Evaluation framework for CMA natural resource management
Evaluation framework for CMA natural resource management
Contents

1. About the evaluation framework .................................................................1
   What is evaluation? .............................................................................................1
   What is the evaluation ‘framework’ for NSW CMAs? ........................................1
   Why an evaluation framework?
   Principles of evaluation
   Reviewing the framework
   Applying the framework ....................................................................................7
   Developing evaluation capacity through a participatory approach ......................8
   References .........................................................................................................9

2. Evaluation context ........................................................................................10
   Establishing the terms of reference .................................................................10
   Why use terms of reference?
   Elements of the terms of reference
   Determining the drivers for evaluation activities .............................................11
   External drivers: State
   External drivers: National
   Internal drivers
   Relationship between different reporting requirements
   Identifying stakeholders....................................................................................16
   Defining the type of evaluation .......................................................................17
   Understanding the logical framework ............................................................20
   Components of a program logic framework
   Conceptual models
   Results hierarchy
   Using logic to help define targets
   Program logic table
   References .......................................................................................................27

3. Evaluation design .........................................................................................28
   Evaluation design criteria ................................................................................28
   Information requirements ................................................................................28
   Types of information in a mixed method approach
   Using multiple lines and levels of evidence
   Identifying performance measures ................................................................34
   Using an evaluation panel ...............................................................................34
   Developing an evaluation plan .........................................................................34
   Portfolio of evaluations
   Elements of an evaluation plan
1. About the evaluation framework

Key information in this section
- What is evaluation?
- What’s in the evaluation framework and how should CMAs apply it?
- Principles to guide sound evaluation

What is evaluation?

Evaluation is a systematic and objective review of the appropriateness, efficiency and/or effectiveness of a program (Department of Finance 1994). The results of an evaluation are used to adaptively manage programs either by improving them or adopting evaluation findings from other programs.

The terms ‘evaluation’, ‘program evaluation’ and ‘performance evaluation’ are all used to describe the process of monitoring, evaluation and reporting (MER).

Monitoring and reporting, when applied to the management of natural resources, support evaluation by providing the information needed to undertake evaluations and sharing the evaluation findings so that improved practices and outcomes can be achieved. For NSW Catchment Management Authorities (CMAs), monitoring, evaluation and reporting processes are concerned with collecting, recording, analysing and using information to adaptively manage investment strategies and ensure that progress towards catchment targets is being achieved.

By treating the evaluation process as a systematic and transparent learning process, the individual interacting components may be considered in the following ways:

**Evaluation** attempts to explain why a particular outcome has occurred, how well a program or activity was undertaken, whether it was a good thing to do, and what should be done in the future in light of the evaluation findings. Evaluation requires a questioning attitude for it to lead to continual improvement. The complexity and stage of the program or activity will determine the type of evaluation. For example, an evaluation that considers whether a program’s outcomes have been achieved will occur towards the end of a program as well as at the mid-term if it is a long program.

**Monitoring** addresses the evaluation questions and describes what is occurring over the monitoring period. The information gathered may be a mix of qualitative and quantitative, generated from formal or informal collection processes. Examples of formal processes include specifically designed natural resource monitoring programs or designed survey questionnaires. Informal processes include general observations about process, interactions or information gathered through informal project team discussions or discussion with a landholder. Information gathered from informal processes needs to be tested to determine if it is suitable as evaluation evidence.

**Reporting** is the communication of the results and findings and facilitation of their use. Good reporting is essential to demonstrate accountability and inform adaptive management that improves methods of program delivery and the achievement of outcomes.

What is the evaluation ‘framework’ for NSW CMAs?

The evaluation framework for CMA natural resource management provides guidance and practical resources to assist CMAs fulfil their evaluation responsibilities. It will be referred to throughout as the ‘framework’.
The framework will help CMAs develop their evaluation systems to achieve the targets under their Catchment Action Plans (CAPs) and adaptively manage their investments. Applying the framework will enable CMAs to meet their evaluation obligations to both NSW and the Commonwealth.

The framework allows appraisal of complex natural resource management (NRM) programs using different sources of information. It is easily adapted to meet various evaluation requirements. The framework is strategic in approach to ensure the efficient use of information and puts forward a process that provides for repeatable and transparent evaluations.

The evaluation framework map (www.environment.nsw.gov.au/4cmas/evalframeworkmap.htm) illustrates the components of the evaluation framework. While presented as a sequence, the process of undertaking an evaluation is iterative as information gathered during later steps may require a revisit to earlier steps.

See also the checklist for the whole evaluation cycle (www.environment.nsw.gov.au/resources/4cmas/08644evalchecklist.pdf) which can be used in conjunction with the more explanatory information and examples presented in the following other sections of the framework:

- **Developing and sharing information** (www.environment.nsw.gov.au/resources/4cmas/0947devshareinfo.pdf)

The evaluation tools (www.environment.nsw.gov.au/4cmas/evaltools.htm) include a number of templates for use in real-life evaluations and several practical examples of framework applications (www.environment.nsw.gov.au/4cmas/evalexamples.htm) at different scales are also provided.

Other background information provided:

- **Further reading** (www.environment.nsw.gov.au/4cmas/evalreading.htm)
- **Establishing an evaluation panel** (www.environment.nsw.gov.au/4cmas/tpsevalpanel.htm)

### Why an evaluation framework?

In 2005 the chairs of NSW CMAs agreed on the need for a common evaluation framework to help them meet their evaluation and reporting responsibilities.

The aim of the framework would be to provide guidance and tools that CMAs could use to develop specific evaluation plans for their CAPs. Ongoing implementation of the evaluation plans by CMAs would meet several objectives. It would enable CMAs to meet their evaluation obligations, including legislative responsibilities, at both national and state levels. Importantly, it would also enable each CMA to adaptively manage its CAP to:

- **improve and strengthen design** of new or revised implementation activities using lessons learnt from evaluation
- **improve implementation** to enhance the efficiency and effectiveness of new or revised implementation activities, again from lessons learnt
• **report change resulting from implementation** and so demonstrate returns for natural resource management investment

• **demonstrate the benefits of sustainable resource management**, thereby promoting current best practice.

It would be difficult for a CMA to meet its responsibilities without revising internal processes where necessary to adaptively manage the implementation of its CAP.

The evaluation framework provides processes to guide the three types of evaluation (appropriateness, efficiency and effectiveness). These processes have been developed collaboratively by CMAs, the Commonwealth Government, the Natural Resources Commission (NRC) and other relevant resource management agencies.

‘Evaluation context’ (www.environment.nsw.gov.au/resources/4cmas/0945evalcontext.pdf) provides an introduction to defining the type of evaluation to use.

**Principles of evaluation**

Evaluation processes require the collection, analysis, use and communication of a wide range of information from many sources. Adhering to a set of principles can guide these processes, particularly when dealing with complex evaluations. The following principles (not in any order of priority) form the basis of the framework and can also be applied when developing and implementing evaluation systems:

**Principle 1: Link the performance information to other planning scales**

There is a hierarchy of links between sub-catchment, catchment and state resource planning scales. Indicators are selected and measured to ensure that they satisfy the requirements of the scales against which they are primarily evaluated. Ideally, the information provided by these indicators is able to be aggregated or disaggregated and used at other scales of evaluation. It is important, however, to ensure that the data is technically relevant for use at these other scales. For example, it may not be possible to directly aggregate or disaggregate the data itself, but the information or knowledge gained from the evaluation may be applied at other scales. This principle is relevant to the other principles of consolidation of complementary systems (2), cost-effectiveness (3) and technical validity (4).

Figure 1 provides an example of the potential for aggregating information across scales.

**Principle 2: Complement and consolidate relevant existing systems**

An evaluation system should, where feasible, integrate and complement relevant existing evaluation requirements. This ensures a consistent approach that not only helps build capacity but also enables more efficient use of evaluation information. This principle does not deny the importance of considering the appropriate method of evaluation on a case-by-case basis. In addition, the evaluation system should complement other systems already in place within an organisation, e.g. project management and information management.

**Principle 3: Be cost-effective**

The benefits of the information obtained from the monitoring and evaluation system must outweigh the costs of developing and implementing the system. Existing monitoring programs, for example, should be reviewed and, where relevant, incorporated to reduce duplication and increase cost-effectiveness. The principle can also be applied to reporting processes which can be aligned to meet different stakeholder needs.

**Principle 4: Ensure the evaluation system is relevant to the CAP targets**

Evaluation design and, in particular, the selection of performance measures must be relevant to the targets of the plan and the type of evaluation to be undertaken. If the design is not relevant, it will be difficult for a CMA to make judgements on the performance of the CAP.
Figure 1: Potential aggregation of information

Principle 5: Apply ethical practices to evaluation

Ethics is about right and wrong. In the context of evaluation, ethics covers issues such as informed consent, appropriate behaviour, and storage and retrieval of study data. Ethical issues should be considered at the beginning of an evaluation and throughout all its phases, no matter what role is being played: commissioning the evaluation, undertaking it, or participating in it.

The Australasian Evaluation Society (2002) has prepared guidelines (see www.aes.asn.au) for the ethical conduct of evaluations covering:

- commissioning and preparing for an evaluation
- conducting an evaluation
- reporting evaluation findings.

Ethical conduct covers the ways in which information from surveys or interviews should be used. Patton (2003) suggests the following common ethical principles:

- explanation of the purpose of the study should use appropriate language and include precise detail of the work and the outcome expected
- commitments made to participants should be taken seriously and honoured
- planning should consider risks to people, such as psychological stress, legal liability and community repercussions, and how to deal with them if they arise
- confidentiality and anonymity should be considered and defined, in particular who will own the data, where it will be stored and how long it will be kept
it should be decided who will provide advice on ethical issues to staff undertaking if it is needed.

Equality of opportunity for access to resource management investment within a catchment community also needs to be maintained.

The presentation of evaluation findings should not only be balanced to ensure validity and acceptance, but also take into account any arrangements for post-evaluation use of the data sourced from collaborators or participants.

**Principle 6: Make evaluations manageable**

The complexity of natural resource management (NRM) issues, CAPs and their targets, and the practical constraints of the operational environment can make developing and implementing an evaluation system seem overwhelming. It is therefore important to ensure that CAP evaluations are manageable by:

- starting with a good overall understanding of the logic or intent of the CAP
- using or disregarding the framework tools as necessary and adapting them to needs
- breaking large tasks down into their smaller parts
- keeping watch on practical issues such as budget, workload, funding, etc. and implementing or adjusting practices where necessary
- keeping the evaluation plan for the whole CAP evaluation focused on higher level needs
- developing more detailed evaluation plans that incorporate project planning for the component parts of the evaluation system
- using a team approach to evaluations and, where possible, allowing individual staff or groups of staff to take responsibility for parts of the evaluation requirements
- keeping everyone informed and ensuring no surprises when an evaluation report is delivered
- seeking expert advice or assistance where needed
- using available information, standards and methods
- focusing on the most critical information pathways to address the evaluation questions and not being distracted by information that, while relevant to someone else, may not be relevant to the evaluation at hand.

**Principle 7: Ensure indicators are flexible**

NRM is an evolving discipline and is based on current best practice. Issues that need to be addressed to ensure appropriate management of natural resources will change over time and it will be likely that some of the indicators chosen for long-term projects may also change.

**Principle 8: Develop evaluation in partnership**

Partnership approaches will greatly benefit in building capacity and managing expectations of evaluation. In addition, the sources of data to meet the evaluation needs are likely to come from a variety of collaborators. As evaluation and the CAP are both long-term projects, it is essential that the partnerships are also seen as long-term. Direct links will need to be developed with NSW Government agencies as well as broader links to the community, community groups, universities and others.

**Principle 9: Use practical and objective verification**

An evaluation system must be based on sound information and processes so that there is confidence in its findings, it is practical to apply, and its approach transparent.
Principle 10: Link evaluation to the adaptive management cycle

Evaluation systems are primarily implemented to provide feedback on NRM. They should be used as part of a continuous improvement or adaptive management process and focus on the use of information from the evaluation, not just the collection of the information. ‘Developing and sharing information’ (www.environment.nsw.gov.au/resources/4cmas/0947devshareinfo.pdf) has more on adaptive management.

Principle 11: Be consistent with the State-wide Standard

CMAs are required to apply the elements of the State-wide Standard for quality NRM in all aspects of their business, including evaluation processes. Some elements may be more relevant to evaluations than others, but following the elements of the standard will contribute to sound project management and NRM practices.

The State-wide Standard recommended by the Natural Resources Commission (NRC 2005) can be accessed from the Natural Resource Commission’s website (www.nrc.nsw.gov.au). Table 1 lists those elements within the standard that, as a minimum, need to be considered when applying the framework.

<table>
<thead>
<tr>
<th>Standard’s required outcome</th>
<th>Framework’s information or tools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collection and use of knowledge:</strong> Use of the best available knowledge to inform decisions in a structured and transparent manner</td>
<td>Conceptual models Evaluation design Multiple lines and levels of evidence Information collection Information management Reporting and using findings</td>
</tr>
<tr>
<td><strong>Determination of scale:</strong> Management of natural resource issues at the optimal spatial, temporal and institutional scales to maximise effective contribution to broader goals, deliver integrated outcomes and prevent or minimise adverse consequences</td>
<td>Evaluation context Conceptual models Evaluation design Multiple lines and levels of evidence Information management Reporting and using findings</td>
</tr>
<tr>
<td><strong>Opportunities for collaboration:</strong> Collaboration with other parties to maximise gains, share or minimise costs, or deliver multiple benefits explored and pursued wherever possible</td>
<td>Stakeholder analysis Program logic analysis Evaluation design Multiple lines and levels of evidence Analysis of information Information management Reporting and using findings</td>
</tr>
<tr>
<td><strong>Community engagement:</strong> Implementation of strategies sufficient to meaningfully engage the participation of the community in the planning, implementation and review of NRM strategies and the achievement of identified goals or targets</td>
<td>Stakeholder analysis Evaluation design Multiple lines and levels of evidence Information management Reporting and using findings</td>
</tr>
<tr>
<td><strong>Risk management:</strong> Consideration and management of all identifiable risks and impacts to maximise efficiency and effectiveness, ensure success and avoid, minimise or control adverse impacts</td>
<td>Evaluation context Stakeholder analysis Conceptual models Program logic analysis Evaluation design Multiple lines and levels of evidence Information management Reporting and using findings</td>
</tr>
<tr>
<td>Standard's required outcome</td>
<td>Framework's information or tools</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------</td>
</tr>
</tbody>
</table>
| **Monitoring and evaluation:** Quantification and demonstration of progress towards goals and targets by means of regular monitoring, measuring, evaluation and reporting of organisational and project performance and the use of the results to guide improved practice | Evaluation plan  
All steps and tools in the framework address this outcome |
| **Information management:** Management of information in a manner that meets user needs and satisfies formal security, accountability and transparency requirements | All steps and tools in the framework address this outcome |

**Reviewing the framework**

The framework was developed as a collaborative project by the former Department of Natural Resources and the CMAs. State and Commonwealth agencies and other key stakeholders also provided input.

Evaluation of the performance and outcomes of natural resource management investment can be complex and application of the evaluation discipline to NRM is still relatively new and being undertaken in an evolving policy environment. It is therefore envisaged that the framework will also evolve as understanding and experience increases.

It is expected that the framework will be reviewed at least at strategic milestones such as:

- every five years or following the major reviews of CAPs
- following any significant institutional or policy change.

These reviews should take an opportunity to draw on new techniques and experiences gained by CMAs from the application of evaluation.

**Applying the framework**

The following points should be considered when applying the framework.

- Depending on the type of evaluation, and the driver, budget and time frame for undertaking the process, some elements of the framework may not be applicable. Using the checklist for the whole evaluation cycle (www.environment.nsw.gov.au/resources/4cmas/08644evalchecklist.pdf) as a guide allows reference to the relevant sections of the framework for additional information and assistance.

- The framework has been written to address the needs of a CAP but could also be applied to projects, programs and themes. The resourcing of any evaluation process needs to be ‘fit-for-purpose’, depending on the drivers, risk, budget and time frame.

- While the framework has been developed as a logical step-by-step approach, it should also be viewed as an iterative process: that is, as information is gathered to address some steps, previous steps may need to be updated. The person commissioning an evaluation, for example, may have originally requested a review of whether a program is achieving its objectives. However, after completing the evaluation context steps, it may be apparent that a different type of evaluation is required.
The application of program evaluation is reasonably new to NRM. This framework has therefore been prepared as a guide and will be reviewed and updated at strategic milestones outlined in the framework. The updates will incorporate new knowledge and experience in applying evaluation to NRM.

**Developing evaluation capacity through a participatory approach**

Adopting a participatory approach will increase the capacity of those undertaking an evaluation or potentially affected by it, and also help manage expectations about the evaluation and increase the uptake of any resulting recommendations.

In the context of the framework, the creation of a participatory environment is not just about involving the community, local government or state agencies during the gathering of information; it is also about ensuring that the staff or organisation associated with managing or delivering the program has ownership of the process too.

Further, participation by partners in an evaluation should not just involve them at the point of gathering information, but at every stage of the process. This might include:

- scoping for the evaluation, including understanding of the project or NRM issues
- evaluation design
- information needs, monitoring and data management
- evaluation of findings against evaluation questions
- reporting or communicating evaluation findings and negotiating any program changes.

The evaluation process should recognise that different partners can provide insights into the evaluation and the information required to support it. These insights will lead to greater common understanding of the program objectives, why investment strategies are being delivered in particular ways, and why particular programs or projects may need to change. This in turn can increase the partners’ commitment when working towards targets.

One of the aims of increasing the capacity for evaluation is to also reduce some of the ‘myth’ or uncertainty around the process. This can increase a partner’s willingness and ability to contribute to evaluations as well as critically evaluate their own contribution (both direct and indirect).

Some things to consider when developing a participatory approach to evaluation include:

- How much participation is relevant for each partner? This will depend on the role of the partner in the program and the reason for involving them.
- Do not force partners to participate as a single group if it diminishes what is trying to be achieved or the motivation for each group to participate.
- Ensure that participation is worthwhile for the partners – often partners will become and remain involved if they see some benefit from the investment of their time and resources.
- Ensure that the participation is relevant to the evaluation.

The following questions should be considered when looking to engage partners in the evaluation process:

- When is participation important for evaluation and who are the most relevant partners to involve at each of the stages?
- Who is going to use the evaluation findings and for what purpose, e.g. accountability, program improvement or high-level decision-making?
Evaluation framework for CMA natural resource management

- Will the analysis of information against evaluation questions require specialist skills or a broad range of skills?
- Are the roles and responsibilities for evaluation clear or is a partner’s help needed in defining those roles?
- Will there be a requirement for capacity building with partners in advance of, or during, the evaluation process?

Long-term programs, such as CAPs, require a long-term commitment from partners for many different facets of their implementation, including evaluation. Factors that may influence a sustained involvement include:

- perceived benefits
- relevance to the priorities of the partners
- quick and relevant feedback to participants
- capacity of the program to act on issues or recommendations that arise from the partners
- capabilities, leadership and maturity of the group
- willingness of groups to be open or acknowledge ethical issues as part of a two-way process of trust.

It is important for any evaluation system and its application to remain flexible to deal with some of the above issues.

It may be that not all aspects of an evaluation system will require a participatory approach from a CMA’s partners. However, by giving thought to the questions and the issues outlined above, participatory and non-participatory elements can be blended and complementary within an evaluation system.

The best time to consider the questions and issues above is when developing an evaluation plan, which is discussed in ‘Evaluation design’ (www.environment.nsw.gov.au/resources/4cmas/0946evaldesign.pdf). It is important, though, to regularly review this element during a longer-term evaluation process, such as the evaluation plan for the overall CAP.

References


2. Evaluation context

<table>
<thead>
<tr>
<th>Key information in this section</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Defining an evaluation’s terms of reference</td>
</tr>
<tr>
<td>• Understanding what is driving the evaluation requirements</td>
</tr>
<tr>
<td>• Determining stakeholder needs</td>
</tr>
<tr>
<td>• Defining the type(s) of evaluation to be undertaken</td>
</tr>
<tr>
<td>• Using the logical framework approach</td>
</tr>
</tbody>
</table>

**Establishing terms of reference**

The terms of reference for an evaluation underpin all its other elements, including design, information needs, and how its findings will be used and reported. The terms of reference will confirm what is being evaluated, the scope of the evaluation, who is commissioning it, particular constraints, available resources and governance arrangements. The terms of reference need not be overly detailed but they should provide enough information to act as an ongoing point of reference.

A number of CMAs are developing an evaluation strategy which acts as an overarching description of the evaluation activities for their Catchment Action Plan (CAP). This is then supported by more detailed information for specific evaluations. In these situations, the MER strategy could also include the key elements of the terms of reference for the overall CAP. 

‘Evaluation design’ (www.environment.nsw.gov.au/resources/4cmas/0946evaldesign.pdf) has more information on MER strategies and developing evaluation plans.

**Why use terms of reference?**

In the first instance, the terms of reference for an evaluation identify a commitment to the exercise and a shared agreement on the work that needs to be undertaken. However the terms of reference can also act as a focal point if they need to be re-negotiated as more information becomes available.

It is important that the evaluation remains focused. Terms of reference can provide this focus by avoiding generic statements such as ‘the evaluation will determine the effectiveness of the program’. They can also clarify any questions about the evaluation that may arise from various stakeholders.

**Elements of the terms of reference**

While all terms of reference will be different, there are certain common elements they should consider:

• the purpose and scope of the evaluation
• the key issues to be evaluated
• constraints
• resources
• time frame.
Purpose and scope of an evaluation

The purpose will provide an indication of how the findings of an evaluation will be used in relation to improvement, decision-making or accountability.

Examples of purpose

Example 1: The current incentive program has been running for two years. Before development of the next investment program, advice must be provided to the General Manager and Management Team on whether the program's delivery should be changed. Therefore a review to determine whether the incentive program is meeting the needs of the CMA is required.

Example 2: The program under review has been in place for 10 years, has experienced several institutional and technological changes, and responded to changing client needs. The proposed review will determine whether to keep the program in its current format or change it.

The scope of the review should identify the following issues:

- spatial – will it cover the whole CMA, part of the CMA or cross CMA boundaries?
- temporal – if there has been an earlier evaluation, a new evaluation will be from a particular point in time
- target groups – whether the evaluation will include specific client groups or all relevant stakeholders, including possibly some internal to the CMA.

Key issues to be evaluated

The key issues to be evaluated can be identified from the evaluation purpose. The issues relating to appropriateness, efficiency and effectiveness need to be identified to provide a focus for the evaluation. In Example 1 above, the evaluator is asked to focus on whether the needs and objectives are still consistent and so the evaluation will focus on the appropriateness of the incentive program to deliver on CMA targets. ‘Defining the type of evaluation’ later in this section explains the different types of evaluations.


Constraints, resources and time frame

The terms of reference should broadly consider the constraints of the evaluation, the resources available and the time frames required for each stage of the evaluation. These elements may be further defined in the evaluation plan but there should be broad agreement at the outset.

Determining the drivers for evaluation activities

It is important to understand what is driving the need for an evaluation. This will help in determining the stakeholders, timing factors, type of evaluation and why the evaluation is needed. For evaluations at different scales, it is best to confirm the drivers with the commissioner of the evaluation.

There are many drivers for evaluation. External drivers include the NSW legislation, the recommended State-wide Standard and Targets, and bilateral agreements between the NSW and Commonwealth governments. These drivers explicitly require CMAs to undertake evaluation. CMAs also have their own ‘continuous improvement’ drivers for undertaking evaluations. They can strategically plan their evaluation process by considering the various
drivers. Determining common elements that will serve the needs of both internal and external drivers will assist in developing a focused and cost-effective evaluation process.

In addition to these drivers, evaluation provides a systematic and transparent system which can inform a CMA’s adaptive management processes and improve its performance and outcomes.

External drivers: State

**NSW Catchment Management Authorities Act 2003**

This Act provides the legislative authority for CMAs and covers their operations. It details governance and operational arrangements and also specifies auditing and reporting requirements. Requirements include:

- regular review of the CAP by the CMA or as directed by the Minister
- audit of CAPs at least every five years by the Natural Resources Commission (NRC) or an independent audit panel
- annual reports to the Minister (under the *Annual Reports (Statutory Bodies) Act 1984*), which include progress towards achieving the results set out in the CAP, planned activities set out in the Annual Implementation Plan, compliance with the State-wide Standard and Targets, and any other matters directed by the Minister
- the need to comply with state-wide natural resource management (NRM) standards and promote any state-wide targets when developing a CAP.

**State Plan and State-wide Standard and Targets**

NSW has adopted a State Plan which identifies NRM as a priority under the Environment for Living theme. It sets the policy and priorities for NRM programs.

The Natural Resources Commission (NRC) is an independent body that was created to ensure a sound scientific basis and audit process for the properly informed management of natural resources in the best social, economic and environmental interests of NSW.

The State Government has implemented a series of legislative and policy reforms to facilitate strategic investment and accountability by CMAs in NRM. The Government has adopted the Standard for Quality NRM and State-wide Targets for Natural Resource Management recommended by the NRC. Section 23(2) of the *Catchment Management Authorities Act 2003* ‘provides that the Minister is not to approve a draft plan unless it complies with state-wide natural resource management standards, and promotes the achievement of state-wide targets, so far as they relate to the area of operations of the relevant authority’.


The NRC has developed a process for auditing the implementation of the CAPs and compliance with the Standard for Quality NRM. The purpose of this auditing is to gauge how effectively the CAPs are being implemented and assess progress towards achieving the state-wide targets for natural resources in the State Plan. These audits will support adaptive management in natural resources and provide confidence that the investments being made in NRM are sound.

The NRC will audit the effectiveness of the implementation of each CAP at least once every three years to provide an appropriate level of assurance to investors and stakeholders. To
Encourage ongoing improvement, the CAPs may be audited more frequently and earlier if the NRC identifies a high or very high level of risk in any of the risk categories during its annual risk assessment process.


**NSW Natural Resources Monitoring, Evaluation and Reporting Strategy**

The NSW Natural Resources Monitoring, Evaluation and Reporting Strategy (DNR 2006) was developed to coordinate the resources and efforts of NSW natural resources and environment agencies with CMAs, local governments, landholders and other natural resource managers. It establishes a monitoring, evaluation and reporting system which provides for a whole-of-government approach to enable reporting of progress against the state-wide targets for NRM. This model is being refined through the ongoing development of the Monitoring, Evaluation and Reporting program (MER) which will deliver both the State of the Catchment and NRM components of the NSW State of the Environment report in 2009.

Cross-agency ‘theme’ teams have been established for each of the 13 state-wide targets. These teams are responsible for establishing monitoring programs that will provide input to state-wide, regional and CMA-scale activities. There are also integrating themes across all the targets for information management and evaluation. A secure extranet site has been developed for CMAs and agency staff involved in the program to enhance information sharing.

Specific arrangements for CMAs include:

- annual reports to the Commonwealth Government detailing progress on the programs it funds
- four-year rolling investment programs submitted annually to the NSW Minister for the Environment, showing planned investment activities that contribute to achieving each of the 13 state-wide targets
- annual reports to, and periodic audits by, the NRC on implementation of CAPs and progress toward achieving catchment and state-wide targets
- establishment of resource-condition monitoring (aligned to developed performance measures) at the sub-catchment and project scale to inform all reporting levels and improve CMA decision-making.

Collaboration between NRM agencies and CMAs in reporting progress against state-wide targets will ensure efficient use of resources and consistent use of monitoring protocols and standards. This coordination and the relationships between CMAs and NRM agencies is managed through memorandums of understanding (MOUs) which outline information sharing, reporting and other operational arrangements.

The application of this framework will provide a consistent approach to undertaking evaluations at both the regional and state scale.

Reporting on NRM targets at a state scale will occur through the NSW State of the Environment report. State of the Environment (SoE) reporting has been operating at local, state and national levels for over 10 years. It is a reporting program that provides regular broad-scale reporting on the status of our natural resources using a range of performance indicators. The NSW SoE report is produced every three years. The SoE reporting process and indicators for natural resources are being updated to align with the state-wide targets to ensure the processes are complementary.

Reporting on NRM targets at the catchment scale will occur through State of the Catchment reports.
External drivers: National

Caring for our Country

In March 2008, the Commonwealth Government announced a new program, Caring for our Country, to restore health to Australia’s environment and build on improved land management practices. Caring for our Country will invest in projects which match six national priorities:

- building up a national reserve system
- conservation of biodiversity and natural icons
- protection of coastal environments and critical aquatic habitats
- adoption of sustainable farm practices
- effective natural resource management in remote and northern Australia
- enhanced community skills, knowledge and engagement.

This program replaces the Natural Heritage Trust (NHT) and National Action Plan for Salinity and Water Quality (NAP) programs that were provided to NSW to support specific NRM outcomes.

CMAs will be central to delivering the outcomes of Caring for our Country, using a guaranteed base-level share of program funds.

The Commonwealth Government will release a set of clear and measurable outcomes for the first five years of the program during 2008. It will also develop an annual business plan that describes investment priorities and short-term targets of between one and three years duration.

Details on the monitoring, evaluation and reporting requirements of CMAs under this new program were not available at the time of publication.

For further details on Caring for our Country, go to www.nrm.gov.au/

Internal drivers

Learning from success and failure, and from critical reflection, is fundamental to an effective program. This is at the heart of adaptive management which improves performance by allowing a program to be adjusted in response to lessons learned during the life of the activity (Commonwealth of Australia and State of NSW 2003a and 2003b). Monitoring and evaluation information can be used in a feedback loop to make necessary adjustments to the program. Adaptive management assists a program to continue to have an impact long after its completion.

Adaptive management requires a formalised process which allows a response to changing knowledge and circumstances, followed by adaptation of a program to achieve its intended outcomes (IFAD 2004). NRM uses an adaptive approach to resource planning, management and sustainable use. The main reasons include:

- application of the ‘precautionary principle’ in NRM (‘where there are threats or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation’ – Protection of the Environment Administration Act 1991)
- the complexities and interactions within our environment, overlain by social complexities
- the need to implement strategies using the best information available
• an often extended period before strategy outcomes in sustainable resource management are known.

Implementing processes to systematically adopt and further develop adaptive management practices is the key to improving the performance of environmental management. Adaptive management requires (IFAD 2004):

• an understanding of program design or logic
• the collection and analysis of relevant information against which to make judgement
• a learning environment for all program partners
• an ability to negotiate program changes.

Collecting information to measure performance during program implementation and following completion provides a basis for identifying needs and opportunities for evaluation and policy review (Commonwealth of Australia and State of NSW 2003a and 2003b). Evaluation of this information provides a tool for managing adaptively over the entire program, policy and planning cycle.

Adaptive management processes in an evaluation plan could include regular collection of information to measure performance, an internal evaluation process to review performance during a program, and specified triggers for further action or investigation. These processes could highlight the appropriateness of performance measures and identify any gaps in performance information and unexpected or undesired results (Commonwealth of Australia and State of NSW 2003a and 2003b). This prior warning of potential problems allows program implementation to be adjusted and greater success in meeting program objectives and targets.

‘Developing and sharing information’ (www.environment.nsw.gov.au/resources/4cmas/0947devshareinfo.pdf) has more on adaptive management.

Relationship between different reporting requirements

A review of external and internal drivers for evaluation shows that many have common elements.

Careful consideration of how reported information is used in decision-making at each NRM scale will enable the development of information which contributes to understanding at all levels of NRM. A nested approach to evaluation will allow efficient and cost-effective use of information for reporting and decision-making.

Table 1 summarises the use of findings from an evaluation program at different scales and for different levels of decision-making.

<table>
<thead>
<tr>
<th>Example of how whole-of-CAP or funding model evaluation information may be used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National</strong></td>
</tr>
<tr>
<td>High-level decision-making</td>
</tr>
<tr>
<td>Performance improvement</td>
</tr>
<tr>
<td>Accountability</td>
</tr>
</tbody>
</table>
Evaluation framework for CMA natural resource management

<table>
<thead>
<tr>
<th>State</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level decision-making</td>
<td>State makes decisions about state-CMA model and priority state</td>
</tr>
<tr>
<td></td>
<td>NRM asset management (state-wide targets)</td>
</tr>
<tr>
<td>Performance improvement</td>
<td>State makes decisions about how best to deliver the CMA-state</td>
</tr>
<tr>
<td></td>
<td>programs to achieve progress towards meeting state-wide targets</td>
</tr>
<tr>
<td>Accountability</td>
<td>State makes decisions about the efficient use of current program</td>
</tr>
<tr>
<td></td>
<td>funds to achieve state-wide targets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regional</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level decision-making</td>
<td>CMAs make decisions about CAP targets and strategies to achieve</td>
</tr>
<tr>
<td></td>
<td>the targets in the State Plan</td>
</tr>
<tr>
<td>Performance improvement</td>
<td>CMAs make decisions about how best to deliver programs to</td>
</tr>
<tr>
<td></td>
<td>achieve CAP targets</td>
</tr>
<tr>
<td>Accountability</td>
<td>CMAs make decisions about efficient delivery of investment</td>
</tr>
<tr>
<td></td>
<td>strategies</td>
</tr>
</tbody>
</table>

The monitoring and evaluation which support reporting requirements will need to be considered, planned and implemented to allow multiple reporting deadlines to be met. For example, reporting annual progress toward catchment and state-wide targets will only be possible if implementation activities are monitored or recorded throughout the year.

**Identifying stakeholders**

Identifying and consulting with stakeholders early in the planning stage of an evaluation will have major benefits for the overall delivery of the evaluation.

Stakeholders are individuals or organisations (including possibly some within the CMA) with an interest or stake in the program or project. They may be either directly involved or indirectly associated with the program or project (Table 2).

**Table 2: Possible CMA stakeholders**

<table>
<thead>
<tr>
<th>Description of likely stakeholder group</th>
<th>CAP examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clients of the program:</strong> Target groups which benefit from the program</td>
<td>Receivers of incentive payments or grants</td>
</tr>
<tr>
<td>directly or program funders</td>
<td>Commonwealth Government</td>
</tr>
<tr>
<td></td>
<td>State Government</td>
</tr>
<tr>
<td><strong>Managers of the program:</strong> Those making decisions about delivery of the</td>
<td>CMA management team</td>
</tr>
<tr>
<td>program</td>
<td>CMA board</td>
</tr>
<tr>
<td><strong>Parties with an interest in the program:</strong></td>
<td>Farmers Federation</td>
</tr>
<tr>
<td>May include advocacy groups or government agencies</td>
<td>Community environment groups</td>
</tr>
<tr>
<td></td>
<td>Local indigenous groups</td>
</tr>
<tr>
<td></td>
<td>CSIRO</td>
</tr>
<tr>
<td></td>
<td>Department of Environment and Climate Change</td>
</tr>
<tr>
<td></td>
<td>Local government</td>
</tr>
<tr>
<td><strong>Outside the program but affected by it:</strong></td>
<td>General community individuals or groups not receiving incentives</td>
</tr>
</tbody>
</table>
Evaluation framework for CMA natural resource management

It is important to understand the roles that stakeholders may play so that their expectations are managed through the evaluation process. Importantly, there should be no surprises at the end of the process as this may derail how evaluation findings are reported or used.

The stakeholders that are directly related to an evaluation are:

- those who commission the evaluation – they may also provide resources to enable the evaluation to occur
- those who undertake the evaluation
- the users of the evaluation information
- those affected by the findings.

Sometimes these roles overlap. For example, the commissioner of the evaluation may also be the audience for the evaluation findings.

Another important distinction is that the users of the evaluation information are often different from those who are affected by the evaluation findings. For example, the CMA board may be the users or audience of an evaluation finding that recommends that more benefit can be achieved if the priority areas for salinity investment are changed. This may in turn mean that some previous recipients of salinity incentives are ranked lower during the incentive process than on previous occasions.

Consideration of how to manage the evaluation for those people who may be affected by the findings needs to be undertaken during all stages of the process.

The defining stakeholder needs template, provided as an evaluation tool (www.environment.nsw.gov.au/4cmas/evaltools.htm), enables an analysis of potential issues and needs. How these will be managed through the evaluation should be documented in the evaluation plan.

Defining the type of evaluation

It is important to define the type of evaluation that can reasonably be undertaken as this will help focus the evaluation by:

- ensuring the essential elements of the evaluation have been considered and agreed to
- managing expectations about what the evaluation will deliver
- providing a basis from which the evaluation design and information needs can be defined and implemented
- ensuring reporting requirements are met.

For the purposes of the framework, there are three key types of evaluations as suggested by DIPNR (2004) and Department of Finance (1994):

- Appropriateness evaluations – An evaluation that assists in deciding the need for, and nature of, a proposed new program. May not only be applied at planning stage but over the life of a longer term program, particularly if the political, economic, environmental or social context changes.
- Efficiency evaluations – Evaluates the inputs and processes used to produce the outputs of a program. Is undertaken to identify whether implementation is occurring appropriately, i.e. using the best available methods in priority locations with consideration of scale and recognising climatic and timing requirements. Will be undertaken throughout the life cycle of the program.
**Effectiveness** evaluations – Examines extent to which program objectives or desired outcomes have been achieved. Will also measure factors that affect achievement and establish relationships between program implementation and measured outcomes. These evaluations are usually conducted when a program is well established.

An additional type of evaluation – **cost-effectiveness** – compares inputs with outcomes in financial units. This is not discussed in the framework as it was not identified within the bilateral agreement or the NSW Monitoring and Evaluation Implementation Plan as a required evaluation for CMAs.

Figure 1 illustrates how the three different evaluations relate to the whole-of-CAP cycle. Note that the cycle presented can be adjusted to represent a project cycle. From this figure the types of comparisons that can be made and the relevance of timing for the type of evaluation become clearer. These issues are discussed further in the design for each of the evaluations.

**Figure 1: Relationship between the CAP cycle and the different types of evaluation (adapted from Funnell 2000)**

Questioning key stakeholders, particularly those that will use the information or those that have commissioned the evaluation, can help evaluators decide the type of evaluation they should use. Table 3 presents typical questions that could be asked. These questions should also be considered by the evaluator when they are reviewing background material associated with the drivers for the evaluation, such as legislation, bilateral agreements, etc.
### Table 3: Questions to help define the type of evaluation required

<table>
<thead>
<tr>
<th>Question</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose of evaluation:</strong> What is the purpose of the evaluation?</td>
<td>The following possible reasons for an evaluation should be considered:</td>
</tr>
<tr>
<td></td>
<td>• improvement: refining an existing program</td>
</tr>
<tr>
<td></td>
<td>• accountability: regular monitoring to report to ‘investors’ or managers</td>
</tr>
<tr>
<td></td>
<td>• measuring progress towards objectives/outcomes: meeting reporting requirements or determining the continuation of a program or adoption of the program into other programs</td>
</tr>
<tr>
<td></td>
<td>• program development: information to help design a program.</td>
</tr>
<tr>
<td><strong>Extent of implementation:</strong> What stage of implementation has the project or program reached?</td>
<td>Projects or programs under evaluation will vary in implementation from conceptual stage to having been in place for a while with no modifications. It is important to understand what stage the program in question has reached.</td>
</tr>
<tr>
<td></td>
<td>For example, a program that has only just been implemented cannot legitimately be evaluated against its long-term outcomes but an evaluation that recommends what needs to be implemented to enable this to happen could be undertaken.</td>
</tr>
<tr>
<td><strong>Focus of evaluation:</strong> What aspect of the project or program should the evaluation focus on?</td>
<td>Determine whether the people commissioning the evaluation want to focus on one or more elements of a program, such as:</td>
</tr>
<tr>
<td></td>
<td>• environmental, social, economic or political needs under which a program is being developed</td>
</tr>
<tr>
<td></td>
<td>• adequacy of design</td>
</tr>
<tr>
<td></td>
<td>• method of program delivery</td>
</tr>
<tr>
<td></td>
<td>• outcomes (or targets).</td>
</tr>
<tr>
<td><strong>Timing of evaluation:</strong> At what stage during the project or program should the evaluation occur?</td>
<td>Consider the temporal links between the evaluation and program delivery, i.e. should the evaluation occur before/during/after/towards the completion of the program?</td>
</tr>
</tbody>
</table>

Table 4 illustrates some typical responses to the above questions for each of the evaluation types (adapted from Owen 1993). A similar table, together with the defining evaluation type template, is provided in the [evaluation tools](https://www.environment.nsw.gov.au/4cmas/evaltools.htm).
Table 4: Common considerations in determining evaluation type

<table>
<thead>
<tr>
<th></th>
<th>Appropriateness</th>
<th>Efficiency</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of evaluation</td>
<td>Program planning</td>
<td>Accountability</td>
<td>Progress towards outcomes (targets)</td>
</tr>
<tr>
<td></td>
<td>Ongoing relevance for longer term program</td>
<td>Program improvement</td>
<td></td>
</tr>
<tr>
<td>Extent of implementation</td>
<td>None</td>
<td>Program in place/established</td>
<td>Program well established</td>
</tr>
<tr>
<td></td>
<td>Long-term program with no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus of evaluation</td>
<td>Context</td>
<td>Adequacy of design</td>
<td>Outcomes and delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methods of delivery</td>
<td></td>
</tr>
<tr>
<td>Timing of evaluation</td>
<td>Before program implemented or approved</td>
<td>During implementation</td>
<td>Program end or after completion Mid-term if long program</td>
</tr>
</tbody>
</table>

Understanding the logical framework

Understanding the logic of a CAP is a critical early stage in the evaluation process as it quickly clarifies outcomes and their intent and also defines the expected relationships between investment, outputs and outcomes. Program logic can be used both as a planning and evaluation tool. This section describes the program logic framework and how it can be applied by CMAs to their whole of CAP or projects and programs within the CAP.

Components of a program logic framework

CAPs are complex plans which detail catchment and management targets for natural resource assets within a CMA area. In combination with an investment strategy, they cover the strategies, activities and investment to achieve these targets. A program logic framework makes use of conceptual models, results hierarchies and program logic tables.

Ideally, the conceptual model or issue identification and results hierarchy are developed at the planning stage so that a common understanding of the CAP is achieved and effort for both investment and evaluating performance can be strategically focused.

Frequently the results hierarchy can be developed against an existing plan or program. This provides an opportunity to determine whether the original plan was ‘logical’ and enables adjustments to be made. If the plan cannot be adjusted, the differences in logic should be noted as this will enable later review of targets as well as evaluation of progress towards targets.

The components of a program logic framework are:

- **Conceptual models** which are used to analyse a problem: The process uses existing knowledge and information about the different assets. It enables an expression of the current state of these and the threats or pressures they are experiencing. The models may be expressed in different ways, but each provides a summary of the problem.

- **A results hierarchy** is a summary of the expected linkages required as a response to the problem analysis: The process builds on the understanding gained from the conceptual model. The results hierarchy illustrates the proposed inferred relationships between the elements of a program; it does not list activities of the program.
A **program logic table** identifies assumptions and factors of success that will help point to specific evaluation questions for the type of evaluation required. The table then helps the evaluation team identify its information needs.

The benefits of using the components of a program logic framework include:

- common understanding of the current condition and pressures on a resource
- opportunity to identify new information and understanding that can assist the evaluation process
- consensus on catchment targets and the strategies required to achieve those targets
- opportunity to identify priority projects for further investigation as part of an evaluation process
- identification of those factors that may be outside the control of a CMA but which affect its ability to achieve CAP objectives
- forms part of the reporting process to demonstrate progress towards long-term outcomes
- commences the process to define specific evaluation questions and information needs to address these questions
- an easy-to-read summary of complex programs.

Conceptual models, results hierarchies and program logic tables help define the evaluation questions and are revisited and tested during the evaluation process. Ideally they are applied collaboratively during the development of a plan or project. They can also be used at other scales, such as for project-scale evaluations. See the examples of both project-scale evaluation and CAP theme-scale evaluation and their associated program logic provided.

The three components of the program logic framework are described in more detail below.

### Conceptual models

Conceptual models are used in natural resource management to describe processes that are occurring or thought to occur within a landscape. They are often used to illustrate a perceived or actual interaction between society and the environment. The models may be narrative, tabular or diagrammatic. The diagrammatic models range from a simple two-dimensional sketch of a particular site or issue to a more complex three-dimensional catchment illustration that uses symbols to describe the different processes and challenges within the catchment. In many cases, textual models have been developed to inform CAP development and in their background documents.

While it is important to choose the form of conceptual model that suits the purpose, most users respond better to a visual summary as there is often too much information to digest in a narrative or tabular format. In addition, a diagram can be used as an information tool in pamphlets or project plans as part of a consultation process.

Conceptual models have many uses in NRM:

- They provide a tool for better understanding and communicating difficult management issues.
- They describe a potential issue or interaction within a landscape that can then be investigated or tested.
- They provide the first step in the development of a quantitative model or monitoring program.
The starting point for developing a conceptual model can easily be based on a pressure-state-response (PSR) model.

Figure 2 is an example of a pressure-state-response model applied to an estuary. Through existing knowledge and a participatory approach, the current resource condition of the catchment is defined and the likely pressures that have resulted in that state defined through simple diagrams.

**Figure 2: Pressure-state-response model applied to an estuary**

Figures 3 and 4 illustrate a simple conceptual model and a more detailed model. The diagrams can be drawn to reflect as much or as little detail as needed to illustrate the main issues.

**Figure 3: A simple conceptual model**
Ideally, the development of conceptual models will occur during the CAP planning phase, as it provides the basis for the CAP by highlighting resource conditions and pressures. The results hierarchy and program logic are also planning tools for the CAP but are more of a summary of what the CAP is proposing – in other words, the response.

Both of these tools are often applied after a program is developed. If it is found that the logic is not clearly expressed through the CAP, it is important to document differences and understand why they exist (e.g. social pressures may have required different priority responses) and then test these as part of the evaluation process.

There are numerous examples of the application of conceptual models in NRM. Two examples are the Healthy Waterways program for Moreton Bay Catchment in Queensland (Healthy Waterways Program 2002) and a study of the Wallis Lake catchment (CSIRO 2003).

**Practical development of conceptual models**

The use of conceptual models serves numerous purposes in relation to CAPs:

- They identify the link between a CAP and the current understanding of catchment issues. This interpretation will also determine investment priorities and assist in setting targets.
- They help to identify monitoring needs as part of the evaluation design.
- They form one of the analytical tools for the evaluation and can be reviewed in light of information collected over the investment period.

MER theme working groups have been established to develop and implement monitoring, evaluation and reporting systems to meet the requirements of the NSW Natural Resources Monitoring, Evaluation and Reporting Strategy (DNR 2006) and the NSW State Plan (NSW Government 2006). These working groups will be developing generic conceptual models for each of the themes addressed by the state-wide targets.

However, while they are a reasonable starting point, scientists experienced in using conceptual models in NRM indicate that generic models have limitations when used in specific situations (Dr Graham Harris, CSIRO, pers. comm. 2006). It is therefore recommended that each catchment or issue is dealt with on a case-by-case basis. Other
experience indicates that the documentation or evidence that supports the conceptual model should be referenced with the model. An internationally recognised example of the development of conceptual models is available from the International Union for Conservation of Nature at [data.iucn.org/dbtw-wpd/edocs/PAG-014.pdf](http://data.iucn.org/dbtw-wpd/edocs/PAG-014.pdf).


**Results hierarchy**

A results hierarchy (often referred to as ‘logical’ or ‘outcome’ hierarchy) is an analytical tool that assists with understanding how a plan, program or project works by describing the likely relationships between the different phases of a program.

A results hierarchy assumes that implementing the inputs will lead first to outputs, then to outcomes, and ultimately to higher outcomes. A CAP has two outcomes: catchment targets (longer term outcomes) and management targets (intermediate outcomes). It also highlights management actions that will be implemented to achieve these targets and result more directly in tangible outputs, e.g. kilometres of riparian fencing.

Figure 5 illustrates how the simple results hierarchy applies to CAP elements and the Commonwealth Government’s (draft) NRM Monitoring, Evaluation, Reporting and Improvement (MERI) Framework.

While Figure 5 outlines the simplest results hierarchy, the reality of NRM programs is that the relationships and links are usually much more complex. Rogers (2008) identifies that increased complexity may occur when:

- management of a resource or location falls within the responsibility of several organisations or land managers
- simultaneous strands mean all expected causes of impact must be addressed for the investment to succeed
- there are alternative strands where an impact can be addressed by either path.

![Figure 5: Application of the simple evaluation results hierarchy to CAPs and the national MERI Framework](http://example.com/figure5.png)
A simple version of a results hierarchy is useful as a communication tool when describing the program or the evaluation process but it is important for the evaluation team to understand the complexity that may sit behind this.

See the examples of project-scale evaluation and CAP theme-scale evaluation for simple and more complex results hierarchies.

**Using logic to help define targets**

The process of collaboratively developing the conceptual models and results hierarchy will assist in reaching consensus on management and catchment targets. The actual target definition within the management targets (e.g. 80% by 2015) and, to a lesser extent, the catchment targets can then be developed on the basis of priorities, known costs for the work required and known investment values.

**Program logic table**

The results hierarchy can be presented within a program logic table which is a tool that summarises information about a program in tabular form. Once the logical hierarchy has been developed and the key points identified, the parts of the hierarchy that form the focus for the evaluation can be summarised in a program logic table.

Not all management actions are presented in a program logic table but the management actions that are considered the most critical in achieving the targets should be included.

All CMAs, for example, need to undertake a mid-term effectiveness evaluation for their CAP. Once the results hierarchy has been completed for all the themes in a CAP, a CMA may wish to ensure that the monitoring needs are defined and implemented for the mid-term review before the monitoring needs for other evaluations are defined.

A logic table incorporates information on each level of the results hierarchy. Information that can be included, such as planned results, success factors, performance information, and benchmark internal and external risks and assumptions, is shown in the constructing a program logic table template in the evaluation tools (www.environment.nsw.gov.au/4cmas/evaltools.htm). However, many different formats can be used and a wide range of information recorded to illustrate the logic of a program.

Program logic that is appropriate to the purpose it addresses should be developed. Some CMAs use an Excel spreadsheet to record, in a single file, all of the information relevant to each level of the logic table. This acts as a ‘master’ record and allows information relevant to each purpose to be accessed when required.

Evaluations are a process of comparisons, such as the broad question: ‘Are we meeting our catchment targets?’ It is important, however, to narrow the evaluation to specific comparisons. Without asking specific questions, it will be harder to define the monitoring needs required and the risk of an unfocused evaluation increases. Therefore, a theory approach is used to describe the success factor at each level within the program logic table with the intention of providing the specificity required.

This approach enables the monitoring required for evaluation to be more focused and cost-effective. Once completed, the information in the program logic table can be used throughout the evaluation processes to decide:

- evaluation questions
- what processes need to be examined for each type of evaluation
- information needs
Evaluation framework for CMA natural resource management

- performance measures
- information collection methods
- information management requirements
- information analysis methods.

Figure 6 describes each column within the program logic table, which is provided in the constructing a program logic table template in the evaluation tools (www.environment.nsw.gov.au/4cmas/evaltools.htm).

Development of the logical framework is best undertaken collaboratively by a team. The make-up of the team will depend on the topic. The advantages of a collaborative approach include:

- an increasing awareness of evaluation and involvement in the evaluation process
- ability to draw on others’ knowledge
- important debate and negotiation that will enhance the final product.

Key elements of the debate should be documented as it is possible new information or relevant catchment studies may be identified in the process.

**Figure 6: Components of a program logic table (adapted from Funnell 2005)**
References


CSIRO 2003, Seagrass change assessment using satellite data for Wallis Lake, NSW, A consultancy report to the Great Lakes Council and Department of Land and Water Conservation, CSIRO Land and Water, Canberra.


DIPNR 2004, NSW Monitoring and Evaluation Implementation Plan for NHT extension and NAP, Department of Infrastructure, Planning and Natural Resources, Sydney.

DNR 2006, NSW Natural Resources Monitoring, Evaluation and Reporting Strategy, NSW Natural Resources and Environment CEO Cluster Group, Department of Natural Resources, Sydney.


Funnell, S 2005, ‘What can we learn?’ presentation to CMA workshop, 2 August, Sydney.

Harris, Dr G, CSIRO 2006, personal communication during development of Seagrass change assessment using satellite data for Wallis Lake, NSW, CSIRO 2003.


Owen, John M 1993, Program evaluation forms and approaches, Allen & Unwin Pty Ltd, St Leonards.

3. Evaluation design

<table>
<thead>
<tr>
<th>Key information in this section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design criteria for evaluations</td>
</tr>
<tr>
<td>Information requirements including using multiple lines and levels of evidence</td>
</tr>
<tr>
<td>Identifying performance measures</td>
</tr>
<tr>
<td>Using an evaluation panel</td>
</tr>
<tr>
<td>Developing an evaluation plan</td>
</tr>
</tbody>
</table>

Evaluation design is concerned with the detailed planning of the evaluation. It builds on the evaluation context to specifically identify practices, processes, timing and responsibilities for completing an evaluation. The detailed information gathered at this stage can be compiled into an evaluation plan for the particular type of evaluation and contribute to the portfolio of evaluations discussed below.

No single evaluation design applies across all evaluations. The design will depend on the evaluation context documented by the evaluation team, time constraints, existing information and the resources available.

**Evaluation design criteria**

Information collated when determining the scope of an evaluation can be used to help define evaluation design issues. All design options have strengths and weaknesses when considered in the context of specific evaluation requirements. Criteria which could be relevant when considering the design of an evaluation are:

- relevance to the evaluation purpose
- cost-effectiveness
- validity of the information
- ethical issues around how the information is to be used.

The evaluation team should be conscious that, as more information becomes available or gaps are identified, the original design may need to be adjusted.

Evaluation design issues relating to each of the three types of evaluation are discussed in:

- [Design for appropriateness evaluations](www.environment.nsw.gov.au/resources/4cmas/08640appevaldesign.pdf)
- [Design for efficiency evaluations](www.environment.nsw.gov.au/resources/4cmas/08641efficevaldesign.pdf)

**Information requirements**

Evaluations will use both existing and new information in their assessment of a project or program.
The earlier work in defining the evaluation context will determine the evaluation type (or combination of types) required. From this information and using the above design criteria, an evaluation team can start to define the methods needed.

It is most likely that a combination of methods will mean a mix of qualitative and quantitative information will be analysed. This is often referred to as a ‘mixed method’ approach to evaluation and a combination of both sets of information may lead to a richer base of evaluative information.

Types of information in a mixed method approach

**Descriptions** illustrate or describe what is happening in the program. Examples include:

- the process used to deliver an incentives program
- the outputs from the program
- what may happen to incentive recipients after they complete their obligations under the program.

**Judgements** are made when a program’s performance is being compared with standards, targets or benchmarks. Examples include:

- an NRC audit report against the State-wide Standard for NRM
- progress towards catchment targets.

**Interpretations** are based on inferred relationships and used to explain whether the measured outcomes of a program can be attributed to the program.

An evaluation may draw on a mix of these different information types. A simple example could be descriptions of outputs from a riparian incentive program. Descriptions of downstream sediment loads would be combined with knowledge from previous riparian management studies and literature to interpret the relationship between the incentive program and water quality outcomes measured downstream.

While it is not important to specifically classify information into the types described above, it is important to understand the roles different information types play and how most evaluations will draw on multiple lines of information from each.

Using multiple lines and levels of evidence

With an understanding of the types of evaluation designs and the diversity of activity and complexities associated with a CAP, it is obvious that no single source of evidence or analytical design will be able to address all evaluation issues. Multiple lines and levels of evidence (MLLE) is the evaluation method recommended for CAP evaluations because it can infer relationships using various sources of information, existing or new, based on an assessment against criteria.

MLLE was first proposed by Hill (1965) in the medical field and has since been used in human and ecological risk assessments (Culp et al 2000; Fairbrother 2003). It is now being adapted for NRM (Adams 2003; Young et al 2006).

The MLLE framework uses information from a variety of sources. This is first assessed against criteria and then combined to address evaluation questions. Table 1 defines the lines and levels of evidence and provides examples of each.

Multiple sources of evidence can be used to address an evaluation question. Evidence sources are generated from existing data or information or new data or information created for the
evaluation. From a cost-effective perspective, existing sources should always be reviewed first. If the weight of evidence is insufficient, new data sources should be sought.

Table 1: MLLE framework components and examples relevant to a CAP

<table>
<thead>
<tr>
<th>Framework component</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple levels of evidence</td>
<td>Criteria used to determine confidence or strength of inference that the information can address the evaluation question. Sometimes referred to as ‘weight of evidence’.</td>
<td>Is the response of riparian management specific to CMA catchments? Is the response to good riparian management consistent?</td>
</tr>
</tbody>
</table>

Examples of existing data sources are detailed in Table 2 while Table 3 lists examples of new data sources.

Table 2: Examples of existing data sources

<table>
<thead>
<tr>
<th>Potential existing sources</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment target performance measures (PMs)</td>
<td>The resource condition performance measures are considered 'existing sources' as they are required by the intergovernmental agreement and monitoring and reporting systems should be in place. In addition, some catchment PMs may use data from programs with state-wide targets. At a catchment scale, these state monitoring programs may need to be supplemented with additional data. PMs compared with targets will provide a description of the condition of the resource and a judgement about how it is performing against the catchment target. This information alone will not allow for cause-and-effect inference between investment and catchment target.</td>
</tr>
<tr>
<td>Published literature</td>
<td>Common source of evidence Review that identifies scientific evidence for a link between an issue or action and its response Review needs to consider the applicability of the findings to the CMA’s landscape and natural resource management issues.</td>
</tr>
<tr>
<td>Existing catchment reports</td>
<td>As with published literature, but more relevant to the catchment concerned</td>
</tr>
</tbody>
</table>
### Evaluation framework for CMA natural resource management

#### Potential existing sources

<table>
<thead>
<tr>
<th>Potential existing sources</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMA annual reports and annual implementation plans, CAP and investment strategy</td>
<td>Investment trends provide information on outputs achieved for the investment and links to catchment and management targets. Analysis of this information in a program logic framework particularly provides information on the efficiency and effectiveness of a CAP.</td>
</tr>
<tr>
<td>Scenario modelling (if already exists)</td>
<td>The use of existing well-calibrated scenario models can predict resource condition that results from the implementation of management actions.</td>
</tr>
<tr>
<td>CAP project reports or LandCare group diaries, etc.</td>
<td>The management of this quantitative and qualitative information so that it is easily accessed and reviewed could also assist in evaluations against the management outputs and management targets. At a CAP scale it will be important to review the results hierarchy and evaluation questions to determine which projects to focus on. Information from projects may also supplement case studies. The Hunter–Central Rivers CMA publication <em>Keeping a project journal</em> (Wark 2005) is aimed at LandCare group projects. Review of this information may be used with case studies or information on barriers or relevant monitoring.</td>
</tr>
</tbody>
</table>

![](image)

#### Table 3: Examples of new data sources

<table>
<thead>
<tr>
<th>Potential new sources</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case studies</td>
<td>Case studies provide an in-depth understanding of a single issue or case and its likely relationships to actions. Case studies use a variety of methods to collect data, focused on the particular questions being investigated by the case. May range in complexity and be unnecessarily resource-intensive if not well designed.</td>
</tr>
<tr>
<td>Scenario modelling (if new work)</td>
<td>Resources are required to develop and validate a model which can predict the resource condition that results from the implementation of management actions.</td>
</tr>
<tr>
<td>Surveys or interviews</td>
<td>Surveys can range from highly structured questionnaires to non-directive interviews. Can provide qualitative and quantitative information from stakeholders depending how they are designed.</td>
</tr>
<tr>
<td>Externalities</td>
<td>Activities that are outside the control of the CMA but may impact (positively or negatively) on the ability to achieve the management and catchment targets. Externalities are identified within the program logic tables. Important to identify early, but only monitor if other levels of evidence indicates the need.</td>
</tr>
</tbody>
</table>
The type of evaluation will determine the lines of evidence (including constraints) that will need to be sourced for the evaluation. Some of the analytical tools or methods that may be used are then applied before bringing the different lines of evidence to the table for assessment against the evaluation questions posed. Some of these evaluation analysis tools available are detailed in the evaluation tools (www.environment.nsw.gov.au/4cmas/evaltools.htm). This list is not intended to be definitive but provide a starting point to the range of tools available.

**Using MLLE early to determine monitoring needs**

It is important that the strength of inference from existing information sources is understood as early as possible in the CAP implementation phase. For example, assuming strong lines of evidence from literature and past catchment studies on the benefits of stabilisation and revegetation of highly erodible soils may reduce the need to monitor other data sources. This will free up expenditure which can be used to gather new data on other catchment targets as required.

Initial application of the lines of evidence criteria is recommended as part of a gap analysis when determining monitoring needs. This would be undertaken by:

- determining context and specifically confirming the types of evaluation to be undertaken
- defining key evaluation questions and information needs
- collating existing information
- reviewing existing information against lines of evidence with an evaluation panel to determine confidence in the available information to inform the evaluation questions
- documenting this process
- determining how best to address any information gaps and implementing programs.

**Considerations when applying MLLE**

Young et al (2006) identified numerous issues to be considered when using the MLLE framework. These have been adapted below for application to the CAP process.

**Clearly defined evaluation questions:** If the question in the program logic table is too broad, the existing sources of data may not be specific enough to enable rigorous application to the criteria. This may also increase unnecessary investment in new data sources when a more clearly defined question would have avoided extra costs.

**Determining which literature or studies are relevant to the questions:** This does not mean that only literature that supports a positive answer to the question is sought. It is important to consider both sides. The issue is about being able to use the literature in the context of the specific landscape or application. The use of the literature should be documented, as well as the reasons why it was chosen.

**Criteria to inform interpretation:** The strength of the evidence provided by collated existing and new data needs to be assessed against each evaluation question. Table 4 presents recommended criteria for assessing relevance of evidence (adapted from Chessman 2005; Downes et al 2002; Young et al 2006).
### Table 4: Criteria for assessing relevance of evidence

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Question posed by criterion</th>
<th>Example of response to criterion from different lines of evidence*</th>
</tr>
</thead>
</table>
| Credible linkage                 | Is the evidence relevant to the issue, i.e. is this evidence expected in the study area?    | Literature (references) demonstrates there is a relationship between improved riparian management (activity) and sediment nutrient fluxes (response) of waterways.  
Local catchment studies (referenced) support the findings of the above literature.  
Performance measure monitoring for catchment targets is consistent with investment trends and outputs for riparian management. |
| Presence of a response           | Is there a reliable explanation for the evidence in the study area?                         | Performance measure monitoring for catchment targets linked to SedNet scenario modelling within a case study provides evidence for the management of sediments and nutrients within the catchments.  
Performance measure monitoring for catchment targets is consistent with investment trends and outputs for riparian management for those estuaries.  
Reported catchment investigations for like systems. |
| Evidence of ‘intervention-response’ relationship with activity | Is this evidence likely only under different spatial or temporal situations?                | Performance measure monitoring for catchment targets is consistent with investment trends and outputs for riparian management.  
SedNet scenario modelling highlights how the application of relevant management actions in priority catchments will have the greatest reduction in sediment inputs to estuaries.  
Performance measure monitoring for catchment target linked to SedNet scenario modelling within a case study provides evidence for management of sediments and nutrients within the catchments. |
| Consistency of association       | Does the expected response always occur in the presence of the activity?  
Is there a credible linkage between intervention and response? | Performance measure monitoring for catchment target linked to SedNet scenario modelling within a case study provides evidence for management of sediments and nutrients within the catchments.  
Performance measure monitoring for catchment target in particular estuaries is consistent with investment trends and outputs for riparian management. |
| Consistency                      | Are there consistent findings across different lines of evidence?                          | All lines of evidence tested against criteria and show consistent findings.                                                      |

* This column provides an example only of how existing and new sources of information may be used with the criterion.
**Identifying performance measures**

Performance information needs have been recorded in the program logic table. The measures used may be broad and combine several indicators. Running monitoring programs across all of these would be costly and so criteria are used to decide which will be the most appropriate to use. This is particularly the case with performance measures against high-level and intermediate outcomes.

When identifying specific performance measures from a large number of possibilities, it is important to select measures that are reliable and will meet the performance measurement needs of the project or program now and into the future. The practicality of using measures should also be considered.

A template for identifying performance measures is available in the [evaluation tools](http://www.environment.nsw.gov.au/4cmas/evaltools.htm).

**Using an evaluation panel**

Use of an expert evaluation panel is recommended for significant evaluations. It allows a wide range of expertise to be brought together to assess available information and develop findings and recommendations.

The size of the panel and the multi-disciplinary nature of expertise needed will depend on the evaluation being undertaken. For example, a wide range of internal and external expertise would be appropriate for an effectiveness evaluation of CAP targets. A smaller panel with a shorter operational time frame may be appropriate for an annual review of the performance of the investment strategy and may involve a cross-section of people from the investment, operations and planning areas of a CMA.

Benefits of using a representative and well-run evaluation panel include:

- A panel brings together a range of views, experiences and knowledge for making judgements on the evaluation information.
- A panel develops valid and defensible judgements or conclusions.
- It develops or enhances networks and knowledge for the CMA.
- An evaluation panel is a more cost-effective approach than outsourcing the whole evaluation, due to the contribution from the CMA and its local knowledge. It is also more likely that the CMA will have greater ownership of the results and the adaptive management processes.
- The panel process will bring together local and internal knowledge through CMA contributions as well as broader experience and knowledge.

[Establishing an evaluation panel](http://www.environment.nsw.gov.au/4cmas/tipsevalpanel.htm) has advice on setting up and supporting an expert body.

**Developing an evaluation plan**

An evaluation plan should be developed to outline and map the requirements and implementation of each evaluation process. Whether an evaluation process is being designed to address the needs of a CAP evaluation or those of a small project, the dimensions of the plan will be similar. The size and relevance of the evaluation will influence the detail within the plan.
Portfolio of evaluations

A number of CMAs are considering the model of a high-level evaluation plan or strategy supported by more detailed planning information for evaluations. This approach involves a relatively brief planning document which could refer to the detailed evaluations to be undertaken to support the catchment and management targets and assess major projects.

Example: High-level evaluation plan for Murray CMA

The Murray CMA is developing a high-level evaluation plan or strategy to identify the broad MER requirements, roles and responsibilities for its CAP. It will identify the major types of evaluations required by drivers and stakeholders, their timing and broad requirements.

A brief planning document will refer to the detailed evaluations that have to be undertaken to support the catchment and management targets and assess major projects. The plan will be used as a tool to communicate evaluation issues, inform project management and support any funding bids. It will detail a hierarchy of evaluations which together cover the detailed planning of all required evaluations.

The evaluations that sit under this strategy could be brought together as they are developed to form a ‘portfolio’ of evaluations. It is important to keep this portfolio manageable to begin with and let it grow as required.

The evaluation plans that sit under the evaluation strategy would then be more flexible documents that represent a lot of the project planning and specific details required to undertake those evaluations.

Once a portfolio of evaluations is established, it will continue to evolve and provide detail of the thinking behind the evaluations. It will also be a resource to inform future development of evaluations and plans.

Elements of an evaluation plan

An evaluation plan should be developed to meet the specific needs identified by each CMA. As such, plans are likely to differ to some degree from each other and also change over time as they evolve. Despite these differences, each evaluation plan should consider the principles and key elements of evaluation.

Part of the planning for an evaluation is the development and documentation of specific roles and responsibilities for players in the process. This includes:

- development of an evaluation team that meets regularly to discuss progress and issues – often an effective way to manage progress and develop skills
- bringing together people relevant to the subject of the evaluation
- negotiation of roles and responsibilities for team members for all elements of the evaluation within resourcing and timing constraints – this can be documented as part of the plan
- development of required communication and awareness strategies
- identification of any training needs for different elements of the evaluation, such as undertaking surveys, doing performance stories
- implementation of a means of reviewing progress against agreed tasks – this will vary in detail depending on the size of the evaluation.
Implementing an evaluation plan

An evaluation plan should be used to guide implementation of evaluation processes. It provides the detail of responsibilities, timing and processes for the evaluation team and so should be carefully managed:

- The plan should be regularly reviewed and adapted where necessary to reflect changes to projects or programs.
- Where changes occur, efficient distribution of the revised plan and communication changes in responsibilities or timing should be highlighted.
- Regular team meetings where issues or problems can be addressed will support effective evaluation processes.

Ensure the timely implementation of evaluation processes as detailed in the plan. In particular, the establishment of relationships to access and share information, identify sources of support and implement monitoring programs are critical to the effective gathering of information.

References


Wark, M 2005, Keeping a project journal, Hunter–Central Rivers Catchment Management Authority, Tocal.

Young, B, Nichols, S and Norris, R 2006, ‘Application of multiple lines and levels of evidence (MLLE) for addressing ecological questions of causality’, Australian Society for Limnology 45th Annual Conference, 25–29 September, Albury, NSW.
4. Developing and sharing information

<table>
<thead>
<tr>
<th>Key information in this section</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Analysing information to meet evaluation requirements</td>
</tr>
<tr>
<td>• Role of adaptive management in improving future NRM performance</td>
</tr>
<tr>
<td>• Reporting requirements for CMAs</td>
</tr>
<tr>
<td>• State-scale NRM reporting</td>
</tr>
<tr>
<td>• Learning from evaluations</td>
</tr>
</tbody>
</table>

Analysis of information

Information is analysed against the evaluation questions and should be considered during evaluation design. In particular, consider:

• what analysis will be required to answer the evaluation questions
• what expertise and tools will be needed to undertake analysis and the relevant process in the evaluation plan to develop or access that skill base
• whether synergies in information types or performance measures may be needed to develop meaningful analyses – include this in the information needs section of the evaluation
• what form of assessment will be used to reach precise findings and recommendations.

The specific analysis required will depend on the type of information being assessed. The evaluation tools (www.environment.nsw.gov.au/4cmas/evaltools.htm) contain a description of evaluation analysis tools which can be used in assessment.

For any evaluation, an understanding of the resource or theme under consideration will be invaluable, together with recently acquired knowledge in that field. Because of this, the use of a multiple lines and levels of evidence (MLLE) approach and an expert evaluation panel are recommended, particularly if the evaluation is associated with defining or reviewing targets. Organisation of these should be highlighted in the evaluation plan where necessary.

The recording assessment using MLLE criteria template is included as an evaluation tool (www.environment.nsw.gov.au/4cmas/evaltools.htm).

For smaller projects, simple analysis will be adequate and the process can be restricted to the CMA’s nominated project evaluation team.

Using evaluation findings

Adaptive management

Evaluation is not the end but the means by which informed decisions can be made about a program. Therefore, the greatest value that will come from investment in evaluation is the use of evaluation findings as part of an adaptive management framework.

Current reporting requirements for CMAs for each evaluation type are discussed later in this section.

Natural resource management (NRM) is based on an adaptive approach to resource planning, management and sustainable use of natural resources. The main issue is the complex nature of
resource management programs in achieving a balance between environmental, social and economic outcomes that are supported across different institutional arrangements. As well as these complex interactions are the spatial and temporal issues that influence resource management’s longer term targets.

Therefore, while a CMA may have legislative and contractual reporting requirements, this information can also be used to inform its own internal adaptive management processes. An implementation of reliable evaluation systems helps inform the adaptive management process. This may lead to:

- improved design using lessons learnt from evaluation to strengthen new implementation activities
- improved implementation using lessons learnt from evaluation to enhance the efficiency and effectiveness of new or revised implementation activities
- an ability to report change resulting from implementation, demonstrating returns from investment in NRM
- demonstration of the benefits of sustainable resource management in promoting current best practice.

Two critical elements are:

- giving consideration to the primary audience for the evaluation in the planning stages and how best to present the evaluation findings
- ensuring there is ongoing communication with key stakeholders so that by the time the evaluation is reported there are no surprises.

The evaluation system developed by each CMA should enable a systematic, strategic and transparent approach from which management and program management decisions can be made. An internationally recognised example of good adaptive management is available from the International Union for Conservation of Nature at data.iucn.org/dbtw-wpd/edocs/PAG-014.pdf.

**Reporting evaluation findings**

Reporting conveys information to assist in decision-making. As such, it is vital that the evaluation information presented is clear, concise and appropriate for the purpose of the communication.

A constant theme through a report will provide readers with an understanding of why the report has been written.

[Writing effective evaluation reports](www.environment.nsw.gov.au/4cmas/tipsevalreports.htm) has advice on preparing clear and concise reports.

**CMA reporting**

Some of the information required for evaluations will already be covered in accountability reports and many CMAs use this information as part of their review process.

CMAs should use their evaluation findings to make decisions on the performance of their programs. This includes both externally and internally driven evaluations.

Some of the many benefits from reporting evaluation findings include:

- transparency
- a demonstration to funding bodies of how the outputs of projects are leading to the targets
Evaluation framework for CMA natural resource management

- a way to communicate with the CMA community
- an assessment of the achievements of the CMA
- a demonstration of where change in management has been, or can be, made.

Communicating evaluation findings to different users will require information to be presented differently, depending on the primary audience.

**Specific reporting on appropriateness**

For external reporting, the first major appropriateness evaluation by CMAs is the initial development of the CAP. This may have been done informally but an assessment of the pressures on resource condition and the activities needed to manage for improvement is essentially an appropriateness evaluation. A report of this assessment is provided for each CAP. Further appropriateness evaluations will underpin the development of investment strategies and will be required during review of the CAP and later investment strategy development.

**Specific reporting on efficiency**

CMAs are not currently required to undertake external reporting of efficiency evaluations. However, some CMAs have already instigated a regular internal review and reporting procedure, which is proving valuable.

A simple internal efficiency review and reporting process at a project or program scale can enhance CMA performance. Answers to the following five basic questions could form the basis for evaluating and modifying practices to improve efficiency:

- What was done?
- What worked well?
- What did not work so well?
- What could be done differently next time?
- What action should be taken now?

Consideration of information compiled for accountability reporting could be considered during assessment of efficiency. CMAs complete accountability requirements through financial and milestone reporting biannually. These reports relate to the source of funds for each activity and include:

- funds spent during the reporting period
- anticipated expenditure (contingent liabilities) over the next reporting period
- additional funds required for disbursement from the Joint Steering Committee’s holding account to the CMA to cover contractual obligations over the following six months
- which milestones were achieved and in which quarter
- which milestones were not achieved
- any changes to milestones and delivery dates approved by the NSW and Commonwealth governments.

A partially populated report template for each activity is provided shortly to each CMA before the end of the reporting period.
Specific reporting on effectiveness

Reporting on the findings of effectiveness evaluations will inform progress toward meeting the objectives or outcomes of projects and programs. CMAs, their funding partners and other stakeholders will better understand the natural resources being managed and knowledge of management practices can be shared and improved. It will also enable lessons learned to inform CAP and implementation review and planning. CMAs are required to report on the effectiveness of their activities using the reports below.

Annual reporting

CMAs are currently required to provide annually a subjective score on effectiveness based on a rating developed by the Commonwealth agencies managing investment funds. This is not a true effectiveness evaluation but a determination of how a CMA believes it is putting processes in place to enable a more detailed evaluation to occur.

Mid-CAP and end-of-CAP reporting

Under current legislation and bilateral agreement, CMAs are required to undertake five-yearly mid-term and end-of-term reviews of the effectiveness of their CAP implementation.

State of the Catchment

State of the Catchment (SoC) Reports are being established to communicate changes in resource condition to the catchment community. Development of format, timing and a template for the reports is being led by NSW NRM agencies in collaboration with CMAs. The SoC will be a reporting vehicle for CMAs to inform stakeholders of progress toward CAP targets. CMAs will be responsible for publishing and distributing SoCs using information collected and developed by the state-wide monitoring, evaluation and reporting program and CMA regional programs.

Performance Story Reporting

Performance Story Reporting will be required by the Commonwealth agencies for NRM. The proposal for these reports identifies a need to give greater consideration to intermediate targets or management targets rather than only longer term catchment targets. The concept is that relevant lines of evidence are gathered from across the results hierarchy to evaluate progress towards catchment targets and that they are reported in an easily accessible format. This concept is currently being referred to as ‘performance stories’ which will be underpinned by the program logic framework and evaluation questions.

The following points highlight how a performance story might be developed using the tools within this framework:

- identify evaluation questions and information required to address these questions based on the logic
- using the MLLE approach described, monitoring programs for qualitative and quantitative information are implemented
- use an evaluation panel to test the information across the levels of evidence for each evaluation question
- the results of this panel process can be summarised in a Performance Story Chart.

A performance story should be documented based on the proposed layout in Figure 1.

**Reporting effectiveness at a state scale**

The results of monitoring natural resource condition will be reported at the state-wide scale by NRM agencies in the *NSW State of the Environment* report. The information reported will provide the broader context for CMA reporting and may be referenced to provide additional value or understanding of resource condition at the wider state-wide scale. However, to successfully achieve this, reporting for state-wide targets needs to adopt the following concepts:

- delivery of information on both resource condition and trend, as well as an indication of confidence around the information presented
- use of the pressure-state-response model in the framework, ensuring consistency with state of the environment reporting conventions
- the collection of indicators for four themes: biodiversity, land, water and socio-economics
- provision of opportunities for links to further information for those who want to explore the supporting information
- ability for users of the report to drill down to different levels of detail (e.g. state-wide targets, CMA) depending on needs
- delivery of information in an accessible manner using a combination of text, graphics and symbols
- a consistent look and feel of reporting documents for all CMAs and the state.

The state-wide reporting process does not aim to produce a technical report or evaluation report but to provide a summary of condition and trend at the state-wide target scale.
Learning from evaluations

Reflecting critically on what has been done in any program and learning from success and failure allows the identification and adoption of improved ways of doing things. This applies just as essentially to an evaluation process.

On completion of an evaluation, the evaluation process should be evaluated. This need not be arduous and as always the effort should reflect the significance of the evaluation. The simplest approach would be for the relevant people to discuss openly their responses to the following questions:

- What was done?
- What was done well and why?
- What could be done better and why?
- What could be done differently (and why) next time?
- How can what has been learnt be used next time?

For a more significant evaluation, a more rigorous review of the activities and processes of the evaluation should be undertaken. This may include considering:

- the tools and information used
- whether the evaluation questions were well-formulated
- if information management practices and processes were efficient
- whether the information that was generated answered the evaluation questions adequately
- whether there was sufficient NRM and evaluation capacity available to rigorously complete evaluation
- if the CMA officers involved in the evaluation found any problems with the evaluation process
- whether adequate information was developed to fulfil reporting requirements
- whether a formal process was used to enable evaluation findings to influence future practices.

Sometimes a CMA may seek external review of its evaluation design prior to implementation. This may be required if an evaluation is considered contentious, or complex, or requires significant new resources.

The conclusions from evaluation experiences should be documented and included in the portfolio of evaluations discussed in ‘Evaluation design’ (www.environment.nsw.gov.au/resources/4emmas/0946evaldesign.pdf) as a formal record of findings and to ensure actions are implemented.

References


DNR 2006, NSW Natural Resources Monitoring, Evaluation and Reporting Strategy, NSW Natural Resources and Environment CEO Cluster Group, Department of Natural Resources, Sydney.
Appendix I: Designing an evaluation

Evaluation design is concerned with the detailed planning of an evaluation and is based on the type of evaluation required. The evaluation framework for CMA natural resource management provides for the following types of evaluations:

- **Appropriateness** evaluations, which assist in deciding the need for, and nature of, a proposed new program

- **Efficiency** evaluations, which assess the inputs and processes used to produce the outputs of the program

- **Effectiveness** evaluations, which examine the extent to which program objectives or desired outcomes have been achieved.
Design for appropriateness evaluations

Appropriateness evaluations are broadly about comparing needs on one hand with objectives and their strategies on the other to ensure the latter are relevant to the former. The aim of an appropriateness evaluation is to determine:

- whether the objectives or desired outcomes of a program are appropriate, given what is already known about the social, economic or environmental context or needs of the issue
- whether the program’s strategies will assist in achieving the objective(s) or desired outcome(s).

Appropriateness evaluations should be undertaken during a program’s initial design or where the original objectives of a long-term program have changed over time. They are most relevant for CMAs in:

- CAP development or review where resource or community needs must be reflected in CAP targets
- development or redevelopment of an investment strategy where a CMA wants the investment to reflect the intent of the CAP and its targets
- development of a project, program or activity which must contribute to CAP outcomes.

Appropriateness evaluations have already been undertaken by all CMAs during the development of their CAPs and establishment of targets, investment strategies and projects. The processes are generally employed by CMAs involved in assessing the current natural resource issues and management actions or strategies.

**Example: An appropriateness evaluation by Lachlan CMA**

The finalisation of the Lachlan CMA’s CAP coincided with the development of the CMA’s Monitoring Plan. Program logic was used on the draft CAP targets at workshops with other agency staff to develop the measures, etc. needed to monitor the draft targets. Analysis of the logic within the draft CAP led to some small but very important changes that were adopted to ensure that efficient implementation and evaluations of CMA activities could be achieved. These small changes ensured that CAP targets were monitored using appropriate measures.

Design considerations

The table below summarises the design considerations for an appropriateness evaluation. These considerations are applicable to both a project and program evaluation.

The evaluation questions are examples only as more specific questions are likely to be identified against an individual program or project.
## Design considerations for appropriateness evaluations

<table>
<thead>
<tr>
<th>Typical appropriateness questions</th>
<th>Examples of comparisons</th>
<th>Potential monitoring methods</th>
<th>CAP example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a need for the program?</td>
<td>Program targets or outcomes compared with needs</td>
<td>Review of research literature and relevant catchment studies to better understand contributors to the issues, and relationship between issues and strategies, desired outcomes and strategies</td>
<td>In developing the catchment and management targets for its CAP, a CMA brought ‘theme teams’ together to review collated information on catchment studies and baseline data. The teams added knowledge of relevant research and experience of other similar strategies.</td>
</tr>
<tr>
<td>Do the desired outcomes address the needs?</td>
<td>Nature and/or extent of the need now compared with the need at the time the program was established/designated</td>
<td>Review of strategies and desired outcomes against government policy and strategies</td>
<td>The theme teams developed a conceptual model that expressed the pressures on the resource and relationship between these pressures and current condition.</td>
</tr>
<tr>
<td>Are the desired outcomes consistent with catchment and government priorities?</td>
<td>Desired outcomes compared with government policies and strategies</td>
<td>Review of best practices of other programs or evaluations of other like programs</td>
<td>Following this, the CMA facilitated a process of developing and analysing a results hierarchy to define its targets and likely strategies.</td>
</tr>
<tr>
<td>Are the proposed strategies going to deliver the desired outcomes?</td>
<td>Proposed strategy compared with identified need/issue and likely contributors to the need/issue</td>
<td>Analysis of existing baseline data</td>
<td>The agency representatives were able to confirm that the desired outcomes and strategies proposed were consistent with current policy.</td>
</tr>
<tr>
<td></td>
<td>Desired outcomes and strategies of program compared with outcomes and strategies of other like programs and their strategies</td>
<td>Analysis of logic and conceptual models</td>
<td>The CMA refined its targets by undertaking feasibility studies based on their cost estimates for implementation with regard to total investment over the first half of the CAP.</td>
</tr>
<tr>
<td></td>
<td>Proposed strategies compared with the likely investment available for the program</td>
<td>Needs analysis using techniques such as focus groups</td>
<td>The CMA ensured that the methods, studies and references quoted during the process were well documented.</td>
</tr>
</tbody>
</table>
Information management

Information management is a broad term which covers all the tools, systems and processes used to collect, record, store and access information. Information management considerations for evaluation design should be based on the information needs already identified.

Collection and management of information for appropriateness evaluation should consider the following issues:

- Existing expertise and knowledge of each theme will be recorded in a range of literature and this information should be recorded and referenced as it is identified so that it can be referred to later. In addition, the experience of staff from the CMA, academia and other agencies will be invaluable and may need to be accessed.

- Knowledge of past planning, such as needs analysis, CAP development and the investment strategy, will be recorded in CAP documentation or CAP development papers.

- New knowledge of resource conditions, processes, interactions and pressures or needs should be recorded in appropriate systems. This information may be derived through a continuous ‘watching brief’ of case studies, on-ground experiences, etc. In addition, a new needs analysis may be required where the appropriateness evaluation is being undertaken as part of redeveloping a long-term CAP. An information management system for this kind of information should be established so the information can be recorded as it becomes known.

- A CMA will need to record qualitative information or be able to easily search for relevant information. How to achieve this needs to be addressed.

Information storage and retrieval procedures for NRM agencies are specified in the Draft Natural Resources Information Management Strategy (NSW Government 2002; available at www.nrims.nsw.gov.au). Information management practices for natural resource management agencies in NSW must be consistent with NRIMS. The strategy identifies the coordination, communication, quality, data management and access requirements for natural resource information and is consistent with national standards and requirements. All CMAs will need to consider these requirements when they wish to serve information to an agency database.
Design for efficiency evaluations

Efficiency evaluations are concerned with the processes by which a plan is delivered to produce outputs. In theory, they are concerned with comparing the inputs with the outputs and determining how best to maximise outputs for the resources allocated. However, efficiency evaluations for NRM need to also consider whether programs are being implemented using the best available methods in areas where the most progress toward desired outcomes is likely and with an understanding of contextual needs.

Efficiency evaluations rely on descriptions and judgements during the life of the project. The information required for efficiency evaluations is generated by the project information. Therefore, this type of evaluation may consider what systems are in place for activities to be implemented, the application of best practice, or allocated expenditure versus actual expenditure.

Efficiency evaluations are an important tool allowing CMAs to manage the delivery of strategies under their CAPs in order to achieve desired outcomes. This is because these evaluations provide ‘leading’ information during the life of a program rather than after completion when it is too late to influence the desired outcomes.

Many CMAs already employ strategies for undertaking efficiency evaluations. Southern Rivers CMA, for example, undertakes an annual review of the delivery of its CAP. In most other CMAs, monitoring and evaluation officers provide input to the monitoring requirements for incentive projects.

Example: An efficiency evaluation by Hunter–Central Rivers CMA

The Hunter–Central Rivers CMA has established a risk-based decision-making system for applying monitoring and auditing resources to its investment projects. The process is used to guide the use of limited resources and meet reporting requirements. Financial investment, landholder capacity and complexity of the work have been used to determine whether frequent site inspections, less frequent inspections or a single final inspection are required. This allows efficient use of CMA resources while ensuring that the most significant and highest risk investments are targeted for increased surveillance.

Design considerations

Even though CMAs have to provide accountability reports, they are not specifically required to undertake an efficiency evaluation as part of this process. Therefore, apart from NRC audits, most efficiency evaluations are internally driven. As part of the strategic use of CMA resources, monitoring and evaluation officers are encouraged to use program logic to identify significant projects or programs for efficiency evaluations. These should be chosen because they are:

- critical to the achievement of management and catchment targets
- of high investment value
- perceived as a higher risk investment because they are innovative or use new best practice.

If designed appropriately, evaluation information can also be used not only for the specific program or project that was evaluated but to inform the effectiveness evaluation for a CAP.
Example: Western CMA incentives program

The Western CMA incentives program is the delivery mechanism for investment in on-ground works for natural resource management. The desired outcomes from the delivery of this program have clear linkages to all management and catchment targets in the CAP. The incentives program team has reviewed and made changes to the program in the past. The more formal evaluation of the incentives program with the monitoring and evaluation officer, project manager, operations managers and investment managers was designed with multiple purposes. Firstly, it provides training on monitoring and evaluation within the CMA. Secondly, it provides an opportunity for the significant changes adopted by the program to add benefit to the program delivery. Finally, the information from this evaluation is able to inform the anticipated mid-term evaluation of CAP performance.

The table below provides a summary of the design considerations for an efficiency evaluation. These considerations are applicable to both a project and program evaluation.

The evaluation questions are examples only as more specific questions are likely to be identified against an individual program or project.
### Design considerations for efficiency evaluations

<table>
<thead>
<tr>
<th>Typical efficiency questions</th>
<th>Examples of comparisons</th>
<th>Potential monitoring methods</th>
<th>CAP example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the program achieving the planned outputs?</td>
<td>Extent of actual outputs against planned outputs</td>
<td>Analysis of routine project information of resources, processes and outputs</td>
<td>The CMA investment group is preparing to undertake its annual review of major programs. In preparation for this, it has collected information on planned versus actual resources, processes and outputs. This information is also used to report to the Commonwealth Government. Spatial information from the investment database illustrates where investment has occurred and has also enabled the group to calculate most of its outputs. The group also has a copy of the last NRC audit against the state-wide standard in case it provides supporting information on process. As part of its annual review, a major program is identified each year and simple case studies comparing the delivery of projects within the program undertaken. These case studies are designed so the group can also add to the effectiveness evaluations planned by the CMA.</td>
</tr>
<tr>
<td>Are the program’s resources being used to achieve outputs of the desired quantity and quality?</td>
<td>Expenditure compared with allocations</td>
<td>Audits against standards</td>
<td></td>
</tr>
<tr>
<td>Could the use of the resources be improved?</td>
<td>Community accessing the program versus those most in need of the program</td>
<td>Benchmarking against other like programs</td>
<td></td>
</tr>
<tr>
<td>Is the implementation proving feasible?</td>
<td>Areas of actual investment versus priority areas</td>
<td>Case studies</td>
<td></td>
</tr>
<tr>
<td>Is the program adequately resourced to enable the achievement of desired outcomes?</td>
<td>Current costs of outputs compared with planned costs from original feasibility studies</td>
<td>SWOT (strengths, weaknesses, opportunities and threats) analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program implementation compared with standards or known best practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Actual implementation compared with desired implementation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Information management

Information management is a broad term which covers all the tools, systems and processes used to collect, record, store and access information. Information management considerations for evaluation design should be based on the information needs already identified.

Storage and retrieval of qualitative or project-based information

Numerous reports into the evaluation process point out that most time allocated to an evaluation is spent trying to find relevant information rather than analysing it against the evaluation questions. The evaluation process will be greatly streamlined if a CMA can efficiently record its qualitative information or search for past catchment studies or relevant information.

Some CMAs, such as Hunter–Central Rivers, are currently recording their catchment reports in a local database.

Example: Border Rivers–Gwydir CMA’s resource library

Information and equipment is being managed by the Border Rivers–Gwydir CMA through a system called Equipment and Resources Library (EARL).

EARL provides a range of services for CMA staff, the catchment community and others involved in resource management. A number of component sections will allow the CMA to manage access to information and equipment by various groups. Some of the services include:

- a central and complete record of all equipment, documents and other resources held by the CMA
- a lending service where the catchment community and others can borrow resources, such as books and equipment, that can assist in on-ground works
- an internal assets register to allow the CMA to track and manage resources.

Electronically held information will be downloadable from the CMA’s internet site.

To access EARL, registration and a password is required. A link to the site from the CMA’s website will be available but the site can be accessed (and registration and password organised) by going to www.cmaextra.net.

Many CMAs are now adopting the use of a land management database. This is a spatial recording and reporting tool developed by the Department of Environment and Climate Change. The system enables:

- accurate spatial recording of funded works, including extent of works
- detail of activities undertaken for the investment
- linkage to the funding sources, and management and catchment targets
- project monitoring and output reporting.

The database also has the capacity to link products from an investment, such as project reports, methods and photo-points, so that all information on a project is more easily retrievable.

Natural Resources Information Management Strategy

It is likely that some of the outputs generated by CMAs could be served to NRM databases held by different agencies. Information storage and retrieval procedures for NRM agencies
are specified in the Draft Natural Resources Information Management Strategy (NSW Government 2002; available at www.nrims.nsw.gov.au). The information management practices for natural resource management agencies within NSW must be consistent with NRIMS. The strategy identifies the coordination, communication, quality, data management and access requirements for natural resource information and is consistent with national standards and practices. All CMAs will need to consider these requirements when they wish to serve information to an agency database. At the same time, custodianship of spatial data and brokerage arrangements are continually being updated. As a result, reference should be made to DECC’s Director of Information Science for the latest requirements and procedures.

**Example: Southern Rivers CMA review of implementation activities**

The principles of evaluation are being adopted by the Southern Rivers CMA where progressive review of implementation activities is keeping investment on track and ensuring CAP priorities are regularly considered. A review of investment in revegetation was undertaken to identify the number of hectares, vegetation type, kilometres of fencing, location of revegetation, etc. to determine whether investment is in line with CAP priorities and the investment cycle. The CMA has thus identified that the area treated at this point in the investment cycle is close to plan and that a small adjustment in the location of treatment in the next investment phase will ensure that CAP priority areas are meeting CAP implementation requirements.

**Financial and milestone reporting**

CMAs are required to complete financial and milestone reporting biannually. These reports relate to funds for each funded activity and include:

- funds spent during the reporting period
- anticipated expenditure (contingent liabilities) over the next reporting period
- additional funds required for disbursement from the Joint Steering Committee’s holding account to the CMA to cover contractual obligations over the following six months
- which milestones were achieved and in which quarter
- which milestones were not achieved
- any changes to milestones and delivery dates approved by the NSW and Commonwealth governments.

A shell of each report (in the form of Excel spreadsheets pre-formatted and populated with financial or milestone details) is provided to each CMA shortly before the end of the reporting period. The report is organised by activity.
Design for effectiveness evaluations

Effectiveness evaluations are used to determine the extent to which plan outcomes have been achieved and are primarily concerned with comparing actual outcomes with the desired outcomes or objectives. These evaluations rely on understanding and interpreting relationships between inputs and outcomes and are normally undertaken at the end of a program or sometimes mid-term in longer programs.

An understanding of other evaluations that may have been undertaken previously provides insights into the findings of an effectiveness evaluation. The relationship of each evaluation to the whole CAP cycle is therefore very important.

An effectiveness evaluation for NRM is complex. These evaluations are often performed at the end of a program when stakeholders who may be able to provide significant information are no longer available. In addition, actual outcomes may be much more influenced by issues such as policy change, drought or land-use change that are outside the control of a CMA.

For CAPs, where outcomes are defined in NRM, there is the potential that the interval before an impact can be measured will be longer than the 10-year term of the CAP. Further complexity may be added because:

- understanding of many ecological relationships is still evolving
- outcomes can be affected by social interactions.

It is important that an effectiveness evaluation of complex programs is designed from the beginning of the program and not left until the evaluation findings are required. The following issues should be considered:

- Effectiveness evaluations will require resource-condition monitoring because the majority of targets are expressed in this form. Implementation of these programs or reassurance that existing programs are suitable should happen in the early stages of each CAP and be monitored over the longer term.

- Resource condition monitoring relies on the maintenance of long-term partnerships to support the monitoring needs of CMAs. These should be identified and established early in the CAP development stage.

- More detailed data management systems need to be developed to manage diverse data needs and sources.

Due to the complex nature of effectiveness evaluations, the design should provide an approach that enables all assumptions, interpretations and relevant evidence to be transparent and repeatable. This will provide more confidence in the results for users of the information. Other complications are usually the result of program planning and include:

- poorly expressed objectives or outcomes
- poorly conceived assumptions that strategies or actions within a plan will lead to the desired outcome.

Design considerations

A number of CMAs are looking at strategic evaluations that will not only inform the effectiveness of their individual projects or programs but contribute to the effectiveness evaluations of the CAP.
Example: Incentive monitoring program in Central West CMA

Central West CMA has instigated a monitoring program to assist with the effectiveness of its incentives program. Most Central West incentive contracts contain a compulsory project monitoring component. The monitoring is designed to demonstrate the effects of a project over a number of years and engage landholders in data collection while at the same time building their confidence in program impacts.

The monitoring program is drawn from the previously successful Rangelands Assessment Program and will be applied to most terrestrial projects within the Central West catchment. The process involves collecting photo-point images and performing annual vegetation transects at a fixed location over five years. The adopted method is intentionally simple to encourage maximum possible participation from all incentive owners. A DVD produced by the CMA shows landholders how to undertake the monitoring and reporting. The aim is maximum possible uptake, rather than data of the highest possible quality.

The CMA believes that, in addition to evaluating the CAP, the benefits of this approach include:

- measuring project impacts which promote continuous improvement of a program
- a demonstration of investment returns on CMA incentives
- building community awareness of better land-use practices
- linking remote imagery databases to large on-ground data sets.

The table below summarises the design considerations for an effectiveness evaluation. These considerations are applicable to both project and program evaluations.

The evaluation questions are examples only as more specific questions are likely to be identified against an individual program or project.
## Design considerations for effectiveness evaluations

<table>
<thead>
<tr>
<th>Typical effectiveness questions</th>
<th>Examples of comparisons</th>
<th>Potential monitoring methods</th>
<th>CAP example</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent are the program’s outputs being achieved?</td>
<td>Measured outcomes versus desired outcomes</td>
<td>Experimental designs, e.g. group or area receiving the program compared with groups or areas not receiving the program</td>
<td>In preparation for the CMA’s five-yearly review of its CAP, the evaluation team identified that the soil theme has sufficient monitoring information (based on an analysis of the lines of evidence) to allow outcome monitoring using information collected in monitoring programs by NSW NRM agencies, analysis of logic, investment information and relevant literature. The CMA was more concerned that there was less confidence in its existing lines of evidence for the aquatic health and native vegetation themes so it instigated a case study approach that would provide more detailed information and cover both these themes.</td>
</tr>
</tbody>
</table>
| What factors have affected those outcomes (positive and negative)? | Measured outcomes of the program compared with measured outcomes of similar programs | Quasi-experimental designs:  
- matched group design  
- time series or intervention design  
- pre- and post-program implementation  
- longitudinal design | |
| Should the program be modified to achieve better outcomes? | Measured outcomes of the program compared with needs or issues of the program | Non-experimental design:  
- outcome monitoring  
- qualitative and quantitative surveys  
- case studies | |
| What are the factors most critical to the achievement of a successful program? | Contribution of factors external to the program compared with the program | | |
Information management

Information management is a broad term which covers all the tools, systems and processes used to collect, record, store and access information. Information management considerations for evaluation design should be based on the information needs already identified.

Collection and management of information for effectiveness evaluations should consider the following issues:

- Existing expertise and knowledge of each theme will be recorded in a range of literature and this information should be recorded and referenced as it is identified so that it can be referred to later. In addition, the experience of staff from the CMA, academia and other agencies will be invaluable and may need to be accessed.

- Knowledge of past planning, such as needs analysis, CAP development and the investment strategy, will be recorded in CAP documentation or CAP development papers.

- New knowledge of resource conditions, processes, interactions and pressures or needs should be recorded in appropriate systems. This information may be derived through a continuous ‘watching brief’ of case studies, on-ground experiences, etc. In addition, a new needs analysis may be required where the effectiveness evaluation is being undertaken as part of redeveloping a long-term CAP. An information management system for this kind of information should be established so the information can be recorded as it becomes known.

- A CMA will need to record qualitative information or be able to easily search for relevant information. How to achieve this needs to be addressed.

Performance measures

Performance measures provide simplified information that may be derived from vast sources of primary quantitative or qualitative data, models or complex statistics. These are measures that best represent elements of a complex ecosystem or environmental issue and their application to complex environmental systems requires a detailed understanding of the system, processes and assumptions in order to ensure that the interpretation is correct.

Resource condition performance measures for a CAP should be seen as only one of the information needs required for an effectiveness evaluation.

Performance measures can operate at various temporal and spatial scales and may be ‘leading’ (that is, providing an early warning of changes within the ecosystem) or ‘lagging’ (showing changes in the ecosystem after they have occurred). A mix of leading and lagging indicators should be considered when defining relevant performance measures, particularly at the outcome levels in the program logic.

Resource condition performance measures should reflect the hoped-for outcome (target for CAPs). If the intention of the target is unclear, reference should be made to the supporting documentation and consultation (such as conceptual models and the results hierarchy) to determine an appropriate indicator. It is important to document these decisions for later evaluation and reporting. The intent would then be reflected by the success factor in the program logic table.

Attributes and available data

Attributes are the components that make up performance information. An attribute is a description of individual parameters or responses. Attributes for the performance measures need to be valid, measurable and applicable, and there are often multiple attributes for each performance measure.

The identifying performance measures attributes template in the evaluation toolkit (www.environment.nsw.gov.au/4cmas/evaltools.htm) can be used to record available and required information for each performance measure.

It is also essential that the data sourced is compatible and of a standard that allows confident interpretation and aggregation if required.

Consultation with key stakeholders is necessary to determine whether they have monitored any of the attributes identified for the catchment and management targets. Where relevant monitoring has been or is being undertaken, its method and data quality should be documented. This allows linkages to be made, where possible, and the most cost-effective monitoring program to be recommended.

Monitoring method

Once the performance measures and attributes are confirmed, monitoring methods can be defined. This should be done through consultation with monitoring experts and relevant literature. Consultation with statisticians will add value, especially where the spatial and temporal variability of a performance measure needs to be addressed. Consultation with experts will provide information on:

- method
- monitoring frequency
- locations
- data interpretation and analysis
- quality control methods
- any assumption or monitoring implications.

The template for preparing performance measure profiles and monitoring plans in the evaluation toolkit (www.environment.nsw.gov.au/4cmas/evaltools.htm) can be used to record the details and monitoring for each performance measure.

Advice on monitoring methods and standards is available from the NSW agencies’ MER theme teams for state-wide targets. The methods and protocols for the state-wide monitoring and reporting programs will inform monitoring needs and will be available as published documents when these programs are fully established.

Monitoring program design

The design of monitoring programs requires application of experimental design. An experiment is a specific type of scientific method used to study the effect of change. Monitoring design must be based on the issue or subject being studied, the conditions or context of the program and type of information required.

Controlled experimental design

The strictest application of experimental method tests hypotheses by introducing change in a single variable (the independent variable) to study the effect on another variable (the dependent variable(s)). To do this, all conditions must be kept constant or controlled.
Application of controlled experimental design is rare because of the difficulty of keeping conditions constant and generally requires laboratory conditions. It is generally used in physics and chemistry where conditions can be controlled.

The application of controlled experimental design in social and natural resource situations and so for evaluation of CAPs is not recommended mainly because it is not a true reflection of the environment being managed. There are also questions relating to:

- equity
- diversity and scale of issues being managed by the CAP
- temporal and spatial scales
- the need for the CMA to maintain a flexible and adaptable approach to investment over the longer term.

Designs for the effectiveness evaluation are likely to be quasi-experimental, non-experimental or a combination of both.

**Quasi-experimental designs**

These are similar to experimental designs but without the same degree of control. There are a few quasi-experimental designs that could be applied to a CAP evaluation and each has its strengths and weaknesses. These include:

- matched group designs
- time series or intervention designs
- longitudinal designs.

A *matched-group design* could compare two sub-catchments: one receiving funds for specific management action-related projects and the other not. This type of design may introduce a bias as groups or sub-catchments are not selected randomly but selected for activities in a priority investment area or because of the timing for that particular investment.

Matched-group design is more likely to be useful within a case study or applied at a project scale rather than whole-of-CAP scale. An example is where a CMA wants to better understand why some landholders access funds for on-ground works where others do not.

A *time-series or intervention design* will take measures over the long term, including before and after the management intervention being investigated. This design method is particularly useful if there is already a relevant monitoring program for a catchment target in place, as this information can be drawn upon to understand intervention impacts. This design can be problematic where NRM programs have been in place before CAP implementation, but activities may have been more sporadic, less strategic and on a smaller investment scale. Another possible issue is the impact of externalities.

A *longitudinal design* will follow the same management intervention or group over a longer period but the monitoring will need to start before the particular investment commences. This design has similar issues to time series.

**Non-experimental designs**

Non-experimental designs relevant to evaluating effectiveness of a CAP include:

- outcome monitoring designs
- case studies
- qualitative and quantitative surveys.

*Outcome monitoring* using performance measures should be in conjunction with other supporting evaluation information to determine the effectiveness of CAP implementation. The
Performance measure needs to be relevant to the catchment target, i.e. a measure of performance against the target. If it is not relevant to the catchment target, it will be difficult to determine how effective NRM investment has been.

Case studies use a variety of data-collection methods to obtain an in-depth understanding of significant activities, often relying on qualitative and quantitative information. The use of case studies for significant management activities is proposed for the evaluation of CAPs where there is a need to supplement existing information to address specific evaluation questions.

Qualitative surveys use questions to find out information about outcomes. For example, if a CMA needed to better understand the role of an NRM education program, surveys addressing awareness, participation and behavioural change could be undertaken. Surveys are a technique that may be applied within case studies. Qualitative information can add value to quantitative data by helping to understand why quantitative results are being achieved.

Quantitative surveys are designed to allow detailed statistical analysis of the survey results. Design of questions is critical to avoid bias in the survey information. Many surveys are designed to enable both qualitative and quantitative information to be gathered.

Combination designs
The multiple lines of evidence approach uses both quasi- and non-experimental design methods supported by the use of other relevant information such as:

- published literature
- catchment reports
- research findings
- project monitoring programs
- descriptive and spatial information on investment trends and outputs (e.g. annual reports, investment strategies and spatial outputs from a land management database).

Expert advice on developing new information to inform the evaluation, advice on monitoring procedures, standards and protocols should be sought.

Database systems
Information storage and retrieval procedures for NRM agencies are specified in the Draft Natural Resources Information Management Strategy (NSW Government 2002; available at www.nrims.nsw.gov.au). Information management practices for natural resource management agencies in NSW must be consistent with NRIMS. The strategy identifies the coordination, communication, quality, data management and access requirements for natural resource information and is consistent with national standards and requirements. All CMAs will need to consider these requirements when they wish to serve information to an agency database.

The Commonwealth Government has identified the need for more strategic data collection to ensure data is accessible and available to the community and all levels of government. An effort to promote the development of linked NRM data and information systems is under way through:

- strategic or information-sharing partnerships with government and research organisations such as –
  
  Office of Spatial Data Management (www.osdm.gov.au/)
  Australian Spatial Data Directory (asdd.ga.gov.au/)
  ANZLIC the Spatial Information Council (www.anzlic.org.au/)
  Spatial Sciences Institute (www.spatialsciences.org.au/)

59
Cooperative Research Centre for Spatial Information (www.crcsi.com.au)

- nationally linked data and information systems through the implementation of an Australian natural resource information infrastructure (ANRII) (www.anra.gov.au/topics/publications/national/introduction.html).

The Commonwealth and NSW Governments are working closely together on managing NRM information. NSW is also moving toward more broadly available and publicly accessible NRM information.
Appendix II: Evaluation tools

The evaluation toolkit is a series of templates and checklists to assist in developing, undertaking and documenting evaluations. These are suggested tools only: use or adapt them to suit the individual requirements of each evaluation.

Template: Defining stakeholder needs
Template: Defining evaluation type
Building a conceptual model
Template: Constructing a program logic table
Template: Identifying performance measures
Template: Identifying performance measure attributes
Template: Preparing performance measure profiles and monitoring plans
Evaluation analysis tools
Template: Recording assessment using MLLE criteria
Performance story charts
Template: Defining stakeholder needs

Identifying the needs of stakeholders is crucial in defining the context of an evaluation context and how it should be designed. Carefully and clearly documenting these needs will reduce inefficiency in designing and undertaking the evaluation.

Clear identification of stakeholder needs will help identify:

- why the evaluation is being undertaken
- who requires the evaluation information
- when the findings are required
- the scope of the program or project to be evaluated
- potential collaborators
- who will use the information to make decisions
- who may need to implement the recommendations
- what format is most appropriate for presenting evaluation findings.

Using the template

The template uses questions to develop responses which summarise stakeholder needs.

- Consider and list all stakeholders for the evaluation.
- Apply each of the questions to each of the stakeholders.
- Record any additional comments below the table.
- Use this information to determine how best to engage with stakeholders when confirming the content of the evaluation as well as while it is being conducted.
- Use this information when considering the evaluation questions.
### Defining stakeholder needs template

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Who will use the findings?</th>
<th>How will they use the findings?</th>
<th>When and how will they want the findings?</th>
<th>Who will be affected by the findings and how?</th>
<th>Who will implement recommendations?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments**
Template: Defining evaluation type

The type of evaluation needs to be defined so that it can then be designed appropriately to meet the objectives of the exercise.

The types of evaluations adopted for this framework are:

- **appropriateness** evaluations, which are used to define project or program objectives and investment in response to needs
- **efficiency** evaluations, which assess whether the processes used are maximising outputs for the level of inputs
- **effectiveness** evaluations, which determine to what degree a project or program has met its objectives.

The evaluation type can be identified by asking the following questions:

- What is the purpose of the evaluation?
- What stage of implementation has the project or program reached?
- What aspect of the project or program should the evaluation focus on?
- At what stage during the project or program implementation should the evaluation occur?

While these questions seem straightforward and an evaluator might assume that the answers are known intuitively, the type of evaluation required is often not obvious. Using the template will help define the evaluation type and serve as a record of the agreement reached with the evaluation ‘client’ or evaluation project team.

Using the template

- Consider each of the questions in the left-hand column of the template when discussing with key stakeholders or the evaluation project team.
- Using the prompts in Column 2 if required, summarise responses by circling the most relevant response in the three right-hand columns under the types of evaluation. Alternatively, add your summary response to the most relevant column.
- Review all responses to determine the type of evaluation or combination of evaluations to be undertaken.
- Discuss these responses, if required, with the client requesting the evaluation to ensure their expectations are managed.
- Retain the worksheet and any discussion points with your evaluation documents to form a record of conversation and agreement.
- Ensure the terms of reference or evaluation strategy (for whole of CAP) reflects these findings.
- Use the result of this step to help define the evaluation questions, information needs and evaluation method.
### Defining evaluation type template

<table>
<thead>
<tr>
<th>What is the purpose of the evaluation?</th>
<th>Appropriateness</th>
<th>Efficiency</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which of the following are the main reasons for the evaluation?</td>
<td>Program planning</td>
<td>Accountability</td>
<td>Progress towards outcomes (targets)</td>
</tr>
<tr>
<td>• improvement: refining an existing program</td>
<td>Ongoing relevance for longer term program</td>
<td>Program improvement</td>
<td></td>
</tr>
<tr>
<td>• accountability: regular monitoring to report to ‘investors’ or managers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• measuring progress towards objectives/outcomes: meeting reporting requirements or determining the continuation of a program or adoption of the program into other programs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• program development: information to help design a program</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What stage of implementation has the project or program reached?</th>
<th>Appropriateness</th>
<th>Efficiency</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to understand what stage the project or program being evaluated has reached. This will vary from the conceptual stage to having been in place for some time with no modifications. For example, a program that has only just been implemented cannot legitimately be evaluated against its long-term outcomes but an evaluation that recommends what needs to be implemented to enable this to happen could be undertaken.</td>
<td>None</td>
<td>Program in place or established</td>
<td>Program well established</td>
</tr>
<tr>
<td></td>
<td>Long-term program with no change</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What aspect of the project or program should the evaluation focus on?

Determine whether the people commissioning the evaluation want to focus on one or more elements of the program, such as:

- environmental, social, economic or political needs under which a program is being developed
- adequacy of design
- method of program delivery
- outcomes (or targets).

<table>
<thead>
<tr>
<th>What aspect of the project or program should the evaluation focus on?</th>
<th>Context</th>
<th>Adequacy of design</th>
<th>Outcomes and delivery</th>
</tr>
</thead>
</table>

At what stage during the project or program implementation should the evaluation occur?

Consider the temporal links between the evaluation and program delivery, i.e. should the evaluation occur before, during or after/towards the completion of the program?

<table>
<thead>
<tr>
<th>At what stage during the project or program implementation should the evaluation occur?</th>
<th>Before program implemented or approved</th>
<th>During implementation</th>
<th>Program end or after completion</th>
</tr>
</thead>
</table>

Mid-term or long program
Building a conceptual model

A conceptual model is able to represent the current understanding of a process of interest, in this case involving NRM. It can include the relevant components and how they interact in a system that helps to clarify issues, needs and pressures when developing resource management activities.

Use the steps below, adapted from the (US) National Parks Service (2005) (available at science.nature.nps.gov/im/monitor) when developing a conceptual model. While these are presented sequentially, the process can be iterative.

Considerations for building a conceptual model

<table>
<thead>
<tr>
<th>Steps for building a conceptual model</th>
<th>Considerations</th>
</tr>
</thead>
</table>
| Clearly state goals for developing the model | Some examples:  
  • to synthesise the understanding of ecosystem processes and stressors for a specific theme within a catchment  
  • to identify gaps in knowledge about ecosystem processes for a specific theme within a catchment  
  • to develop models to support management decisions for NRM investment. |
| Identify the scope of what is under investigation | It is important to clearly identify the boundaries (spatial or temporal) or even whether the elements of an ecosystem or its pressures will be the main focus. |
| Identify key components of the model and pressures | This is where components may first be identified as a pressure, state or response to help construct the model.  
The team developing the model may consider in more detail how best to present the conceptual model, although this may change as the model is developed. |
| Identify relationships between components of the model | An understanding of the linkage between these components will either come from collaborators’ technical knowledge and experience or from the literature.  
The best models are those that stay simple. If the detail is too complex, consider breaking the model into smaller components. |
| Documentation | It is not only important to document sources of evidence that have been used to formulate the model but also any key questions, assumptions or limitations. This will ensure knowledge is not lost over time, when the model is reviewed or used at a later stage as part of the evaluation. |
| Review and refine the model | When first developed, the model will be based on best-available knowledge. As new knowledge becomes available, the model may need to be reviewed and any management decisions implemented. |
Template: Constructing a program logic table

The template for constructing a program logic table can be used with the conceptual models already developed to analyse the issues and detail how best to address them and evaluate performance.

A program logic table can be constructed for a project or program and provide a detailed outline of the thinking behind them. In particular, it clearly records the expectations, needs and assumptions that led to the development of the project or program. This information will be invaluable in informing evaluations, with specific lines of the program logic table applying to specific types of evaluation.

The template can be used to:

- consider appropriate responses to issues and drivers during preparation of a catchment plan
- reach consensus on the desired objectives and strategies required to achieve those objectives
- identify the causal means by which objectives can be achieved (using a results hierarchy)
- identify priority projects for further investigation as part of an evaluation case study
- identify factors that may be outside the control of a CMA but will still have an impact on its ability to achieve CAP objectives
- demonstrate progress towards long-term outcomes as part of the reporting process
- define specific evaluation questions
- provide an easy-to-read summary of complex programs.

The results hierarchy illustrates the expected relationship between the activities and the desired outcome of a project or program. It assumes that deploying inputs will lead first to ‘outputs’, then to ‘outcomes’ at progressively higher levels. The program logic table expands on detail at each level of the results hierarchy.

Using the template

The program logic template can be used to record project or program details for an evaluation. Each column of the suggested program logic table is explained below, together with the information to be included in them.

Outcome or planned results

- Starting point for thinking about what the project or program is aiming to achieve
- Demonstration of intended relationship among levels in the hierarchy
- Foundation for developing success criteria and performance information

Success factors

This column is important in cases where the interpretation of the objectives is obscure.

- Important characteristics for knowing whether success has been achieved for each level of the hierarchy
• Information needs are identified from these questions which form the foundation of the evaluation
• Discussion about success factors can start to identify assumptions and key evaluation questions

Performance measures
• Identifies the most important aspects of the project or program that should be measured to address the evaluation questions or success criteria
• Information that will enable an assessment of progress towards meeting targets may be a performance measure (e.g. hectares of native vegetation) or a combination of information to be used to answer evaluation question(s) such as project management-based information
• Qualitative and/or quantitative information could be involved
• Ensures that information is collected on what needs to be known rather than just collecting a lot of information
Assumptions will also need to be considered when defining the performance measures.

Basis for comparison
• May include trends over time and the use of baselines, targets, standards or benchmarks
• Adds meaning to performance information
• Should allow change to be measured, adding meaning to evaluation findings

Internal and external risks
These are factors or risks that affect the project or program outcomes.
• Internal: within the control of a project or program, e.g. staff training or management systems
• External: outside the control of a project or program but sometimes open to influence, e.g. politics, demographics, economy or climate
The potential impact of these may also need to be considered during the evaluation.

Assumptions and/or comments
• Describes assumptions made when developing the hierarchy or CAP strategies
• May be important to monitor as part of evaluation and will form some of the specific evaluation questions, e.g. the major impact on an estuary is the sediment load from the upstream catchments rather than the point sources around the estuary
The following lines of the program logic table are most likely to be relevant for each type of evaluation used in the evaluation framework:
<table>
<thead>
<tr>
<th>Lines of program logic used to inform evaluation</th>
<th>Type of evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs and intermediate outcomes or high-level outcomes</td>
<td>Appropriateness evaluations</td>
</tr>
<tr>
<td>Inputs and outputs</td>
<td>Efficiency evaluations</td>
</tr>
<tr>
<td>High-level and intermediate outcomes</td>
<td>Effectiveness evaluations</td>
</tr>
</tbody>
</table>
Constructing a program logic table template

<table>
<thead>
<tr>
<th>Results hierarchy</th>
<th>Outcome or planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>Internal risks</th>
<th>External risks</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Template: Identifying performance measures

The performance measures needed for the evaluation have been recorded in the program logic table. These may be broad measures which combine several indicators. Running monitoring programs across all of these would be costly and so criteria are used to decide which will be the most appropriate to use. This is particularly the case with performance measures against high-level and intermediate outcomes.

When identifying specific performance measures from a possibly large number of possibilities, it is important to select measures that are reliable and will meet the performance measurement needs of the project or program now and into the future. The practicality of using measures should also be considered.

The following template for identifying performance measures applies ‘SMART’ criteria to select practical and reliable performance measures.

SMART = the Specific, Measurable, Achievable, Relevant and Timely criteria in the template.

Using the template

To complete the template, answer the question posed for each SMART criterion in the appropriate cell of the table for each performance measure:

Specific

Is the performance measure attribute related to the intent of the objective? Consider carefully whether information collected on the attribute will help answer the evaluation questions and, especially for resource condition, if it will assist progress toward meeting CAP targets. The complexity of natural resources and their management can make it difficult to ensure that the information being collected will provide the answers needed.

Is the performance measure attribute directly linked to what is required for monitoring or is it a surrogate? Will the collected information specifically inform resource condition? Also consider whether the use of a surrogate will provide the information needed.

Measurable

Is data currently collected and/or readily available? Where data is already being collected or available, a longer and more complete dataset may yield more comprehensive information to answer evaluation questions. The use of existing monitoring information means more efficient use of resources can be made.

Is monitoring easy and practicable? More complex attributes or monitoring programs are likely to require a higher input of resources and may prove unreliable because they are confounded by their complexity.

Can monitoring be repeated reliably? When significantly different findings result from the repeat of a monitoring program, the original findings are not reliable. Scientifically justifiable information must be reliable and decisions using unreliable findings can result in poor outcomes.

Is current research sufficient? Development of acceptable attributes and indicators results from thorough investigation and trialling. Using an indicator which has not been thoroughly trialled may result in misleading findings.
**Achievable**

**Is monitoring cost-effective (i.e. benefits outweigh costs)?** Consider the costs required to undertake the collection of information on the attribute. Collection, equipment needed, laboratory analysis, data analysis, etc. can all be very expensive. Budgets are always limited so before adopting an attribute, ensure that funds are adequate to meet the costs of undertaking the program at a scale that will produce meaningful information.

**Is the effort realistic?** A monitoring or analysis program which requires unreasonable effort will be difficult to sustain and runs the risk of resulting in inadequate or poor information.

**Who will do the monitoring (agency, councils, NGO, contractor)?** Undertaking monitoring of complex natural resource and social systems often requires extensive experience. Ensure that appropriate expertise is available within the organisation responsible for undertaking the monitoring.

**Who will analyse the information (agency, councils, NGO, contractor)?** As with monitoring, analysis of information requires appropriate expertise.

**Relevant**

**Is the information being collected relevant to other reporting requirements (state-wide target, SoE)?** CMAs and agencies must meet many reporting requirements. Efficiencies will be gained where information can be used for multiple purposes.

**Timely**

**Is it a leading or lagging performance measure?** Performance measures operate at various temporal and spatial scales and be ‘leading’ (providing an early warning of changes within the ecosystem) or ‘lagging’ (showing changes in the ecosystem after they have occurred).

**What is the lag time?** A short lag time is one year, medium around five years, long about 10 years. It may take considerable time before enough information is collected for a confident understanding of the resource. Consider how long it will be before reliable findings are likely to be available.

**Is the attribute a measure of pressure (P), state (S) or response (R)?** These terms are used to identify whether the attribute measures the pressure on a resource, the current resource condition (state) or the management action that has been put in place (response).

**Conclusion**

**Can the attribute deliver?** Consider the answers to all of the above questions and determine whether the attribute can deliver technical validity by being specific, measurable, achievable, relevant and timely. A technically valid, achievable and efficient attribute, group of attributes or monitoring program can be confidently used to answer the evaluation questions.
## Identifying performance measures template (using ‘SMART’ criteria)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Specific</th>
<th>Measurable</th>
<th>Achievable</th>
<th>Relevant</th>
<th>Timely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance measure</td>
<td>Is the performance measure attribute related to the intent of the objective?</td>
<td>Is the performance measure attribute directly linked to what is required for monitoring or is it a surrogate?</td>
<td>Is data currently collected and/or readily available?</td>
<td>Can monitoring be repeated reliably?</td>
<td>Is monitoring cost-effective (i.e. benefits outweigh costs)?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments (include detail of assessment where needed to record decision-making process)
Template: Identifying performance measure attributes

Once the performance measures for an evaluation have been confirmed, the template identifying their attributes can be used to answer a number of questions. These include who might hold the necessary information, its format and whether a monitoring gap exists.

An ideal outcome would be to derive multiple benefits from a single monitoring program, which provides information that can be aggregated or disaggregated across various scales. However it is more likely that a range of specific performance information will be required at a catchment scale.

The template can be used to record the information required in evaluating a project or program.

Using the template

The attributes template may be completed with the help of a range of stakeholders, such as agencies, local government and industry, thus ensuring that thorough knowledge of current monitoring and possible monitoring needs is identified. Collecting and recording this information will highlight and form the basis of a comprehensive information access and collection system.

Complete the template as follows:

• Complete the first two columns of the template using the hierarchy and performance measure information from the program logic table.

• Determine potential attributes for each performance measure and record in Column 3. Advice from those experienced in collecting and managing information in the specific field will be helpful. Where an index or statistical analysis is to be used, it may be useful to consider the relationships between criteria.

• Determine whether monitoring of each attribute is currently occurring and, if so, what, when and by whom. Also determine whether historic information that could be used as the basis for comparison is available. Record this information in Column 4.

• Assess whether a monitoring program needs to be developed or a current monitoring program supplemented and record recommendations in Column 5.

• In Column 6, record an outline of any new monitoring programs that need to be developed to inform measurement of performance and consider who is best able to undertake this monitoring.

• In Column 7, record comment on the decisions reached in completing the template. In particular, record any ideas on how effort may best inform performance and whether there are additional issues to consider, such as information management, data analysis, etc.

Completing the table might indicate that the performance measures need to be reviewed, particularly if the identified monitoring programs are inappropriate to needs.
Identifying performance measure attributes template

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Template: Preparing performance measure profiles and monitoring plans**

Once performance measures have been confirmed, completion of a performance measure profile for each indicator is recommended, together with the monitoring plans proposed. This is particularly important if there is no information for an existing project or program or a new program is being instigated.

If the profile information is available, for example through an agency monitoring program, ensure the evaluation plan cross-references the methods and standards and identifies how the information should be used for CMA purposes.

The template for preparing performance measure profiles and monitoring plans provides a brief summary of the rationale and methods identified for collection and treatment of the information. Recording this information for each performance measure need not be detailed but should provide a brief overview of how the information needed will be gathered, stored and analysed.

The template may need to be adapted to encompass information requirements for different types of indicators. The recorded information will provide:

- a plan for information collection
- an outline of the approach
- a record of the method used for reporting purposes
- identification of common monitoring needs across CMAs
- identification of analysis support that will be required following data collection
- linkage to other information needs
- information requirements for funding proposals
- identification of database development needs in a timely manner
- information required for compiling metadata statement(s)
- justification for the monitoring program, such as for the board
- information for formulation of contracts
- details on communication with other staff, clients and agencies.

**Using the template**

Briefly record for each performance measure that will be monitored:

- definition or brief outline of the program
- rationale or summary of the current understanding of the project/program/theme that underpins why the work is being undertaken, possibly with a brief outline of the history and why the information is being gathered
- monitoring requirements or an outline of the monitoring or information collection program
- reporting products where detail of frequency of reporting requirements and format of reporting information is recorded
- data custodian arrangements: who is responsible for collecting and managing the data?
• data storage and management requirements, including where the information is stored, information sharing arrangements and, if required, Natural Resources Data Directory requirements

• links to other indicators or where the information collected can be used to inform other targets, projects or evaluations

• information on future development of the project or program if planned or anticipated

• further information sources, such as other projects, references, tools, etc.
### Preparing performance measure profiles and monitoring plans template

<table>
<thead>
<tr>
<th>Performance measure name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Qualitative or quantitative?</td>
</tr>
<tr>
<td>Attributes that make up the performance measure</td>
<td></td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>What is the rationale for the performance measure?</td>
</tr>
<tr>
<td></td>
<td>Context in which it is to be measured with regard to national, state and regional resource management programs</td>
</tr>
<tr>
<td>Geographic scope</td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring requirements</strong></td>
<td>Monitoring location (scale)</td>
</tr>
<tr>
<td></td>
<td>Monitoring frequency</td>
</tr>
<tr>
<td></td>
<td>Data measurement method</td>
</tr>
<tr>
<td></td>
<td>Data collation/calculation method</td>
</tr>
<tr>
<td></td>
<td>Data analysis and interpretation</td>
</tr>
<tr>
<td></td>
<td>Robustness or quality assurance</td>
</tr>
<tr>
<td><strong>Reporting products</strong></td>
<td>Graphical, spatial, tabular, index, modelled, etc.</td>
</tr>
<tr>
<td><strong>Data custodian</strong></td>
<td>Who collects and manages the data?</td>
</tr>
<tr>
<td><strong>Data storage and management requirements</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Links to other indicators</strong></td>
<td>Are the indicators relevant to other natural resource management plans?</td>
</tr>
<tr>
<td></td>
<td>Format in which aggregated information is to be put forward</td>
</tr>
<tr>
<td><strong>Future project or program development</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Further information sources</strong></td>
<td>References, other projects, etc.</td>
</tr>
</tbody>
</table>
Evaluation analysis tools

The following information on evaluation analysis tools provides a brief description of some of the tools that may be useful for different types of evaluations. The list is intended as a starting guide and is not exhaustive. The specific analysis tools to use will depend on the evaluation in question.

For ease of use, the evaluation tools have been broadly categorised, although there is a large amount of overlap between the categories.

**Participatory tools** are group decision-making and communication tools. These are often employed where information on stakeholder values and needs is required.

**Creative thinking (and problem framing) tools** are used to facilitate the development of new or innovative ideas and ensure that as many aspects of an issue as possible are considered. This includes collection or recognition of existing information and using it to infer conditions in a different area or issue. This information is often used as the starting point for understanding a problem or matter.

**Economic tools** are most often used for analysis of financial information but are becoming more common in assessing resource outcomes against investment.

**Models and decision support tools** are computer tools which help visualise potential outcomes, prioritise actions or record information.

**Project and program analysis tools** are methods for bringing information together to evaluate delivery of a project or program. They can be used at any time during a project or program but are most often used following their completion.
### Participatory tools

<table>
<thead>
<tr>
<th>Analysis tool/ Evaluation most useful for</th>
<th>Overview/description</th>
<th>Benefits (+) and shortcomings (−)</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stakeholder surveys</strong>&lt;br&gt;Use for:&lt;br&gt;• Appropriateness&lt;br&gt;• Effectiveness</td>
<td>Collection of data from stakeholder groups using a range of methods, including mail-out, personal interview, telephone interview, electronic tools or combination of methods.&lt;br&gt;There are several styles of surveys, such as focus groups and individual responses.&lt;br&gt;The design of surveys is critical to minimise bias and ensure that the key issues will be addressed through the responses.</td>
<td>+ Range of methods available are able to be customised to reach target groups&lt;br&gt; + Able to collect information from the community on performance and investment recipients on implementation.&lt;br&gt;+/– Confidentiality needs to be managed diligently&lt;br&gt; – May be difficult to gain the confidence of stakeholders&lt;br&gt; – Need to consider target population issues, e.g. literacy, geographic spread, ability to deal with complicated language or concepts, etc.&lt;br&gt; – May be expensive, especially for person-to-person interviews&lt;br&gt; – May be a mixture of qualitative and quantitative information which will require significant data reduction</td>
<td>Australian Bureau of Statistics: <a href="http://www.abs.gov.au">www.abs.gov.au</a>&lt;br&gt;National Statistical Service: <a href="http://www.nss.gov.au">www.nss.gov.au</a>&lt;br&gt;Bureau of Rural Sciences (<a href="http://www.daff.gov.au/brs">www.daff.gov.au/brs</a>) provides a range of useful tools and information, including <em>Social Atlas of Rural and Regional Australia</em>: <a href="http://www.affashop.gov.au/product.asp?prodid=13896">www.affashop.gov.au/product.asp?prodid=13896</a>&lt;br&gt;DAFFA: <em>Signposts for Australian Agriculture</em> – <a href="http://www.daff.gov.au/natural-resources/monitoring/signposts-aust-agriculture">www.daff.gov.au/natural-resources/monitoring/signposts-aust-agriculture</a>&lt;br&gt;<em>Sourcebook for social and economic surveys</em> – <a href="http://products.lwa.gov.au/products/pn20504">products.lwa.gov.au/products/pn20504</a>&lt;br&gt;<em>Assessing a community’s capacity to manage change: A resilience approach to social assessment</em> – <a href="http://www.affashop.gov.au/product.asp?prodid=14167">www.affashop.gov.au/product.asp?prodid=14167</a></td>
</tr>
<tr>
<td>Analysis tool/ Evaluation most useful for</td>
<td>Overview/description</td>
<td>Benefits (+) and shortcomings (–)</td>
<td>Additional information</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----------------------</td>
<td>----------------------------------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| Most significant change (MSC)          | MSC is a technique based on the collection of stories and the systematic selection of the most significant of these by panels of designated stakeholders or staff. The panel initially searches for project impact and discusses the value of the reported change. This focuses attention on the impact of the program being considered. MSC is a qualitative approach to behavioural change. | + Appropriate and valuable in monitoring and assessing behavioural change  
+ Provides good leading indicators for behaviour change  
+ Discussion required to reach findings is valuable because learning and identification of potential approaches to issues are enhanced  
– Requires significant commitment because repeated interviewing is required  
– Requires a large and diverse group to undertake the technique to ensure that findings are balanced and bias is minimised  
– Because of resource requirements, use in case studies would be appropriate but broad-scale evaluation may be expensive | DECC can provide catchment-specific socio-economic profiles to support NRM decision-making  
Most Significant Change (MSC) technique: A guide to its use by Rick Davies and Jess Dart: [www.mande.co.uk/docs/MSCGuide.htm](http://www.mande.co.uk/docs/MSCGuide.htm)  
<table>
<thead>
<tr>
<th>Evaluation framework for CMA natural resource management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal-attainment scaling (GAS)</strong></td>
</tr>
<tr>
<td><strong>Use for:</strong></td>
</tr>
<tr>
<td>• <strong>Effectiveness</strong></td>
</tr>
<tr>
<td><strong>GAS</strong> is a quantitative but non-statistical method for evaluating attainment of multiple goals. It uses a scale to integrate and assess diverse information in a repeatable and transparent way. <strong>GAS requires:</strong></td>
</tr>
<tr>
<td>• identification and agreement on what is satisfactory performance</td>
</tr>
<tr>
<td>• development of a scale of descriptors (poor to good) with a quantified score for each</td>
</tr>
<tr>
<td>• assignment of a score of performance toward attaining the goal.</td>
</tr>
<tr>
<td><strong>+ Widely applicable</strong></td>
</tr>
<tr>
<td><strong>+ Able to use diverse performance information to assess</strong></td>
</tr>
<tr>
<td><strong>+ Panel of experts in field/theme provides validity through debate and agreement</strong></td>
</tr>
<tr>
<td><strong>– Scoring requires careful judgement</strong></td>
</tr>
<tr>
<td><strong>– Risk of inconsistency or bias</strong></td>
</tr>
<tr>
<td><strong>GAS has been mainly used broadly in service delivery but has begun to be applied to NRM. Report of its use in this field:</strong></td>
</tr>
</tbody>
</table>

| **Multi-criteria analysis (MCA)**                      |
| **Use for:**                                           |
| • **Appropriateness**                                  |
| **MCA** can be used for evaluations that are based on inputs from groups of lay people or experts in different disciplines. MCA can help ensure that evaluations are representative of divergent views and values. It involves identifying options and evaluation criteria, weighting the criteria and assessing options against the weighted criteria to rank alternatives. |
| **+ Able to be used to evaluate qualitative and quantitative data** |
| **+ Provides a structured and transparent process for evaluations that might otherwise be confusing and reliant on informal, subjective judgements** |
| **– Relies on the subjectivity of experts to identify options and weight evaluation criteria** |
| **TopDec from NSW Department of Planning:** |
| Success-case method | Success-case method involves creation of a model of what defines success, seeking out the best and worst stories using survey techniques and documenting the experiences. The stories are corroborated by evidence collected through methods such as triangulation. It is used to find out which parts of an initiative have worked and which have not so that performance can be improved. | + Valuable for community-based programs  
+ Robust and adaptable to different situations  
+ Identifies methods to improve the evaluated program  
– Limitations similar to stakeholder surveys  
– May be difficult to identify success or non-success in very complex issues | Australasian Evaluation Society 2006 Conference Papers: [www.aes.asn.au](http://www.aes.asn.au/) |

**Use for:**  
- Effectiveness
### Creative thinking tools

<table>
<thead>
<tr>
<th>Analysis tool/ Evaluation most useful for</th>
<th>Overview/description</th>
<th>Benefits (+) and shortcomings (−)</th>
<th>Additional information</th>
</tr>
</thead>
</table>
| Analysis of program logic and results hierarchy | A representation of the inferred relationship between investment-activities-outputs and outcomes. Can be used to determine if the proposed strategies to achieve goals are logical. | + Summarises a complex program into its core elements to demonstrate expected outputs and outcomes  
+ Used to confirm objectives  
+ Useful communication tool  
− May be timely when developed in a group setting | Online course on program logic: [www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html](http://www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html) |
| Conceptual models | Conceptual models are descriptions, usually diagrammatic, of the elements and processes or interactions of a system. Can be used to help define the objectives and required strategies to address the issues. | + Can be used to simplify complex issues or relationships  
+ Provide good communication of an issue  
+ Able to be as complex as necessary to be appropriate to the required use  
− May over-simplify an issue, leading to inadequate or inappropriate action  
### Qualitative desktop review of literature and reports, project plans, etc.

**Use for**
- Appropriateness
- Efficiency
- Effectiveness

Review provides the basis for an understanding of the issue at hand and may provide direction for appropriate action and/or goal setting.

+ Enhances understanding of the issue
+ Compilation of lines of evidence for later use in effectiveness evaluation
+ Identification of broad range of points of view about the issue could provide more balanced approach to management
  - Reviewer of information needs to remain objective and not introduce bias into their assessment
  - May not be specific to the particular geographic area or all the factors of the issue of concern

### Gap analysis

**Use for**
- Appropriateness

Gap analysis uses existing information, data and understanding to identify gaps in current knowledge of an issue.

+ Identifies where knowledge of an issue is absent and research is required, thus prompting entry into research arrangements with research organisations
+ Improves efficiency of investment by ensuring unnecessary monitoring is not undertaken
  - Requires thorough knowledge of the issue and any investigations currently under way

### Benchmarking

**Use for**
- Appropriateness
- Efficiency

Benchmarking is the practice of using existing information to develop a level or range of resource condition or organisational performance against which to measure later performance or condition. A benchmark may be identified as the condition before a management change or it may be an ideal value.

- Able to provide a level to measure performance or condition against
- If developed with a good understanding of an issue, the benchmark subject identifies the performance measure and attributes for measurement
- Needs to be considered carefully in the light of all influencing factors so that the benchmark is realistic and achievable

### Economic tools

<table>
<thead>
<tr>
<th>Analysis tool/ Evaluation most useful for</th>
<th>Overview/description</th>
<th>Benefits (+) and shortcomings (–)</th>
<th>Additional information</th>
</tr>
</thead>
</table>
| Economic tools and cost-benefit analysis | Cost-benefit analysis is the primary economic tool and is used to quantify benefits and costs in a clear, systematic and rational way. It reduces both the costs and benefits to the same unit of measure (usually dollars) but other measures can be used. | + Assesses return on investment so, in the context of an appropriateness evaluation, can be used to plan the most efficient management actions  
+ Able to compare the ‘with action’ to the ‘without action’ scenarios  
+ Can be applied at a range of scales | Department of Finance: [www.finance.gov.au/](http://www.finance.gov.au/)  
• Introduction to cost-benefit analysis and alternative evaluation methodologies  
• Handbook of cost-benefit analysis |
| Auditing | Auditing is the examination of records by someone who has had no part in their preparation. It is used to determine if an organisation is meeting standards or methods that it said would apply. | + Can include recommendations for future improvement of business practices by auditor  
+ Provides feedback on efficiency of practices  
– May be time-consuming as auditor may require significant support  
– Expense of employing external auditor  
### Evaluation framework for CMA natural resource management

#### Models and decision support tools

<table>
<thead>
<tr>
<th>Analysis tool/ Evaluation most useful for</th>
<th>Overview/description</th>
<th>Benefits (+) and shortcomings (–)</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decision support tools and simulation models</strong></td>
<td>A range of computer-based tools, including decision support systems, simulation models, risk assessment and indexing tools that help the user prioritise strategies for achieving NRM objectives and assess progress against targets.</td>
<td>+ The use of tools can help consolidate knowledge and identify knowledge gaps &lt;br&gt; + Trusted tools can be used to benchmark current conditions and evaluate different management scenarios &lt;br&gt; – Quantity and quality of data and scientific knowledge are often inadequate &lt;br&gt; – Tool development or application requires expert involvement and can be time-consuming and costly</td>
<td>NSW CMA-focused tools are included in PVP Developer (<a href="http://www.environment.nsw.gov.au/vegetation/nvmanagement.htm">www.environment.nsw.gov.au/vegetation/nvmanagement.htm</a>) and Tools2/SCaRPA (under development). eWater CRC maintains a repository of catchment modelling tools: (<a href="http://toolkit.net.au/Themes/Catchment">toolkit.net.au/Themes/Catchment</a>)</td>
</tr>
<tr>
<td><strong>Expert systems</strong></td>
<td>Expert systems are computer programs that attempt to replicate the reasoning process of experts. They incorporate expert knowledge, encoded as rules in the software, and analyse information supplied by the user to make recommendations.</td>
<td>+ Understandable by experts and non-experts &lt;br&gt; + Provides an auditable and systematic method of evaluation &lt;br&gt; – Usually domain- and problem-specific &lt;br&gt; – Errors can accumulate and lead to erroneous recommendations</td>
<td>An example of an expert system is NEXSYS (Nutrient Expert System), which is used to compare nutrient exports from different land types and land uses.</td>
</tr>
</tbody>
</table>

*Use for*<br>• Appropriateness<br>• Efficiency<br>• Effectiveness
## Project and program analysis tools

<table>
<thead>
<tr>
<th>Analysis tool/ Evaluation most useful for</th>
<th>Overview/description</th>
<th>Benefits (+) and shortcomings (−)</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statistical analysis</strong>&lt;br/&gt;<em>Use for</em>&lt;br/&gt;- Efficiency&lt;br/&gt;- Effectiveness</td>
<td>Statistical analysis is a set of tools and techniques used for describing, organising and interpreting information or data. May be applied to performance indicators against targets or to assess financial information, as well as survey information to provide quantitative results from qualitative data.</td>
<td>+ With good data and sound techniques, clear answers within definable levels of confidence will be achieved&lt;br/&gt;+ Unbiased results from observed information&lt;br/&gt;– Analysis, especially of biological information, may need to be done by a specialist statistician&lt;br/&gt;– Expense of employing a statistician&lt;br/&gt;– Requires reliable and trustworthy data which can be difficult to access</td>
<td>National Statistical Service: <a href="http://www.nss.gov.au">www.nss.gov.au</a></td>
</tr>
<tr>
<td><strong>Case studies</strong>&lt;br/&gt;<em>Use for</em>&lt;br/&gt;- Effectiveness</td>
<td>Case studies are relatively small-scale but focused investigations where the results of the studies are used to infer conditions, management consequences or relationships for a broader geographic areas or social groups.</td>
<td>+ Cost-effective collection of data or information&lt;br/&gt;+ Able to infer relationships and outcomes&lt;br/&gt;+− Can use a range of techniques so pros and cons of methods used need to be considered&lt;br/&gt;– Interpreting results of a case study too literally or too broadly could result in false assumptions</td>
<td>Case studies in sustainability from Western Australia: <a href="http://www.communitybuilders.nsw.gov.au/building_stronger/enterprise/cs_wa.html">www.communitybuilders.nsw.gov.au/building_stronger/enterprise/cs_wa.html</a></td>
</tr>
</tbody>
</table>
### Checklists

**Use for**
- **Appropriateness**

Checklists are lists designed to remind or inform an evaluator about things that need to be considered in an evaluation. List items may be weighted and responses scaled to semi-quantitatively compare alternatives.

+ Simple to develop and use and easy to understand
+ Provides an auditable and systematic method of evaluation
  - Lists may be too general or too specific
  - Results may be reliant on additional expert input

Evaluation checklists site: [www.wmich.edu/evalctr/checklists/](http://www.wmich.edu/evalctr/checklists/)
**Template: Recording assessment using MLLE criteria**

The use of multiple lines and levels of evidence (MLLE) enables diverse lines of evidence to be assessed together and weighted against specific criteria to answer evaluation questions.

**Using the template**

This template has been developed to record all the lines of evidence available for each evaluation question.

Each line of evidence is assessed against each criterion and a summary recorded in the appropriate column.

Assessment of evidence against the MLLE criteria will be most useful in undertaking an effectiveness evaluation and especially where the resource interactions are complex and there are conflicting sources of evidence. As such, the use of an evaluation panel of experts in the field of the evaluation is recommended.

The use of an expert evaluation panel will facilitate clear assessment and combination of findings to develop an informed answer to the evaluation question.

The following criteria/questions should be considered:

- Is the evidence relevant to the issue? Is this evidence expected to be in the study area?
- Is there a reliable explanation for the evidence in the study area?
- Is this evidence restricted to particular spatial or temporal situations? Is there evidence of a relationship (spatial or temporal) between the activity and the response to that activity?
- Does the expected response always occur in the presence of the activity? Is the response always evident after the activity occurs?
- Are there consistent findings across different lines of evidence? Is there a credible linkage between intervention and response? A clear relationship between the activity and the response would be expected where the investment was based on a conceptual model of the system. Consistency of association between the activity and the response is observed where testing the evidence against all the criteria provides positive findings.
- Is there any other evidence that should be considered? Determine whether there is evidence from other investments or management activities in which the expected change occurred after the activity. Determine whether there is any basis for including additional assessment criteria. Consider where appropriate.

When all lines of evidence have been assessed against the MLLE criteria, the combined assessment should be considered and an answer to the evaluation question determined. Document the logical development of the findings at the bottom of the template.
Recording assessment using MLLE criteria template

<table>
<thead>
<tr>
<th>Evaluation/project title:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date completed:</td>
<td></td>
</tr>
<tr>
<td>Form completed by:</td>
<td></td>
</tr>
<tr>
<td>Name of evaluation panel members (if used):</td>
<td></td>
</tr>
<tr>
<td>Document storage:</td>
<td></td>
</tr>
</tbody>
</table>

### Evaluation question

<table>
<thead>
<tr>
<th>Line of evidence summary</th>
<th>Response to levels-of-evidence criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the evidence relevant to the issue?</td>
<td></td>
</tr>
<tr>
<td>Is the evidence expected to be in the study area?</td>
<td></td>
</tr>
<tr>
<td>Is there a reliable explanation for the evidence in the study area?</td>
<td></td>
</tr>
<tr>
<td>Is this evidence restricted to particular spatial or temporal situations?</td>
<td></td>
</tr>
<tr>
<td>Does the expected response always occur in the presence of the activity?</td>
<td></td>
</tr>
<tr>
<td>Are there consistent findings across different lines of evidence?</td>
<td></td>
</tr>
<tr>
<td>Is there a credible linkage between intervention and response?</td>
<td></td>
</tr>
<tr>
<td>Is there any other evidence that should be considered?</td>
<td></td>
</tr>
</tbody>
</table>

Record findings from combined assessment of all lines of evidence and develop response to the evaluation question
**Performance story charts**

The table below is recommended for use in this framework to summarise relevant performance story information. The logic should be presented with outcomes at the top so that key findings associated with outcomes appear first with the detail that follows reflecting the reasons why.

An additional column has been added to the chart to provide a quick reference to the evidence in support of the tabulated result.

Once an evaluation panel has assessed the lines of evidence as part of the MLLE approach, it is likely to be in a position to summarise its key findings for each of the evaluation questions in this format.

It should be noted that the performance story needs to be underpinned by the evidence that supports the findings.

**Performance story charts template**

<table>
<thead>
<tr>
<th></th>
<th>Hierarchy</th>
<th>Result</th>
<th>Supporting evidence reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix III: Evaluation examples

The advice and tools suggested by the evaluation framework for CMA natural resource management are applied below to several types of CMA evaluations at different scales: a natural resource management project and a Catchment Action Plan theme.

While they are illustrative only, they should provide some insight into how evaluation information may be gathered, documented and used for adaptive management.

The project evaluation applies many of the tools and processes suggested by the framework while the theme example suggests how the complexity of information may be managed in a logical framework.
Evaluation of a project

About the example

This example of a project evaluation demonstrates how to use the information and tools recommended in the evaluation framework for CMA natural resource management.

The ‘Riparian Rehabilitation Project’ referred to is not an actual project but is based on reality and designed to illustrate many of the useful features of the framework approach.

The example broadly follows the steps of the framework process. It shows how appropriate tools are used and is a compilation of the information required to report on the evaluation. It does not represent an actual evaluation report.

Project details

The Riparian Rehabilitation Project (RRP) is a joint venture between the Department of Environment and Climate Change (DECC), the CMA and ABC University. Its original objective was to contribute to meeting the catchment targets identified by the Catchment Blueprint process. The aim of the RRP is to rehabilitate an eight-kilometre stretch of river through revegetation and thus establish a self-sustaining, largely native, riparian community on both sides of the river.

Project background

The water quality and ecological condition of the river and its tributaries are highly degraded following nearly 200 years of intensive European land use within the catchment. Its degraded state is the result of extensive clearing of native vegetation, grazing of stock on river banks, channelisation, removal of logs from the river bed, the planting of introduced willows to reduce erosion, the introduction of other new species, and use of the river for waste disposal. It was considered that revegetation of the riparian areas (to at least 30 metres in width) would contribute to river health, terrestrial and aquatic habitat, and improved water quality (Bunn et al 1999; Lynch and Catterall 1999; Davies et al 2004).

Discussions between DECC, the university and several stakeholder representatives indicated broad interest in pursuing rehabilitation of an area of river bank. It was acknowledged early on that the initiative needed to be based on sound scientific principles so that the ecosystem restoration techniques used could be both demonstrated and evaluated.

After the RRP began, the CMA was established, prompting consideration of the project in a new context. DECC was interested in the project progressing but could only commit existing data and a small amount of staff time. The CMA was interested in the project, even though it pre-dated its own establishment, because riparian management is integral to its catchment plan. The university researchers were keen to continue and expand their research with the aim of further developing an understanding of river dynamics. Landholders wishing to rehabilitate their river bank and so improve their properties also wanted to be involved.

The CMA, local councils and the LandCare group had already taken responsibility for revegetating the public land on the left bank of the river. The right bank comprises parts of three properties and the CMA had developed agreements with each of the landholders or property managers to revegetate their river bank areas using incentive funding.
**Organisational structure**

The RRP is a consortium of partners from state and local government, the community and ABC University. The original partners, DECC and the university, were joined by the CMA to form the executive committee. This committee is responsible for strategic oversight of the RRP. The university employs a project manager and a research officer. The project manager is responsible for coordinating scientists and students, and for community liaison and management of the program’s operational aspects.

A stakeholder consultative committee (SCC) is a forum allowing the project’s major sponsors, stakeholders and the community to provide input. There are five permanent members of this committee, including community partners (the local Aboriginal Land Council, local councils and the LandCare group).

**Project goal**

The RRP seeks to revegetate eight kilometres of river bank to create an ecologically self-sustaining riparian plant community dominated by native species so that:

- river health is improved
- habitat is provided for native species
- the area becomes a valued community resource.

**Project objectives**

To create a riparian plant community through revegetation along an eight-kilometre stretch of river that:

- uses species that occurred or were likely to have occurred on the original riparian and floodplain landforms and provides a source of natural downstream colonisation
- provides habitat for terrestrial and aquatic indigenous species
- ensures bank stability
- improves water quality
- provides opportunities for community education and involvement in the project so that it is recognised as a valuable community resource.

**Relevant CAP targets**

During development of its Catchment Action Plan (CAP), the CMA identified pressures and issues affecting the region. Catchment and management targets were developed and documented in the CAP to address these pressures and issues.

The RRP will contribute to the following two catchment targets by 2016:

- improve or maintain the biodiversity of the CMA region
- improve the aquatic health and condition of streams in the CMA region.

It will also contribute to the following 2016 catchment management targets:

- regenerate 1000 kilometres of degraded native riparian vegetation
- protect an additional 1000 kilometres of native riparian vegetation
- stabilise 200 kilometres of unstable or degraded stream channels
Evaluation framework for CMA natural resource management

- protect an additional 10,000 hectares of native vegetation
- improve habitat to 1000 kilometres of stream channels.

**Funding and resources**

Funding established and required for the four years of the RRP is detailed in the following table:

**Funding for RRP**

<table>
<thead>
<tr>
<th>Income</th>
<th>(a) Commonwealth Government funds via the CMA</th>
<th>(b) State Government (cash and in-kind contributions)</th>
<th>(c) Local government (cash and in-kind contributions)</th>
<th>(d) Other contributor (cash and in-kind contributions)</th>
<th>(e) Total (a+b+c+d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds committed for Year 1</td>
<td>$100,000</td>
<td>$130,000</td>
<td>$40,000</td>
<td>$45,500</td>
<td>$315,500</td>
</tr>
<tr>
<td>Funds committed for Year 2</td>
<td>$50,000</td>
<td>$130,000</td>
<td>NIL</td>
<td>$12,500</td>
<td>$192,500</td>
</tr>
<tr>
<td>Funds proposed for Year 3</td>
<td>$50,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$12,500</td>
<td>$72,500</td>
</tr>
<tr>
<td>Funds proposed for Year 4</td>
<td>$50,000</td>
<td>$5,000</td>
<td>NIL</td>
<td>$12,500</td>
<td>$67,500</td>
</tr>
<tr>
<td>Total income</td>
<td>$250,000</td>
<td>$270,000</td>
<td>$45,000</td>
<td>$83,000</td>
<td>$648,000</td>
</tr>
</tbody>
</table>

**Monitoring**

Monitoring is required to determine whether the objective of creating a sustainable, largely native, riparian plant system within the RRP site has been achieved and to learn from the process. Monitoring was required to include the number of plantings and their area.

**Project status**

The RRP has been running for two years (approximately half the project term). The mid-term report has been received and an evaluation of progress and results is required. Details of progress to date include:

- approximately four kilometres of river bank has been planted with native/indigenous plant species, including approximately one-third of the public land on the left bank and two of the private properties on the right bank
- all of the public land and one of the private properties in the project area has been fenced to restrict cattle, in line with CMA requirements
- the project area on one of the private properties has not been fenced
- cattle have been reaching the river on the unfenced private area and since the landholder has undertaken the revegetation part of the work on this property, the cattle have been browsing the new seedlings
• one of the stakeholder partners in the project, the local LandCare group, was actively involved in planting in the early stages of the project, but some key members have moved on and it is unclear what the group’s future role will be

• monitoring of the RRP has commenced and the first annual report has been received, indicating $508,000 (approximately 78%) of the project funds have been spent or committed and 635 tree and shrub seedlings (15 species) planted

• a method of monitoring the survival and growth of individual plants is being developed (documentation available from the university but the method still being trialled)

• estimated plant survival rate is approximately 64% (data available from the university but graphical presentation of the data is provided)

• photo points have been recorded by the LandCare group on three occasions

• some baseline data exists and is available from DECC

• media releases have been picked up by the local newspaper and radio station and the regional television news

• four field days have been conducted and were well attended

• technical seminars are planned at the university

• trend analysis of turbidity data, vegetation extent data and seedling survival rate was provided

• university researchers attended a river management conference this year and presented a paper on the RRP.

References


Evaluation of the project

Evaluation of the RRP largely follows the steps outlined in the evaluation framework and used in the checklist for the whole evaluation cycle. This has been provided as an example of how the tools within the framework can be applied.

**Evaluation terms of reference**

Undertake an evaluation to determine if the CMA should provide ongoing funding for the RRP. To do this:

- the CMA will assess whether the implementation process is progressing as planned
- the CMA will assess the project’s progress toward planned outcomes
- information will be compiled by the project manager and the project team
- the evaluation will occur over a three-month period using existing funding
- evaluation findings will be reported to the CMA’s investment manager and project team.

**Evaluation context**

**Project goal:** To create an ecologically self-sustaining riparian plant community dominated by native indigenous species so that:

- river health is improved
- habitat is provided for native species
- the area becomes a valued community resource.

The RRP is half-way through its life cycle. Consider:

- efficiency – is the project using best practice, including current scientific and social knowledge?
- effectiveness – look at whether the project is heading towards its objective/outcomes.
## Stakeholder analysis

The following details the evaluation requirements, who needs the findings, how they will be reported and how they will be implemented.

### Defining stakeholder needs

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Who will use the evaluation findings?</th>
<th>How will they use the findings?</th>
<th>When and how will they want the findings?</th>
<th>Who will be affected by the findings and how?</th>
<th>How will the findings be communicated?</th>
<th>Who will implement the findings?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CMA</strong></td>
<td>Investment manager</td>
<td>Further investment Knowledge</td>
<td>3 months</td>
<td>CMA in relation to investment strategy, resources, future practices, large-scale experiments, public relations, accountability</td>
<td>Report to CMA</td>
<td>CMA in relation to accountability</td>
</tr>
<tr>
<td></td>
<td>Program manager</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring and evaluation officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DECC</strong></td>
<td>Science information</td>
<td>Knowledge</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Science and licensing staff</td>
</tr>
<tr>
<td></td>
<td>Licensing</td>
<td>Inform future investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ABC University</strong></td>
<td>ABC University</td>
<td>Knowledge</td>
<td>–</td>
<td>ABC University in relation to accountability, investment, knowledge, future practices</td>
<td>–</td>
<td>ABC University in relation to improved practices and knowledge taught</td>
</tr>
<tr>
<td></td>
<td>Project management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Department of Primary Industry</strong></td>
<td>Licensing</td>
<td>Knowledge</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Research on fisheries</td>
<td>Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mining companies</strong></td>
<td>Environmental officer</td>
<td>Public relations</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Mine manager</td>
<td>Investment in this and future projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Type of evaluation

The type of evaluation required can be identified by highlighting the cells of the following table. The required evaluation type is identified as the column where most information is appropriate from the evaluation context.

<table>
<thead>
<tr>
<th>Type of evaluation</th>
<th>Appropriateness</th>
<th>Efficiency</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is the purpose of the evaluation?</strong></td>
<td>CMA – ongoing relevance</td>
<td>Program improvement</td>
<td>Progress toward outcomes</td>
</tr>
<tr>
<td><strong>What stage of implementation has the project reached?</strong></td>
<td>In place 2 years – currently mid-term, no changes to plan</td>
<td>Program in place; established</td>
<td></td>
</tr>
<tr>
<td><strong>What aspect of the project should the evaluation focus on?</strong></td>
<td>Method of delivery</td>
<td></td>
<td>Progress toward outcomes – in terms of whether method of delivery will achieve outcomes</td>
</tr>
<tr>
<td><strong>At what stage during the project implementation should the evaluation occur?</strong></td>
<td>During</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Decision:**
Efficiency evaluation is required with consideration of method of delivery and potential to achieve outcomes.

Logic of the RRP

The logical relationships between project components can be identified using three tools: the conceptual model, results hierarchy and program logic for the RRP.
Evaluation framework for CMA natural resource management

Conceptual model of RRP

Cattle access to stream → Loss of riparian vegetation → Loss of vegetation habitat → Loss of shading of stream → Loss of carbon input to stream → Increased algal growth and potential bloom → Loss of aquatic species

Cattle access to stream → Loss of riparian vegetation → Increased sediment to stream → Loss of carbon input to stream → Increased water temperature → Low DO levels where bloom occurs → Loss of terrestrial species

Increased water temperature → Reduced aquatic health

Loss of carbon input to stream → Reduced terrestrial and aquatic habitat

Reduced terrestrial and aquatic biodiversity

References
ANZECC/ARMCANZ 2000, Australian and New Zealand guidelines for fresh and marine water quality
Moreton Bay Waterways and Catchment Partnership 2002, Ecosystem health report card 2004
NLWRA 2002, Australian catchment, river and estuary assessment 2002
Results hierarchy for RRP

RRP achieves ecologically self-sustaining riparian zone using locally sourced native species

- Riparian zone provides habitat and water quality improvements
- Stakeholders satisfied with project delivery using local species and colonisation downstream, bank stability works
  - Site prepared for planting and bank works
  - Local species are sourced and provided by local nursery
  - Stakeholders informed of project and involvement confirmed
    - Improvement in riparian zone meets community and environmental needs

Community sees the riparian resource as valuable

- Community has increased opportunity in ongoing involvement in project
  - Community has increased knowledge of riparian management
  - Community is exposed to information and awareness increases
    - Information is accessible by community groups
      - Information for community groups developed
### Evaluation framework for CMA natural resource management

#### Program logic for RRP

<table>
<thead>
<tr>
<th>Results hierarchy</th>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
</table>
| **Goal**          | To create an ecologically self-sustaining riparian zone dominated by native species, so that:                                                                                                                  | An ecologically self-sustaining riparian plant community is achieved if there is an improvement in:                                                                                                                | Improvement in river health as measured by Water Watch                                                                                                                                                    | Change in performance indicators over time                                                                  | Climate  
Land-use change  
Legislation/policy change  
Property ownership change  
Pest infestation                                                                                      | Assumes goal will be met if outcomes are implemented  
Assumes ecologically self-sustaining riparian community is achieved through:  
  • improved river health  
  • habitat provided for native species  
  • resource valued by community.                                                                                       |                                                                                                                                                    |                                                                                                                                                                                                                   |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |
|                   |  • river health is improved                                                                                                                                                                                   |  • river health                                                                                                                                      |  Increase in extent and condition of riparian vegetation                                                                                                                                                      |                                                                                                              |                                                                                                                                                                                                                    |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |
|                   |  • habitat is provided for native species                                                                                                                                                                     |  • habitat dominated by native species                                                                                                                | Change in community attitude                                                                                                                                                                               |                                                                                                              |                                                                                                                                                                                                                    |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |
|                   |  • the area becomes a valued community resource.                                                                                                                                                                |  • the community values the resource.                                                                                                                |                                                                                                                                                                                                               |                                                                                                              |                                                                                                                                                                                                                    |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |
| **Outcomes**      | Establishment of a native riparian vegetation community that uses species that occurred or were likely to have occurred on the original riparian and floodplain landforms and provides a source of natural downstream colonisation.                      | A native riparian vegetation community will be established if native/indigenous species are planted along the project area.                                                                                   | Extent of native riparian plant community established                                                                                                                                                         | Change in performance indicators over time                                                                  | Climate  
Land-use change  
Legislation/policy change  
Property ownership change                                                                                               | Assumes that planting native species will result in seed setting  
Assumes that riparian revegetation will provide a source of natural colonisation of native species downstream                           |                                                                                                                                                    |                                                                                                                                                                                                                   |                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |
### Evaluation framework for CMA natural resource management

<table>
<thead>
<tr>
<th>Habitat is provided for terrestrial and aquatic indigenous species.</th>
<th>Habitat is provided for terrestrial and aquatic species if a native riparian vegetation community is established</th>
<th>Extent of native riparian plant community established</th>
<th>Change in performance indicators over time</th>
<th>Climate</th>
<th>Land-use change</th>
<th>Legislation/policy change</th>
<th>Property ownership change</th>
<th>Assumes that riparian revegetation will provide habitat for terrestrial and aquatic indigenous species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank stability is ensured.</td>
<td>Bank stability will be ensured if a native riparian vegetation community is established</td>
<td>Extent of native riparian plant community established</td>
<td>Change in performance indicators over time</td>
<td>Climate</td>
<td>Land-use change</td>
<td>Legislation/policy change</td>
<td>Property ownership change</td>
<td>Assumes that riparian revegetation will ensure bank stability.</td>
</tr>
<tr>
<td>Water quality is improved.</td>
<td>Water quality will be improved if a native riparian vegetation community is established</td>
<td>Extent of native riparian plant community established</td>
<td>Change in performance indicators over time</td>
<td>Climate</td>
<td>Land-use change</td>
<td>Legislation/policy change</td>
<td>Property ownership change</td>
<td>Assumes that riparian revegetation will improve water quality.</td>
</tr>
<tr>
<td>Opportunity for community education and involvement is provided so that the riparian area is recognised as a valuable community resource.</td>
<td>Community is involved in the project and considers the project to be a valuable community resource</td>
<td>No. of community members participating in project</td>
<td>Change in community attitude over time</td>
<td>Climate</td>
<td>Change in demographics</td>
<td>Change in local economy</td>
<td>Assumes that the community will be interested in the project.</td>
<td></td>
</tr>
</tbody>
</table>

**Change in performance indicators over time**
- Climate
- Land-use change
- Legislation/policy change
- Property ownership change
### Evaluation framework for CMA natural resource management

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Description</th>
<th>Assessment</th>
<th>Risks and Constraints</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planting completed</strong>&lt;br&gt;(note ongoing maintenance)</td>
<td>Planting will be completed if 100% of planned planting is completed</td>
<td>No. (or %) of plants planted&lt;br&gt;No. (or %) of plants that survive</td>
<td>Planned versus actual planting&lt;br&gt;Planned versus actual plant survival</td>
<td>Climatic variables, including drought and flooding&lt;br&gt;Land-use change&lt;br&gt;Development pressure</td>
</tr>
<tr>
<td><strong>Four community field days undertaken</strong></td>
<td>Community education component of project will be completed if four community field days are undertaken</td>
<td>Community field days held</td>
<td>Planned versus actual field days held</td>
<td>Change in demographics&lt;br&gt;Change in local economy&lt;br&gt;Property ownership change</td>
</tr>
<tr>
<td><strong>Site preparation completed</strong></td>
<td>Site preparation will be complete if 100% of site is prepared for planting</td>
<td>Area (or %) of site prepared for planting</td>
<td>Planned versus actual site preparation</td>
<td>Delay in machinery availability&lt;br&gt;Climate – rain, flood&lt;br&gt;Unforeseen geological structures</td>
</tr>
<tr>
<td><strong>Incentive program delivered to landholders at completion of fencing</strong></td>
<td>Incentive program will be complete when landholders have completed fencing and received incentive funding</td>
<td>Amount ($) of incentive funds delivered</td>
<td>Planned versus actual funds delivered</td>
<td>Climate&lt;br&gt;Change in local economy&lt;br&gt;Property ownership change</td>
</tr>
<tr>
<td>Evaluation framework for CMA natural resource management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td><strong>Project manager employed</strong></td>
<td>Employment of project manager will be complete when recruitment process complete and position accepted</td>
<td>Date of project manager employment</td>
<td>Planned date of employment versus actual</td>
</tr>
<tr>
<td><strong>Funding received and invested</strong></td>
<td>100% investment of funding</td>
<td>% of funding invested in project</td>
<td>Comparison of desired versus actual investment in project</td>
<td>Inadequate funding for project requirements</td>
</tr>
<tr>
<td><strong>Contract for propagation of native plants finalised within required time frame</strong></td>
<td>Contract for native plant propagation will be complete when the contract is agreed and signed by both parties</td>
<td>Contract signed</td>
<td>Planned versus actual time frame to sign contract</td>
<td>Required seedling species may be unavailable</td>
</tr>
<tr>
<td><strong>Geomorphic survey of river completed prior to site preparation</strong></td>
<td>River survey will be complete if survey undertaken and geomorphic categorisation is completed</td>
<td>Geomorphic survey completed on time</td>
<td>Planned versus actual completion date for survey</td>
<td>Availability of geomorphic expertise</td>
</tr>
</tbody>
</table>
Broad efficiency evaluation questions

Based on the evaluation type identified, and an understanding of the project through an analysis of its logic, the efficiency evaluation questions are:

- What has been implemented or achieved by the project and how does this compare with what was planned? If there are variations, why?
- How do actual costs compare with planned/total costs by all sources?
- How does the method of delivery compare with best management practice (BMP)? Define BMP. Has there been additional investment? How and from where?
- What is the basis for undertaking the project? What supporting evidence is there? Is the project consistent with the evidence? Is the approach consistent with the conceptual model?
- Is the program logic sound and does the project respond to it?
- Is relevant monitoring in place?
**Evaluation design**

The following table expands on information requirements detailed in the program logic and documents the performance information required for the evaluation. It also allows documentation of what existing information may be available and who holds it.

**Information needs and available information**

<table>
<thead>
<tr>
<th>Evaluation questions</th>
<th>Performance information</th>
<th>Attributes</th>
<th>Recommended monitoring</th>
<th>Current attribute monitoring: by whom?</th>
<th>Additional required monitoring: likely source, surrogates, etc.</th>
<th>Comments/action: rationale for new info required, additional costs, info storage arrangements costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>What outputs have been achieved compared with what was planned?</td>
<td>Project reports Strategic plan</td>
<td>No. of media releases No. of field trips Ground prepared Seedlings planted</td>
<td>No. of media releases, field trips, planting area prepared, seedlings planted: University</td>
<td>No. of media releases, field trips, planting area prepared, seedlings planted: University</td>
<td>–</td>
<td>Outputs achieved as planned</td>
</tr>
<tr>
<td>How do actual costs compare with planned costs?</td>
<td>Strategic plan Planned investment Expenditure</td>
<td>Projected expenditure Detailed actual expenditure</td>
<td>Expenditure: CMA</td>
<td>Expenditure: CMA</td>
<td>–</td>
<td>Expenditure on track</td>
</tr>
<tr>
<td>How does method of delivery compare with planned method (assume ‘best management practice’ – BMP)?</td>
<td>Success of method Planned method (assumed BMP) BMP literature Current research Current knowledge</td>
<td>Change or otherwise of BMP Published riparian literature Recent relevant experience</td>
<td>Published riparian literature Recent relevant experience</td>
<td>–</td>
<td>Published riparian literature Recent relevant experience</td>
<td>Definition of BMP required and compare with practices being employed Currently cannot be evaluated University to record</td>
</tr>
<tr>
<td>Evaluation questions</td>
<td>Performance information</td>
<td>Attributes</td>
<td>Recommended monitoring</td>
<td>Current attribute monitoring: by whom?</td>
<td>Additional required monitoring: likely source, surrogates, etc.</td>
<td>Comments/action: rationale for new info required, additional costs, info storage arrangements costs</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Has additional investment been attracted as planned? From where?</td>
<td>Financial input Strategic plan – milestone</td>
<td>Funds received</td>
<td>Income/funds received</td>
<td>–</td>
<td>Income/funds received</td>
<td>No additional funds received as yet but museum considering providing additional funds CMA to record</td>
</tr>
<tr>
<td></td>
<td>Monitoring location, scale, frequency, etc.</td>
<td>Turbidity, nutrients, bed/bank stability, river styles, seedlings planted versus seedlings surviving</td>
<td>Seedling survival rate: University Water quality, bed/bank stability and river styles: Dept of Water and Energy</td>
<td>Seedling survival rate: University Water quality, bed/bank stability and river styles: Dept of Water and Energy</td>
<td>–</td>
<td>Relevant monitoring in place. Outcomes able to be evaluated but because of the lag in response by resource significant time frames (10 years) will be required.</td>
</tr>
<tr>
<td>Is relevant monitoring in place? Can/will outcomes be able to be evaluated?</td>
<td>Monitoring location, scale, frequency, etc.</td>
<td>Turbidity, nutrients, bed/bank stability, river styles, seedlings planted versus seedlings surviving</td>
<td>Seedling survival rate: University Water quality, bed/bank stability and river styles: Dept of Water and Energy</td>
<td>Seedling survival rate: University Water quality, bed/bank stability and river styles: Dept of Water and Energy</td>
<td>–</td>
<td>Relevant monitoring in place. Outcomes able to be evaluated but because of the lag in response by resource significant time frames (10 years) will be required.</td>
</tr>
<tr>
<td>What is the basis for undertaking this work?</td>
<td>BMP Research Literature Lessons learnt</td>
<td>Detail of method used Requirements of BMP</td>
<td>Literature Research Lessons learnt</td>
<td>–</td>
<td>Literature Research Lessons learnt</td>
<td>Regular review of literature, research, lessons learnt, etc. to be recorded by University to ensure work is valid.</td>
</tr>
<tr>
<td>Is the program logic logical?</td>
<td>Literature Recent experience Conceptual model Research</td>
<td>Current knowledge New knowledge of riparian systems</td>
<td>Literature Research Lessons learnt</td>
<td>–</td>
<td>Literature Research Lessons learnt</td>
<td>Review program logic in light of any change in knowledge Monitoring as above will be required</td>
</tr>
</tbody>
</table>
Information management

Since information collection, access and storage is undertaken by ABC University, the evaluation can consider the reported information and its collection methods.

Analysis of information

Based on the ABC University report on the project, analysis of information was undertaken against the evaluation questions. The questions and evaluation findings are documented in the following table.

Information analysis

<table>
<thead>
<tr>
<th>Evaluation questions</th>
<th>Evaluation findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>What outputs have been achieved compared with what was planned?</td>
<td>Outputs achieved as planned</td>
</tr>
<tr>
<td>How do actual costs compare with planned costs?</td>
<td>Expenditure on track</td>
</tr>
<tr>
<td>How does method of delivery compare with planned method (assume ‘best management practice’ – BMP)?</td>
<td>Definition of BMP required and compare with practices being employed</td>
</tr>
<tr>
<td></td>
<td>Currently cannot be evaluated</td>
</tr>
<tr>
<td>Has additional investment been attracted as planned? From where?</td>
<td>No additional funds received as yet</td>
</tr>
<tr>
<td>Is relevant monitoring in place? Can/will outcomes be able to be evaluated?</td>
<td>Relevant monitoring in place. Outcomes will be able to be evaluated but because of the response lag in vegetation growth, river system stabilisation and habitat development, significant time frames (10 years?) will be required.</td>
</tr>
<tr>
<td>What is the basis for undertaking this work?</td>
<td>Regular review of literature, research, lessons learnt is required to ensure the work is valid.</td>
</tr>
<tr>
<td>Is the program logic logical?</td>
<td>Review program logic in light of any change in knowledge.</td>
</tr>
<tr>
<td></td>
<td>Monitoring as above is required</td>
</tr>
</tbody>
</table>

Reporting and using findings

An evaluation report will be compiled to detail the evaluation process and findings. The report should provide the level of detail appropriate to the target audience. This will be developed from information recorded in establishing the evaluation context and, in particular, the documentation of stakeholders and their needs. In this case, the main reporting requirement is to inform the decision-making of CMA staff who are overseeing the project and investment decisions.

Adequate detail will be required to ensure that a clear argument is presented which:

- informs the audience of the issue
- specifically presents information that displays how findings were reached
- includes an explanation of the methods and tools used
- uses format and presentation tools appropriately
Evaluation framework for CMA natural resource management

- includes clear recommendations which in this case could be continuation of funding for the project, continued monitoring and adoption of lessons learnt into best management practices for use in future stream rehabilitation practices.

From this more detailed report, a summary report can be developed which could serve as an executive summary to the main report and modified into a fact sheet or flyer for broader community distribution.

**Using the findings to improve management**

The findings and recommendations of the evaluation will include the alteration of practices concerning project and investment management within the CMA. A process to consider adoption, implementation and communication of the changes will be undertaken. In this way, adaptive management can become a customary practice of the CMA.
Evaluation of a CAP theme

**About the example**

This example of the evaluation of a CAP theme (in this case relating to an estuary) demonstrates how to use the information and tools recommended in the evaluation framework for CMA natural resource management.

Estuarine processes and the effects of human activities on them are complex. As a result, an estuarine CAP requires a wide range of management actions to address estuarine health. While all aspects of an estuarine CAP have been considered for this example, only a subset of the potential management targets and management actions are included. These targets and actions were chosen to illustrate the evaluation tools and how their use could significantly improve management for estuarine health and so provide more potential to meet the CMA’s targets.

The tools provided in the evaluation framework for CMA natural resource management are able to be used at all scales. The tools for developing a logical framework at the CAP theme level are provided to illustrate the use of these tools at a higher and more complex scale. At this scale, these tools allow the concise documentation of levels of environmental management and the links between these levels. They provide a simplified representation of the thinking and planned activity which is the foundation of the CAP target.

This example illustrates the use of the following tools:

- A simple **conceptual model** which illustrates the major impacts on an estuary in a developing catchment: Many other impacts could be included and each activity associated with these could also be the basis for additional conceptual models.

- A simplified **results hierarchy**: Many more management actions are identified in a CAP but not all are included here. The actions included in the results hierarchy reflect those management actions that are considered most critical to achieving the respective management targets, based on the intent within the theme.

- A simplified **program logic table** which reflects the conceptual model and results hierarchy but the number of management actions included has been limited.
Simple conceptual model for CAP estuarine theme

- Bank instability and loss of wetlands
  - Inappropriate development in catchment
  - Poor stormwater management
  - Discharge of sewage effluent
  - Inappropriate land management

- Increased nutrient and sediment levels
  - Increased erosion
  - Effluent discharge from boats
  - Increased sedimentation

- Loss of seagrass beds
  - Burying of seagrass by sediment
  - Reduced light infiltration
  - Reduced estuarine habitat

- Loss of estuarine species
  - Loss of 'nursery' conditions for fish recruitment

- Reduced estuarine ecosystem function

References
ANZECC/ARMCANZ 2000, *Australian and New Zealand guidelines for fresh and marine water quality*
NLWRA 2002, *Australian catchment, river and estuary assessment 2002*
Results hierarchy for CAP estuarine theme

No decline and, where appropriate, improvements in estuarine ecosystem functioning as reflected in key indicators by 2014

- No net loss of extent of riparian and littoral vegetation and protection or rehabilitation of a minimum of 125 km foreshore in priority areas by 2016
- Improved stormwater management: No decline in stormwater quality from 2004 and 100% adoption of Water Sensitive Urban Design in new subdivisions by 2016
- Appropriate sewage management: Provision of reticulated sewage systems by 2016 and 100% compliance with on-site guidelines by 2016
- No discharge of sewage from boating to estuaries by 2016
- Progressive development, adoption and implementation of Best Management Practices (BMPs) for rural activities

Develop policy and influence decision-making
- BMPs for rural and urban areas and publicly owned land
- Sewage management systems

Community involvement and capacity
- Conservation agreements
- Education programs for rural and urban communities

On-ground investment
- Stormwater quality improvement projects
- Implement wetland restoration projects
- Riparian restoration projects
- Foreshore rehab projects
- Install vessel pump-out facilities
### Program logic table for a CAP estuarine theme

**CAP Target (‘CT’ or goal)**

<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
</table>
| No decline and, where appropriate, improvements in estuarine ecosystem functioning as reflected in key indicators by 2016 | No decline, or a measured improvement, in estuarine ecosystem functioning if:  
- no net loss in extent of riparian and littoral vegetation and protection or rehabilitation of 125 km of the foreshore in priority areas by 2016  
- no increase in stormwater nutrient and suspended solid concentrations  
- priority areas have reticulated sewerage systems by 2016  
- 100% compliance with on-site sewage management guidelines  
- no discharge of sewage from boats to estuaries  
- demonstrated adoption of best management practices (BMPs) for rural activities. | Estuarine performance measures  
Primary indicators:  
- chlorophyll $a$  
- extent of seagrass and macro-algae  
- modelled catchment nutrient loads  
- water quality indicators  
- extent of salt marsh and mangrove encroachment  
Secondary indicators:  
- seagrass depth  
- seagrass condition  
- phytoplankton composition  
- macro-algae blooms  
- growth of sediment fans  
- extent of mangroves and mudflats  
- shell fishery closures  
- faecal coliforms and enterococci in swimming areas | Trend over time to determine no decline or improvement  
Modelling to assess relative impact on reducing sediments and nutrients to the estuary of each management target (MT) if implemented | Climate  
Policy  
Inappropriate development  
Resourcing delays  
Limited behavioural change  
Existing pollutants in situ | Assumes that current catchment activities are causing a decline (baseline data is lacking in many cases)  
Assumes that excessive nutrient/sediment input to the estuary is the main stress factor on estuarine ecosystem functioning (MTs are focused on this issue)  
Assumes delivery on the MTs will achieve the CT. Some MTs may result in little change to overall nutrient/sediment inputs compared with others  
Priority areas in the MTs defined as those delivering relatively high values of sediment/nutrient. |
### Management Targets (‘MTs’ or outcomes)

<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
</table>
| No net loss of extent of riparian and littoral vegetation and protection or rehabilitation of a minimum of 125 km of stream and foreshore in priority areas by 2016 | No net loss of extent of riparian and littoral vegetation and protection or rehabilitation of a minimum of 125 km of stream and foreshore in priority areas by 2016 if:  
- riparian protection/rehabilitation projects implemented in partnership in priority streams  
- education programs for riparian management rationalised, integrated and built upon  
- foreshore protection/rehabilitation projects implemented in priority areas in partnership in three lakes. | Extent of riparian/littoral vegetation monitored remotely and on individual project scale  
Percentage of riparian/foreshore protection/rehabilitation projects undertaken successfully and length completed in priority areas for nutrient/sediment delivery (as defined by Riverstyles or catchment nutrient modelling where available). | Trend over time identified remotely (e.g. by air photo Interpretation) to determine no net loss in priority areas defined using Riverstyles  
Target of 125 km in priority foreshore areas by 2016 monitored at the project scale.  
Sediment/nutrient modelling pre- and post-projects to determine relative reduction in sediment/nutrient export to estuary as a result of successful project implementation  
Percentage change in community attitudes | Climate (e.g. prolonged drought may influence success at the project scale)  
Inappropriate development  
Resourcing delays | Priority areas (as defined using Riverstyles and/or sediment/nutrient modelling) for riparian/foreshore rehabilitation/protection/revegetation are assumed to be those contributing relatively large amounts of nutrient/sediment  
Success at the project scale will need to be monitored to account for issues such as flooding/drought, etc. |
## Evaluation framework for CMA natural resource management

<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
</table>
| Improve stormwater management | No decline in stormwater quality as measured by nutrient and suspended solids concentrations if:  
- riparian protection/rehabilitation projects implemented in partnership in priority urban streams which receive stormwater  
- wetland rehabilitation projects implemented in partnership in priority wetlands as defined by rehabilitation strategies  
- stormwater quality improvement projects implemented  
- education programs for stormwater management rationalised, integrated and built upon | Modelling to assess reduction in quality using MUSIC  
Pre- and post-survey of community attitudes/practices relating to improving stormwater quality | Trend over time to determine no decline in loads in developed catchments  
Comparison of loads between developing and undeveloped catchments  
Determination of net load  
Percentage change in community attitudes | Inappropriate development  
Conflicting policy  
Climate  
Existing nutrients in situ – time lag  
Lack of resources/commitment within local government | Priority urban streams (as defined using Riverstyles) are assumed to be those actively contributing sediment/nutrient from stormwater  
Priority wetlands are those that will assist in treating/receiving stormwater before it enters estuarine systems  
Predicting the effect of stormwater management using modelling is appropriate |
<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate sewage management for unsewered urban and light industrial areas, villages, rural areas and recreational areas</td>
<td>Priority areas are on reticulated sewerage systems by 2016</td>
<td>Percentage of reticulated sewage systems commissioned in priority areas</td>
<td>Target of 100% compliance by 2016</td>
<td>Availability of investment for reticulated system</td>
<td>Priority areas are defined as those having high potential for contribution of nutrients to the estuary defined from the Small Town Sewage Priority program (priorities may require reassessment using more rigorous method). Legislative responsibility for the councils to license these</td>
</tr>
<tr>
<td>No discharge of sewage from boating to estuaries by 2016</td>
<td>No discharge of sewage from boating to estuaries</td>
<td>Surrogate based on installation of pump-out facilities</td>
<td>Percentage of installed versus planned (required) pump-out and disposal facilities</td>
<td>Availability of pump-out facilities</td>
<td>Proportion of boating effluent was directly disposed into estuaries where facilities were not available</td>
</tr>
<tr>
<td>Progressive development, adoption and implementation of BMPs for rural activities</td>
<td>Demonstrated adoption of BMPs for rural activities (which potentially lead to nutrient/sediment input to estuaries) if: • new BMPs developed or existing practices reviewed • education programs for BMPs rationalised, integrated, implemented.</td>
<td>Qualitative survey on adoption/awareness of relevant BMPs which will result in a reduction in sediment/nutrient loads if implemented Decreased loads based on nutrient modelling (if modelling not problematic)</td>
<td>Trend over time of changed community awareness/ adoption Change in modelled loads</td>
<td>Economic climate for primary producers Changing land use Lack of extension program to assist with implementation</td>
<td>Survey will need to be designed so that the spatial area of BMP adoption can be determined for modelling purposes Technical resources to undertake modelling are available</td>
</tr>
</tbody>
</table>
### Management Actions ('MAs' or outputs)

<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement riparian protection/rehabilitation projects through partnerships with local landholders in priority streams and integrate with other appropriate rehabilitation actions</td>
<td>Riparian rehabilitation and improvement projects implemented through the total investment strategy and undertaken in priority areas reduce nutrient and sediment input to estuaries</td>
<td>Riparian protection or rehabilitation projects successfully completed in priority areas Numerical modelling to determine estimated reduction in nutrients</td>
<td>Change in modelled nutrient loads (if available) Percentage of sampled projects that meet their performance measures, including change in length (measure of success)</td>
<td>Unwillingness of landholders to participate Availability of suitable seed stock Climate Lack of extension program</td>
<td>Will require relevant performance measures to be developed and measured at the project scale Technical resources to undertake modelling are available</td>
</tr>
<tr>
<td>Rationalise, integrate and build on existing education programs for both rural and urban communities</td>
<td>Delivery of an integrated and accessible education strategy and programs through a total investment strategy that addresses priority issues, leading to a reduction in potential for waterway contamination</td>
<td>A strategy for rationalisation of education programs is completed Awareness of revised programs specific to estuarine health (via targeted survey)</td>
<td>Completed as per project requirements in the total investment strategy Percentage increase in awareness/adoption</td>
<td>Availability of suitable contractors Cross-organisational agreement of rationalisation of programs</td>
<td>Increased awareness and adoption will lead to a reduction in nutrient and sediment delivery to estuaries</td>
</tr>
<tr>
<td>Planned results</td>
<td>Success factors</td>
<td>Performance measures</td>
<td>Basis for comparison</td>
<td>External factors</td>
<td>Assumptions and/or comments</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Implement wetland rehabilitation projects through partnerships with community groups and landholders for priority wetlands</td>
<td>Where the relevant components of the total investment strategy are successfully implemented, a reduction in sediment/nutrient delivery to estuaries or improved salt marsh communities</td>
<td>Wetland projects in priority areas successfully completed Numerical modelling to determine estimated reduction in nutrients (use surrogate of successful project completion where modelling problematic)</td>
<td>Change in modelled nutrient loads (if available) Percentage of sampled projects that meet their performance measures (measure of success)</td>
<td>Unwillingness of landholders to participate Community groups have different priorities Climate delaying work</td>
<td>Priority wetlands are those which have a capacity to improve water quality prior to its entry to estuaries or include salt marsh communities Will require relevant performance indicators to be developed and measured at the project scale Technical resources to undertake modelling are available</td>
</tr>
<tr>
<td>Implement stormwater quality improvement projects. Priority projects to be identified within Stormwater Management Plans (SMPs)</td>
<td>Where relevant components of the total investment strategy are successfully implemented, stormwater quality improvement projects for the three priority lakes will result in a reduction of nutrient/sediment input to estuaries</td>
<td>Priority stormwater projects are successfully completed Numerical modelling to determine estimated reduction in nutrients</td>
<td>Change in modelled nutrient loads Percentage of sampled projects that meet their performance measures (measure of success)</td>
<td>Councils do not develop SMPs Council SMPs' priorities are not consistent with the CAP</td>
<td>Councils will develop performance indicators for each project to measure its success Type of stormwater works used are appropriate for the catchment</td>
</tr>
<tr>
<td>Planned results</td>
<td>Success factors</td>
<td>Performance measures</td>
<td>Basis for comparison</td>
<td>External factors</td>
<td>Assumptions and/or comments</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
| Develop new or review existing regional BMPs for rural activities and publicly owned land to address:  
  • establishment and management of riparian/littoral zones and wetlands  
  • activities including chemical and fertiliser application, water efficiency, sedimentation and erosion control. | Where the relevant components of the total investment strategy are successfully implemented and adopted, new or revised BMPs for rural activities are developed. | Activities for BMP identified  
BMPs for the activities are completed  
BMPs adopted by community and area under BMP  
Modelled reduction in nutrient/sediment input (where available) | Percentage of sampled projects that meet their performance measures (measure of success)  
Trend over time of changed community awareness/adoption of BMPs (targeted survey)  
Pre- and post-implementation modelled results | Availability of suitable contractors  
Conflicting local and state policies | Adoption of BMPs will lead to a reduction in nutrient and sediment input to estuaries  
Technical resources to undertake modelling are available |
| Implement conservation agreements in partnership with landholders and community groups for regionally significant ecosystems | Where the relevant components of the total investment strategy are successfully implemented, conservation agreements in partnership with landholders and community groups for regionally significant ecosystems in areas identified as priority for reducing nutrient/sediment input to estuaries are implemented. | Number and geographical location of conservation agreements in place in sensitive riparian or soil type areas | Percentage of sampled projects that meet their performance measures (measure of success)  
Land-use change or planning changes | Protection of existing sensitive environments will reduce future risk of instability/erosion  
Priority areas based on Riverstyles and soil derivative maps are sensitive to erosion areas |
<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement foreshore rehabilitation/protection</td>
<td>Where the relevant components of the total investment strategy are successfully implemented, foreshore rehabilitation and protection projects result in a reduction of nutrient/sediment input to estuaries or protection of salt marsh/mangrove communities.</td>
<td>Priority foreshore projects successfully completed</td>
<td>Percentage of sampled projects that meet their performance measures (measure of success) Change in modelled nutrient loads (if available)</td>
<td>Community groups have different priorities Climate delaying work</td>
<td>May be difficult to model nutrient loads generated by foreshore projects (simple sediment budget estimate may be required)</td>
</tr>
<tr>
<td>Identify deficient sewage management systems including those associated with rural, urban and industrial, public recreation, reticulation systems</td>
<td>Where the relevant components of the total investment strategy are successfully implemented, deficient sewage management systems are identified. Treatment of deficient systems leads to a reduction in nutrient inputs to estuaries.</td>
<td>Deficient sewage management systems identified Number identified Number corrected Numerical modelling to determine estimated reduction in nutrients</td>
<td>Percentage of sampled projects that meet their performance measures (measure of success) Change in modelled nutrient loads</td>
<td>Not seen as priority Systems can not manage increasing populations or change in industry Budgetary constraints</td>
<td>Councils will develop performance measures for each project to measure its success Part of the councils’ legislative responsibility Technical resources to undertake modelling are available</td>
</tr>
<tr>
<td>Install vessel pump-out facilities</td>
<td>Where the relevant components of the total investment strategy are successfully implemented, vessel pump-out facilities are installed, leading to a reduction in nutrient input to estuaries.</td>
<td>Pump-out facilities installed Facilities used (targeted survey) Numerical modelling to determine estimated reduction in nutrients</td>
<td>Percentage of sampled projects that meet their performance measures (measure of success) Change in modelled nutrient loads (or surrogate) Usage over time</td>
<td>Not seen as priority by NSW Waterways Recreational water users do not use facilities</td>
<td>Prior to installation of facilities a proportion of boat users disposed of effluent directly into the water body</td>
</tr>
</tbody>
</table>
### Inputs

<table>
<thead>
<tr>
<th>Planned results</th>
<th>Success factors</th>
<th>Performance measures</th>
<th>Basis for comparison</th>
<th>External factors</th>
<th>Assumptions and/or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment Plan requiring:</td>
<td>100% of desirable investment in Management Actions (outputs or MAs) that address the estuarine catchment (CAP Target or goal) and Management Targets (MTs or outcomes) is achieved and will lead to the Catchment Target being met.</td>
<td>Implementation strategy implemented Contracts and SLAs implemented where required CMA has systems in place to manage process (including monitoring and reporting at all scales) Proportion of desired investment for each MA achieved</td>
<td>Comparison of desired versus actual investment for each MA</td>
<td>External organisations delay implementation process CMA establishment and transitional delays Policy/legislation change Lack of funding</td>
<td>Achievement of 100% desired investment in the relevant MAs will result in meeting the CAP Target</td>
</tr>
</tbody>
</table>
Appendix IV: Evaluation tips

Effectively setting up an expert evaluation panel and preparing a convincing evaluation report can be fundamental to program improvement.

An evaluation panel can lend significant authority to evaluation findings as stakeholders can be confident that both the evaluation process and its findings have been scrutinised by skilled natural resource management and evaluation experts. Similarly, a well written and delivered evaluation report will add weight to the evaluation findings and recommendations.

Key points to consider for each of these are provided below.
Establishing an evaluation panel

Establishing and running an evaluation panel needs considerable planning and effort to be successful. Some key points are described below.

Select panel members carefully: Ensure that a range of skills is represented and, if possible, a range of views so that findings are valid and credible. Where possible, also try to include some members who represent collaborators or clients so that evaluation needs are considered throughout the panel process. Include a panel member who is common to the evaluation panel for each CAP theme or compile a panel that crosses the range of themes so that cross-benefits or issues can be identified and reported on.

Use an independent and skilled chair or facilitator: This will ensure that the panel process runs smoothly and allows others to support information and deliberation requirements.

Provide a comprehensive package of information to the panel in advance of the first meeting so that members have time to consider all information necessary to the evaluation, including its purpose, how the panel will be run and its terms of reference. Ensure adequate time is allowed for preparation of the information package because input from many collaborators may be required.

Hold an introductory panel meeting to agree on the panel process, information needs, timing of meetings and other detail related to the evaluation panel process. This will enable panel members to identify any additional information required or alternative analysis of existing information that may inform the panel evaluation.

Provide technical support officers to present technical advice to the panel where required. Team members who have been involved in developing the project or program, the logical framework and the evaluation plan will be valuable to the panel.

Provide administrative support to record and distribute all information presented, fact or understanding raised and deliberations of the panel. Use an agreed worksheet to record deliberations. Administrative support should be provided by an officer with technical skills in the relevant area.

Ensure that panel members’ comments and recommendations are agreed to prior to final documentation in the evaluation report.

Ensure that panel members are able to view the draft report before its finalisation and distribution.
Writing effective evaluation reports


**Determine the scope of the report:** Be clear about the purpose of the report and keep this in mind when collecting information and reporting findings and recommendations.

**Consider the target audience, its needs and decision-making processes** when determining the report’s style and format including:

- audience demographics, such as age, alliances, attitudes, etc.
- education level, especially in regard to experience and knowledge of NRM
- responsibility for decision-making
- level of detail required and background needed
- level of technical language and need to define terms, perhaps in a glossary
- how to assist understanding by using visual aids.

**Gather and organise information** by providing:

- background information with objectives, project plans, investment plans, policy environment, etc.
- methodologies used in collecting information and managing it
- literature that was used to guide and inform programs and projects
- historical information, such as baselines or needs analyses
- records of experiences and external influences
- visual tools such as graphs, tables, etc.

**Analyse and weigh information** so that findings are balanced and justifiable, numbers reported are explained and their significance identified, analysis methods are documented and findings are weighed in the context of internalities and externalities.

Present **findings and recommendations** in a non-threatening and efficient manner so that ongoing improvement is not jeopardised. Ensure that findings, which could be seen as negative, are reported constructively.

**Report format** must reflect the purpose, audience, kind of information being reported and desired outcome. Ensure information is conveyed accurately and objectively. Presentation quality will influence the perception of information quality, so ensure the report is accurate, concise and that punctuation and grammar emphasise intended meaning.

Use an **evidentiary approach** which illustrates the relationship between the facts and the recommendations and thus instils confidence in stakeholders and audiences.
Glossary of evaluation terms

This glossary includes common terms, definitions and abbreviations used in the evaluation framework. Unless stated otherwise, definitions have been sourced from:

Department of Finance 1994, Doing evaluations: A practical guide, Commonwealth of Australia, Canberra


**Accountability line**  
The level within the results hierarchy to which a program’s results could be considered reasonable. The level to which a program could be held accountable.

**Adaptive management**  
An approach that involves learning from management actions and using that learning to improve the next stage of management (Holling CS 1978, Adaptive environmental management and assessment, Wiley, Chichester).

**Appropriateness evaluation**  
An evaluation that will assist in deciding the need for, and nature of, a proposed new program. May not only be applied at planning stage but over the life of a longer term program, particularly if the political, economic, environmental or social context changes.

**Attributes**  
The data layers or components that will inform a performance indicator against its target or basis for comparison

**BMP**  
Best management practices or principles

**CAP**  
Catchment action plan

**CMA**  
Catchment management authority

**Commissioner**  
Instigator or authority for the evaluation

**Compliance audit**  
An examination of procedures, systems, program documentation and controls that have been implemented, i.e. considers how actual inputs, processes and outputs comply with those that were intended.

**DECC**  
Department of Environment and Climate Change NSW

**DNR**  
Department of Natural Resources (NSW)

**Effectiveness evaluation**  
Examines extent to which program objectives or desired outcomes have been achieved. Will also measure factors that affect achievement and relationships between program implementation and measured outcomes. These evaluations are usually conducted when a program is well established.

**Efficiency evaluation**  
Evaluates the inputs and processes used to produce the outputs of the program. Will be undertaken throughout the life cycle of the program.

**Evaluation**  
A systematic and objective assessment of a program’s appropriateness, efficiency or effectiveness (or a combination of these). Evaluation findings are used to manage a program adaptively.

**Evaluation commissioner**  
Person or organisation requesting the evaluation
### Evaluation framework for CMA natural resource management

**Externalities**  Those factors or risks outside the control of a program or organisation, but which may still impact on the delivery of that program

**GIS**  Geographic information system

**Inputs**  Resources (e.g. human or other) used to produce program outputs

**MER**  Monitoring, evaluation and reporting

**MLLE**  Multiple lines and levels of evidence

**NFST**  National Framework for Natural Resource Management Standards and Targets

**NLWRA**  National Land and Water Resources Audit

**NMEF**  National Natural Resource Management Monitoring and Evaluation Framework

**NRC**  Natural Resources Commission

**NRM**  Natural resource management

**Objectives**  Concise, realistic outcome-styled statements about what a program is aiming to achieve

**Outcome hierarchy**  The arrangement of the results (measured or desired) of a program in an ordered sequence from lowest to highest. Usually represents the relationship between the results of inputs, outputs and outcomes.

**Outcomes**  All the consequences of a program beyond its outputs. Outcomes are usually longer term and may be intended or unintended.

**Outputs**  The products or services that are produced by a program. Often more tangible and measurable than outcomes.

**Performance information**  Qualitative or quantitative evidence that is collected and used to address the evaluation questions


**Qualitative**  Descriptive form of performance information. May be collected through surveys or observations.

**Quantitative**  Numerical form of performance information

**SoE Report**  State of the Environment Report

**Unanticipated outcomes**  Outcomes not predicted to be caused by a program. They may be positive or negative outcomes in terms of the program. These types of outcomes should be considered during the logical framework approach.
Further reading


DIPNR 2005, *Guidelines for an integrated Catchment Action Plan, annual implementation program and investment strategy*, working draft, Department of Infrastructure, Planning and Natural Resources, Sydney.


Funnell, S 1990, *Developments in the use of the NSW approach to analysing program logic*, major issue no. 5 review paper, NSW Office of Public Management, Sydney.


