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Guidelines for Target Setting in Regional Natural Resource Management Planning



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1 Introduction

A target is a fixed goal or objective over time. In the context of natural resource planning and management, targets may relate to absolute improvements in resource condition, changes in the rate of degradation or percentage changes on related issues. Targets are a commitment that the fixed goal or objective will be met to an agreed level within a specified timeframe and are used to formally measure the success of a program (or activity). As such, targets involve more than a statement of ambition.

Targets enable:

- Quantification of desirable outcomes,
- Management of the cumulative impacts of actions at various sites,
- Comparison of the environmental (ecological), economic and social benefits and costs of different actions,
- Selection of the most cost-effective actions to address natural resource management (NRM) issues, and
- Success of a program (or activity) to be measured. (NSW Government 2000a)

Targets are tools to be used in regional natural resource management (NRM) planning in Queensland. This approach was adopted to:

- Guide the type and location of management actions and capacity building.
- Measure performance, and
- Improve the planning focus and action on resource condition, including change in land and water management systems and practices to improve resource condition.

Regional NRM Bodies (regional bodies) will be setting targets and these are central to each regional NRM plan. NRM targets may be quantitative or may include processes for obtaining information for the development of quantitative targets by a nominated time. This module is focused on providing guidance for developing quantitative NRM targets from current resource condition and trend information. Further guidance the module “Best Practice NRM Planning” is available which focuses on best practice regional NRM planning from which NRM targets may be developed.

For clarity, regional bodies should articulate in detail (preferably in the regional NRM plan) the processes and strategies used to develop targets from resource information (see section 3.1).

1.1 Defining targets and standards

There are three types of targets to be developed in a regional NRM plan.

Aspirational targets

Aspirational targets are about the desired condition of natural resources in the longer term (20 – 50+ years) and represent the regional NRM vision or goal. These targets are used to guide regional planning.

Resource condition targets

Resource condition targets are specific, time-bound and measurable, relating to the condition of natural resources in the medium term (10 – 20 years). Resource condition targets should emphasise practical constraints for targets given the social and economic context.

Management action targets

Management action targets relate to management actions or capacity building, which contribute to resource condition targets. These are short term achievements (1 – 5 years).

Standards

Standards refer to a stated level of quality that is considered acceptable, usually by an established authority. In the NRM context there are a number of relevant standards, for example, those that relate to the collection, analysis and interpretation of data. Some NRM issues are subject to regional and local variations and guidelines are more appropriate than standards. Guidelines are statements

offering advice on the implementation of policy or the preferred approach for implementation. For example, guidelines for developing water quality targets and resource planning guidelines.

1.2 Guidance for target setting

This module is aimed at Regional NRM Body executive and support staff, members of technical advisory panels, consultants undertaking work on behalf of Regional Bodies, Government Agency staff and Regional Body members taking a particular interest in the target setting process. The document provides a framework and some detailed information for setting targets through the regional NRM planning process in Queensland. It is consistent with the agreed national approach.

In this module, information to guide the appropriate establishment of targets in regional NRM plans is provided for accreditation of regional NRM plans under the National Action Plan for Salinity and Water Quality (NAP), and the extension of the Natural Heritage Trust (NHT2). Reference is also made to the Great Barrier Reef Water Quality Protection Plan 2003 in relation to target setting in reef catchments. Future versions may also address other relevant, regionally delivered programs such as the Coastal Catchment Initiative and the National Landcare Program.

To be consistent with continuous improvement principles of the NRM planning process, and adaptive management approaches, 1st generation and 2nd generation considerations for target setting are described. First generation considerations are needed for NRM Plans to be accredited. Accreditation of first generation plans will take into account available levels of information for target setting. Provided plans demonstrate adaptive management, targets and actions that address priority natural resource outcomes and processes for continuous improvement of targets, accreditation and funding should follow. Second generation considerations should be addressed in subsequent reviews of the regional NRM plan and annual reviews of the Regional Investment Strategy. Accreditation considerations also refer to issues which “might be” included in the planning process in the interest of fully integrating NRM issues and planning at the regional level.

Although this module provides specific guidance on the target setting process, for broader guidance on the regional NRM planning process in Queensland, it should be read in conjunction with:

- *Guidelines for developing a Regional Natural Resource Management Plan and Regional Investment Strategy*, provides a summary interpretation of the Bilateral and National Frameworks to which Queensland has agreed, including the process for setting regional targets;
- *Regional Investment Strategy*, guides NAP and NHT2 investments based on management action targets in regional NRM plans;
- *Queensland Monitoring and Evaluation Implementation Plan for National (Australian Government and State) Programs*, sets out the considerations for monitoring, evaluation and reporting of targets in regional NRM plans; and
- *Best Practice Natural Resource Management Planning*, describes accepted processes and policies for effective regional NRM planning in Queensland.

The relationship of the target setting module, to other guiding products is shown in **Figure 1-1**.

1.3 This document

This document, **Module 5a** sets out definitions, process steps and accreditation considerations for setting targets in regional NRM plans. The style and approach is to provide guidance not prescription. Sections in this module consist of:

- Background Information outlining national and Queensland issues to be considered in the target setting process.
- Process steps including a recommended approach for target setting and detailed accreditation considerations.

State guidance on target setting for the (ten) resource condition matters for targets are detailed in **Module 5b**, *State Guidance for Target Setting in Regional Natural Resource Management Planning*. Module 5b provides reference to state resources and guiding information including State level targets and standards (where available), plans, strategies, policies and relevant legislation, information on methods and other resources to be considered in the target setting process.

REGIONAL NRM PLANNING GUIDING INFORMATION PRODUCTS

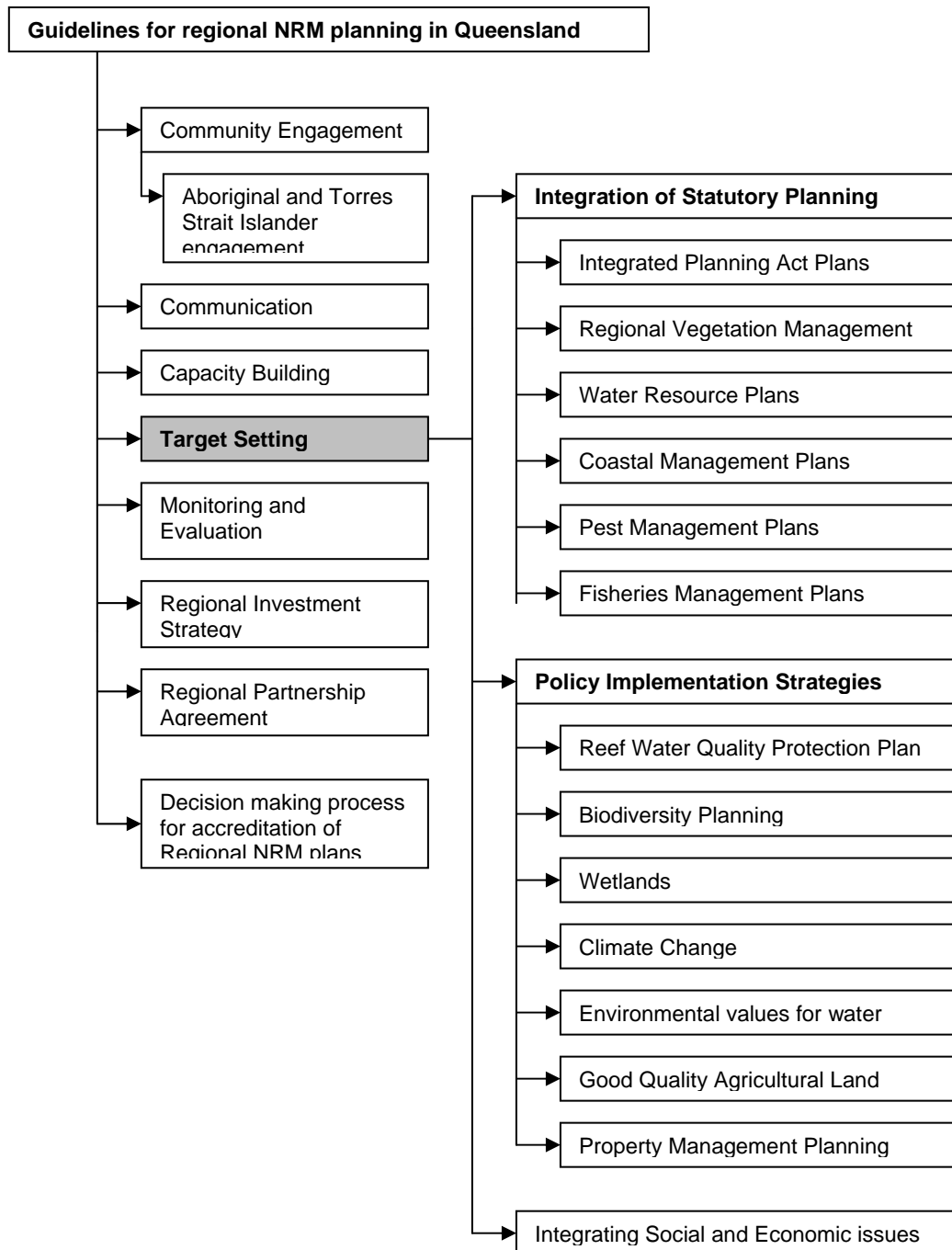


Figure 1-1: Guidance products for regional NRM planning in Queensland

2 Background

The NAP Bilateral¹ requires that an accredited Regional NRM plan must contain regional targets for salinity, water quality and associated water flows, and stream and terrestrial biodiversity and that regional NRM plans establish regional targets for

- (i) the minimum set of issues identified in the *National Framework for NRM Standards and Targets* and;
- (ii) other issues of specific relevance to the region.

The NHT2 Bilateral requires an accredited Regional NRM plan to contain regional targets that address the minimum set of matters for target. (Note that the minimum set of issues described in the National Standards and Targets Framework has been revised to include issues related to achieving the objectives of the NHT2 program.)

2.1 National Framework for NRM Standards and Targets

The *National Framework for NRM Standards and Targets* (Standards and Targets Framework) establishes the principles and requirements for NRM standards and targets to guide investment from national NRM programs (particularly NAP and NHT2) through regional NRM plans. It comprises of:

- Desired national natural resource outcomes are aspirational statements including the objectives of the NAP and NHT2, for example;
 - The impact of salinity on land and water resources is avoided or reduced,
 - Populations of significant species and ecological communities are maintained or rehabilitated.
- These national outcomes provide direction to Regional Bodies in identifying targets, which will progress towards achieving the desired national natural resource outcomes.
- National standards defining best management practice to assist achievement of national outcomes.

Matters for Target

The Standards and Targets Framework specifies the minimum matters for target a Regional Body should consider in setting regional targets. These matters for target represent the issues to be addressed in order to achieve the nationally agreed outcomes. **Table 2-1** shows the desired national natural resource outcomes and associated matters for target. For example, the land salinity, matter for target should be addressed at the regional level in order to achieve the national outcome of minimising, avoiding and/or reducing the impact of salinity on land and water resources. If matters for target are not significant in a region the NRM Plan should explain why the matter for target is not applicable. For example, estuarine, coastal and marine habitats are not necessary to consider by land-locked catchments. The matters for target should also be considered in subsequent reviews of the NRM Plan and annual reviews of the Regional Investment Strategy.

¹ An Agreement Between the Australian and Queensland Governments for the Implementation of the Intergovernmental Agreement on a National Action Plan for Salinity and Water Quality.

Table 2-1: National outcomes and minimum set of matters for targets

National Outcomes The national outcomes are aspirational statements about desired national natural resource outcomes	Matters for which Regional Targets must be set
	Resource Condition Matters for Targets
<ol style="list-style-type: none"> 1. The impact of salinity on land and water resources is avoided or reduced. 2. Biodiversity and the extent, diversity and condition of native ecosystems are maintained or rehabilitated. 3. Populations of significant species and ecological communities are maintained or rehabilitated. 4. Ecosystem services and functions are maintained or rehabilitated. 5. Surface and groundwater quality is maintained or enhanced. 6. The impact of threatening processes on locations and systems which are critical for conservation of biodiversity, agricultural production, towns, infrastructure and cultural and social values, is avoided or minimised. 7. Surface water and groundwater is securely allocated for sustainable production purposes and to support human uses and the environment, within the sustainable capacity of the water resource. 8. Sustainable production systems are developed and management practices are in place which maintain or rehabilitate biodiversity and ecosystem services, maintain or enhance resource quality, maintain productive capacity and prevent and manage degradation. 	<ol style="list-style-type: none"> 1. Land salinity. 2. Soil condition. 3. Native vegetation communities' integrity 4. Inland aquatic ecosystems integrity (rivers and other wetlands). 5. Estuarine, coastal and marine habitats integrity 6. Nutrients in aquatic environments. 7. Turbidity / suspended particulate matter in aquatic environments. 8. Surface water salinity in freshwater aquatic environments. 9. Significant native species and ecological communities. 10. Ecologically significant invasive species.
	<p style="text-align: center;">Management Action Matters for Targets</p> <p>Critical assets identified and protected.</p> <p>Water allocation plans developed and implemented.</p> <p>Improved land and water management practices adopted.</p>

2.2 National NRM Monitoring and Evaluation Framework

Accountability for achieving targets for natural resource condition should also be taken into consideration when setting targets. Regions will be required to report progress against management action targets, with on-going investment linked to the achievement of these targets. The *National NRM Monitoring and Evaluation Framework* <http://www.deh.gov.au/nrm/monitoring> is aimed as assessing progress related to the health of the nation's land, water, vegetation and biological resources.

The Framework is based on a set of principles for the monitoring, evaluation and reporting of natural resource condition and provides indicators on the assessment of:

- Change in resource condition,
- Adoption of sustainable development and production techniques,
- Community processes relevant to, or affected by, NRM programs.
- Institutional, social and economic matters related to the above, and
- Program performance.

The Framework also proposes indicators for resource condition, minimum matters for target, and is developing protocols for measurement. These indicators and measurement methods represent a nationally agreed position for monitoring resource condition and ensure national consistency in monitoring and reporting. The use of consistent measurement methods particularly for resource condition is proposed to ensure that regional information on these indicators can contribute to developing a state and national picture of resource condition and trend. **Appendix A.** <http://www.ea.gov.au/nrm/monitoring/index.html>.

2.3 State considerations for target setting

A number of modules provide information on integration of regional statutory planning processes and policy implementation strategies (**Figure 1-1**). Information in these modules should assist regional bodies to ensure targets and actions in NRM plans comply with relevant Commonwealth and State legislation, and complement statutory and non-statutory planning processes and actions (e.g. vegetation, coasts, biodiversity, water resources, integrated planning, pest management, fisheries management and reef water quality).

Accredited regional NRM plans are intended to guide NAP and NHT2 investment. Regional Bodies may also use accredited Plans to attract other sources of investment. As such Regional Bodies need to address the full range of regionally relevant NRM issues, some of which may fall outside of the scope of activities to be funded under the NAP and NHT2 programs.

Linking to the above planning processes and of particular interest to the target setting process are also:

- Environmental values and water quality objectives; and
- Reef Water Quality Protection Plan 2003.

2.3.1 Environmental values and water quality objectives

The *Environmental Protection Policy (Water)*, 1997 is a framework for identifying environmental values for aquatic environments (ecological, economic, social and cultural values) and determining water quality objectives for the protection of these values. The Environmental Protection Agency (EPA) is responsible for administering the EPP (Water) and has developed a Standard Operating Procedure (SOP) for the identification of environmental values and determining water quality objectives. The EPP (Water) provisions are applicable to the development of regional NRM plans and must be addressed. For more detailed information on environmental values refer to Module 21.

Water quality objectives

Water quality objectives are measurable criteria which, when met, support and protect the environmental values of a waterway. They are based on scientific criteria such as water quality guidelines, but may need to be modified by social or economic information. For example:

- Turbidity of less than 30 NTU.
- Diversity of macro-benthos to be greater than 0.6 (units)
- Maintenance of seagrass depth range to at least 5 m.

Water quality objectives represent a sub-set of resource condition targets, that is targets for water quality and aquatic biodiversity. Similar to other resource condition targets they need to be agreed through a process that includes identifying and trading off ecological, social and economic impacts. In developing water quality objectives there are a suite of guidelines for indicators that will protect water quality for the environmental value under consideration including the National Water Quality Guidelines (ANZECC & ARMCNAZ 2001) and the Queensland Water Quality Guidelines, 2004.

2.3.2 Reef Water Quality Protection Plan (RWQPP)

The reef water quality protection plan has two primary objectives:

- Halt and reduce the load of pollutants from diffuse sources entering the Reef
- Rehabilitate and conserve areas of the Reef catchment that have a role in removing water borne pollutants.

To achieve RWQPP objectives, and report in a meaningful way on achievements, clarity about regional water quality targets is essential. The Australian and State governments deliberately did not set targets for reef catchments in the RWQPPP in recognition of the role of Regional NRM Bodies in setting resource condition targets and the need for Regional NRM Bodies to use processes to set these in a way that integrates other water quality values and aims in the region, and considers social and economic impacts of particular targets.

However the RWQPP has set the year 2013 to achieve a reversal in the decline of water quality entering the Reef. Regional NRM Bodies with catchments flowing to the reef should clearly indicate what is achievable in those catchments within this timeframe. It is proposed that interim water quality targets are established by 30 June 2005 in the river mouths of the priority basins as per Appendix 3 of the RWQPP for the following matters:

- Nutrient loads or levels and
- Sediment loads or levels.

Plans put forward for accreditation before this date should either include interim targets or commit to a process of setting such targets by 30 June, 2005.

3 The target setting process

3.1 Introduction

The regional NRM planning process provides a strategic framework through which Regional NRM bodies can, amongst other things,

- develop targets that reflect regional aspirations, derived from the range of strategies formulated during the development of the Regional Overview,
- identify actions to achieve these targets, and
- develop processes to monitor and evaluate actions and report on outcomes.

Targets are a core element of each regional NRM plan and **Figure 3-1** shows the steps in setting targets in the regional NRM planning process. The figure shows an overall process but it is understood that each step is iterative within and between steps of the entire planning process. The process for setting targets must also be consistent with the planning principles that include:

- Effective involvement,
- Covering the full range of NRM issues,
- Based on scientific analysis,
- Focused on causes rather than symptoms,
- Identifying targets and strategies to implement agreed NRM policies, and
- Demonstrating consistency with other planning processes and legislative requirements.

The process and procedures used to set targets needs to be described and recorded in the regional NRM plan, including:

- Approach and process – how the targets were established;
- Level of and extent of stakeholder engagement and community consultation;
- Methods used to negotiate and reach agreement;
- Identified improvements required for future target setting exercises; and
- Where necessary, justification for the nature of targets.

3.2 Target setting steps

Each of the target setting steps are shown in **Figure 3-1** and detailed descriptions, examples and accreditation considerations are provided in **sections 3.3 to 3.9**. The target setting process shows that establishing targets takes place early in the regional NRM plan development, only some management action targets are fully developed for investment, and reporting of regional milestones and outputs provides that basis for reviewing and updating targets.

Prioritisation of targets

Prioritisation occurs at each of the steps described in **Figure 3-1**. Sufficient resources will rarely be available to immediately implement all of the management actions identified to progress towards resource condition targets. The Figure shows that identification of management options to achieve resource condition targets involves prioritisation and trade-off analysis. Application of appropriate criteria should result in feasible management action targets being fully developed and nonsense actions being rejected. The prioritisation that occurs at each step within the target setting process culminates in priority management action targets identified for investment in the Regional Investment Strategy. Refer to *Guidelines for the development of a Regional Investment Strategy (Module 8)* for further detail. This is further described in Section 3.8.

Monitoring, Evaluation and Reporting considerations

It is recognised that resource condition changes may only be apparent over a long time, and will be influenced by factors that go beyond the actions funded by NAP and NHT2, for example climate variability. Regular reviews of targets should be undertaken to take account of improving information and scientific understanding about trends in resource condition and about ecosystem function.

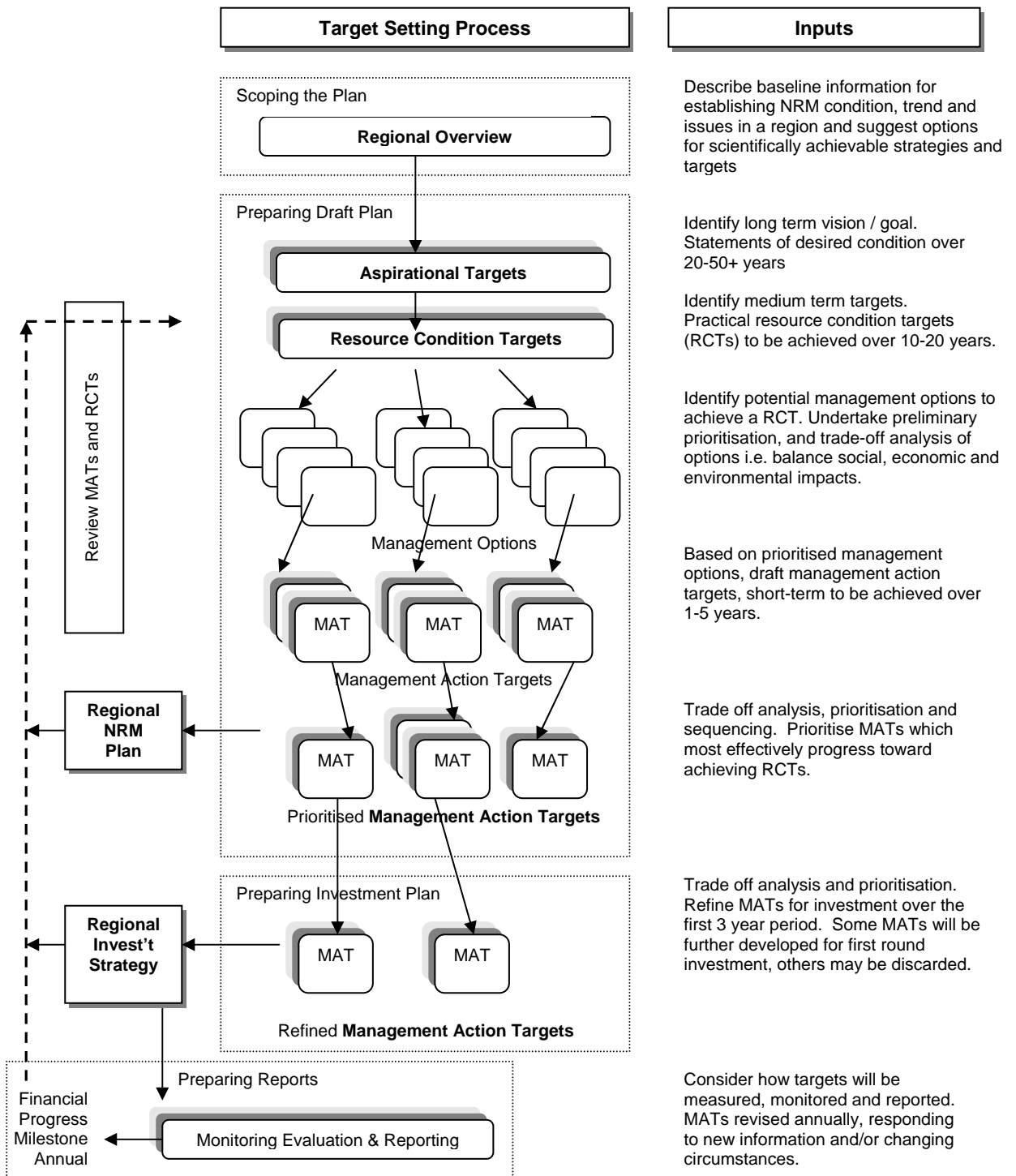


Figure 3-1: Conceptual diagram of target setting process

3.3 Regional Overview

At a glance ...

What	<p>A qualitative and quantitative description of the natural resource management assets and issues facing the region; their cause, extent and severity; and the impacts of these issues. Suggest options for achievable strategies and NRM targets based on condition and trend data and existing strategies addressing these issues.</p> <p>Describes in broad terms the social, economic, cultural and heritage profile of the region.</p> <p>Identifies critical assets at risk.</p>
How	Review and analysis of existing datasets and information contained in reports, plans, strategies and legislation.
Why	Provides the basis for target setting.
What does it look like?	Section containing Regional Overview information in the regional NRM plan.
Deliverables	<ol style="list-style-type: none"> 1. Identification of existing relevant information sources and assessment of their reliability and potential use. 2. Compilation of regionally relevant information, data and standards for NRM (including assets). 3. Identification of gaps in regional data and knowledge.

The Regional Overview should **describe the environmental, economic and social context for NRM** as a basis for setting targets. The Regional Overview should address the current condition (or health) and trends for natural resources in the region. It should analyse and distil appropriate baseline information. In most regions there are numerous existing documents available to assist in the definition of natural resource issues of local and regional importance eg. regional NRM strategies, catchment management plans. Further work will usually be required to quantify NRM issues and to include the most recent data and information.

Other information not previously considered in NRM planning such as the social and economic profiles and (natural and constructed) assets in the region should also be considered in the Regional Overview.

The Regional Overview should introduce the asset-based approach to develop regional targets. This approach is an assessment of the risks to regional assets, including risks to environmental, economic and social assets in the region. This assessment should also include impacts/risks to downstream systems (eg estuaries, the Great Barrier Reef, Murray Darling Basin, Lake Eyre Basin) and placed in the context of wider scale ecosystem and conservation functions and goals (eg habitat for migratory birds). The asset-based approach is fully described in the *Guidelines for developing a Regional Natural Resource Management Planning and Investment Strategy in Queensland (Module 1, Appendix 2)*.

The outcome of including a Regional Overview in the NRM Plan includes:

- Regional assets, and risks to assets described and value of services provided,
- Baseline condition and trends of natural resources described,
- Natural resource management issues facing the region quantified and qualified,
- Causes, extent and severity of issues described and where possible quantified,
- Social and economic profile of the region and external influences described,
- Content and actions of existing plans, strategies and legislative requirements reviewed; and
- Possible strategies to address identified NRM issues including preliminary identification of NRM targets.

With this information the task of identifying targets for regional natural resource assets should be enhanced. It is acknowledged that for some assets, information may be limited and the Regional Overview should identify gaps in regional data and knowledge.

3.3.1 Accreditation of the regional overview

The Regional Overview <u>should</u> :		The Regional Overview <u>might</u> also:
1 st Generation Plan	2 nd Generation Plan	
1 <i>For example</i>	Describe the study area for the regional NRM plan in biophysical and institutional terms. <ul style="list-style-type: none"> - Study area boundaries - Relevant planning boundaries - Relevant jurisdictional boundaries - Natural resource management zones eg. sub-catchments, regional ecosystems. 	Describe and report changes to institutional factors.
2 <i>For example</i>	Describe in broad terms the economic and social (including cultural and heritage aspects) profile of the region, focused on regional social and economic issues dependent on or related to NRM. <ul style="list-style-type: none"> - Demography and social characteristics - Economic values of primary production and local industry. - Regional investment in natural resource management. 	Describe and report changes to economic and social factors. Provide a specific focus/ case study of a social, economic or cultural profile of regional importance.
3 <i>For example</i>	Describe previous natural resource planning and management processes in the region. <ul style="list-style-type: none"> - Integrated catchment management planning - Local sub-catchment action planning - Future Profit planning. 	Describe progress towards implementation of previous plans. That is, the NRM issues that have been addressed in the past and the relative success of these measures.
4 <i>For example</i>	List and assess existing regulatory planning processes underway in the region and their status/progress, and requirements for NRM . <ul style="list-style-type: none"> - Regional vegetation management plan. - Regional coastal management plan. 	Integrate information and changes to regulatory planning processes. - Amendments to relevant legislation.
5	List and describe the NRM issues as identified by technical assessment and community stakeholders.	Incorporate results from research and monitoring programs. Identify linkages between NRM issues and the resource condition matters for targets.
6	Identify critical assets at risk.	Identify future assets at risk Categorise NRM assets as per suggested

The Regional Overview <u>should</u>:		The Regional Overview <u>might</u> also:
1st Generation Plan	2nd Generation Plan	
<i>For example</i> <ul style="list-style-type: none"> - Area of intact remnant vegetation. - Seagrass beds. - Sites of indigenous significance. - Transport networks 	Maintenance of increased extent of vegetation.	themes – Land Management, Terrestrial Biodiversity, Inland Aquatic Ecosystems, Estuarine, Coastal and Marine Ecosystems.
7 <p>Identify existing threats (or pressures) to critical assets.</p> <i>For example</i> <ul style="list-style-type: none"> - Configuration of regional nature reserves constricting fauna movement. - Sediment load from catchment land uses impacting on protected estuarine and coastal systems - Dryland salinity impacting on transport infrastructure. 	Identify future potential threats/risks (or pressures) to critical assets. Climate	
8 <p>Where sufficient information exists, describe the condition and trend of natural resources relevant to those issues identified in 6 and 7 and suggest possible strategies to address these issues (preliminary identification of targets).</p> <i>For example</i> <ul style="list-style-type: none"> - Local declines in endangered species populations - Rapid growth in local populations of aquatic weeds - Potential for large increase in rural-residential land use - Proposed development impacts on air quality. 	Describe and report changes in resource condition and trend.	Compare natural resource condition and trend data with relevant standards <ul style="list-style-type: none"> - E.g. Refer to the Queensland Water Quality Guidelines
9 <p>Where insufficient information exists, describe knowledge gaps.</p>	Describe and report progress to fill/address information and knowledge gaps.	

3.4 Aspirational Targets

At a glance ...

What	Defines the long term aspirations or goals for natural resources in the region (ie. 20 – 50+ years).
How	Through community consultation and/or previous planning processes, to elicit the regional aspirations or goals.
Why	Provides the overall direction for natural resource management and planning.
What do they look like?	Statements, or geographical presentation.
Deliverables	1. Brief description of the aspirational targets for the region for each relevant resource condition Matter for target.

Aspirational targets are about the desired condition of natural resources in the longer term (ie. 20-50+ years) and represent the regional NRM vision or goal. Aspirational targets can be quantitative (usually numerical or limiting statements) or qualitative. These targets are used to guide regional planning, examples being:

- Decrease in the areal extent of dryland salinity.
- Extent of native vegetation increased to 30% cover including representation of all regional ecosystems.
- Decrease the nitrogen load in waterways discharging to the coast.

Aspirational targets need to be considered at the earliest phase in development of the regional NRM plan as they provide the basis for development of resource condition targets and subsequently management action targets.

An aspirational target could also include a benchmark to measure progress of achieving the target into the future. For example, 10% decrease from 1999 levels of the nitrogen load in regional waterways discharging to the coast.

3.4.1 Example Aspirational Targets

Example aspirational targets are provided below and also shown is the relationship to the matters for targets and suggested natural resource asset themes.

Asset Themes	Matters for target	Example Aspirational Targets
Land Use and Management	Land Salinity	<ul style="list-style-type: none"> • Dryland salinity outbreaks minimised by 2020. • The rate of the occurrence of any further dryland salinity outbreaks is reduced by 2050.
Terrestrial biodiversity	Native vegetation (extent and distribution)	<ul style="list-style-type: none"> • At least 30% vegetation cover is established or maintained in each catchment by 2030. • All representative regional ecosystems in catchments of the region are conserved by 2050.
	Significant native species.	<ul style="list-style-type: none"> • No further loss of fauna species in the region by 2030. • Populations of existing rare and threatened flora and fauna species are recovered/ rehabilitated by 2050.
Inland aquatic ecosystems	Turbidity	<ul style="list-style-type: none"> • Suspended sediment loads entering the coastal environment are reduced by 2030.

Asset Themes	Matters for target	Example Aspirational Targets
	Inland aquatic ecosystems (wetland extent and distribution)	<ul style="list-style-type: none"> All regionally significant wetlands in slightly modified (or better) condition are protected by 2030. Regionally significant wetlands in highly modified condition are sustainably managed for multiple users by 2050.
Estuarine, coastal and marine ecosystems	Coastal habitat	<ul style="list-style-type: none"> Mangrove habitat in the Diltler and Hyand River estuaries is restored by 2040.

3.4.2 Accreditation of Aspirational Targets

Aspirational targets <u>should</u> :		Aspirational targets <u>might also</u> :
1 st Generation Plan	2 nd Generation Plan	
<p>1 Define the long term goals for NRM based on the regional community's vision.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> - Not more than one major algal bloom to occur in the region within a five year period. - No further areal increase in dryland salinity. 	<p>Define environmental values for waterways in the region.</p> <p>The environmental values for the fresh water section waterways in the Diltler River catchment are:</p> <ul style="list-style-type: none"> - Protection of aquatic ecosystems. - Drinking water supply. - Secondary contact recreation. - Stock watering. 	<p>Define long term goals for related social and economic objectives.</p>
<p>2 Ensure the minimum set of matters for targets are addressed.</p>	<p>Incorporate new/emerging matters for targets.</p>	<p>Identify aspirational targets for issues outside the minimum matters, if considered regionally relevant.</p>

3.5 Resource Condition Targets (RCTs)

At a glance ...

What	Describe and quantify the desired resource condition, achievable in the medium term, for each resource condition matter for target.
How	Based on existing condition and trend information, as described in the Regional Overview. These targets are linked to aspirational targets. State and regional standards are considered when setting targets. Resource condition targets need to be developed in an iterative way. After consideration of costs and benefits, and potential impacts, the targets may need to be adjusted.
Why	Provide the direction for short term natural resource management and planning, including definition of management actions.
What do they look like?	Statements, or geographical presentation.
Deliverables	<ol style="list-style-type: none"> 1. Statements that quantify the desired resource condition for each regionally relevant Matter for target (and other relevant NRM issues). 2. Demonstrable consideration of existing information, aspirational targets, and (where available) standards. 3. Demonstrable consideration of the social and economic implications of achieving resource condition targets. 4. Identification of research, resource assessments and monitoring requirements to derive resource condition targets where existing information is insufficient. 5. Identification of process for monitoring and reviewing resource condition targets.

Resource condition target are specific, time-bound and measurable, relating to the condition of natural resources in the medium term (ie. 10–20 years). Resource condition targets should emphasise practical constraints for targets given the social and economic context of the region.

Achievement of resource condition targets is the desired outcome of the regional NRM planning process in the medium term. These targets are steps to achieving the agreed aspirational targets. Resource condition targets represent the desired regional outcome and have the added dimension of providing definitive statements about what can be achieved in the medium term as well as what the region can afford. Resource condition targets need to reflect what can realistically be achieved given the biophysical, social, economic and other constraints and characteristics of the region.

First Pass RCTs

Resource condition targets should be based on an assessment of the current condition of the resources, and measured and/or predicted trends (eg. worsening, stabilising or improving). The assessments provide the basis for management and capacity building actions. Where information is available and resource condition targets can be set, these should have characteristics as follows:

1. Resource condition targets should be consistent with the National Framework for NRM Standards and Targets and these Guidelines; and
2. Resource condition targets should be consistent with State of Queensland agreements through processes such as, the Murray Darling Basin Commission and the Reef Water Quality Protection Plan.

Interim RCTs

The National Standards and Targets Framework identifies that in some cases there may not be sufficient information to set natural resource condition targets. Where insufficient information is the case, interim resource condition targets should be set and should include:

1. Statements that resource condition targets are developed within a specified time frame;
2. Management action targets that should result in progress towards developing resource condition targets;
3. Commitments to establish monitoring systems to collect/analyse baseline and trend information, to enable setting of resource conditions targets for the matters for targets, and eventually all priority regional NRM issues;
4. The proposed method/s and timing for target setting;
5. ***Within three years of signing the NAP Bilateral Agreement (ie. by 1st March 2005), to have in place regional resource condition targets for the Matters for Targets, or have demonstrated significant progress towards their establishment*** (including performance against actual resource condition targets in NRM Plans); and
6. For the river mouths of priority basins as per the Reef Water Quality Protection Plan, establish interim water quality targets by 30 June 2005, at least for nutrient and sediment loads or levels.

Matters for targets

Resource condition targets should be described for each of the 10 resource condition matters for targets in **Table 2-1**. State-level guidance suggests that the matters for targets are categorised against a number of “themes”. This approach enables consideration of matters for targets across the range of habitat types. For example, “significant native species and ecological communities” should be considered for terrestrial, freshwater and, estuarine and coastal systems. The suggested themes used to group matters for targets are presented in **Table 3-1**.

When considering the matters for targets and identifying targets “contextual information” of a region is also important to recognise, for example land use, current management practices, demographic information, social and economic information, such as commodity prices. There may also be matters that have not been agreed at the national level but could be considered important for Regional Bodies in Queensland to address. For example, under a theme called “Atmosphere” potential matters for targets could be air quality and green house gases.

Indicators

Resource condition targets need to be measurable. When drafting targets, it is important to consider the indicators to be used and how the targets would be measured. For example, where salinity is resulting from rising groundwater tables the resource condition may be focused on the change in groundwater depth rather than the actual outbreak of salinity.

The nationally agreed indicators for each of the matters for target are shown in **Table 3-1** and Appendix A. Completed indicators are available from <http://www.ea.gov.au/nrm/monitoring/index.html>. Monitoring and reporting considerations for targets is further discussed in **Section 3.9**.

Iterative process

Progression towards natural resource condition is recognised as a lengthy process, typically of the order ten to 30 years. Resource condition targets need to represent a graduated or stepwise path to achieving aspirational targets. Identification of resource condition targets should also be identified through an iterative process (meaning repetitious or revisited). This ensures that targets can be realistically achieved given the biophysical, social, economic and other constraints and characteristics of the region.

Table 3-1: Themes used to group matters for targets and indicators

Asset Theme	Matter for target	Matter for Target Indicator Heading
Land management	Land salinity	Area of land threatened by shallow or rising water tables.
	Soil condition	Soil Condition
Terrestrial biodiversity	Native vegetation	Native vegetation extent and distribution. Native vegetation condition.
	Significant native species and ecological communities	Selected significant native species and ecological communities extent and conservation status.
	Ecologically significant invasive species	Selected ecologically significant vertebrate invasive species extent and impact. Selected ecologically significant invasive vegetation species extent and impact
Inland aquatic ecosystems	Inland aquatic ecosystem integrity	River condition
		Wetland ecosystem extent and distribution
		Wetland ecosystem condition
	Nutrients in aquatic environments	Nitrogen in aquatic environments Phosphorus in aquatic environments
	Turbidity / suspended particulate matter in aquatic environments	Turbidity / suspended solids
	Surface water salinity in freshwater aquatic environments	In-stream salinity
	<i>Contaminants</i>	<i>No national agreement, no indicators available</i>
	Significant native species and ecological communities	Selected significant native species and ecological communities extent and conservation status.
Ecologically significant invasive species	Selected ecologically significant vertebrate invasive species extent and impact. Selected ecologically significant invasive vegetation species extent and impact.	
Estuarine, coastal and marine ecosystems	Estuarine, coastal and marine ecosystems integrity	Estuarine, coastal and marine habitat extent and distribution. Estuarine, coastal and marine habitat condition.
	Nutrients in aquatic environments	Nitrogen in aquatic environments Phosphorus in aquatic environments
	Turbidity / suspended particulate matter in aquatic environments	Turbidity / suspended solids
	<i>Contaminants</i>	<i>No national agreement, no indicators available</i>
	Significant native species and ecological communities	Selected significant native species and ecological communities extent and conservation status.
	Ecologically invasive species	Selected ecologically significant marine invasive species extent and impact.

3.5.1 Example resource condition targets

In comparison to “higher level” aspirational targets, resource condition targets should be specific and definitive. They can be described as SMART:

- Specific** – Targets should have a clear, unambiguous purpose, be well defined, quantitative and relevant to prescribed outcomes
- Measurable** – Targets should be associated with readily measurable parameters (ie.

indicators) that reliably indicate progress towards achievement of the target condition.

- Achievable – Targets should be achievable given a reasonable level and continuity of resourcing.
- Realistic – Targets should be based on a realistic assessment of likely resourcing, and political, institutional and attitudinal constraints.
- Time-bound – Targets should be formulated to be achieved over a specified time.

Format

Resource condition targets may relate to absolute improvements, changes in the rate of degradation, or percentage changes on related issues and examples include:

- 20 stream reaches within Lower Emu Creek rated as “good condition” or above (using Queensland Index of River Health) by 2015.
- An average in-stream salinity of 800 EC for 85% of the time at Taylor’s Bridge on Middle Creek site by year 2005.
- 4,500 ha of Red gum woodland on channels and levees within Possum Creek Catchment to be maintained or regenerated by 2020.
- Ground cover in grazing systems in the Donley Region of not less than 60% for 80% of years by 2012.

Geo-referencing of targets is another format to be considered in NRM Plan development. The NSW Salinity Strategy (NSW Government 2000b) and the Murray-Darling Basin Salinity Management Strategy 2001-2015 (MDBSMS 2000) have used geographically based targets. These are described below.

An **end-of-valley target** has been used as a river-based target for salinity (and can be used for other NRM issues) at a point in the lower reach of catchment’s main river. It is a “big picture” target ie. an overall indication of the desired condition and the salt load which is aimed for at the end of the catchment or valley.

A **within-valley target** has been used to express the levels of salinity (and can be used for other parameters) desired to maintain assets and values for locations or areas within a catchment, upstream of the end-of-valley target. Within-valley targets can be water or land based targets.

These geographic descriptors may not apply to all NRM issues. There are other geographical scales to be considered in setting targets, for example;

- paddock, property,
- local action or local planning area,
- river reach, sub-catchment, catchment,
- groundwater basin,
- regional ecosystem,
- estuary or bay.

3.5.2 Accreditation of resource condition targets

Regional Bodies should demonstrate that they have considered each of the Matters for targets and provide appropriate justification for those matters that have not been addressed.

As a first pass resource condition targets should consider generally the types of management actions that could be used to achieve them. It is also important to consider the costs and benefits as well as the impacts of these actions. A range of assessment techniques such as risk analysis, trade-off analysis, cost-benefit analysis and prioritisation could be used to inform this process. Application of such techniques is discussed further in **Section 3.8**.

Resource condition targets <u>should</u>:		Resource condition targets <u>might</u> also:	
1st Generation Plans	2nd Generation Plans		
1	<p>Define the desired regional natural resource condition and target to be achieved in the medium term.</p> <p>RCTs should link to identified aspirational targets.</p> <p>Resource condition targets should be SMART:</p> <p>Establish targets by Mar 2005 or</p> <p>Demonstrate progress towards establishment of targets</p> <p>1.1 Quantify the resource condition to be achieved.</p> <p>1.2 Describe the location or extent which is applicable.</p> <p>1.3 Define the timeframe in which they will be achieved.</p> <p>1.4 Reflect the economic, social and political realities of the region.</p> <p>1.5 Use indicators which can be readily measure change or improvement.</p>	<p>Document and describe changes in condition and trend through annual reporting.</p> <p>Upgrade interim targets to targets.</p> <p>Review targets based on monitoring data and new information.</p>	<p>Define long term objectives for related social and economic objectives.</p>
2	<p>Address all (ten) resource condition Matters for targets.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> Refer to Table 2-1 	<p>Incorporate new/emerging matters</p>	<p>Address other issues of regional significance.</p> <ul style="list-style-type: none"> Waste reduction and management Air quality management Fire management
3	<p>Ensure consistency with:</p> <ul style="list-style-type: none"> National Frameworks National and State agreements These guidelines 	<p>Review targets to reflect changes in national and state documents</p>	
4	<p>Where information (data & knowledge) is insufficient:</p> <ul style="list-style-type: none"> draft interim targets and describe time frame for establishing targets develop management action targets to establish RCTs establish monitoring/resource assessment studies to enable setting of RCTs 	<p>Establish targets based on outputs/outcomes of management actions</p>	
5	<p>Reef catchments set interim water quality targets by 30 June 2005 for at least nutrient and sediment loads or levels.</p>	<p>Reef Water quality targets established</p>	

3.6 Management action targets

At a glance ...

What	Describe the best practice, capacity building or management actions that progress the resource condition targets.
How	Based on the existing information on methods to progress towards achieving the resource condition target and/or, Collection of information to develop resource condition targets.
Why	Provide the basis for immediate and short-term actions to achieve resource condition targets.
What do they look like?	Statements.
Deliverables	<ol style="list-style-type: none"> 1. Collation and assessment of known methods to implement actions. 2. Identification of the approach to fill existing gaps in information and knowledge. 3. Information needed to implement agreed NRM investment (through the regional NRM plan).

Management action targets are those that will most effectively deliver environmental, social and economic outcomes, in the short-term whilst progressing achievement of resource condition targets. Management action targets relate to management actions, best practice or capacity building, which contribute to resource condition targets. These are short term, achieved in 1-5 years and are statements. For each Resource Condition Target, there should be at least one, and most likely several Management Action Targets to achieve the RCT.

Five categories of management action targets are proposed and these categories are also used for reporting:

- Resource assessment which informs capacity and decision-making. It includes for example, applied science, data collection, analysis, monitoring and modelling.
- Planning which provides information for the formation and sequencing of actions. It includes for example, plan development, minor studies and expert and community input.
- Capacity building which assists in developing decision-making capabilities and may motivate involvement and participation. It includes for example, dissemination of information and training.
- On-ground works which are real time works or actions to achieve resource condition outcomes. It includes for example, works and actions on-ground and management of conservation agreements.
- Implementation of best practice management or current recommended practices.

3.6.1 Example management action targets

Management action targets need to contain enough detail to enable Regional Bodies (and others) to identify achievement. That is, enough detail to answer, “How will we know when we got there?” **Table 3-2** provides examples of management action targets based on each of the MAT categories and sub-categories.

Table 3-2: Categories of management action targets

Categories	Sub-categories	Example of management action targets
Resource assessment	Research and development	Trial the effectiveness using 1080 baits in reducing feral cat populations in Bilby conservation areas by 2005.
	Investigations	Survey community understanding of regional natural management priorities for the Tenthill Region by 2004.
	Baseline, condition and trend monitoring	Establish in-stream salinity monitoring program to determine baseline condition at 15 representative sites in the Middle Creek Catchment by 2005.
	Decision support tools	Use a multi criteria analysis program to establish management priorities of identified natural resource critical assets in the Kinkol Region by 2004.
Planning	Resource management plans	Prepare fire management plan to maintain biodiversity values of the Dundo Conservation Park by 2006.
	Integrated management plans	Prepare integrated catchment plans for the 12 sub-catchments of the Isendon River Catchment by 2007.
	Property management plans	Prepare property management plans for 50% of property owners operating in the Hugo Irrigation District by 2005.
	Development of best practice codes or guidelines	In association with Industry stakeholders, develop guidelines for establishing and operating poultry farms in the Craven Valley by 2005.
Capacity Building	Awareness raising	Prepare pamphlet on acid sulfate soils and their likely location in the Ambiwerra region by 2004.
	Skills and training	Five training sessions to assist regional stakeholders in applying Wotup region-specific social and economic data from the Office of Economic and Statistical Research in the development of the Regional Investment Strategy by 2004.
	Facilitation, support and motivation	Two officers employed to co-ordinate efforts between Local Governments and the Regional Body for the Land for Wildlife Program in the Urway Region.
	Institutional change	Establish a Memorandum of Understanding between the Hillgreen Regional Body and the State Department of Sustainability for consultation services in the year 2005/06, by March 2005.
On-ground works	Vegetation protection, regeneration, revegetation, or rehabilitation	Install fencing and actively manage stock access in the ten priority conservation areas in the Lydli area by 2008.
	Management of significant species or ecological communities.	Establish breeding program for the black crested pigeon by 2005 for reintroduction of a viable population into the Runcorn National Park.
	Management or control of ecologically significant invasive species.	Implement a control program to reduce feral pigs numbers in the Tiltop Plains area by 2005.
	Soil management	Undertake engineering works at 15 sites on properties in the south Coppersfield area to address soil erosion by 2006.

Categories	Sub-categories	Example of management action targets
	Water quality management	Install and maintain 5 urban stormwater improvement devices in Sommerville to reduce nutrient load to the Dawson estuary by 2007.
	Water use efficiency	Cap 100 artesian bores in the north-eastern Dingron District by 2008.
	Aquatic ecosystems management	Install 2 fish ladders at the Stopton and Goffer Weirs on the Caddacup River by 2007.
	Salinity control measures	Install a groundwater pumping plant and salt evaporation pond adjacent to the Tigres crossing on the Lidon River by 2005.
	Coastal and marine management	Stabilise and rehabilitate native vegetation along 15 km of the Balwsa Bay dunal system by 2006.
Implementation of best management practice	Code of Practice	80% of producers in the Glengalan Catchment endorse the application of the Piggery Code of Practice by 2006.
	Environmental Management Systems	Implement the Fine Merino Wool EMS on the 57 participating properties in the Woocoo Region by 2005.
	Best Management Practice	In the Downs Region 50% of fruit and vegetable growers to implement Best Management Practice by 2006.

Iterations for management action targets

Development of management action targets should also be iterative and take into consideration:

- The effect of the management action on the related resource condition target.
- The potential environmental, social and economic impacts of the management action,
- Mitigation or management of environmental, social and economic impacts of the management action.
- The technical feasibility.
- Achievability for the regional community within the timeframe considered.
- The proposed links between management and capacity building actions.
- The most effective combination of actions.
- The monitoring and evaluation of management action targets, and
- The effect of the management action target/s on regional resource condition.

3.6.2 Accreditation of management action targets

Management action targets <u>should</u> :		Management action targets <u>might</u> also:
1 st Generation Plan	2 nd Generation Plan	
1	Define the desired best practice, capacity building and management actions in the short-term. Ensure management action targets relate to achievement of resource condition targets. Management action targets should also be SMART:	Update to reflect achievement or changes in best practice, capacity building and on-ground works.
2	Specify the <u>PURPOSE</u> of the action.	Evaluate

Management action targets <u>should</u> :		Management action targets <u>might</u> also:
1 st Generation Plan	2 nd Generation Plan	
<p><i>For example</i></p> <ul style="list-style-type: none"> • Revegetation to reduce groundwater tables (cf. wind breaks). • Restoration of river banks to reduce erosion (cf. riparian biodiversity). • Fire management to maintain biodiversity values (cf. solely improve production) • Improve awareness. 		<p>achievement of targets with respect to changes to resource condition and trend.</p> <p>Modify and update Management Action Targets (purpose, method, time frame and/or location) to ensure progress toward resource condition targets.</p>
<p>3</p> <p>Describe <u>HOW</u> the target will be met or implemented.</p> <p>3.1 Describe the proposed method, standard or approach.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Regeneration (ie. Exclusion of stock and other pressures to allow regeneration of native species). • Fire management (ie deliverate hot and cool burning and/or prevention of frequent fires). • Extension of information. • Workshops. • Newsletters. <p>3.2 Reference a specific method</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Revegetation as per species identified for the relevant regional ecosystems. • Construction of a fish ladder using DPI specifications. <p>3.3 Include an action to identify the most appropriate method.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Review existing methods. • Conduct a trial of new methods. 		
<p>4</p> <p>Describe the <u>TIME FRAME</u> for achieving the target, by number of years and/or months from investment.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Year, and quarter or month if possible • Within 9 months • Within 3 years 		
<p>5</p> <p>Describe the location (geo-reference) or extent that is applicable to the target. Be as specific as possible, although acknowledging that this will depend on the information available (and may be variable over the region).</p> <p><i>For example</i></p> <p>Either geographic, thematic (issue) or reference to identified priority area.</p> <ul style="list-style-type: none"> • Improve land condition through adoption of best management practices on grazing lands in the Dirott sub-catchment. • Revegetation of priority riparian areas as identified by the State of the Rivers report. • Protect vegetation in the Northern Brigalow Belt by reducing the rate of clearing as per the Regional Vegetation Management Plan. 		

Management action targets <u>should</u> :		Management action targets <u>might</u> also:
1st Generation Plan	2nd Generation Plan	
<ul style="list-style-type: none"> • Areas of bank instability as identified in State of the River reporting. • Areas of weed invasion as identified in local government plans/mapping. • As identified in the Reef Water Quality Protection Plan. <p>5.1 Inclusion of a management action target to identify priority areas.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Review existing information. • Collect new information. 		
<p>6</p> <p>Be set using indicators that can be readily measured.</p> <p><i>For example</i></p> <ul style="list-style-type: none"> • Refer to Table 3-1 • Refer to Module 5b 		
<p>7</p> <p>Consider the management action target categories and sub-categories for reporting when drafting targets.</p>		

3.7 Practical example of target setting

This section of the report provides an example of target setting for a specific matter for target, land salinity. The example information is an excerpt from the Wyalla Regional NRM Plan. **Section 3.7.1** provides a suggested method for progressing from salinity hazard information to target setting.

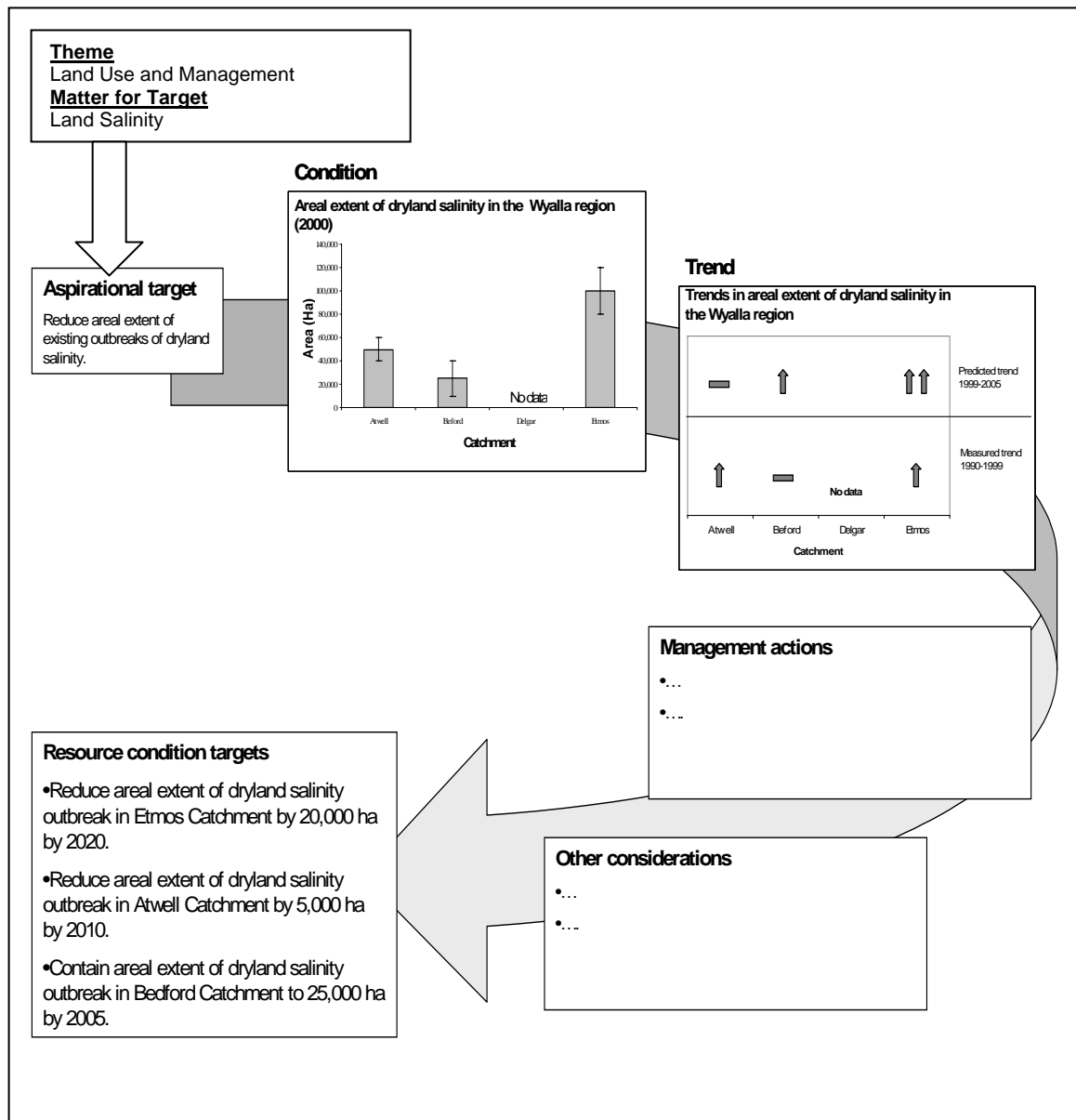


Figure 3-2: Concept for developing targets based on condition and trend information

The purpose of the above diagram is to conceptually demonstrate the identification of an aspirational target for the theme land use management and the land salinity matter for target. The availability of condition and trend information should assist with the identification of aspirational targets and development of first pass or interim resource condition targets. The management actions and other considerations headings indicate that order to define the resource condition targets, several thinking steps take place first, eg "given this information, what type of actions are possible and are there any social, economic and cultural considerations to take into account." The remainder of this section explores the target setting process through the salinity example.

3.7.1 Salinity target setting based on risk assessment

Salinity hazard mapping provides a basis for investigation (compared to management), since a “trigger” is required for areas of salinity hazard to become a reality. Salinity hazard is best applied for:

- Raising awareness
- Investigation of the existence of salinity, and if confirmed, the scale and rate of increase.
- Exploration of management options.

Where salinity information is limited, it may be more appropriate to focus on issues where the current condition and trend are well scoped and identified as priority NRM issues. Although salinity must be considered and integrated with other natural resource issues.

The process steps recommended here will provide an assessment of which areas should be investigated as a priority. Other responses which should be considered as a result of undertaking Steps 1 through 6, are for example, monitor to detect change in resource condition or investigate but not as a priority.

This rating of the priority of investigation provides the basis for management action targets for salinity management. That is, where the resource condition target can not be set due to the lack of information, the management action target will address how to set these targets and in the first instance this will be through an assessment of the “condition” or investigation of potentially saline areas.

After investigation and when salinity risk is available, management focused responses to salinity risk can be applied. Management responses will range from maintain current condition, actively manage, through to restoration of outbreaks. Restoration activities will need to focus on the landscape process which are driving regional salinity whether these are recharge or discharge or a combination of both within the same local area.

Step 1 – Divide area (usually a catchment) of interest into management units.

	For example ...	
NAPSWQ Priority Investment Region	Condamine-Balonne-Maranoa	87,300 km ²
↓		
Region	Balonne-Maranoa	?? km ²
↓		
Catchment	Maranoa	?? km ²
↓		
Sub-catchment	Upper Maranoa	10,400 km ²
↓		
Management Unit	Merivale River catchment	4,000 km ²

Step 2 – Assign a salinity hazard “comparative index” for each management unit

Salinity Hazard	In numbers	In words	Comparative Index
Low	Low = $\geq x\%$ Low to moderate = $\leq x\%$	Mostly low	Low
Low to moderate	Low = $\geq x\%$ Low to moderate = $\geq x\%$ Moderate = $\leq x\%$	Mostly low with some moderate	Moderate
Moderate	Low to moderate = $\geq x\%$ Moderate = $\leq x\%$	Mostly moderate	Moderate
Moderate to high	Moderate = $\geq x\%$ Moderate to high = $\leq x\%$ High = $\leq x\%$	Mostly moderate with some high	High
High	Moderate to high = $\geq x\%$ High = $\geq x\%$	Mostly high	High

Step 3 – Identify dominant process for each management unit

Important salinity processes are

- Salt storage
- Recharge
- Discharge

Note that a management unit may have more than one process at work, therefore it will be necessary to select the dominant process.

Step 4 – Identify other “risks” for salinity expression

For example ...

Issue	Indicators / Info sources
Historic land uses	API
<p>Current land use</p> <p style="padding-left: 40px;">Diffuse sources</p> <p style="padding-left: 40px;">Point sources</p>	<p>Grazing</p> <p>Dryland cropping</p> <p>Irrigated cropping</p> <p>Mining</p> <p>Forestry</p> <p>Tourism</p> <p>Intensive animal industry</p> <p>Aquaculture</p> <p>Sewage treatment plants</p> <p>Processing / Manufacturing</p> <p>Ground cover, animal equivalents</p> <p>Visitor numbers</p> <p>Licensed premises (DPI)</p> <p>ERA Licences (EPA)</p>
Current land management practice/s	Code of Practice, Progress towards implementation of best practice.
Change of land use	<p>Tree clearing</p> <p>Water allocation</p> <p>SLATS, RVMP permits</p> <p>WRP, ROP</p>

	Urban development	Local Government Planning schemes
Climate variability and change		Long term averages Seasonal forecasting Long term forecasting

Step 5 – Identify assets potentially impacted on by salinity

For example ...

Issue	Asset
Biodiversity	Terrestrial – flora, fauna, fragmentation
	Instream – flora, fauna
	Groundwater – fauna
Water services	Consumption – irrigation, drinking, stock water
	Other services – Recreation, ecological
Land resources (productivity)	Water logging
	Erosion
Assets	Wetlands
	Infrastructure – roads, bridges, pipes
Cultural	Indigenous, European heritage
Aesthetic	Amenity value

Step 6 – Compile information for decision-making

Management Unit	Angus	Bingo	Cue	Dido	Elvis
Size (ha)	20,000	25,000	12,500	12,500	30,000
Salinity Hazard (comparative index)	High	Low	High	Moderate	Moderate
Dominant Process	Store	Recharge	Recharge	Discharge	Discharge
Local “Risks” (Rating 1 highest to 5 lowest)	2	4	3	3	1
Other Assets (Rating 1 highest to 5 lowest)	2	5	2	5	2

		↓			
Priority for Investigation	✓				✓
Investigate (not as a priority)			✓	✓	
Monitor for change in condition		✓			

3.8 Prioritisation and trade-off analysis

At a glance ...

What	Applying criteria to rank priority of targets and methods for assessment of social, economic and environmental benefits and costs.
How	Numerous methods available ranging in scale and complexity. All need to be based on appropriate data.
Why	To ensure targets encompass the preferred approach for NRM, balancing the regional environmental, social and economic needs.
What do they look like?	Description of prioritisation/trade-off analysis processes where applied, and key outcomes.
Deliverables	<ol style="list-style-type: none"> 1. Understanding and informed decision making on the environmental, social and economic impacts of targets. 2. Management actions in Regional Investment Strategy are prioritised based on objective decision making.

Section 4.7.1 provides a series of process steps which, taken together, form a method for progressing from salinity hazard information to target setting. This method generates a number of criteria that are used to determine which areas should be investigated as a priority. The rating of priority indicates the most important catchments for which management action targets (to assess resource condition or investigate potentially saline areas) will need to be set in order to develop good resource condition targets.

The criteria used in the salinity target-setting example, included:

- Size of the management area (hectares) – large indicating a greater need for attention.
- Salinity hazard comparative index – high, medium, low
- Dominant processes – recharge, discharge, store, etc.
- Other risks for salinity expression – historic and current land use, land management practices, climate variability and change, etc. ranging from high risk scores to very low risk scores, and
- Other assets potentially impacted – biodiversity, water services, cultural and aesthetic assets, land resources, etc. where scores are allocated along a continuum of many assets potentially impacted down to very few assets impacted.

Step 6 (section 4.7.1), of the process compiles all of the information into a table in order to weigh up each catchment against all the criteria and then allocate catchments to one of three categories, either:

- “Priority for investigation” with high scores against most criteria,
- “Investigate (not as a priority)” with moderate scores overall or
- “Monitor for change in condition” with much lower scores against a number of criteria.

Throughout the target setting process, similar choices will often need to be made between a number of alternatives so that decisions can be taken by individuals and by groups. Some choices are very straightforward and so obvious that little thought is given to the process by which the decision is reached. Other choices are more complex, with the need to consider or weight up a large amount of information. Choices become even more difficult when they require value judgments, involve large numbers of people or require comparisons between distinctly different types of alternatives where comparisons seem difficult to make. Complex choices will be made more easily if there is a formal process used to determine priorities.

In order to improve the quality of the decision and to justify actions subsequently taken, the basis for such decisions should be explicit and the process structured to be equitable, open, transparent and accountable. ***This means that the criteria used need to be clearly stated and the method of applying the criteria well explained.*** Sections 3.8.1 and 3.8.2 explore the types of criteria to consider when prioritising resource condition targets and management action targets.

3.8.1 Criteria to do with prioritising resource condition targets

The Standards and Targets Framework specifies the (minimum) matters for target (MfT) which the Regional Body must consider in setting regional targets. Within each of the ten Resource Condition Matters for Targets, resource condition targets need to be set and agreed unless it can be justified that there are no significant NRM issues in the region related to a particular matter for target.

For each resource condition MfT it is possible to develop a number of resource condition targets within each category. Since the number of resource condition targets is potentially unlimited, the decision over which resource condition targets are most appropriate or 'best' is a public decision and the process of determining these should be made using agreed criteria for what constitutes 'the best'.

Some of the more obvious criteria which could be used in making a choice between resource condition targets might be the:

- Value of the asset, in environmental, economic and/or social terms
- Nature, magnitude and trend of the threat to the asset, or even
- Scale of the outcomes arising from the investment.

Value of the asset, in environmental, economic and/or social terms

Economic. Does the asset underpin the economy of the region?

Social. Is the traditional use of the asset central to the established way of life in the region?

Nature, magnitude and trend of the threat to the asset

- Nature. Is the effect of the threat irreversible, at least for all practical purposes? For example, have rising water tables resulted in salt-encrusted claypans on which nothing will grow? *Is it something that will respond to human intervention?*
- Magnitude. Is the magnitude of the threat such that it will be responsive to planned intervention? Is human intervention really capable of making a difference to the source or effects of the threat, or would it just be playing around the edges making only marginal gains?
- Trend. Is the threat increasing? Is there an urgency about intervening? Is this a particularly opportune time to intervene? Does the trend indicate that waiting until later will make little difference?

Scale of the outcomes arising from the investment

Scale can refer to various measures of extent, numbers or significance.

- Aerial extent (eg. area of weeds removed, remnants protected, hectares revegetated)
- Length (eg. length of wildlife corridors, riparian revegetation, salinity interception drains installed)
- Volume (eg. Gigalitres of water for environmental flows)
- Number of landholders (e.g. adopting new management practices, now aware of undesirable practices) or even
- Significance associated with asset impacts (key feature which delivers benefits to a number of other issues or other assets).

The common assumption here is that the larger the extent, the greater the significance. However significance is not always related to size. Many economic and ecological systems are able to operate at near threshold conditions or in marginal circumstances where very slight changes will be enough to provoke significant impacts. For example, a very slight decrease in available timber supply might result in the closure of a regional mill which was already only marginally profitable. Alternatively, the last 2 centimetre rise in the watertable

might result in wide spread salination which ends in the loss of 90% of a particularly widespread ground cover.

“Significance” then as a criterion requires a careful exploration and explanation of connected relationships.

3.8.2 Criteria to do with prioritising management action targets

There are additional types of criteria, those to do with capacity of the implementers, relative costs, and time scales, that may also need to be considered. Some criteria that may be useful in determining ‘the best’ of several potential management action targets are:

- Rate of change in the underlying resource condition anticipated from the investment,
- Likelihood of effective implementation of planned intervention in terms of required dollars, potential participation, the group’s ability to implement,
- Overall effectiveness in modifying controllable aspects,
- Cost of the planned intervention option,
- Cost of not implementing the intervention,
- Risk of not achieving the desired outcomes,
- Feasibility of option with currently accessible resources and skills,
- Ease of implementing intervention,
- Existence of associated asset deterioration or other collateral impacts,
- Relevance of addressing new and rapidly emerging issues,
- Time to implement option – the urgency or alternatively the ability to delay implementation of an intervention without significant impact,
- Security of resources for long term interventions – a 20 year undertaking or completed within 2 years,
- The degree of innovation of the management action and the extent to which new tools are being trialled.

The choice of criteria needs to be carefully explored and agreed before proceeding to a formalised process of assessing alternative interventions against each of the criteria. The salinity example in section 4.7.1 stops short of allocating scores against all criteria (for example, against size of the management unit or against dominant processes) and then proceeding to aggregate those scores to arrive at definitive priorities. Instead it relegates Bingo catchment to a “low” overall priority because of a combination of low Salinity Hazard, low additional risks and few other assets affected. Clearly Angus and Elvis catchments rank as Priority investigation catchments because they cover large areas, have many other local risks and many other assets which are affected. However the exact contribution of the dominant processes is difficult to discern as is the relative contribution of salinity hazard and other assets to the final priority score.

With very limited alternatives and very few criteria, relative degrees of significance or importance between alternatives may be reasonably obvious. However as the number of criteria and the number of alternatives grow, a more formalised process, of weighing up alternatives against agreed criteria by using scores (and possibly even weighted scores) will be useful.

A simple and commonly-used technique, called Matrix Scoring, can be used to simplify the prioritisation and therefore the decision-making process.

3.8.3 Matrix scoring

Matrix scoring is a streamlined version of a multiple criteria analysis in that it provides a structure for comparing alternatives against a number of criteria, which are then combined to give a single index. The technique works well when there is a need to make a choice or to make a comparison between similar options where a number of different criteria are being used to make the choice. The method copes well when the elements used to make the choice are in different units, eg. in dollars, hectares or micro-siemens. The method can also

be used where preferences are provided as comparative indices such as expert relative judgements or with simple preference ranking.

The process for using matrix scoring can be simply explained in a few steps.

1. List options or alternative interventions.
2. Identify criteria you are using to compare against. A good way of choosing these criteria is to determine the main advantage and disadvantage of each of the options or alternative interventions. These then become criteria that are applied across all the interventions.
3. Phrase the criteria in such a way that high scores will all lead in the same direction. For example, in the previous example large number of hectares, a high salinity hazard comparative index, numerous risks for salinity expression and high numbers of other assets potentially impacted would all deserve scores on the high side of the range.
4. Compare options or alternatives against each criterion. This can be done using a number of different scoring methods, but the simplest is to rank each option on each criterion (1 to 5).
5. Then add up the total points allocated to each option and compare the different totals to help decide which are the best overall options.

Table 3-3: Simple matrix scores for salinity example

Options (Catchments) Criteria	Priorities for Further Investigation				
	Angus	Bingo	Cue	Dido	Elvis
Size of the management area – in hectares – large indicating greater need for attention (Score 1 small to 5 large area)	20,000 3	25,000 4	12,500 2	12,500 2	30,000 5
Salinity hazard comparative index – high scores 5, moderate scores 3, low scores 1	High 5	Low 1	High 5	Moderate 3	Moderate 3
Dominant processes – (store scores 5, discharge scores 4, recharge scores 2)	Store 5	Recharge 2	Recharge 2	Discharge 4	Discharge 4
Other risks for salinity expression – historic and current land use, land management practices, climate variability & change, (where high risks score 5; very low risks score 1)	4	2	3	3	5
Other assets potentially impacted –water services, biodiversity, cultural and aesthetic assets, land resources, (many assets score 5 and very few assets score 1).	4	1	3	2	4
Totals	21	10	15	14	21
Priority for Investigation	✓				✓
Investigate (not as a priority)			✓	✓	
Monitor for change in condition		✓			

In **Table 3-3**, all criteria were weighted equally. That is, no single criterion was judged to be of greater importance than any other in determining which catchment to investigate as a priority. Applying differential weighting may change the results. For example, weighting “size of catchment” as being three times as important as the other criteria would result in a shift of priorities as shown in **Table 3-4**.

Table 3-4: Matrix Scores with differential weightings

Options (Catchments)	Priorities for Further Investigation				
	Angus	Bingo	Cue	Dido	Elvis
Criteria					
Size of the management area (x3)	9	12	6	6	15
Salinity hazard comparative index	5	1	5	3	3
Dominant processes	5	2	2	4	4
Other risks for salinity expression	4	2	3	3	5
Other assets potentially impacted	4	1	3	2	4
Totals	27	18	19	18	30
Priority for Investigation	✓				✓
Investigate (not as a priority)		✓	✓	✓	
Monitor for change in condition					

Awarding scores ranging from 1 to 5 is only one way of scoring. Other ways to score would be to score each box out of 10 comparing different alternatives for the same criterion.

Alternatively, 100 points could be distributed across the alternatives for each criterion. An even more complex scoring would be to give each really important criteria 100 points to distribute but give lesser criteria fewer, say, 40 or 30 points, to distribute across the options. Some people may find it easier to think about this as distributing a sum of money in dollars, rather than points, amongst alternatives.

In Table 3-5, this might mean that for the criterion of 'size', 40 points might be distributed – or in this case \$40 – across the 5 catchments, giving the largest amount to the largest catchment (because it would cost more to fix a large catchment) and lesser amounts to smaller catchments. The end result might give \$12 to Elvis, \$10 to Bingo, \$8 to Angus, and \$5 each to Cue and Dido for a total of \$40. It might then be decided that the 'salinity hazard comparative index' is a more important/significant criteria and so 100 points, or \$100, is available to distribute across the catchments against this criteria.

Table 3-5: Matrix scores with variable distribution of scores

Options (Catchments)	Priorities for Further Investigation				
	Angus	Bingo	Cue	Dido	Elvis
Criteria					
Size of the management area – in hectares – large indicating greater need for attention (Score 1 small to 5 large area)	20,000 \$8	25,000 \$10	12,500 \$5	12,500 \$5	30,000 \$12
Salinity hazard comparative index – high scores 5, moderate scores 3, low scores 1	High \$30	Low \$10	High \$30	Moderate \$15	Moderate \$15
Dominant processes – (store scores 5, discharge scores 4, recharge scores 2)	Store ...	Recharge ...	Recharge ...	Discharge ..	Discharge
.....				

When this is done for each of the criteria, scores or 'dollars' can be added to determine which catchment ranks highest in priority.

The choice to use a more complex relative weighting for some criteria, as in Table 3-5, belongs to the panel or Board tasked with developing and using the prioritisation process, and, like the choice of the most relevant criteria, needs to be agreed through a process of discussion and negotiation.

A more in-depth discussion (and additional models) of alternative prioritization methods which will be particularly useful in determining Regional Investment Strategy priorities can be located in **Module 2** *Prioritisation Models* which supplements the Guidelines for developing a regional NRM plan **Module 1**.

3.8.4 Trade-off analysis

Trade-off analysis in target setting should take place as an iterative process within the context of preparing for accreditation of an integrated NRM Plan. Trade-off analysis involves the identification of social, economic and associated environmental values that require particular consideration in moderating the choice of Resource Condition Targets and the choice and development of Management Action Targets. A trade-off analysis of management scenarios is one of several approaches for incorporating social, economic and allied environmental considerations into the prioritisation of targets.

As a general rule, prioritisation should take place “net” of the consideration of social, economic and allied environmental considerations, that is, having already considered the social, economic or allied environmental ‘downsides’ of a particular management action target.

For example, the adoption of best management practices may increase individual enterprise costs if not well managed. An initial scoping of the issue identifies potential socio-economic costs, such as increased pressure to reject low cost practices or to invest in the increased use of technology or management. This could potentially increase costs for some landholders and possibly lead to increased conflict and reduced social cohesion. At the same time, potential benefits include increased efficiency and production, improved natural resource condition and training and development opportunities.

At the very least, the allied economic, social and environmental dis-benefits or costs or particular alternative interventions need to be taken into consideration at an informal level when choices between potential management interventions are being made. This may be accomplished by simply ensuring that whenever the intervention alternatives are displayed, their dis-benefits are also clearly shown, so that potential benefits are evaluated in full awareness of associated costs and/or dis-benefits.

At a more formal level, the initial scoping exercise discussed above can lead into a structured socio-economic assessment of likely impacts that should be clearly articulated when management action targets are being prioritised. For more information on formal methods for incorporating socio-economic consideration of likely impacts, please refer to *Integrating Economic and Social Issues in Regional Natural Resource Management Planning: A Framework for Regional Bodies* available on line at http://nrm.dnr.qld.gov.au/regional_planning/nap/priority_docs/gen_guide.html

3.9 Monitoring, evaluation and reporting in target setting

At a glance ...

What	Monitoring, evaluation and reporting requirements considered in developing targets.
How	Iterative consideration of monitoring, evaluation and reporting during target setting.
Why	Enables continuous improvement of natural resource management, and ensures reporting requirements can be met
What do they look like?	Included in phrasing of targets.
Deliverables	<ol style="list-style-type: none"> 1. Understanding of monitoring, evaluation and reporting requirements relating to targets. 2. Targets that are measurable. 3. Monitoring programs that complement existing information and systems.

Monitoring, evaluation and reporting (MER) on achievements is essential to both adaptive management and continuous improvement of the regional NRM planning process and development of targets. In developing targets it is important to consider how the targets will be measured or monitored, how targets and the results of monitoring fit into evaluations, and how the targets will be reported.

The monitoring, evaluation and reporting feedback loop in **Figure 3-1** indicates that targets are regularly reviewed in response to new information and/or changing circumstances. It is expected that aspirational and resource condition targets will be less frequently reviewed than management action targets. Review of these targets may be adequately addressed in the annual review of the regional NRM plan. To facilitate adequate review of targets, it is important to ensure that appropriate indicators and monitoring methods for targets have been selected, and reporting requirements are met.

The *MER for Regional NRM Plans* guidance document is being developed. This document will provide guidance on the accreditation requirements of MER. It will also:

- Promote consistency in setting and measuring progress towards targets within and across regions (and nationally across States and Territories).
- Ensure a capacity to aggregate and report on progress across regions and the State.
- Ensure the capacity to compare program achievements with national and State assessments of trends in resource condition (eg. National Land and Water Resources Audit, State of the Environment reporting, surface water ambient network monitoring)
- Enable regional feedback on their contributions to achieving State and national outcomes.

3.9.1 Monitoring and evaluation considerations in developing targets

To develop resource condition and management action targets, issues requiring consideration during selection of indicators, in phrasing targets and in developing monitoring programs are provided in **Table 3-6**.

Table 3-6: Monitoring and evaluation issues and considerations

Issue	Considerations
Sensitivity	<ul style="list-style-type: none"> • Be sensitive to natural resource condition change. • Provide early warning of potential problems.
Robustness	<ul style="list-style-type: none"> • Directly relevant to natural resource issues being addressed and not overly influenced by contextual or related issues. • Represents a common sense approach.
Scientific rigour	<ul style="list-style-type: none"> • Capable of being monitored to provide statistically verifiable and reproducible data that show trends over time.
Spatial coverage	<ul style="list-style-type: none"> • Applicable to the range of environmental conditions in the region. • Whole of region recognizing existing administrative boundaries.
Complementary (to existing information and monitoring programs)	<ul style="list-style-type: none"> • Where possible and appropriate, be consistent and comparable with State and Local Government monitoring programs, including where new data is to be collected. • Where possible aggregate. That is, amenable to combination with other monitoring programs to produce more general information about natural resource condition. • Where possible and appropriate, use existing commercial and managerial indicators. • Contributes to monitoring of progress towards the broad issue of sustainable regional natural resource management.
Clarity	<ul style="list-style-type: none"> • Easy to understand and to interpret data information • Of direct relevant to Regional Body regional natural resource management.
Resource intensity	<ul style="list-style-type: none"> • Collection, analysis and interpretation procedures are cost effective.
Capacity to monitor	<ul style="list-style-type: none"> • Collection, analysis and interpretation procedures are not logistically difficult.
Skills capacity	<ul style="list-style-type: none"> • Where possible and appropriate, “accredited” groups or community members can participate in monitoring. • Capacity to accept (own) targets.

NRM will also occur amongst the complexities of other factors such as, biophysical, social, economic and cultural issues, each of which may make it difficult to identify, and isolate the effects on, natural resource condition and trend. Accordingly, the National NRM Monitoring and Evaluation Framework acknowledges that changes in resource condition may not be measurable in the short to medium term. The Framework recognises NRM interventions will occur across time scales – from five to fifty years.

It is recommended that for monitoring, Regional Bodies focus on:

- Identifying existing Commonwealth, State and Local Government monitoring programs and information sources, and identifying how to link with, and build on these, including the National Land and Water Resources Audit (the Audit), and National, State and Regional State of the Environment reporting.
- Monitoring natural resource condition at the local and regional level, with the initial emphasis on collecting baseline data sufficient for target setting.
- Monitoring of management action targets, outputs, investments, activities and intermediate outcomes linked to natural resource condition, and
- Monitoring resource condition at the local and regional level to measure change in condition or trend.

3.9.2 Indicators and measurement methods

Queensland Government has responsibility for monitoring some resource condition and trend across the State. There are advantages in integrating regional and state-scale monitoring programs. Benefits include using the same indicators and the expertise of government in designing and implementing resource condition monitoring programs.

As signatory to the National NRM Framework for Monitoring and Evaluation, the Queensland Government must ensure Regional Bodies are using this suite of indicators and measurement methods (where applicable). However, there may be issue-specific matters where variations to this suite are necessary. For example, where different indicators have been used for baseline information and for practical purposes would be carried through for use in the target setting process, or where a more (ecologically) direct measure of the natural resource condition issue under consideration is being proposed.

The Standards and Targets Working Group is reviewing these indicators and measurement methods for application in Queensland. Once agreed, the recommended indicators and measurement methods for Regional Body use (conforming as far as practicable with the Framework) will be included in the State-level guidance. (**Module 5b**, in progress).

It is recommended that **Regional Bodies use Queensland templates for matters for targets including indicators and measurement methods (Module 5b)**, since these are derived from the national monitoring protocols. Where different indicators are necessarily chosen, a brief description or justification should be provided.

3.9.3 Reporting requirements

Under the NAP and NHT2 programs, it is expected that Regional Bodies will report on progress of:

- resource condition targets.
- management action targets, and
- outputs.

Acknowledging the complexities of NRM it is necessary to assess performance of actions and changes in resource condition and trend against resource condition targets identified in regional NRM plans. Regional Bodies will not be held accountable for change, or lack of change, in natural resource condition and trend.

Progress towards Resource Condition Targets

Regional Bodies are responsible for measuring progress towards achieving resource condition targets, in terms of measurable change in regional resource condition and/or trend. This should focus on the effectiveness of management and capacity building actions on the local, sub-regional and where possible regional effects of regional NRM processes. For appropriate interpretation, (social, economic and community) contextual information relevant to the indicator being considered may also need to be provided.

Progress towards Management Action Targets

Regional Bodies are accountable for, and will need to report progress towards management action targets, in terms of the percentage of the relevant work complete, and/or the milestones achieved. It is important to note that for reporting purposes management action targets need to be directly linked to the resource condition targets that they progress towards. Continued investment in implementation of regional NRM plans will be linked to the achievement of these targets.

Outputs

Outputs are the goods or services produced, purchased or delivered to achieve resource condition outcomes. Outputs are an interim measure of progress towards management

action targets (and hence resource condition targets), especially important in the early years of the program when change in resource condition (outcomes) may not be immediately measurable or apparent. These outputs will also provide valuable information for future evaluations.

A hierarchical system for national Reporting Categories for Outputs is proposed, this is a system of:

- Output categories, reporting to
- Output sub-categories, reporting to
- Outputs and measures (units or metrics).

Draft Output categories are the same as those suggested for Management Action Targets (see Table 3-2), except that Implementation of best management practice is excluded. This is because best practice outputs could be considered within any one of the other categories, for example,

- Planning – development of guidelines for best management practice.
- Resource Assessment – field trial of the elements of best management practice.
- Capacity building – training on the adoption of best management practice.
- On-ground works – incentives-based on ground actions to achieve best management practice.

The reporting of outputs is part of a broader requirement and that is reporting of program performance (e.g. NAP and NHT2). Monitoring, evaluation and reporting of programs (NAP and NHT2) is outlined in the *Queensland Monitoring and Evaluation Implementation Plan for National Programs*. Monitoring, evaluation and reporting for NAP and NHT2 focuses on four areas:

- Investment – financial investment in the regional planning process and its implementation.
- Outputs – goods or services delivered through the regional planning process which achieve management action targets (which are in turn focused on contributing to resource condition change).
- Intermediate outcomes – achievement of management or capacity building activities which contribute to resource condition change, derived from progress towards management action targets.
- Outcomes – change in the regional resource condition, due to progress towards regional resource condition targets.

National reporting on program performance will be based on information provided by each state or territory, which in turn is information sourced from Regional Bodies.

3.9.4 Reporting systems

Regional Bodies will need to report achievements to the Queensland and Australian governments in line with agreed requirements as detailed above. This requires storage of monitoring and evaluation information. Guidance for data management systems and data exchange is being provided through the SIP *Regional Information Services Framework for NRM* Project (IM01).

The *Information Systems for Regional Arrangements* (ISRA) Project progressed through Q-MERRWG has examined data management systems for storing performance-based information to address national reporting requirements. Output reporting as part of the development of information systems is also being further investigated.

4 Glossary of State-level guidance terms

Adjacent habitats (for aquatic ecosystems)	The area of land adjacent to the aquatic ecosystem, influenced by the physical, chemical, biological and ecological properties of the aquatic ecosystem. For example, the riparian habitat adjacent to a river.
Aquatic habitat	Habitat in which inundation by water influences the physical and chemical features, as well as the biota and ecological processes, including surface waters, ground waters and tidally influenced waters.
Biodiversity	The variety of all life forms – the different plants, animals and micro organisms, the genes they contain, and the ecosystems of which they form a part.
Bioregion	An area of land dominated by similar broad landscape patterns that reflect major structural geologies and climate, as well as major changes in floristic and faunal assemblages.
Biota	All the organisms of an ecosystem.
Classification	The process of systematic placement into categories. For example classification of wetlands based water column salinity and location, classification of taxa within hierarchical series of groups.
Coastal ecosystems	Permanent or tidal shallow waters less than six metres deep at low tide including bays and straits. This includes: <ul style="list-style-type: none"> - Subtidal aquatic beds eg. kelp beds, seagrasses, tropical marine meadows. - Coral reefs. - Rocky marine shores, rocky offshore islands and sea cliffs - Sand, shingle or pebble beaches, sand bars, spits and sandy islets. - Intertidal mud, sand or salt flats, or saltmarshes - Mangrove forests. - Dune and foredune systems. - The water medium.
Coastal waters	Coastal waters are those located to the limit of the highest astronomical tide.
Community	Any group of organisms belonging to a number of different species that co-occur in the same habitat or area and interact through trophic (food chain) and spatial relationships; typically characterised by reference to one or more dominant species.
Conservation status	An assessment of the current state of a species or communities usually based on its condition and/or current extent in a bioregion. For example, rare, vulnerable, endangered or presumed extinct.
Critical Habitat	Habitat that is essential for the conservation of a viable population of protected wildlife or community of native wildlife, whether or not special management considerations and protection are required. Critical habitat may include an area of land and/or water that is considered essential for the conservation of protected wildlife, even though the area is not presently occupied by the wildlife.
Distribution	The geographic occurrence of a species and/or ecosystem. Distribution does not describe area alone (see definition for 'extent'), it describes where a species or ecosystem is more or less likely to be present, and under certain conditions (eg. in respect to seasonal and climatic cycles).
Ecosystem	An ecological community together with its environment, functioning as a unit.
Ecological condition	Ecological condition or health is the ability of the aquatic ecosystem to support and maintain key ecological processes and a community of organisms with a species composition, diversity, and functional organisation as comparable as possible to that of undisturbed habitats within the region. For aquatic ecosystem it can be described by the five major components that characterise a stream: water quality, water quantity (hydrology),

instream biota, physical form (bed, banks and instream habitat) and the riparian or streamside zone.

Ecologically significant invasive species	Any pest plant or animal species which moves or is transferred into areas beyond its natural range and which has an adverse environmental or ecological effect on native species or communities.
Estuarine ecosystems	The area of a coastal river mouth, characterised by tidal effects and mixing of fresh water with seawater.
Estuarine habitat	Those habitats influenced by estuarine ecosystems. This includes: <ul style="list-style-type: none"> - riparian vegetation - mangrove forests - mud flats - rocky shores/beds - sand banks - macrophyte beds, - and the water medium.
Extent	Where a species or ecosystem is believed to exist. The spatial limit of a species or ecosystem's existence, often reflecting their biophysical thresholds. May be measured two-dimensionally (eg. area in hectares or, length in kilometres) or three-dimensionally (eg. area by depth).
Floodplain	The flat or nearly flat land adjacent to a river that is temporarily inundated by flood waters, usually associated with lowland rivers. It consists of a mosaic of aquatic and terrestrial environments that are intricately linked with the river.
Habitat	The locality, site and particular type of local environment occupied by an organism.
Hydrology	The scientific study of the properties, distribution, and circulation of surface and subsurface water.
Indicator	Any physical, chemical, biological or ecological characteristic used to measure environmental quality.
Inland aquatic ecosystems	Any body of water including lakes, streams, wetlands, reservoirs or estuaries and associated living organisms and non-living components functioning as a natural systems.
Integrity	The ability of an ecosystem to be productive, biologically diverse and resilient to change. It includes: <ul style="list-style-type: none"> - Ecological integrity – meaning that all ecosystem processes and characteristics are present, operational and ecologically viable, and - Biological integrity – meaning that the ecosystems supports and maintains a community of organisms having a species composition, diversity and functional organisation comparable to that of the natural habitat of the locality in which the water is situated.
Internal Habitats (for aquatic ecosystems)	The land over which the water of the aquatic ecosystem normally flows or is normally covered, whether permanently or intermittently. It does not include the land adjoining or adjacent to the aquatic ecosystem that is sometimes covered by floodwater. For example, the channel of a river system.
Invasive species	A translocated or alien species occurring at a place outside its historically known natural range as a result of intentional or accidental dispersal by human activities. Most are introduced (i.e. alien or non-native) species such as weeds and feral animals. Some are native species that occur beyond their natural range.

Littoral zone	The shallow margin at the edge or shore of a lake or wetland,. Usually characterised by rooted aquatic plants that are periodically exposed to the air due to fluctuating water levels.
Load	A quantitative measure of the quantity of a (physical or chemical) water quality parameter passing a point in the system. It is calculated or modelled using the concentration of a parameter multiplied by the volume of water.
Marine habitat	Habitats in areas of open ocean including sand, reefs, rock, rubble, artificial reefs and unconsolidated bottom sediments, and the water medium.
Marine systems	The open ocean in areas greater than five metres deep. Marine ecosystems are exposed to the waves and currents of the open ocean and the water regimes are determined primarily by the ebb and flow of oceanic tides.
Regionally significant	Any species or ecosystem, which is considered important for regional biological, ecological, cultural, social, recreational, iconic, aesthetic or economic values. For example, EPA classifies Regional Ecosystems as “Endangered”, “Of Concern” or “Not of Concern” using the rules described on its website which is based on a blend of the definitions in Sattler and Williams (1999) and the <i>Vegetation Management Act (Qld) 1999</i> .
Riparian zone	Any land that adjoins, directly influences, or is influenced by a body of water.
River	A natural stream of water which flows longitudinally through a defined course, emptying into an ocean, lake, or other body of water, and usually fed along its course by converging tributaries.
River condition	River condition or health is the ability of the aquatic ecosystem to support and maintain key ecological processes and a community of organisms with a species composition, diversity, and functional organisation as comparable as possible to that of undisturbed habitats within the region. It can be described by the five major components that characterise a stream: water quality, water quantity (hydrology), instream biota, physical form (bed, banks and instream habitat) and the riparian or streamside zone.
Significant ecological communities	Any ecological community which has been identified as significant through Commonwealth, Queensland or regional legislation, or planning and management documents, or through local knowledge. Refer to Box 1 for examples.
Significant native species	Any native species, sub-species or population which has been identified as significant through Commonwealth, Queensland or regional legislation, or planning and management documents. For example, those species listed in State and Commonwealth legislation as being of conservation significance (endangered, vulnerable, rare, or covered by international convention), locally significant species, species under threat due to human activities, and species at the edge of their range. Refer to Box 1 for more examples.
Significant pest species	An organism with capacity to create human health, harm living resources, damage amenities and impairs biological diversity.
Threatening process	Any process that threatens or may threaten the survival, abundance or evolutionary development of any ecological community.
Water quality	The physical, chemical and biological properties of water. For example, turbidity, salinity, chlorophyll <i>a</i> .

Note that the flora and fauna of an aquatic ecosystem is considered separately and referred to as biota.

Note also that within the target-setting templates, the term *water quality* is used to refer to ambient or base flow conditions. In contrast, a *load* will measure the mass of a physical or chemical water quality parameter during ambient and event flow conditions.

Wetland ecosystem

Wetlands are areas of permanent or periodic inundation, whether natural or artificial; fresh, brackish or saline; still or flowing. This includes marine and coastal zone wetlands, inland wetlands and artificial wetlands.

Box 1: Examples of international, Commonwealth and State documents which identify significant ecological communities and species.

International

- International Union for Conservation of Nature (IUCN) Red List of Threatened Species.
- Convention on the International Trade in Endangered Species of Wild Fauna and Flora.
- RAMSAR Convention
- Bonn Convention
- CAMBA
- JAMBA
- RAMSAR Wetlands

Commonwealth

- *Environment Protection and Biodiversity Conservation Act (Cth), 1999*
- Environment Australia (2001). *A Directory of Important Wetlands in Australia*. Third Edition. Environment Australia, Canberra.

Queensland

- *Nature Conservation Act (Qld), 1992*
- *Nature Conservation (Wildlife) Regulation 1994*
- *Nature Conservation (Protected Plants) Conservation Plan 2000*
- *Vegetation Management Act (Qld), 1999*
- *Vegetation Management Regulation 2000*
- State Planning Policies eg. Policy 1/97 Conservation of Koalas in the Koala Coast

Appendix A Resource Condition Indicators

Matter for target	Indicators Headings	Recommended indicators
RESOURCE CONDITION		
Land Salinity	Area of land threatened by shallow or rising water tables	<ul style="list-style-type: none"> • Depth to groundwater • Groundwater salinity • Location and size of salt affected areas
Soil Condition	Soil condition	<p>For regionally significant soil condition issues that are the subject of targets in regional plans:</p> <ul style="list-style-type: none"> • Soil acidification • Soil erosion – water • Soil erosion – wind • Soil carbon content • Soil physical condition • Surface hydrophobicity • Soil biota activity
Native Vegetation	Native vegetation extent and distribution	<p>For regionally significant native vegetation that is the subject of targets in regional plans:</p> <ul style="list-style-type: none"> • The extent of native vegetation by IBRA subregion measured in hectares. • The extent of each present native vegetation type by IBRA subregion measured in hectares. • The proportion remaining of each native vegetation type by IBRA subregion measured as a percentage of the pre-European extent.
	Native vegetation condition	<p>For regionally significant native vegetation types that are the subject of targets in regional plans:</p> <ul style="list-style-type: none"> • The proportion of each native vegetation type in each IBRA subregion that is estimated to be in specified condition classes based on a selected set of attributes.
Inland Aquatic Ecosystems Integrity	River condition	<p>For regionally significant reach based issues that is the subject of targets in regional plans, the indicators are:</p> <ul style="list-style-type: none"> • Benthic macroinvertebrate community assemblages • Fish community Assemblages • Benthic diatom community assemblages • Riparian vegetation community assemblages • Riverine physical structure and in-stream habitat • Water quality • Hydrology <p>If all or most of these indicators are measured, it may be possible to use monitoring data to develop an index of river condition.</p>
	Wetland ecosystem extent and distribution	<ul style="list-style-type: none"> • Extent of regionally significant wetlands
	Wetland ecosystem condition	<ul style="list-style-type: none"> • Condition of regionally significant wetlands
Estuarine, coastal and marine habitat	Estuarine, coastal and marine habitat extent and distribution	<ul style="list-style-type: none"> • Area of each estuarine, coastal and marine habitat type measured in hectares

integrity	Estuarine, coastal and marine habitat condition	<ul style="list-style-type: none"> Condition of habitat at significant sites of selected estuarine, coastal and marine habitats
Nutrients in Aquatic Environments	Nitrogen in aquatic environments	<ul style="list-style-type: none"> Total Nitrogen + flow leaving sub-catchment or whole catchment
	Phosphorus in aquatic environments	<ul style="list-style-type: none"> Total Phosphorus + flow leaving sub-catchment or whole catchment
Turbidity / suspended particulate matter in aquatic environments	Turbidity / suspended solids	<ul style="list-style-type: none"> Turbidity OR Total Suspended Solids (TSS) + Flow
Surface Water Salinity in freshwater aquatic environments	In-stream salinity	<ul style="list-style-type: none"> Total dissolved solids (TDS) + Flow OR Electrical conductivity (EC) + Flow
Significant native species and ecological communities	Selected significant native species and ecological communities extent and conservation status	<p>For significant species that are the subject of targets in regional plans:</p> <ul style="list-style-type: none"> Range area and location of each species: area Area, location and condition of key habitat of each species: Relative abundance of each species. <p>For significant ecological communities that are the subject of targets in regional plans</p> <ul style="list-style-type: none"> extent of each ecological community: estimated area (in hectares) condition of each ecological community.
Ecologically significant invasive species	Selected ecologically significant marine invasive species extent and impact	<ul style="list-style-type: none"> Presence/absence of known or new: <ul style="list-style-type: none"> exotic marine species and native pest marine species in commercial ports and boat harbours.
	Selected ecologically significant vertebrate invasive species extent and impact	<ul style="list-style-type: none"> Reduction in impact of regionally significant invasive vertebrate pests (excluding fish)
	Selected ecologically significant invasive vegetation species extent and impact	<ul style="list-style-type: none"> The areal extent and density of weeds under selected regulatory control that are being addressed by regional bodies or community projects
MANAGEMENT ACTION		
Critical assets identified and protected		<ul style="list-style-type: none"> The extent to which assets are identified during the planning process Steps taken to protect assets identified in the plan
Water Allocation Plans developed and implemented		<ul style="list-style-type: none"> Water allocation plans developed and implemented in accordance with relevant State or Territory legislation
Improved land and water Management Practices adopted		<ul style="list-style-type: none"> Adoption of codes of practices or recommended practices that are identified in the regional plan

INDICATORS FOR SOCIAL AND ECONOMIC ISSUES RELATED TO OR IMPACTED BY NRM ISSUES

		<p>These are indicators based on nationally collected information. Regionally relevant indicators are yet to be developed.</p> <ul style="list-style-type: none"> • Effectiveness of information networks • Youth net migration • Index of Economic Diversity • Median income and income distribution • Farm cash income • Farm family off-farm income • Farm Debt-equity ratio • Education • Age and experience • Population Growth
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