



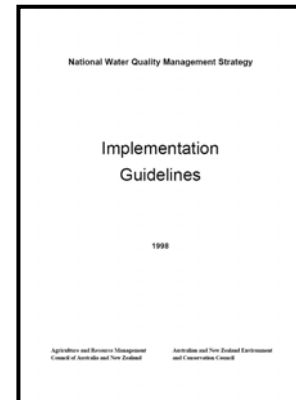
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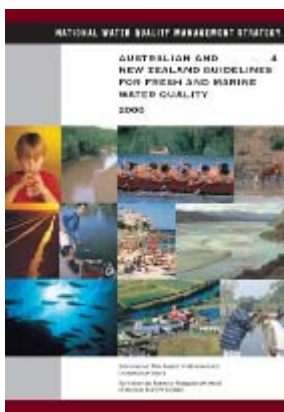


FINAL DISCUSSION PAPER

ON

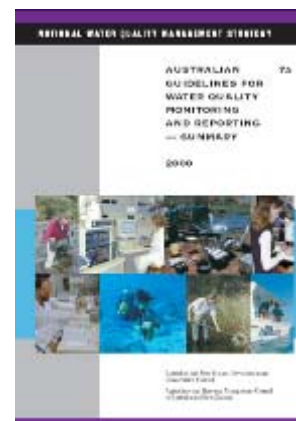


IMPLEMENTATION OF THE NATIONAL WATER QUALITY MANAGEMENT STRATEGY (NWQMS)



Prepared by

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in consultation with the NWQMS Contact Group

December 2008

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List of Abbreviations

ACT	Australian Capital Territory
ADWG	Australian Drinking Water Guideline
AETG	Aquatic Ecosystem Task Group
ANZECC	Australian and New Zealand Environment & Conservation Council
ARMCANZ	Agricultural & Resource Management Council of Australia and New Zealand
BoM	Bureau of Meteorology
BMP	Best management practice
CCI	Coastal Catchments Initiative
COAG	Council of Australian Governments
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Development Assessment
DAFF	Department of Agriculture, Fisheries and Forestry
DEWHA	Department of Environment, Water, Heritage and the Arts
DSE	Department of Sustainability and Environment
EIA	Environmental Impact Assessment
EHO	Ecosystem Health Objective
EPA	Environment Protection Authority/Agency
EPBC	Environmental Protection and Biodiversity Conservation
EPHC	Environment Protection and Heritage Council
EV	Environmental value
FARWH	Framework for Assessing River and Wetland Health
FSANZ	Food Standards of Australia and New Zealand
HCVAE	High Conservation Value Aquatic Ecosystems
ICAG	Intergovernmental Coastal Advisory Group
ICZM	Integrated Coastal Zone Management
IUWCM	Integrated Urban Water Cycle Management
JSC	Joint Steering Committee
LG	Local Government
LWA	Land and Water Australia
M&E	Monitoring and Evaluation
MDB	Murray Darling Basin
NAP	National Action Plan for Salinity and Water Quality
NCP	National Competition Policy
NEN	National Estuaries Network
NHMRC	National Health and Medical Research Council
NHT	Natural Heritage Trust
NLWRA	National Land and Water Resource Audit
NRM	Natural Resource Management
NRMCM	Natural Resource Management Ministerial Council
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
NWC	National Water Commission
NWI	National Water Initiative
NWQMS	National Water Quality Management Strategy
QLD	Queensland
RHCG	River Health Contact Group
S&T	Standards and Targets
SA	South Australia
SEQ	South east Queensland
SoE	State of Environment
TAS	Tasmania
VIC	Victoria
WA	Western Australia
WG	Working Group
WQ	Water quality
WQIP	Water Quality Improvement Plan
WQO	Water Quality Objective
WSC	Water Sensitive Cities
WSUD	Water Sensitive Urban Design
WWTF	Wetlands and Waterbirds Taskforce

Executive Summary

Background - NWQMS to date

The National Water Quality Management Strategy (NWQMS) is the main mechanism for water quality management in Australia (see Appendix 1). The Strategy was jointly developed in the 1990s by the Agricultural & Resource Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment & Conservation Council (ANZECC). These two Ministerial Councils are now the Natural Resource Management Ministerial Council (NRMMC) and the Environment Protection and Heritage Council (EPHC). They continue to have responsibility for overseeing implementation of the NWQMS which is carried out by state and territory governments (and others).

The NWQMS and its **guideline documents** relate to various components of WQ Management and are broken down under the following headings:

- **Policies and Process** for Water Quality Management;
- Water Quality Benchmarks;
- Groundwater Management; and
- Guidelines for Diffuse and Point Sources.

The NWQMS document *Policies and Principles* is based on a strategy of high-status national guidelines with local implementation and emphasises the importance of:

- ecologically sustainable development;
- integrated (or total) catchment management; and
- best management practices, including the use of acceptable modern technology and waste minimisation and utilisation.

Fundamental to the relevance and success of the NWQMS is that it provides guidance that can be readily tailored to suit legislative and institutional arrangements across jurisdictions and the specific task being undertaken. Governments have made substantial progress in water quality management, using the NWQMS as a key reference and source of guiding policies and principles.

The process for water quality management starts with the community working in concert with government to develop a management plan for each catchment, aquifer, estuary, coastal water or other waterbody. The plan should take account of all existing and proposed activities and developments; it should contain feasible management options that aim to achieve the environmental values (EVs) that have been agreed for that waterbody. The process is outlined in NWQMS *Implementation Guidelines* and schematically represented in Figure 1 from a national perspective and in Figure 2 from a specific catchment perspective.

Purpose of this Review of Implementation of the NWQMS

The purpose of this project is to rapidly review implementation of the NWQMS across Australia and New Zealand and recommend a range of suggested actions to DEWHA and the NWQMS contact group for possible future developments to improve its implementation. The project scope does not include assessing the feasibility of the suggested actions.

This report represents one source of information to be used by DEWHA and the NWQMS contact group for their discussions on the need for and extent of a potential review of the NWQMS components.

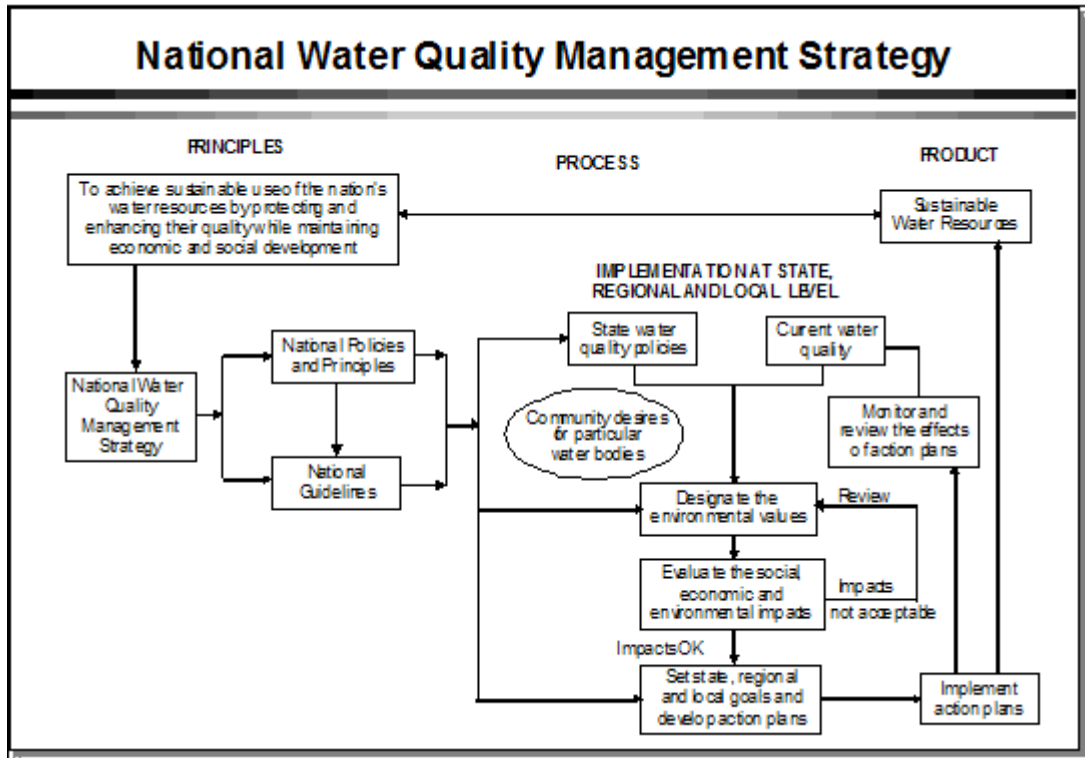


Figure 1. National Water Quality Management Strategy (NWQMS)

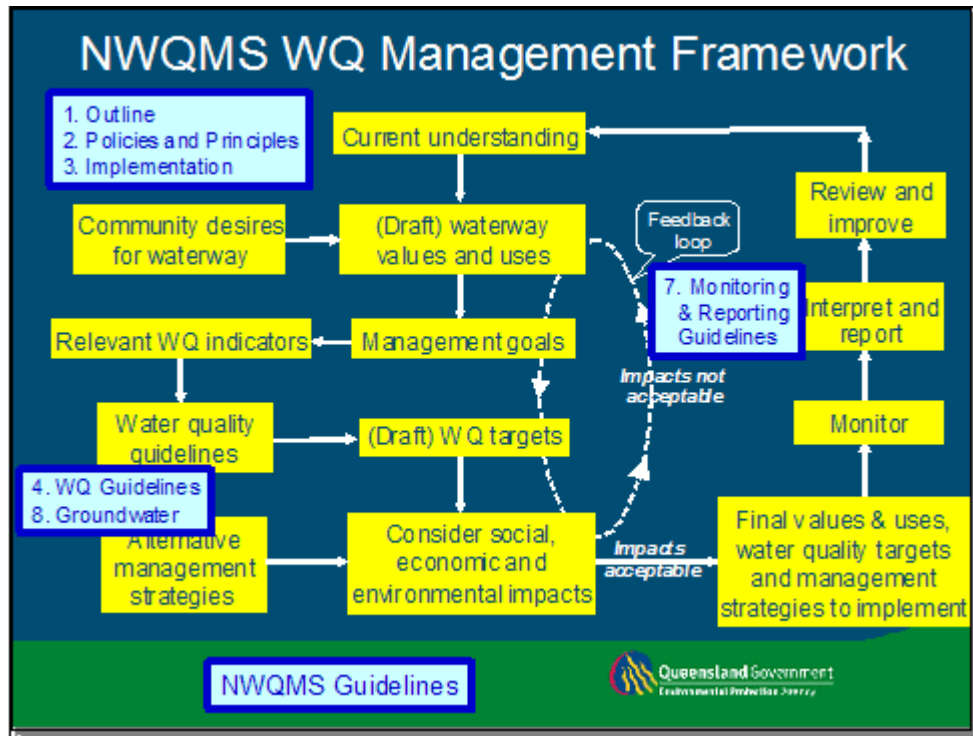


Figure 2. NWQMS Water Quality Management Framework

Review Methodology

The agreed process for this project included the following tasks:

- establish a network of key jurisdictional personnel involved with implementation of the NWQMS (based on the existing NWQMS contact group);
- review of the relevant NWQMS literature (NWQMS Guideline documents, jurisdictions' legislation/policies/regulations, 2005 Water Reform Assessment, selected regional / catchment NRM plans);
- design a survey / questionnaire (with DEWHA) based on the literature review;
- email the survey / questionnaire to the selected NWQMS network;
- follow up telephone interviews with the selected NWQMS network based on their response to the survey / questionnaire (plus some face to face interviews);
- draft report and workshop the findings with DEWHA and the NWQMS Contact Group;
- final report to DEWHA and the NWQMS Contact Group (this "discussion paper").

Context for the NWQMS Review

In order to both review NWQMS implementation to date and make recommendations for future directions and priorities, it is necessary to:

- understand the target audience ("users") and their needs;
- understand the changes in these "users" and their surrounding environment;
- consider the range of water types and the connectivity between them;
- understand the complementary national initiatives related to WQ management;
- understand the future threats to Australia's waterways;
- have an agreed vision for where the NWQMS fits into this environment; and
- be adaptive in both WQ management actions and the supporting processes (including the nature and content of the NWQMS).

The Review

The review examined the status of NWQMS implementation to date, recognising the flexibility to vary implementation approaches is part of the strength of the Strategy. The review focused on the contribution the strategy and its guideline documents has made to WQ management and achieving sustainable water resources. Through the literature review and the interviews and workshop with the NWQMS contact network, information was obtained on the successes and areas for improvement at the jurisdictional level (e.g. through legislation, policies, regulations, programs, etc.), as well as at the regional/catchment level where WQ management plans form the basis of NWQMS implementation.

Within that context, the review looked at specific WQ-related management actions (e.g. point sources, urban and rural diffuse sources), other sources of impacts on WQ/ecosystem health (environmental flow requirements, activities in-stream and in riparian areas), as well as actions supporting the development and implementation of successful catchment based WQ management plans (community engagement, scientific information and understanding, WQ guidelines, effective management strategies, decision support tools, economic measures, effective monitoring, evaluation and reporting).

Lastly, it also looked at emerging NWQMS-related activities including identification and protection of high conservation value aquatic ecosystems, off-stream wetland programs, climate change activities, total water cycle management, acid sulfate soils and improved groundwater management (linked to learnings from mining developments and their studies).

The following two sections provide a summary of the key findings of the review under the headings of “successes” and areas for “improvements”. Then the graphic (explained in detail in section 6) shows how this review fits into the strategic planning for future implementation of the NWQMS. Lastly, a summary table of the actions recommended (in sections 5 and 6) is provided under group headings of “outcomes sought”, as well as a table summarising the proposed action for each NWQMS guideline.

Key findings

“Successes”

The following are areas where the NWQMS has been the driver for “successes” in WQ management in Australia and some good lessons have been learnt:

Good Process

- The NWQMS WQ management framework (shown graphically in Figure 2) has provided a good, consistent WQ management process which has been firstly incorporated in jurisdictions’ legislation & policies and then used as the basis for catchment level WQ management plans;
- Most WQ management issues have been covered by the NWQMS guideline documents;
- Point sources of pollution are well managed, by firstly legislated approval processes, and then compliance monitoring and enforcement;

Good technical guidelines

- The WQ “benchmark” guidelines (water quality, drinking water, monitoring and reporting guidelines) have provided sound technical references to support WQ management;
- Jurisdictions have developed to various extents their own WQ guidelines (mainly based on a referential approach);
- The NWQMS has been reactive to some emerging WQ issues (e.g. wastewater recycling, water sensitive urban design).

Good progress at catchment level

- At the catchment scale, there is now a good range of examples of riverine & coastal catchment WQ management plans. These provide a wealth of information and knowledge that needs to be collated to provide case studies to share with relevant NWQMS users and improve WQ management across Australia. The components of these WQ management plans where case study material exists includes:

- ✓ Conceptual (graphical) models;
- ✓ Community engagement in planning & management (including establishing environmental values);
- ✓ Reference sites-based WQ guidelines;
- ✓ Effective management strategies;
- ✓ Catchment and receiving water modelling;
- ✓ Risk assessments;
- ✓ Decision making tools; and
- ✓ Designing, implementing, collating, assessing and reporting on WQ monitoring.

“Improvements”

The following are areas where the NWQMS could be “improved” so the NWQMS will be more effective in supporting future WQ management in Australia:

Better “linking” of water management activities and agreed role of NWQMS

- With the advent of the National Water Initiative, the NWQMS is not included in water reform assessments. A process is needed to keep the necessary links between management of water quantity and WQ and combine the assessments of their progress;
- Reviewing implementation of the NWQMS offers an opportunity to revise the “Vision” for NWQMS and define its key areas of responsibilities and its necessary links to other WQ-related activities;
- In defining these responsibilities and links, the opportunity should also be taken to group the relevant skill sets necessary for the range of complex WQ management issues and hence produce effective results. Working groups, etc. from both management and scientific perspectives need to be drawn from their areas of expertise e.g. ecosystem health [all water types], human health, industrial uses, etc.

Better access to NWQMS information

- With the advent of new information technologies and a more mobile workforce, it is critical to have a central, well maintained NWQMS website and provide information and capacity building in “user-friendly” manner. There are a number of recommendations that hinge on having such a website to disseminate their products;
- The wealth of information and knowledge from the “successes” in catchment WQ management plans needs to be collated and disseminated on the NWQMS website to provide case studies to share with relevant NWQMS users and improve WQ management across Australia;

Improved interactions and processes at the catchment level

- From a stakeholder’s perspective, there needs to be consistent “terminology” for all water resource management activities (including NWQMS, NWI and NRM programs)
- Again from a stakeholder’s perspective, each waterway needs a common value setting process (i.e. NWQMS’s environmental values) that supports all water resource management activities (WQ management, water quantity management, natural resource management). This common value setting for waterways would then assist better “integration” of all water resource planning & management;
- With the advent of improved catchment-based WQ management plans, the next challenge is to use these plans for jurisdiction/regional/local government planning e.g. proactively assisting with future “urban footprints” to ensure waterway environmental values are protected;
- A number of jurisdictions responsible for environmental impact and development assessment processes are detailing the processes for assessing impacts of new developments (e.g. new urban areas, new industries) on receiving waters. These methods could be consolidated and shared with other WQ managers;

Emerging issues and opportunities

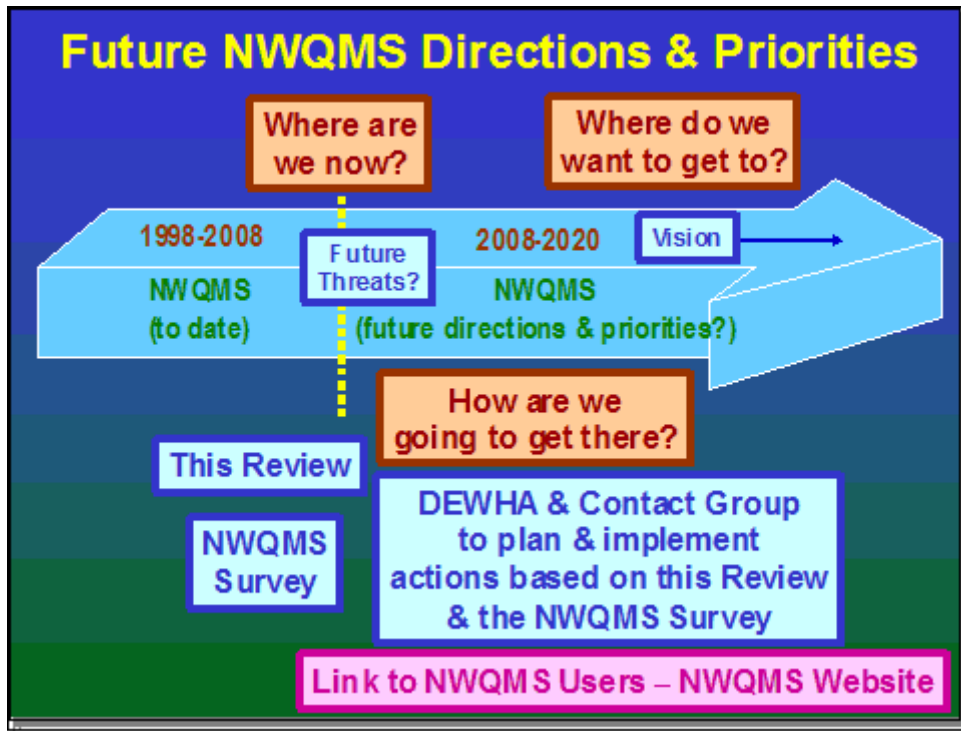
- Emerging activities in response to climate change and improvements in approaches to WQ management such as total water cycle management and water sensitive urban design provide opportunities to integrate WQ management-related matters with developments in these areas. These should be pursued in future NWQMS directions and priorities;
- Economic measures were espoused in NWQMS documents but it is only in recent times that these measures (e.g. market based instruments) are actively being assessed and

used for WQ management. These measures are likely to be more prominent in future NWQMS implementation;

- The NWQMS to date has had reasonable successes for riverine and coastal waterways with less focus on ground waters and off-stream wetlands, and even less success in considering the connectivity between these water types. Opportunities exist to improve in these areas and build on recent programs for off-stream wetlands, as well as the improved knowledge of groundwaters (principally from mining studies);
- A key component of WQ management is the identification and protection of high conservation value aquatic ecosystems. This work has recently got underway and needs to be incorporated into future implementation of the NWQMS;

Improved guidelines

- While the “technical” WQ and Monitoring & Reporting guidelines have provided a sound foundation for the NWQMS to date, they can be improved by incorporating the learnings from the last decade’s research and application, as well as developing more “user friendly” versions for the NWQMS website (and allow easier access to them for new and existing users).



Context of this Review in Planning for future NWQMS implementation

Recommended Actions

The following table provides a **summary of recommended actions (grouped by outcomes sought)**.

Outcome sought	Brief description	Section
Agree on next steps to progress NWQMS	DEWHA and the NWQMS Contact Group to continue to meet and, based on inputs including this report, develop and implement a plan for future NWQMS directions and priorities	6.3.1
Engage NWQMS practitioners in scoping future NWQMS directions	Survey other NWQMS users to determine their needs	5.1.2.2 6.1
Establish context of future issues for NWQMS	Undertake a rapid assessment of future threats to Australian waters (linked to climate change risk assessments)	6.2
Set core future direction for NWQMS	Agree on vision, role and process to manage NWQMS into the future	6.3.1&4
Map out and establish links to NWQMS related activities	Map out how national water management activities will be linked	6.3.4
	Establish appropriate NWQMS links to other WQ-related initiatives and documents	6.3.4
	DEWHA & NWQMS Contact Group to work with NWC to agree on a modification to the NWI to include an obligation to implement and report on the NWQMS	4.1
	Map out and maintain appropriate links with NHMRC's WQ-related working groups (WGs)	5.1.1.3
	NWQMS Contact Group consider formally engaging the NWC WSUD WG for NWQMS urban stormwater management matters	5.2.2
	Actively link the NWQMS with climate change programs (and update guidelines where necessary)	5.4.3
	Progress opportunities to get better connections between NWQMS and programs focusing on off-stream wetlands	5.4.2
A central, user-friendly NWQMS website that supports future NWQMS implementation	Develop and maintain a user-friendly NWQMS website	6.3.2
	Consider a web-based learning environment for key NWQMS technical guidelines	6.3.2
	Develop user-friendly interfaces for main NWQMS Guidelines, especially #4 and #7	5.3.3 5.3.6
	Addition of tools, documents, and links to other relevant resources on the NWQMS website, to meet the needs of those involved with total water cycle management	5.4.4
Collate and share	Hold a workshop to review CCI's WQIPs	5.1.3

Final Discussion Paper on Implementation of NWQMS

Outcome sought	Brief description	Section
“lessons” on establishing and using catchment based WQ management plans		
	Review Victorian riverine WQ Management Plans (with action #15)	5.1.3
	Collate case studies on community engagement and setting EVs (link with action #15)	5.3.1
	Collate case studies on consultation with traditional owners/indigenous people and establishing cultural and spiritual values	5.3.1
	Collate case studies on conceptual models	5.3.2
	Collate case studies on models, socio-economic assessments and decision support tools	5.3.4
	Continue to collate feedback on WQ case studies using economic measures	5.3.5
	Develop/collate case studies on use of Guideline #7	5.3.6
Improve on catchment based WQ planning & management	Develop consistent “terminology” for all WQ/NRM plans	5.1.3
	Align NWQMS rural diffuse matters with national NRM programs	5.2.3
	Establish a WG to consolidate management strategies for riparian and in-stream habitats	5.2.4.2
	Develop case studies in use of ICM plans for jurisdiction/LG planning	5.1.2.2
	Undertake SWOT (strengths, weaknesses, opportunities, threats) analysis re need for NRM legislation when appropriate	5.1.2.1
	Collate, and further develop if necessary, user guides for undertaking EIAs and receiving water assessments for discharges to waterways/water resources	5.1.2.2 5.2.1
Improve “integration” of WQ and water quantity management	Establish a WG to develop riverine value setting and threat assessment processes (to underpin both WQ and quantity management)	5.2.4.1
	After that, explore similar processes for other water types	5.2.4.1
Improve/update existing NWQMS guidelines	Then update Guidelines #1-3 (Policies and Processes). The update should include outcomes of AETG’s HCVAE work	5.1.3 5.4.1
	Establish a WG to develop a detailed strategy to update Guidelines #4 and #7	5.3.3 5.3.6
	Consider updating Guideline #7 to include simpler documents, case studies and latest knowledge as a component of updating Guideline #4	5.3.6
	Update Guideline #10 with the NWC WSUD WG’s outputs/outcomes	5.2.2
	Update Guideline #9 at appropriate stage	5.2.3
New guidelines	Scope the need for a new NWQMS Economic Measures Guideline	5.3.5

Final Discussion Paper on Implementation of NWQMS

The table below provides a **summary of proposed actions for each NWQMS guideline:**

No.	NWQMS Guideline Title	Proposed Action
	Policies and Process for WQ Management	
1	<i>Water Quality Management — An Outline of the Policies (1994)</i>	Update these three guidelines after the case studies for catchment WQ management plans and HCVAE tasks are completed (and incorporate their findings)
2	<i>Policies and Principles — A Reference Document (1994)</i>	
3	<i>Implementation Guidelines (1998)</i>	
	Water Quality Benchmarks	
4	<i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)</i>	Establish a WG to develop a detailed strategy to update Guideline #4
6	<i>Australian Drinking Water Guidelines (2004)</i>	NHMRC (and NRMCC) continue with responsibility for updating this guideline
7	<i>Australian Guidelines for Water Quality Monitoring and Reporting (2000)</i>	Develop supporting simpler documents and case studies for Guideline #7. Update with Guideline #4.
	Groundwater Management	
8	<i>Guidelines for Groundwater Protection (1995)</i>	Update using risk based approach to management?
	Guidelines for Diffuse and Point Sources	
9	<i>Rural Land Uses and Water Quality — A Community Resource Document (2000)</i>	Align NWQMS rural diffuse matters with national NRM programs. Update at appropriate stage.
10	<i>Guidelines for Urban Stormwater Management (2000)</i>	NWC WSUD WG to advise if/when to update guideline to incorporate their recent work
11	<i>Guidelines for Sewerage Systems — Effluent Management</i>	Await feedback from LGs and wastewater utilities in survey re their needs for updates and new guidelines
12	<i>Guidelines for Sewerage Systems — Acceptance of Trade Waste (Industrial Waste) (1994)</i>	As for #11
13	<i>Guidelines for Sewerage Systems — Biosolids Management (2004)</i>	As for #11 and continue to use current “biosolids” working group
14	<i>Guidelines for Sewerage Systems — Use of Reclaimed Water (1999) – see #21</i>	Superseded by #21
15	<i>Guidelines for Sewerage Systems — Sewerage System Overflows (2004)</i>	As for #11
16a	<i>Effluent Management Guidelines for Dairy Sheds (1999)</i>	Await feedback from specific industries in survey re their needs for updates and new guidelines
16b	<i>Effluent Management Guidelines for Dairy Processing Plants (1999)</i>	
17	<i>Effluent Management Guidelines for Intensive Piggeries (1995)</i>	
18	<i>Effluent Management Guidelines for Aqueous Wool Scouring and Carbonising (1995)</i>	
19	<i>Effluent Management Guidelines for Tanning and Related Industries in Australia (1995)</i>	
20	<i>Effluent Management Guidelines for Australian Wineries and Distilleries (1998)</i>	
21	<i>Australian Guidelines For Water Recycling - Managing Health & Environmental Risks - Phase 1&2 (in prep)</i>	Continue with current development process

1. NWQMS History

The National Water Quality Management Strategy (NWQMS) is the main mechanism for water quality management in Australia (see Appendix 1). The Strategy was jointly developed in the 1990s by the Agricultural & Resource Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment & Conservation Council (ANZECC). These two Ministerial Councils are now the Natural Resource Management Ministerial Council (NRMCC) and the Environment Protection and Heritage Council (EPHC). They continue to have responsibility for overseeing implementation of the NWQMS which is carried out by state and territory governments (and others).

The Natural Resource Management Ministerial Council has main responsibility for implementation of the NWQMS. The Environment Protection and Heritage Council has put water quality (WQ) on its strategic plan and is also involved in certain Guidelines such as water recycling. The National Health and Medical Research Council (NHMRC) and the Australian Health Ministers' Conference are involved in aspects of the NWQMS which affect public health.

The NWQMS and its documents have three major elements: policies, process and national guidelines.

1.1 Policies

The main policy objective of the NWQMS is set out in NWQMS Document #2, Policies and Principles — A Reference Document (ANZECC/ARMCANZ 1994) and is:

to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development.

This objective is being pursued through a strategy based on high-status national guidelines with local implementation. Document # 2, emphasises the importance of:

- ecologically sustainable development;
- integrated (or total) catchment management;
- best management practices, including the use of acceptable modern technology and waste minimisation and utilisation; and
- the role of economic measures, including 'user-pays' and 'polluter-pays' approaches.

1.2 Process

The process for water quality management starts with the community working in concert with government to develop a management plan for each catchment, aquifer, estuary, coastal water or other waterbody. The plan should take account of all existing and proposed activities and developments; it should contain feasible management options that aim to achieve the environmental values that have been agreed for that waterbody. The process is outlined in NWQMS Document #3, *Implementation Guidelines* (ANZECC/ARMCANZ 1998) and schematically represented in Figure 1 from a national perspective and in Figure 2 from a specific catchment perspective.

The NWQMS envisages use of both regulatory and market-based approaches. Management of water resources is mainly a State and Territory responsibility, but implementation of the NWQMS will be accomplished in the context of:

- the NWQMS guidelines;
- State and Territory water policies;
- community preferences on the use and values of local waters;
- the current water quality of local waters; and
- the economic and social impacts of maintaining current water quality or of meeting new local water quality goals.

Implementation of the NWQMS should include:

- catchment, groundwater and coastal water quality management plans;
- an appropriate level of water and sewerage services provided by water authorities; and
- further development of regulatory and market frameworks.

Community views form a crucial part of the NWQMS and public comment is sought during both the development and the implementation of the strategy.

1.3 National Guidelines

The national guidelines are technical documents providing guidance on many aspects of the water cycle including ambient and drinking water quality, monitoring, groundwater, rural land and water, urban stormwater, sewerage systems and effluent management for specific industries. These are discussed in Section 4.2.

2. Context for the NWQMS Review and Recommending Future Directions

2.1 Purpose of the NWQMS

The NWQMS aimed to assist with WQ management across Australia and New Zealand by providing:

- consistent principles, policies and processes;
- a process for integrated WQ management at a catchment scale, including the establishment of environmental values (EVs) and water quality objectives (WQOs) to protect them;
- technical guidelines for water quality to protect these environmental values;
- guidelines on management of key threats to water quality from point sources (sewage and industrial wastewaters) and diffuse sources from both urban and rural areas; and
- guidelines for monitoring and reporting on water quality.

The following sections of this report evaluate the strengths and weaknesses in implementing the NWQMS to date (including the use of the NWQMS documents) recognising that fundamental to the success of the NWQMS is that it provides guidance that can be readily tailored to suit legislative and institutional arrangements and has the flexibility to be relevant to specific tasks. This report suggests options for improved future directions and priorities for NWQMS, including any necessary adjustments and developments required for the NWQMS support mechanisms e.g. guidelines documents, information dissemination.

2.2 Context for Evaluation of NWQMS

In order to both review NWQMS implementation to date and make recommendations for future directions and priorities, it is necessary to:

- understand the target audience (“users”) and their needs;
- understand the changes in these “users” and their surrounding environment;
- consider the range of water types and the connectivity between them;
- understand the complementary national initiatives related to WQ management;
- understand the future threats to Australia’s waterways;
- have an agreed vision for where the NWQMS fits into this environment; and
- be adaptive in both WQ management actions and the supporting processes (including the nature and content of the NWQMS).

Target audience (“users”) and their needs

In the context of the target audience, Doolan (2000) outlined the roles in waterway management at different levels from the national government to individual landholders. Table 1 is adapted from those roles, by adding other “users” of the NWQMS, and also provides NWQMS-related examples. *[Note: Management approaches and institutional frameworks can vary significantly between jurisdictions, therefore the roles for waterway management presented in this table are indicative only].*

The better these roles and responsibilities are understood, agreed and coordinated, the better the management of WQ in our waterways will be. Also, the better the needs of the NWQMS “users” are known, the better the NWQMS products will meet their needs. The “users” that were involved in this rapid evaluation are highlighted in yellow in Table 1. *[Note: The ‘roles’ presented in this table are indicative only. This is because management approaches and institutional frameworks can vary between jurisdictions.]*

Table 1 - NWQMS “Users” roles & NWQMS-related examples

Roles	NWQMS-related examples
National role	
• funding to jurisdictions, groups and individuals to achieve national objectives	Caring for our Country, Natural Heritage Trust, National Action Plan for Salinity and WQ, Coastal Catchments Initiative
• facilitates inter-jurisdictional coordination	NRM Ministerial Council and committees, NWQMS Contact Group
• invests in development of national principles, best management practices, tools, research and development to facilitate improved management	NWQMS to date, Cooperative Research Centres
• ensures Australia meets its international obligations	Australia's National Program of Action for the Protection of Marine Environments; EPBC Act requirements
• monitoring & reporting	BoM, NLWRA, National SoE Report
State/Territory role	
• sets jurisdiction-wide policy and strategic directions	Environmental Protection Policies (Water)
• establishes legislative and regulatory frameworks	Environmental Protection Acts and Regulations
• establishes institutional arrangements	Regional NRM Bodies, Local Governments
• invests in provision of advice, research and monitoring, planning, extension, on-ground works and enforcement functions	Typically functions of jurisdictional level government (e.g. environmental protection, water resources, primary industry and planning agencies)
• implements jurisdiction responsibilities under nationally agreed strategies	Establishes environmental values (EVs) & water quality objectives (WQOs), Develops Water Resource Plans
• provides funding to groups and individuals to achieve jurisdiction and regional priorities	Cash and In-kind support for regional NRM bodies (e.g. NHT programs)
• monitoring & reporting	Jurisdiction's SoE Reports
Regional role	
• develops regional strategies and action plans	Regional NRM Plans, WQ Improvement Plans
• provides advice to jurisdiction on regional resourcing priorities	Regional Investment Strategies
• coordinates and implements work programs	Implements Regional NRM Plans
• provides incentives and support for groups and individuals	Funding actions in NRM Plan and providing extension services
• provides mechanisms for community involvement in natural resource management	Community involved in developing and implementing NRM Plans
• monitoring & reporting	State of Region Reports
Water Utilities' role	
• provide water supply, wastewater treatment and stormwater drainage services	Provides services that meet Water Quality Objectives and relevant NWQMS Guidelines
Local governments' (LG) role	
• incorporates waterway management objectives, priorities and actions into statutory planning processes	Incorporates Water Sensitive Urban Design into LG planning schemes and development assessment processes
• provides local support for local community groups	Support for local communities' waterway restoration projects
Developers' role	
• provides sustainable development	Plan and implement water sensitive urban design
Industries' role	
• provides sustainable industries	Incorporates industries' guidelines in its activities
Consultants' role	
• provides professional/technical services to developers, industries, government, etc.	Provides services that meet Water Quality Objectives and relevant NWQMS Guidelines
Peak Industry Bodies' (Industries, AWA, IEAust, SIA, etc) role	
• provides strategic support for their industry	Support development and implementation of industry guidelines
Landcare (community) groups' role	
• smaller-scale waterway and catchment management projects	NHT Envirofund projects
Landholders' role	
• land stewardship	Developing and implementing their farm management plans
Research institutions' role	
• provide supporting knowledge and tools	Scientific studies, models, best practices, WQ guidelines

Key features of where the NWQMS has had potential to assist to date are:

- providing direction to national and jurisdictional funding programs;
- facilitating inter-jurisdictional coordination through relevant council, committees and working groups;
- development of national principles, processes, best management practices, etc to facilitate improved planning, impact assessment and management;
- setting jurisdiction-wide legislation, policy, regulations and strategic directions;
- supporting institutional arrangements for regional NRM bodies;
- provision of process and advice on catchment-based WQ planning, including community involvement and scientific underpinning;
- provision of process and advice on management actions for specific point and diffuse pollution sources, as well as supporting actions such as monitoring, research and community capacity building.

[Note: The main target audience for this rapid evaluation of the NWQMS was the NWQMS Contact Group (i.e. state/territory government level) but feedback was also sought from this group on NWQMS implementation at the regional and local government level.]

Users and their changing environment

For this review of the NWQMS and to make recommendations for future directions, it is necessary to consider both the changes in the users of the NWQMS and their surrounding environment over time. This is particularly relevant in making future recommendations for the NWQMS to ensure that the revised products, processes and other support mechanisms best match the users needs and environments.

Given an understanding of the current context, matters that need to be considered in relation to future development and implementation of the NWQMS include:

- Users are more “mobile” in the employment now and are likely to continue to be into the future. This means that water management agencies need to better capture and document “corporate knowledge” to carry out their core functions, as well as being able to more easily “induct” and “skill” new employees into their roles;
- Information is much more readily available now, and will be in future, with the advent of technologies such as the internet;
- The “learning” environment is also changing from structured courses in academic institutions to more flexible options such as “online” courses;
- The institutional arrangements supporting implementation and continual improvement of the NWQMS are subject to change e.g. greater role for regional NRM bodies with programs such as Caring for our Country;
- “Water quality” management needs to be considered together with other major “water” initiatives that impact on it, including the National Water Initiative (including major changes with water quantity management), total water cycle management, integrated catchment/waterway management programs (e.g. regional NRM Plans), water sensitive urban design, wetland management programs, coastal management programs, etc..

Range of water types and their connectivity

In principle, the NWQMS should address all water types (see Figure 3) in all climatic regions in Australia. In practice, these are complex matters with catchments containing all water types. A key challenge that is still facing water managers is both the knowledge and tools for, and the management of, the connectivity between the water types. The management of these different water types falls to different agencies, with different management mechanisms to achieve their protection, as well as different scientific skills and personnel providing the understanding needed for management. In particular, management of off-stream wetlands has received “fragmented” coverage across Australia. Likewise, the treatment of groundwater issues needs further

attention. Future NWQMS directions will need to consider how to better link WQ management of all these water types and manage their important connectivity issues, both at the local catchment scale and with any necessary supporting national strategies.

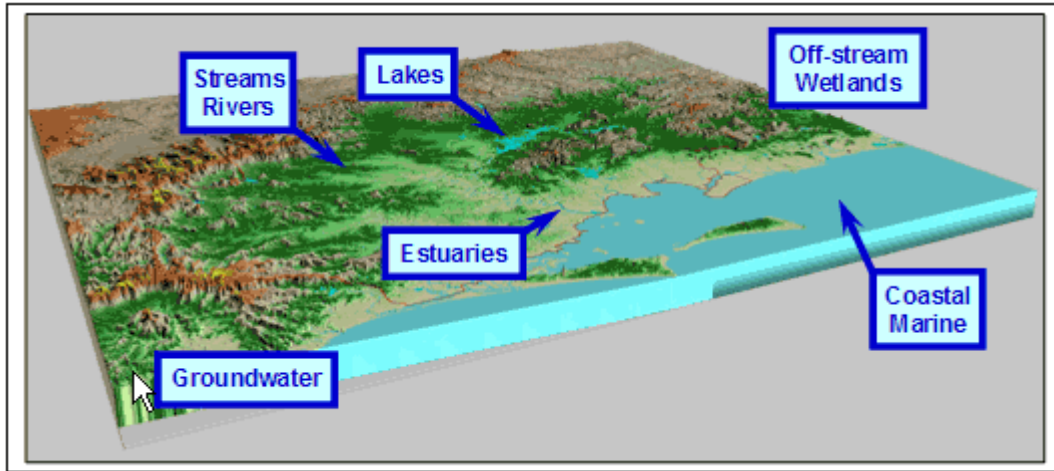


Figure 3 - Example of different water types (Adapted from SEQ Healthy Waterways graphic)

Understand the complementary national initiatives related to WQ management

The key to a successful NWQMS is to clearly define its role and how it will link to complementary WQ-related initiatives. These may take the form complementary strategies, programs, plans, working groups, etc. (see Table 2 for a list of these).

Table 2 - Key National WQ-related Strategies, Programs, Plans, Groups, etc

Complementary Initiatives	Principal Water Types Addressed	Focus	Comments
NWQMS	All	All WQ management processes and issues	Subject of this evaluation
NRM Plans (National S&T and M&E frameworks)	Potentially all water types	All NRM matters for targets including physical-chemical WQ and aquatic ecosystem integrity	Supported by Caring for our Country Program and associated jurisdictional programs
WQIPs (using Framework for marine and estuarine WQ)	Estuaries Coastal	Sustainable pollutant loads to protect coastal environmental values	Provides more detailed estuarine/coastal WQ management components to catchment NRM/WQ Plans
ICZM	Coastal Marine	National cooperative approach to coastal management	
ICAG	Coastal Marine	National cooperative approach to coastal management	Intergovernmental group to implement ICZM
NWI (NWC)	All water types	COAG framework for water reform	See Table 3 and Appendix 8
NWI JSC for Water Sensitive Cities	All water types	NWI Paragraph 92 – IUWCM, WSUD, WSUDev.	Sub - working groups including WSUD Technical Working Group
BoM	Rivers	Data on flow, physical-chemical WQ	
State of Environment / NLWRA	All water types	Consistent approach to water monitoring, assessment and reporting	
AETG	All water types	Identification and protection of HCVAE	
RHCG	Rivers	Technical support for river health monitoring	Sub-group of AETG
WWTF	Off-stream wetlands Lakes?	Technical support for wetland monitoring	Sub-group of AETG
NLWRA Estuaries Group / NEN	Estuaries	Technical support for wetland monitoring / Technical networking for estuary management	
Water-watch	All water types	Community based WQ monitoring	
Commonwealth Water Act 2007 / Basin Plan / MDBA / MDBC	Rivers Groundwater Off-stream wetlands	Water flows, salinity, fish	Formal management structures, committees, working groups

The above table is a starting point for discussion as there are also other national strategies, programs, plans, groups, etc. that have links to WQ management such as: National Rainwater and Grey Water Plan; National Biosolids Research Program; National Acid Sulfate Soils Management Plan and Water for Future.

An example of mapping out appropriate links with NHMRC's WQ-related working groups is provided in section 5.1.1.3 (see Figure 14). Such a "map" then provides a basis for establishing relevant roles of each group and maintaining appropriate links between their WQ management activities. Once such links, roles, etc. are agreed, they can be easily communicated to interested stakeholders.

Current and Future Threats to Australia's Water Environments

For NWQMS to be strategic and proactive in the future, it should be informed by both current and future threats to Australia's water environments. Existing information from audits, state of environment reports, etc provides an insight into the current state and management responses to current pressures on Australian waterways and wetlands. This information needs to be supplemented with risk assessments and predictions of impacts from major new emerging issues such as climate change, global fuel and food shortages, future requirements for food, fibre, water, mineral resources, etc. to shape the NWQMS needs for future strategic management. The future NWQMS directions therefore need to be informed by these assessments and be flexible in the strategies to incorporate any emerging WQ issues.

Vision

The current NWQMS has the following Policy Objective:

to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development.

The future NWQMS would greatly benefit from both a long term "aspirational" vision, such as the following, as well as more specific medium term objectives for assessing its progress:

to help achieve healthy water bodies that support livelihoods, lifestyles and ecosystems, with sustainable use of the nation's water resources, by providing a flexible framework that can be applied for protecting and enhancing their quality while maintaining economic and social development.

This vision would allow users to clearly see where the NWQMS fits within all water-related initiatives and strategies. The medium term objectives such as:

- *High conservation value aquatic ecosystems are identified & protection mechanisms are in place;*
- *Water quality and water quantity management are integrated; and*
- *Urban areas are designed based on total water cycle management & water sensitive urban design;*

could be used to "plot" and adaptively manage future "core" and "integration/linking" directions for the NWQMS e.g. better integration of water quantity and water quality management at the catchment level.

Adaptive Management

The concept of adaptive management ("learning by doing") is now well established in natural resource management (NRM) and WQ management across Australia and New Zealand. This is reflected in the NWQMS WQ Management Framework shown at the national scale in Figure 1 and at the catchment scale in Figure 2. More broadly, it also underpins both the national NRM program and its monitoring and evaluation (M&E) framework, including the work of the National Land and Water Resources Audit (NLWRA) and its associated working groups for various water types (rivers, estuaries, coastal/marine). It also underpins

environmental protection legislation which typically incorporates the concept of state of environment (SoE) reporting informing future environmental management.

Adaptive management operates at a number of spatial and temporal scales and is based on progressively incorporating new learnings, tools, priorities, etc.. For example:

- At a sub-catchment scale, regional NRM bodies are reviewing their investment strategies annually;
- At a catchment/regional scale, these bodies are reviewing their NRM/WQ plans at about a 3-5 year period;
- At a jurisdictional level, related legislation, regulations, policies, plans, etc are being reviewed around a 5-10 year period; and similarly
- At a national scale, reviews of national legislation, strategies (e.g. this NWQMS), programs (e.g. NHT) are being reviewed on a 5-15 year period.

The NWQMS needs to ensure its supporting principles, policies, processes, guidelines, working groups, etc reflect the benefits of such adaptive learning and be periodically modified to suit. The NWQMS Contact Group and its working groups also need to be flexible and adapt to changing situations to best achieve the NWQMS vision and policy objectives.

Overall, this review and subsequent decisions for the future of the NWQMS need to recognise the above context and ensure that the products, processes and other future support mechanisms are effective in achieving its vision. This means the role of the NWQMS needs to be clearly defined, and be flexible in its future implementation, so that it best supports WQ management and integrates with the other water-related initiatives and strategies.

2.3 Project Scope

The Department of Environment, Water, Heritage and the Arts (DEWHA) has contracted this project to rapidly report on implementation of the NWQMS to date and recommend to DEWHA and the NWQMS contact group possible future developments to improve its implementation.

The Australian Government approach to this evaluation is to pursue nationally agreed perspectives and implement national strategies in collaboration with states and territories. As such, the DEWHA and NWQMS contact group can then further assess this report's recommendations, along with other inputs, and agree on subsequent actions to improve NWQMS implementation.

The services required of this project are detailed in Appendix 2. In summary, the project is to:

- assess current status of NWQMS implementation;
- identify issues where implementation was working well or not working well;
- recommend ways to improve implementation of the NWQMS; and
- assist develop future directions and priorities of the NWQMS.

2.4 Project Limitations

The following limitations have applied throughout this evaluation:

- interviews were limited to the NWQMS contact network (i.e. the NWQMS users highlighted in Table 1) and so was largely at the state/territory government level with their insights of other NWQMS "users" perspectives; and
- the report is based, in a large part, on information provided by the Contact Network, at interviews, in completed survey/questionnaires and in a Contact Group workshop.

3. Project Methodology

The aim of the project is to rapidly establish the status of implementation of the NWQMS across Australia and New Zealand and make recommendations for future developments to DEWHA and the NWQMS contact group for their further assessment and subsequent action. The initial agreed process for this project was:

- establish a network of key jurisdictional personnel involved with implementation of the NWQMS (based on the existing NWQMS Contact Group);
- review of the relevant NWQMS literature;
- design a survey / questionnaire (with DEWHA) based on the literature review;
- email the survey / questionnaire to the selected NWQMS network;
- follow up telephone interviews with the selected NWQMS network based on their response to the survey / questionnaire; and
- report on the findings to DEWHA.

Subsequently, DEWHA extended the project to have the NWQMS Contact Group review the draft report and then discuss it together at a two day workshop in Adelaide (19-20 August 2008). An outcome of the workshop was to rework this report incorporating comments and inputs from DEWHA and jurisdictions. The final steps were quick reviews of the final draft discussion paper (the “report”) by the DEWHA and contact group, and producing the final document to reflect the comments received. A key change was that the report is now titled a “discussion paper”, to reflect its purpose to stimulate discussions on future directions for the NWQMS. These discussions started at the August 2008 workshop and will continue through the NWQMS Contact group.

3.1 NWQMS Contact Network

There is an existing NWQMS Contact Group including representation from all jurisdictions (including New Zealand). This group was used as the core of the contact network for this project. Based on feedback from the contact group, this group was expanded to include other key contacts who have had significant involvement with the NWQMS since its inception in the 1990s. Appendix 3 is a list of the people contacted for the project.

DEWHA initially provided the contact network with a letter of introduction to the project and its process. The consultant then made initial contact with each member of the group to clarify any questions on the project, provide more detail on the process of using the survey / questionnaire and then follow up interviews, seek feedback on other key contacts and lastly their suggestions for regional natural resource management (NRM) plans to review. The group was subsequently provided with a survey / questionnaire (and associated thought provokers) to complete and return. Then they participated in either a face to face meeting or a telephone interview to assist in completing their detailed feedback (based on the survey / questionnaire). DEWHA subsequently extended the terms of reference for the project to include an initial review of the draft project report by the contact network, then consideration and discussion of its recommendations together at a two day workshop in Adelaide (19-20 August 2008) and finally a review of the final draft discussion paper.

3.2 Review of relevant NWQMS literature

The review of relevant NWQMS literature included the following:

1. the NWQMS documents (see Box 1 in Appendix 1);
2. all Australian Government, state, and local government level legislation, policy instruments and regulations addressing water quality management in Australia;

3. previous progress reports on the Council of Australian Governments' (COAG) water reforms to the National Competition Council (and more recently the National Water Commission [NWC]), which included reports on implementation of the NWQMS; and
4. a representative cross section of NRM plans developed by individual catchment management authorities and groups across Australia, including those funded by Natural Heritage Trust.

The NWC has developed an Australian Water Governance website (http://www.nwc.gov.au/nwi/water_governance/index.cfm) that includes a category for all jurisdictions on "water quality management". This has three sub-categories of: drinking water management, recycled water management and environmental health management. It has a graphic and 2-4 page summary of the environmental health management category that is an excellent summary of the principal WQ management legislation, policy instruments and regulations for each jurisdiction. After meeting with DEWHA and NWC officers, it was decided that this project would use, and then with jurisdictions' assistance, would update these summaries and graphics. This material also provided the basis for task 2 above.

On 20 April 2006, the Australian Government released the *2005 National Competition Policy Assessment of Water Reform Progress* (NWC 2006). The assessment was conducted by the National Water Commission and is the sixth and last National Competition Policy (NCP) assessment of governments' progress with implementation of water-related reforms. Previous assessments were undertaken by the National Competition Council. This is the most recent national review of jurisdictions' implementation of the NWQMS. NWC's *Water Reform Assessment Framework 2005* (NWC 2005) detailed the requirements for the jurisdictions' reports.

In future years, the NWC will assess governments' water reform performance through the biennial assessments of progress in implementing the National Water Initiative. The first biennial assessment for 2006–07 is scheduled for public release in 2008.

Following the consultant's meetings with NWC and DEWHA, DEWHA agreed that, while the 2005 NCP Assessment would be analysed to provide some information on implementation of the NWQMS, much more current and detailed information would result from the interviews with the contact network in this project. Hence, DEWHA decided that the review for task 3 would be limited to reporting on the 2005 NCP Assessment.

For task 4, the cross-section of NRM plans chosen for review was based on the feedback from the contact group and consultants involved in reviews of these plans. The links between Water Quality Improvement Plans (developed under the Coastal Catchments Initiative) and regional NRM plans were also considered.

In summary, the literature review aimed to inform and support the interviews in evaluating the NWQMS implementation, including jurisdictions' similarities and diversity of approaches to water quality management.

3.3 Link to NWQMS Capacity Building Workshops

The Department of Agriculture, Fisheries and Forestry (DAFF) and South Australian Environment Protection Authority/DEWHA funded ten NWQMS Capacity Building Workshops around Australia in 2005-2006 (see workshop locations in Figure 4). The Coastal CRC ran the workshops and Mackenzie et al (2005) reported on the outcomes of the first seven workshops.

A social evaluation of the 2005-2006 NWQMS workshop series (Urbis 2008) ran in parallel with this consultancy. As an input to the Urbis project, the consultant for this project was contacted and interviewed to provide additional information to that evaluation. It is envisaged that future NWQMS capacity building workshops commissioned by DEWHA will be enhanced by feedback from both the above social evaluation and this project.

The ***Evaluation of the 2005/06 NWQMS Workshop Series*** report (Urbis 2008) was provided to the consultant on 4 June 2008 i.e. during the review period for this report. It has a number of findings that support the outcomes of this review. The Urbis findings are shown in the following text box and the individual findings are repeated in shaded text boxes (like this one) in relevant sections of this report to complement the related findings from this project.

Opportunities to further support practitioners implementing the Guidelines

Although it is clear that the workshops have an important place in terms of supporting and promoting the uptake of the Guidelines and Strategy more broadly, there have been a number of other suggestions made about how practitioners and associated stakeholders working in the field might be better supported in their work.

It may be beneficial to consider the following:

- Producing a community supplement to the NWQMS and an accompanying 'how to' guide;
- Preparing a few simple case studies that describe how the NWQMS has been implemented;
- Creating an online forum for practitioners implementing the NWQMS;
- Producing a booklet or online resource for under-resourced organisations;
- Promoting the email list that updates subscribers on changes to the NWQMS;
- Articulating how the NWQMS fits with other policies and legislation that inform NRM requirements;
- Offering and promoting access to independent scientists and water quality management experts;
- Creating a community engagement supplement;
- Exploring ways in which to connect on-ground practitioners and NRM Boards to funding opportunities, and link use to NWQMS.

Considerations for the NWQMS

In terms of making the NWQMS more palatable to practitioners, and increasing its perceived currency and accessibility, the following might be considered:

- Engaging practitioners in any forthcoming review of the Guidelines; and
- Addressing ways in which data collection and management can be improved.

An outcome of the ten workshops and related Coastal CRC projects was an initial website with NWQMS-related material. With the wind-up of the CRC, Geoscience Australia inherited custodianship of that website and is still maintaining it at the following website:

http://www.ozcoasts.org.au/env_mgmt/index.jsp

3.4 Survey / Questionnaire Design, Assessments and Interviews

The project's brief and budget initially required the NWQMS evaluation be based on telephone interviews with the network of key NWQMS stakeholders described above. However, in conjunction with an AusAID project the consultant was participating in, and with limited supplementary funding from DEWHA, the consultant was able to have face to face meetings with contact network members in the ACT, WA, SA, Victoria, Queensland and NSW. Finally, the Adelaide workshop with the NWQMS contact group provided a final opportunity to discuss the draft report with all group members, and in particular those who had not previously had face to face interviews i.e. NT, TAS and New Zealand.

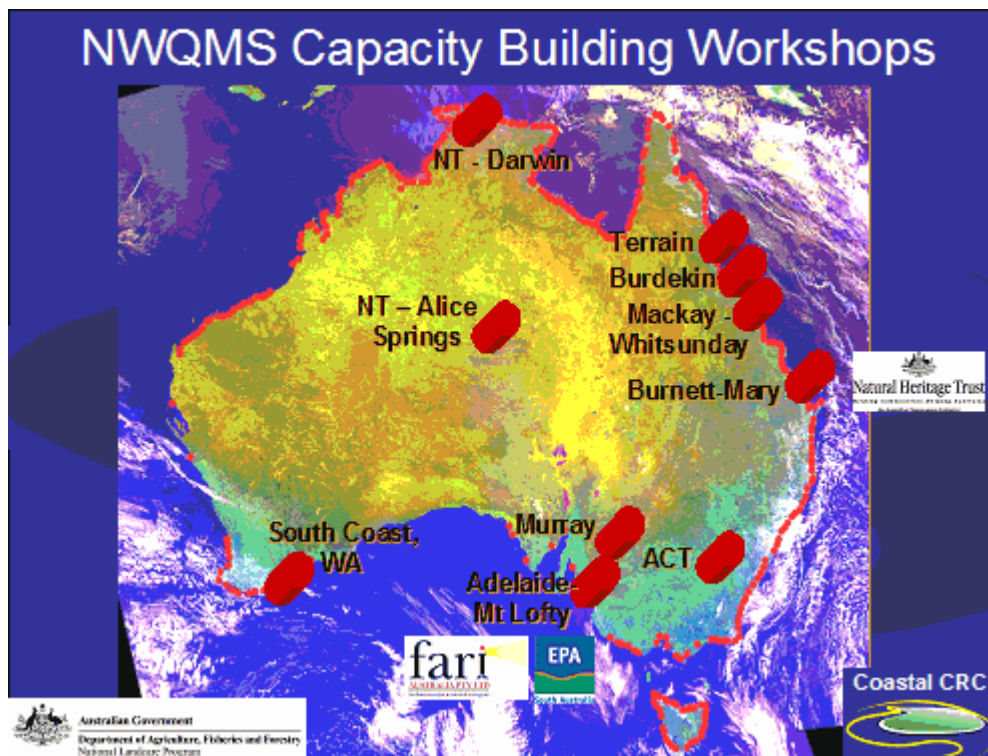


Figure 4 - Location of NWQMS Capacity Development Workshops (2005-6)

As a basis for the interviews, the consultant's first step was to develop a survey / questionnaire and thought provoker in consultation with and endorsement by DEWHA. The aim of the thought provoker (Appendix 4) and questionnaires [comprised of three pro-forma] (Appendices 5-7) was to get the maximum feedback prior to the interviews and to get some consistency in responses from the contact network. The thought provoker and questionnaires also encouraged respondents to provide additional feedback on implementation of the NWQMS and, in particular, recommendations for future directions of the NWQMS.

The questionnaires were developed to help detail and summarise jurisdictions' implementation of the NWQMS (see Appendices 5-7 and note that the appendix numbers shown in brackets below refer to the relevant pro-forma). These were focused on key components of the NWQMS, as shown in Figure 5. The figure shows the main components of the NWQMS, including:

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- the NWQMS guideline documents [policies, processes and technical guidelines] – (Appendix 5);
- the legislation, regulations and policy instruments – (Appendices 6 & 7);
- using the NWQMS process to develop WQ management plans at the catchment level – (Appendices 6 & 7);
- key implementation actions in these plans (e.g. managing point and diffuse sources) – (Appendix 6);
- monitoring and reporting on progress of these actions – (Appendix 6).

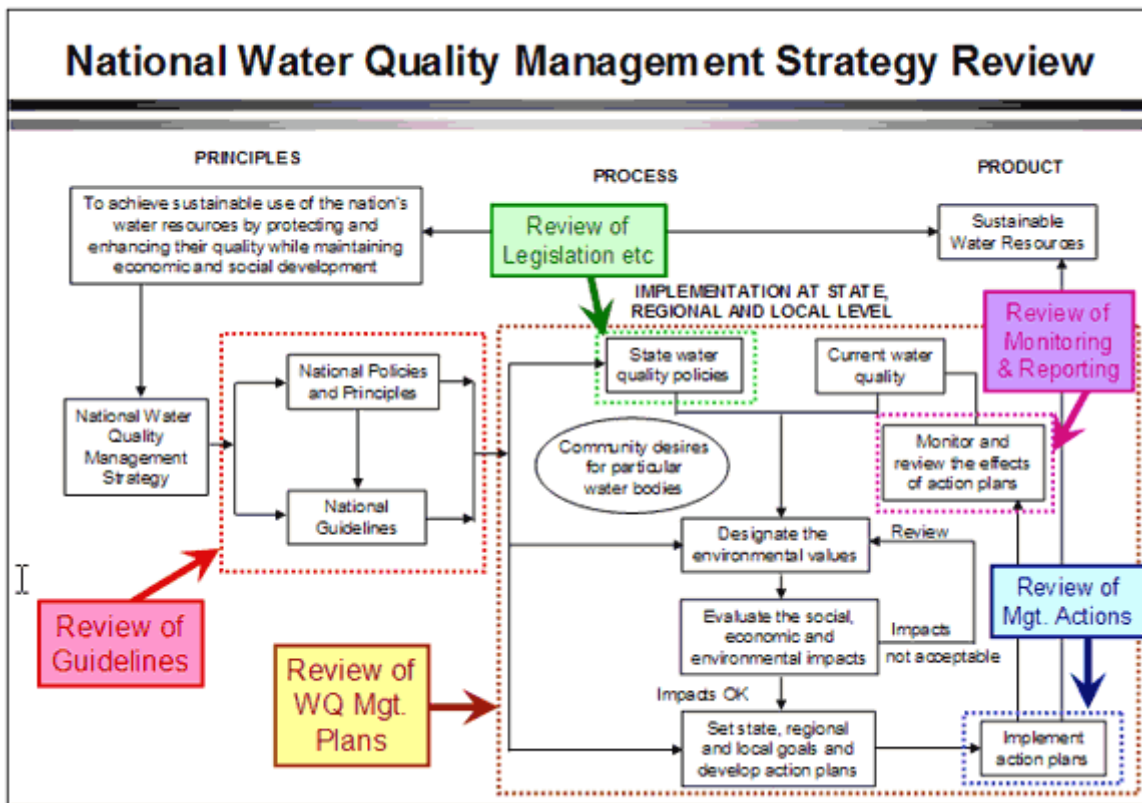


Figure 5 - Key NWQMS components addressed by questionnaires / pro-forma

The questionnaire / pro-forma on the NWQMS guidelines (Appendix 5) sought feedback on all guidelines, with specific questions including:

- How has your jurisdiction used the guideline?
- Who uses it?
- What value is it?
- Does it need updating?
- What needs to be added, updated?
- How can these be regularly updated?
- Any relevant jurisdiction guidelines?
- Any links to jurisdiction's guidelines?
- How to set priorities for new guidelines?
- How to link with Total Water Cycle Management/Water Sensitive Urban Design / Urban Stormwater Management?

The questionnaires / pro-forma were piloted in an initial meeting with ACT government staff. They were then revised and emailed to all the network members for them to complete and return prior to their face to face or telephone interviews. Appendices 4-7 are the final thought provoker and questionnaires / pro-forma.

It was envisaged that the completed questionnaires / pro-forma would be returned on time to assess for common feedback and ideas for future directions, prior to the interviews. In practice, the contact network are busy people and therefore the network members were taken through them in their interviews. Also, as indicated above, further discussions were held with contact group members in Adelaide in response to the draft report, both collectively in the workshop sessions and individually out of session.

The assessments of the information from the interviews provided constructive inputs to the levels of NWQMS implementation and future directions. This interview process allowed more comprehensive implementation information to be obtained and it greatly value-added to the information gained from the literature review. The results from all these tasks are presented in the next section.

4. Results

The results provided below are from the literature review and the interviews with the NWQMS contact network. They are discussed in the next two sections in the context of lessons learnt from NWQMS implementation to date and future directions and priorities for the NWQMS.

4.1 Review of NWQMS Implementation reports to COAG

Background

As outlined in section 3.2, it was agreed that the 2005 NCP Assessment (NWC 2006) would be analysed to provide historical information on implementation of the NWQMS but much more current and detailed information would result from the interviews in this project. Appendix 8 provides details of the NWQMS component of NWC's Water Reform Assessment Framework (NWC 2005), together with the related jurisdictions' responses in the Australian Government's 2005 National Competition Policy Assessment of Water Reform Progress (NWC 2006).

Key requirements of the Assessment Framework are "quoted" below. The comments in brackets show how the pro-forma in this project were designed to provide more recent supporting assessments of jurisdictions' NWQMS implementation.

"NWQMS sets out a national framework within which all stakeholders can contribute to better water quality management. The strategy is based on policies and principles for water quality management that apply nation-wide and includes guidelines covering the key elements of the water cycle, including groundwater, aquatic ecosystems, stormwater, agricultural water use and effluent management for specific industries (pro-forma on NWQMS guidelines – Appendix 5).

The NWQMS has been developed to assist jurisdictions in establishing appropriate environmental outcomes. The national guidelines have a shared national objective but allow flexibility in responding to different circumstances at regional and local levels (Appendices 6 & 7).

Water quality management should occur at the State and Territory level using water quality planning and policy instruments to set water quality goals and objectives that are in line with agreed national guidelines. These goals and objectives should form the basis for management strategies and actions (Appendices 6 & 7).

The process of implementing the NWQMS involves the community working in concert with government in setting and achieving local environmental values, which are designed to maintain good water quality and to progressively improve poor water quality (Appendix 7).

The 1994 Water Reform Framework calls for a mix of approaches including, but not limited to, regulatory and market-based approaches, monitoring, integrated catchment management, education and guidance. Implementation of the NWQMS has strong linkages to other water reform elements, such as water planning, providing water to achieve environmental outcomes, water trading, and the urban water reforms, as well as broader environment protection, planning and natural resource management activities (Appendix 6)."

The findings of the 2005 Assessment are discussed in conjunction with the feedback from interviews in section 5. In summary, jurisdictions have:

- developed legislation, policies and regulations to implement the NWQMS consistently around Australia (some states have state WQ management strategies to implement the NWQMS);
- established environmental values and water quality objectives for catchment waterways either using statewide or catchment based processes;
- developed state and catchment WQ management plans and actions to address point and diffuse sources of pollution;
- incorporated links to the NWQMS policies and principles in their water planning processes to protect EVs and establish environmental flow requirements;
- established links to land use planning and natural resource management plans;
- regulated point sources of pollution;
- developed best practice guidelines and codes of practice for diffuse sources;
- established WQ monitoring and reporting frameworks.

Table 3 shows the components of the NWC’s Water Reform Assessment Frameworks for 2005 and 2007. **It shows that the latest framework does not have a requirement to report on the progress with implementing the NWQMS.** In future, this requirement could be reintroduced or another mechanism (e.g. through the NWQMS Contact Group, revisions to the NWI) introduced to periodically review NWQMS implementation.

Table 3 - National Water Commission’s Water Reform Assessment Frameworks

NWC 2005	NWC 2007	Future NWC Option?
2005 National Competition Policy Water Reform Assessment (COAG 1994)	First Biennial Assessment of NWI (COAG 2004)	Second Biennial Assessment of National Water, Waterways and Wetlands Initiative?
NWC’s Water Reform Assessment Framework Components	Elements of Water Management	Elements of Water, Waterway and Wetlands Management?
Implementation		
Water Access Entitlements and Planning Framework	Water access entitlements and planning framework	As for NWC2007
Water Markets and Trading	Water markets and trading	As for NWC2007
Best Practice Water Pricing and Institutional Arrangements	Best practice water pricing	As for NWC2007
Integrated Management of Water for Environmental and Other Public Benefit Outcomes	Integrated management of water for environmental and other public benefit outcomes	As for NWC2007
Water Resource Accounting	Water resource accounting	As for NWC2007
Urban Water Reform	Urban water reform	As for NWC2007
Community Partnership and Adjustment	Community partnerships and adjustment	As for NWC2007
Knowledge and Capacity Building	Knowledge and capacity building	As for NWC2007
National Water Quality Management Strategy		National Healthy Waterways and Wetlands Management Strategy?

Action Needed:

- DEWHA and NWQMS Contact Group to work with NWC to agree on any necessary modification to the NWI to include an obligation to implement and report on the NWQMS, and at the appropriate time, forward the modification to Natural Resource Management Ministerial Council with a recommendation for endorsement.

4.2 NWQMS Guideline Documents

The NWQMS guideline documents relate to various components of WQ Management and are broken down under the following headings:

- Policies and Process for Water Quality Management;
- Water Quality Benchmarks;
- Groundwater Management; and
- Guidelines for Diffuse and Point Sources.

The guidelines are used by a wide variety of people involved in WQ management and the Table 4 aims to show, generally, the NWQMS guidelines and environmental values of principal interest to the various groups of NWQMS “users”. This table will support the subsequent discussion of NWQMS implementation and scoping future NWQMS directions.

Table 4 - NWQMS Users & Guidelines and EVs of Principal Interest to them

NWQMS “User”	NWQMS Guidelines of Principal Interest ¹	Environmental Values of Principal Interest ²
Environment Protection Agencies	Most	All
Water Resource Management Agencies	3 – Implementation 4 – Water Quality 7 – Monitoring & Reporting 8 – Groundwater 9 – Rural Land Uses	Aquatic ecosystems Primary Industries Recreational uses
Primary Industries Agencies	3 – Implementation 4 – Water Quality 7 – Monitoring & Reporting 8 – Groundwater 9 – Rural Land Uses	Primary Industries
Health Agencies	6 – Drinking water 8 – Groundwater 13 – Biosolids Management 21 – Recycled Water Recreational Guidelines Food Standards Code	Drinking water Recreational uses (Primary & secondary contact) Human consumption
Water Supply Utilities (urban)	4 – Water Quality 6 – Drinking water 8 – Groundwater 21 – Recycled Water Recreational Guidelines Food Standards Code	Drinking water Recreational uses Human consumption
Water Supply Utilities (rural)	4 – Water Quality 6 – Drinking water 8 – Groundwater 9 – Rural Land Uses	Primary Industries Drinking water Recreational uses Human consumption

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NWQMS “User”	NWQMS Guidelines of Principal Interest¹	Environmental Values of Principal Interest²
	Recreational Guidelines Food Standards Code	
Wastewater Utilities	4 – Water Quality 7 – Monitoring & Reporting 11 – Sewage Effluent 12 – Trade Waste 13 – Biosolids Management 14 – Reclaimed Water 15 – Sewage Overflow 21 – Recycled Water	All EVs in waters receiving their treated effluent
Catchment Management Authorities	3 – Implementation 4 – Water Quality 6 – Drinking water 7 – Monitoring & Reporting 8 – Groundwater 9 – Rural Land Uses 10 – Urban Stormwater	All EVs
Local Governments	3 – Implementation 4 – Water Quality 6 – Drinking water 7 – Monitoring & Reporting 8 – Groundwater 10 – Urban Stormwater 13 – Biosolids Management 14 – Reclaimed Water 21 – Recycled Water	Aquatic ecosystems Recreational uses Drinking water Human consumption Cultural & spiritual values
Specific Industries	16a – Dairy Sheds 16b – Dairy Processing 17 – Piggeries 18 – Wool Scouring 19 – Tanning 20 – Wineries & Distilleries	Industrial Uses Primary Industries
Developers	3 – Implementation 4 – Water Quality 7 – Monitoring & Reporting 8 – Groundwater 10 – Urban Stormwater	Aquatic ecosystems Recreational uses Drinking water Human consumption Cultural & spiritual values
Consultants	All (depending on client)	All (depending on client)
Land Care Groups/Landholders	9 – Rural Land Uses	Aquatic ecosystems Primary Industries Drinking water Human consumption
General Public	1– Outline 2 – Policies & Principles 3 – Implementation 4 – Water Quality 6 – Drinking water 7 – Monitoring & Reporting 8 – Groundwater	Aquatic ecosystems Recreational uses Drinking water Human consumption Cultural & spiritual values

Notes: ¹ See Appendix 9 for full list of NWQMS and related guidelines and their short titles
² See Appendix 10 for full list of environmental values for waterways in the NWQMS

The contact network provided feedback on the use of the NWQMS guidelines by completing the pro-forma at Appendix 5. The information provided in completed pro-forma is combined in the detailed table in Appendix 11. As well as this feedback from Australian jurisdictions, two detailed submissions were received from New Zealand and the Australasian Society of Ecotoxicology in relation to future updates to Guideline #4 (i.e. the “Water Quality” guidelines). These submissions are include as Appendices 11-1 and 11-2 respectively.

4.3 WQ Management legislation, policy instruments and regulations

Information on jurisdictions’ WQ management legislation, policy instruments and regulations was initially sourced from the NWC’s literature, principally the “environmental health management” component of its website. These documents were updated with the assistance of feedback from the completed pro-forma from and interviews with jurisdictions and are included in Appendix 12. Further detailed information was also obtained from the jurisdictions’ information in completing the pro-forma in Appendices 6 & 7. The completed pro-forma based on Appendices 6 & 7 are in Appendices 13 & 14 respectively. These contain extensive information on the workings of Australian legislation, policy instruments and regulation, as well as more detailed information on catchment based WQ management.

Being a separate country, the New Zealand (NZ) WQ management arrangements naturally differ from the Australian situation. Firstly, it doesn’t come under the COAG requirements which provides overall direction to the Australian jurisdictions. Secondly, most water-related environmental management and regulation in NZ is conducted by sixteen regional councils, which have equivalent functions to those of Australian jurisdictions. Regional council boundaries are catchment-based. This assists WQ management at the catchment level by reducing cross-boundary issues at the regional level¹. Thirdly, NZ has a national *Resource Management Act* under which most regional councils develop regional water plans. These plans generally follow the NWQMS WQ management process and hence have a lot of similarities with WQ management plans in Australia. Appendix 15 provides a summary of WQ management in New Zealand.

4.4 Review of Selected Regional Natural Resource Management (NRM) Plans

Water Quality Management Plans at the catchment level are a key instrument for implementation of the NWQMS. Development and implementation of these plans are supported by a number of national and jurisdictional policies, programs, plans and projects. At the national level, regional NRM Plans have been supported over the last decade by the Natural Heritage Trust (NHT) programs and the National Action Plan for Salinity and Water Quality program (NAP). The NHT2 program included a Coastal Catchments Initiative (CCI) which supported development of Water Quality Improvement Plans (WQIPs) around Australia in key coastal “hotspot” areas. These WQIPs provided improvements primarily to the estuarine and coastal WQ management components of the regional NRM Plans.

Currently, the Caring for our Country national NRM program is continuing this support for regional NRM Plans and their investment strategies. The jurisdictions, through their bilateral arrangements with the Australian Government, are jointly steering and providing complementary support (cash and in-kind) for these programs. Appendices 13 & 14 show details of jurisdictions’ roles and responsibilities in water quality management planning.

¹ However, it should be noted that there are a number of smaller local authorities within each regional council boundary, who have land use control functions. This means there can be jurisdictional overlap in a region, particularly with regard to integrating water management with land use planning and control.

For this project, a cross-section of NRM plans was chosen for review based on the feedback from the contact group and consultants involved in reviews of these plans. The NRM plans included a cross section to show: improvements over time; plans for riverine and coastal waterways; and plans with different levels of detail. The plans reviewed were:

- Mackay-Whitsunday Region (QLD) NRM Plan 2005;
- Mackay-Whitsunday WQ Improvement Plan (May 2008) – to be incorporated in M-W NRM Plan;
- Hawkesbury Lower Nepean (NSW) Catchment Blueprint (2002);
- Hawkesbury-Nepean Catchment Action Plan (2008);
- South Australian Murray-Darling Basin NRM Region - Initial NRM Plan 2006-2007 – Water Quality Section;
- Goulburn Broken (VIC) Regional River Health Strategy (2005 – 2015); and
- Southeast Queensland Healthy Waterways Strategy (2007-2012).

Appendix 16 details key features of these selected plans, including establishing environmental values, water quality objectives/targets and management and monitoring actions to achieve those objectives/targets. These are discussed further in section 5.1.3. The Mackay-Whitsunday NRM Plan and the subsequent Mackay-Whitsunday WQIP was specifically chosen for review to show the links between WQIPs and regional NRM plans, including how the WQIP added more detail to the WQ management components of the previous NRM Plan. Similarly, the Hawkesbury-Nepean Catchment Action Plan has provided greater WQ management detail to the previous Catchment Blueprint. These examples are also relevant to the discussion on adaptive management in section 5.

In summary, the NWQMS WQ management framework has provided a consistent process for these catchment WQ management plans and there is now a good range of case studies available for riverine and coastal waters to review and share the lessons learnt with those people developing plan for other areas. These opportunities are discussed in section 5.