

**Guidelines for  
Implementing Total Management Planning**

**Asset Management**

**WATER SOURCE MANAGEMENT  
Implementation Guide**



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## **LIST OF ACRONYMS**

COAG	Council of Australian Governments
KPI	key performance indicator
NR&M	Department of Natural Resources and Mines
ROL	Resource Operations Licence
ROP	Resource Operations Plan
SWOT	strengths, weaknesses, opportunities, threats
TMP	Total Management Plan
TWE	transferable water entitlement
WRP	Water Resources Plan
WSP	Water Service Provider

## 1 PURPOSE

This guide is intended to provide guidance for water service provider (WSP) practitioners and their consultants on the processes involved in establishing and implementing effective water source management strategies and procedures and developing associated documentation.

## 2 INTRODUCTION

### Outcomes

The outcomes from the implementation of effective water source management are:

- water sources of quantity, quality and reliability that will meet a WSP's current and future requirements; and
- regulatory compliance.

### Outputs

Outputs from the water source management process include:

- Water Source Management Plan (TMP sub-plan);
- strategic water source planning studies;
- water allocation approvals;
- catchment management studies;
- water quality studies;
- Drinking Water Quality Management Plan (TMP sub-plan), as per the Drinking Water Quality Implementation Guide; and
- dam safety studies.

## 3 BACKGROUND

Water sources can be classified as:

- surface water sources;
- groundwater sources; or
- bulk water purchased from another WSP.

A reliable, quality water source is one of a WSP's most critical assets. Failure of supply, in terms of both quality and quantity, can have serious implications for customer service and the business.

The Queensland Government has recently reviewed the State's water resource policies and legislation, resulting in the *Water Act 2000*. This is in response to emerging needs and community expectations that water be managed in an ecologically sustainable way, with equitable, transparent and reliable arrangements for water sharing and use.

These water reforms are part of a national obligation, recognised and agreed to by all Australian States and Territories through the Council of Australian Governments (COAG). Key elements of the COAG Water Reform Policy are:

- secure provision of water for the environment;
- clearer specification of water entitlements for users;
- adoption of transfer arrangements for water;
- opportunity for greater private sector involvement in the water industry;
- institutional arrangements that separate the roles of water supply and regulation; and
- greater public consultation and participation in water management.

## 4 THE WATER SOURCE MANAGEMENT PROCESS

Water source management consists of four interrelated elements within a regulatory framework:

- management of water source reliability;
- water quality management;
- management of infrastructure assets; and
- optimisation of business opportunities.

### 4.1 Management of water source reliability

To achieve this it is important to have an understanding of the sources of water supply including:

- meeting regulatory requirements in relation to:
  - Water Resource Plans (WRPs);
  - Resource Operations Plans (ROPs); and
  - Resource Operations Licences (ROLs);
- evaluating the current yield and reliability of existing sources;
- assessing future raw water requirements and identifying and pursuing available sources and allocations, within the framework of the *Water Act 2000*;
- developing and implementing formalised operating rules for storages, detailing how the storage would be operated to meet WRP outcomes regarding environmental flows (where appropriate);
- operation of the sources (ground and surface water) to meet customer demands during normal and abnormal (e.g. drought) conditions;
- reducing water losses from sources (e.g. capping of bores within the Great Artesian Basin);
- maximising water available from headworks; and
- investigating opportunities that may exist for water trading.

### 4.2 Water quality management

Over the past few years both the urban and rural water industry have suffered increasingly from the deterioration of raw water quality. Problems have included blue-green algae outbreaks, giardia, cryptosporidium, increasing turbidity and salinity, and excessive growth of noxious weeds. There have also been increasing incidences of groundwater contamination from nitrates. Effective management of catchments and water storages can provide considerable water quality improvement. Water quality management will involve:

- proactive involvement in integrated catchment management initiatives;
- proactive input into land use planning;
- monitoring, analysing and reporting on water quality;
- operating intakes to abstract the optimal quality water;
- improving water quality through destratification (where appropriate);
- managing recreational activities to minimise impacts on water quality and the natural environmental; and
- risk management and the development of contingency plans in the event of adverse events that have an impact on water quality.

### 4.3 Management of infrastructure assets

Water source infrastructure such as dams, weirs and bores would be included in a WSP's planned maintenance program and documented operation procedures. These assets would be given a high level of importance, thus justifying investment in maintenance. Referable dams, due to the potentially damaging consequences of failure, are subject to regulatory requirements under the *Water Act 2000*. Many of these requirements are essentially good practice and could also be applied at an appropriate level to non-referable dams.

A dam safety program should ensure that six functional levels of documentation exist:

- emergency action plan;
- standing operating procedures;
- detailed operating and maintenance manuals;
- inspection and evaluation reports;
- data books; and
- dam safety review/design report.

#### **4.4 Optimisation of business opportunities**

Where a WSP is supplied bulk water from another WSP a formal agreement will exist between the parties, which will cover matters such as water quantity, quality, reliability, pricing, payment, flow measurement, communication processes and conflict resolution.

### **5 RISK ISSUES**

Potential risks associated with water source management include:

- failure of structure (e.g. dam/weir/bore);
- errors in yield estimation/storage capacity;
- water quality risks;
- inappropriate development within catchment;
- chemical spillage within catchment;
- source failure due to over-allocation/severe drought etc.; and
- inappropriate operational practices.

### **6 TMP REQUIREMENTS**

Each WSP's Total Management Plan (TMP) should include an outline of key issues and identified strategies addressing these issues for the WSP's services in respect of water source management. Appendix A provides indicative content and appropriate TMP development level for this sub-plan.

A hierarchy has been established to define the level to which a WSP should develop its plan under total management planning. This is discussed in more detail in the TMP Development Guide. The development level depends on the size of the WSP (in terms of the replacement cost of its assets).

### **FURTHER READING**

*Guideline for Failure Impact Assessment of Water Dams*, Department of Natural Resources and Mines, 2001.

*Queensland Safety Management Guidelines For Referable Dams*, Department of Natural Resources and Mines, 2001.

## APPENDIX A: Content and development level of sub-plan

TABLE A1: Indicative sub-plan content

Sub-plan features	Water Source Management Plan content
Issues covered in sub-plan	<ul style="list-style-type: none"> <li>▪ Conjunctive water sources and allocations.</li> <li>▪ Institutional arrangements, management structures and agreements.</li> <li>▪ Source utilisation regimes/protocols.</li> <li>▪ Source water quality management.</li> <li>▪ Catchment/recharge area management.</li> <li>▪ Dam safety management.</li> <li>▪ Environmental flows.</li> </ul>
Purpose of plan	<ul style="list-style-type: none"> <li>▪ To provide an overview of the WSP's current water source (surface and groundwater) management practices.</li> <li>▪ To outline the WSP's future objectives and initiatives in water source management.</li> </ul> <p>NOTE: The Water Source Management Plan need not encompass the management of sources of water purchased in bulk from another WSP.</p>
Policies that may be required	<ul style="list-style-type: none"> <li>▪ Management of catchment/recharge area land use.</li> <li>▪ Recreational use of raw water storages.</li> <li>▪ Operation of multiple-purpose storages with conflicting objectives.</li> </ul>
Other Total Management Plan elements that are intimately linked to this sub-plan	<ul style="list-style-type: none"> <li>▪ Operations Management Plan: addresses need for source operating regimes.</li> <li>▪ Infrastructure Plan: provides for planning of future source development.</li> <li>▪ Drinking Water Quality Management Plan: for provision of safer water supplies.</li> <li>▪ Environmental Management Plan: management strategy will consider environmental impacts of and on water sources.</li> <li>▪ Risk Management Plan: will consider risks of source failure, dam failure, water quality problems, etc.</li> </ul>
External issues contributing to the current operating environment that need to be considered	<ul style="list-style-type: none"> <li>▪ Conditions of water allocations for each source, dam failure, etc. under a WRP or earlier NR&amp;M permit.</li> <li>▪ The Great Artesian Basin rehabilitation program.</li> <li>▪ Integrated catchment management Initiatives.</li> <li>▪ The availability of TWEs. WSPs will be able to use TWEs to buy, sell, or lease excess water to match the demand.</li> <li>▪ Implications of any requirements for environmental flows.</li> <li>▪ Statutory responsibilities and initiatives for land use control within source catchments.</li> <li>▪ Referable dam safety conditions under <i>Water Act 2000</i>.</li> <li>▪ New water resource legislation under <i>Water Act 2000</i>.</li> </ul>
Issues that need to be considered in summarising the status of current operations	<ul style="list-style-type: none"> <li>▪ Range of sources, allocations, environmental flow allowances, and supply yields.</li> <li>▪ Status of bulk supply agreements.</li> <li>▪ Catchment land use control arrangements.</li> <li>▪ Storage recreation control arrangements.</li> <li>▪ Storage and groundwater operating principles.</li> <li>▪ Storage water quality management arrangements.</li> <li>▪ Groundwater conservation and water quality protection measures.</li> <li>▪ Status of compliance with dam safety conditions and surveillance.</li> <li>▪ Broad SWOT analysis of relevant operations.</li> </ul>

Sub-plan features	Water Source Management Plan content
Strategic basis of the plan	<p>The strategic elements forming the basis of the plan should include:</p> <ul style="list-style-type: none"> <li>▪ goal for asset management;</li> <li>▪ objective(s) for water source management;</li> <li>▪ adopted KPIs; and</li> <li>▪ management strategies and performance targets.</li> </ul> <p>The management strategies developed will be based on the identified key strategic issues and SWOT findings, including risk assessment, in respect of water source management, and on the required TMP development level.</p> <p>Many WSPs are likely to require strategies for securing future water allocations; developing/ enhancing management plans for catchment and/or aquifer recharge area land use; recreational use of storages; storage operation and/or control of aquatic plants; developing/ enhancing water quality monitoring programs; and for reviewing dam safety and complying with dam safety conditions.</p> <p>The strategies should be supported by detailed action plans covering a period of up to 3 years.</p>
Suggested performance measures	<p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>▪ Number of days unplanned water restrictions applied.</li> <li>▪ Number of days emergency alternative sources utilised.</li> </ul> <p><b>Output:</b></p> <ul style="list-style-type: none"> <li>▪ Water storage volume.</li> <li>▪ Ratio of total abstraction to available yield.</li> </ul>
Supporting documentation	<p>This will depend on the WSP, but typically would include:</p> <ul style="list-style-type: none"> <li>▪ strategic water source assessment studies;</li> <li>▪ copies of water allocation permits;</li> <li>▪ catchment management studies;</li> <li>▪ water quality studies;</li> <li>▪ design, construction information (bores, weirs, dams); and</li> <li>▪ dam safety studies.</li> </ul>

**TABLE A2: Required sub-plan development level**

Development level <sup>1</sup>	Target management mechanisms of Water Source Management Plan
3	<ul style="list-style-type: none"> <li>▪ Future water requirements assessed and allocations secured.</li> <li>▪ Catchment and/or aquifer recharge area land use management plans in place.</li> <li>▪ Emergency response plan in place for major catchment/recharge area pollution events</li> <li>▪ Storage recreational use management plan/policies in place.</li> <li>▪ Storage operational regime(s) in place.</li> <li>▪ Management plan(s) in place for controlling aquatic plants and cyanobacteria, such as blue-green algae.</li> <li>▪ Source water quality monitoring program(s) in place.</li> <li>▪ Compliance with referable dam safety conditions.</li> </ul>
2	<ul style="list-style-type: none"> <li>▪ Future water requirements assessed and allocations secured.</li> <li>▪ Emergency response plan in place for major catchment/recharge area pollution events.</li> <li>▪ Storage recreational policy established.</li> <li>▪ Management plan(s) in place for controlling aquatic plants and cyanobacteria, such as blue-green algae.</li> <li>▪ Compliance with referable dam safety conditions.</li> </ul>
1	<ul style="list-style-type: none"> <li>▪ Future water requirements assessed and allocations secured.</li> <li>▪ Emergency response plan in place for major catchment/recharge area pollution events.</li> <li>▪ Management plan(s) in place for controlling aquatic plants and cyanobacteria, such as blue-green algae.</li> <li>▪ Compliance with referable dam safety conditions.</li> </ul>

<sup>1</sup> Defined in Section 4.2 of TMP Development Guide.