



Australian Government
National Water Commission

Water issues in jurisdictional planning for mining: an overview of current practice

Sinclair Knight Merz

Waterlines Report Series No 29, May 2010



Waterlines

A SERIES OF WORKS COMMISSIONED BY THE
NATIONAL WATER COMMISSION ON KEY WATER ISSUES

Waterlines

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Online: ISBN 978-1-921107-99-3

Water issues in jurisdictional planning for mining: an overview of current practice, May 2010

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Published by the National Water Commission
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Canberra ACT 2600
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Date of publication: May 2010

Cover design by: Angelink
Front cover image courtesy of SKM library

An appropriate citation for this report is:

Trina Jensen 2010, *Water issues in jurisdictional planning for mining: an overview of current practice*, Waterlines report, National Water Commission, Canberra.

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Abbreviations and acronyms

ACT	Australian Capital Territory
COAG	Council of Australian Governments
DPEMP	Development Proposal and Environmental Management Plan
DPIFR	Department of Primary Industry, Fisheries and Resources
DPIPWE	Department of Primary Industries Parks Water and Environment
DR	Development report
DWLBC	Department of Water, Land and Biodiversity Conservation
EES	Environment Effects Statement
EIS	Environmental Impact Statement
EP Act	<i>Environmental Protection Act 1994</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EMPC Act	<i>Environmental Management and Pollution Control Act 1994</i>
ERMP	Environmental Review and Management Program
MARP	Mining and rehabilitation program
NRETAS	Department of Natural Resources, Environment, the Arts and Sport
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
NT	Northern Territory
NWI	National Water Initiative
PER	Public Environmental Review
PIRSA	Primary Industries and Resources South Australia
QLD	Queensland
SA	South Australia
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i>
SKM	Sinclair Knight Merz Pty Ltd



National Water Commission Mining position statement

The mining and water challenge

On a national basis mining¹ uses a relatively small proportion of water resources, however this use has been increasing rapidly in the last decade and in a number of regions across the country mining is the primary consumer of water. In these regions, or where water systems are approaching or at full allocation, current and future mining developments could, if not adequately managed and regulated, impact on surface water or groundwater systems at a regional scale.

The mining industry plays a major role in the country's economy, but it faces a number of water management challenges including:

- a lack of integration of mine planning and operations in regional water planning processes
- absence of water markets in some mining areas and barriers to trading where markets are established
- uncertainty and insecurity in water supply arrangements
- differences between the mining industry's sectoral regulatory regime and the water sector's regulatory regime, including regulatory changes resulting from the national water reform agenda
- increasing community concerns regarding the cumulative impacts of mining on water resources.

Secure access to and delivery of water are critical to the productivity and development of the minerals, petroleum, energy generation, pulp and paper (MPEPP) and other industrial sectors in Australia. A national report by ACIL Tasman (2007) found that the availability of water is a constraint on further investment and expansion of the MPEPP industries and suggested that the potential value of lost production, due to the unavailability of water of suitable quality, is high.

Mining and the National Water Initiative

Clause 34 of the NWI states that the Parties agree that there may be special circumstances facing the minerals and petroleum sectors that will need to be addressed by policies and measures beyond the scope of the NWI Agreement. In this context, the Parties note that specific project proposals will be assessed according to environmental, economic and social considerations, and that factors specific to resource development projects, such as isolation, relatively short project duration, water quality issues, and obligations to remediate and offset impacts, may require specific management arrangements outside the scope of the Agreement.

Progress on mining related reforms

The Commission found in its 2009 Biennial Assessment of progress in implementation of the NWI that the circumstances in which special clause 34 would apply are not defined and identified in a consistent and transparent manner. Little progress has been made in the five years since the signing of the NWI in fleshing out the special provisions for the minerals and related industries. As a consequence, there has been little integration of those industries with broader water markets and water planning processes, despite the potential for considerable benefits in many cases.

The Commission recommends that NWI-consistent water access entitlements be defined for the minerals and similar industrial sectors in order to provide those industries with secure

¹ For the purposes of this statement, the term *mining* refers to all activities taking place on a mine lease and miscellaneous leases that are associated with the extraction and on-site processing of ore (e.g. ore recovery, tailings management, water supply, on-site processing). Non-mine related activities such as exploration, loading facilities, ports and transport infrastructure, and smelting that take place external to the site or before a mining lease is granted are not included in the term.

access and the ability to trade with other users. Particular circumstances (such as mine dewatering and return flows) and potential third-party impacts that might limit the applicability of NWI-consistent water access entitlements should be clearly identified and managed.

Mining and the Commission

The Commission has developed a number of activities that report on or have direct association with water and the mining industry:

- The Minerals Council of Australia, which represents exploration, mining and minerals processing industries across the country, has been a member of the Commission's stakeholder reference group since its inception.
- The Commission is providing \$1.8 million to fund a major body of work, the *Potential local and cumulative effects of mining on groundwater resources project*, which will report on the NWI compliance of planning legislation and develop tools and guidelines to account for potential local and cumulative effects of mining on groundwater resources.
- The Commission has developed a major program of investments in projects to improve national groundwater management through the Groundwater Action Plan, including a substantial investment with the Australian Research Council in the new National Centre for Groundwater Research and Training.

Additionally, the Minerals Council of Australia has piloted a water accounting framework at a number of mine sites in Western NSW, as part of the Bureau of Meteorology water accounting development activities

Future priorities for mining and water

The Commission believes that, wherever possible, mining activities should be incorporated into State and territory water planning and management regimes from their inception. Specifically:

- The interception of water by mining should be licensed to ensure it is integrated into water sharing processes from their inception.
- The regulated use and sale of any excess water should be encouraged.
- Wherever possible, mining activities should operate under the same rules and regulations as other water users.
- A standard water accounting framework should be used across the minerals industry and incorporated into the Bureau of Meteorology water reporting regulations to allow consistent reporting of cumulative effects.
- NWI-consistent water plans should be completed to enable mining operations to secure their necessary water supplies, either through the issue of entitlements or their purchase from willing sellers.
- Mining companies should be actively engaged and encouraged to participate in water planning processes.
- Water related data held by mining companies and mining agencies should be made publically available to enable assessment of cumulative effects.
- Mining project approval processes need to reflect water management objectives and regulatory regimes.
- Efforts should be made to make legislation covering mining, water, and land use planning as compatible as possible.
- Where mining activities access low quality water, water planning regimes should be extended to encompass these resources.

The Commission's position is that the use of Clause 34 of the NWI is only intended to operate in exceptional circumstances. Where Clause 34 is used, a clear and transparent explanation of why it was used rather than the generic water planning and management regime, should be provided. Additionally, due to the locality of many mining operations, focus needs to be maintained, and sharpened, on regions outside the Murray Darling Basin.

The Commission maintains that NWI-consistent water access entitlements should be made available to mining activities wherever possible. This will provide secure access to water markets to buy or sell water to alter overall water security, and allow new mining entrants to seek to purchase water in the market.

Executive summary

Water planning is a fundamental tool for achieving the sustainable use of water, and it is a key element of the National Water Initiative (NWI). During the past decade, state and territory water planning authorities have made major investments in this area ; however, decision makers and water use planners face growing challenges in the planning and permitting of activities in areas where there are multiple water users.

Under the Water for the Future's National Groundwater Action Plan, the National Water Commission is undertaking projects to address groundwater knowledge gaps and progress the groundwater reforms under the National Water Initiative. One such project is the *Cumulative Effects of Mining on Groundwater Resources Project*.

This Waterlines report is the first product of the project and assesses the extent to which state and territory mining and environmental assessment processes are consistent with National Water Initiative objectives and consider the cumulative effects of mining on groundwater. For the purposes of this project, mining is defined as those activities that take place on a mine or miscellaneous lease and are associated with the extraction and onsite processing of ore. It excludes exploration and non-mining activities that take place outside the mine site, such as loading facilities, transport infrastructure and smelting.

The scope of the appraisal includes all state and territory jurisdictional agencies that have responsibility for planning, water, mining and environmental assessment processes. It also encompasses an assessment of Commonwealth jurisdictional requirements that are relevant to groundwater resources or Commonwealth land. Drawing on advice from the Ministerial Council for Minerals and Petroleum Resources Water Working Group and elsewhere, relevant jurisdictional agencies and contact persons were contacted to conduct semi-structured interviews, after which a draft report was presented back to the Water Working Group for validation and the Project Steering Committee for comment. Feedback from these key stakeholder groups has been considered and addressed in this final report.

A range of statutory requirements apply in each jurisdiction to different stages of the mining cycle—from approval through to post-closure. The application of legislation is coordinated through cooperative arrangements across the water, mining, environment and planning agencies. Similarly, where the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is triggered, bilateral agreements with South Australia, New South Wales, Queensland, the Northern Territory, Tasmania and Western Australia allow the Commonwealth to delegate responsibility for environmental assessment. Draft bilateral agreements are in place with the Australian Capital Territory and Victoria.

Jurisdictional environmental assessment processes consider natural resource aspects such as the physical environment, climate, ecosystems and communities, as well as mining aspects such as mine maturity, mining method and type, and rehabilitation. Within all jurisdictions, achieving consistency between mining approvals processes across all mining, environment, water and planning legislation is fundamental for implementing, achieving and sustaining the NWI objectives. A clear framework, consistent arrangements, and a risk-based approach for each jurisdiction are key steps in ensuring that the cumulative effects of mining operations on groundwater resources can be assessed. Similarly, effective communication and coordination between agencies involved in planning and approvals process is also critical. There is a perceived need for strengthening existing legislation in some jurisdictions, and where necessary, to develop new policies to deal with water management issues and enhance regulatory powers to achieve NWI objectives.

Across jurisdictions, there are stricter requirements for aquifers that are high yielding, high quality, economically viable, and highly utilised or stressed. In general, there are three levels of management for groundwater: (i) water management plans; (ii) water sharing arrangements; and (iii) non-specific water arrangements. Groundwater management plans are area specific, and their development requires a detailed understanding of regional or local water use, water use practices, environmental water requirements and water availability. Water sharing arrangements may be in place for surface water, groundwater or both, and these may be governed by state legislation, regional area plans or statewide policy. Areas without specific management arrangements may have either low levels of water utilisation or a lack of resources to invest in developing water management plans.

Groundwater management plans determine the conditions of approvals and licenses for use. At the planning stage, the proponent collects groundwater data, and as part of the regulator's assessment, the relevant agencies consider proponent data within the context of the entire water resource.

Historically, the cumulative impact assessment of mining on groundwater resources has been limited. More recently, however, cumulative effects on environmental receptors, including surface and groundwater, are included in the environmental impact assessment in all jurisdictions, and the potential for interaction between groundwater and surface water and other groundwater systems is to be considered. Where limited data are available, additional conditions for monitoring and reporting may be imposed within the approvals process.

Annual water consumption data, water budgets and water balance modelling, and identification of mitigation measures are typically required for approval of new projects. The responsibility for groundwater data collection and storage typically falls on the proponent, who is required to make the data available to the relevant jurisdictional agency as part of compliance reporting, audits or investigations. The mixed quality, quantity and availability of groundwater resource data is a common issue across jurisdictions. In some instances, concerns over the validity of the data collected and reported is also of concern. Similarly, data sharing is limited because of the absence of regulatory requirements and the often perceived commercially sensitive nature of the data by mining companies.

Whilst all jurisdictions have demonstrated inclusion of the NWI in assessing the cumulative effects of mining on groundwater, there are opportunities for improvement, for example:

- i) environmental assessment of local and cumulative effects of mining on groundwater, taking a nationally consistent risk-based approach
- ii) communication and coordination between agencies involved in planning and approvals to improve decisions
- iii) strengthening existing legislation in some jurisdictions, and where necessary, develop new policies to deal with water management issues and enhance regulatory powers to achieve NWI objectives
- iv) developing nationally consistent water accounting, data collection, storage and sharing protocols.

Addressing these recommendations will assist jurisdictions, mining companies and other groundwater users to better understand and manage the local and cumulative effects of mining on groundwater resources.

1. Introduction

1.1 Overview

The National Water Initiative (NWI) provides a blueprint for the reform of Australia's water management. The NWI acknowledges that all water users require an equitable basis from which to share groundwater and surface water resources.

The National Water Commission (the Commission) recognises that a rigorous and consistent management approach is required for the use of groundwater by mining operations. To address this challenge, the Commission commissioned the development of tools to assist prediction and assess the potential local and cumulative effects of mining on groundwater resources.

The objectives of the project are to:

- assist jurisdictions in ensuring that their land use planning and environmental assessment requirements are NWI compliant in relation to mining activities
- ensure that the cumulative effects of mining on groundwater are considered in the mining project approvals process at state and territory and Commonwealth levels
- develop tools and methodologies that can be applied in environmental reporting, permitting and planning processes for mining activities to ensure that (i) the cumulative effects (positive as well as negative) of mining on groundwater resources are understood, documented and minimised; and (ii) they take place within a consistent national framework
- develop tools and guidelines that (i) account for cumulative effects on groundwater; (ii) minimise negative cumulative, and maximise positive, effects on groundwater; (iii) incorporate management and stakeholder engagement strategies; (iv) can be applied consistently across all regions; and (v) are complementary to other NWI initiatives
- assess the cumulative effects on groundwater, from a sustainability perspective, in four priority regions where there are existing or possible conflicts between resource users.

1.2 Background

Australia has a long history of mining, and over time, the industry has contributed significantly, through the provision of raw materials for commodities, employment and generation of export income, to the high standard of living enjoyed by the nation.

The mining industry typically requires access to substantial volumes of varying qualities of water to meet, for example, processing, dust suppression and potable water requirements. Water is sourced from (i) sea water (not usually the case); (ii) surface water (e.g. lakes and rivers, often the case in more temperate regions of Australia); and (iii) groundwater (typically the case in arid and subtemperate and tropical regions). The mining industry also uses recycled water, where available, to meet its operational requirements.

The interception of surface water and groundwater resources through mining activities is increasingly becoming an issue for decision makers, water users and planners, as well as for individual mines and the mining industry. Whilst in many areas of Australia, mining operations have co-existed with the broader community without conflict (e.g. in Western Australia's Pilbara Region) and has contributed substantially to the establishment of sustainable economies (e.g. the Victorian Goldfields), there are locations in Australia where the potential

for conflict between the mining industry and other water users exists (e.g the Great Artesian Basin, which straddles the jurisdictional boundaries of Queensland , New South Wales, and South Australia).

1.3 This report

1.3.1 Purpose

The report includes an examination of the methodology and mechanisms for implementing the NWI objectives across jurisdictions. It also reports on how the objectives are incorporated as part of the planning and permitting process for mining.

This report describes:

- the compliance of jurisdictional land use planning and environmental reporting and permitting processes with NWI requirements
- whether the cumulative effects of mining on groundwater are considered in the mining project approvals process at state, territory and Commonwealth levels.

The report includes an overview of the actual and perceived limitations as identified by agencies for:

- adopting the objectives of the NWI
- working towards meeting those objectives.

The report also examines the extent to which jurisdictional water planning processes consider mining. A review of each jurisdiction's water resource accounting method is presented, and this includes an assessment of how the NWI objectives are incorporated, whether targets are set to meet these objectives, and whether performance indicators are met.

The report presents a snapshot of the environmental assessment process for mining project approvals in each jurisdiction with regard to consideration of cumulative effects on groundwater. Information was gathered from interviews and through a review of land use planning, water planning and environmental assessment processes. This study uses this information to document the extent to which the positive and negative cumulative effects of mining operations are considered in jurisdictional land use planning and environmental assessment processes. Further to this, the study identifies the methods used to achieve compliance with, and issues around, implementing NWI objectives.

1.4 Guide to report

Section 2 outlines the NWI objectives and compliance parameters. **Section 3** provides an overview of cumulative effects. This is followed by a summary of jurisdictional land use planning, water planning and environmental assessment processes across all jurisdictions in **Section 4**.

Section 5 through to **Section 11** presents a detailed assessment of each jurisdiction's legislation in terms of its inclusion of NWI objectives, methods for implementing objectives, and compliance with parameters. The limitations of legislative processes for dealing with cumulative effects within each jurisdiction are also summarised in Appendix A.

Section 12 covers the environmental assessment process as it relates to the Commonwealth and the Australian Capital Territory.

Section 13 presents a review of how jurisdictional processes align with NWI objectives.

Section 14 presents a summary and conclusions of the report, including a summary of key findings in relation to the outcomes of consultation with the jurisdictions.

The appendices include key issues and limitations with achieving jurisdictional NWI compliance, a review of mining regulations, and a list of stakeholders interviewed in compiling this report.

1.5 Definition of mining

For the purposes of this project, the term *mining* refers to all activities taking place on a mine lease and miscellaneous leases that are associated with the extraction and onsite processing of ore such as ore recovery, tailings management, water supply, coal washery and beneficiation. The following activities are not included in the term:

- non-mine related activities such as loading facilities, ports and transport infrastructure, and smelting that take place external to the site
- activities associated with mineral exploration.

Although the accompanying text is prepared to specifically address jurisdictional processes involved in groundwater management in relation to mining, there are commonalities with other industries and land use changes.

2. National Water Initiative objectives

2.1 Overview

The overall objective of the NWI is to achieve a nationally compatible market, regulatory and planning based system of managing surface water and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes. The objectives of the NWI are:

- clear and nationally-compatible characteristics for secure *water access entitlements*
- transparent, statutory-based water planning
- statutory provision for *environmental and other public health benefit outcomes*, and improved environmental management practices
- return of all currently over-allocated or overused systems to *environmentally sustainable levels of abstraction*
- progressive removal of barriers to trade in water and meeting of other requirements to facilitate the broadening and deepening of the water market, with an open trading market to be in place
- clarity around the assignment of risk arising from future changes in the availability of water for the *consumptive pool*
- water accounting which is able to meet the information needs of different water systems with respect to planning, monitoring, trading, environmental management and on-farm management
- policy settings that facilitate water use and efficiency and innovation in urban and rural areas
- consideration of future adjustment issues that may impact on water users and communities
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

Water accounting is a key aspect of the NWI, and the Commission has made water accounting a major reform priority through building on the water resources measurement, monitoring and reporting activities already undertaken by the states, territories and industry. Further to this the NWI supports the development of a national water accounting system and the closure of any gaps that exist in the current systems.

As indicated above, a key objective of the NWI is to return all currently over-allocated or overused systems to environmentally sustainable levels of abstraction. This objective underpins many of the activities relating to groundwater being undertaken by the Commission.²

² The NWI defines environmentally sustainable level of abstraction as: the level of water abstraction from a particular system, which if exceeded, would compromise key environmental assets, or ecosystem functions and the productive base of the resource.

2.2 Key elements for action

The NWI agreement includes outcomes and commitments to specific actions across eight interrelated elements of water management:

- i) water access entitlements and planning
- ii) water markets and trading
- iii) best practice water pricing
- iv) integrated management of water for environmental and other public benefit outcomes
- v) water resource accounting
- vi) urban water reform
- vii) knowledge and capacity building
- viii) community partnerships and adjustment.

2.3 Jurisdictional alignment with NWI objectives

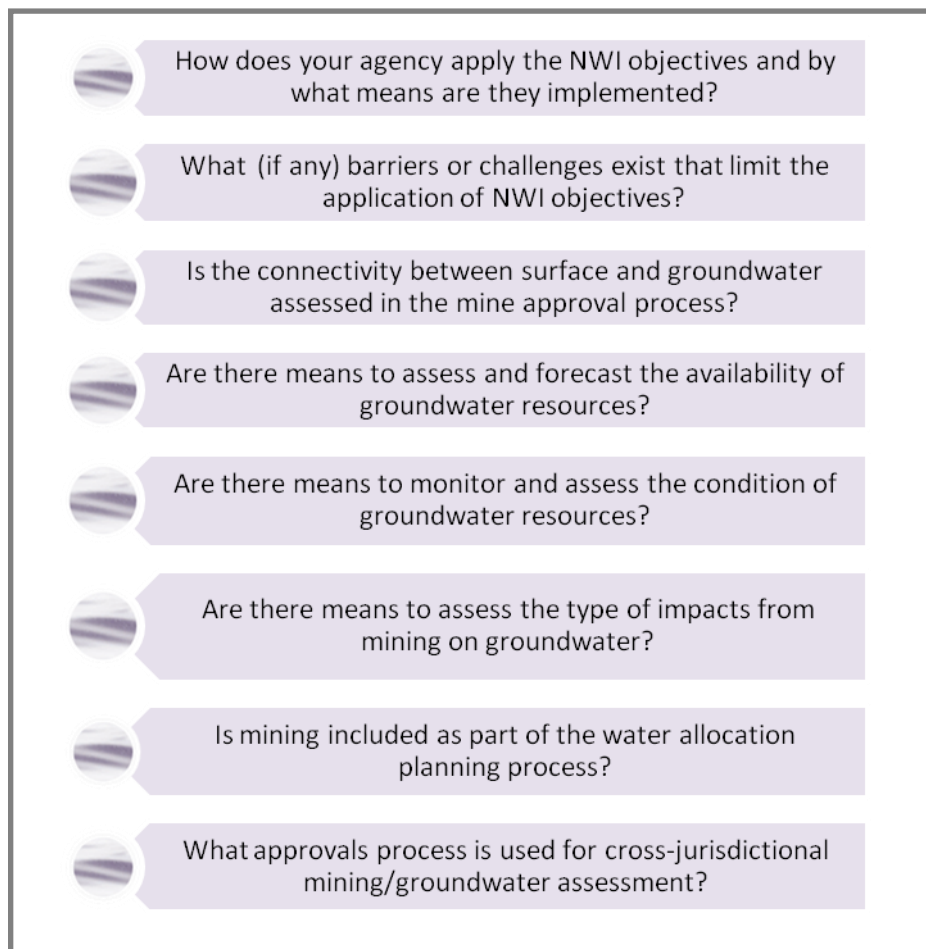
For each jurisdiction, an assessment of alignment with NWI objectives has been provided. This is based on the 2005 to 2006 NWI implementation plans that have been developed by each jurisdiction. These plans are currently being updated and due for release in the near future. Although every effort has been made during the interview process to capture an up-to-date status of actions and achievements against these plans, the information presented here may not represent the current status of all actions or capture all achievements due to the ongoing progress.

2.4 NWI compliance

As outlined in Section 1, the overall strategic objective for this project is to provide a framework to ensure that local and cumulative effects of mining on groundwater resources are considered during the planning and permitting phases of new mine developments or expansions.

As a way of determining the extent to which NWI principles and objectives are currently considered in the planning and permitting phase, key questions were asked of each jurisdiction, including those shown in Figure 1. The responses to these questions form the basis for the discussion presented in this report.

Figure 1: Key questions from the jurisdictional consultation phase

- 
- How does your agency apply the NWI objectives and by what means are they implemented?
 - What (if any) barriers or challenges exist that limit the application of NWI objectives?
 - Is the connectivity between surface and groundwater assessed in the mine approval process?
 - Are there means to assess and forecast the availability of groundwater resources?
 - Are there means to monitor and assess the condition of groundwater resources?
 - Are there means to assess the type of impacts from mining on groundwater?
 - Is mining included as part of the water allocation planning process?
 - What approvals process is used for cross-jurisdictional mining/groundwater assessment?

3. Cumulative effects

In the broadest sense, 'cumulative effects' can be defined as both the positive and negative outcomes of an activity on society, the economy and the environment. The nature and scale of such effects can vary significantly, depending on factors such as the type of activity performed, the proximity of activities to each other, and the characteristics of the surrounding natural, social and economic environments (Brereton and Moran 2008).

Cumulative effects can result from several activities interacting with the environment in a region. They can also be caused by the synergistic or antagonistic effects of different individual activities, as well as the temporal or spatial characteristics of the activities.

All individual disturbances in the environment created by natural and human activities have the potential to act in unison to create cumulative impacts, which in some cases may be greater than the sum of their individual impacts. These individual impacts can be additive in space or time, or they may interact together.

Upper Hunter Cumulative Impact Study and Action Strategy,
Department of Urban Affairs and Planning (1997)

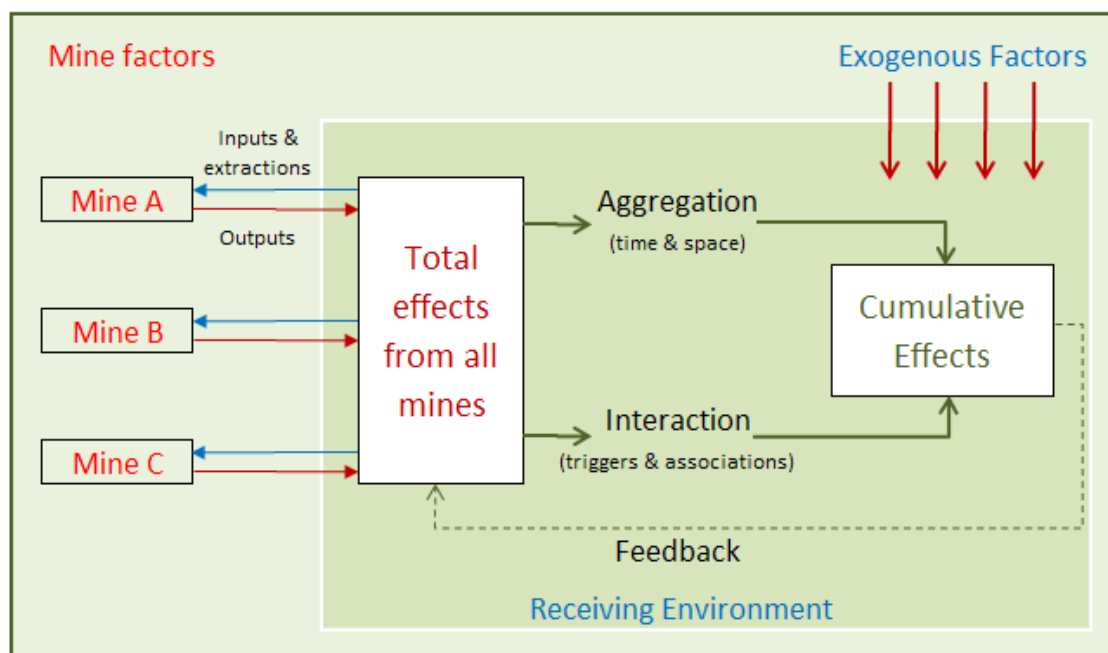
When assessing cumulative effects, all present, past and foreseeable actions have to be taken into consideration. Kørnørv (2007) suggests that the assessment can be guided by the following steps:

- identification of important and valuable environmental parameters
- identification of other human activities (in the past, present and in the future) that affect the same parameters
- identification of the relations of impacts of the action to other activities
- identification of opportunities to handle and mitigate cumulative effects.

Following from this, any assessment of cumulative effects specific to mining projects would require the following aspects to be considered:

- identify other existing or proposed activities that are in the same area and that could have environmental impacts or activities that are likely to affect the same elements of the environment (e.g. clearance of the same type of habitat)
- assess the extent to which the environment affected by the proposal is already stressed
- identify any likely long-term and short-term cumulative effects, such as air quality, noise or traffic disturbance, visual impacts, surface water and groundwater issues, public health; or loss of heritage items, vegetation or fauna habitat
- consider the receiving environment's ability to achieve and maintain environmental objectives
- consider options for integrating operations with adjoining mines to obtain operational synergies, reduce costs, prevent environmental impacts, or lessen land degradation (e.g. spoil transfer, wastewater exchange for re-use, integrated rehabilitated landforms, joint rail or road haulage works, joint handling or treatment facilities, integrated and shared monitoring networks and programs).

Figure 2: Schematic showing cumulative effects from mining operations



Source: Adapted from Brereton and Moran (2008)

Figure 2 shows schematically the interactions between different mining operations and how the effects of these interactions can become cumulative, both spatially and over time.

As indicated in Figure 2, cumulative effects can be complex and may be difficult to predict. As a result, they are generally poorly addressed or currently absent from environmental assessment studies in Australia. It is this comprehensive assessment of cumulative effects that is widely seen as an area in need of improvement in the environmental approvals process in Australia (Glasson et al. 2005).

The importance of assessing cumulative effects as part of the environmental assessment process has been recognised, in particular after a major review undertaken by the Australian Government in 1994. This review highlighted the need to reform environmental assessment at the Commonwealth level, and to improve, among other issues, the consideration of cumulative effects, public participation process, and consideration of social and health impacts (Glasson et al. 2005). Well over a decade later, the practical implementation and consideration of cumulative effects remains limited, and cases of good practice and useful frameworks are still relatively rare.

In Australia, cumulative effects have mostly been assessed through applying a cumulative impact assessment process. To date, however, cumulative impact assessments have been mostly conducted by regulatory authorities, rather than project proponents, and they have been mainly focused on assessing regional air quality and the salinity of water in catchment areas (Glasson et al. 2005).

The success of environmental and planning policies will ultimately be determined by their ability to rapidly promote a sustained reduction of negative, and an increase in positive, environmental effects on groundwater systems. Negative environmental effects are likely to accumulate as a result of increased development. It is vital that policies are adapted to handle those impacts that are cross-jurisdictional and are cumulative over time.

“Sustainable development will be impossible if cumulative effects are not considered in environmental planning ... managing cumulative effects in environmental policy, however, offers hope that future environmental degradation may be limited.”

Harty, Potts, Potts & El Jourbagy (2005)

4. Outline of key areas of regulation

4.1 General overview

Within each jurisdiction, there are many different areas of legislation and other arrangements applicable to all stages of mining projects from approval through to post-closure. In each jurisdiction, the application of legislation is coordinated through cooperative arrangements across the water, mining, environment and planning agencies, as shown in Table B.1 (Appendix B).

Across all jurisdictions, water resources are regulated to some degree or licensed to allow activities such as water well construction, water supply development for mining purposes, and any works that interfere with aquifers.

Mining legislation in all jurisdictions provides for the assessment, development and use of mineral resources, as well as requiring environmental responsibility in mining. Mining legislation enables the enforcement and regulation of environmental rehabilitation performance through defining conditions on titles granted under the legislation. In some areas, mining legislation requires compliance with other Acts, such as environmental protection legislation, rather than specifying the requirements directly.

Extensive environmental legislation is applied across all jurisdictions for the assessment, planning and management of mining projects. In most jurisdictions, other legislation, such as mining Acts, calls up environmental or natural resource legislation; and arrangements exist for the environmental authority to take responsibility for the environmental assessment process, environmental conditions, compliance, auditing and monitoring of mining.

Mining is generally not a federal responsibility (with the exception of uranium mining), and mining project assessment and water resource allocation is determined by state and territory legislation. Commonwealth involvement in the assessment of mining projects is carried out under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Projects require an environmental assessment under the EPBC Act if the activity is deemed to involve a controlled action—that is, it has the potential to impact on matters of national environmental significance or is carried out on Commonwealth land.

Bilateral agreements allow the Commonwealth to delegate to the states and territories the responsibility for conducting an environmental assessment under the EPBC Act and, in certain circumstances, the responsibility for granting environmental approval under the EPBC Act. The purpose of the agreement is to avoid duplication of the assessment process for proposals that are controlled actions requiring assessment under Part 8 of the EPBC Act and that are undergoing an environmental impact assessment process under state legislation.

Bilateral agreements relating to environmental assessment have been established with South Australia, New South Wales (NSW), Queensland, the Northern Territory, Tasmania and Western Australia. Draft agreements are in place with Victoria and the Australian Capital Territory (ACT).

The *Commonwealth Water Act 2007* makes provision for the management of the water resources of the Murray–Darling Basin and for other matters of national interest in relation to water and water information. The *Water Act 2007* reflects many of the objectives of the NWI specifically in relation to the Murray–Darling Basin. The *Water Act 2007* and the *Water Regulations 2008* are administered by the Commonwealth Department of the Environment, Water, Heritage and the Arts.

4.2 Jurisdictional environmental assessment processes

A brief summary of the approach to environmental assessment for each state and territory is provided in sections 5–11, and specifically as it applies to the assessment of mining projects. Figure 3 provides a schematic of issues to be considered in the assessment of mining proposals in Australia. Table 1 presents a simplified summary of each jurisdiction’s approach to mining project approvals.

Figure 3: Assessment requirements for mining proposals in Australia

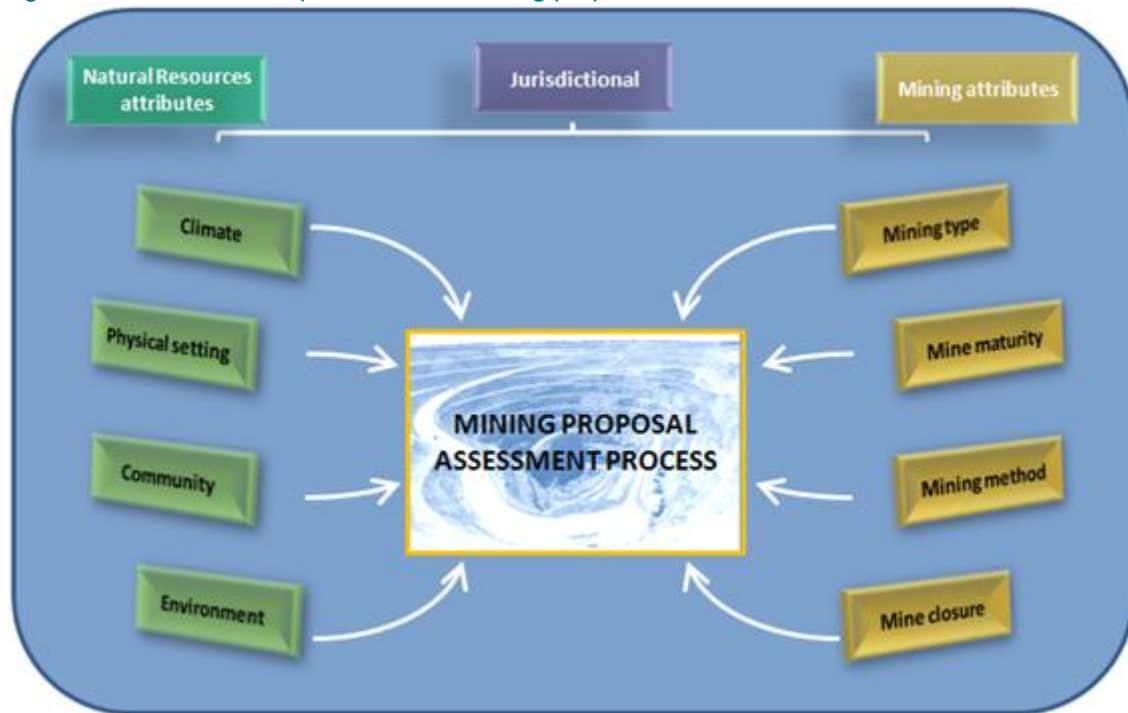


Table 1: Overview of the environmental assessment process for mining projects

<i>State or Territory</i>	<i>Level of environmental assessment^[1]</i>			<i>Level of public consultation</i>	
ACT	Environmental impact statement ^[1]			Draft environmental impact statement for public review	
NSW	Environmental assessment ^[2]			Public exhibition of environmental assessment	
Northern Territory	Environmental impact statement (EIS) / Public environmental report (PER) ^[3]			PER: lower level consultation (Up to 28 days public and government review)	EIS: full consultation (minimum 28 days public and government review)
Queensland	Level 2: Simplified environmental approval ^[4]	Level 1: Objection process including environmental documents	Level 1: EIS process prior to objection process ^[5]	Level 2: consultation not required	Level 1: EIS or lower level of consultation
South Australia	Environmental impact statement (EIS) ^[6]	Development report (DR) ^[7]	Public environmental report (PER) ^[8]	Mining rehabilitation management plan ^[9]	EIS and PER level: full public consultation, public exhibition is at least 30 days DR level: public exhibition is at least 15 days and public meeting not a statutory requirement

Notes: following table

Table 1:Continued

State or territory	Level of environmental assessment ^[1]			Level of public consultation
Tasmania	Environmental effects report (EER) ^[10]	Development proposal and environmental management plan (DPEMP) ^[11]	Level 3 activities ^[12]	EER and DPEMP made available for public comment
Victoria	Planning permit process ^[13]		Environment effects statement (EES) ^[14]	Planning permit process – public notice for 14-21 days EES – Full public consultation during the process; and public comment within a period of 20 to 30 business days
Western Australia	Assessment on Referral Information (ARI) [15] Environmental Protection Statement (EPS) [16] Public Environmental Review (PER) [17] Environmental Review and Management Program (ERMP) [18]	Integrated Project Approvals System, where development proposal is within the State Development portfolio Standard pathway—if the project is straightforward Coordinated pathway—where multiple approvals are required		Public given a significant role in the environmental impact assessment process PER—up to an 8 week consultation period ERMP—10 week period for public review Integrated Project Approvals System – extensive consultation

Notes to Table 1

ACT

1. Required if the development is listed in Schedule 4 of the *Planning and Development Act 2007* (ACT) and the ACT Planning and Land Authority is the approving authority.

Notes continued on next page ...

NSW

2. Required if under the *Environmental Planning and Assessment Act 1979* (NSW)
 - a. Part 3A (major projects); State significant development, for major projects of regional or state significance
 - b. Part 4 (other projects); Designated development, listed either in planning instruments or in Schedule 3 of EP&A Regulation 2000
 - i. Local development—requires consent, but is not ‘State significant development’
 - ii. Complying development—common or routine development.
 - c. Part 5—those which do not fall under Parts 3A or 4.

Northern Territory

3. Under the *Environment Assessment Act 1994*, whether a public environmental review or environmental impact statement required depends upon
 - a. sensitivity of the local environment
 - b. scale of the proposal
 - c. potential environmental impacts.

Queensland

4. Required under *Environmental Protection Act 1994* if low level environmental impact
5. Required under the *State Development and Public Works Organisation Act 1971* if
 - a. project declared a ‘significant project’ by the Coordinator-General; or
 - b. any activities of a mining project cannot comply with the criteria set out in Schedule 1A of the Environmental Protection Regulations 2008 requires a non-code compliant environmental authority (mining activities) and exceed trigger values published in a guideline.

South Australia

6. Required under the *Development Act 1993* if
 - a. in the opinion of the Minister the development is a major social, economic or environmental importance; or
 - b. there are many unknown issues, or a wide range of issues involved.

7. Required under *Development Act 1993* for major developments, related to planning
8. Required under *Development Act 1993* if there are a limited number of issues or a wide range of issues where an extensive amount of information is already available
9. Required under the *Mining Act 1971* if the project is a 'standard' project

Tasmania

10. Required under the *Environmental Management and Pollution Control Act 1994* if a Level 2A proposal; these are generally small projects with minimal environmental impacts
11. Required under the *Environmental Management and Pollution Control Act 1994* if
 - a. a Level 2B proposal (most projects assessed under this); or
 - b. a Level 2C proposal with complex and significant environmental impacts.
12. Declared to be of state significance according to the *State Policies and Projects Act 1993*

Victoria

13. Required under the *Planning and Environment Act 1987*
14. Required under the *Environment Effects Act 1978* if the proposal could have a significant effect on the environment. Referral made to the Minister and decision made as to whether an environmental effects statement is required

Western Australia

15. Applies to proposals that raise a small number of environmental issues that can be readily managed under the *Environmental Protection Act 1971*
16. Issues of local interest under the *Environmental Protection Act 1971*
17. Proposals where there are significant environmental impacts or where there is major public interest under the *Environmental Protection Act 1971*
18. Major proposals that have strategic environmental implications and are of statewide interest under the *Environmental Protection Act 1971*

4.2.1 Agency roles in the environmental assessment process

There are a number of roles that government agencies take in the assessment and decision making process for environmental assessment depending on the nature of the project and, in some instances, the approval path chosen by the proponent. These include:

- assessor of applications
- environmental assessment coordinator
- assessment manager or referral agency
- advice agency/ies as part of assessment processes
- co-ordinator of advice and statutory notices to the Commonwealth environment department related to assessments (including accredited environmental assessment processes) under the EPBC Act.

4.3 Outline of water planning and management processes

4.3.1 General

All states and territories are covered by defined water management areas for surface water and groundwater. In most jurisdictions, all areas outside of designated plans are covered by a basic jurisdiction-wide policy on licensing, abstraction, diversions and environmental protection measures.

Groundwater is managed at both the state and territory-wide scale (through the application of state and territory-wide policy) and at a more detailed, regional or local area scale through local water planning instruments.

Across all states and territories, there are three levels of management for groundwater: (i) water management plans; (ii) water sharing arrangements; and (iii) non-specific water arrangements. Groundwater management plans are area-specific; and their development requires a detailed understanding of regional or local water use, water use practices, environmental water requirements and water availability. In general, groundwater management plans cover areas that have highly utilised groundwater resources, and often these resources are under stress due to anthropological influences. They usually apply to aquifers that have high quality water (low salinity levels), and yields that are economically viable to extract.

In areas not covered by groundwater management plans, water sharing arrangements may be in place for surface water, groundwater or both, which are governed by state legislation, regional area plans or state-wide policy that is not generally supported by a detailed understanding of the availability and use of the local resources, or environmental water requirements. Areas without specific management arrangements may have either low levels of water utilisation, or a lack of resources to invest in developing a water management plan for that area.

4.3.2 National water information

Under the *Commonwealth Water Act 2007*, the Bureau of Meteorology has been given the responsibility for collecting, managing and publishing national water information. This includes

the collection of data for national water resource assessments and national water accounting, as well as water availability forecasting and public dissemination over the Internet.

This means that all jurisdictions are obliged to provide such water information to the Bureau of Meteorology as specified in the Commonwealth *Water Regulations 2008*. This includes information about surface and groundwater resources, water storages, water use, water rights, water allocations, water trades, water restrictions, water quality and other descriptive and reference information about water, as well as meteorological information. Further detail is available from the Bureau of Meteorology website, <<http://www.bom.gov.au>>.

4.3.3 Role of catchment management authorities

The responsibility of sustaining the environmental values of natural resource regions through implementing natural resource action plans and coordinating of all stakeholders falls under the auspices of a number of catchment based authorities, councils and committees. NSW, the ACT, South Australia and Victoria are the only states and territories that have catchment groups. The structure and role of these groups varies between jurisdictions, but typically, they all have a role in water resource planning and are responsible for facilitating consultation between communities and the respective state and territory government bodies on water resource planning matters.

Examples of the manner in which catchment groups operate in the different jurisdictions are as follows:

- Water sharing plans in NSW are prepared and administered by the Department of Environment Climate Change and Water, Office of Water. The water resource planning role of catchment management authorities in NSW is limited to the facilitation of community consultation with the Office of Water in the development of water sharing plans. Certain catchment management authorities also have responsibilities in the management of adaptive water through the water trust funds introduced with the commencement of the NSW *Catchment Management Authorities Act 2003*.
- In Victoria, the primary responsibility for water planning lies with the Minister for Environment and the Department of Sustainability and Environment, who delegates responsibility to prescribed water authorities such as Southern Rural Water. As in NSW, the water resource planning roles of the catchment management authorities are to facilitate community participation in the planning process.
- In South Australia, the responsibility for approving and administering water allocation plans lies with the Minister for Environment and Conservation. Regional natural resource management boards are responsible for preparing, reviewing and amending water allocation plans under the *Natural Resources Management Act 2004*. Natural resource management boards also have responsibilities in preparing regional natural resource management plans that are consistent with the State Natural Resource Management Plan.

5. New South Wales (NSW)

5.1 NSW environmental assessment process

There are three approval streams under the *Environmental Planning and Assessment Act 1979* (the EP&A Act) for major developments in NSW, and these are regulated by Parts 3A, 4 and 5 of that Act. Environmental assessment for mining projects can occur either through Part 3A (major projects) or Part 4 (other projects), depending on the scale and location of the project. In practice most mining projects will be under ‘major projects’, where ministerial approval is required.

Under Part 3A of the EP&A Act, developments deemed to be ‘major developments’ require approval by the Minister for Planning. There is no prescribed process for environmental impact assessment under Part 3A of the EP&A Act. The requirements for environmental assessment of major developments are detailed in the Director General’s requirements (Department of Planning), which are developed individually for each project assessed under Part 3A. The Minister for Planning is tasked with approving major projects and the Director General provides a Statement of Compliance that all steps in the assessment process have been followed.

If a development does not meet the criteria of a ‘major development’ under Part 3A, it may be assessed under Part 4 or Part 5 of the EP&A Act.

Projects that do not require consent under Part 4 and do not meet the criteria to be assessed under Part 3A are assessed under Part 5 of the EP&A Act. Part 5 assessment is required when a developer intends to develop a project that requires approval from a government agency (called a determining authority). Such approvals include licences under the NSW water management legislation. An environmental impact statement is required under Part 5 if the determining authority decides that an activity is likely to significantly affect the environment, critical habitat, or threatened species, populations, or ecological communities, or their habitats. All coal mine projects are assessed as major projects.

5.2 NSW water management and planning process

In NSW, approximately 80 per cent of water extracted is managed through water sharing plans under the *Water Management Act 2000*. The remaining water resources will continue to be managed under the *Water Act 1912* until water sharing plans under the *Water Management Act 2000* are completed. Generally, water sharing plans deal with surface and groundwater separately, but some are combined surface and groundwater plans. Currently there are 12 water sharing plans specific to groundwater, and the remaining areas will be covered by macro water plans. These are administered by the NSW Department of Environment, Climate Change and Water, Office of Water.

For each water source they cover, water sharing plans assign a portion of recharge to the environment, set a long-term average extraction limit, establish rules for sharing water, allow for local restrictions on pumping to be set at certain times to maintain water levels, assign distance limits between production bores and between new extraction bores and groundwater-dependent ecosystems, and set rules for water trading. The six water sharing plans operating under the *Water Management Act 2000* for major inland groundwater systems also include a process for reducing the total entitlements to sustainable extraction limits over the ten years of the plan.

Macro water plans are currently being prepared for unregulated rivers and groundwater and will include several groundwater plans. Macro water plans are water sharing plans that cover more than one river or groundwater system. They generally apply to catchments where there is less intensive water use. At the time of preparing this report, these areas accounted for most of the remaining 20 per cent of water use not already managed by existing water sharing plans.

There is a water market established in NSW, whereby water users can purchase relevant water licences to meet their demands. For most new commercial purposes in NSW, water trading remains the only way that water can now be obtained as, in most areas of the state, available water is fully allocated (DWE 2009). Entry into the water market can only in accordance with the provisions of the *Water Management Act 2000* and the *Water Act 1912*. The mining industry, as are all water users, is able to purchase water entitlements through permanent or temporary transfer of water licences. The purchase and transfer of licences for surface and groundwater resources can occur under both the *Water Act 1912* and *Water Management Act 2000*.

Mining does not have a higher security than other water users. Higher priority is provided only under the *Water Management Act 2000* and water sharing plans for purposes such as the environment, basic landholder rights, major water utilities (major water supply and electricity generation), and town water supply.

The Office of Water is currently drafting an 'aquifer interference guideline' with a long-term view to having this policy incorporated into the NSW Department of Planning assessment for major projects. Under this policy, subsidence impacts arising from aquifer interference (e.g. longwall mining and groundwater pumping) will be addressed; the quantity of water interfered with will be accounted for as well as incidental water such as mine inflows. Implementation of this policy will result in consistency for groundwater accounting across all regions and how it is applied to all operations and users.

5.3 Jurisdictional Inclusion of NWI objectives

The NSW implementation plan for the NWI (NSW Government 2006) was accredited by the Commission in 2006 and the following presents a summary of its key actions.

The NSW *Water Management Act 2000* is very closely aligned with the NWI objectives. The Department of Water and Energy has planning and policies that are consistent with the NWI principles, and a report has been prepared that outlines how NSW is working towards achieving the NWI objectives. The *Water Management Act 2000* has been amended and incorporates parts of the NWI framework and principles. The amendments made to date have been aimed at achieving consistency between Acts, and there will be further amendments specifically aimed at mining projects and related issues.

To ensure that the principles and objectives of the *Water Management Act 2000* are implemented, the former Department of Land and Water Conservation prepared the NSW State Groundwater Dependent Ecosystems (GDE) Policy 2002, which sets out a process by which the water management plans are prepared. The groundwater dependent ecosystems policy is implemented under the water sharing plans arrangements. It applies the policy principles at a local level, identifies and classifies groundwater dependent ecosystems, and includes rules for bores and other works (such as setback distance) and to protect groundwater dependent ecosystems from water extraction impacts.

In line with returning all currently over-allocated or overused systems to environmentally-sustainable levels of abstraction, NSW is working towards reducing the total entitlements in

any overcommitted groundwater system, through the water sharing plans, to targeted sustainable yield levels. This objective has not been fully achieved for some systems in NSW, particularly the major inland alluvial aquifers—the Upper and Lower Namoi, Lower Gwydir, Lower Macquarie, Lower Lachlan, Lower Murrumbidgee and Lower Murray groundwater systems. For NSW, achieving this objective for the return to a sustainable yield is a long-term process that will take several years.

To ensure a consistent approach is achieved in the implementation of NWI objectives, NSW has established an operational relationship with the Queensland Department of Environment and Resource Management to deal with issues particular to the NSW–Queensland Border Rivers system. However, this is an exception rather than the rule, as there are no cross-jurisdictional agreements in relation to mining in place.

5.4 Performance indicators

The NWI implementation plan sets out the actions that NSW has already completed and provides detailed information, for each NWI action, on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

An extract from this plan details the method used by NSW to monitor progress against performance indicators:

NSW will monitor its progress in water reform with reference to key performance indicators developed by the national Natural Resource Management Ministerial Council (NRMMC).

A second source for performance indicators specific to NSW's activities will be the NSW Natural Resources Commission (NRC), the independent statutory body responsible for providing advice and making recommendations to Government on major policy actions related to environmental and natural resource management. The NRC has already established a strong record of public consultation and offering meaningful and clear state-wide standards and targets.

(NSW Government 2006, p. 6)

5.5 Jurisdictional planning compliance with NWI objectives

NWI objectives and principles are considered as part of the environmental assessment process for proposals, including transparent statutory-based water planning, market allocation and entitlements, water accounting and connectivity.

The NSW planning and environmental assessment policies and processes are essentially compliant with all the NWI objectives in that they are working towards the NWI objectives with clear actions and targets in place for achieving each of them. However, questions raised by the NSW Government and other jurisdictions such as 'What constitutes compliance?' and 'How will we know we are achieving compliance?' highlight some uncertainties.

In terms of achieving compliance with the NWI objective to achieve '... a regulatory and planning based system of managing surface and groundwater resources', the NSW Government considers that attaining consistency across inter-agency legislation and processes (such as between planning, mining, environmental and water legislation) is fundamental.

As summarised in Section 5.3, NSW is working towards achieving the NWI objectives and significant progress has been achieved to date.

5.6 Consideration of groundwater and surface water interaction

Surface water and groundwater interaction is an important consideration in the development of water sharing plans. The NSW Office of Water employs a risk-based approach to the issue of groundwater and surface water interaction that is used to assess projects on a case-by-case basis, especially for systems showing high and medium connectivity. The tools used by the Office of Water to assess the interaction of groundwater and surface water and connectivity effects are currently being revised and updated.

The *NSW Groundwater Quality Protection Policy* (DLWC 1998) and the *NSW State Groundwater Dependent Ecosystems Policy* (DLWC 2002) provide a framework for an integrated approach in which groundwater issues must be considered in relation to surface water management, including groundwater quality, groundwater quantity and dependent ecosystems, as well as the potential for impacts of groundwater use on surface water systems.

The Office of Water developed a policy guideline for the Hunter Valley region in 1996. The issue of impacts on groundwater and surface water from mining has been assessed and detailed in this report. At the time of preparing this report, the policy was being further developed and expanded.

5.7 Assessing the availability and condition of groundwater

Water sharing plans set the rules that are reflected in conditions on both licences and approvals issued under the water management area for the water resources they cover. At the planning stage, the proponent collects groundwater data (usually at a local scale and specific to their mining activities), and as part of their assessment, The Office of Water considers this in the context of the entire water resource system and all potential impacts. In some regions, there is limited available information or data for a groundwater system, and where this is the case, additional conditions for monitoring and reporting may be required of the proponent.

The Office of Water has extensive knowledge on the basal aquifers in NSW and this information forms the basis for the water sharing plan. With an improved understanding of the limits and capacity of groundwater resources, the Office of Water is now able to accurately assess cumulative effects on a regional scale and set realistic abstraction limits for a system.

5.8 Assessing cumulative effects in the planning process

The majority of mining projects in NSW fall under the category of 'major projects', and are therefore assessed under Part 3A of the EP&A Act. As part of a detailed environmental impact assessment process, the Director General's requirements are developed individually for each project to be assessed under Part 3A.

A review of the Director General's requirements for several coal mines assessed under Part 3A revealed that cumulative impacts of these projects on a range of environmental aspects, including surface and groundwater, are customarily included as a requirement for environmental impact assessment. These impacts are assessed on a scale of the mining project under assessment and all neighbouring mining projects.

In assessing mining projects, the Department of Planning usually requires that groundwater impacts are modelled in detail, such as through using three-dimensional modelling technology and all available regional data. Particular attention is given to potential drawdown from surface water sources and alluvial aquifers. Coal seam aquifers (which are dewatered as part of the coal extraction process) are usually saline and generally have no other beneficial use. The key water management issue associated with dewatering of a coal seam aquifer is the management, reuse or disposal of the saline water.

5.9 Data collection and reporting

As a condition of approval for new projects, annual water consumption data must be reported to the Office of Water as well as details of water budget, updated water balance modelling, updated mitigation measures etc. For some heavily used regions, such as the Hunter Valley, there is an excess of information which is difficult for the Office of Water to manage or utilise for modelling in a timely fashion, due largely to the overload and resource requirements to process the data. Mining companies are required to collect, interpret and model the data and then provide a report demonstrating compliance based on the data.

Monitoring programs are carried out by the Office of Water in some regions. Data may also be publically available in regions where monitoring is undertaken by private entities.

5.10 Limitations to achieving NWI compliance

Table A.1 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in NSW. The issues have been identified in consultation with NSW Government stakeholders.

6. Northern Territory

6.1 Northern Territory environmental assessment process

The Environment, Heritage and the Arts Division of the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) is responsible for the implementation of the environmental assessment process in the Northern Territory. The process is administered under the *Environmental Assessment Act* and administrative procedures. The Act and procedures establish the framework for the assessment of potential or anticipated environmental impacts of a development. The objective of the Act is to ensure that matters affecting the environment to a significant extent are fully examined and taken into account in decisions by the Northern Territory Government.

Mining related environmental assessments in the Northern Territory can be conducted either at the public environmental report or the environmental impact statement level, depending on a project's size, complexity and location. However, where it can be demonstrated that a project will have negligible adverse environmental effects, approvals can be gained without going to either level of assessment.

The public environmental report process entails a lower level of public consultation, although the draft guidelines for a public environmental report or an environmental impact statement are made available for public comment.

An assessment report is prepared containing the NRETAS Minister's determination and advice. This is forwarded to the approving Minister for consideration and final approval.

6.2 Northern Territory water planning and management

NRETAS is the statutory body that manages Northern Territory water resources. The *Water Act* provides for the investigation, allocation, use, control, protection, management and administration of water resources, except in regard to the abstraction of surface water and groundwater for mining activities. Mining activities are subject to an inter-agency memorandum of understanding that ensures water resources are used within sustainable limits.

The Water Management Branch is responsible for the development of water allocation plans for water control districts across the Northern Territory. Water allocation plans are statutory instruments, declared under the *Water Act* to ensure that water abstraction is undertaken in a sustainable and equitable manner.

Within the Northern Territory, eight groundwater management units are covered by a regional or area management plan. The Ti Tree Region and Alice Springs water resource strategies and the water allocation plan for the Katherine region are the only statutory water allocation plans to have been declared to date. The remainder of groundwater management units within the Northern Territory are managed under territory-wide policy.

6.3 Jurisdictional inclusion of NWI objectives

Under the Northern Territory *Mine Management Act*, a mine management plan must be prepared for any mining proposal. For 'high risk' sites, the mine management plan must include a water management plan that is updated annually, and a report must be submitted to the Department of Resources for auditing.

Some components of the mine management plan and parts of the *Mine Management Act* are in line with the NWI objectives and principles. The Northern Territory has water control districts that have water allocation plans set for specified periods (i.e. 10 years). Work is currently underway to build surface water and groundwater accountability into these water allocation plans and in the water management plans for mines in line with the NWI objectives.

The Northern Territory is continuing to work on the development of nationally compatible water licence registry systems, and current registers are publicly accessible. The Northern Territory Government perceives that no institutional or statutory barriers to trade exist, but they consider it likely that the uptake of trade in water may well be constrained by the small market bases offered by Northern Territory water resource systems.

The Northern Territory *Water Act* and associated regulations currently assign all risks to water access entitlement holders for reduction or loss of reliability in the capacity of water resources to meet the upper limit extractive volumes specified in licences. The Northern Territory Government is now working towards better defining, in terms of probabilities, the degree of risk assignment (and therefore security of entitlements) in all licences that are subject to water allocation plans.

The Northern Territory has an implementation plan for the NWI (NT Government 2006) that is accredited by the Commission.

6.4 Performance indicators

The Northern Territory NWI implementation plan (NT Government 2006) details the performance indicators developed by the Northern Territory in assessing the effectiveness of the actions detailed in the NWI.

Schedule E of the Northern Territory NWI implementation plan details the responsibilities for developing these performance indicators and their relationship with the reporting framework including Commission biennial assessments, and annual reports to the NRMCC and the Council of Australian Governments (COAG). It states that performance indicators have been developed to address the objectives contained in clauses 5 and 23, which the Northern Territory government believes is representative of the main intent of the NWI.

The indicators set in the NWI implementation plan have been designed to help draw out information on whether economic, social and environmental outcomes have been optimised (or improved) over time. In addition, a set of overarching indicators has been identified for the purpose of providing a simple analysis of resource health and water use efficiency over the life of the NWI. The actions presented in the implementation plan are directly linked to the relevant performance indicator.

6.5 Jurisdictional compliance with NWI objectives

The Northern Territory framework for the management of water resources is generally compliant with NWI requirements that are relevant to the status of its water resources. It is considered that there is less pressure on groundwater resources in Northern Territory than in many other states, and therefore, the jurisdiction has fewer commitments to meet in terms of sustainable water usage and future adjustments under the 1994 COAG water reform framework. Regardless, there is still a 'strong commitment by the Northern Territory to the progressive development of water allocation plans in all areas where the need is clearly identified' (NT Government 2006, p. 15).

The Northern Territory is meeting the requirements of the NWI objectives in terms of establishing clear and nationally compatible characteristics for secure water entitlements. Public benefit and improved environmental management practices are achieved through the implementation of water allocation plans, and it is a 'mandatory requirement under the *Water Act* that water is allocated within the estimated sustainable yield of the relevant water resources to both non-consumptive uses and consumptive uses' (NT Government 2009, p. 21).

Trading of water resources in the Northern Territory is generally restricted to intrastate trade due to the lack of designated water control districts adjacent to state borders, as described below:

While it may be argued that the restriction of trading to within water control districts is a form of institutional barrier to trade, the Northern Territory considers it to be entirely appropriate for the under-allocated resources and small scale, widely dispersed trading market structures that are expected to prevail for the foreseeable future.

(NT Government 2006, p. 38)

6.6 Consideration of groundwater and surface water interaction

The Northern Territory takes the connectivity between surface water and groundwater into consideration in the planning and approval phase under the Planning Provision and as a requirement under the *Mine Management Act*. For mining activities, the management of groundwater and surface water interactions is part of the water management plan for the site, but that plan is applicable to the mine lease area only.

In looking at the Northern Territory as a whole, surface water is taken into consideration in three groundwater management units. This is because the amount of surface water and groundwater connection is unknown for most of the Northern Territory. Of those units in which surface water is considered part of the groundwater management framework, only two groundwater management units (Koolpinyah Dolomite and the Tindall-Katherine Water Control District) make any changes to the volume of groundwater yield to maintain surface water flows.

6.7 Assessing the availability and condition of groundwater

The water allocation plan allows for the availability and condition of groundwater to be assessed through requirements under water licences. At the planning stage, the proponent collects groundwater data (usually at a local scale and specific to the mining activities) and as part of the assessment, NRETAS considers the data in the context of the entire water resource system and all potential impacts. For some groundwater systems, there is limited available information or data, and where this is the case, additional conditions for monitoring and reporting may be required of the proponent.

6.8 Assessing cumulative effects in the planning process

Proponents are required to consider cumulative effects of their mining activities on groundwater in environmental assessments and in line with the water allocation plan. These impacts are usually assessed at only a local scale by the proponent due to lack of data and a lack of access to groundwater data from other companies. The administering authority makes further assessment of the potential impacts at the regional scale, encompassing multiple mines, using data provided by companies and collected under government initiatives.

6.9 Data collection and reporting

Under the water management plan and mining management plan, mining companies are required to collect and report data (both surface and groundwater), including details of usage, site water balances, potential contamination or elevated levels, and storage levels. The mine site water data that are reported under the *Mine Management Act* is stored and managed by the Department of Primary Industries, Fisheries and Resources (DPIFR), but all raw data collected for each operation are stored onsite and managed by each company. Company data that are reported to DPIFR may be included in reporting to other agencies such as the Bureau of Meteorology.

DPIFR collects some water-related data to assist compliance monitoring for groundwater. However, this monitoring is currently only carried out for a few 'high risk' sites. The monitoring data are available to NRETAS.

6.10 Limitations to assessing cumulative effects

Table A.2 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in the Northern Territory. The issues have been identified in consultation with Northern Territory Government stakeholders.

7. Queensland

7.1 Queensland environmental assessment process

In Queensland, there are three pieces of legislation that govern environmental assessment: the *State Development and Public Works Organisation Act 1971* (SDPWO Act) (for 'significant projects'), the *Integrated Planning Act 1997* (not applicable to mining environmental assessment) and the *Environmental Protection Act (EP Act) 1994* (relevant to mining activities).

A mining project can be assessed under the SDPWO Act through the Co-ordinator General under the Department of Infrastructure and Planning, if declared a 'significant' development or as a standard process under the EP Act. There are two different levels of assessment for mining projects according to size, complexity and location, which, when combined, reflect the potential environmental risk of the project. Level 2 is a simplified environmental assessment process that does not require public consultation, whereas Level 1 requires public notification and may require consultation through an environmental impact statement.

The Coordinator General (or designated assessment manager) is the approving authority under the SDPWO Act. Under the EP Act the Department of Infrastructure and Planning is the approving authority.

7.2 Queensland water management and planning process

The majority of Queensland's groundwater resources are administered by the Department of Environment and Resource Management (formerly the Environmental Protection Agency and Department of Natural Resources and Water) under the *Water Act 2000*. A water resource plan is developed, for each catchment, which assesses the size and nature of the resource to enable sustainable water allocation and management. Water resource plans include both surface and groundwater systems. The Queensland *Water Act 2000* also establishes a process by which existing entitlements to water are converted to 'water allocations' and are tradable.

Water resource plans are implemented through a corresponding resource operations plan, which ensures that the environmental and consumptive objectives detailed in the water resource plan are achieved through establishing guidelines for water trading and water use. Where necessary, resource operations plans are developed for a specific catchment to set out how the water resource plan will be implemented, including monitoring requirements. There are currently 21 such plans in operation, covering more than 90 per cent of the state's water catchment areas. These are being amended (or have been amended) to incorporate groundwater resource management. This process has been completed for the Pioneer Valley, the Burnett and the Barron Plan areas.

Groundwater in Queensland is managed through the establishment of groundwater management areas under a water resource plan or other regulation under the *Water Act 2000*, with additional management measures set out under the Wild Rivers Declaration in some instances. Queensland has declared groundwater management units which have specific groundwater management plans covering groundwater abstraction, allocation and

use. Groundwater management units outside of a water resource plan are administered by water licensing.

Groundwater management units fall into either the subartesian or artesian category and may overlap. Subartesian groundwater management units have been defined in accordance with current management practices that are applied by the Department of Environment and Resource Management. Artesian groundwater management units have been defined into hydrologic zones in accordance with the guidelines set by the *Water Resource (Great Artesian Basin) Plan 2006*.

7.3 Jurisdictional inclusion of NWI objectives

According to the *Queensland's National Water Initiative State Implementation Plan* (Queensland Government 2006), significant steps have been taken to implement the 1994 COAG water reform framework. The Queensland Government is implementing a water accounting project that will create an integrated water management system for the state. Ninety per cent of Queensland is currently covered by water resource planning activities with the finalisation of fourteen water resource plans, five resource operations plans and further plans in the draft stage.

The introduction of the *Water Act 2000* provided Queensland with the legislative framework to deliver improved water planning, allocation, management and supply processes and to ensure improved security for water resources. A core purpose of the *Water Act 2000* in regard to water allocation and management is ensuring sustainable resource access. A critical element of the legislation involves management of the catchment water balance through consideration of all its components, including environmental flow needs, in a single catchment-based water resource plan.

Amendments have been made to the *Water Act 2000*, and ongoing efforts are made to ensure that policies currently under development are also consistent with NWI objectives. Water resource plans are required under the *Water Act 2000*, and these have been developed in line with NWI objectives. This is Queensland's key legislative mechanism for implementing the NWI principles.

The NWI objectives are applied in Queensland through the environmental assessment process on a case-by-case basis: groundwater issues are specifically managed through the Department of Environment and Resource Management. This process takes account of what is already occurring at a location through a regional assessment of the existing environment. This includes an assessment of existing groundwater resources, current impacts on groundwater, and potential impacts from the proposal. Cumulative effects are considered through this process.

The Queensland Government acknowledges the desirability of nationally compatible characteristics for secure water access entitlements but states that, at this stage, there will be no amendment to the current legislative framework to provide for such commonality.

Queensland's implementation plan for the NWI was accredited by the Commission, and a new plan is currently being drafted. Queensland has an implementation plan prepared for each of the NWI key actions.

7.4 Performance indicators

Queensland's NWI implementation plan outlines the key actions and implementation dates for achieving NWI objectives. Compliance with the NWI requirements is assessed as part of annual reporting to the NRMCC and COAG (Queensland Government 2006, p. 142).

Performance indicators for environmental flow objectives and water allocation security objectives are included in some water resource plan. For example, the *Water Resource (Boyne River Basin) Plan 2000* uses performance indicators generated from a simulation of flows over an extended period of time for environmental flow objectives. The monthly reliability of supply of water is used as a water allocation security performance indicator.

Some of the larger catchments that are exposed to a greater intensity of water use, including the Great Artesian Basin, do not have quantitative performance indicators set. Sustainable water use in these catchments is managed through a risk-based system that prevents the increase of average volumes of water taken from the area to which the plan applies.

7.5 Jurisdictional compliance with NWI objectives

The Queensland planning and environmental assessment policies and processes are compliant with the majority of NWI objectives. However, variation exists in the areas of the assignment of risk, the creation of a common lexicon, and the determination of sustainable yields.

The risk assignment framework for changes in allocation is detailed in Part 3 of the *Water Act 2000*. Under this legislation, compensation is 'payable to the entitlement holder if a change reduces the value of the entitlement, and the change is made within 10 years after the Water Resource Plan is approved'. The assignment of risk under the *Water Act 2000* is dependent on the timing of any change in allocation to an entitlement holder: This framework is not consistent with the NWI risk assignment framework, in which the entitlement holder is liable for only the first 3 per cent of any water reduction, with the remainder shared between the Commonwealth and the state. Future amendments to the *Water Act 2000* to incorporate the NWI risk framework have a proposed commencement date of 2014.

Queensland's NWI implementation plan states that legislation will not be amended to achieve the desired common terminology detailed in the NWI, and any amendments to Queensland legislation will be completed on a case-by-case basis only. This may be considered to be inconsistent with the NWI objective for clear and nationally compatible characteristics for secure water access entitlements:

Queensland already has in place legislation which defines water licences, interim water allocations, and water allocations. The public has been educated on this terminology. The disruption that would be caused by changing terminology at this time would far outweigh any benefits. (Queensland Government 2006, p. 9)

Over-allocation of catchments is determined on a risk basis by:

... estimating the risk to the State's groundwater resources involves ranking the groundwater systems according to their level of allocation compared with recharge, vulnerability to threats such as seawater intrusion, rising water tables, threats to groundwater dependent ecosystems and local issues such as local pumping effects, development pressures or community conflicts. (Queensland Government 2006, p. 15)

This risk-based method does not include any quantification of the levels of sustainable yield; therefore, it is not possible to determine whether catchments in Queensland are over-allocated. As a result, it is not possible to assess whether water use is 'sustainable' for any catchment as required by the NWI.

7.6 Consideration of groundwater and surface water interaction

Water resource plans are the mechanism for assessing environmental flow requirements in relation to both surface water and groundwater systems. Whilst water resource plans have initially focused on surface water, key plans are now being, or have been, amended to include groundwater, for example the water resource plans for the Burnett and Pioneer rivers. Queensland is currently commissioning a study to assess the risk of groundwater allocations affecting surface water flow and surface water entitlements across the state. The outcomes of this study will then influence future water resource plan prioritisation and necessary amendments to existing water resource plans to avoid any double accounting occurring.

As mentioned above, consideration is given to the connectivity between groundwater and surface water under the water resource plan. In terms of assessing the ongoing impacts and interactions of groundwater and surface water, both are now administered through the recently formed Department of Environment and Resource Management.

7.7 Assessing the availability and condition of groundwater

At the planning stage, the Department of Environment and Resource Management requires that a mining proponent carry out a groundwater investigation to assess the impacts of the project on groundwater. This would include collecting and assessing groundwater data (usually at a local scale and specific to their mining activities). As part of their assessment, the department considered this in the context of the entire water resource system and all potential impacts.

Any direct or indirect (e.g. dewatering) take of groundwater from an aquifer in an area where water is managed will require the granting of an authority to take water. The conditions or approvals of the authority depend upon either the relevant water resource plan or declared groundwater area policy rules. Approvals are issued with conditions that require monitoring, reporting, assessment and mitigation of the effects of the take where appropriate.

7.8 Assessing cumulative effects in the planning process

In Queensland, cumulative effects are considered at the start of a project proposal. However, in the past, inclusion of groundwater in mining project environmental assessments have been quite limited. Proponents are now required to assess cumulative effects for all aspects of their mining project when preparing environmental assessments. How much detail and depth are required for the environmental assessment is not specified. At present, cumulative effects typically form a small section of an environmental assessment. The section briefly highlights a broad range of cumulative effects, ranging from socio-economic, cultural, noise, air and other aspects of the project.

The environmental assessment must detail the impacts of the project in conjunction with the development of other proposals and information on the cumulative effects of all aspects of the project, including water. These impacts are usually only assessed at a local scale by the proponent due to lack of historical data and poor access to groundwater data from other companies. The administering authority (typically the Department of Environment and Resource Management) further assesses the potential impacts at a regional scale by assessing water resource usage of multiple mines and other users.

Where necessary, resource operations plans are employed under the *Water Act 2000* to set out how the water resource plan will be implemented, including monitoring requirements. A resource operations plan is developed for a specific catchment and guides how water use will be managed within the catchment. It can be revised to include a new project's impacts on the water resources of the catchment, e.g. in the Fitzroy Basin Resource Operations Plan.

7.9 Data collection and reporting

Under the environmental authority conditions for a mining lease, proponents collect and report data on (for example) water quantity and quality, drillhole logging data, hydro maps and modelling. The data and resulting report are provided to the Department of Environment and Resource Management, which then stores, reviews and manages this information to build up a database for a region. This information is also collated and reported to other agencies such as the Bureau of Meteorology. The department also carries out independent monitoring, and this information may also be provided to proponents to assist in developing groundwater models of a region.

Where relevant, to validate models or to monitor for contamination, the Department of Environment and Resource Management requires groundwater quality information to be collected by mining companies under their environmental authority. However, the actual groundwater quality monitoring data collected by companies are generally retained by the companies and made available to the department during audits or investigations relating to a spill or complaint. The department does not carry out groundwater monitoring activities.

7.10 Limitations to achieving NWI compliance

Table A.3 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in Queensland. The issues have been identified in consultation with Queensland Government stakeholders.

8. South Australia

8.1 South Australian environmental assessment process

South Australia has two processes by which mining approvals can be obtained: the *Mining Act 1971* (Mining and Rehabilitation Management Plan) process for standard projects and the *Development Act 1993* (EIS process) for projects of major social, economic or environmental significance.

Department of Primary Industries and Resources South Australia (PIRSA) is the main statutory body responsible for authorisation of mining in South Australia under the *Mining Act 1971*. Activities assessed under the *Mining Act 1971* are not considered as a 'development' under the *Development Act 1993*, and do not require separate planning assessment and approval.

Under Section 46 of the *Development Act 1993*, the Minister for Urban Development and Planning can declare a proposed development a 'Major Development' if the development is deemed appropriate or necessary for assessment of an environmental impact statement and where the proposal is considered to be of major economic, social or environmental importance. BHP Billiton's Olympic Dam Expansion Project is an example project deemed to be a 'Major Development' in South Australia, triggering a state-run assessment process with opportunity for public comment before any decision is made on whether the proposal warrants approval. Once a proposal has been declared a major development proposal by the Minister, and the development application has been received, the application is referred to the Development Application Commission.

The three possible levels of detailed assessment that may be required by the Development Application Commission are:

- an environmental impact statement (EIS), which is required for the most complex major proposals and requires in depth investigation
- a public environmental report (PER), which may be referred to as a targeted EIS. This applies where the issues surrounding the proposal require investigation in depth but are narrower in scope and there is existing information available
- a development report (DR), which is the least complex level of assessment, and principally relies on existing information.

8.2 South Australian water management and planning process

The Department of Water, Land and Biodiversity Conservation (DWLBC) is the statutory authority that manages South Australia's water resources. Water access and use is licensed in prescribed areas. In areas where water resources are not prescribed, there is no limit to the volume of surface water or groundwater that can be taken, providing adverse impacts on existing users will not arise. Water allocation plans deal with both surface and groundwater allocations, and the *Natural Resources Management Act 2004* aims to facilitate integrated management of all water resource systems within a natural resource management framework.

In its 59 water management areas, South Australia has 15 approved management plans, one draft management plan, and 11 further plans in progress. At the time of report preparation, there were twelve areas being managed by statewide policy, 20 by regional area plans, and 27 by area management plans.

In terms of water allocations, water use by mining operations is recognised as a use in South Australia. It can be allocated water and access is granted in the same manner as any other user through a licensing process. However, there are no whole-of-basin allocations specifically reserved for mining purposes; hence, if a basin is fully allocated, a mining company would need to purchase water to gain water access.

8.3 Jurisdictional inclusion of NWI objectives

In 2004, the South Australian Government enacted the *Natural Resources Management Act 2004*. That Act enables various natural resources to be managed conjunctively and combines functions of three earlier pieces of legislation—the *Water Resource Act 1997*, *Soil Conservation and Land Care Act 1989*, and the *Animal and Plant Control (Agriculture and Other Purposes) Act 1986*.

The State Natural Resources Management Plan sets the overall strategic direction for the management of all water resources in the state and addresses holistic management and integration with other natural resources. The responsibility for developing regional natural resources management plans, including detailed water allocation plans that define consumptive/non-consumptive water balances for each catchment, is delegated to the natural resources management boards. The plans are developed using hydrologic and hydrogeological models based on historical, current and predictive data. Water allocation plans for prescribed water resources are designed to address all aspects of resource management at the catchment level. They set out the criteria for determining water access entitlements in line with appropriate site use and trade conditions with the focus on sustainability. The Far North Water Allocation Plan—which is used to administer the groundwater resources generally coinciding with the limits of the Great Artesian Basin in South Australia and associated groundwater systems—does not assign a tradeable right to mining-related water allocations. Plans are reviewed at least once every five years.

South Australia has an NWI implementation plan (SA Government 2005) that is accredited by the Commission. The plan is supported by the institutional structures and statutory framework to achieve the outcomes of the NWI.

8.4 Performance indicators

The South Australian NWI implementation plan (SA Government 2005) sets out the actions that South Australia has already completed and provides detailed information for each NWI action on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

At the time of publication, the South Australian NWI implementation plan stated that reporting would be against South Australian performance indicators and, when developed, against the relevant National Indicators. At the time of publication of the implementation plan, the NRMCC performance indicators had not been developed. However, SA Water releases bi-annual sustainability reports available to the public, which provides details of the scope of certification, progress against environmental monitoring systems performance indicators, results of external audits, and compliance with Environment Protection Authority licences.

8.5 Jurisdictional compliance with NWI objectives

The South Australian planning and environmental assessment policies and processes are compliant with the majority of NWI objectives. However, variation exists in the assignment of risk arising from future changes in the availability of water for the consumptive pool.

In relation to the assignment of risk in terms of water availability, the *Natural Resources Management Act 2004* 'provides that the Minister may reduce allocations where necessary to protect the sustainability of the resource and/or water dependent ecosystems. This includes taking account of climate change and periodic events. Compensation is not payable to holders of water entitlements.' This is inconsistent with the risk framework set out in the NWI, and as such, the South Australian legislation is inconsistent with this requirement.

In relation to over-allocated systems, the *Natural Resources Management Act 2004* includes provisions to return these systems to sustainable levels of extraction through five-yearly reviews incorporating extensive community consultation and the amendment of water allocation plans. This has been successfully achieved in the McLaren Vale region.

The South Australian planning and assessment framework is compliant with the remainder of the NWI objectives.

8.6 Consideration of groundwater and surface water interaction

The *Natural Resources Management Act 2004* provides a mechanism to manage significant interception of water by regulations and by water affecting activity permits.

The impact of dams on the water cycle is already considered in the preparation of natural resource management plans, including water allocation plans for prescribed watercourses and surface water resources. The plans manage these activities through provision of a 'Water Affecting Activity' permit, or the activities are managed through a development approval with control provisions from water resource managers if usage is above the designated threshold. Likewise, the impact of groundwater production wells on neighbouring water users (particularly stock and domestic), water dependent ecosystems and other water resources is considered in respect to prescribed wells and water resource areas.

South Australia has limited areas of groundwater and surface water interaction, but the Great Artesian Basin springs of the Far North, wetlands of the South East, the Clare Valley and Mt Lofty Ranges are obvious exceptions. PIRSA encourages mining proponents to consult with the DWLBC early in the mine planning process to identify water related issues associated with the proposed development prior to the issue of a mining lease. A mining development must have a licensed water allocation issued under the relevant water allocation plan in order to access the entitlement.

DWLBC provides advice to proponents in relation to the technical assessments that are required and the range of options and water management regimes that may be considered in preparation of a mine lease proposal or a 'mining and rehabilitation program' (MARP). Particular issues that are primary concerns in relation to mining proposals include groundwater and surface water interaction, potential pollution from acid rock drainage (for example), and groundwater recharge areas that may be affected by mine dewatering. The

DWLBC also provide information and input into the development of South Australia's water allocation plans.

Where there are no water allocation plans governing the areas where mining developments are proposed, the proponent is required to apply for permits to access water resources.

8.7 Assessing the availability and condition of groundwater

The South Australian mining approvals process, which includes the *Mining Act 1971* (MARP) process for standard projects and the *Development Act 1993* (EIS process) for projects of major social, economic or environmental significance, requires that the availability and condition of groundwater be assessed. Whilst there is primarily a two-stage authorisation process for mining in South Australia (mineral lease proposal and MARP), groundwater issues are dealt with in the same manner in each of the processes. PIRSA applies a standard risk-based approach for all impacts of the proposed development, which includes identifying the value of the groundwater resource and assessing whether the resource will be affected by the mining operation. Proponents are required to undertake a full water balance for every new mine site to determine the extent to which development will affect the identified environmental values associated with groundwater.

The state also assesses the availability and condition of groundwater to assist in formulating and revising water allocation plans, which are reviewed every five years. Changes in the number of water users and the types of water users are to be considered during the water allocation plan review process.

8.8 Assessing cumulative effects in the approval process

The mine planning and approvals process in South Australia focuses on ensuring that mining companies and proponents focus on identifying the environmental values that are required to be assessed and managed as a result of the impact of their development. Proponents are encouraged to be innovative about the way they propose to manage the identified water issues so as to protect environmental values and assess cumulative effects.

PIRSA Mineral Regulatory Guidelines specify that all mining proposals must include: a water balance and risk assessment, details about the current state of the environment, and an assessment of what impact the mine development will have on the current state of the environment, including water resources. At the MARP stage of the approvals process, proponents are to establish and document what strategies they are proposing to achieve the environmental outcomes documented in the mine lease proposal. A description of the environmental value and risk assessment is a necessary part of the planning and approvals stage.

8.9 Data collection and reporting

Proponents are required to provide to the state government all groundwater data obtained through groundwater investigations associated with the mine approval process.

All data are managed in the state databases that are maintained by PIRSA (lithology) and DWLBC (groundwater). DWLBC's observation wells database is used to manage

groundwater data collected from across the state. All information stored on the state databases is available for public access. The DLWBC is also responsible for regulating water quantity, groundwater salinity and groundwater dependent ecosystem issues, as well as administering water allocations through the water allocation plan. The regulation of water quality is the responsibility of the Environment Protection Authority and managed separately.

8.10 Limitations to assessing cumulative effects

Table A.4 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in South Australia. The issues have been identified in consultation with South Australian government representatives.

9. Tasmania

9.1 Tasmanian environmental assessment process

In Tasmania, environmental assessment is undertaken for activities that may cause environmental harm under the *Environmental Management and Pollution Control Act 1994* (the EMPC Act). The Tasmanian Environment Protection Authority has a number of statutory responsibilities under this legislation, including assessing and regulating large industry in Tasmania. The EMPC Act deals with three classifications of activities that may cause environmental harm. For mining projects, environmental assessments are generally conducted at two levels: Level 1 addresses mining up to 5000 cubic metres per year and Level 2 addresses mining of more than 5000 cubic metres per year.

The Level 1 assessment process is managed by local government, and the Level 2 process is managed by the Environment Division of the Department of Primary Industries Parks Water and Environment (DPIPWE) through the Environmental Management and Pollution Control Board (the Board). Where assessment is carried out under the EMPC Act, an environmental impact statement is required. The Board makes a determination about whether the project should proceed or not, and under what conditions.

A third classification of activities that may cause environmental harm (Level 3 activities) are those declared to be of state significance according to the *State Policies and Projects Act 1993*. These are managed by the Resource Planning and Development Commission.

9.2 Tasmanian water management and planning process

In Tasmania, groundwater and surface water are both managed under the *Water Management Act 1999* and regulated by the DPIPWE. All licensing, allocation, water use restrictions, trading and other water management provisions apply equally to groundwater and surface water. The EMPC Act requires water to be allocated to the environment (including groundwater dependent ecosystems, if identified), allows for licensing and allocation of surface water and groundwater, sets priorities for access to water and provides for the development of water management plans.

Until recently, there was no licensing system in place for groundwater, and the right to take groundwater without a licence was provided for under Part 5 of the *Water Management Act 1999*. In December 2008, the Tasmanian Parliament passed amendments to that Act to enable the management of groundwater. Led by the DPIPWE, a best-practice framework, funded by the National Water Commission, for managing groundwater in Tasmania is now being developed.

Water planning is currently less developed in Tasmania than in other states, as there is perceived high water availability. The Australian Government Department of Environment Water Heritage and the Arts is currently contributing to the funding of a water planning project in Tasmania, which will develop comprehensive scientific information on groundwater and surface water resources across the state. It will provide more accurate information that allows managers and communities to make informed water planning decisions as envisaged under the NWI. Mining will be included as part of the water allocation planning process where relevant.

9.3 Jurisdictional inclusion of NWI objectives

Tasmania has an NWI implementation plan (State of Tasmania 2006) that is accredited by the Commission.

The Implementation plan guides policy and management of water issues within the DPIPWE. It is also one of the drivers for the planned introduction of a groundwater regulation framework, which is due in 2010. Groundwater is currently virtually unregulated in Tasmania, with the exception of issues of groundwater quality that are considered in the context of mining projects.

9.4 Performance indicators

The Tasmanian NWI implementation plan sets out the actions that Tasmania has already completed and provides detailed information, for each NWI action, on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

At the time of publication of the implementation plan, the NRMCC performance indicators had not been developed, and as such, Tasmania did not report against any performance criteria for the tasks contained in the implementation plan.

9.5 Jurisdictional compliance with NWI objectives

The Tasmanian planning and environmental assessment policies and processes are compliant with the majority of NWI objectives. Areas of variation exist in the absence of licensing of groundwater extractions, resulting in a minimal level of water trading. This situation is a reflection of the groundwater systems in Tasmania, which are currently considered well within sustainable limits and often spatially disconnected; however, there are areas within the state where high levels of localised extraction occur.

As there are no systems considered to be over-allocated, Tasmania is not required to adjust water use to within sustainable yields. If required in the future, the *Water Management Act 1999* contains provisions for management intervention 'including the licensing and metering of groundwater users in specified areas, where significant problems are identified' (<http://soer.justice.tas.gov.au/2009/wat/3/issue/72/index.php>)

The majority of water trading, other than that directly related to rural property sales, has occurred within major irrigation schemes and through privately arranged physical transfers between landholders. For instance, substantial water trading is currently occurring between Hydro Tasmania and irrigators.

The Tasmanian planning and assessment framework is compliant with the remainder of the NWI objectives.

9.6 Consideration of groundwater and surface water interaction

It is recognised that groundwater and surface water interaction exists in Tasmania, and this management issue will be explicitly addressed in the forthcoming groundwater regulation

framework. Currently, this connectivity is addressed in assessments of potential acid mine drainage and the associated impacts on both surface water and groundwater.

9.7 Assessing the availability and condition of groundwater

The availability and condition of groundwater is currently not well understood, as its use is limited because of the abundant availability of surface water; it is also not perceived as a priority area for research and policy. While mining proponents are expected to identify the need for groundwater resources in their planning application, actual instances of this are limited. Mining operations in Tasmania are generally net producers of water, so water quality rather than depletion is seen as the primary issue to be addressed.

There is generally no competition for water between mining operations and other (anthropological) users, as most mining is located in the forested west of the state. In areas with lower rainfall (e.g. in the northwest), where mining might compete with agriculture for water, abstraction from rivers is licensed by DPIPWE.

The forthcoming groundwater regulation framework will include a system that will require permits for all new wells (which is currently not the case). This will aid the authorities' understanding of demand for groundwater, as well as its availability and condition.

9.8 Assessing cumulative effects in the planning process

Cumulative impacts are currently not well understood due to a generally high availability of, and lack of competition for, water. Cumulative effects on water quality are considered in mine development and management approval processes, but this is not a major issue at present. Once the groundwater framework is introduced, the capacity to address cumulative effects will exist.

No specific tools or methods are used currently with respect to groundwater quantity and groundwater quality, and the mine operator is expected to employ leading practice in estimating and monitoring mine water excess.

9.9 Data collection and reporting

DPIPWE has a substantial (historical) database for boreholes and wells and has recently conducted a groundwater modelling study covering 20 catchments across the state. However, the database is currently not used in a regulatory context.

9.10 Limitations to assessing cumulative effects

Table A.5 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in Tasmania. The issues have been identified in consultation with Tasmanian government stakeholders.

10. Victoria

10.1 Victorian environmental assessment process

In Victoria, the mining approval process usually commences with application for a mining licence. Before a work plan for a mining proposal can be considered under the *Mineral Resources (Sustainable Development) Act 1990*, one of two assessment processes must be completed: an environment effects statement (EES) may be required under the *Environment Effects Act 1978*; alternatively, if an EES is not required, a planning permit must be obtained under the *Planning and Environment Act 1987*. Once either an EES or planning permit process is completed, a work plan for a mine can be considered for approval. Major mining proposals are usually subject to the EES process.

10.2 Victorian water management and planning process

Victoria's water allocation framework provides the basis for the management of Victoria's water resource. Victoria's water allocation framework takes a whole-of-system water management approach. It considers all water resources (groundwater and surface water) for both consumptive and environmental purposes at all phases of the water cycle.

The Department of Sustainability and Environment is the statutory authority that manages Victoria's water resources. The Victorian *Water Act 1989* governs the regulation of water resources and has been designed to enable integrated management of surface water and groundwater resources. This is achieved through the development of water management plans and licence provisions. Under the *Water Act 1989*, a water supply protection area may be declared to protect groundwater resources, surface water resources, or both. Licences issued under this Act are the regulatory instruments that define the management requirements of individual operations. The licenses include water management frameworks that are developed by the licensees.

The consumption of groundwater from Victoria's aquifers is managed according to geographical area. The principal management unit for groundwater in Victoria is the groundwater management unit, the boundaries of which often fall across more than one river basin. A groundwater management unit can be a groundwater management area, water supply protection area, or an unincorporated area. There are more than 60 groundwater management units and three unincorporated areas covering the state. Of the 62 groundwater management units, 24 are gazetted as water supply protection areas under the Act. The three unincorporated areas are managed under statewide policy. Water corporations are responsible for providing water services and planning for future provision within their defined areas of operation. For groundwater, rural water corporations are responsible for issuing licences and administering the *Water Act 1989*.

Permissible consumptive volumes can be used in groundwater management areas and water supply protection areas. A permissible consumptive volume is set by the Minister for Water: it is the maximum volume of water that can be allocated in the area. Many groundwater management areas and water supply protection areas already have been allocated their permissible consumptive volume limit. In these areas, new licences cannot be issued. To acquire new water from the groundwater management areas or water supply protection

areas, the proponent must purchase a licence from an existing groundwater entitlement holder. Permissible consumptive volumes are imposed to prevent the resource being depleted or adverse impacts such as:

- declining water levels
- reduced base flows in rivers and streams
- changes to water quality.

The declaration of a permissible consumptive volume for an area provides certainty as to the limits available for extraction.

In some instances, there is a perception that the current state of groundwater resources is not very well understood, and this can affect the allocation of water resources. The current water allocation framework is based on a fixed level of resources as assessed for a specific geographic area, not taking into account geological characteristics such as the depth of water resources. There are approximately 2500 observation bores located across the state. These are monitored regularly for water levels in order to assist with responsible management of groundwater resources for long-term sustainability.

Victoria has rural water corporations that provide services such as bulk water and bulk sewerage services, management of rivers and creeks and major drainage systems, irrigation and domestic stock services in regional areas.

10.3 Jurisdictional inclusion of NWI objectives

Victoria has an NWI implementation plan (Victorian Government 2006) that is accredited by the Commission. The implementation plan guides policy and management of water issues within the Department of Primary Industries and the Department of Sustainability and Environment. The NWI and its objectives are credited with increasing the focus on groundwater, which is currently less well understood than surface water.

Proponents of mining projects are required to complete a mining work plan, which must contain the information listed in Schedule 13 of the Mineral Resources Development Regulations 2002. This includes a rehabilitation plan, an environmental management plan, an occupational health and safety plan, and a community engagement plan. Conducting regular monitoring of groundwater levels is another requirement of the work plan. The data are retained by the proponent and are available for inspection as required.

Where groundwater abstraction is considered necessary, the proponent requires a 'Licence to Take and Use Water' under in Section 51 of the *Water Act 1989*. Water well or dam construction and the use of pumping equipment require a Section 67 Works Licence. Both Section 51 and Section 67 licences can be refused on the grounds that they may adversely impact on existing entitlements, environmental water requirements, drainage or a watercourse or aquifer. In addition, under Section 51 licences, there is a need to transfer water into areas where permissible consumptive volume limits have been reached or management plans are in place.

Any entitlement of water is an entitlement to an amount of water that can be taken under specific conditions or specifications up to a maximum value. Licences are issued for a period of between one and 15 years. Licence conditions may be changed at the time of renewal or on transfer to ensure compliance with a management plan for a water supply protection area.

Under the *Water Act 1989*, the Minister for Water can determine permissive consumptive volumes for an area or water system. Such determinations are based on advice from the

Department of Sustainability and the Environment, relevant regional water authorities and catchment management authorities. They serve to set a limit on the issue of rights to extract water to prevent over allocation.

Under Section 22A of the *Water Act 1989*, the Minister may make an order in relation to the permissive consumptive volume. The order imposes a cap on the water available to be taken from a certain area for a specific period of time. There are no limitations as to the reason this order can be imposed. Section 33I of the *Water Act 1989*, prevents the Minister from issuing a water share if he or she is of the opinion that the issue of share would exceed the permissive consumptive volume order. However permissive consumptive volumes for groundwater systems are set to reflect historic use and are not a measure of sustainable yield. There is currently no process in place to return over allocated systems to sustainable levels of use.

Permissive consumptive volumes specify a maximum volume of water that can be taken from an area or water system during a specified period. Permissive consumptive volumes apply to surface water and groundwater; they have been declared for most surface water catchments in central Victoria and priority groundwater management units throughout the state.

There are no identified impediments to Victoria co-operating with other jurisdictions in regard to cross-jurisdictional mining and groundwater approvals.

10.4 Performance Indicators

The Victorian NWI implementation plan (Victorian Government 2006) sets out the actions that Victoria has already completed and provides detailed information for each NWI action on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

At the time of publication of the implementation plan for Victoria, the NRMCC performance indicators had not been developed. Victoria did not report against any performance criteria for the tasks contained in the implementation plan.

10.5 Jurisdictional compliance with NWI objectives

The Victorian framework for the management of water resources is generally compliant with NWI requirements that are relevant to the status of its water resources.

Amendments to the *Water Act 1989* were completed in consultation with NSW, Queensland and South Australia to understand the approaches to matters adopted in each of these jurisdictions. These amendments brought the Victorian legislation into conformity with the NWI objectives, and the common lexicon has been adopted where appropriate.

Victoria has adopted a proactive method of managing systems that are currently within sustainable extraction limits through a precautionary approach known as the environmental water reserve. Systems with existing entitlements that are currently above the sustainable yield will be capped and future water recovery completed where necessary.

Victoria's risk assignment framework has been incorporated into the *Water Act 1989*, and it is consistent with the COAG approach.

10.6 Consideration of groundwater and surface water interaction

At a state level, management of surface water and groundwater is not integrated, largely due to the poor understanding of the links between surface water and groundwater systems. Project level impact assessments include a consideration of interactions between surface and groundwater through the EES process or through extraction licence applications.

Proponents of mining projects are required to address the potential impact of their operation on both surface water and groundwater as part of the EES. Interaction between groundwater and surface water is addressed in the assessment of the EES, drawing in other agencies such as the Department of Sustainability and Environment or the water authorities for expertise where considered necessary.

The Section 51 licensing process equally requires proponents to address surface water and groundwater connectivity and the potential impact of their projected water requirements on either of these resources. Regulation of groundwater in Victoria is achieved through universal licensing to control the standards of bore construction, and 'take and use' licensing of water taken for irrigation or commercial purposes. The licensing provisions for groundwater are the same as those for surface water. Licensing powers are derived from the *Water Act 1989* and delegated to a number of authorities that are subject to government policy and ministerial guidelines.

The *Water Act 1989* provides for:

- licensing of drillers
- licensing of bore construction
- licensing of groundwater used for irrigation and commercial purposes
- the continuation of private rights to groundwater for domestic and stock use
- preparation of management plans in water supply protection areas.

New bore construction and groundwater extraction licence applications are assessed taking into account any adverse impacts on existing users, waterways, wetland and aquifers.

10.7 Assessing the availability and condition of groundwater

The Victorian Government has developed a long-term plan of water management, which has been in place since 2004. Water is managed primarily through a progressive water allocation and entitlement system that enables the assessment and management of the availability and condition of groundwater throughout the state. Groundwater is considered a significant and valuable component of Victoria's water resources.

In groundwater systems, the initial environmental water reserve comprises the water available after accounting for existing licences and private rights, as well as any additional water available under the cap on entitlements for an aquifer (known as permissible annual volumes). Environmental water reserves have been set using a precautionary principle based on the fact that the groundwater systems have not been fully allocated.

Where groundwater is identified as being under threat of over use, the area is declared a water supply protection area, and extractions are managed in accordance with approved management plans. The objective of the management plan is to make sure that the water resources of the water supply protection area are managed in an equitable manner to ensure the long-term sustainability of those resources.

A management plan may impose restrictions on the taking of groundwater to prevent groundwater level decline or a permissible consumptive volume from being exceeded, or to ensure that the environmental water reserve is maintained in accordance with the environmental water reserve objective (note: the value of groundwater to the environment has been formally recognised through the establishment of the 'environmental water reserve'. The environmental water reserve places extra legal protection over environmental water).

Areas of Victoria that are not covered by groundwater management areas or water supply protection areas are known as 'unincorporated areas'. These are subject to the normal licensing requirements.

The Groundwater and Licensing Branch of the Department of Sustainability and Environment is the Victorian Government's lead organisation responsible for overseeing the monitoring and management of Victoria's groundwater resources. Potential impacts of mining on groundwater are addressed as part of the EES process and in the mining work plan that is required by the Department of Primary Industry.

The State Observation Bore Network comprises 2500 strategically placed bores across Victoria that are used to monitor groundwater levels, water quality and interaction between groundwater and surface water systems. The information that is gathered through monitoring provides water resource managers with key data and knowledge to enable sustainable use and long-term planning in relation to groundwater resources.

A groundwater database that contains information on approximately 135,000 boreholes and wells throughout Victoria was last updated in 2002. More recent groundwater data can be accessed through the Victorian Water Resources Data Warehouse site.^[3] As part of mine project applications, the availability and condition of groundwater is examined by the proponent through the EES approvals process.

A Regional Groundwater Committee is examining the aquifers in the Latrobe Valley area immediately surrounding existing coal mines. All mining operators in the area are members of the Committee and are required to conduct ongoing monitoring of groundwater levels, which are subject to five-yearly evaluations.

10.8 Assessing cumulative effects in the approval process

The potential for cumulative environmental effects should be identified in the EES that is required for projects with potentially significant environmental impacts. Effective completion of this assessment is dependent on the ability of the proponent to access information on the effects of other existing activities or potential projects, and the availability of relevant regional policies, plans, strategies, and regional data. Due to the constraints involved in qualitative assessment of cumulative effects, often only a quantitative assessment is practicable.

In Victoria, there are more than 60 groundwater management areas and water supply protection areas that have been declared by the Minister for the protection of groundwater

³ <<http://www.vicwaterdata.net/vicwaterdata/home.aspx>>

resources. These areas are defined not only by a boundary at the ground surface, but with reference to a particular aquifer within a specified depth range below the surface. Both groundwater management areas and water supply protection areas must be declared by the Minister: the only difference is the level of management and public consultation required.

The Ministerial Guidelines for the Assessment of Environmental Effects under the *Environment Effects Act 1978* provides guidance on assessment of cumulative effects as part of the EES process. Cumulative effects are considered in preparing management plans for water supply protection areas. Cumulative effects are also managed through setting permissible consumptive volumes that cap the extraction from groundwater management areas.

A groundwater management area is declared to ensure that a moderate level of monitoring and management can occur to secure the long term sustainability of the aquifer. A water supply protection area requires more intensive management through the development of a groundwater management plan due to the extensive exploitation of the groundwater resource. In addition to seeking approval from the Minister, the declaration of a water supply protection area incorporates a mandatory public consultation process. July 2006 saw the introduction of permissible consumptive volumes to set the current total licence allocation for a particular groundwater management area or water supply protection area.

Once a water supply protection area is declared, all trading into and out of the declared areas is suspended until a groundwater management plan is approved. At this time, a consultative committee is appointed to assist with the development of the groundwater management plan. The consultative committees consist of local water users (at least 50 per cent of committee membership), government organisations and non-government organisations. Decisions relating to prescriptions outlined in the plan are reached by consensus among the committee members. This process allows for the majority of members to agree in principle that the prescriptions are a fair and reasonable means of achieving the agreed objectives, which in essence allows for the cumulative impact assessment of the area's activities on the groundwater resource.

In Victoria, the cumulative effects of mining are recognised as a particular issue in the Latrobe Valley, due to the concentration of coal mining operations. Clean Coal Victoria, a planned new branch of the Department of Primary Industry, is to be based in the Latrobe Valley. The branch will be examining impacts of mining on groundwater as part of its remit, which includes rehabilitation and closure planning. It is recognised that cumulative effects are an issue in the Latrobe Valley, as most mines will need to conduct dewatering so that operations are conducted efficiently and safely.

Currently, dewatering abstractions are used for multiple purposes, including the steam cycle, plant cooling and general-purpose use associated with mining and power generation. However, due to different coal conversion processes being used, new technology is expected to require lower volumes of water for their efficient operation, and water that becomes excess to existing requirements will need to be managed by other means.

The government's sustainable water strategy for the eastern region of Victoria (encompassing South Gippsland, Latrobe, Thomson, Mitchell, Tambo, Snowy and East Gippsland basins) will take these issues into account. The strategy, which has recently been initiated, is being developed by the Department of Sustainability and Environment in partnership with rural and urban water corporations, catchment management authorities, other key regional stakeholders, interest groups and communities. Completion is expected before 2011.

10.9 Data collection and reporting

As there is no formal requirement to consider cumulative effects of mining on groundwater, systematic data collection is limited. The groundwater database and the Victorian Water Resources Data Warehouse, as mentioned above, are the main sources of available data, in addition to that held by mining proponents. Data gathered by the Regional Groundwater Committee in the Latrobe Valley feeds into the Department of Sustainability and Environment's database.

10.10 Limitations to assessing cumulative effects

Table A.6 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in Victoria. The issues have been identified in consultation with Victorian Government stakeholders.

11. Western Australia

11.1 Western Australian environmental assessment process

In Western Australia, the Environmental Protection Authority is charged with the duty of enhancing the quality of the environment and conducting environmental impact assessment. In Western Australia, the approvals process has three approval streams: a Standard assessment by the Department of State Development; the development of a State Agreement; or under the Integrated Planning Approvals System.

Mining projects can have an environmental assessment completed at four different levels:

- Assessment on referral information—low-impact projects are reviewed informally and advice is provided to the proponent to manage environmental effects.
- Environmental protection statement—required for projects deemed by the Environmental Protection Authority to raise environmental issues of local interest that can be readily managed.
- Public environmental review—used for proposals with significant environmental impacts or where there is major public interest.
- Environmental review and management program—this is the highest level of assessment and corresponds to the scale and complexity of the project. It is equivalent to the environmental impact statement in other states and territories.

All four levels of assessment are approved by the Minister for Environment.

The Integrated Project Approval System is applied to more complex mining projects, such as those significant to the state's economy.

11.2 Western Australian water management and planning process

The Department of Water is the statutory authority that manages Western Australia's water resources. The *Rights in Water and Irrigation Act 1914* governs the regulation of water resources. Licences and permits issued under this Act are the regulatory instruments that define the management requirements of individual operations and include water management frameworks developed by the licensees. Statewide policies provide further guidance on specific licensing requirements that are to be implemented in a water management framework.

Major water planning and management activities in Western Australia typically cover groundwater resources because these are generally better suited to being developed than surface water resources. More than half of the groundwater management units in the state are managed by regional, subregional or local area management plans, depending on the level of management required. The remaining groundwater management units are managed under statewide policy.

Mining is specifically included as part of the water allocation planning process in which the industry is considered a major user of water, and water plans are being developed for some

regions (e.g. the Pilbara^[4]), which specifically take into account the particular water needs of mining operations.

The mining industry is considered in the same way as any other water user in relation to accessing water allocations.

11.3 Jurisdictional inclusion of NWI objectives

The Western Australian Environmental Protection Authority branch of the Western Australia Department of Environment and Conservation manages the environmental assessment process for projects deemed to have a significant impact. The Environmental Protection Authority provides overarching environmental advice to the Minister for the Environment, incorporating considerations of various departmental and state policies and initiatives, including the NWI. For specific water-related issues, the Environmental Protection Authority refers to the Western Australian Department of Water.

The Western Australian Department of Water is the key authority incorporating the NWI into its work. Along with the Western Australian water reform process and the state water plan, the NWI informs the strategic direction of the Department of Water in transitioning from 'development phase' to 'mature phase' water management approaches. This is specifically affected through forthcoming changes to legislation, as well as through transition mechanisms to meet the intent of the NWI. New water resources legislation is being drafted to incorporate the NWI requirements and the recommendations made in 'A Blueprint for Water Reform In Western Australia'. A detailed report on the progress of Western Australia in achieving NWI objectives is provided in Western Australia's *Achievements in Implementing the National Water Initiative : Progress Report* (Department of Water 2008).

Under Western Australia's current water trading scheme, which is governed by the *Rights in Water and Irrigation Act 1914*, it is recognised by the Western Australian Government that changes are required to the system of entitlements to make Western Australia compliant with NWI requirements.

Western Australia defines environmental outcomes in statutory water management plans, enabling the effectiveness of measures to meet environmental outcomes to be monitored and publicly reported on a regular basis. However, Western Australia's current water plans, despite giving consideration to public and environmental water, are not legally binding on water users or the Minister for Water. Legislative reforms are currently underway that will provide for legally binding water management plans.

The incidence of cross-jurisdictional mining and groundwater approvals is limited, given the location of most of Western Australia's mineral resources. However, there are no impediments to Western Australia working closely with other jurisdictions as required to address cross-jurisdictional issues.

Western Australia has an NWI implementation plan (Government of Western Australia 2007) that is accredited by the Commission.

⁴ See <<http://portal.water.wa.gov.au/portal/page/portal/PlanningWaterFuture/AllocationPlanning/Pilbara>> for information on mining water management in the Pilbara.

11.4 Performance indicators

The Western Australian NWI implementation plan sets out the actions that Western Australia has already completed and provides detailed information for each NWI action on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

Western Australia has reported against the performance indicators developed by the NWI Performance Indicators Working Group, which includes representatives from all jurisdictions and the Commission.

11.5 Jurisdictional compliance with NWI objectives

The Western Australian planning and environmental assessment policies and processes are compliant with the NWI objectives, with water reforms well underway and new water resources legislation under development to support the intent of the NWI.

Policies to achieve consistency with the NWI objectives are being developed, particularly to support future statutory plans in parallel with the drafting of the new Water Resources Management Bill. While the current allocation plans are enabled under the *Rights in Water and Irrigation Act 1914*, they are not statutory in compliance with the NWI. Western Australia anticipates that the water allocation plans for all management areas of the state will be completed by 2012. Of these plans, those completed under the *Rights in Water and Irrigation Act 1914* will be converted or updated to statutory plans following the introduction of the new legislation.

11.6 Consideration of groundwater and surface water interaction

Both the Environmental Protection Authority approval process and the licensing process for water availability and management under the *Rights in Water and Irrigation Act 1914* consider groundwater and surface water interaction, and this interaction is addressed if there is an identified need for groundwater supply in order to ensure that water is used on a sustainable basis. In particular, the objective is to avoid negative impacts of mine dewatering or water abstraction on nearby surface water bodies or vegetation. Connectivity is also being addressed in the water licensing processes.

11.7 Assessing the availability and condition of groundwater

In 2005, the Department of Water commenced an investigation of Western Australia's groundwater resources, with actions planned through to 2020. The program's timing is driven by the large increase in groundwater use during the past decade and a large projected growth in demand. It is currently focused on metropolitan areas and horticultural districts, but it will successively be introduced at a regional level to facilitate a statewide assessment.

To provide data on groundwater water quantity and quality, there are approximately 3000 monitoring wells in the coastal plain around Perth, between Moore River and Mandurah, and

a similar number are distributed throughout the rest of the state. Water levels and chemical analysis samples are taken at regular intervals, usually monthly or quarterly, providing a growing historical record of the state of the aquifers. From this basic information, policies are developed to protect groundwater supplies and groundwater dependent wetlands and vegetation.

In mine project applications, the availability and condition of groundwater is examined through the water licence assessment and reporting processes. Annual and (more comprehensive) triennial groundwater monitoring reports are typically a requirement of regulatory approvals for mining operations.

11.8 Assessing cumulative effects in the planning process

Being conscious of cumulative effects as an increasing issue in Western Australia, the Environmental Protection Authority has encouraged industry to develop sector-wide approaches whereby, for instance, mining projects with water demands are linked with others where dewatering is conducted. In regions where cumulative effects are currently considered an issue, each operation's contribution to these effects is examined on a case-by-case basis. The assessment depends on:

- the possibility for retrofitting where there are multiple operations or expanded operations causing cumulative changes to the water regime that can be managed as a whole
- the scale of new effects relative to original effects
- the practicality of setting resource condition targets in highly modified or highly variable environments
- the scale of effects relative to natural changes in regime (e.g. impacts of floods and fire)
- downstream consequences
- pre-existing legal arrangements.

Specific mechanisms for assessing cumulative effects vary by location, depending on the issues set out above, therefore the context and considerations with respect to mining vary significantly between regions such as the Pilbara, Goldfields and Collie. A regional-based hydrogeologist assesses each mining application for water licences. This assessment includes drawdown and dewatering effects, and also cumulative effects. Modelling provides the main tool for assessing these effects, but the Department of Water is also developing policy tools to further enable assessment.

At the time of preparing this report, existing informal guidelines that had been applied for several years were being translated into formal guidelines for mining proponents in the Pilbara to provide guidance on meeting the regulatory requirements of the Department of Water in alignment with processes of the Environmental Protection Authority, the Department of State Development, and the Department of Environment and Conservation approvals processes.^[5] Further to this, a tool for assessing cumulative effects for Pilbara mining had been initiated, and a tool for considering cumulative effects on salt lakes was under preparation.

⁵ These guidelines can be found at <http://portal.water.wa.gov.au/portal/page/portal/PlanningWaterFuture/AllocationPlanning/Pilbara>.

11.9 Data collection and reporting

The Department of Water independently collects and disseminates a wide range of data, including groundwater levels and quality, which are used in policy development to protect groundwater supplies and groundwater dependent ecosystems.

To obtain water licences, proponents of mining projects collect data, including groundwater data, and report to the Department of Water. In the pre-feasibility stage, proponents provide an outline of the development concept, including a summary of water requirements, major water management issues and an indicative water balance, all of which are guided by statewide requirements for water resource management. The regulatory requirements for the proposed projects are then defined and the scope of studies and investigations necessary for a Section 5C licence (a licence that allows the holder to 'take' water from a watercourse, wetland or underground source) are agreed upon. Where the construction of groundwater wells is necessary, application for a Section 26D licence is also required.

The proponent then conducts agreed studies and submits a draft water management plan and supporting information in the form of a more developed water balance and hydrogeological assessment. Draft plans describe and justify the proponent's strategy for managing water over the life of the project. They are typically required as part of the Environmental Protection Authority's environmental assessment process, but they may be required by the Department of Water to support a licence application.

A detailed operating strategy then sets out how the proponent intends to manage water over the life of the project in accordance with the approved water management plan. The operating strategy must include an adaptive management cycle where the results of the monitoring program are used to continually review and improve the management of water. Responsibility for developing appropriate terms and conditions for the licence also lies with the Department of Water, which will decide on terms and conditions after considering all submitted information and the outcome of an assessment by the Environmental Protection Authority (where applicable).

During construction and operation, proponents are required to report to the Department for Water in accordance with their licence conditions. Licence compliance is managed through reporting and departmental regional hydrogeologist surveys.

11.10 Limitations to assessing cumulative effects

Table A.7 (Appendix A) summarises the key issues and limitations associated with achieving NWI compliance in relation to the assessment of cumulative effects during the environmental assessment process in Western Australia. The issues have been identified in consultation with Western Australian state government stakeholders.

12. Other Jurisdictions

12.1 Commonwealth

Environmental matters of the Commonwealth are governed by the EPBC Act. The EPBC Act is triggered if an action has, or is likely to have a significant impact on a matter of national environmental significance. There are seven matters of national environmental significance that are protected under the EPBC Act, these are:

- World Heritage properties
- National Heritage places
- wetlands of international importance
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- nuclear actions (including uranium mines).

In addition, the EPBC Act is triggered if the action will have, or is likely to have a significant impact on, the environment associated with Commonwealth land.

The Commonwealth jurisdiction is relevant to groundwater resources only if the project impacts, or is likely to impact, on a groundwater dependent ecosystem, or if the project takes place on Commonwealth land.

In addition, some jurisdictions have bilateral agreements in place to reduce duplication of environmental assessment and regulation between the Commonwealth, states and territories. Bilateral agreements allow the Commonwealth to 'accredit' particular state or territory assessment processes and, in some cases, state or territory approval decisions.

In effect, bilateral agreements allow the Commonwealth to delegate to the states and territories the responsibility for conducting environmental assessments under the EPBC Act and, in certain circumstances, the responsibility for granting environmental approvals under the EPBC Act.

12.2 Australian Capital Territory

There are no major mining activities currently occurring within, or are likely to occur within, the jurisdiction of the Australian Capital Territory.

13. Summary and conclusions

13.1 Summary of key findings of jurisdictional consultation

Approvals process

Within all jurisdictions, it is clear that achieving consistency between mining approvals processes across all mining, environment, water and planning legislation is fundamental to implementing, achieving and sustaining the NWI objectives. It follows from this that providing a clear framework and consistent arrangements for each jurisdiction is a key step in ensuring cumulative effects on groundwater from mining operations can be assessed.

Inter-agency communication

In some states, there is a perception that a lack of communication and coordination between different government agencies involved in planning and approvals process in regard to significant water resource issues affects the decision-making process and environmental impact assessment outcomes.

Strengthening state legislation

In order to achieve the objectives of the NWI and implement the NWI principles, there is a perceived need for strengthening and improving existing state legislation and, where necessary, developing new policies to adequately deal with water management issues and, in some instances, to enhance regulatory powers or provide means to achieve NWI objectives.

Data availability

The availability of data on groundwater resources and systems is a consistent issue across all jurisdictions and poses limitations for assessing cumulative effects for new or existing mining projects and regions, for example:

- difficulties associated with integrating locally collected data, such as that provided by a mining company, with the historical and regional scale data
- in some regions, extensive groundwater datasets are available in localised areas, but outside of these areas data are limited or of a scale that makes an assessment of cumulative effects problematic
- difficulties arise in assessing cumulative effects on a groundwater system from multiple mining operations across a region if all user data are not represented in state databases
- a lack of reporting of groundwater data by all system users, including in some cases mining companies but also irrigators and other industry, means new data are not being collected and modelled to build a detailed regional understanding of water resource condition or monitor impacts.

Data quality and quantity

A key issue raised was the lack of a standardised format for data that are collected by mining companies and reported to the administering authorities. In all jurisdictions, mining companies are required to fund the environmental investigations required for assessment under the mining project approvals process. This results in a large amount of variability in the quality and quantity of data that may be available for assessment, and it further affects the usefulness of the data in terms of aggregating data across sites, comparing data, using the data for regional modelling, and assessing cumulative effects. In some instances, concerns over the validity of the data collected and reported is also of concern.

Data sharing

Data sharing between administrative authorities and industry is identified as an important practice for assessing cumulative effects on groundwater systems. To date, data sharing between mining companies has been limited or non-existent despite encouragement from administering authorities. Mining companies are reluctant to share information with their competitors, and at present there are no regulatory requirements and no perceived benefit to the mining companies for making the additional effort required to share data. In addition, each mining company collects monitoring data using different methods and the data is stored in different formats using different software—this makes sharing data between companies complicated and not necessarily useful. Administering authorities see data sharing between mining companies operating in mining intensive regions not as a major limitation to assessing impacts as such, but as an important starting point for mining companies to collaboratively address multi-mine issues.

13.2 Conclusions

Governments around Australia have made significant efforts and progress in working towards achieving the objectives and implementation of the principles of the NWI Intergovernmental Agreement. The limitations discussed in this report highlight that there are differences in the approvals frameworks and processes across all jurisdictions and, importantly, for managing mining within the water planning process and on the priority placed on sustainably managing groundwater resources. Nonetheless, the limitations identified are not considered major impediments to achieving the NWI objectives. It is clear that attention must be given to matters of inter-agency and inter-jurisdictional cooperation, communication, accountability and resourcing.

Along with legislative frameworks, the jurisdictions are well advanced in developing and implementing water plans that have the capacity to assist in managing the effects of mining operations on groundwater resources. In those areas where water plans are not in place, mining proponents still need to demonstrate under the legislative framework that proposed mining activities involving the use of groundwater resources will not impact adversely on other users of the resource.

For all jurisdictions, it is clear that achieving consistency between mining approvals processes across all mining, environment, water and planning legislation, is fundamental for each state to implement, achieve and sustain the NWI objectives. The report has highlighted some areas where there is significant scope to improve how cumulative effects in the mine planning and approval process are considered and addressed, such as through adapting the environmental assessment processes to better handle those impacts that are cumulative spatially and over time.

Providing a clear framework and consistent arrangements for each jurisdiction is considered a key step in:

- ensuring cumulative effects of mining on groundwater are adequately assessed in the approvals process
- reducing adverse environmental effects arising from mine-altered groundwater regimes to acceptable levels
- achieving sustainable development.

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Appendix A — Key issues and limitations associated with achieving jurisdictional NWI compliance

New South Wales

Table A1: NSW limitations to assessing mining-related cumulative groundwater effects

<p>Administering authorities believe cumulative effects are difficult to assess on a local scale as the current NSW processes are large-scale assessments and are not easily applied to localised areas.</p>
<p>Data collected and reported by mining companies to the administering authority are not required in a standardised format, which makes collation, comparison and further modelling difficult.</p>
<p>Administering authorities indicate that, due to resourcing issues, there is limited capacity for regulating and assessing compliance. However, to address this, options such as self-compliance or spot checks on compliance are under consideration.</p>
<p>Although data sharing has been encouraged by administering authorities, there has been limited uptake by any mining companies. Administering authorities view data sharing between mining companies operating areas where intensive mining takes place as a means of enabling operators to get a view of the 'big picture' and the effects their operations have in a regional context. This is not seen as a major limitation to assessing impacts as such, but as an important starting point for mining companies in collaboratively addressing multi-mine issues.</p>
<p>In some instances, administering authorities feel they do not have the necessary power or means to apply the NWI objectives or to make the needed changes to legislation to achieve these objectives.</p>
<p>There is a perceived need to focus on water accounting as a key issue to working towards and achieving NWI objectives. Sustainable use objectives require water accounting systems to be representative of the mining operation and broader environment.</p>
<p>There is a perception that the generality of the <i>Water Management Act 2000</i>, and the NWI prompts a need for strengthening and improving existing legislation and, if necessary, developing new policies to further expand on the intent of the <i>Water Management Act 2000</i> and the NWI to specifically deal with water management issues.</p>
<p>Some concerns have been expressed over the open terminology used in the NWI; for example, terms such as 'short duration' and 'isolated' in Clause 34 are open to various interpretations.</p>
<p>There is a perception that there is a focus in NWI on duration rather than impact, which therefore does not take into consideration that a significant impact can occur within a very short period of time.</p>
<p>There is a perception that the issue of water should be elevated across all agencies to ensure the protection of water resources is appropriately addressed in the environmental assessment process.</p>
<p>Achieving consistency between planning and approvals process across different legislation—such as the <i>Environmental Planning and Assessment Act 1979</i> and the <i>Water Management Act 2000</i>—is fundamental to implementing, achieving and sustaining the NWI objectives.</p>

Northern Territory

Table A2: Northern Territory limitations to assessing mining-related cumulative groundwater effects

Due to limited resourcing, the administering authorities have indicated that only high-risk sites are regulated at present, and capacity for compliance auditing is therefore limited. Administering authorities feel that compliance auditing is essential for ensuring companies are compliant with the water management plan as well as for understanding what the actual impacts are and potentially might be.

High-risk sites (locations) are identified and included in the compliance program, but other medium or lower risk sites are not captured, making it difficult to assess cumulative effects from multiple sites across a region.

There is a perception that there is a need for consistency across the agencies in terms of reporting requirements and a standardisation of communication nationally to eliminate, as an example, problems of multiple reporting requirements for different information to different agencies.

It is evident there is some lack of clarity and understanding around what Northern Territory government agencies should be working towards, in cooperation with other jurisdictions, to meet and sustain NWI objectives in the long term.

Queensland

Table A3: Queensland limitations to assessing mining-related cumulative groundwater effects

<p>Cumulative effects of a new mining project on groundwater are assessed based on the local data provided by the proponent and existing regional data. However, in some regions, data are limited or of a regional scale, making an assessment of cumulative effects problematic.</p>
<p>In some regions, a lack of detailed historical information and baseline data for existing projects can limit the assessment of cumulative effects.</p>
<p>It is believed that alignment of water act assessments with the environmental assessment process would ensure consistency and clarity of roles in the approvals process.</p>
<p>Improvements to inter-agency collection, management and evaluation of incoming water data would lead to an improved ability to assess cumulative effects and identify potential issues, such as matching up groundwater quality data that are reported to the EPA and water quantity that data are reported to the DERM to provide a more rigorous database for assessing cumulative effects.</p>
<p>There are issues around managing expectations, approaches and principles across all agencies and coming to an agreement about what the best outcome or solution might be in relation to water management, e.g. disposal of liquid waste in ponds or via re-injection.</p>
<p>Administering authorities have identified a lack of resources for fully investigating and assessing groundwater systems and usage resulting in a limited understanding of the systems and also of potential cumulative effects. For instance, incoming data are not being modelled or developed into a usable system due to a lack of resources.</p>
<p>Lack of reporting of groundwater data by all groundwater users, including mining companies, means new data (including quality assurance and quality control data) are not being collected and modelled to build a better regional picture. In some cases, the data are reported annually as required, but due to a lack of government resources, the information is stored and not processed further. In some cases there are concerns over the validity of the data collected and reported.</p>

South Australia

Table A4: South Australia limitations to assessing mining-related cumulative groundwater effects

<p>In South Australia, as with all jurisdictions, mining companies are required to fund environmental investigations required for assessment under the mining project approvals process; and it has been raised that issues arise due to the large variation in quality and quantity of data that may be available for assessment, which further affects the usefulness of the data in assessing cumulative effects.</p>
<p>A key issue highlighted for South Australia is the quality and quantity of available groundwater water data, which are very limited for some regions of the state, making an assessment of cumulative effects in these regions difficult.</p>
<p>A lack of funding for resourcing is considered a major limitation for South Australia in assessing cumulative effects or implementing NWI objectives.</p>
<p>Historical groundwater data are available in some areas of South Australia, and the data collected and reported by mining companies as part of the mine approvals process provide much more detailed information about groundwater systems. However, further use of the data and information is limited, typically due to resourcing issues, and the data are not further modelled or built on to develop an ongoing assessment of systems and cumulative effects.</p>

Tasmania

Table A5: Tasmanian limitations to assessing mining-related cumulative groundwater effects

<p>Water is generally considered a low priority issue, and there is a perception of minimal political regard for the resource due to assumed abundant quantities of water. As a consequence, administering authorities believe that insufficient resources are provided to allow for the assessment of cumulative effects on water resources in association with mining and other industries, such as irrigation.</p>
<p>No regulatory framework currently exists for groundwater, and therefore no mechanisms exist to assess cumulative effects or other groundwater related issues.</p>

Victoria

Table A6: Victorian limitations to assessing mining-related cumulative groundwater effects

<p>Groundwater resources are not always well understood, which affects the allocation of water resources specifically for mining. The current water allocation framework is based on a fixed level of resources assessed for a specific geographic area, not taking into account geological characteristics and depth of groundwater occurrence.</p>
<p>Existing caps on groundwater provide barriers to mineral exploration, which in turn may affect the accumulation of further knowledge on groundwater resources.</p>
<p>Separate allocation systems for groundwater and surface water make the assessment of cumulative effects and assessing the connectivity between the surface water and groundwater systems difficult.</p>
<p>Knowledge of groundwater resources in Victoria is stored and managed across several different government agencies and private companies (including miners). There is generally no collective use of all the data. This has meant that collation of the data and information for further use, such as for assessing cumulative effects, would be difficult and time consuming.</p>

Western Australia

Table A7: Western Australian limitations to assessing mining-related cumulative groundwater effects

<p>While cumulative effects are assessed on a case-by-case basis, there is a need for inclusion of strategic planning in the assessment process.</p>
<p>There is a perception of a lack of liaison between different government agencies involved in planning and approvals processes, and that essential interactions between agencies at the decision level for approvals are not occurring in a consistent manner or at the strategic level required to achieve effective outcomes.</p>
<p>Data sharing and co-operation between mining companies is limited despite being encouraged by administering authorities.</p>
<p>There is a perception that the language used in the NWI can presume a water management context that does not necessarily match the actual water management context, necessitating an interpretation of the NWI intent.</p>
<p>Setting the context for 'cumulative effects of mining on groundwater' within the key NWI issues of over-allocation, sharing water, efficiency, and ecosystem protection, for example, would be useful in guiding the assessment process.</p>

Appendix B—Review of mining regulations

Table B1: Key legislation relevant to mining project approvals

<i>State or Territory</i>	<i>Water</i>	<i>Mining</i>	<i>Environmental Protection</i>	<i>Planning</i>
C'wealth	<ul style="list-style-type: none"> National Water Initiative National Water Quality Management Strategy 	<ul style="list-style-type: none"> Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, the JORC Code 2004 Enduring Value 	<ul style="list-style-type: none"> EPBC Act 	
ACT	Not applicable	Not applicable	Not applicable	Not applicable
NSW	<ul style="list-style-type: none"> <i>Protection of Environment Operations Act 1997</i> <i>Water Management Act 2000</i> Water Management Regulation 2004 	<ul style="list-style-type: none"> <i>Mining Act 1992</i> <i>Coal Mines Regulation Act 1982</i> Mining Regulation 2003 Coal Mines Regulations 1999 	<ul style="list-style-type: none"> <i>Protection of Environment Operations Act 1997</i> Protection of the Environment Operations Regulation 1998 Clean Waters Regulation 1972 	<ul style="list-style-type: none"> <i>Environmental Planning and Assessment Act 1979</i> Environmental Planning and Assessment Regulation 2000
Northern Territory	<ul style="list-style-type: none"> <i>Water Act 1992</i> Water Regulations 2002 	<ul style="list-style-type: none"> <i>Mining Act 1980</i> <i>Mining Management Act 2001</i> Mining Regulations Mining Management Regulations 	<ul style="list-style-type: none"> <i>Environmental assessment Act 1994</i> <i>Waste Management and Pollution Control Act 1998</i> Environmental assessment Administrative Procedures 2003 Waste Management and Pollution Control (Administration) Regulations 1998 	<ul style="list-style-type: none"> <i>Planning Act 1999</i> Planning Regulations 2005

Table B1: Key legislation relevant to mining project approvals

<i>State or Territory</i>	<i>Water</i>	<i>Mining</i>	<i>Environmental Protection</i>	<i>Planning</i>
Queensland	<ul style="list-style-type: none"> • <i>Water Act 2000</i> • Water Regulation 2002 • Environmental Protection (Water) Policy 1997 • <i>Wild Rivers Act 2005</i> 	<ul style="list-style-type: none"> • <i>Mineral Resources Act 1989</i> • Mineral Resources Regulation 2003 	<ul style="list-style-type: none"> • Environmental Protection Act 1994 • State Development and Public Works Organisation Act 1970 • Environmental Protection Regulation 2008 • Guidelines 	<ul style="list-style-type: none"> • <i>Integrated Planning Act 1997</i> • Integrated Planning Regulation 1998
South Australia	<ul style="list-style-type: none"> • <i>Water Resources Act 1997</i> • Water Resources Regulation 1997 • Environment Protection (Water Quality) Policy • <i>Natural Resources Management Act 2004</i> 	<ul style="list-style-type: none"> • <i>Mining Act 1971</i> • Mining Regulations 1998 	<ul style="list-style-type: none"> • Environment Protection Regulations 1994 • <i>Environmental Protection Act 1993</i> 	<ul style="list-style-type: none"> • <i>Development Act 1993</i> • Development Regulations 1993
Victoria	<ul style="list-style-type: none"> • <i>Water Act 1989</i> 	<ul style="list-style-type: none"> • <i>Mineral Resources (Sustainable Development) Act 1990</i> • Mineral Resources Development Regulations 2002 	<ul style="list-style-type: none"> • <i>Environment Protection Act 1970</i> 	<ul style="list-style-type: none"> • <i>Planning and Environment Act 1987</i> • Planning and Environment Regulations 2005 • <i>Environment Effects Act 1978</i>
Tasmania	<ul style="list-style-type: none"> • <i>Water Management Act 1999</i> • Water Management Regulations 1999 	<ul style="list-style-type: none"> • <i>Mineral Resources Development Act 1995</i> • Mineral Resources Regulations 2006 • Mineral Exploration Code of Practice • Quarry Code of Practice 	<ul style="list-style-type: none"> • Mineral Exploration Code of Practice • Quarry Code of Practice 	<ul style="list-style-type: none"> • <i>Land Use Planning and Approvals Act 1993</i> • Land Use Planning and Approvals Regulations 2004

Table B1: Key legislation relevant to mining project approvals

<i>State or Territory</i>	<i>Water</i>	<i>Mining</i>	<i>Environmental Protection</i>	<i>Planning</i>
Western Australia	<ul style="list-style-type: none"> • <i>Water and Rivers Commission Act 1995</i> • <i>Rights in Water and Irrigation Act 1914</i> 	<ul style="list-style-type: none"> • <i>Mining Act 1978</i> • <i>Mining on Private Property Act 1978</i> • <i>Mining Regulations 1981</i> 	<ul style="list-style-type: none"> • <i>Environmental Protection Act 1986</i> • <i>Environmental Protection Regulations 1987</i> • <i>Guidelines to Help You Get Environmental Approval for Mining Projects in WA</i> 	<ul style="list-style-type: none"> • <i>Local Government Act 1995</i> • <i>Planning Commission Act 1985</i> • <i>Land Administration Act 1997</i> • <i>Statements of Planning Policy for Environment and Natural Resources</i>

Appendix C—List of stakeholders interviewed

Table C1: List of stakeholders interviewed

<i>State or Territory</i>	<i>Agency</i>	<i>Interviewee</i>
Queensland	Department of Environment and Resource Management (formerly Department of Natural Resources and Water – Groundwater Assessment and Planning)	Adrian McKay Senior Planning Officer (Groundwater) Sanjeev Pandey Team Leader (Groundwater) Groundwater & Planning Policy Coordination
	Department of Environment and Resource Management (formerly Department of Natural Resources and Water)	Randall Cox Director, Strategic Water Policy Strategic Water Initiatives
	Department of Environment and Resource Management (formerly Environmental Protection Agency)	Ian Wilson Senior Director, Technical Operations, Environmental Services Division
	Department of Employment, Economic Development and Innovation (formerly Department of Mines and Energy)	David Carmichael Principal Project Officer, Industry Development Division Russell D'Arcy Manager, Strategic Initiatives and Partnerships
	Department of Infrastructure and Planning	Phil Dash Assistant Coordinator General, Significant Projects Coordination
	Queensland Resources Council	Andrew Barger Director, Industry Policy
New South Wales	Department of Water & Energy	Mark Mignanelli ,Manager Major Projects, Mine Assessments and Planning George Gates, Manager Groundwater Assessment Eddie Harris, Principal Policy Officer (Water) Jan Gill, Principal Policy Officer (Water) Fergus Hancock, Senior Assess. & Mining Coordination Officer Michael Williams, Principal Hydrogeologist Robert O'Neill, Director Planning & Interstate Programs
	Department of Primary Industries	Rebekah Gomez-Fort ,Policy Manager Water Resources Policy Branch, Strategy, Policy and Communications Division Elise Newberry Mineral Resources Division, Director Environment Sustainability Branch
	Department of Planning	Howard Reed, Acting Manager - Mining, Major Development Assessment
	Hawkesbury-Nepean CMA	Kerryn Richardson

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<i>State or Territory</i>	<i>Agency</i>	<i>Interviewee</i>
Northern Territory	Department of Natural Resources, Environment, the Arts and Sports	Ian Lancaster Water Planning and Regulation
	Department of Primary Industries, Fisheries and Mines	Gillian Jan Director - Mining & Petroleum Authorisations & Evaluations Division
Western Australia	Department of Water	Susan Worley Water Allocation Branch
	Department of Environment and Conservation	Ray Claudius Mining and Industrial Assessment Branch Environmental Impact Assessment
	Department of Industry and Resources	Ian Briggs General Manager, Environmental Policy
	Department of Planning and Infrastructure	Kelly Hudson Senior Environmental Planner, State Strategic Policy
South Australia	Department of Primary Industries and Resources	Greg Marshall Chief Inspector of Mines, Manager PIRSA Mining Regulation and Rehabilitation Branch
		John Morton Program Manager, Mine Technical Services PIRSA Mining Regulation and Rehabilitation Branch
	Department for Water Land and Biodiversity Conservation	Lloyd Sampson Senior Hydrogeologist
Victoria	Department of Planning and Community Development	Anthony Wansink Senior Environmental Assessment Officer
	Department of Primary Industries– Minerals Development	Kathy Friday Minerals Development Manager
	Department of Primary Industries – Sustainable Development	Doug Sceney Manager Sustainable Development & Business Systems Unit
	Department of Sustainability and Environment	Jennifer Fraser Director, Groundwater & Licensing Randal Nott Senior Hydrogeologist, Groundwater & Licensing Geoff Steendam Office of Water
	Mallee CMA	Glenn Sutherland
	East Gippsland CMA	Rex Candy

Table C1: List of stakeholders interviewed

<i>State or Territory</i>	<i>Agency</i>	<i>Interviewee</i>
Tasmania	Department of Environment and Resource Management (formerly Department of Natural Resources and Water – Groundwater Assessment and Planning)	Adrian McKay Senior Planning Officer (Groundwater) Sanjeev Pandey Team Leader (Groundwater) Groundwater & Planning Policy Coordination
	Department of Environment, Parks, Heritage and the Arts	John Langenberg Environmental Officer, Mining & Extractive Industries Stephen Pratten Scientific Officer (Water), Scientific and Technical Services of Environment Division