the organisation and stakeholders can obtain a reliable indication of performance at different points in time.

Finally, organisations should also conduct regular reviews of performance indicators to ensure they remain relevant and valuable to internal and external users.

7.4 Assessment of DoW's performance indicators

DoW has in place a number of performance indicators, on which it reports on an annual basis. These indicators are set out in DoW's annual budget papers and its annual reports. DoW does not always use the indicators reported in the budget papers and DoW's annual reports internally and DoW often complements or substitutes the published indicators with other internally recorded measures.

Table 45 contains a list of published and internally used performance indicators and an assessment of the efficacy of each. In addition, Western Australian Auditor General uses supplementary indicators to assess DoW's performance published in the *Public Sector Performance Reports* for 2003 and 2009. These indicators are also recorded in Table 45.

Table 45: Performance indicators used by DoW

Activity / Service	Measure / Indicator	Where reported	Assessment of efficacy
Water licensing and compliance	Number of appeals against licence decisions	Internal	Provides indication of sound decision process but absence of appeals does not necessarily represent optimal level of effort
	Number of applications for licensing instruments received and issued	Internal	Provides efficiency gauge but must be viewed with backlog figures to determine efficient level of effort
	Licence application backlog	Internal	Recorded but no distinct target based on efficient level of backlog
	Average time taken (days) to process a license by water category grouping	Budget papers / Annual report	Targets for low priority licences often ignored due to prioritisation of high risk licences
	Average cost per water licence administration (all categories)	Budget papers / Annual report	Considered to have low value internally. Difference in trends between published indicators and figures provided in DoW submission
Water source protection planning	Proportion of public water supplies covered by a drinking water source protection plan	Budget papers / Annual report	Question of whether assumption of 100% coverage is appropriate. Target needs to be set based on cost-benefit analysis
	Number of water source protection plans scheduled and completed	Internal	Changes in target according to perceived complexity of plans and other priorities limits use to improve efficiency
	Average cost per drinking water source protection plan	Budget papers / Annual report	May not reflect complexity of water source protection plan. Considered to have low value internally and higher than that derived from DoW's submission
Water information collection	Average number of bore readings per year	Internal and Public Sector Performance Reports	Enables tracking of effort but not based on cost benefit analysis of information benefits. Subject to technological change (e.g. data loggers). Optimal number may differ by region and resource.
	Average processing times of collected groundwater data	Public Sector Performance Reports	Not clear target based on cost-benefit analysis of most efficient time
	Number of gaugings per year	Internal and Public Sector Performance Reports	Enables tracking of effort but not based on cost benefit analysis of information benefits. Subject to technological change (e.g. IP telemetry). Optimal number may differ by region and resource.

Activity / Service	Measure / Indicator	Where reported	Assessment of efficacy
	Number of days outstanding for trace and rating calculations	Internal	Indicator of effort but needs to be based on targets for efficient result
Water allocation planning	Number of published plans and reports	Internal	Target needs to reflect the complexity of the plans and reports
	Proportion of water resource management areas that are planned appropriate to their water resource category	Budget papers / Annual report and Public Sector Performance Report	Informative if there are robust and consistent criteria for assessing the adequacy, such as cost-benefit analysis. Not clear that this is the case
	Average cost per allocation plan completed (three year rolling average)	Budget papers / Annual report	Rolling average smooths expenditure due to varying plan complexity, but still subject to particular plans completed. Considered to have limited use internally
Providing water allocations and managing the ongoing use of water (service)	Proportion of water resources with licensed allocations that are within the allocation limit	Budget papers / Annual report	May inform other efficiency indicators as to level of effort required, but questionable whether appropriate measure to target
Metering	Number of state owned meters installed per year	Internal	Allows assessment of capital efficiency
	Number of meter readings / condition inspections per year	Internal	Allows operational efficiency assessment but requires target based on cost-benefit analysis of information requirements
Statutory referrals	Total number of referrals completed per year	Internal	Provides basis for efficiency measure but does not differentiate between the types (complexity) of referrals
	Average time in days for referral processing	Internal	Does not differentiate between the types (complexity) of referrals
	Average cost per statutory referral processed	Budget papers / Annual report	Does not differentiate between the types (complexity) of referrals. Considered to have limited value internally
	Unit cost per regional plan delivered	Budget papers / Annual report	Considered to have limited value internally
Groundwater assessment, investigation and review and surface water assessment	Average cost per water resource assessment	Budget papers / Annual report	Does not reflect differences in complexity / effort required to assess different water sources. Considered to have limited value internally
Guiding urban drainage and water management (service)	Average cost per waterway management plan	Budget papers	Does not reflect variation in complexity
	Average cost per drainage and water management plan and assessment	Budget papers	Does not reflect variation in complexity

All of DoW's indicators provide some information of value. However, DoW could improve the selection of performance indicators it uses, the manner in which many of the indicators are used, their level of resolution and the targets against which they are measured.

Before assessing the existing indicators, PwC notes that DoW has a limited number of indicators that relate to the quality of the service it provides. Most indicators relate to inputs or intermediate outputs. There is a general lack of measures relating to whether (or to what extent) DoW's services are meeting the needs of their stakeholders. There is also no reference to minimum standards or requirements for particular outputs.

One example is the delivery of the 'water source protection planning' activity. The three indicators focus on the number of plans completed, the coverage of the plans and the cost of developing them. These indicators do not inform whether the plans are adequate to deliver their intended outcomes. Similarly, indicators for the 'groundwater assessment, investigation and review' activity focus entirely on cost (inputs) and intermediate outputs, but they do not address the quality of final outputs (e.g. of the assessment or report) or outcomes (e.g. improved accuracy of the sustainable yields for water abstraction). They are therefore inadequate to assess these aspects of DoW's performance.

The other gap in the provision of indicators relates to changes in the indicators collected by DoW. As was identified by Marsden Jacob in its report to the ERA of October 2009, there has been significant alteration of indicators in recent years, reducing the utility of these indicators in determining efficiency.

The remainder of this section evaluates these indicators under the 'SMART' criteria.

Specific

For the most part, DoW's performance indicators are clear and easily understood. Average cost and proportion measures (the unit terms for most indicators) are easily comparable to benchmarks or other comparators. It is also generally clear what DoW needs to achieve under each performance measure. In most cases, DoW is to minimise inputs costs related to a particular output (e.g. water licence administration).

One area in which DoW could improve would be the level of specificity for some of its indicators. Many are at a high level (particularly those reported in the Annual Report and budget papers) and do not account for differences in effort and complexity within the activity being measured. For example, the indicators concerning statutory referrals relate to the total number of referrals when the different levels of referral have markedly different levels of effort associated with them. An inability to examine the level of effort undertaken on different types of statutory referral prevented assessment of the efficiency of the statutory referral activity in this report.

Measurable

The majority of performance indicators relate to DoW's use of inputs (e.g. unit cost, average cost) and, occasionally, outputs (e.g. number of licences processed). Such measures have the advantage of being directly observable and easily measured within an organisation's existing reporting systems. However, this ease of measurement is a symptom of a lack of indicators addressing the quality of outputs and the achievement of strategic objectives.

Many of the internal performance indicators, while used to assess trends and general performance, do not have specific targets. The lack of targets reduces the value of the measured performance and prevents guidance as to what level of performance is appropriate, even if trends are in the right direction.

Achievable

While the failure of DoW to meet targets set for some performance indicators may be evidence of inefficiency, it also raises the issue of whether the targets are achievable.

Given the indicators primarily relate to inputs (costs) and rely on financial and activity based information, the number of indicators are reasonable and should not impose an excessive reporting burden on DoW's management.

Relevant

One test of relevance of performance indicators is whether they relate logically to an organisation's core activities. On this point, subject to the focus on inputs rather than the quantity and quality of outputs (discussed above), the indicators outlined in Table 45 perform well. Each relates to an aspect of DoW's responsibilities and in most instances, the relevance of the measure to the performance of that activity or service is self-evident.

Another test of relevance is the extent to which the performance indicators for each activity relate back to the strategic objectives of the organisation. Based on the information provided for our review, there is no obvious link between the water management activities, the performance indicators and the organisational strategic objectives of DoW.

DoW staff signalled during consultation a lack of relevance for many of the indicators in DoW Annual Report and Budget Papers as they considered the indicators inaccurate or they were unclear on how a particular indicator was determined. As a result, the operating areas within DoW ignored these indicators and substituted them with other internal measures, removing any link between performance against the indicator and the practices of DoW.

Timed

For most of DoW's performance indicators that have a timed target, the targets accord with the annual reporting cycle. There were no indicators with longer-term, timed targets.

Most internal indicators did not have a time component.

7.5 Recommended performance indicators

Based on the review of performance indicators above, PwC has identified a range of recommended performance indicators for DoW for the activities that have been subject to detailed review (Table 46). These indicators include a number of indicators that DoW is already collecting, plus a number of additional indicators that the assessment above indicated are required to enable adequate quantitative assessment of DoW's effectiveness and efficiency.

Table 46: Recommended performance indicators (existing performance indicator)**

Activity	Recommended performance indicator
Water licensing and compliance	Number of water licences in force
	Number of water licence/consent applications processed annually**
	Average number of days to process an application**
	Licence application backlog**
	Number of appeals against licensing decisions**
	Number of appeals resolved to the satisfaction of DoW
	Percentage of licences subject to compliance audits per year
	Percentage of licences audited that are compliant with licence requirements
	Average cost per water licensing application type processed**
Metering	Number of meters installed per year**
	Percentage of water entitlement metered (by region)
	Proportion of meters accurate to the relevant standard
	Average cost per meter installation
	Average maintenance cost per meter
	Number of meter readings per year**
	Average cost per meter reading
	Proportion of meters read target [X] times per year (target by region)
Statutory referrals	Number of statutory referrals per year (by type)
	Average annual cost per statutory referrals processed (by type)
	Average time for processing of statutory referral (by type)

Activity	Recommended performance indicator
Water source protection planning	Number of water source protection plans completed per year**
	Proportion of water sources covered by a current water source protection plan**
	Average cost per water source protection plan**
	Average time taken per water source protection plan
Groundwater investigation, assessment and review	Number of bores drilled per year
	Number of metres drilled per year
	Average cost per bore drilled
	Average cost per metre drilled
	Proportion of groundwater investigations completed within budget
Water information collection	Proportion of gauging stations monitored [X] times per year (targets by region, adjusted for technology)**
	Proportion of gauging stations visited for maintenance each year
	Average cost of operating and maintaining gauging stations each year
	Average time for calculation of trace / ratings**
	Average number of readings per bore per year (targets by region, adjusted for technology)**
	Average processing time for bore readings per bore per year**
	Proportion of bore sites visited for maintenance each year
	Average cost of operating and maintaining groundwater monitoring installations each year
Water allocation planning	Proportion of water allocation plans in place and at required standard**
	Number of published allocation plans**
	Average cost per water allocation plan (by planning category)**

DoW should calculate these indicators in a manner and at a level so that they are meaningful to the staff engaged in the associated activity or service. DoW should calculate the indicators in a transparent manner and in such a way that DoW staff and external stakeholders can see a clear link between DoW's actions and the indicator. While a number of the existing performance indicators do not meet this standard, DoW should retain them at least until DoW has obtained a time series of performance against the new indicators. As was noted in the Marsden Jacob report, constant changes to indicators decreases their effectiveness as a measure of changes in efficiency.

Setting of targets

For each of these indicators, targets should be set based on an assessment of the effective and efficient level of service provision. In most instances, DoW should conduct some level of cost-benefit analysis to determine the efficient level of service provision. By knowing what the marginal costs and benefits of, for example, an additional bore is, the optimal number of bores in an area can be determined and targets to achieve that level of information can be set.

Appropriate targets could also be set by undertaking “stress tests” of some of the activities. By considering what would be the impact of, say, a $100,000 reduction in budget for the activity in terms of activity outputs and the value of those outputs, DoW could obtain an indication of whether the current level of service provision is appropriate or that targets should be adjusted accordingly.

DoW should shape each of the performance indicators to reflect the SMART characteristics described above.

Cost of indicators

Whereas input based indicators, typically, use information that organisations collect under their normal management procedures, output or outcome based indicators may require information that is not readily collected. For example, customer satisfaction surveys or quality reviews of management plans for the purposes of assessing quality may place additional reporting burden on DoW. Accordingly, DoW should consider the reporting burden of any new indicators before they implement them.

Appendices

Appendix A Cost of services

1 Introduction

This appendix contains supplementary information on the services provided by DoW. As the services in this appendix are costed without regard to the beneficiary of the service, as was done in DoW's submission, the service costs for 2008-09 presented below differ from those in DoW submission. This section also includes costs an allocation of activity costs to services for 2006-07 and 2007-08.

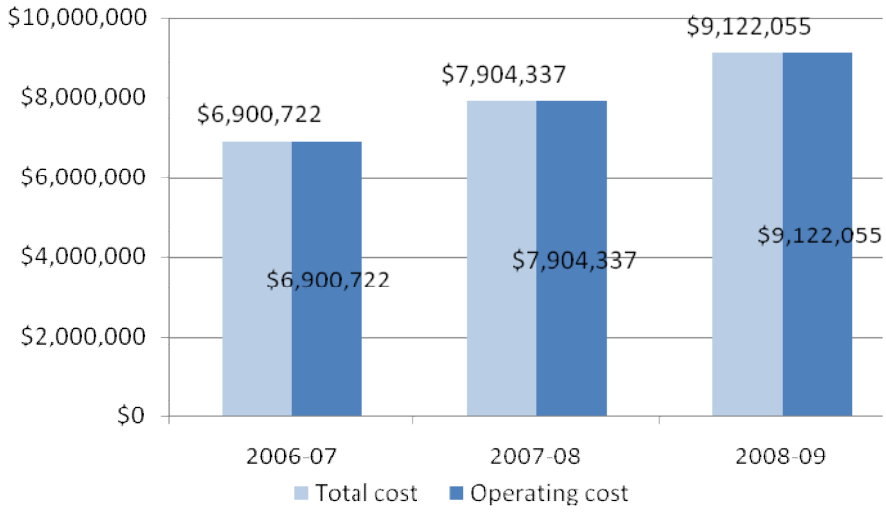
In this appendix, operating costs include the direct costs of operational projects plus the internal branch support costs and overheads associated with those direct costs.

2 Processing and assessment of applications for water licences and permits

This service comprises activities involved in assessing applications and issuing water licences and permits to water users. It includes maintenance of licensing support systems and provision of technical advice on groundwater or surface water impacts. DoW also issues licences to construct or alter wells.

Total and operational costs of delivering the service are presented in Figure 43. There has been a significant cost in delivering this service between 2006-07 and 2008-09.

Figure 43: Total and operating costs of processing and assessment of applications for water licences and permits



Changes in the costs of the contributing activities are presented in Table 47. There have been cost increases across all of the major contributing areas to this activity. All costs incurred in the delivery of this service are operating costs.

Table 47: Total cost of processing and assessment of applications for water licences and permits

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water licensing and compliance	100	$6,031,324	$7,115,121	$7,831,548
Water licensing support	100	$557,361	$685,871	$1,213,442
Regional hydrogeological advice[16]	100	$237,230	NA	NA
Surface water assessment	10	$74,807	$103,344	$77,064
Total		$6,900,722	$7,904,337	$9,122,055

Trends

DoW anticipates growth in a number of licence applications due to:

- the proclamation of new surface water areas in the South West and completion of allocation plans;
- new water user numbers increasing with economic growth; and
- a growth in applications for trades and licence transfers as areas reach full allocation.

DoW also expects the average cost of assessing licences to increase as complexity increases as areas approach full allocation. However, once fully allocated, DoW can reallocate departmental resources.

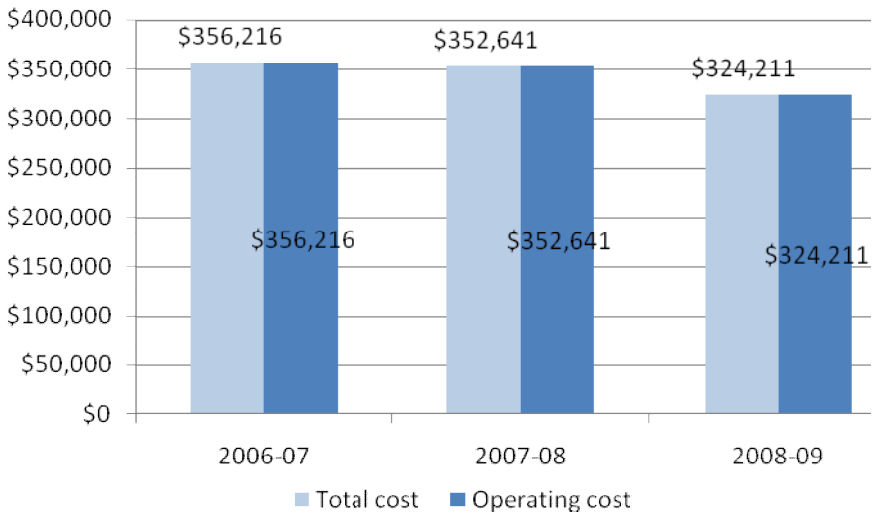
3 Licensing of the Water Corporation for the IWSS

The service involves the licensing of the Water Corporation to abstract water for the Perth Integrated Water Supply Scheme (IWSS). As recommended by the ERA, DoW costed the service and corresponding activity separately.

Total and operational costs of delivering the service are presented in Figure 44.

[16] Costs were not separately indentified in 2007-08 and 2008-09.

Figure 44: Total and operating costs of licensing of the Water Corporation for the IWSS



A single activity contributes to this service (Table 48). All cost incurred in the delivery of this service are operating costs.

Table 48: Total cost of licensing of the Water Corporation for the IWSS

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
IWSS licensing	100	$356,216	$352,641	$324,211
Total		$356,216	$352,641	$324,211

Trends

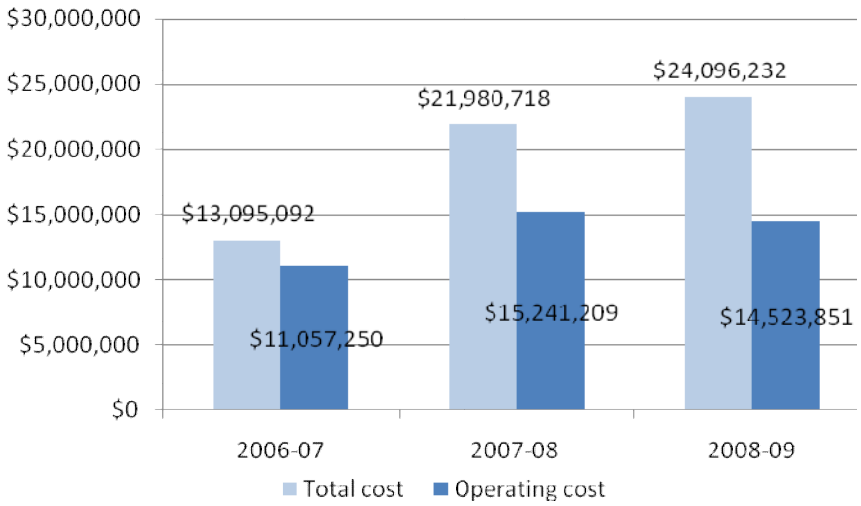
DoW does not anticipate any changes in the cost or level of the service over the next three years.

4 Providing water allocations and managing the ongoing use of water

This service involves determination of the amount of water that users can abstract from a water resource and to manage the ongoing use of that water. DoW delivers the service to users who take water from proclaimed water management areas. Most of these users are licence holders, with some being unlicensed water users in catchment areas (riparian users, stock and domestic bore users).

Total and operational costs of delivering the service are presented in Figure 45. There has been a significant increase in expenditure in delivery of this service over the last three years.

Figure 45: Total and operating costs of providing water allocations and managing the ongoing use of water



The activities that contribute to this service are presented in Table 49. Activities that have contributed most to the cost increase were water licensing policy, enforcement, water allocation planning and groundwater assessment, investigation and review.

Table 49: Total cost of providing water allocations and managing the ongoing use of water

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water licensing policy	100	$825,910	$4,239,466	$1,887,395
Enforcement	100	$92,559	$347,024	$621,319
Metering	100	$2,084,933	$2,679,289	$2,954,969
Water allocation planning	100	$1,979,938	$2,941,273	$3,545,836
Environmental water planning	100	$2,305,196	$3,052,063	$3,122,315
Surface water assessment	80	$598,457	$826,756	$616,514
Groundwater assessment, investigation and review	90	$3,373,543	$5,614,339	$8,733,425
Water information collection[17]	21	$1,496,293	$1,876,688	$2,110,311
Water information management	30	$338,262	$403,821	$504,148
Total		$13,095,092	$21,980,718	$24,096,232

[17] The Department of Water's submission allocates 90 per cent of the activity's cost towards surface water information collection and 10 per cent towards groundwater information collection. The effort is estimated to be 15 per cent and 70 per cent for surface water and groundwater information collection respectively.

Changes in the operating costs of the contributing activities are presented in Table 50. The increase is operating cost is less steep than that for the total costs,

Table 50: Operating cost of providing water allocations and managing the ongoing use of water

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water licensing policy	100	$825,910	$4,239,466	$1,887,395
Enforcement	100	$92,559	$347,024	$621,319
Metering	100	$1,696,933	$657,289	$816,969
Water allocation planning	100	$1,962,792	$2,220,076	$2,601,470
Environmental water planning	100	$2,065,813	$2,538,528	$3,018,307
Surface water assessment	80	$598,457	$826,756	$616,514
Groundwater assessment, investigation and review	90	$2,260,322	$2,589,860	$3,213,473
Water information collection	21	$1,216,201	$1,418,467	$1,281,568
Water information management	30	$338,262	$403,743	$466,836
Total		$11,057,250	$15,241,209	$14,523,851

Trends

DoW anticipates a growth in the provision of the service over the next three years due to:

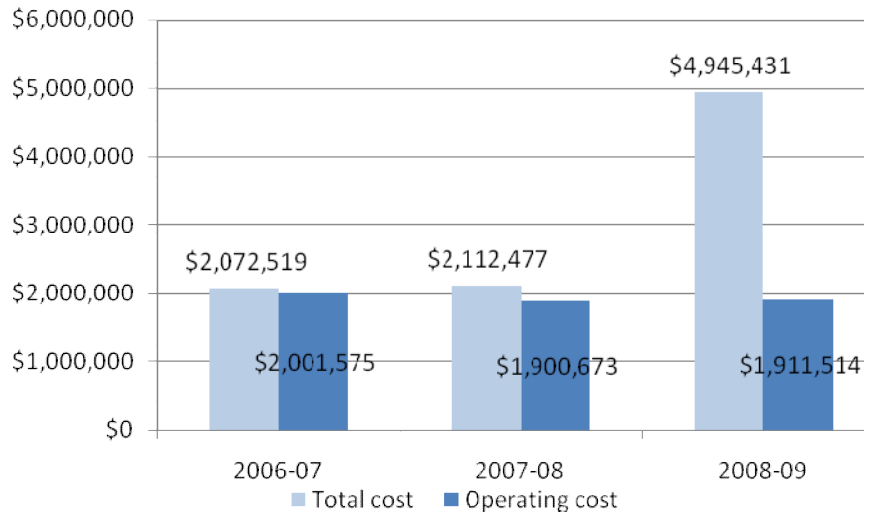
- growing water use while a number of water resources are reaching full allocation;
- a National Water Initiative requirement to develop statutory plans based on a consumptive pool approach; and
- a growing focus on compliance and enforcement as water resources approach full allocation.

5 Protecting public drinking water sources

The service includes activities aimed at protecting drinking water sources used by water service providers (the Water Corporation, the Aqwest and the Busselton Water), mining companies and local government authorities to provide drinking water to customers. In June 2009, there were 146 public drinking water sources in Western Australia.

Total and operating costs of delivering the service are presented in Figure 46. There was an increase in total expenditure in 2008-09 due to increased capital costs, with operating costs relatively constant.

Figure 46: Total and operating costs of protecting public drinking water source



The activities that contribute to this service and the costs of the contributing activities are presented in Table 51. This shows that the increase in total cost was driven by the acquisition of land in 2008-09, with groundwater assessment, investigation and review also increasing.

Table 51: Total cost of protecting public drinking water source

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water source protection	100	$1,296,448	$1,242,051	$1,106,436
Groundwater assessment, investigation and review	5	$187,419	$311,908	$485,190
Preparation of guidance notes	50	$426,132	$344,456	$425,738
Implementation of water source protection plans	20	$90,262	$132,350	$138,802
Acquisition of P1 land	100	$0	$27,257	$2,721,700
Land asset management	20	$72,257	$54,455	$67,565
Total		$2,072,519	$2,112,477	$4,945,431

Operating costs for all activities that contribute to this service, as shown in Table 52, were relatively flat.

Table 52: Operating cost of protecting public drinking water source

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water source protection	100	$1,296,448	$1,242,051	$1,106,436
Groundwater assessment, investigation and review	5	$125,573	$143,881	$178,526
Preparation of guidance notes	50	$426,132	$344,456	$425,738
Implementation of water source protection plans	20	$81,164	$115,830	$133,249
Acquisition of P1 land	100	$0	$0	$0
Land asset management	20	$72,257	$54,455	$67,565
Total		$2,001,575	$1,900,673	$1,911,514

Trends

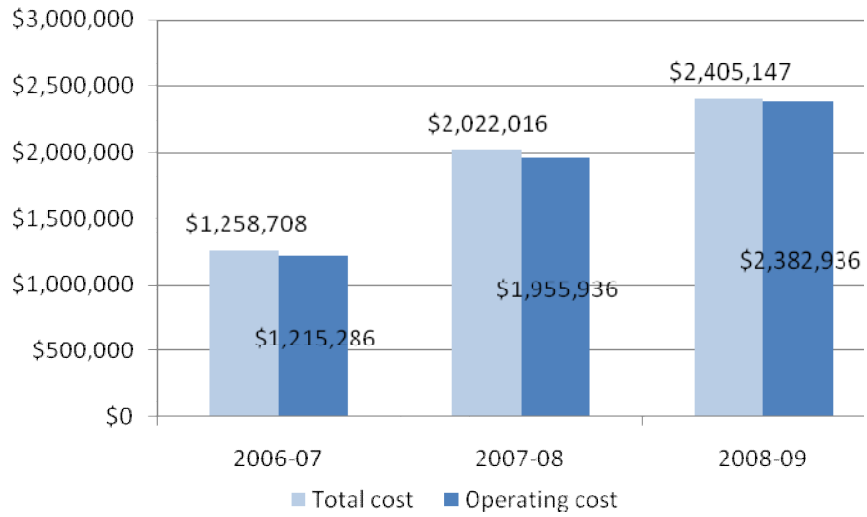
DoW does not anticipate any changes in the cost of providing the service over the next three years.

6 Providing advice on statutory referrals

The service comprises activities associated with provision of advice to local government authorities and the Western Australian Planning Commission on water management impacts of land use development. Proposals cover urban development, industrial development and notification of rural development.

Total and operational costs of delivering the service are presented in Figure 47.

Figure 47: Total and operating costs of providing advice on statutory referrals



Changes in the total cost of the contributing activities are presented in Table 53.

Table 53: Total cost of providing advice on statutory referrals

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Statutory referrals	100	$471,527	$1,148,159	$1,424,201
Implementation of water source protection plans	80	$361,049	$529,402	$555,208
Preparation of guidance notes	50	$426,132	$344,456	$425,738
Total		$1,258,708	$2,022,016	$2,405,147

Changes in the operating costs of the contributing activities are presented in Table 54.

Table 54: Operating cost of providing advice on statutory referrals

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Statutory referrals	100	$464,497	$1,148,159	$1,424,201
Implementation of water source protection plans	80	$324,657	$463,322	$532,997
Preparation of guidance notes	50	$426,132	$344,456	$425,738
Total		$1,215,286	$1,955,936	$2,382,936

Trends

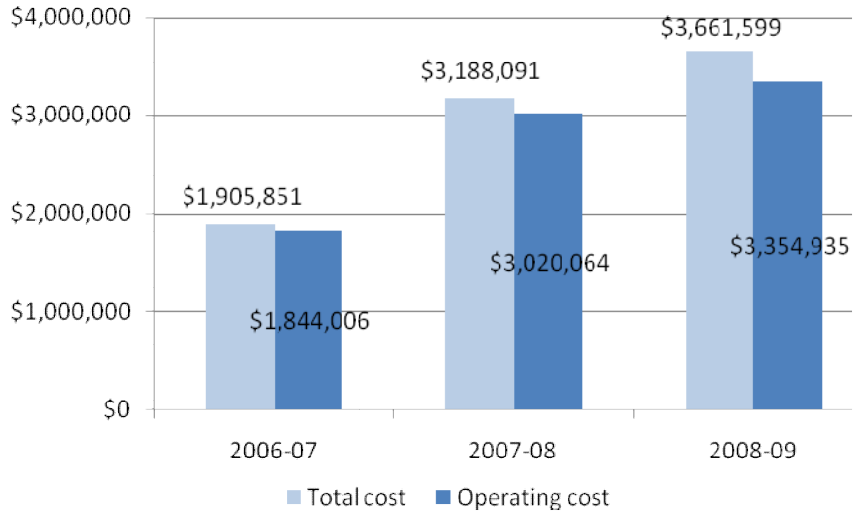
Although DoW expects the number of referrals to increase, DoW does not anticipate any changes in the overall cost of providing the service over the next three years. DoW intends to achieve this through working with local governments to increase their capacity to assess water management issues and streamlining of DoW's responses to referrals relating to sub-division.

7 Guiding urban drainage and water management

The service comprises activities associated with the provision of water management advice for urban environments. DoW provides this service to landholders in areas with existing arterial drainage systems and to land developers.

Total and operational costs of delivering the service are presented in Figure 48.

Figure 48: Total and operating costs of guiding urban drainage and water management



Changes in the costs of the contributing activities are presented in Table 55. All three contributing activities increased in cost.

Table 55: Total cost of guiding urban drainage and water management

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Drainage and water management planning	100	$902,906	$1,452,060	$1,668,265
Arterial drainage studies	100	$815,526	$1,424,123	$1,508,143
Groundwater assessment, investigation and review	5	$187,419	$311,908	$485,190
Total		$1,905,851	$3,188,091	$3,661,599

The operating costs of the contributing activities are presented in Table 56. Operating costs show a similar scale of increase to total costs with the exception of groundwater assessment, investigation and review, which had a significant capital component in the latter years.

Table 56: Operating cost of guiding urban drainage and water management

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Drainage and water management planning	100	$902,906	$1,452,060	$1,668,265
Arterial drainage studies	100	$815,526	$1,424,123	$1,508,143
Groundwater assessment, investigation and review	5	$125,573	$143,881	$178,526
Total		$1,844,006	$3,020,064	$3,354,935

Trends

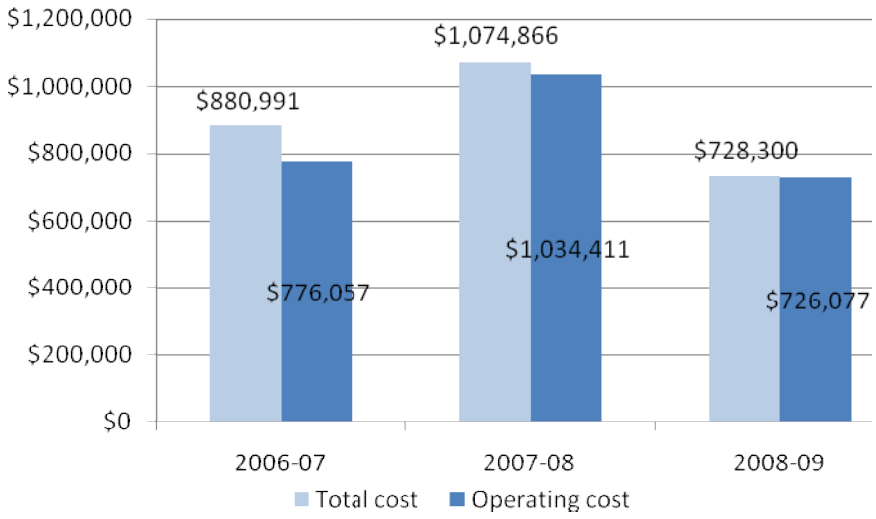
DoW expects an increasing demand for urban water management planning from rapid urban expansion in Perth, largely in areas with a high water table.

8 Providing floodplain management advice

The purpose of the service is to provide floodplain management advice, generally related to specific planning and development proposals. DoW provides this service to landholders and developers in or near floodplain areas through local government authorities, the Western Australian Planning Commission and consulting companies.

Total and operational costs of delivering the service are presented in Figure 49. The costs of this service increased in 2007-08, before decreasing the following year.

Figure 49: Total and operating costs of providing floodplain management advice



A single activity contributes to delivery of this service (Table 57).

Table 57: Total cost of providing floodplain management advice

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Floodplain management advice	100	880,991	1,074,866	728,300
Total		$880,991	$1,074,866	$728,300

Changes in the operating costs of the contributing activities are presented in Table 58, showing a similar pattern of change.

Table 58: Operating cost of providing floodplain management advice

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Floodplain management advice	100	$776,057	$1,034,411	$726,077
Total		$776,057	$1,034,411	$726,077

Trends

DoW does not anticipate any changes in the cost of providing the service over the next three years.

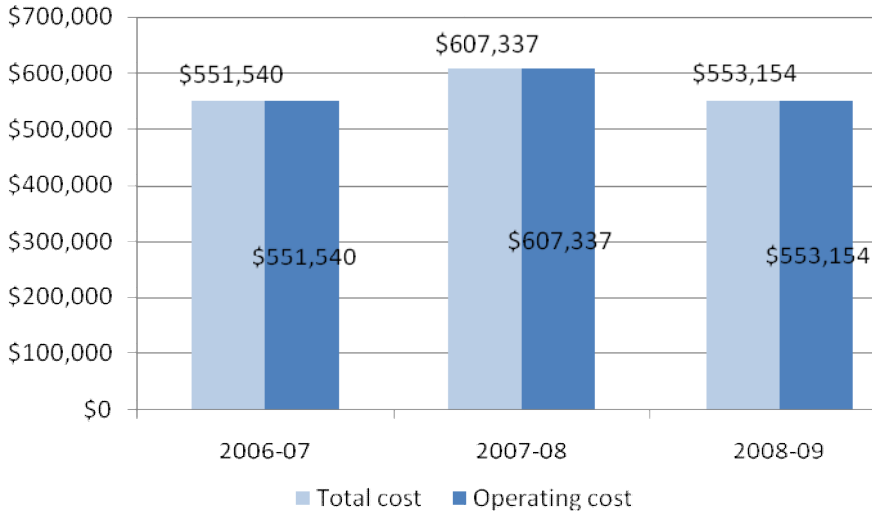
9 Providing water information

The purpose of this service is to provide information about groundwater and surface water in Western Australia. In 2009 (calendar year) DoW responded to 1,804 private sector requests for groundwater and

surface water data. The service also includes provision of water information to the Bureau of Meteorology under the *Water Act 2007* (Cth).

Total and operational costs of delivering the service are presented in Figure 50, showing a relatively constant level of expenditure over the period examined.

Figure 50: Total and operating costs of providing water information



Only a single activity contributes to this service, as is shown in Table 59. All costs are operating costs.

Table 59: Total cost of providing water information

Contributing activities	Contribution to function (%)	2006-07	2007-08	2008-09
Water information provision	100	$551,540	$607,337	$553,154
Total		$551,540	$607,337	$553,154

Trends

DoW expects a decreasing demand for water data due to the Bureau of Meteorology's initiative to make data available free through its Australian Water Resource Information System.

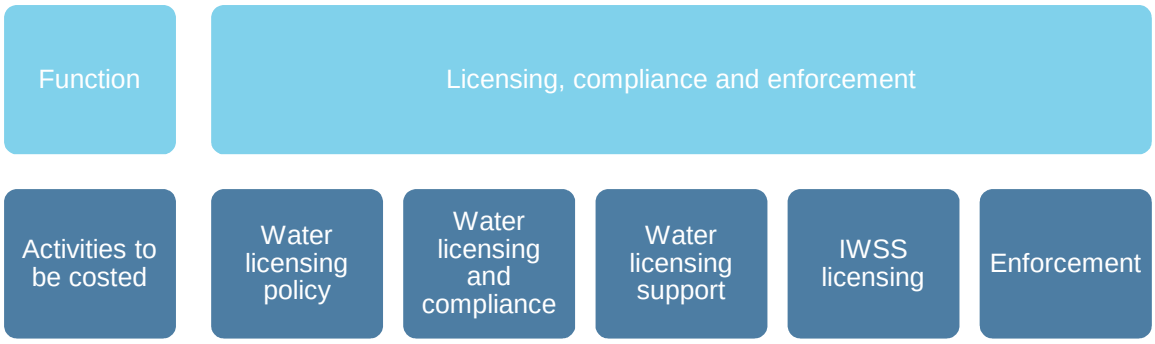
Appendix B Mapping of DoW activities to ERA study classifications

This appendix maps the activities costed in DoW's submission to the grouping of activities shown in Figure 1.

1 Assess, Allocate and Licence Water Resources

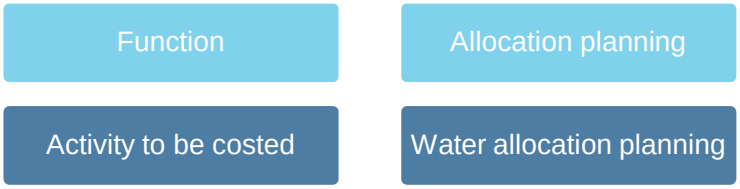
Licensing, Compliance and Enforcement

Figure 51: Licensing, compliance and enforcement activities



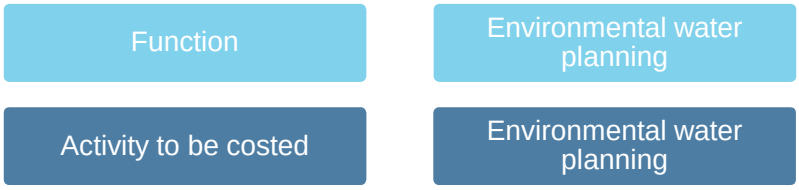
Allocation Planning

Figure 52: Allocation planning activities



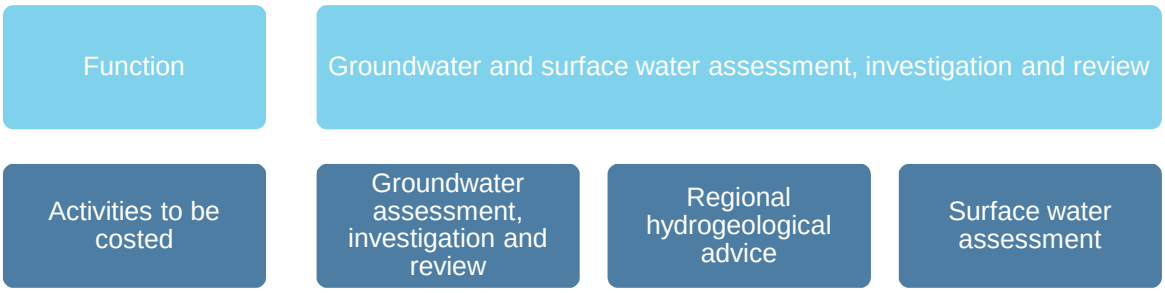
Environmental Water Planning

Figure 53: Environmental water planning activities



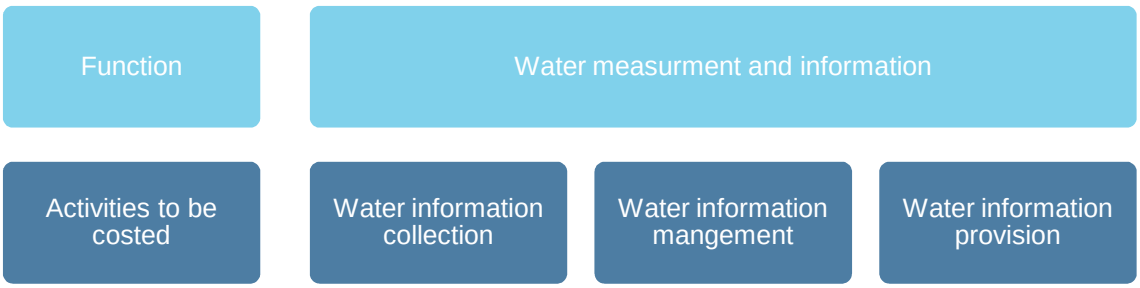
Groundwater and Surface Water Assessment, Investigation and Review

Figure 54: Groundwater and surface water assessment, investigation and review activities



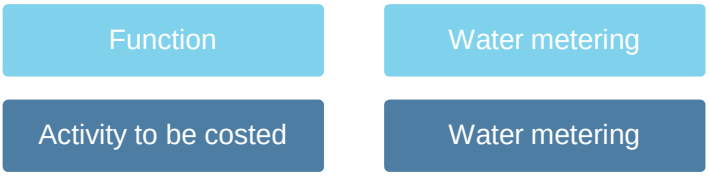
Water Measurement and Information

Figure 55: Water measurement and information activities



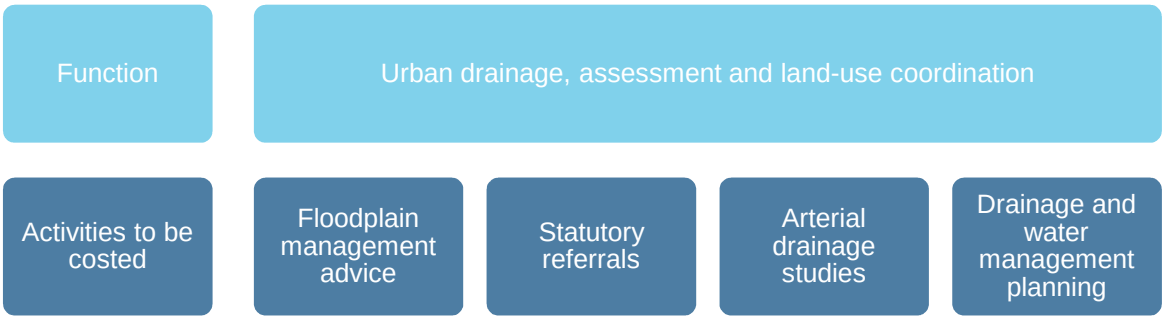
Water Metering

Figure 56: Water metering activities



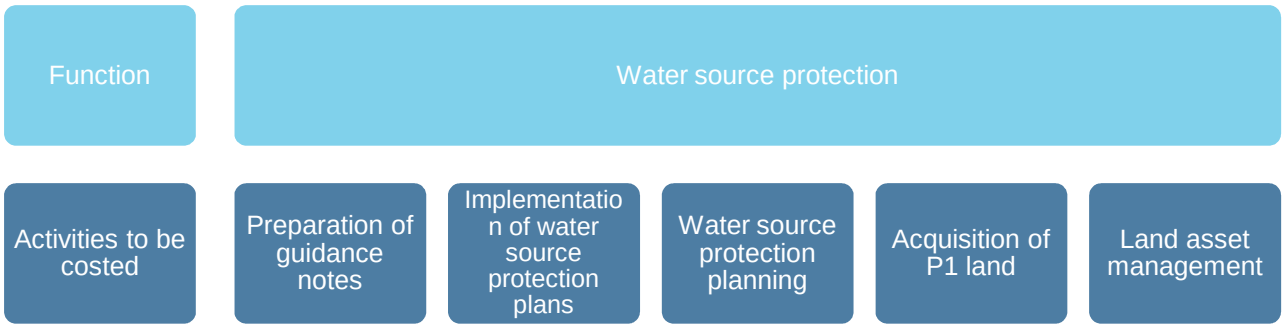
Urban Drainage, Assessment and Land-Use Coordination

Figure 57: Urban drainage, assessment and land-use coordination activities



Water Source Protection

Figure 58: Water source protection activities



Appendix C Bibliography

Aquaterra, 2009, *Strategic Review of the Surface Water Monitoring Network*, Department of Water, Perth, Western Australia

Auditor General for Western Australia, 2003, *Second Public Sector Performance Report*, Report No 7, Perth, Western Australia

Auditor General for Western Australia, 2009, *Public Sector Performance Report*, Report 1, Perth, Western Australia

Australian National Audit Office, 2007, *Application of the Outcomes and Outputs Framework*, Audit Report No. 23 2006-07, Performance Audit

Commonwealth Government, 2010, *National Water Initiative Pricing Principles*, Steering Group on Water Charges, www.environment.gov.au/water/publications/action/nwi-pricing-principles.html. Accessed 23 July 2010

Curristine, T., 2005, Performance Information in the Budget Process: Results of the OECD 2005 Questionnaire, *OECD Journal of Budgeting*, Volume 5, No 2, OECD

Department of Environment, 2005, *Groundwater investigation program in Western Australia (2005 to 2020)*, Hydrogeological Record Series, Report HG10, Perth, Western Australia

Department of Health, 2009, *Drinking Water Catchment Protection*, Government of Western Australia, Perth, Western Australia

Department of the Premier and Cabinet, 2006, *State Water Plan 2007*, Government of Western Australia, Perth, Western Australia

Department of Water, 2007, *Principles and Guidelines for Assessing Water Licence and Permit Applications in WA*, Operational Policy No. 3, Department of Water, Perth, Western Australia

Department of Water, 2009a, *Annual Report 2008-09*, , Perth, Western Australia

Department of Water, 2009b, *Economic Regulation Authority Draft Inquiry into Water Resource Management and Planning Charges: Response to the Issues Paper*, Perth, Western Australia

Department of Water, 2009c, *Submission to the Discussion Paper: Inquiry into Water Resource Management and Planning Charges*, Perth, Western Australia

Department of Water, 2010a, *Department of Water Submission to the Economic Regulation Authority Draft Report of 3 December 2009: Inquiry into Water Resource Management and Planning Charges*, Perth, Western Australia

Department of Water, 2010b, *Economic Regulation Authority Inquiry into Water Resources Management and Planning Charges: Costing of Water Activities*, Perth, Western Australia

Department of Water, 2010c, *Improved Groundwater Resource Management through Better Groundwater Monitoring: A Review of Groundwater Monitoring*, Hydrogeological Record Series, Report HR268, Perth, Western Australia

Department of Water, 2010d, *Measurement and Monitoring Steering Committee: Terms of Reference*, Perth, Western Australia

Department of Water, 2010e, *Proposal for the Implementation of IP Telemetry in Western Australia,* Department of Water, Perth, Western Australia

Department of Water, 2010f, *State Groundwater Investigation Program: Review and Planning 2010-11 to 2012-13*, Hydrogeological Record Series, Report HR302, Perth, Western Australia

Department of Water, 2010g, *Strategic Plan*, Perth, Western Australia

Economic Regulation Authority, 2009, *Inquiry into Water Resource Management and Planning Charges: Draft Report*, Perth, Western Australia

Economic Regulation Authority, 2009, *Inquiry into Water Resource Management and Planning Charges: Discussion Paper*, Perth, Western Australia

Economic Regulation Authority, 2009, *Inquiry into Water Resource Management and Planning Charges: Issues Paper*, Perth, Western Australia

Government of Western Australia, 2006, *A Blueprint for Water Reform in Western Australia: Final Advice to the Western Australian Government*, Water Reform Implementation Committee, Perth, Western Australia

Government of Western Australia, 2008, *Better Urban Water Management,* Western Australian Planning Commission, Perth, Western Australia

Government of Western Australia, 2008, *Western Australian State Budget 2008-09*, Budget Paper No 2, Department of Treasury and Finance, Perth, Western Australia

Government of Western Australia, 2009, *Inquiry into Water Resource Management and Planning Charges: Terms of Reference*, Perth, Western Australia

Government of Western Australia, 2009, *Notice for the Amendment to the Terms of Reference for an Inquiry into Water Resource Management and Planning Charges*, Economic Regulation Authority, Perth, Western Australia

Government of Western Australia, 2009, *Western Australian State Budget 2009-10*, Budget Paper No 2, Department of Treasury and Finance, Perth, Western Australia

Government of Western Australia, 2010, *Western Australian State Budget 2010-11*, Budget Paper No 2, Department of Treasury and Finance, Perth, Western Australia

Johnson, S.L., Commander, D.P., O'Boy, C.A. and Lindsay, R.P., 2005*, Groundwater investigation program in Western Australia (2005 to 2020*), Department of Environment, Hydrogeological Report Series, Report HG10

Johnson, S.L, 2010, *State Groundwater Investigation Program Review and Planning 2010/11 to 2012/13*, Department of Water, Hydrogeological Report Series, Report HR302

Marsden Jacob Associates, 2009, *Advice on the Department of Water's Cost Efficiency and Water Resource Management and Planning Charges*, Economic Regulation Authority, Perth, Western Australia

National Water Commission, 2009, *Australian Water Reform 2009: Second biennial assessment of progress in implementation of the National Water Initiative*, National Water Commission, Canberra, ACT

Quantum Management Consulting and Assurance, 2010, *Report for the Economic Regulation Authority Inquiry into Water Resource Management and Planning Charges: Department of Water's Processes*, Economic Regulation Authority, Perth, Western Australia

Thomas, J.F, 2010, *Report to the Economic Regulation Authority on the Department of Water's Approach to Determining Allocation Limits in the Manjimup Area for the ERA Inquiry into Water Resource Management and Planning Charges*, Resource Economics Unit, Perth, Western Australia

Appendix D Glossary

Term	Definition
Allocation plan	A plan that details how much water is available from a particular area, how much water can be taken and how it should be accessed
Allocation planning response (R) Also called risk response	Management response as R1, R2, R3, or R4 that largely based on the risk category (C) that the water resource falls into, specifically: • R1 - water use managed though licences • R2 - water use managed through licences and allocation plan. Plan based on most current investigation and assessment work • R3 - water use managed through licences and allocation plan. Plan based on newly commissioned investigation and assessment work. • R4 - water use managed through licences, allocation plan (R2 or R3) and recovery strategy
Aquifer	Underground formation of water bearing rock
Bore	A deep hole of small diameter drilled to an aquifer
Catchment area	A drainage area, especially of a reservoir or river
Consumptive pool	The amount of water that can be made available for consumptive use in a particular water allocation plan area under that plan
Direct costs	In this report, direct costs refer to the expenditure incurred in projects directly associated with the conduct of the activity In DoW's submission, direct costs also include the internal branch support costs allocated to activities
Gauging station	A water level recorder installed to measure and record the depth of water in a stream
Gigalitre (GL)	Measure of volume equivalent to one billion litres 1GL=1,000ML
Gnangara Mound	Perth's largest source of groundwater, stretching from Gingin in the north to the Swan River in the south.
Internal branch support costs	Costs incurred with a branch of DoW in support of the activities conducted within that branch. Involve direct support of and involvement in the activity and hence, are not considered to be overheads.
Internet Protocol (IP) telemetry	Technology that transfers data directly from a gauging station to a regional server allowing remote measurement and reporting of data
Kilolitre (kL)	Measure of volume equivalent to one thousand litres 1 kL = 1,000 L

Term	Definition
Management area category (C)	Categorisation as C1, C2, C3, or C4 according to the current allocation as a percentage of the allocation limit, where: • C1 – resource is <30% allocated • C2 – resource is between 30% and 70% allocated • C3 – resource is between 70% and 100% allocated • C4 – resource is >100% allocated
Megalitre (ML)	Measure of volume equivalent to one million litres 1 ML = 1,000 kL
National Water Initiative (NWI)	The Intergovernmental Agreement on a National Water Initiative was signed at the 25 June 2004 Council of Australian Governments meeting. Western Australia Government joined in April 2006. The NWI contains commitments by governments to increase the efficiency of Australia's water use.
On-costs	Include costs associated with activities that support DoW's operations , such as finance and administration, human resources and information Also referred to as overheads
Over-allocation	Situations where with full development of water access entitlements in a particular system, the total volume of water able to be extracted by entitlement holders at a given time exceeds the environmentally sustainable level of extraction for that system
Proclaimed areas	Areas proclaimed under the *Rights in Water and Irrigation Act 1914.* Water sources in these areas are managed by DoW through licensing water users.
Rating curve	Curve representing the relationship between the height and flow of surface water sources
Trace	Calculation to identify the depth for surface water sources