Science guidelines to support water allocation plans – ecology, hydrology and hydrogeology

Part 6: Monitoring, evaluation, reporting and improvement

Department of Environment, Water and Natural Resources

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1 Purpose

1.1 Purpose

This section presents guidelines for Monitoring, Evaluation, Reporting and Improvement (MERI) to assist with planning the monitoring and review of Water Allocation Plans (WAPs) in accordance with the requirements of the *Natural Resources Management Act 2004* (the Act). It also addresses the requirements of related state policy directions including the *Risk Management Framework for Water Planning and Management* (DEWNR, 2012).

These guidelines reflect the learnings acquired through national Natural Resources Management (NRM) and water planning investments as outlined by frameworks such as the *Australian Government Natural Resources Management (NRM) MERI framework* (Australian Government, 2009) and *Monitoring and Evaluation for Adaptive Management: Issues Paper* (National Water Commission, 2013), and have been structured into the following sections:

- Background and context
- MERI for water allocation plans
- A MERI framework for water allocation plans
- Conclusion.

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2 Background and context

2.1 Monitoring, Evaluation, Reporting and Improvement frameworks

Monitoring, Evaluation, Reporting and Improvement (MERI) is a process designed to support and inform decision making, good governance and knowledge management in the NRM context. The key driver for MERI is *adaptive management* (Holling, 1978), which, put simply, is "learning by doing". Adaptive management aims to achieve natural resource management objectives while accruing information to support improved decision making in the future.

Relevant National MERI related initiatives for implementing adaptive management in the NRM context include the Australian Government *Natural Resources Management Monitoring, Evaluation, Reporting and Improvement framework* (Australian Government, 2009), *Monitoring and Evaluation for Adaptive Management: Issues Paper* (National Water Commission, 2013), *Monitoring, Evaluation Reporting and Improvement Framework* (Commonwealth Environmental Water Office, 2013) and *Murray-Darling Basin water reforms: framework for evaluating progress* (Murray-Darling Basin Authority, 2014).

The Australian Government NRM MERI framework proposes that MERI is an integral component of NRM programs supporting learning, improvement, and accountability. A key objective of this MERI framework is to "make change transparent so that all parties can learn, through reflection and discussion, which interventions are most appropriate, effective and efficient." The framework conceptualises adaptive management as a continuous cycle of learning and participation (Figure 1).
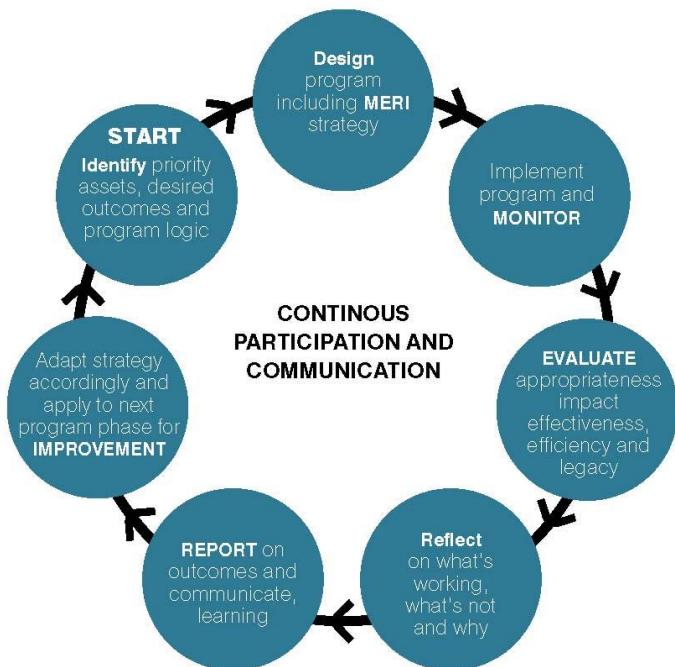
Figure 1: MERI adaptive management cycle - after Australian Government (2009)

The Australian Government's MERI framework has been adopted for a range of NRM interventions in Australia including the water resource frameworks outlined above. For example, the Commonwealth Environmental Water Holder (CEWH) has adopted the guiding principles of this framework to support prioritisation of environmental water use, development of predictive models and identification of key knowledge gaps (CEWH, 2013).

Similarly, the National Water Commission has endorsed the Australian Government NRM MERI framework for addressing National Water Initiative's (NWI) requirements regarding monitoring and reporting progress towards water plan objectives, and ensuring that planning frameworks address the needs of adaptive management (NWC, 2013). Specifically, it is proposed that MERI supports efficient, effective and appropriate use and management of resources as it:

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- facilitates a clear understanding of the resource, the effects of its use, the outcomes of interventions and the costs and benefits of investments
- is a central element of good governance by facilitating accountability, transparency and efficiency in decision making
- is fundamental for continuing improvements in management.

The Adelaide and Mount Lofty NRM Board is implementing a *Verification of Water Allocation Science Program (VWASP)*, which is consistent with these MERI guidelines. VWASP defines and tests predicted environmental, hydrological, and hydrogeological objectives and outcomes of Water Allocation Plan policies. A key element of VWASP is the coordination and consolidation of hydrological, hydrogeological and aquatic ecology monitoring efforts and the interrogation of the causal relationships between hydrological drivers and ecological responses.

2.2   DEWNR's Risk Management Framework for Water Planning and Management

In 2012, Department of Environment, Water and Natural Resources (DEWNR) executive endorsed the *Risk Management Framework for Water Planning and Management* (DEWNR, 2012a) and the *Risk Management Policy and Guidelines for Water Allocation Plans* (DEWNR, 2012b). These documents aim to assist with the implementation of risk-based water planning and are based on the principles and processes of the AS/NZS ISO3100:2009 risk management standard consistent with the directions of the NWI. The AS/NZS ISO 31000:2009 risk management principles, framework and process are illustrated in Figure 2. This figure shows that continuous improvement is a key element of a risk management framework, while monitoring and evaluation inform every step of the risk management process.

When applying this framework, the goal of water planning and management is to manage risks to water resources, including water dependent ecosystems, risks to community values dependent on water resources, and risks to the effective operation of water plans.
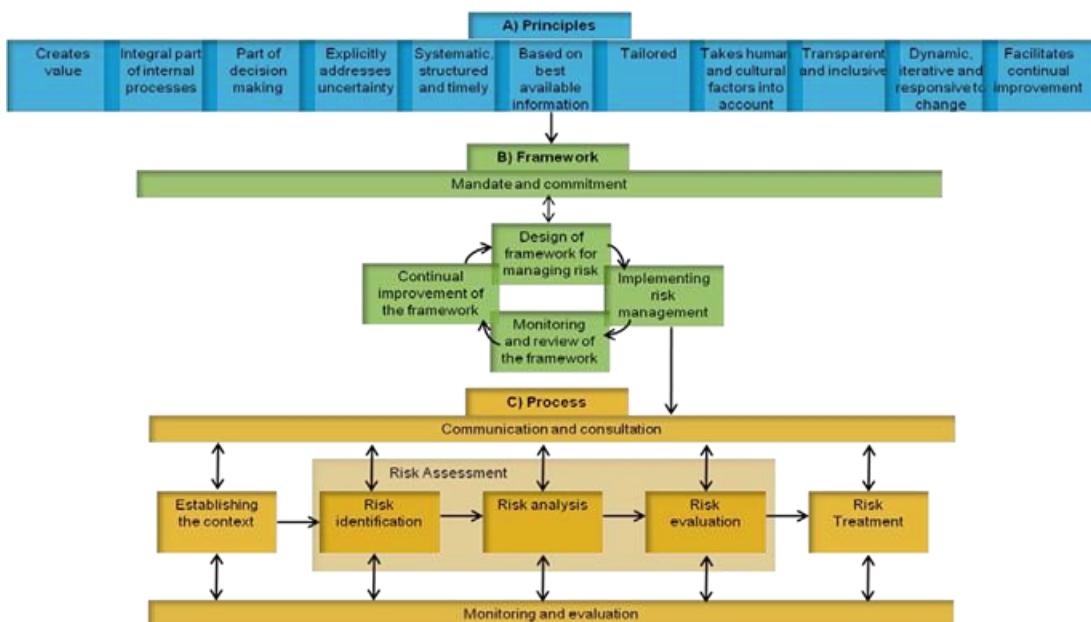
Source: AS/NZS IS031000: 2009

Figure 2: AS/NZS ISO 31000:2009 risk management principles, framework and process

The *Risk Management Framework for Water Planning and Management* establishes the risk management principles and processes for all prescribed and non-prescribed water resources in South Australia. It endorses the principles and processes of the AS/NZS ISO 31000:2009 risk management guidelines as a backbone, and sets out the generic risk management context relevant for water planning and management. It establishes three categories of risk to be managed by water planning and management activities, including:

- Risks to the resource (e.g. the potential for adverse changes impacting water quantity, water quality or the health of water dependent ecosystems)

- Risks to community values (e.g. the potential for changes in the condition of the water resource to cause impacts on economic development, water for human consumption, community amenity, and recreational, spiritual or cultural use)

- Risks to the effective operation of a plan (e.g. a WAP in accordance with the Act). Examples include the potential for outcomes of a plan not being achieved due to difficulties in implementing policies, legal challenges, lack of public support, non-compliance and extreme events.

The *Risk Management Policy and Guidelines for Water Allocation Plans* (DEWNR 2012b) builds on this framework for the prescribed water resources areas in South Australia by providing guidelines as to how risk assessments inform the water allocation planning process.

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3 MERI for water allocation plans

3.1   Definitions

For the purposes of these guidelines, the following definitions are adopted for each of the components of MERI:

- Monitoring: To watch – in the MERI context, it means routine collection of quantitative or qualitative information for the purposes of reporting and/or evaluation.
- Evaluation: A structured process of inquiry to discover the worth or relevance of plans, policies, activities, assumptions, decisions or other factors impacting the achievement of planned outcomes.
- Reporting: Routine communication of monitoring and evaluation outcomes to stakeholders for the purposes of accountability and informed decision making.
- Improvement: "Closing the loop" to ensure that findings of monitoring, evaluation and reporting are considered in decision making with respect to planning or implementation.

3.2   Purpose

The purpose of these guidelines is to address the monitoring, evaluation and review requirements of Section 76 and 81 of the NRM Act consistent with national and state directions for MERI in the NRM context.

Historically, water allocation plans have included a section on monitoring addressing the requirements of Section 76 of the Act. However, Section 81 of the Act does not specify the criteria or approach for undertaking review of WAPs. Therefore, MERI based processes are being developed and implemented with the purpose of informing the review of WAPs as MERI provides for an evaluation of their effectiveness and other relevant review questions. In the context of WAPs, provisions for MERI should facilitate:

- Achievement of the requirements of Section 76 of the Act (refer to text below)
- Implementation of the *Risk Management Framework for Water Planning and Management* and the *Risk Management Policy and Guidelines for Water Allocation Plans*
- Evaluation of a WAP's effectiveness in achieving its objectives to inform periodic review in accordance with the requirements of Section 81 of the Act
- Reporting as required by stakeholders for the purposes of accountability and good governance
- Review of regional NRM plans as per Section 81 of the Act.

As mentioned above, Section 76 of the Act - Preparation of water allocation plans- outlines the following requirements for WAPs relevant to the scope of monitoring, evaluation and reporting activities:

- *(4) A water allocation plan must—*
- *(a) include—*
- *(i) an assessment of the quantity and quality of water needed by the ecosystems that depend on the water resource and the times at which, or the periods during which, those ecosystems will need that water; and*
- *(ii) an assessment as to whether the taking or use of water from the resource will have a detrimental effect on the quantity or quality of water that is available from any other water resource; and*
- *(aab) include—*
- *(i) an assessment of the capacity of the water resource to meet environmental water requirements; and*
- *(ii) information about the water that is to be set aside for the environment including, insofar as is reasonably practicable, information about the quantity and quality, the time when that water is expected to be made available, and the type and extent of the ecosystems to which it is to be provided; and*
- *(iii) a statement of the environmental outcomes expected to be delivered on account of the provision of environmental water under the plan; and*
- *(ab) determine, or provide a mechanism for determining, from time to time, a consumptive pool, or consumptive pools, for the water resource; and*

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- *(b) set out principles associated with the determination of water access entitlements and for the taking and use of water so that—*
- *(i) an equitable balance is achieved between environmental, social and economic needs for the water; and*
- *(ii) the rate of the taking and use of the water is sustainable; and*
- *(c) in providing for the allocation of water take into account the present and future needs of the occupiers of land in relation to the existing requirements and future capacity of the land and the likely effect of those provisions on the value of the land; and*
- *(d) assess the capacity of the resource to meet the demands for water on a continuing basis and provide for regular monitoring of the capacity of the resource to meet those demands; and*
- *(e) identify and assess methods for the conservation, use and management of water in an efficient and sustainable manner;*

Section 81 of the Act (review and amendment of plans) requires that NRM plans, which include WAPs, to be reviewed at least once every 10 years. However, the NRM Act does not specify the criteria to be considered or the method by which the review should be undertaken.

3.3   Principles

Work undertaken by DEWNR, as part of coordinating and implementing state NRM monitoring and evaluation frameworks, has identified a number of key principles that underpin MERI in supporting adaptive management and good governance. They are:

1.   *Planning is essential for MERI to support adaptive management, good governance and knowledge management*

Planning for monitoring, evaluation and reporting increases the likelihood that these processes deliver value to NRM programs and activities. Planning is essential to ensure that:

- The scope of monitoring and evaluation activities target the most relevant issues
- Evaluation and reporting is timed to influence key decisions affecting program direction and performance
- Evaluations have timely access to the right data, information and knowledge to address key evaluation questions
- The right stakeholders participate in monitoring, evaluation and reporting processes to maximise opportunities for learning and for program improvement.

Planning for monitoring, evaluation and reporting typically involves the development of a schedule outlining when specific evaluation and reporting activities occur, by whom, by when, and in response to what needs. Schedules can facilitate program improvement by making the links between inquiry and decision making explicit.

2.   *Planning for MERI starts with a clear understanding of how a program is anticipated to achieve planned outcomes*

Monitoring, evaluation and reporting activities deliver most value when based on a clear understanding of the outcomes to be achieved and the mechanisms by which planned activities will, in time, contribute to these outcomes. Typically, program logic is used as a methodology for developing and explaining the "theory of operation" for an NRM plan or program. It provides a conceptual model showing the cause-effect relationships between a program's allocated resources, activities, outputs and shorter and longer term outcomes, and highlights assumptions. Program logic is typically differentiated from program planning in that it focuses on anticipated consequences or outcomes, which are consequences of events or activities.

Outcomes in program logic are generally categorised according to timeframes over which they are expected to be observed. The Australian Government MERI framework program logic identifies four distinct levels:

- Foundational activities
- Immediate activities and outcomes
- Intermediate outcomes
- Longer term outcomes.

Program logic forms the basis of adaptive management as it facilitates identification of issues where improved data, information and knowledge can lead to improved decision making. In particular, it identifies assumptions underpinning the achievement of

planned outcomes. These may relate to internal or external factors (events, conditions, cause–effect relationships, decisions) that affect success. Articulating these assumptions is critical for providing appropriate context when reporting program performance and for focussing monitoring and evaluation efforts on key areas of uncertainty impacting decision making.

MERI frameworks encourage a collaborative approach to developing and reflecting on program logic because it maximises learning and program improvement opportunities.

3. Planning for monitoring should be based on established Key Evaluation Questions (KEQs) before identifying indicators

Monitoring is the routine collection of quantitative and qualitative information. However, to be useful, it must be clear how data derived from monitoring will be applied to meet the information needs of evaluation and reporting processes. Key evaluation questions (KEQs) provide focus for data gathering efforts thereby increasing the likelihood that "right" data are collected so evaluation and reporting can lead to improvement and good governance. At the highest level, KEQs typically fall under the following categories:

- **Effectiveness** – relates to the success at achieving objectives.
- **Impact** – relates to the intended and unintended, positive and negative outcomes of a program or plan.
- **Efficiency** – relates to the extent to which resources committed to the development and implementation of a program or plan have contributed to outcomes.
- **Appropriateness** – relates to the extent to which the right objectives, processes and provisions have been established and implemented.

The appropriate number and types of KEQs will depend on plan specific context such as objectives and expected outcomes, the information needs of stakeholders, key decision points and/or review cycles, and relevant risk management and program implementation processes.

4. Considering multiple lines of qualitative and quantitative evidence as part of evaluation processes

NRM evaluation processes may consider multiple evaluation questions that cannot be addressed by a single source of evidence or analytical design. Having multiple lines and levels of evidence enables determination of both trends in resource condition and the extent to which NRM programs have contributed to resource condition outcomes.

5. Facilitating plan improvement by participatory approaches to monitoring, evaluation and reporting

The Australian government MERI framework conceptualises MERI as a continuous cycle of participation and communication rather than a single evaluation event. It purposes that active participation of planners and decision makers in evaluation facilitates learning and increases the likelihood that key findings are considered by program planning and implementation decisions.

6. Applying concepts and methods of the MERI guidelines when reviewing existing and new WAPs

While there is no requirement to apply these guidelines to existing WAPs, it should be recognised that applying concepts and methods as described in these guidelines promotes a systematic and transparent basis for decisions regarding the review and amendment of WAPs.

4 A MERI framework for water allocation plans

4.1   Scope

This framework is intended to facilitate planning for the monitoring, evaluation and reporting required for WAP implementation and review. It has been designed to address the requirements of the Act, support risk based WAPs and implement best practice frameworks with respect to monitoring, evaluation, reporting and improvement.

4.2   Objectives

Given the requirements of the Act, DEWNR's risk management framework for water planning and management and best practice frameworks for MERI, WAPs should provide for the following objectives:

- Ensure timely access to data, information and analysis to support WAP implementation. For example:
  o Monitoring and assessment processes for determination of consumptive pools for unbundled WAPs
  o Monitoring and evaluation required to operationalise management "triggers". For example, policies dependent on resource condition thresholds
  o Monitoring of key risks identified through the risk based water allocation process in accordance with the DEWNR's *Risk Management Policy and Guidelines for Water Allocation Plans*.
- Ensure that the review of WAPs as required by Section 81 of the NRM Act is based on evaluation of the extent to which the WAP has effectively achieved its objectives as per Section 76 of the NRM Act and managed risks to resources, risks to community values and risks to effective operation of the WAP. This evaluation may consider the following:
  o The extent to which key principles or policies of the WAP have been implemented
  o The extent to which objectives with respect to water resource outcomes have been achieved
  o The extent to which stated expected environmental outcomes have been achieved
  o The extent to which anticipated hydrological Implementation of WAP principles and achievement of WAP objectives and anticipated outcomes
  o Contribution of WAP policies to objectives and outcomes
  o Unintended negative and positive impacts of WAP implementation
  o The extent to which the objectives and principles of the WAP are appropriate based on:
    ▪ The above evaluation criteria regarding WAP effectiveness, efficiency and impact
    ▪ An analysis of the extent to which assumptions underpinning the WAPs objectives and principles hold true, which takes into account an assessment of risks to the resource, risks to community values and risks to effective operation of the WAP as required by DEWNR (2012b).
- Provide for WAP review processes informed by transparent and evidence-based evaluations of policies and implementation
- Ensure that decision making (e.g. regarding policies, implementation and/or risk management) are supported by fit-for-purpose scientific evidence and analysis
- Facilitate WAPs that support NRM reporting at multiple levels, including regional and larger scale drivers such as State NRM report cards, Australian Government, Murray-Darling Basin Plan evaluation and interjurisdictional related NRM programs

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- Provide for WAP review processes informed by transparent and evidence based evaluations of policies and implementation.

4.3   Planning for MERI

It is recognised that, given the legal status of a WAP when adopted, a MERI plan, as a component of a WAP, should achieve a balance between providing sufficient direction for monitoring, evaluation and reporting activities while allowing flexibility with respect to implementation. In order for this balance to be achieved, it is suggested that the WAP contains the strategic components of a MERI plan including a summary of the program logic, key evaluation questions, assumptions and risks; and a schedule of evaluations to inform reporting, review and key decision points regarding policies.

It is anticipated that these strategic components of the MERI plan will provide a driver for identification of required indicators and development of monitoring programs. It is recommended that specific "operational" components of MERI, such as detail regarding indicators, monitoring programs, reporting and evaluation be documented separately from the WAP as outlined in Table 1.

Table 1: MERI planning to support monitoring and evaluation requirements of a WAP

Element	Part of WAP?	Purpose	Call to action	Review cycle
MERI plan	Yes	Sets direction for monitoring, evaluation and reporting based on key evaluation questions, key assumptions and requirements of risk management	MERI monitoring plan (below)	As specified by NRM Act (maximum 10 years)
MERI monitoring plan	No	Provides for operational details such as monitoring and collation of lines of evidence (i.e. indicators, monitoring) to support MERI plan	Business plans (NRM Board, partners)	Annual, or at discretion of NRM Board

4.3.1   Suggested components of a WAP MERI Plan (i.e. internal to WAP)

It is suggested that, to address evaluation and reporting needs of a WAP, the MERI plan includes the following components, as described in Table 2:

- Objectives for MERI in the context of the WAP. At a minimum, it is anticipated that the MERI plan should address evaluation of the effectiveness of WAP policies in contributing to WAP objectives for the purposes of informing the WAP review

- Documentation of the rationale for how the WAP will achieve its stated objectives (i.e. program logic) through the implementation of activities and showing the links to:
    o   outputs (e.g. issuing of licenses)
    o   anticipated shorter and long term outcomes
    o   key cause-effect relationships

- Key evaluation questions to be addressed by evaluations (e.g. relating to the effectiveness, efficiency, impact or appropriateness of the WAP)

- Any key assumptions underpinning the achievement of planned outcomes for the WAP

- Any risks to resources, community values or risks to the effective operation of the plan to be addressed by monitoring and evaluation

- A schedule of evaluation and reporting that addresses the objectives for MERI, having reference to points 3, 4 and 5 above.

4.3.2   WAP MERI monitoring plan

A WAP MERI monitoring plan, which complements a WAP but is external to the legal instrument, may consider more detailed operational issues such as information on indicators, monitoring programs, data management etc.

Table 2: Components of MERI framework suggested for inclusion in a WAP MERI plan

	MERI plan components	Purpose	Suggested content
1	**Objectives for MERI**	• Establish the broad purpose of MERI to be conducted on behalf of WAP	Objectives for MERI activities, which may include: • Evaluate effectiveness of WAP policies as an input to review of WAP • Inform key decision points identified by WAP policies • Inform risk management (e.g. through monitoring of at-risk resources)
2	**Program logic**	• Establish rationale for how WAP policies will achieve WAP objectives	• Anticipated outputs of WAP implementation • Anticipated shorter and longer term outcomes • Key cause-effect relationships between outputs and outcomes, and between shorter and longer term outcomes
3	**Key evaluation questions**	• Set direction and provide focus for monitoring and evaluation activities	Key evaluation questions to be addressed by evaluations: • E.g. for WAP review, an overarching question: 'To what extent should the WAP be revised?' • At the minimum, key questions should address the effective of WAP policies at achieving objectives. Questions may also consider questions of impact, efficiency and appropriateness of policies. • Questions may also address key elements of uncertainty that affect the achievement of overarching objectives (e.g. environmental water requirements)
4	**Key assumptions**	• Provide context for WAP evaluations by outlining the conditions likely to affect effectiveness of policies • Identify key areas of uncertainty (e.g. regarding cause-effect relationships, resource condition, etc.) contributing to the assessment of risks.	• Statements of assumptions (e.g. cause-effect relationships). These could related to WAP implementation, understanding of resource condition and threatening processes, external factors that could impact the success of the WAP. • Reference to evidence supporting assumption
5	**Risk management**	• Establish monitoring requirements for risk management	• Key risks potentially affecting achievement of WAP outcomes • Monitoring and evaluation requirements for risk management
6	**Evaluation schedule**	• Outline the timing and scope of evaluation processes to meet MERI objectives (1 above) having regard to key evaluation questions, key assumptions, and risk management requirements • Provide for information needs of miscellaneous NRM or other reporting if required	It is suggested the schedule consider information needs concerning: • WAP implementation (e.g. supporting WAP policies, risk management). Likely to including ongoing monitoring and evaluation of resource condition • Statutory review addressing key evaluation questions to inform decisions regarding WAP amendment. It is suggested that, for each evaluation, a schedule could outline: • Evaluation purpose and key questions to be addressed • Timing/frequency • Evaluation methods and lines of evidence • Key stakeholders

4.4 WAP MERI plan components

This section provides guidelines for developing content for and implementing each of the suggested components of a WAP MERI plan outlined by the framework presented in Table 2.

4.4.1 Objectives for MERI

A WAP MERI plan should clearly state the objectives of monitoring, evaluation, reporting and improvement activities to be undertaken as prescribed by the WAP. As a minimum, the WAP should outline:

- Statutory requirements that are drivers for monitoring, evaluation and reporting, including:
  - o A statement of the environmental outcomes expected to be delivered on account of environmental water under the plan (Section 76(4)(aab)(iii) of the Act)
  - o Monitor, evaluate and report on the state and condition of water resources, including their capacity to meet known and projected demands (i.e. Section 76(4)(d) of the Act)
  - o Review of the WAP within five years of adoption (i.e. Section 81(4) of the Act)
- Monitoring, evaluation and reporting requirements stemming from relevant contemporary policy directions such as:
  - o Risk Management Policy and Guidelines for WAPs (DEWNR, 2012b)
  - o Regional NRM reporting and review frameworks relevant for the WAP
  - o Higher level reporting and assessment frameworks (e.g. Murray-Darling Basin Plan, NWI, State of the Environment report for SA, Caring for our Country).

4.4.2 Program logic

Existing MERI frameworks recommend that the first step to planning MERI activities is establishing a clear rationale for the plan, program or intervention in question. To this end, existing NRM MERI frameworks recommend application of 'Program Logic'. The Australian Government has published guidelines for developing and using program logic in NRM (see Roughly, 2009).

Program logic (refer to Figure 3) is a management tool that helps planners model how an intervention is understood to produce results. A key product of program logic is the 'outcomes hierarchy', which plots a chain of expected consequences, or outcomes, arising from planned NRM activities or policies. Individual outcomes are mapped according to a timeframe over which they are anticipated to occur. Shorter term outcomes are linked to longer term outcomes by assumed cause-effect relationships.

4.4.3 Defining an outcomes hierarchy

As a minimum, it is suggested that an outcomes hierarchy for the WAP be devised along the lines of the framework presented in Table 3, whereby anticipated outcomes are classified according to the timeframe over which they are expected to be realised.

Table 3 shows that outcomes are to be defined as 'immediate' (1-3 years), 'intermediate' (5 years) and 'long-term' (10-20 years). It is expected that the immediate and intermediate level outcomes are specific to a WAP, whereas the long-term outcomes are regional NRM plan targets to which a WAP contributes to.

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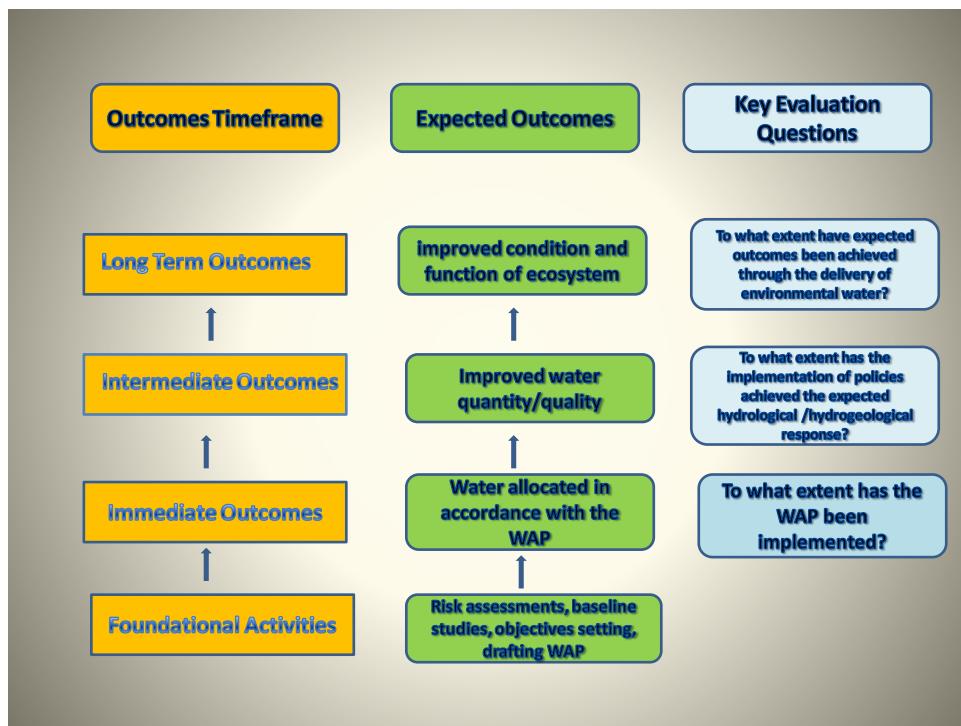
Figure 3: An example of a program logic

Table 3: Outcomes to be monitored and evaluated

Outcome level	Timeframe	Driver	Example
Long term	10–20 years	Regional NRM Plan	Improved condition and function of ecosystems in region
Intermediate	5 years	WAP	Observed changes to flow regimes Improved water quantity/quality Health of water dependent ecosystems at local or resource unit scale not limited by water quantity/quality Observed expected environmental outcomes
Immediate	1–3 years	WAP	Water allocated in accordance with the WAP Water taken and used in accordance with the WAP

It is expected that an outcomes hierarchy for a WAP will address stated expected outcomes related to both resource management, resource condition and environment (as per Section 76 of the NRM Act). In the context of a 'risk-based' WAP in accordance with DEWNR (2012b), outcomes may be expressed in terms of the treatment of identified risks to water resources or community values that depend on water resources. Table 4 provides examples of the types of outcomes that may be articulated by a MERI plan.

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Table 4: Examples of outcomes to be included in an outcomes hierarchy

Examples of resource management outcomes	Examples of resource condition outcomes
Changes in:	Changes in:
• Management or administrative systems	• Flow regimes
• Community attitudes	• Groundwater level and salinity
• Behaviour of water users	• Condition of water dependent ecosystems
• Land management and use	• Risks to community values

4.4.4 Key evaluation questions

The purpose of setting key evaluation questions is to provide direction to monitoring and evaluation activities. It is suggested that this is particularly relevant for evaluations of the WAP that are scheduled to inform the statutory review. They are also important for identifying and providing direction for other evaluation processes required to inform management of risks during implementation.

Examples of evaluation questions relating to the effectiveness, impact, appropriateness and efficiency of a WAP include the following:

- *Effectiveness:*
  - To what extent has the WAP been implemented?
  - Have the resource management and resource condition objectives of the WAP been achieved?
  - To what extent has the WAP achieved its stated environmental outcomes expected?

- *Impact*
  - How has adoption and implementation of the WAP impacted the community?
  - What were the unintended and intended positive/negative outcomes from the WAP?
  - To what extent has the WAP contributed to intermediate and long term regional NRM outcomes?

- *Appropriateness*
  - To what extent have assumptions made within the WAP proved to be correct? If not, why not?
  - Is the balance of WAP objectives and provisions consistent with known water resource risks?
  - Is the WAP consistent with existing policy frameworks for water planning and NRM?
  - Does the WAP address the needs and aspirations of the community?
  - Have appropriate processes been followed in the development of a WAP?

- *Efficiency*
  - To what extent could the WAP be developed or implemented more cost-effectively?

It is expected that the wording of evaluation questions will be specific to the context of a WAP depending on factors such as the risk status of the water resources, outcomes articulated for the WAP and any key assumptions that have been identified. The following are examples of evaluation questions relating specifically to Environmental Water Provisions (EWP)s:

- To what extent were policies to deliver EWPs implemented?
- To what extent were EWPs delivered?
- To what extent did EWPs deliver anticipated ecological response?
- To what extent did the ecological response lead to stated expected outcomes with respect to asset condition?

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- o   Are the Environmental Water Requirements (EWRs) correct?
- o   What long term condition can EWPs realistically sustain?

Methods of evaluation considered relevant in addressing these questions may include:

- Compliance reporting
- Water accounting
- Condition monitoring (targeted to conceptual understanding and deterministic models)

More details with respect to MERI and EWRs/EWPs is provided in the *Guidelines: Environmental Water Requirements and Provisions*.

4.4.5   Key assumptions

It is recommended that a MERI plan identifies the assumptions on which the outcomes are based. In this context, assumptions refer to any essential pre-conditions that are understood to be crucial for realising anticipated outcomes. Articulating and testing assumptions is a process that contributes to learning and adaptive management; as such, it is a critical step for facilitating decisions regarding the extent to which a WAP should be amended.

Assumptions may include any condition or relationship that has a bearing on the realisation of outcomes. For example:

- Cause and effect relationships understood to exist for both human and biophysical systems (e.g. environmental water provisions will lead to measurable improvements in ecosystem health)
- Existence of certain environmental or climatic conditions
- Implementation of other related plans or policies in the prescribed area
- Socio-economic trends that may impact development and taking of water.

It is suggested that assumptions are documented according to the following categories:

- Statement of assumption
- Evidence to support assumption
- Likelihood and consequence of assumption being wrong
- Suggested approach to testing assumptions (e.g. monitoring and evaluation provisions).

In the context of a risk-based WAP, identification of assumptions will be facilitated through an assessment of risks to the effective operation of the plan. Similarly, it is likely that MERI products, such as the outcomes hierarchy, will facilitate risk assessments regarding the operation of the WAP.

4.4.6   Risk management

In accordance with the *Risk Management Policy and Guidelines for Water Allocation Plans* (DEWNR 2012b), policies expressed within a WAP will address the needs to treat risks to resources, risks to community values and risks to the effective operation of the WAP. It is recommended that a MERI plan should directly reference the monitoring requirements of a risk registers established within the WAP where monitoring is required as part of a treatment for that risk. It is suggested that the following schema be used to document the monitoring requirements for assessed risks:

- Statement of risk
- Risk level and tolerability
- Types of indicators/monitoring that may be relevant
- Purpose of monitoring (e.g. to inform adaptive management)
- Audience for monitoring.

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4.4.7 Evaluation schedule

A MERI plan for a WAP should outline an evaluation schedule. It is suggested that a MERI plan provide for the following types of evaluations:

- Assessment of water resource status
- Tracking of key risks identified by risk assessment processes outlined in DEWNR 2012b
- Statutory review of the WAP.

The following schema is suggested for documenting each scheduled evaluation:

- The purpose of the evaluation
- The evaluation questions addressed
- Timing of the evaluation
- Suggested method of evaluation
- Types of evidence that may be required (e.g. indicators, information sources)
- Potential participants in the evaluation
- How evaluation products may be communicated.

Note that it is not necessary or desirable to outline specific requirements or roles and responsibilities regarding elements of an evaluation. Rather, the purpose of the schedule is to provide a driver and a framework for MERI business planning undertaken on behalf of the WAP. Table 5 provides a summary of two proposed evaluations according to these criteria. As described, an annual assessment is primarily concerned with tracking key risks and adaptive management within a WAP, while the periodic statutory review is primarily concerned with learning and adaptive management for the WAP itself. It can be expected that the periodic review will be more intensive in terms of information resources and stakeholder input than the annual evaluation.

Table 5: Suggested minimum requirements for scheduled evaluations

Evaluation	Timing	Primary purpose	Primary audience
Assessment of resource status	Annual	Operational performance, monitoring of risks, adaptive management	NRM Board, Minister
Statutory review	At least once per 10 years	Support decisions regarding amendment, accountability for effectiveness	All WAP stakeholders

4.4.7.1 Assessment of resource status

Purpose

Regular assessments of the state and condition of water resources and risk status are used for the purposes of surveillance and for supporting resource allocation decisions made on account of the WAP. They also are used for public accountability of the WAP with respect to the sustainable management of the resource. The achievement of expected environmental outcomes is directly linked to assessment of resource status.

Evaluation questions

This evaluation is primarily concerned with addressing the effectiveness and efficiency of the WAP.

Timing

This assessment can occur on an annual basis.

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Evaluation methods, indicators, and stakeholder involvement

The specifications for this evaluation in terms of methods, indicators and stakeholder involvement will depend on the individual circumstances of the WAP. It is likely that where resource risks are deemed to be higher, the assessment is likely to be more intensive in terms of data and knowledge.

4.4.7.2   Statutory review

Purpose

The WAP review should be a structured evaluation of the WAP that is intended to inform decisions on the extent to which it should be amended. The review thus requires systematic consideration of the evaluation questions that have been posed in the WAP MERI plan.

It is suggested the evaluation be divided into three parts:

1. An assessment of the state, condition and trends of water resources informing the status of risks to the resource (including water dependent ecosystem).
2. An evaluation of the following:

    o   Effectiveness at achieving expected outcomes (environmental, social and economic)

    o   Extent to which WAP has contributed to expected outcomes

    o   Positive and negative, intended and unintended impacts of WAP development and implementation

    o   Appropriateness of key policies and expected outcomes of the WAP given contemporary policy directions and community values.

3. An evaluation of the extent to which the WAP should be amended to achieve improvement (i.e. key NRM question 3).

Timing

The Act requires that WAPs be reviewed at least once every ten years. Depending on individual circumstances facing each WAP, it may be appropriate for reviews to be conducted more frequently. Therefore, it is suggested that the timing of a WAP review be determined according to one or all of the following conditions:

- Where a risk assessment has determined that overall risk is high (either due to water resource related risk or risks to the effective operation of the WAP), a review may be pre-scheduled for a time earlier than the statutory period
- Where annual or other scheduled evaluations indicate a level of risk beyond a predetermined threshold, a WAP review may be triggered before the statutory period
- Where the condition of the water resource is such that it is unlikely that expected outcomes will be achieved.

Evaluation methods

The WAP review should be fit for purpose depending on the overall size and importance of the water resources concerned and the levels of risk that have been determined. As a suggested approach, the statutory WAP review should:

- Evaluate the existing WAP through systematic consideration of the evaluation questions expressed by the MERI plan
- Be a participatory process involving appropriate representation from stakeholders identified by the WAP
- Consider relevant expert advice - e.g. covering the following themes:

    o   Science (surface water, groundwater, ecology)

    o   Social science

    o   Economics

    o   Legal

- o   Administration
- Review risks registers
- Consider all options to improve the effectiveness, impact and appropriateness of the WAP
- Consider the 'no change' option.

As a guide, it is expected that evaluations informing a WAP review will consider multiple lines and levels of evidence, and will involve qualitative and quantitative evaluation methods.

5 Conclusion

There will be a transition period where the majority of existing WAPs have monitoring and evaluation provisions that predate these guidelines. While there is no requirement to apply these guidelines to existing WAPs, it should be recognised that a structured approach to evaluation promotes a systematic and transparent basis for decisions regarding the amendment of a WAP.