

FINAL REPORT

**Expert Panel for the 10 Year Review of the
Snowy Water Licence**

November 2018



FINAL Report of the Expert Panel Review of the Snowy Water Licence

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Abbreviations

Alluvium	Alluvium Consulting Australia Pty Ltd
cl.	Clause (of the Licence or the SWIOID)
Department	NSW Department of Industry (see Glossary below)
DPI	NSW Department of Primary Industries
MDBA	Murray-Darling Basin Authority
Ministerial Corporation	The Water Administration Ministerial Corporation (see Glossary below)
OEH	NSW Office of Environment and Heritage
RAR	Required Annual Releases
RMIF	River Murray Increased Flows
Snowy Hydro	Snowy Hydro Limited
SMRIF	Snowy Montane River Increased Flows
SRIF	Snowy River Increased Flows
SSC	Snowy Scientific Committee
SWIOID	Snowy Water Inquiry Outcomes Implementation Deed
SWL	Snowy Water Licence
SWTAG	Snowy Water Technical Advisory Group
ToR	Term of Reference
WCLC	Water Consultation Liaison Committee

Glossary

Word	Meaning described here
Act	Used to refer to the Snowy Hydro Corporatisation Act 1997 (NSW)
Baseline	The dataset from which changes are assessed (in this report principally the Increased Flows)
Department	<p>Used to refer to the agency administering NSW water management and the Snowy Water Licence (ie the Licensor), which was at various times named the “NSW Office of Water”; “DPI – Office of Water”, “DPI – Water” and at the time of writing, the “Department of Industry” (Lands and Water division).</p> <p>Note that the Ministerial Corporation functions are delegated to the Director General and Deputy Director General of the Department.</p> <p>The Panel has used the term Ministerial Corporation, when referring to obligations and responsibilities established by the Licence. The term “the Department” has been used when referring to more general management and administration.</p> <p>Referencing uses the name cited on the document at time of publication.</p>
Governments	Used (in the plural) to refer to the governments of NSW, Victoria and the Commonwealth in their capacity as the parties to the SWIOID and exercising some functions under the SWL.
Increased Flows	The Snowy River Increased Flows (SRIF), Snowy Montane River Increased Flows (SMRIF) and the River Murray Increased Flows (RMIF)
Licence	The Snowy Water Licence
Licensee	Snowy Hydro
Licensor	The Ministerial Corporation (delegated to the Department)
Ministerial Corporation	<p>The Water Administration Ministerial Corporation (WAMC), which is the legal entity responsible for issuing the Licence, issuing directions and approvals under the Licence, as well as assessing and investigating compliance with the Licence.</p> <p>Note that the Ministerial Corporation functions are delegated to the Director General and Deputy Director General of the Department.</p> <p>The Panel has used the term Ministerial Corporation, when referring to obligations and responsibilities established by the Licence. The term “the Department” has been used when referring to more general management and administration.</p>
Panel	The Snowy Water Licence Review Independent Expert Panel – the authors of this report
Snowy Hydro	Snowy Hydro Limited

1 Introduction

1.1 Terms of Reference

In the Ten-year Review of the Snowy Water Licence: draft report (Department of Industry 2018¹; proposal 21), the NSW Government committed to engaging an independent expert panel to carry out a performance review of:

1. Snowy Hydro's assessment of compliance with the Licence
2. The appropriateness of the management approach taken to account for spills of Snowy River Increased Flows and meet the annual stream flow targets for Snowy Montane Rivers Increased Flows (as discussed in section 7.3 of the draft report)
3. The systems, procedures and frameworks in place to ensure Snowy Hydro Limited and the department can demonstrate Snowy Hydro Limited's compliance with the Licence.

This is the Final Report of the independent expert panel.

1.2 The expert panel

The independent expert panel consists of:

- Mr David Winfield – Alluvium Consulting
- Mr Garry Smith – DG Consulting
- Mr Ross Carter

David Winfield is a water resources and environmental professional with over 20 years' experience in water, environment and natural resource issues at state, national and international levels. David has played leading roles working for the Murray-Darling Basin Authority on Basin Plan development and for NSW environment agencies on water reform and water planning. As a consultant he has advised MDBA, Commonwealth agencies, NSW, Victoria, Queensland and the ACT, as well as Indian water agencies. David has no previous involvement with the Snowy Scheme or its operational decisions.

Garry Smith is a recognised independent expert reviewer, and is an experienced water manager, responsible for developing and delivering river operations, water accounting, irrigation water supply and environmental flows. Garry was a senior executive for many years at Goulburn-Murray Water. He is a member of the MDBA's Independent River Operations Review Group and Independent Assurance Committee. Garry has a strong background in water accounting issues, both from annually reviewing the water sharing and accounting arrangements in southern Murray-Darling Basin, and from his role as a past member of the Bureau of Meteorology's Water Accounting Standards Board. Garry has no previous involvement with the Snowy Scheme or its operational decisions.

Ross Carter is an experienced natural resource and environmental professional with over 30 years' experience in policy, program, and regulatory and compliance frameworks, including over 15 years as a senior executive, in both the NSW and the Commonwealth public service. Mr Carter is a regulatory specialist and was recently awarded a MSc with Distinction for his research into regulatory practice, including community trust and confidence. Ross has previous involvement with, and a sound understanding of, the Snowy Scheme. As a key NSW Environment Protection Authority senior manager in the late 1990s, Ross was a member of the team advising the then NSW Minister for the Environment on all environmental aspects of Snowy corporatisation, including environmental flows. More recently, Ross held senior executive leadership positions in the Commonwealth, working on energy and climate change policy, programs and regulation. He brings independence from management and operational decisions made in the implementation of the Snowy Water Licence since 2002. Most recently, Ross was engaged by NSW to establish the NSW Natural Resources Access

¹ Note: This Report can only give citations for publicly available, published material. This material is listed in tabular format in section 8

Regulator according to best practice regulation principles, before returning to independent consulting and his role as a Commissioner with the NSW Independent Planning Commission.

2 Context

2.1 Fundamentals of the Snowy arrangements

Original design and operation of scheme

The Snowy Scheme was originally established from 1949; (Snowy Hydro Limited, 2018) for two purposes:

- To support irrigation via the inter-catchment transfer of water across the Great Dividing Range from the Snowy River to the westward flowing River Murray and Tumut/Murrumbidgee Rivers.
- To finance Scheme development and operation by the generation of hydroelectricity.

Scheme development investment was by the Commonwealth, NSW and Victoria. The Scheme was built and operated by the former Snowy Mountains Authority until corporatisation and the formation of Snowy Hydro Limited. The design and operation of the scheme is explained on Snowy Hydro's website and in the Draft Report on Review of the SWL (Department of Industry 2017).

Modern balance of values established

In the 1990s, negotiations began to corporatize the former Snowy Mountains Authority as a private company, owned by NSW, Victoria and the Commonwealth. As part of these arrangements, the three governments (and shareholders) agreed to establish a Snowy Water Inquiry to consider a range of issues, including flows for environmental purposes on the Snowy River, the Snowy Montane Rivers and the River Murray. A revised balance between electricity generation and environmental management was established by the NSW parliament in the Snowy Hydro Corporatisation Act 1997 (the Act), and between the NSW, Victorian and Commonwealth governments in various bilateral and multilateral deeds, principally the Snowy Water Inquiry Outcomes Implementation Deed (SWIOID). The Act requires Snowy Hydro to hold a licence (the Snowy Water Licence, hereafter referred to as 'the Licence')², which is administered by the Water Administration Ministerial Corporation. The NSW Minister for Regional Water delegates the functions of the Ministerial Corporation to the Department of Industry – Lands and Water Division (hereafter referred to as 'the Department'). The Act requires Snowy Hydro to comply with the Licence and provides sanctions for non-compliance, which can extend to withdrawal of the Licence. The Licence takes its objectives and principles from the Act and the SWIOID.

Importantly, this fundamental balance of objectives in the Snowy water framework, the Act, the SWIOID and the Licence, are taken as a 'given' for this Review. While the panel makes recommendations for improvement of the framework, review of its fundamentals was not within the scope of the terms of reference. These fundamentals and the balance of objectives that they represent are encapsulated variously in principles, purpose and objectives in the Act, SWIOID and Licence.

Snowy Hydro Corporatisation Act 1997 (NSW)

The Act requires the Licence to provide rights for Snowy Hydro to collect, divert, store and release surface waters from the rivers, lakes and stream of the Snowy River catchment and to use that water to generate electricity. The Licence also gives effect to the outcomes of the Snowy Water Inquiry, as described below. Snowy Hydro is required to release water in accordance with the requirements of the Licence.

Snowy Water Inquiry Outcomes Implementation Deed

The Snowy Water Inquiry Outcomes Implementation Deed (SWIOID) is an intergovernmental agreement intended to have legal effect. The purposes of the Snowy Water Inquiry Outcomes Implementation Deed (SWIOID) are:

- To document the agreements between the parties on the outcomes of the Snowy Water Inquiry, in particular the institutional arrangements to govern the making of Increased Flows and the establishment of the Joint Government Enterprise;

² Note that the issuing of the Licence under the Snowy Hydro Corporatisation Act 1997, puts it under a different regulatory framework from Water Access Licences and Works Approvals issued under the Water Management Act 2000 (NSW).

- To provide for the funding by the parties of the Joint Government Enterprise;
- To establish the Water Consultation and Liaison Committee (WCLC) and prescribe the functions of that Committee in connection with the Annual Water Operating Plan (AWOP) process prescribed under the Licence; and
- To provide for arrangements on the transfer or revocation of the Licence.

The SWIOID documents the Governments' agreed outcomes arising from the Snowy Water Inquiry, for increased flows to the Snowy River, the Snowy Montane Rivers and the River Murray. It identifies the volumes of increased flows, targets and a mechanism for recovery of water entitlements via various measures (efficiency measures and acquisition through a joint-government enterprise (Water for Rivers – now closed following completion of the task)). It identifies that allocation to these entitlements will vary according to water availability and various rules. It establishes the WCLC and the AWOP process that is passed through to the Licence. Importantly, the SWIOID and its annexures establish the agreed basis for the SRIF and SMRIF, their staged implementation, accounting, delivery and reconciliation. It also establishes various constraints on the financial impact to Snowy Hydro.

Snowy Water Licence Principles

The purpose of the Licence is:

- Conferral of rights: to confer on the Licensee rights including those set out in clause 7; and
- Imposition of obligations: to impose on the Licensee various obligations with respect to the exercise of those rights including in particular the Increased Flow Requirements and the Water Release Requirements.

The Increased Flow Requirements relate to the Snowy River Increased Flows (SRIF), the Snowy Montane Rivers Increased Flows (SMRIF) and the River Murray Increased Flows (RMIF). The Water Release Requirements relate to various aspects of the release of Snowy water to the River Murray (via the Snowy-Murray Development) and the Murrumbidgee (via the Snowy-Tumut Development).

The Licence sets high-level objectives for the SRIF and the SMRIF, which are restated under Term of Reference 2 (Chapter 7) in this report.

2.2 Nature of the Snowy water framework

This independent expert panel performance review is framed by several notable aspects of the nature of the Snowy water framework and the Licence. These are introduced here as key premises of this review, while their implications for review against the terms of reference are explored further in subsequent sections.

Regulatory but different

The Snowy water framework is clearly a type of regulatory framework. It nominates a licensor (a regulator), the Water Administration Ministerial Corporation (the Ministerial Corporation) and a licensee, Snowy Hydro Limited (Snowy Hydro). It establishes obligations on the licensee, while providing approval functions for the licensor. The Snowy Hydro Corporatisation Act (section 34) provides for significant penalties for non-compliance with the Licence, for the corporation, and potentially for Directors of the corporation, court orders to address any environmental harm caused by a contravention and potentially to pay costs to a public authority and potentially jail terms for certain types of non-compliance. The ultimate sanction is that the Ministerial Corporation may revoke the Licence. The Act provides powers of entry and inspection to persons authorised by the Ministerial Corporation to investigate compliance. The Ministerial Corporation has powers to vary the Licence, but these powers are quite limited and constrained. There are two principal constraints to variations: Firstly, the Licence and variations must give effect to and be consistent with the SWIOID (section 4.1 and 4.2 of the Licence). Secondly, Licence variations that change Snowy Hydro's obligations must either be agreed by Snowy Hydro or must be subject to a formal independent expert recommendation and determination of compensation to Snowy Hydro and the payment of that compensation by NSW. The licence is issued for 75 years and can only be issued again by an act of parliament.

The Ministerial Corporation functions are delegated (under section 372 of the Water Management Act 2000 (NSW)) to the Secretary Department of Industry, Deputy Secretary Lands and Water and Executive Director Water (Water Management Instrument of Delegation No. 2 2018, under the Water Management Act 2000).

Notwithstanding the regulatory features of the Licence, there are some unique features that differ from other common regulatory frameworks. There is only one licence issued under the Snowy Hydro Corporatisation Act and therefore only one licensee. The Licence limits the powers of the regulator to direct the licensee. Such directions cover only very specific and deterministic water releases and increased flows, that are determined against formulae in the Licence. Where the Licence imposes broader obligations (such as the requirement to modify structures to deliver Snowy Montane River Increased Flows (SMRIF)), the Licence limits the financial impact to Snowy Hydro and prevents the regulator from requiring any specific modifications. It does require Snowy Hydro to consult and gain agreement on proposed works with the WCLC and to consult with WCLC on the AWOP.

Another feature of this regulatory framework is that ongoing and productive cooperation is required between the licensor and the licensee. The Department and Snowy Hydro routinely exchange data as a necessary part of managing the rivers and streams. The Department and Snowy Hydro must cooperate together (with the other Governments and the Murray-Darling Basin Authority (MDBA)) to develop the AWOP, including the analytical and practical aspects of flow planning, as well as management of incidents such as spills and floods. While all regulators seek to maintain productive and appropriate relationships with regulatees, the level of cooperation required in this instance is very unusual.

Finally, the Licence requires the Governments to establish some strategic planning elements, including a Strategy, performance measures and more specific objectives for SMRIF. However, no specific link is made between these strategic elements and the obligations on Snowy Hydro.

Technical and complex

The Licence and its implementation is very complex, technical and specialised, even compared to other water management frameworks, such as the Murray-Darling Basin, River Murray Operations or large urban water utilities. Snowy Hydro staff are recruited and trained to assimilate this complexity and operate within it daily. For the regulator (the Department), operating across other water management frameworks and many thousands of other licensees, this complexity places a considerable burden and responsibility to maintain capability, expertise and skills, to enable it to exercise the responsibilities with which it is charged and to engage with the licensee.

Commerciality and confidentiality

The complexity is compounded by the commercial sensitivity of some of Snowy Hydro's water data and specifically its projections and forecasts. While many regulatees under other frameworks are commercial and have sensitive information, Snowy Hydro is somewhat unique in the centrality of its water data (within the scheme), to its commercial position in the electricity market. This creates an inevitable information asymmetry between Snowy Hydro as the operator and the Ministerial Corporation as the regulator. Information asymmetry is, however, usual between business operators and their regulators.

Since the Licence commenced, a large proportion of the planning and operational information developed, decisions made, and actions taken have been classified as 'commercial in confidence'. Department staff, WCLC members, scientists and consultants (including the Panel) are required to maintain confidentiality.

Community stakeholders

While Snowy Hydro and the Department do have some public information available on their webpages, for community stakeholders (as opposed to the government stakeholders on the WCLC), there are considerable challenges in understanding how the Licence framework is operating, what the rationale for decisions is, and how the decisions of their governments arising from the Snowy Water Inquiry are being implemented. These challenges are framed by a combination of the technical complexity and the unavailability of significant amounts of information classified as confidential. These issues are further explored under the terms of reference below.

3 Method

Preliminary work was undertaken assembling and collating documents. An issues analysis framework and table was developed to assist the Panel to rapidly identify issues and make most efficient and effective use of time. A consolidated package of material was provided for the Panel.

The framework applied to review of documents and interviews of Department and Snowy Hydro staff, considered good practice principles and management of:

- input data quality,
- QA of data analysis, data management and tools,
- workflow processes, manuals, protocols and guidelines
- decision frameworks and protocols
- approach to decision review, approval and documentation of reasons and rationale for decisions
- assessment of risk
- application of good practice water accounting principles
- application of good practice environmental flow decision-making
- application of good practice regulation
- internal control framework for reporting and compliance (identification of likely points of risk and error in processes, what control or mitigation systems are included in processes to prevent mis-reporting or non-compliance)
- assessing the approach to regulator review of information provided by the licensee
- approach to secretariat functions for the WCLC (and formerly to the Technical Advisory Group, Snowy Scientific Committee and Senior Officers Group)
- participation in joint decision-making processes.
- approach to exercise of judgement and discretion where there is scope for this (ie where requirements are not deterministic)
- approach to Licence interpretation, review and amendment
- Optimising oversight, transparency and public confidence, in the context of the uniqueness, complexity and highly technical nature of the snowy water licence.
- approach to managing stakeholders, comms and engagement in a framework of best practice regulation or compliance
- Principles that guide public release of information
- More specifically, for the SRIF and SMRIF, the chronology of actions and basis of the decision(s)

The Panel's Review was not a limited assurance audit. This was beyond scope for the expert panel review. Instead, the Panel's role and approach was to note, from our examination, any absence or potential weakness in approach, systems, procedures or controls that might result in recommendations for either improved practice, controls or audit processes to give confidence in the framework.

The Panel convened in the first week of October 2018, to consider the issues and develop a detailed assessment plan. This was followed by an intensive 3 days based in Cooma and Queanbeyan. This time was spent interviewing relevant parties, being briefed on analytical tools and decision protocols, frameworks, guidelines and workflows. The Panel was also briefed on the operation of the SRIF and the SMRIF. The Panel finished this week with an internal working session, developed draft findings and identified follow up work and a drafting plan.

The Panel then developed a draft report, with each panel member taking on specific matters, followed by a consolidated joint review of evidence, findings and recommendations. A draft report was provided to the Department for review and comment on matters of fact. A revised draft report was then provided to the Department and Snowy Hydro Limited and a presentation was made to both organisations' senior representatives. The panel addressed questions, made clarifications and developed a final report.

4 Term of Reference 1

Term of Reference 1 calls for the panel to review *Snowy Hydro's assessment of compliance with the Licence*.

4.1 Framework

The framework used for examining Snowy Hydro, as the licensee, and its assessment of compliance with the requirements of the Licence draws on elements of corporate governance and due diligence, as relevant. The licence is a complex instrument that defines a number of the key ways in which Snowy Hydro exercises its role in the management of water. Much of this takes the form of volumes to be released from various points in the scheme, and accounting of volumes. Accordingly, many licence requirements are prescriptive and Snowy Hydro's compliance task is deterministic.

In relation to reviewing Snowy Hydro's assessment of compliance, the key areas of compliance activity that the panel was looking to identify and understand were:

Identification and understanding of compliance points and requirements: In a well performing organisation it would be expected that there is a clear, shared understanding of the compliance obligations that need to be satisfied across each element of the business processes that engage with the Licence.

Data acquisition approach, application of industry standards: Many of the compliance elements of the Licence rely on measurement of water related information to support calculation of required water sharing and water release requirements, and to confirm actual performance compared to these requirements. Collection of fit for purpose data at appropriate levels of accuracy is an essential input to support compliance.

Data management systems and quality assurance approach and use of relevant industry standards: Once data has been collected it needs to be effectively stored, its quality assured and verified and then processed accurately to prepare water accounts and support calculation of required water releases and other actions. The existence of clear systems and work processes to achieve these outcomes is necessary to support delivery of repeatable, compliant practice.

Due diligence, risk management, audit and verification: Regular review of risks is an important activity to ensure that internal or external changes in the operating environment don't give rise to new compliance issues. A risk review process can also be used to inform audit programs to ensure specified systems and processes are being followed and correctly applied. Audit and review processes can also identify weaknesses in the control and compliance systems to support continuous improvement.

Reporting and transparency: Measuring and reporting of the outcomes of compliance management activities is a key step in demonstrating the effectiveness of the program and encouraging high levels of compliance.

Governance: Governance processes that provide effective oversight to and emphasise the importance of compliance are an essential component of good practice. The support for a culture of compliance from the highest levels of an organisation is also an important enabling mechanism for good practice in all elements of the compliance chain.

4.2 Findings and evidence

Identification and understanding of compliance points and requirements:

The Licence is the key document setting out all the key compliance requirements for Snowy Hydro. When interviewed by the expert panel, key Snowy Hydro staff demonstrated a strong awareness and understanding of the provisions contained within the Licence document, and their importance in guiding day-to-day operations and management of the scheme.

Snowy Hydro uses the AWOP as a key compliance document. The document extends beyond the minimum content requirement specified in the Licence to provide a clear summary of all the key elements in relation to

water accounting and water release management required to be satisfied under the water licence. Snowy Hydro has also adopted a practice of documenting all the previous advice of the WCLC in relation to clarification and interpretation of the licence provisions.

The water licence sets out a structured process for development of a draft AWOP by Snowy Hydro, review by the WCLC and the Ministerial Corporation, prior to preparation of a final AWOP. Once the final AWOP containing this summary of interpretations and advice is approved by the Ministerial Corporation (being the Department as delegate), Snowy Hydro has a clearly established summary of all the requirements in relation to water release management and water licence compliance available for each water year.

Finding:

Snowy Hydro has a clear understanding of the requirements of the water licence and its compliance obligations under the licence.

Data acquisition approach, application of industry standards:

Snowy Hydro has an extensive network of water monitoring equipment, including stream gauging stations, v-notch weirs, water level recorders, flow meters and measuring flumes.

Equipment maintenance and data collection for this network is undertaken by Snowy Hydro in-house hydrographers and technical staff and is guided by an extensive series of work instructions developed for these purposes. The collection, management and storage of hydrographic and metrological data are undertaken in accordance with industry standards, including AS 3778 *Measurement of water flow in open channels*, and Bureau of Meteorology specifications and guidelines. These activities are also carried out within the framework provided by Snowy Hydro's Quality Management System, which is accredited under ISO 9001.

The panel viewed and was provided with a range of documentation setting out these processes.

Finding:

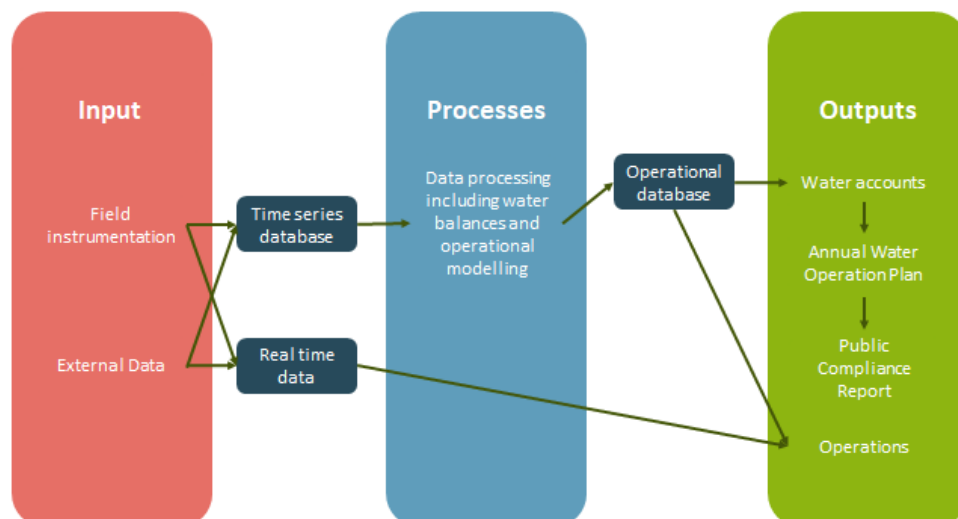
Snowy Hydro has data acquisition systems and processes in place that are based on accepted industry standards and are controlled under an accredited quality management system.

Data management systems and quality assurance approach and use of relevant industry standards:

Snowy Hydro captures hydrological data from a range of sources and stores this data to support analysis, water system forecasting and planning and operational decision making. Monitoring data from field instrumentation sites is collected and stored in a SCADA system database and supports daily operational management of the scheme.

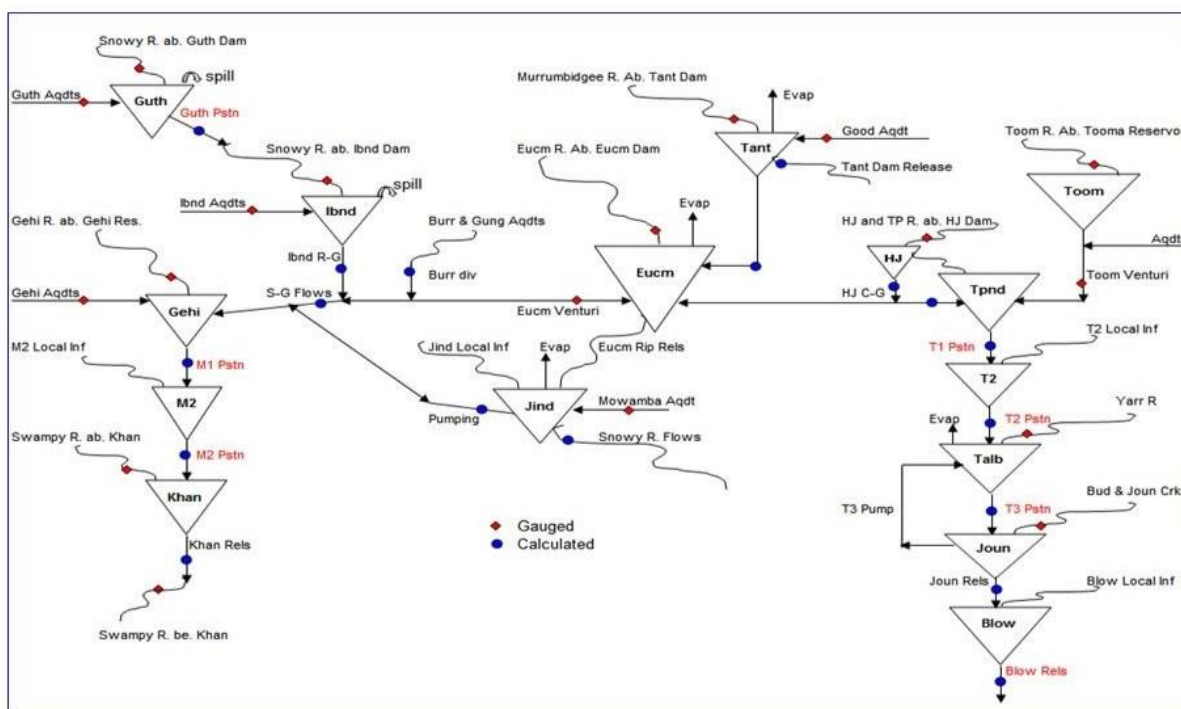
Quality checked data from instrumentation, together with field measurements, check gaugings, rating tables etc is stored in a Hydstra database. Hydstra is a specialised database system designed for the storage and management of hydrologic data. It is widely used in the water industry across Australia, by both government and non-government organisations.

Data management processes (summarised in Figure 1) are also documented in work instructions and within the framework provided by Snowy Hydro's accredited Quality Management System. Water accounting processes are undertaken by Snowy Hydro staff using the various relevant data, and in accordance with the water accounting procedures specified set out in Schedule 6 of the Water Licence. Water balances are calculated for multiple sites and the scheme as a whole, on a daily and monthly basis, to ensure that water is properly accounted for as it travels through scheme and that water is not "lost" by being unaccounted for (see Figure 2).



Source: Snowy Hydro

Figure 1. Overview of Snowy Hydro’s data management systems (adapted from material provide by Snowy Hydro)



Source: Snowy Hydro

Figure 2. Snowy scheme water balancing diagram

Monitoring and review of water releases from the scheme by downstream water management authorities also provides cross checks and validation of these key external releases volumes to the western river systems and to the Snowy River.

The Licence requires Snowy Hydro to maintain a range of water accounts. The opening and closing volumes in these accounts and the key movements in the account balances for the previous year are reported in the Annexures to the AWOP and provide a clear basis for consideration of proposed operations over the coming water year.

Quality assurance for the data management and water accounting processes used by Snowy Hydro is provided through:

- The existence and application of a well structured management process for the collection, management and processing of hydrological data, which occurs within the framework provided by Snowy Hydro's ISO 9001 accredited Quality Management System.
- Independent audit and verification of the data reported in Snowy Hydro's annual compliance report. The compliance report is required under Clauses 4.3 and 4.4 of the Licence. It must report on compliance with the Snowy River Increased Flow (SRIF) release requirements, the Snowy Montane Rivers Increased Flow (SMRIF) release requirements and the Required Annual Release (RAR) requirements.
- Snowy Hydro annually commissions an independent audit and verification of its compliance with:
 - The requirements for the AWOP
 - SRIF and SMRIF release requirements under the provisions of Schedule 3 of the Licence.
 - The RAR under the provisions of Schedule 4 of the Licence.

This independent assessment, which uses techniques based on ISO 19011 (Guidelines for auditing management systems), also provides independent verification that the data provided in the annual compliance report are correct.

Snowy Hydro also noted that in the past (approx. 2010) it had engaged specialist hydrological consultants to review their full water accounting processes. There are likely to be a number of Licence changes arising from the ten-year review and the proposed work plan to address a range of operational and accounting matters, which may also result in amendments to the Licence. Whilst not making a specific recommendation on this matter, the Panel observes that there may be merit in Snowy Hydro considering undertaking another external review of its water accounting processes once these Licence amendments are in place, given the potential for accounting changes and the time since the last external review.

Finding:

Snowy Hydro has implemented data management systems and quality assurance processes which are consistent with relevant industry standards and are subject to independent verification on an annual basis.

Due diligence, risk management, audit and verification:

Snowy Hydro operates a risk management system based on ISO 3100 (Risk management - Principles and guidelines). The Snowy Hydro Board Charter also notes that responsibility for identifying and managing operational and other risks and formulating strategies for managing those risks for consideration by the Board are delegated to senior management of the organisation. Individual executive managers' position descriptions also identify their responsibilities for risk management.

Risks are routinely reviewed, and risk management performance and Licence compliance issues are reported to senior management and the Board. The Board has also established a number of committees to provide detailed oversight of business activities. The Portfolio Risk Committee monitors the effectiveness of risk management policies and procedures for regulatory compliance obligations and reviews risk management systems, processes and the risk management culture. The Safety, Operations and Environment Risk Committee is charged with overseeing risk management relating to water operations management, amongst other issues. These two Board committees exercise oversight of compliance with all aspects of the Licence.

Electricity generation and trading activities are fundamental to the business performance of Snowy Hydro. These activities are heavily dependent on assessment of water available to the scheme and forecasts of anticipated future water availability and expected/required release timing. Snowy Hydro advised that policies are in place which require all water availability advice for commercial decision making to be based on full compliance with Licence conditions. The high level of scrutiny within Snowy Hydro directed to commercial energy market performance provides another important point of oversight of Licence compliance and risk management.

Audit and verification of compliance performance is primarily provided through audit and accreditation of the organisations Quality Management System and through independent audit and verification of the data reported in Snowy Hydro’s annual compliance reports (see above for further details).

Finding:

Snowy Hydro operates a range of risk management systems and processes based on international standards for risk management. These systems and processes are oversighted by executive management and the Board, and compliance performance is the subject of annual independent audit and verification.

Reporting and transparency:

The key processes that that the Panel was made aware of to report on the outcomes of Snowy Hydro’s compliance management activities are set out in Table 1.

Table 1: Key compliance reporting processes that the Panel was made aware of

Item	Description	Availability/audience
Annual Compliance Report (in different years this has been called the Water Report, Water Compliance Report and Water Operations Report)	Annual compliance report required under Clauses 4.3 and 4.4 of the Licence. Provides information on: <ul style="list-style-type: none"> ▪ Inflow and scheme releases to the western river systems ▪ SRIF and SMRIF environmental release program 	Publicly available, published on Snowy Hydro website.
Annual reporting	Annual financial reporting required under statutory provisions of companies law. Includes summary statement on the extent of compliance with Licence in the directors’ report accompanying the financial statements.	Publicly available, published on Snowy Hydro website.
Report on Snowy scheme operations and annual water accounts	Annual reporting on operation of the scheme and extent of compliance with the AWOP for the previous water year, plus detailed water accounts.	Produced as part of the AWOP each year. Available to licensor and members of the WCLC
Regular compliance reporting	Routine reporting on water operations and Licence compliance issues	Internal reporting. Available to Snowy Hydro management and Board.

Finding:

Information on Snowy Hydro compliance management activities is available in a number of different forms, and there is sufficient detailed information available to demonstrate the extent of compliance with the water licence to both internal and external parties. It is noted that the only publicly available information is the summary data provided in the Annual Compliance Report.

Governance:

Snowy Hydro exhibits the key elements of good governance in relation to compliance management that are generally to be expected from an organisation with a strong compliance focus.

- The Statement of Expectations from the shareholder (Commonwealth government) requires Snowy Hydro to operate on a commercial basis “within the bounds of the legislative and governance framework”. This is noted to include the Licence.
- There is a published Board Charter setting out the role and responsibilities of the Board and the framework for control of Snowy Hydro. Amongst other things, the charter requires the Board to:
 - identify and address the principal risks facing Snowy Hydro, including ensuring that a proper system of internal controls and compliance is in place
 - adopt appropriate procedures to ensure compliance with all laws, governmental regulations and accounting standards
 - approve, and review from time to time, Snowy Hydro's internal compliance procedures, including any codes of conduct and take all reasonable steps to ensure that the business of Snowy Hydro is conducted in an open and ethical manner
- Board committees have been established to focus on oversight of risks and compliance issues, including the Licence. The relevant committees are the Portfolio Risk Committee and the Safety, Operations and Environment Risk Committee. These arrangements are also discussed in the due diligence, risk management, audit and verification section earlier.
- Relevant Snowy Hydro management that presented to the panel displayed a good awareness and understanding of the governance arrangements relating to compliance management.
- Snowy Hydro also has in place processes for public interest disclosures by staff or contractors to report “conduct that is dishonest, corrupt, illegal, unethical, unsafe or dangerous to people or the environment”. This include arrangements for protected/confidential disclosures (information available at <https://www.snowyhydro.com.au/home/corporate-policies/reportable-conduct/>).

Finding:

Snowy Hydro has in place governance processes that are designed to provide effective oversight to, and emphasise the importance of, compliance.

4.3 Recommendations

None

5 Term of Reference 3

Term of Reference 3 requires the expert panel to review:

The systems, procedures and frameworks in place to ensure Snowy Hydro Limited and the Department can demonstrate Snowy Hydro Limited's compliance with the licence.

The review of the management approach to SRIF and SMRIF examined under Term of Reference 2, Section 6, provide useful case studies that informed the panels consideration of Term of Reference 3.

5.1 Framework

The Department (licensor/regulator)

The framework for assessing this term of reference has been drawn from the extensive literature on contemporary regulatory practice (including the NSW Quality Regulatory Services Initiative and Guidance for Regulators to Implement Outcomes and Risk Based Regulation, October 2016). At a high level this involves three key regulatory practice concepts viz. responsive regulation; risk-based regulation; and regulatory craft. While these are commonly accepted concepts the operational configuration of these concepts is unique to a particular regulator. As discussed above (section 2.2) the relationship between the licensor, or regulator, the Department of Industry (Ministerial Corporation) and the licensee, or regulated entity, Snowy Hydro Limited is unique. Accordingly, the key elements of the assessment framework used here have been derived from the overarching regulatory framework to match the unique regulatory environment.

Responsive regulation: responses to problems are tailored to the specific problem and are informed by a range of people, including those well placed to fix the problem. The regulator chooses a course of action to solve the problem. This includes the proportionate and appropriate use of regulatory tools (discussed under regulatory craftsmanship, below).

Risk based regulation: information, intelligence and data are used to identify the risks to the objectives of the regulator (in this instance derived from the relevant legislation, SWI/OID, Snowy Water Licence, and state policies) and to determine the significance of the risk (usually based on a probability/consequence basis). This analysis forms the basis of directing the regulator's efforts.

Regulatory Craft: the role of regulators is not confined to the powers and provisions in legislation as it also incorporates the administration of processes, procedures, approaches and policies that give practical effect to law. The critical concept in this regard is the exercise of judgement and discretion in solving a particular problem or managing a potential risk using a configuration of legal, administrative and discretionary tools, sometimes in a bespoke configuration tailored to the specific problem being solved or risk being managed (as referenced above in responsive regulation).

As the terms of reference refer to both ensuring compliance with the Licence and demonstrating compliance with the Licence the framework used has been complemented with applicable elements of regulatory practice that relate to community trust and confidence.

Expertise: the regulator is seen to have valid technical/scientific expertise; independence; and to engage responsively with diverse groups/views.

Stewardship: the regulator demonstrates integrity and ethics (acts in the public interest); is consistent over time and meets long term commitments; demonstrates a fair decision-making process that is rigorous and inclusive; the regulator is receptive to diverse public concern; and demonstrates a commitment to continuous improvement.

Transparency: the regulator demonstrates accessibility and responsiveness; accurate and useful information is provided; time/resources are devoted to communicating information; the regulator assists the capacity of the community to engage with information.

Snowy Hydro Limited (the licensee)

The framework used for examining Snowy Hydro Limited, as the licensee, in assessing and demonstrating compliance with the requirements of the Snowy Water Licence builds on the considerations and findings set out earlier in section 4.1. In this regard the review examined (in 4.1 above) the governance, risk management and quality assurance systems, processes and frameworks that Snowy Hydro has in place to comply, and to assess its compliance, with the requirements of the Licence. Where Snowy Hydro's task is deterministic the relevant framework is:

- Identification and understanding of compliance points and requirements
- Data acquisition approach, application of industry standards
- Data management systems and quality assurance approach and use of relevant industry standards
- Due diligence, risk management, audit and verification
- Reporting and transparency
- Governance

Where the water licence has a level of ambiguity or potential discretion in interpretation Snowy Hydro has exercised its due diligence by utilising AWOP process as a mechanism for registering and determining an agreed interpretation in these areas, to effectively allow a deterministic assessment of compliance. Accordingly, this review has considered this in the context of the Department's role as the licensor/regulator in administering the AWOP process.

5.2 Findings and evidence

The primary processes that the Department has in place for ensuring Snowy Hydro's compliance with the Licence are the AWOP (not published) approval process and the requirement for Snowy Hydro to report annually on its assessment of compliance (published). As discussed, this is largely a deterministic assessment with areas of ambiguity or discretionary interpretation decided as part of the AWOP process.

While the Department (as the delegate of the Ministerial Corporation) is the decision maker under the Licence, the AWOP process provides for the WCLC to examine and advise the licensee on the acceptability of the draft AWOP. In practice, the Department seeks consensus agreement from the WCLC prior to approving the AWOP. The WCLC generally meets annually to consider the draft AWOP. However, there have been instances where the WCLC has convened outside the AWOP cycle to discuss the more complex or challenging issues. The AWOP process is described in Figure 3.

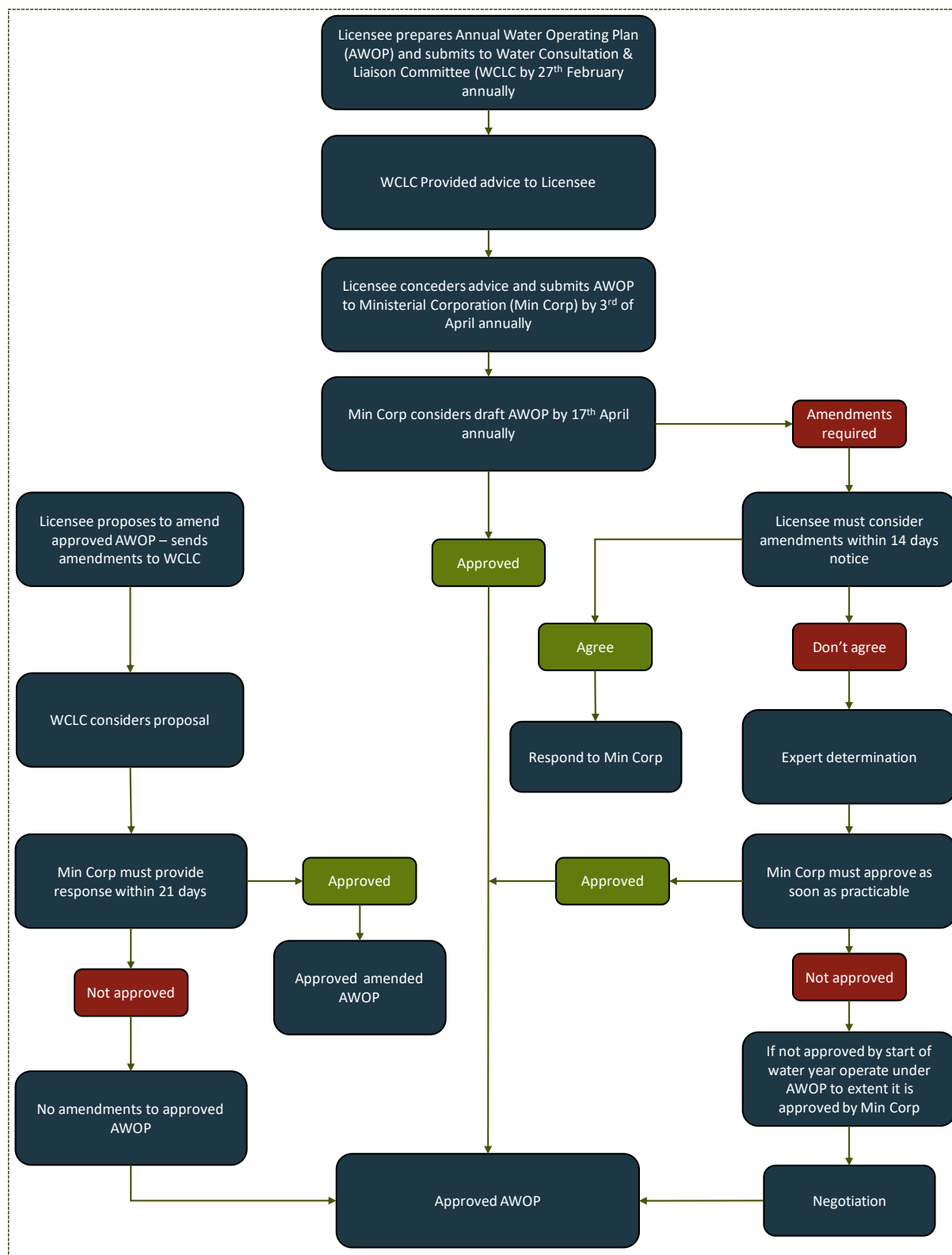


Figure 3. AWOP process

The AWOP process also incorporates a listing of decisions regarding areas of ambiguity or discretionary interpretation, with each AWOP listing all previous decisions. The process for identifying an area of ambiguity, scoping the dimensions of the ambiguity, and determining and testing the alternatives available to resolve it, appears to be variable. In the first instance Snowy Hydro will often identify an area that requires clarification or that poses an issue and present the WCLC with a proposal that is to be considered in the subsequent AWOP.

Documentation supporting consideration of the issue is to be supplied to the WCLC by the 27th of February, prior to the commencement of the annual committee meeting. This can occur at short notice, potentially reducing the amount of time available for analysis and testing of the issue/proposals to be formed prior to discussion and decision-making. Straight forward or simpler issues are often dealt with and agreed upon over one to two meetings however, more complex issues can carry over multiple meetings before being determined. The 10-year licence review process also provides a significant opportunity to resolve complex issues. The WCLC deliver their findings and recommendations to Snowy Hydro for consideration and items that are agreed upon are documented in the AWOP. For some complex issues the matter may be considered by a technical advisory group to advise the WCLC (or by the WCLC itself outside the annual cycle). This has not been used frequently and could be codified in an improved AWOP and WCLC process to provide a useful step for testing and developing robust recommendations and decision reasons.

Members of the WCLC advised that for some complex matters that might, for example, involve the reconciliation of broader policy objectives amongst participating jurisdictions, there is no clear escalation to a more senior group of delegates. This was compared to the Murray-Darling Basin Authority and other spheres, where a Basin Officials Committee or a Senior Officers Group provide a pathway for consideration of matters of this nature. Equally, it can be argued that it is incumbent on the WCLC membership organisations to provide representatives that have the authority and expertise to make a determination. While the panel makes no recommendation in this regard it notes that overall governance of AWOP and WCLC may be improved through access to decision-makers with the required authority for interjurisdictional and policy negotiations and decisions.

The second draft AWOP, including the tracked changes resulting from WCLC advice, is sent to the Ministerial Corporation for approval by the 3rd of April. The Ministerial Corporation must consider the draft AWOP before the 17th of April and inform Snowy Hydro of the decision and any amendments that are required. If no amendments are required, the approved draft report is finalised and submitted back to the Department for final approval before becoming binding. In the event that there are amendments to be made, Snowy Hydro has 14 days to agree or disagree with the amendments that have been requested. If the Department (as delegate for the Ministerial Corporation) and Snowy Hydro cannot agree on the final AWOP an expert determination process can be triggered under the SWL. The panel understands that the formal dispute provisions have not been utilised to date.

Where Snowy Hydro seeks an amendment of an already approved AWOP, the proposed amendments are sent to the WCLC for consideration. WCLC present their findings to the Department who must provide a response to Snowy Hydro within 21 days. If the amendment is approved the change has effect in the current AWOP; if approval is not given, the current AWOP will remain unchanged.

Responsive Regulation:

In interviews with the Department the panel heard that it had a very long exposure to the operations of the Snowy Scheme dating back to the scheme's commissioning. This had resulted in very well developed and understood operational rules (that were effectively codified in the Licence). The introduction of the SRIF and SMRIF following the Snowy Water Inquiry had also been codified through the SWI/OID and the Licence. As discussed in section 6 below the SRIF and SMRIF are areas of Licence administration where discretion is provided within the Licence to optimise the environmental outcomes from the SRIF and SMRIF, in the context of practical and feasible operational and construction constraints. In examining both SRIF and SMRIF, and the AWOP process, the panel was satisfied that the Department was operating as a Responsive Regulator in the approach to problem solving.

The panel also heard that no circumstance had arisen to date where the Department had cause to consider the use of formal sanctions or dispute mechanism available under the Licence. However, had such a circumstance arisen the panel found little evidence of specific policy or procedures on how any such sanction or dispute mechanism would be applied, in the context of the Licence, in accordance with Responsive Regulation principles. At a high level the overarching Department Regulatory policy was provided and does incorporate these principles.

Findings:

The panel considers that the Department is applying Responsive Regulation principles in its administration of the Licence, particularly in relation to problem solving in the SRIF and SMRIF, and more broadly on matters of ambiguity in interpretation or application of particular Licence conditions. The panel was advised that there had not been any matters that may have warranted consideration of either sanctions, triggering the dispute mechanism, or a regulatory approach outside of the AWOP and associated processes, or licence review processes. However, should such a circumstance arise the panel found little evidence of policy or procedural guidance on how consideration of formal sanctions, use of the dispute mechanism, or decisions might be made in the unique context of the Licence.

Risk Based Regulation:

As discussed above the Panel heard that the Department had historical exposure to the operations of the Snowy Scheme and that this long history had resulted in well-understood operational rules that had been codified in the Licence. This has had the effect of reducing much of the potential risk in the Licence on key issues, for example meeting the RAR. As water is accounted and measured at multiple points downstream of the scheme by a wide range of stakeholders with an interest in the volume and timing of water from the scheme, the requirements of the licence in this regard are heavily triangulated for compliance. Snowy Hydro processes, as described in ToR 1, are robust and this additional scrutiny provides a high degree of confidence in compliance.

The panel also heard that the Department considered that mitigating downstream flooding in the Snowy and Tumut/Murrumbidgee rivers was a primary risk that operational practice was effectively mitigating and managing.

The Department undertakes an annual 'wash-up' report to review Snowy Hydro performance against the SRIF, based on the AWOP, Snowy Hydro's annual compliance report and any issues identified during the year. To date no areas of concern (risk) have been identified from the wash up report.

The Panel was provided with the Department Enterprise Risk Management Framework and the Department Regulatory Policy. However, there was no evidence provided on how this policy or framework might specifically apply a risk-based approach to the Ministerial Corporation's responsibilities with Snowy Hydro and administration of the Licence.

Findings:

The Licence provides an inherently robust compliance environment, as risk is reduced through explicit codification of requirements, allowing a deterministic approach to compliance. This is complemented by the scrutiny and measurement undertaken by water managers and users downstream of the scheme. However, the compliance environment did not demonstrate the application of risk-based elements of regulation.

The Department approach could incorporate a more explicit assessment of risk areas for increased compliance monitoring in future years, or for more rigorous/independent analysis and testing. For example, as a commercially focussed entity, Snowy Hydro has a strong incentive to seek decisions, interpretation and accounting treatments that favour generation outcomes, to the extent of any ambiguity or flexibility in interpretation of licence requirements. Generally, Snowy Hydro seeks to resolve issues of interpretation or ambiguity by seeking a decision of the Ministerial Corporation, through the AWOP process. As discussed elsewhere, this is recorded in the AWOP process and, from Snowy Hydro's perspective, results in a deterministic compliance task (which Snowy Hydro is also incentivised to achieve). However, it is unlikely that all areas of ambiguity, interpretation or flexibility have been resolved. There is also the potential for some of the previous decisions to be less than optimum, in the context of the Department's stewardship role or after practical application and experience. Developing a risk-based approach to testing the outcomes against AWOP and licence requirements through this prism, may identify areas of potential risk that require further testing, monitoring, control or mitigation.

Regulatory Craft:

The Snowy Corporatisation Act, and the SWIOID primarily define the regulatory framework for the Licence. Under this framework the Snowy Corporatisation Act provides the formal sanctions that are available to the Department, as regulator, in the event of a breach of Licence conditions, as described in section 2.2. These sanctions require action to be taken in the Land and Environment Court and provide for the Court to impose significant fines, potential on-going daily fines, tenfold increases in fines if the breach is proven to be intentional or reckless and result in environmental harm, and potential specific fines and imprisonment for Snowy Hydro's Directors under certain circumstances. Clearly sanctions of this nature would only be contemplated in the event of significant breaches. However, as the consequences are high they are extremely effective in ensuring that the Board and management of Snowy Hydro are focused on compliance and have rigorous systems in place in this regard (see ToR 1).

The Licence also incorporates the AWOP and WCLC process, a dispute resolution process, and the requirement for Snowy Hydro to assess and publicly report on compliance, and the review process for the licence. The Licence (c14.1 Schedule 4) provides for independent review of water accounts at the end of each water year, but the Panel understands this has not been utilised.

Findings:

The Department, as delegate for the Ministerial Corporation, has used and adapted the AWOP and WCLC process as part of its administration of the licence to resolve and record decisions and provide an annual vehicle for Licence oversight. The Panel also observes that Snowy Hydro uses the same process as part of its management of Compliance. This is complemented by the Snowy Hydro Annual Compliance Report, the Department's internal 'wash up' report and the five- and ten-year licence review processes.

The consideration of issues of interpretation and ambiguity and related decision making that is currently incorporated within the AWOP process provides an opportunity for the Department to consider an increase in rigour and transparency within its administrative discretion, as the panel recommends below. Professional scepticism is an important aspect of a regulator's role and utilising appropriate regulatory tools to test potential areas of risk is the usual approach to exercising this scepticism.

Expertise:

The Panel heard that the Department had a long history of involvement in the management of the Snowy Scheme and that as a result of this substantial corporate knowledge across a range of officers had been in place for many years. However, the areas of the Department responsible for administration of the Licence had not been immune to the extensive changes and loss of corporate capacity outlined in the NSW Ombudsman's report 'Water: compliance and enforcement – a special report to parliament' (August 2018). This has inevitably led to a reduction in the resources and expertise the Department has been able to bring to bear in administering the Licence.

The Panel also heard that the Department's water science and modelling experts had, and were, used to inform the Department's consideration of AWOP's and related decision making. This expertise was brought to bear through the former Technical Advisory Group and SRIF/SMRIF discussions, decisions and the development of SRIF and SMRIF strategies (see section 6).

Findings:

The Panel was satisfied that the Department had previously brought corporate knowledge, science and modelling expertise to bear in relevant areas of Licence administration. However, the extent to which this could be 'seen' by the broader community has been limited by the complexity and difficulty of accessing publicly available information, the high level of commercial-in-confidence material, and the limited resourcing capacity of the Department to engage with the community on technical issues as part of developing a position (see SMRIF and SRIF).

Stewardship:

The Department faces a number of potential challenges in the community perception of it acting in the public interest. In addition to the perceptions that may have arisen regarding NSW water management from the events described in the Matthews 'Independent investigation into NSW water management and compliance' (2017) and the NSW Ombudsman's report (2018), the Department had effectively three distinct roles to reconcile viz. resource manager, regulator, and until the recent Commonwealth purchase, shareholder.

While the Panel heard and reviewed material that indicates that the Department was balancing these roles, there is significant opportunity to improve community perception in this regard. The majority of this is discussed under transparency. However, transparency must be linked to a fundamental demonstration of acting in the public interest. To this end, fair and robust decision-making processes that build in consultation, communication, and are explicitly informed by experts is critical. Of similar importance is the demonstration that a risk-based approach to testing and monitoring the effectiveness of the licence is in place. In this regard objective professional scepticism is important, as is clear and regular communication of what has been done, what lessons have been learned, and what might be improved in future.

Findings:

Submissions to the licence review indicate a level of distrust and opaqueness in the administration of the Licence. Community trust and confidence is likely to be improved by explicit actions aligned with regulatory best practice and by demonstrating through increase transparency and communication that these practices are consistently followed.

Transparency and Communication:

The framework in which the Licence is administered, and the Licence itself, are complex. It is difficult for the community to understand or interpret how it operates in practice. Submissions to the Department's Licence review observe that it is 'opaque' and there appear to be variable levels of community understanding on how the SRIF and SMRIF volumes have been derived, and particularly for the SMRIF, allocated.

The Department and Snowy Hydro publish a substantial amount of useful information on their websites. section 8 of this report provides a list of publicly available material accessed by the Panel.

However, the inherent complexity of the issues, the distributed locations of various components of information within and between websites, and the fact that some information, such as the AWOPs and the interpretative decisions in them, is not publicly available, contribute to this sense of opaqueness. The Panel heard that Snowy Hydro meets with a range of stakeholders regularly, predominantly downstream water users and within scheme communities and businesses. The Department also meets with stakeholders but appears to be significantly resource constrained in engaging and consulting on the ground across the range of stakeholders with specific interest in the scheme.

Findings:

While there is significant information relevant to understanding the operation of the Snowy Scheme, the Licence, the SRIF and SMRIF are not easily accessed and drawn together to provide a coherent narrative. This is exacerbated by an overly cautious approach to publication of information with relevant decisions (with reasons) and interpretation material not publicly available.

While reasonable decision-making processes were evident to the Panel it is unlikely that stakeholders have an understanding of these processes, much less confidence in them being fair, rigorous and tested. The panel considers that long-term investment in communication, engagement and community capacity building aimed at engendering understanding, trust and confidence in the Department's administration of the Licence should be considered.

5.3 Recommendations

R3.1 The Department develop a suite of regulatory policies, within the overarching Department Policy Framework, specific to the oversight of the Licence and regulation of Snowy Hydro. This should articulate a compliance policy (to guide the circumstances under which the powers of the Ministerial Corporation may be used, and how they may be exercised in such an event); a risk policy (to guide the testing and rigour of decision making in relation to the Licence and Snowy Hydro matters and the development of an annual/rolling compliance monitoring plan – potentially as part of the annual ‘wash up’ report – to test, control or mitigate identified risks of non-compliance). Given the robust compliance environment this should be a judicious and fit-for purpose application to avoid unnecessary administrative or regulatory burdens.

R3.2 The Department should improve the governance of the AWOP process (including the role of the WCLC), and of the interpretive decisions that are recorded in it, to increase transparency and confidence in its rigour. A secretariat function should be put in place to ensure that a consistent process including production of meeting agenda’s, papers, minutes and records are kept. For interpretive decisions a process with standard operating procedures that guide the robust legal, technical and consultative approach to test the options and demonstrate robust decision-making should also be put in place. This should include a public decisions register that records the decision and decision reasons.

R3.3 The Department should adopt an “if not, why not” publication position on all policies, decisions, information and processes to the extent that it does not compromise the commercial operations of Snowy Hydro. This includes the AWOP and decision processes. As this information is complex, professional communications production on key issues is important to ensure that the community can access and understand the dimensions of the issue.

6 Term of Reference 2

Term of Reference 2 calls for the Panel to review:

The appropriateness of the management approach taken to account for spills of Snowy River Increased Flows and meet the annual stream flow targets for Snowy Montane Rivers Increased Flows

6.1 Snowy River Increased Flows (SRIF)

The Panel considered the appropriateness of the management approach taken to account for spills of Snowy River Increased Flows.

Summary of events

In March 2012, following an extremely intense rainfall event, Lake Jindabyne spilled. Snowy Hydro determined that 16 gigalitres spilled from Lake Jindabyne in excess of the specified daily SRIF release targets. The Ministerial Corporation, with the support of Snowy Hydro and WCLC, agreed these spills were the consequence of Snowy Hydro holding Lake Jindabyne higher than it would have if it was not targeting releases from the dam in accordance with the SRIF program strategy. A total of 8 GL of the spill volume, which represented the unreleased balance of the 2011/12 SRIF account at the time the spill occurred, was agreed to be accounted for against the SRIF account in a subsequent year (or years).

The Ministerial Corporation, after seeking feedback from WCLC, agreed to a payback arrangement of 2 GL per year from 2015/16 to 2018/19. The 2012 event has been the only spill from Lake Jindabyne since the issuing of the Snowy Water Licence

Framework for review of SRIF spill accounting

The water licence includes a range of provisions that refer to Lake Jindabyne spills. The provisions in the licence are summarised below in Table 2.

Table 2. Provisions relevant to Jindabyne Dam spills in the Licence.

SWL clause reference	Provisions relevant to Jindabyne spills
<p>Section 5 Provisions to address the realities of water operations Clause 5.2 (2)</p>	<p>in the case of:</p> <p>(a) the Snowy River Increased Flows to be made by the Licensee under Part Four of Schedule Three; and</p> <p>(b) the Snowy Montane Rivers Increased Flows to be made from Tantangara Dam under Part Three of Schedule Three, if in any Water Year the actual release made by the Licensee varies from the volume targeted for release, then:</p> <p>(c) in the case of a shortfall: the difference is to be added to the release otherwise required during the subsequent Water Year; and</p> <p>(d) in the case of an excess: the difference is to be subtracted from the release otherwise required during the subsequent Water Year except where the excess is the result of a flood or necessary operational releases from the spillway gates</p>
<p>Schedule 3, Part 4 Clause 15.2 Water Operations for Jindabyne Dam</p>	<p>Despite any other provision in this Licence, a requirement under this clause 15 of this Schedule Three that the Licensee operates the Works so as to target Flushing Flows is a requirement on the Licensee to operate the Works so as to target those Flows provided that the Licensee must not operate the Works to more than a 10% risk of spill from Jindabyne Dam.</p>
<p>Schedule 3, Part 4 Clause 16.1 Accounting for Increased Jindabyne Spill</p>	<p>(1) If as a result of a notice given by the Ministerial Corporation to the Licensee under clause 14.1 of this Schedule Three:</p> <p>(a) in any Month the Licensee releases from Jindabyne Dam the applicable Monthly release volume other than in equal daily release volumes (allowing for increases and decreases of volumes during the two days either side of the beginning and end of each Month to reflect differences in the Monthly apportionments applicable to consecutive Months); and</p> <p>(b) the Licensee must implement water operation arrangements that result in an increase in the volume or frequency of spills from Jindabyne Dam compared to the volume and frequency of those spills under water operations that achieve a uniform daily distribution of releases (again allowing for increases and decreases of volumes during the two days either side of the beginning and end of each Month to reflect differences in the Monthly apportionments applicable to consecutive Months), then:</p> <p>(c) those increased spills are to be accounted for as a borrow against the total volume of Snowy River Increased Flows to be made in the following Water Years up to the lesser of:</p> <p style="padding-left: 40px;">(i) the volume of the actual incremental spill; or</p> <p style="padding-left: 40px;">(ii) the balance of the Snowy River Increased Flows to be made in the current Water Year (for the avoidance of doubt, the volume borrowed is not to include the volume of any releases made by the Licensee during that Water Year prior to the relevant spill),</p> <p>first against the total volume of Snowy River Increased Flows to be made in the following Water Year and second, if agreed between the Ministerial Corporation and the Licensee, against the total volume of Snowy River Increased Flows to be made in subsequent Water Years; and</p> <p>(d) the daily release volumes for the remainder of the current Water Year are to be the lesser of:</p> <p style="padding-left: 40px;">(i) the daily volumes specified in notices given by the Ministerial Corporation under clause 14.1 of this Schedule Three; or</p>

SWL clause reference	Provisions relevant to Jindabyne spills
	<p>(ii) the estimated natural flow calculated as an average over the preceding seven days.</p> <p>(2) For the avoidance of doubt, the provisions of this clause 16.1 do not apply where the Licensee is required to make equal Monthly releases from Jindabyne Dam.</p>

Findings

This matter was considered extensively by the Ministerial Corporation and WCLC following the spill event. The agreed spill accounting arrangements were set out in final 2012/13 AWOP, which was approved by the Ministerial Corporation. The final payback arrangements were agreed and approved as part of finalisation of the 2015/16 AWOP.

In relation to the various provisions for spills accounting:

- Clause 5.2 (2) is considered to not be applicable to the accounting treatment for the March 2012 spills, as there are more detailed provisions dealing with the specific circumstances encountered during this event provided under Clause 16.1 of Schedule 3.
- Schedule 3, Part 4 Clause 15.2 is not relevant to this event. There is no suggestion that Lake Jindabyne was operated to levels that incurred a risk of spill greater than 10%, so it is concluded that Snowy Hydro was compliant with this provision.
- Schedule 3, Part 4 Clause 16.1 is considered to be the relevant provision that is applicable to the determination of accounting treatment of the 2012 spill event.

Considering the provisions of Clause 16.1, notice was given by the Ministerial Corporation to the Licensee under clause 14.1 nominating specific daily target releases for SRIF during the 2011/12 water year. The first flushing flows were delivered in October 2011, and the Ministerial Corporation also advised Snow Hydro that flushing flows would also be required in spring 2012 and nominated the relevant monthly and daily release targets to achieve this. It is considered that these operational requirements meet the conditions set out in Clause 16.1 (a).

The maximum capacity of the Lake Jindabyne outlet works is 5 GL/day. Flushing flows are defined as any daily release that exceeds 5 GL (refer Licence Clause 15.3 (1)). In order to achieve flushing flows, releases must also be made through the spillway gates, which in turn necessitates the lake to be held at higher levels than would be the case under normal operations for release of SRIF without the provision of flushing flows.

Analysis undertaken by Snowy Hydro and reviewed by the WCLC indicates that the 2012/13 SRIF monthly target volumes could have been delivered in equal daily volumes from a starting lake level of 903.1 m on 1 May 2012 (the start of the Snowy water year), however this level would have resulted in less than a 25% probability of the lake being at high enough levels to achieve the spring 2012 flushing flow target releases. The strategy proposed by Snowy Hydro for delivery of the 2012 flushing flows required a 1 May target level of 907.1 m. In February 2012, Lake Jindabyne level was 906.7 m, as part of managing the lake levels to meet the 1 May target. This level was some 4.4 m higher than the long-term average February level of 902.3 m, and if Lake Jindabyne had been at this long-term average level, or even the May target level for equal daily volume releases of 903.1 m, then no spills would have occurred in March 2012.

The WCLC and the Ministerial Corporation concluded that the water operation arrangements required to be put in place to achieve flushing flows in 2012 did result in an increase in the volume or frequency of spills from Jindabyne Dam in March 2012 compared to the water operations that would have been required to achieve a uniform daily distribution of releases. The panel considers that these arrangements meet the provisions set out in Clause 16.1 (b).

The volume of spills agreed to be accounted for as borrow against subsequent water years was assessed as 8 GL, which was the balance of the Snowy River Increased Flows remaining to be made in the 2011/12 water year at the time the March spills occurred, which is consistent with Clause 16.1 (c).

Overall, the panel's finding is that the management approach taken to accounting for the March 2012 Lake Jindabyne spills is seen as appropriate.

Whilst the Department has a clear view of the intent of the provisions in Clause 16.1 of Schedule 3, the panel notes that the language used is complex and could be confusing to some readers. The establishment of a register that records decisions and decision reasons (as suggested in Recommendation 3.2), as part of improving governance of the AWOP process, will also assist in ensuring that the rationale supporting the management of SRIF spills accounting is clearly documented. Additionally, after some six years of experience in the delivery of flushing flows, it is likely that the dynamics of storage management and the sources of risk around incurring spills are better understood, and there may be opportunities to incorporate any learnings into the Licence.

Recommendations

R2.1 Consider redrafting spills accounting and risk provisions: It is recommended that the Ministerial Corporation consider redrafting Clause 16.1 of Schedule 3 to improve the clarity of the provisions, and to incorporate any relevant learnings around the identification and allocation of risks arising from delivery of SRIF flushing flows. In addition, it is recommended the Department consider developing a plain English explanation of the intent of the Licence, for communication with community stakeholders.

6.2 Snowy Montane River Increased Flows (SMRIF)

Framework for review of SMRIF performance

Consistent with Term of Reference (2), the Panel's performance review assesses the **appropriateness of the management approach** taken to **meet the annual stream flow targets** for Snowy Montane Rivers Increased Flows.

What the Licence requires:

The Licence sets three high-level objectives for the SMRIF, in order of priority:

- (1) to protect endangered/ threatened species;
- (2) to maintain natural habitats; and
- (3) to maintain wilderness and national parks values.

The Licence requires that for each river along which Snowy Montane Rivers Increased Flows are to be made (see Table 3 of this report below), the Governments will:

- (1) determine a set of objectives for those Snowy Montane Rivers Increased Flows together with associated performance measures; and
- (2) prepare a riverine management strategy that includes provision for the management of: (a) habitat; (b) native plant and animal species; (c) introduced plant and animal species; and (d) river banks.

The SMRIF are to be made by modifying works along the relevant river reaches. The Licence is not specific about modifications to works on the other rivers, except that they be agreed by the WCLC and that no major structural changes are required except at Tantangara (cl 19.3 (3)).

Table 3. Summary of the Snowy montane river increased flows program*.

Reach	GWh forgone electricity generation on Snowy Montane Rivers	GWh conversion factor	Increased flow in reach (GL)	Annual Natural Flow	Modified works	Average annual yield
Murrumbidgee River	52.4	1.94	27	30%	Tantangara Dam Outlet	35.8
Goodradigbee River	23.3	1.94	12	78%	Goodradigbee River Weir	12.0
Geehi River	36.6	1.85	19	19%	Middle Creek Weir Strzelecki Creek Weir	22.7
Snowy River – Gungarlin	20.6	0,71	29	13%	Tolbar Creek Weir Diggers Creek Weir	18.9
Snowy River – Perisher/Rams Flat	17.1	0.57	30	20%	Falls Creek Weir	3.4
Total	150	-	118			92.8

*Table One of Schedule 3 of the Licence is summarised within the bold borders. The modified works and average annual yield are sourced from the SMRIF annual Strategy (Department of Industry 2018).

The river reaches on which works are to be modified to achieve the SMRIF are specified in Table One³ of Schedule 3 of the Licence (Table One is adopted directly from the SWIOID Annexure Three). Table One also specifies the GWh forgone for each of the river reaches and specifies when the releases are required to commence for each of the first 10 years of the term of the Licence. Since 2012, the applicable column is the 10-year column and only this has been reproduced in Table 3 of this report. Modifications are made at Snowy Hydro's expense (except for fish ladders) and, Snowy Hydro cannot be directed to make any specific modification (except for Tantangara) (Licence Schedule 3 cl 19.3). The Licence specifies that a requirement to release water or modify structures is a requirement to use 'best endeavours' to achieve the flow or modification (Licence cl 2.5).

The Licence provides that Snowy Hydro must make the SMRIF

- Up to the volumes equivalent to the foregone generation GWh in Table One (Schedule 3 cl 22.1)
- But proportional to the SRIF allocations (such that the maximum volumes derived from Table One of Schedule 3 are only available when the maximum SRIF allocation is available and the percentage of the Table One volume is the same percentage as the SRIF) (Schedule 3 cl 22.2)
- Calculated against a baseline that is the flow downstream of each structure prior to corporatisation (Schedule 3 cl 22.3) and where relevant using simulated (ie modelled) streamflow data, and
- Specifically target annual releases from Tantangara Dam to within 10% of the Murrumbidgee / Tantangara volume in Table One that results from the annual allocation, and within 20% of, monthly release targets in the AWOP and daily volumes notified by the Ministerial Corporation.

³ Table One of Schedule 3 of the Licence is represented in Table 3 of this report

The Licence provides for Table One of Schedule 3 to be amended, while prescribing an extensive scientific investigation process required prior to amendment (Licence Schedule 3 cl 23).

To date, the adopted SMRIF modifications have included:

- works at Tantangara Dam mandated by the licence
- modifications at Goodradigbee Weir to enable a constant increase in flow compared to baseline, allowing a portion of flow to pass the structure (a translucent flow)
- modifications at Geehi and the Upper Snowy, to enable all flow to pass the structure, mimicking catchment inflows (a transparent flow), up to the nominated volume.
- a decision to not repair a damaged structure, in order to allow all flows from Strzlecki Creek to flow into the Geehi River, resulting in average annual yield in the Geehi slightly greater than the increased flow volume in Table One (Table 3 of this report).
- Upper Snowy modifications and increased flows were delayed by a 'staged approach' to implementation of the flows, as well as by low allocations.

Submissions to the Department's Licence Review argue that the Upper Snowy modifications result in flows below the volumes identified in Table One of Schedule 3 of the Licence (see Table 3 of this report). The SMRIF modifications have been agreed by the WCLC and approved by the Ministerial Corporation as part of the AWOPs.

Observations – how the SMRIF were implemented

Objectives, Performance Measures and Strategy

The Panel notes that "baseline" assessments of the montane rivers by a scientific expert panel were available, dating from the late 1990s (eg Bevitt *et al* 2009). The Panel has been advised by the Department that a Snowy Flow Response Monitoring and Modelling program (and earlier iterations) was commenced in the mid to late 1990s. This was based on testing a range of hypotheses that were developed by the Department in association with high profile academic and government researchers that were members of an Expert Panel (eg Professor Sam Lake, Professor Wayne Erskine and Dr Bruce Chessman). The hypotheses included questions around the direction, type and magnitude of changes that the environmental flows were predicted to achieve in terms of geomorphic, ecological and water quality indicators. In addition, the Department published 'An Assessment of Matters of Environmental Significance in the Snowy and Montane Rivers' (Williams and Russell 2009), which the Panel understands has influenced SRIF and SMRIF planning (eg by citation in the 2016/17 and 2017/18 Strategies (Williams 2016, 2017)).

Between 2010 and 2013, the Governments were engaged in the development of objectives and flow planning through representatives on the Snowy Water Advisory Government Officials Committee and the Snowy Water Technical Advisory Group (SWTAG). However, the Panel understands that discussions mainly focussed on other issues and not on the SMRIF (although the initial Geehi works were presented to the SWTAG in 2011).

Following the commencement of the Licence in 2002, the determination of the objectives and performance measures as matters of policy, and the preparation of the Strategy for SMRIF, appears to have occurred in practice via decisions of the WCLC and in the publication by the Department of annual SMRIF Strategies, since 2014 (Williams 2014, 2015, 2016, 2017, Department of Industry 2018). The Panel's understanding is that no SMRIF Strategy was published before 2014, despite the Tantangara Dam (2004), Goodradigbee (2004) and Geehi (2011) Rivers increased flows commencing earlier. In these annual Strategies since 2014, there is no specific reference to endorsement by the Governments. However, similarity to the AWOPs implies that the WCLC had reviewed the Strategy in some form. In some years the annual Strategy does acknowledge review and comment by agency staff of the Governments (eg Williams 2016).

There does not appear to have been any more senior or any more active deliberations by "the Governments". Earlier in the term of the Licence, a Senior Officers Group met that represented the Governments. However, this has not met since 2012. Anecdotally, and according to the AWOPs, it appears that the SMRIF Strategies

were in practice developed by the Department's scientific staff, in consultation with Snowy Hydro. Key elements of the strategies were reviewed by the WCLC and key elements were reflected in the AWOP. Documentation of WCLC decisions was only captured in the AWOP developed by Snowy Hydro and then approved by the Department. The Department formally notifies Snowy Hydro each year of the SMRIF requirements.

The annual Strategies for SMRIF published by the Department (Williams 2014, 2015, 2016, 2017, Department of Industry 2018) present "ecological benefits" that are essentially the refined objectives required by the Licence and the SWIOID. These objectives refer to all the Snowy Montane Rivers. They are presented at a detailed level that could serve as performance measures. However, they are not specifically nominated as such.

The annual Strategies present detailed plans over several pages for annual, monthly and daily flow targets from Tantangara Dam for the Upper Murrumbidgee and describes the ecological objectives the flows are designed to achieve. The earlier annual Strategies (Williams 2014, 2015, 2016) note briefly that Upper Snowy flows have not yet been implemented and further investigation is required. The Upper Snowy approach is explained in 2 to 3 paragraphs, while other river reaches (Goodradigbee and Geehi) appear only in the table of volumes. The Strategies introduce the approach of "Long-term Annual Yield" for the Upper Snowy and the implication of greater flows in wet years and lesser flows in dry years. From 2017, the Strategies provide a fuller description and explanation of all the SMRIF reaches, the release structures and the ecological objectives underpinning the full SMRIF Strategy (Williams 2017). However, there is still not a full documentation of the reasons for decisions made (for example with respect to Strzelecki Creek see below).

Proposals for modification of works

For the modification of works on the Snowy Montane Rivers (apart from the Tantangara outlet works specified by the Licence), Snowy Hydro developed proposals and analysis of the SMRIF works, preferred options and assessment of benefits. The panel understands that these were developed in consultation with the Department's scientific staff. The former Snowy Scientific Committee provided some review of earlier proposals, but the panel understands their main focus was on the SRIF and Tantangara releases. Most of the modification proposals for the Geehi and the Upper Snowy were presented in 2011-2013, because until 2014/15, the allocations were not fully available, pending firstly water recovery activities and secondly recovery of River Murray allocations following the Millennium Drought.

The proposed and adopted modifications were supported on the basis that at Geehi and the Upper Snowy they provided a variable flow proportional to the upstream hydrograph (rather than a constant flow as at Goodradigbee), that they focussed on the reaches with the best habitat and that they retained adequate residual flow to maintain flows in the Upper Murrumbidgee from Tantangara (ie within the total flow cap equivalent to the maximum 150GWh in foregone generation). Following a 2013 landslip and infrastructure failure at Strzelecki Creek on the Geehi River, a decision was made (with apparent agreement from the WCLC and approval from the Ministerial Corporation) to increase the SMRIF to the Geehi from 2016. The landslip has introduced a 'significant bed load of sediment' (ie a 'slug' of sediment) moving down the catchment. This makes repairing the weir impractical. The panel understands that the Strzelecki Creek and Geehi River support several threatened species, high conservation and habitat value and wilderness values. A decision was made to account the resulting increased flows within the SMRIF.

The rationale for the adopted modifications includes a premise that the equivalent volumes for each river reach presented in Table One of Schedule 3 of the Licence (Table 1 in this report) are not compliance targets, except for Tantangara Dam releases. However, the Department's annual Strategy publications do refer to the volumes as 'annual targets'⁴. In addition, the SWIOID (Annexure 2 clause 1.1) requires NSW to require the licensee (Snowy Hydro) to make the increased flows along the rivers and in the volumes referred to in [the SWIOID's Annexure 3 – identical to Table One of Schedule 3 of the Licence]. (The SWIOID also establishes the conditions on this requirement of scaling against SRIF allocations.)

⁴ Indeed Term of Reference 2 for this expert panel review refers to the SMRIF "annual stream flow targets"

A further rationale for the adopted, agreed and approved modifications and their resulting annual yield volume is the interaction between

- the small storage nature of most of the montane structures (except Tantangara),
- the requirement for adequate flows to address ecological restoration in the Upper Murrumbidgee, and
- the limiting nature of the annual GWh foregone generation Cap, which is often further limited by reduced allocations driven by drier conditions in the Murray (as the SMRIF allocations are linked to water entitlements recovered in the southern Murray-Darling system).

The small storage of the Montane structures (except Tantangara) means actively managing the release of variable environmental flows is not practical. The choice is then between “one off” modifications that enable a constant flow release (as at Goodradigbee) or that enable a proportionate release of the catchment inflow matching the natural hydrograph. The latter is better practice for environmental flows as it matches natural hydrological cues. In either case, the greater the volume released from the Montane structures, the less that is available for the Upper Murrumbidgee through active Tantangara releases. This problem is accentuated when allocations are low and less than the full 150GWh of foregone generation is available for the SMRIF. The outcome in the lowest allocation years can be zero SMRIF flows for Tantangara. Arising from these interacting factors, decisions were taken to adopt lower flow volumes for some SMRIF river reaches, but to guarantee these in almost all years.

The practical outcome of the proposals brought forward by Snowy Hydro, agreed by the WCLC, written into the AWOP and approved by the Department as delegate for the Ministerial Corporation, was to vary the increased flows from those nominated in Table One of Schedule 3 of the Licence (and as directed by the SWIOID).

Findings

Consistent with its Terms of Reference, the panel has not sought to review Snowy Hydro’s preferred SMRIF modifications, nor the analysis supporting the proposals. Rather the panel assessed “**appropriateness of the management approach** taken to **meet the annual stream flow targets**”.

Objectives, Performance Measures and Strategy

The Licence requires the Governments to decide on objectives, performance measures and riverine strategy for the SMRIF. This strategic level of planning is assigned to the Governments, while more operational decisions (eg the modification of works) are assigned to the licensee (Snowy Hydro) and approval and direction requirements to the Ministerial Corporation. The lack of a definitive record of these strategic planning decisions being made by the Governments raises ambiguities in terms of whether decision-making, trade-offs and strategic direction is being made by the parties intended and at the decision-making level intended.

Further, the panel has not been presented with evidence of any formal delegation to set the Objectives, Performance Measures and Strategies that the Licence had assigned to the Governments. (Delegations have been and are in place under s.372 of the *Water Management Act 2000* for all powers or functions of the Ministerial Corporation in relation to the Snowy Water Licence). Notwithstanding the undoubted scientific and technical diligence that underpinned the SMRIF Strategies released annually since 2014, the absence of formal endorsement or joint branding by the Governments potentially leaves the documents vulnerable to perceptions that trade-off decisions were not taken by the appropriate parties.

SMRIF proposals- agreement, adoption, approval and compliance

Snowy Hydro brought forward proposals for SMRIF works modifications and these were reportedly developed in consultation with the Department’s scientific staff (and this implied by the Department’s annual SMRIF Strategy publications). However, detailed technical review and testing by the Department and the Governments (through WCLC), could have provided confidence that these proposals met the intent encompassed in the SWIOID and the Licence, in terms of environmental and energy generation trade-offs, together with the trade-off between the Upper Murrumbidgee and other montane rivers. Such testing could

also have identified improvements. The panel has not been presented with any documented evidence that the Department or the Governments sought to carry out any detailed review of Snowy Hydro's proposed SMRIF modifications and supporting analysis. Review appears to have been limited to discussion at the WCLC, with the exception of initial Geehi works that were presented to the SWTAG in 2011. This lack of any documented or independent third-party technical review (at the time the proposals were presented), raises risk to objectives and does not support transparency, communication to and confidence of stakeholders.

Snowy Hydro's delivery of the SMRIF was in compliance with the AWOP, agreed by the WCLC and approved in an annual formal notification by the Ministerial Corporation.

SMRIF and Table One of Schedule 3

The implementation of Table One of Schedule 3 of the Licence has been primarily as a calculator for foregone generation and a guide to volumes, rather than a prescription. The implementation approach has been that there are 150Gwh of foregone generation to be "spent" to get the best ecological outcomes within the available "budget". The Panel notes that in principle, this kind of "outcomes-based approach" (rather than a prescriptive approach) is regarded as good practice in environmental flows, as in many other areas of management. Nevertheless, it is also important to consider the policy and legislation of the SWIOID and Licence as they are written and to consider whether the intent was outcomes-based or prescriptive.

The (proportional) matching to the prevailing climate of the long-term average annual yield approach represents another good practice in environmental flows. It is also consistent with the Licence reference (Schedule 3 clause 22.3) to increased flows being calculated by reference to the annual volume downstream of the works prior to corporatisation. However, it does not match other terminology of the Licence (Section 5.2(1) and Schedule 3 clause 22 and Table One) being "[increased flows] up to the volumes in Table One", nor the SWIOID (Annexure 2 and Annexure 3), being "in the volumes referred to" [in Annexure 3 – equivalent to Table One].

These volumes in Table One of Schedule 3 of the licence were varied in response to various issues, including the ongoing investigation of Upper Snowy (Perisher) flows until 2016, and the 2013 failure of infrastructure at Strzlecki Creek, which led to a decision to account these now unregulated flows as SMRIF from 2016. As noted above, adaptive management to vary flows amongst the reaches, to achieve optimum environmental outcomes with the cap of 150 GWh foregone generation, represents a sound principle of environmental flow management. The panel understands that the decisions made with respect to varying the SMRIF flows and selecting which structures would be modified, were made in consideration of environmental values, including the objectives in the Licence Schedule 3 and in the annual Strategies. Necessarily, these decisions also involved consideration of the cost to Snowy Hydro for modifications. This is because the SWIOID and Licence provide that Snowy bears the cost (except fish ladders), modifications must not involve major works and the Ministerial Corporation cannot direct modification of any specific structure.

The Panel has examined the documentation provided to it with respect to each of the SMRIF modification decisions. In each case the decision is validly supported in the documentation, while alternative decisions could also have been valid – ie judgement was required. The key vulnerability is the absence of public documentation beyond the annual Strategies, which do not explain the non-Tantangara decisions.

For Strzlecki Creek, for example, the increased flows are understood to provide an unregulated natural flow pattern into the creek and downstream to Geehi River, which are reported as high conservation value, high habitat value and in parts as wilderness value. In addition flows to Strzlecki and Geehi benefit a much longer stretch of river than on the Upper Snowy. Yet the 2016 and 2017 Strategies present no comparative assessment of the ecological benefits at Strzlecki / Geehi, compared with the ecological consequences of reduced flows elsewhere in the SMRIF program. No specific objectives, performance measures and monitoring results for Geehi/Strzlecki are presented. In contrast, the greater allocation to Tantangara releases (Williams 2017) was accompanied by comprehensive ecological objectives and explanation of the ecological benefits.

The variation from the increased flows and commencement timing identified in Table One of Schedule 3 has been rationalised on the premise that the Table One equivalent volumes are not compliance targets (except for Tantangara). However, this premise is vulnerable in two ways.

Firstly, the licence is unambiguous that Snowy Hydro shall release “up to” the Table One equivalent volumes when full allocations are available for the SRIF. It can also be noted that the SWIOID (Annexure 2 clause 1.1) requires NSW to require the licensee (Snowy Hydro) to make the increased flows “along the rivers and in the volumes referred to” in [the SWIOID’s Annexure 3 – almost identical to Table One of Schedule 3 of the Licence]. (The SWIOID does also establish the same condition passed on to the Licence, that volumes are proportional to SRIF allocations.). The Department’s annual SMRIF Strategy publications refer to the flows as ‘annual targets’ and ‘long-term annual targets’. There is clearly a tension in the provisions of the SWIOID and Licence with respect the role of Table One, and in the understanding by the Department as regulator and Snowy Hydro as Licensee. Stakeholder concerns raised in submissions add to this tension around the understanding of the role of Table One.

Secondly, the failure to amend Table One of Schedule 3 of the Licence, to reflect the agreed approach and any improved knowledge, did not support transparency and communication to stakeholders – and indeed has contributed to confusion. The Licence clearly contemplates amendment to Table One and provides a range of provisions guiding how this can occur. There is some concern that process prescribed in the Licence is too detailed, lengthy, onerous and possibly outdated. In addition, there was a view that Licence amendments should wait until the 10-year cycle of review. However, where AWOP provisions agreed through the WCLC act in practice to vary the Licence terms, there is a risk of divergence between the publicly visible Licence and the confidential AWOP (or there could a perceived divergence).

It is again emphasised that Snowy Hydro’s delivery of the SMRIF was in compliance with the AWOP, agreed by the WCLC and approved in an annual formal notification by the Ministerial Corporation, including the variation in volumes, the balance of delivery between the river reaches, and the variation in timing of commencement.

The most appropriate management response would be to engage in amendment of the Licence (Table One of Schedule 3), while still meeting the intent of the SWIOID, to ensure clarity and consistency between the Licence provisions, decision-making and implementation. In addition, the Governments may wish to canvass periodic review of the SWIOID as occurs with most intergovernmental agreements. Whether in the Licence and/or the SWIOID, such amendment could consider reframing the provision to better articulate the intent and outcomes sought, and to improve clarity on the flexibility available to achieve those outcomes and trade-off between outcomes, improving clarity on the governance of such decisions, while maintaining the boundaries agreed by the Governments on the limit to foregone generation.

Whilst not making any specific recommendations on this matter, the panel observes that the Governments may wish to consider review of the SWIOID at a frequency (eg 15-20 years) that minimises commercial risk to Snowy Hydro, while enabling learning and improvement of the environmental provisions.

Recommendations

The appropriate management approach to meeting the montane “annual stream flow targets”:

R2.2: Seek clarity, transparency and confidence in the intent, objectives and strategy. The Governments may wish to initiate a decision process at the appropriate level to update and confirm SMRIF objectives, performance measures and strategy. This should be possible without amending the fundamentals of the “foregone energy generation” cap set by the SWIOID and the Licence. Once confirmed, the objectives, performance measures and strategy should be easily accessible on a single online platform, together with compliance reports and performance measures monitoring (for which appropriate resourcing needs to be considered by the Department and OEH).

R2.3: Independent review: The Department initiate independent technical review of the adopted SMRIF modifications, alternative options and assess costs, benefits and optimisation against the identified objectives, performance measures and strategy. This review to be brought to WCLC for discussion and agreement. Such a review could be undertaken once every 5 or 10 years to inform SWL Review and support continuous improvement. Consistent with good practice for environmental flows and water planning, the Department (or in future OEH as appropriate) could undertake monitoring, evaluation and reporting against the identified performance measures, in order to inform such review and assessment.

R2.4. Licence review and update: The Department review and amend the Licence in a timely fashion where (a) the provisions are found to be onerous, inefficient or ineffective in supporting the intent (as per the Act and the SWIOLD), and/or (b) revision of specific environmental provisions is supported by scientific investigation. An appropriate management approach will include engagement with Snowy Hydro, its owner, the Governments and stakeholders. The Department aim for such amendments to seek clarity, transparency and confidence in the intent, objectives and strategy, as per R2.2. (see linked overall recommendation 4.2)

7 Conclusions and Recommendations

In this section, the Panel collects together the recommendations made in earlier sections and presents additional overall recommendations emerging from all the ToR.

7.1 Term of Reference 1

The Panel found that Snowy Hydro's assessment of Licence compliance was appropriate and its systems for managing compliance risk are of a high quality.

No recommendations are made for Term of Reference 1.

7.2 Term of Reference 3

The Panel found that the Department and Snowy Hydro exercised systems, procedures and frameworks to ensure compliance. Compliance could be adequately demonstrated to the Department and WCLC members able to view confidential documents. However, the combination of the technical complexity of the Licence, an overly conservative approach to confidentiality and a lack of application of communication expertise, means that demonstration of compliance to a level that supports community confidence was challenging. In addition, the Department, while exercising its role with technical expertise, was not able to show the panel that key elements of regulatory best practice were being applied.

R3.1 The Ministerial Corporation develop a suite of regulatory policies, within the overarching Department Policy Framework, specific to the oversight of the Snowy Water Licence and regulation of Snowy Hydro. This should articulate a compliance policy (to guide the circumstances under which the powers of the Ministerial Corporation may be used, and how they may be exercised in such an event); a risk policy (to guide the testing and rigour of decision making in relation to the Licence and Snowy Hydro matters and the development of an annual/rolling compliance monitoring plan – potentially as part of the annual 'wash up' report – to control or mitigate identified risks of non-compliance). Given the robust compliance environment this should be a judicious and fit-for purpose application to avoid unnecessary administrative or regulatory burdens.

R3.2 The Ministerial Corporation should improve the governance of the AWOP process (including the role of the WCLC), and of the interpretive decisions that are recorded in it, to increase transparency and confidence in its rigour. A consistent secretariat function should be put in place to ensure sound meeting agenda's, papers, minutes and records are kept. For interpretive decisions a process with standard operating procedures that guide the robust legal, technical and consultative approach to test the options and demonstrate robust decision-making should also be put in place. This should include a decisions register that records the decision and decision reasons.

R3.3 The Ministerial Corporation should adopt an "if not, why not" publication position on all policies, decisions, information and processes to the extent that it does not compromise the commercial operations of Snowy Hydro. This includes the AWOP and decision processes. As this information is complex, professional communications production on key issues is important to ensure that the community can access and understand the dimensions of the issue.

7.3 Term of Reference 2

The appropriate management approach to SRIF spills accounting:

Overall, the panel's finding is that the management approach taken to accounting for the March 2012 Lake Jindabyne spills is seen as appropriate.

The panel also notes that the language used in the Licence provisions in Clause 16.1 of Schedule 3 is complex and could be confusing to some readers. The establishment of a register that records decisions and decision reasons as suggested in Recommendation 3.2 as part of improving governance of the AWOP process will also assist in ensuring that the rationale supporting the management of SRIF spills accounting is clearly

documented. Additionally, after some six years of experience in the delivery of flushing flows, it is likely that the dynamics of storage management and the sources of risk around incurring spills are better understood, and there may be opportunities to incorporate any learnings into the Licence.

R2.1 Consider redrafting spills accounting and risk provisions: It is recommended that the Ministerial Corporation consider redrafting Clause 16.1 of Schedule 3 to improve the clarity of the provisions, and to incorporate any relevant learnings around the identification and allocation of risks arising from delivery of SRIF flushing flows. In addition, it is recommended the Department consider developing a plain English explanation of the intent of the Licence, for communication with community stakeholders

The appropriate management approach to meeting the montane “annual stream flow targets”:

Consistent with its Terms of Reference, the panel has not sought to review Snowy Hydro preferred SMRIF modifications, nor the analysis supporting the proposals. Rather the panel assessed “**the appropriateness of the management approach** taken to ... **meeting the annual stream flow targets**”.

Objectives, Performance Measures and Strategy

The Licence requires the Governments to decide on objectives, performance measures and riverine strategy for the SMRIF. This strategic level of planning is assigned to the Governments, while more operational decisions (eg the modification of works) are assigned to the licensee (Snowy Hydro) and approval and direction requirements to the Ministerial Corporation. The lack of a definitive record of these strategic planning decisions being made by the Governments raises ambiguities in terms of whether decision-making, trade-offs and strategic direction is being made by the parties intended and at the decision-making level intended.

SMRIF proposals- agreement, adoption, approval and compliance

Snowy Hydro brought forward proposals for SMRIF works modifications and these were reportedly developed in consultation with the Department’s scientific staff (and this implied by the Department’s annual SMRIF Strategy publications). However, detailed technical review and testing by the Department and the Governments (through WCLC), could have provided confidence that these proposals met the intent encompassed in the SWIOID and the SWL, in terms of environmental and energy generation trade-offs, together with the trade-off between the Upper Murrumbidgee and other montane rivers.

Snowy Hydro’s delivery of the SMRIF was in compliance with the AWOP, agreed by the WCLC and approved in an annual formal notification by the Ministerial Corporation.

SMRIF and Table One of Schedule 3

The (proportional) matching to the prevailing climate of the long-term average annual yield approach represents good practice in environmental flows. It is consistent with some clauses of the Licence, but is in tension with other terminology of the Licence being “[increased flows] up to the volumes in Table One”, nor the SWIOID (Annexure 2 and Annexure 3), being “in the volumes referred to” [in Annexure 3 – equivalent to Table One of the Licence].

The Panel has examined the documentation provided to it with respect to each of the SMRIF modification decisions. In each case the decision is validly supported, while alternative decisions could also have been valid – ie judgement was required. The key vulnerability is the absence of public documentation beyond the annual Strategies, which do not explain the non-Tantangara decisions.

The variation from the increased flows and commencement timing identified in Table One of Schedule 3 has been rationalised on the premise that the Table One equivalent volumes are not compliance targets (except for Tantangara). However, this premise is vulnerable in two ways. Firstly, there is clearly a tension in the provisions of the SWIOID and Licence with respect the role of Table One, and in the understanding by the Department as regulator and Snowy Hydro as Licensee. Stakeholder concerns raised in submissions add to this tension around the understanding of the role of Table One. Secondly, the failure to amend Table One of Schedule 3 of the SWL, to reflect the agreed approach and any improved knowledge, did not support transparency and communication to stakeholders – and indeed has contributed to confusion.

It is again emphasised that Snowy Hydro's delivery of the SMRIF was in compliance with the AWOP, agreed by the WCLC and approved in an annual formal notification by the Ministerial Corporation, including the variation in volumes, the balance of delivery between the river reaches, and the variation in timing of commencement.

The most appropriate management response would be to engage in amendment of Table One and the referring provisions in the Licence, while still meeting the intent of the SWIOD, to ensure clarity and consistency between the Licence provisions, decision-making and implementation.

R2.2: Seek clarity, transparency and confidence in the intent, objectives and strategy. The Governments may wish to initiate a decision process at the appropriate level to update and confirm SMRIF objectives, performance measures and strategy. This should be possible without amending the fundamentals of the "foregone energy generation" cap set by the SWIOD and the SWL. Once confirmed, the objectives, performance measures and strategy should be easily accessible on a single online platform, together with compliance reports and performance measures monitoring (for which appropriate resourcing needs to be considered by the Department and OEH).

R2.3: Independent review: The Department initiate independent technical review of the adopted SMRIF modifications, alternative options and assess costs, benefits and optimisation against the identified objectives, performance measures and strategy. This review to be brought to WCLC for discussion and agreement. Such a review could be undertaken once every 5 or 10 years to inform SWL Review and support continuous improvement. Consistent with good practice for environmental flows and water planning, the Department could undertake monitoring, evaluation and reporting against the identified performance measures, in order to inform such review and assessment.

R2.4. SWL review and update: The Department review and amend the SWL in a timely fashion where (a) the provisions are found to be onerous, inefficient or ineffective in supporting the intent (as per the Act and the SWIOD), and/or (b) revision of specific environmental provisions is supported by scientific investigation. An appropriate management approach will include engagement with Snowy Hydro, its owner, the Governments and stakeholders. The Department aim for such amendments to seek clarity, transparency and confidence in the intent, objectives and strategy, as per R2.1.

7.4 Overarching themes and recommendations

Responsibilities of the Department and OEH for testing interpretation of options put forward, testing and reviewing decisions made and monitoring outcomes.

The Panel has made findings and recommendations under ToR 3 (section 5 of this report) that the Department apply professional scepticism and periodic third-party review to proposals put forward by the licensee.

It is noted that shareholder Government's directed and authorised Snowy Hydro to make significant investments in works and flow releases for environmental outcomes. The Panel assumes these investments came at the opportunity cost of power generation, re-investment in Snowy Hydro operations and maintenance, or shareholder returns to the Governments. In this context, it is good practice to also invest in monitoring the effectiveness of the shareholders' investment in environmental outcomes. The Panel understands there has been considerable activity of monitoring or research investigation of ecological outcomes since 2002 and that several studies have been published in peer-reviewed scientific journals. (The Panel has not reviewed these articles in detail). However, the Strategies do not include monitoring results. The Panel has not been able to readily identify reports monitoring and evaluating ecological outcomes, in the public domain or within the Department's documentation.

The Panel acknowledges that the "Snowy Science" webpage on the Department's website does provide a considerable archive of studies, report, fact sheets and presentations. On the whole these relate to early (*ex ante*) investigations to inform the SRIF and SMRIF flow strategies, rather than (*ex post*) monitoring and evaluation. However, there are some monitoring reports (*ex post*) of results from SRIF and from water quality, dissolved carbon and invertebrate outcomes on the Upper Murrumbidgee Tantangara releases component of the SMRIF. In addition, the Panel recognises the considerable scientific effort in the late 1990s and early 2000s on development of hypotheses around the expected ecological responses to increased flows, including by a

scientific expert panel (Bevitt *et al* 2009, Williams and Russell 2009). The Panel understands that scientific programs were substantially cut back since the late 2000s and the Department's priorities were reported to have shifted. This would seem consistent with the NSW government reassigning the lead agency role for environmental flows to OEH from around 2009 on a state-wide basis, but it is noted that reassignment for the Snowy has not occurred until now.

With the forthcoming transfer to OEH of responsibility for Snowy environmental flows (SRIF and SMRIF), it is important that responsibilities between the two agencies are clearly defined and are funded. That is, the risk of responsibilities being missed between the two organisations needs to be addressed.

R4.1 Testing interpretation of options and decisions, and monitoring and reporting of outcomes: The regulator (the Department) can best manage risk and ensure confidence and demonstration of compliance by embedding in the process a professional scepticism approach to testing options and decisions. This can also be embedded in the recommended risk-based rolling monitoring and reporting program. In the context of the transfer to OEH of annual assessment and planning of SRIF and SMRIF, there is a need for the Department and OEH to clearly identify agency roles and responsibilities for bringing expertise to bear in testing proposals, accounts and outcomes of the SRIF and SMRIF. Responsibilities and funding need to include an appropriate, cost-effective program for monitoring, evaluation, reporting and review of the environmental outcomes of the SRIF and SMRIF, reflecting the significance of investment in these outcomes.

Timely amendment of the Licence

Following the first Licence Review, initiated 5 years after commencement, a decision was taken to only amend the Licence every 10 years, unless exceptional circumstances arose. This did occur in 2011 when exceptional flooding circumstances drove amendment to RAR and Drought Inflow Sequence Volume.

However, since 2011, the WCLC and the Department have agreed and approved various interpretations of complex or discretionary clauses, water accounting treatments and the SMRIF program. (The Panel is in general satisfied that the decisions themselves were appropriate - noting that for matters of judgement, alternative decisions may also have been appropriate). These interpretations, agreements and decisions have been documented in the (confidential) AWOP. If Licence amendments are left to every 10 years, this raises the risk of divergence between regulatory practice (which necessarily does involve exercise of judgement and interpretation) and the provisions of the Licence, risking loss of transparency, as well as loss of regulatory clarity. There is also a risk that an incremental cumulative set of decisions could have unintended consequences when applied as a whole. In this context, waiting 10 years for amendments may be too long.

R4.2 Timely amendment of the Licence: The Panel recommends that the Department consider amending the Licence at least every five years, to capture and clarify agreed interpretations of provisions, remove redundant provisions (and errors if any), harness any opportunities to simplify the Licence and provide stakeholders with an opportunity to comment. Statutory review of the Licence could remain 10-yearly.

8 List of publicly available documents

Author	Title of document	Date published	URL
Department of Industry - Water			
NSW Department of Industry	Ten year review of Snowy Water Licence: draft report	2018	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0018/161451/Ten-year-review-of-the-Snowy-Water-Licence-draft-report.pdf
NSW Department of Industry	Strategy for Snowy Montane River Increased Flows 2018-19	2018	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0006/169710/Strategy-for-the-Snowy-Montane-Rivers-increased-flows-2018-19.pdf
NSW Department of Industry	Strategy for Snowy River Increased Flows 2018-19	2018	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0010/169714/Strategy-for-Snowy-River-increased-flows-2018-19.pdf
NSW Department of Primary Industries – Office of Water (Also referenced under Williams, S.)	Strategy for the Snowy Montane Rivers Increased Flows 2014-15	2014	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0019/154252/Strategy-for-the-Snowy-Montane-Rivers-Increased-Flows-2014-15.pdf
NSW Department of Primary Industries – Water (Also referenced under Williams, S.)	Strategy for the Snowy Montane Rivers Increased Flows 2015-16	2015	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0020/154253/Strategy-for-the-Snowy-Montane-Rivers-Increased-Flows-2015-16.pdf
NSW Department of Primary Industries – Water (Also referenced under Williams, S.)	Strategy for the Snowy Montane Rivers Increased Flows 2016-17	2016	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0003/154254/Strategy-for-the-Snowy-Montane-Rivers-Increased-Flows-2016-17.pdf
NSW Department of Primary Industries – Water (Also referenced under Williams, S.)	Strategy for the Snowy Montane Rivers Increased Flows 2017-18	2017	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0004/154255/Strategy-for-the-Snowy-Montane-Rivers-Increased-Flows-2017-18.pdf
NSW Department of Industry	Snowy Science webpage (includes links to reports on hydrology / hydraulics, water		https://www.industry.nsw.gov.au/water/basins-catchments/snowy-river/snowy-science

Author	Title of document	Date published	URL
	quality, macroinvertebrates and fish)		
Bevitt R, Erskine W, Gillespie G, Harriss J, Lake P, Miners B and Varley I	Expert panel environmental flow assessment of various rivers affected by the Snowy Mountains Scheme, NSW Department of Water and Energy (The original report of this study was produced in 1998 by the former NSW Department of Land and Water Conservation.)	2009	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0014/144131/Expert-panel-environmental-flow-assessment-of-various-rivers-affected-by-the-Snowy-Mountains-Scheme.pdf
NSW Office of Water (Also referenced as Williams S. and Russell M.)	Assessment of matters of National Environmental Significance in the Snowy and Montane Rivers. Snowy River Recovery: Snowy flow response monitoring and modelling	2009	No longer publicly available via http://www.shop.nsw.gov.au/pubdetails.jsp?publication=10383
Snowy Hydro Limited			
Snowy Hydro	Water Operations Report: 2011 – 2012	2012	http://www.snowyhydro.com.au/wp-content/uploads/2016/10/SHL_Water_Ops_Report_201112.pdf
Snowy Hydro	Water Report: 2012 – 2013	2013	http://www.snowyhydro.com.au/wp-content/uploads/2016/10/SHL_WaterReport_2012-13.pdf
Snowy Hydro	Water Report: 2013 – 2014	2014	http://www.snowyhydro.com.au/wp-content/uploads/2016/10/Snowy-Hydro_WaterReport_1314.pdf
Snowy Hydro	Water Report for 2014 – 2015	2015	http://www.snowyhydro.com.au/wp-content/uploads/2016/10/Snowy_Water-Report_14-15.pdf
Snowy Hydro	Water Compliance Report: 2015 - 2016	2016	http://www.snowyhydro.com.au/wp-content/uploads/2018/05/SH1083A_Water-Report_15-16_v2.pdf
Snowy Hydro	Water Compliance Report: 2016 – 2017	2017	http://www.snowyhydro.com.au/wp-content/uploads/2018/05/SH1083B_Water-Report_16-17_v2-1.pdf

Author	Title of document	Date published	URL
Snowy Hydro	Water Compliance Report: 2017 – 2018	2018	http://www.snowyhydro.com.au/wp-content/uploads/2018/10/SH1266_Water-Report-FY17-18_v2.pdf
Other Sources			
Ken Matthews AO	Matthews Report – Independent investigation into NSW water management and compliance	2017	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0016/120193/Mathews-interim-report-nsw-water.pdf
NSW Government	Securing Our Water: NSW Government Water Reform Action Plan	2017	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0016/136204/nsw-government-water-reform-action-plan.pdf
NSW Government	Snowy Hydro Corporatisation Act 1997	2018	https://www.legislation.nsw.gov.au/#/view/act/1997/99
NSW Government	Snowy Water Licence 2011 - Issued under Part 5 of The Snowy Hydro Corporatisation Act 1997	2011	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0008/144278/Snowy-water-licence-October-2011.pdf
Ombudsman New South Wales	Correcting the record: Investigation into water compliance and enforcement 2007-17	2018	https://www.ombo.nsw.gov.au/_data/assets/pdf_file/0003/53229/Correcting-the-record_Investigation-into-water-compliance-and-enforcement-2007-17.pdf
The Commonwealth of Australia, The State of New South Wales, The State of Victoria	Snowy Water Inquiry Outcomes Implementation Deed	2018	https://www.industry.nsw.gov.au/_data/assets/pdf_file/0020/144308/Snowy-water-inquiry-outcomes-implementation-deed.pdf