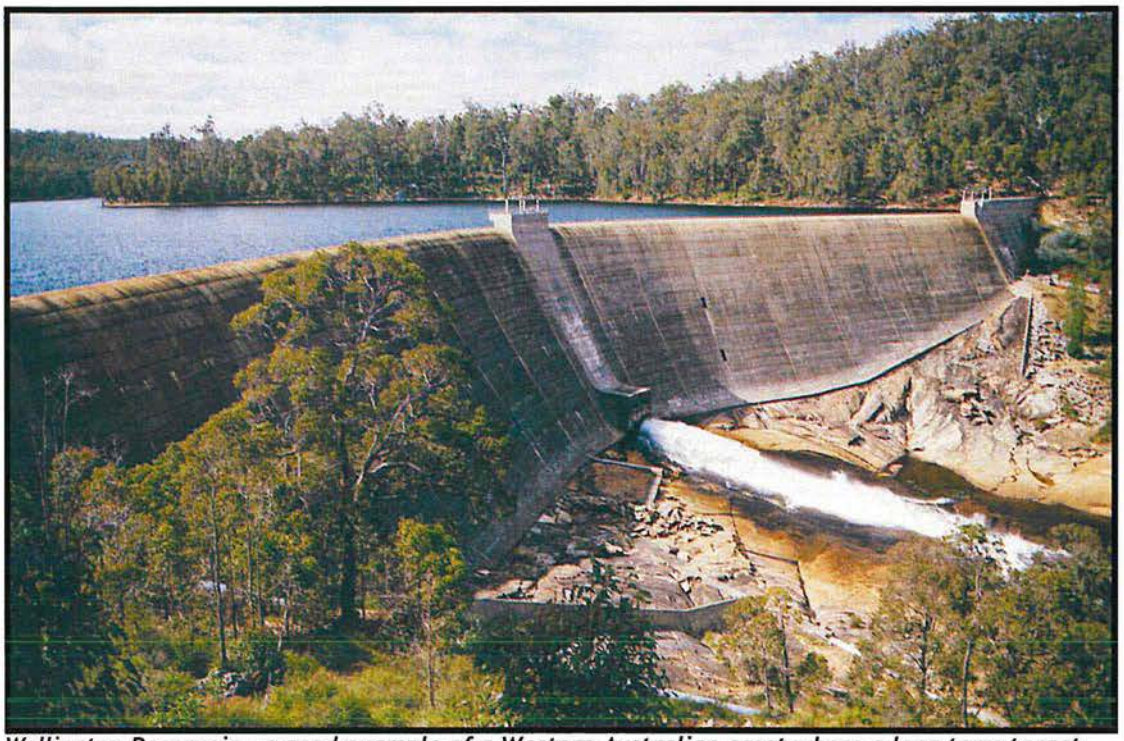
WESTERN AUSTRALIAN GUIDELINES FOR DEVELOPING AND REVIEWING ASSET TARGETS



Wellington Reservoir - a good example of a Western Australian asset where a long term target has been instrumental in focusing management action and delivering beneficial outcomes.

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1. Purpose of this document

The purpose of this Guidelines document is to provide whole-of-State guidance for Western Australia in relation to asset targets, formerly known as Resource Condition Targets (RCT's) under the Natural Heritage Trust 2 (NHT2) and National Action Plan for Salinity and Water Quality Programs (NAP) during 2003-2008. It aims to provide a consistent, transparent, accountable and scientifically sound process for developing and approving these targets for use in natural resource management (NRM). While the Guidelines intentionally focuses on asset targets, many principles and concepts can be applied to other types of environmental and NRM targets.

There is general recognition that previous target development for major NRM funding programs has been overly complex, ineffective, inefficient and lacked coordination and consistency. These Guidelines have been developed to address these deficiencies. It should help to coordinate natural resources management effort across the State and improve the capacity and quality of NRM decision making.

Development of these Guidelines is intended to be applicable beyond major NRM programs, such as the former NHT2, NAP programs and the new Caring for our Country program. For this reason, simple generic terminology has been used in this document.

The Guidelines are not intended to be prescriptive, rather to provide sufficient information for natural resource managers to develop or review asset targets at the State, regional and local (or point of investment) scales. Not-with-standing the above, the Guidelines recommends some common elements for developing and phrasing targets and also provides some recommended asset targets for inclusion in Western Australia's State NRM Plan (Government of WA, 2008) (see Section 10).

2. Background of NRM targets in WA

Developing targets for use in natural resource management is a complicated and challenging task. Historically, aspects of planning, monitoring and evaluation in NRM have received considerably more attention than targets. While the concept of using targets to manage the natural environment is not new in WA, until recently there have only been limited successful attempts to apply NRM targets in a prescribed and meaningful way.

In 1999, nitrogen and phosphorus water quality targets were identified for the iconic Swan and Canning rivers as key measures of progress for the Swan Canning Cleanup Program. In 2001, the value of targets was recognised in the *State Salinity Strategy*, with recognition of long term salinity reduction targets for water and biodiversity recovery assets such as Wellington Reservoir, Denmark River and Toolibin Lake (among others). In 2003, the *State Water Strategy* outlined a specific target for reducing potable water use in Perth households when concerns about climate change impacts on water supply availability became prominent. In 2004, the *State Greenhouse Strategy* identified specific greenhouse gas emission reduction targets to combat climate change. Also in 2004, the *Forest Management Plan 2004-2013* identified a series of performance targets for managing South West forests. It is worth noting that for many of the above examples there has been significant progress towards achieving these targets – illustrating the benefit in having targets to provide direction and management focus. However, most of the above targets have focussed on threats and issues, as opposed to targets focussing on desired asset condition or outcomes.

A national review of Integrated Catchment Management (Bellamy et al, 2002) found that a lack of agreed on-ground targets was a major obstacle in achieving effective NRM and the efficient use of funds. The inclusion of targets in the core accreditation requirements of the Australian Government's Natural Heritage Trust 2 (NHT2) and National Action Plan for Salinity and Water Quality (NAP) programs illustrated that strategic target setting had largely been overlooked in NRM in the past (Hatton and Johnson, 2002; see Section 4). Accreditation of regional NRM groups' strategies in recent years represented the first real attempt to set many NRM targets across WA.

However, a recent evaluation by the Australian National Audit Office (2007) (ANAO) of accredited regional plans for eight regional NRM groups found 80 of 163 RCT's (just under 50%) were not measurable or time bound. Only 24% of regional NRM groups regarded that the current level of scientific knowledge and data availability was adequate for developing plans, investment strategies and measuring targets. This indicated there was still considerable confusion and lack of direction about how to develop effective NRM targets.

The new Australian Government Caring for our Country program intends to re-focus investment on national priorities and iconic assets. Further details and guidance regarding the new program will be revealed later in 2008. However, the program has responded to the findings of the ANAO (2007) by promoting the importance of short 1-3 year targets to help track progress against long term targets and desired outcomes.

Each regional NRM group was interviewed in December 2007 to gain an insight into the role targets played in their past and present business models. A number of technical and political factors were identified that have largely constrained NRM target setting in WA to date (see Appendix).

Firstly, Western Australia is a large State with a relatively small population, with significant biodiversity, several climatic and geographically distinct regions. As outlined in the WA State of the Environment Report WA 2007 (EPA, 2007), existing research and monitoring has been confined to populated areas and this has transposed to a limited understanding of our broader biodiversity, land and water resources. There is a crucial deficiency of environmental and natural resource data in many parts of WA which are needed to understand baseline conditions, ecosystem processes and the current extent of impact or modification, before targets can be set. Without an understanding of ecosystem processes it is extremely difficult to determine cause-effect relationships and hence develop targets that are meaningful and

realistic. The deficiency of data is most pronounced for biodiversity, rangelands and marine assets in WA (EPA, 2007).

Secondly, there is a general lack of understanding of NRM policy and the role targets play in various management frameworks and models. For example, targets have largely been treated in isolation from other parts of the adaptive management cycle to date (see Section 5.3).. The understanding of the Pressure-State-Response model that underpins the rationale behind target selection is also poor in NRM, even though it is globally recognised as the preferred model for environmental reporting (see Section 5.2). The logic flow between targets and policy, investment planning, activities (programs and projects) and evaluation stages has not been clearly understood, but is improving (see Section 5.1).

Thirdly, in the early stages of WA's implementation of the NAP/NHT2 programs, there was extremely limited guidance for setting asset and management related targets. Most regional NRM groups were given limited time to develop regional NRM strategies and associated targets and this resulted in initial targets that didn't align with existing policy (see Section 4) or endorsed models / frameworks (see Section 5) and didn't necessarily adhere to SMART principles (see Section 6). There also remains some confusion as to whether regional asset targets are developed for the region (to be adopted by all NRM stakeholders) or applied at the point of investment scale (adopted by regional NRM groups). In some regions, this lack of guidance has resulted in the almost annual review of targets which has rendered their purpose and use in NRM largely ineffective.

These constraints (among others) have led to a disconnected adaptive management cycle in Western Australia with many regional NRM groups and management agencies having unique target setting processes without a common direction and a distinct lack of integration between stakeholders. In addition, the disjunct between targets and management activity has resulted in some NRM regions not understanding their true purpose and role.

3. Defining targets

3.1 What are targets?

In the world of NRM, targets can be a major source of confusion. Bellamy et al (2002) found the word "target" was often used interchangeably with "goals", "objectives", "outcome", "output" and other similar terms. Defining what "targets" are is a crucial starting point for delivering effective NRM.

In these Guidelines, a "target" is defined as an agreed endpoint, desired outcome or a specific level of performance to be achieved within a specified period of time, for a particular objective. Targets are policy tools, but have a scientific base. They are the measurable or quantifiable component towards achieving desired policy visions, objectives and goals (which in themselves tend to be qualitative, conceptual or general statements of intent). Targets are a critical step in the adaptive management cycle (see Section 5.3), which should be considered an integral aspect to natural resource management. Although beyond the scope of these Guidelines, targets can be applied in many ways beyond NRM, including financial and administrative targets.

Well designed targets are important for providing:

- a means to measure the progress against a stated vision or desired goals or values;
- a key role in the adaptive management cycle;
- a reference point for evaluating progress and assisting with decision making;
- a link in the program logic chain to align actions with desired goals / objectives;
- a means of focussing management attention, effort and resources;
- a way of ensuring consistent communication and collaboration between stakeholders; and,
- increased transparency and accountability.

A well designed target will:

- Consider links to relevant high level policies (see Section 4);
- Consider its role in relevant frameworks and models (see Section 5);
- Incorporate SMART principles (see Section 6); and,
- Support investment and decision-making (see Section 7).

This document outlines each of these components in detail.

3.2 Common target related terms

Beyond NRM, there are other related terms whose terminology is sometimes used interchangeably (often incorrectly) with targets. These should be defined for clarity reasons.

Some of these terms include:

- "Baseline" refers to a starting or reference point, such as collecting baseline data for an indicator where no data has been collected previously. Some people use the term to refer to ambient or background environmental conditions.

- "Benchmarks" refer to the value for an indicator that has some defined environmental significance (usually scientific) or the value for an indicator that demonstrates achievement of best management practice (sometimes referred to as "standards").

- "Criteria" refer to the value for an indicator that helps managers to decide whether a management threshold has been crossed and / or if a different management response is required (e.g. as in 'performance criteria'). "Criteria" are sometimes referred to as "trigger values" or "benchmarks".

- "Guidelines" refer to a document, rules or principles that provide voluntary advice or instructions about setting "standards" or on taking a preferred course of action (e.g. Implementation guidelines for the National Water Quality Management Strategy (NWQMS); Guidelines for integrating capacity building into NRM planning).

- "Standards" are predefined levels of excellence, best practice or performance specifications usually defined by an established authority. They can be applied to inputs, processes, outputs or outcomes (e.g. water quality standards in the NWQMS; ISO14000 standard; National Environment Protection Measure standards).

- "Milestones" mark the achievement of critical stages of program implementation. They may represent partial achievement of desired outcomes or mark a specified point of progress against a target.

- "Objective" refers to an aim or goal that expresses the desired end result or outcome.

- "Outcome" is an intended result, effect, or consequence (beneficial or otherwise) that occurs from carrying out a program or activity (e.g. native vegetation rehabilitated, conservation of a declared rare flora, lowered river salinity, etc).

3.3 Recent target terminology

In relation to the requirements of the former NHT2 / NAP programs, three key types of targets were utilised in regional NRM strategies: aspirational targets, resource condition targets (RCTs) and management action targets (MATs). Given the NHT2/NAP programs are now obsolete, the terms RCTs and MATs have been replaced in this Guidance document by 'asset targets' and 'management targets' to allow improved integration with future NRM programs (e.g. Caring for our Country). There is also an expectation that target terminology will be simplified for future NRM programs.

- *Aspirational targets* are statements about the desired future state or vision for an asset (~50 years) and usually reflect asset values. These targets tend to be more general 'statements of intent' since 'values' can be ambiguous and difficult to measure. The statement should reflect general community aspirations for the asset since the management timeframe is intergenerational and beyond the bounds of political timeframes. It is also possible that community aspirations and values for an asset may change over several decades. For this reason, it is not meaningful for these type of targets to be quantifiable. Rather an aspirational target identifies what assets are considered valuable and sets the direction for management objectives and targets and investment planning.

  Examples:
  - No further loss of endangered flora and fauna species in the Moora region.
  - All conservation significant wetlands on the Swan Coastal Plain are formally protected.
  - Rehabilitate all degraded agricultural land in the Nyabing region that is non-productive.

- *Asset targets* (i.e. formerly known as RCTs) establishes a specific endpoint or desired outcome that makes a contribution towards an aspirational target or objective. This type of target refers to the condition or status of a natural resource asset (e.g. waterways, wetlands, native vegetation, endangered native species, soil units, landscapes, national park, coasts, marine environment, atmosphere, heritage, landforms, landscape, etc). These targets are set over a 10-20 year timeframe given to allow for landscape scale change (i.e. beyond local, property or farm scales). Progress against the asset target can be measured intermittently to track the changes in the asset condition or trend.

  In setting asset targets there is a need to focus on the desired *outcome* (i.e. the environment and natural resources) – not the *means* by which that will be achieved. In

this sense, people and community (i.e. commonly referred to as social assets) are considered a means to an end. That is, community behaviour and attitude change is a primary means by which improvements in natural resource asset condition and the environment occur.

Similarly, threats and symptoms of threatening processes (e.g. eutrophication, weeds, introduced animals, salinity, soil acidity, etc) should also not be considered as natural resource assets. Addressing these issues does not represent a final outcome per se. Any one natural resource asset may be affected by many threats and this needs to be considered in developing asset targets.

Examples:
- Increase native vegetation extent in the South West region from 35% to 40% of the pre-1750 extent between 2005 to 2030.
- Between 2005 and 2050, increase the proportion of monitored waterway sites in the Ord River catchment that have macroinvertebrate diversity in good to excellent condition from 25% to 50%.
- Rehabilitate 5,000 ha of degraded land lost to agricultural production in the Moora local government area between 2005 and 2025.

- *Management targets* (i.e. formerly known as MATs) establishes a specific management outcome or output that (upon completion) will contribute towards improving the condition of the asset and ultimately helping to meet the asset target. Timeframes for management targets will vary depending on the duration of management actions or activities. They may be used for reporting on the delivery of outputs for particular management projects, actions and activities over relatively short timeframes of 1-3 years. In this instance they may refer to targets developed for fencing activities, workshops, tree planting, etc.

  Examples:
  - 20 km of waterway riparian zone to be fenced during 2008.
  - Undertake five workshops during 2008/09 to train farmers in developing farm plans.

  Alternatively, management targets may be developed for measuring the outcome of management programs or projects occurring over the medium term (4-10 years). In this instance, they can be used to measure broad scale progress of management programs and projects that contribute to a long term improvement in asset condition, such as changing behaviours and attitudes, addressing environmental threats and issues, and environmental rehabilitation / restoration activities.

  Examples:
  - Between 2005 and 2010, an additional 20,000 ha of native vegetation (non-forest vegetation) will be placed in management / conservation agreements in the South West region.
  - Between 2007 and 2017, there will be a 20% increase in the number of landholders in the Avon Wheatbelt bioregion using best practice for erosion control.

3.4 How are targets linked to indicators?

Most often, targets are linked to indicators which can be described as a physical, chemical, biological, social or economic variable that measures management performance or progress. Indicators should be considered when developing a target to help determine what needs to be measured – i.e. they summarise the type of monitoring data that will be collected (e.g. depth to groundwater, total nitrogen concentration, or the extent, density and distribution of weeds).

Unlike targets, indicators do not contain specific numbers, do not have outcome statements and are not defined in a spatial or time bound sense. Many natural resource government

agencies use key performance indicators in conjunction with performance targets to convey management progress against important Government policy objectives.

'Matters for targets' was a term specifically used in the NHT2 / NAP programs to act as mandatory indicators for developing targets (particularly RCTs) for NRM regional strategies. However, it has since been recognised that these were an inconsistent mix of asset, threat and issue indicators which have complicated the development of asset based targets.

Targets should be developed in the context of an existing indicator where possible. Often mistakes are made by developing 'ideal' or conceptual targets without considering existing indicators and their related monitoring programs. What results is a target that has no capacity to be measured unless a specific (i.e. tailor-made) monitoring program is developed (often at significant cost). This effectively renders the target meaningless and subsequent management actions developed around the target are also likely to be inappropriate and ineffective.

The solution is to consider target development is in the context of indicators used to explain the cause-effect relationships in the Pressure-State-Response model (see Section 5.2). Existing and preferred indicators can be found within State and national State of the Environment (SoE) Reports, the National Land and Water Resources Audit, the Australian Bureau of Statistics, and some relevant State and national policy documents (see Section 4). Some publications are available that provide consolidated lists of nationally agreed indicators (ANZECC, 2000; NLWRA, 2008; Commonwealth of Australia, 2006).

Because of the complex nature of some ecosystems, a suite of indicators may be required to develop appropriate asset targets. For example, soil condition is a highly desirable indicator used to describe overall soil health. However, in WA there is no one single indicator used to measure soil condition but rather a composite of indicators relating to soil structure, compaction, organic content, pH, erosivity, salinity, etc to provide an overall picture of soil condition. Similarly, there is no one single indicator to measure aquatic ecosystem health in WA; instead relying on a number of physical, biological and chemical indicators to provide a composite picture.

The absence or lack of use of integrated environmental health indicators (or indices) reflects the historical focus in WA on managing issues and threats, rather than managing desired natural resource outcomes. There is a need to change this approach in WA, especially given the widespread lack of environmental condition information (EPA, 2007). Victoria has been using an 'Index of Stream Condition' successfully for some years and is now working on developing a 'Soil Heath' index (www.dpi.vic.gov.au). New South Wales and South Australia have even used similar indices in their State NRM Targets (www.nrc.nsw.wa.gov.au; www.dwlbc.sa.gov.au).

4. Policy context for targets.

Policies convey priorities, the direction a leadership body intends to take, and how it intends to allocate effort and resources. Most policy documents help to establish a vision and objective statements which need to be considered in the context of setting targets and managing related initiatives. Although rare, some policy documents establish targets to provide desired management outcomes or performance measures.

4.1 National policy link to targets

The Australian Government has the responsibility to identify matters of significance to the country and develop appropriate strategic natural resource management policies. The *Environment Protection and Biodiversity Conservation Act 1999* supports the sustainable management of natural resources, the conservation of biodiversity and protection of matters of national environmental significance. Significant policy links to natural resource management were two policy frameworks developed in relation to the Australian Government's NAP and NHT2 programs:

- *National Monitoring and Evaluation Framework*

  The framework for NRM Monitoring and Evaluation was agreed by the NRM Ministerial Council in 2002 and updated in 2003. It assesses progress towards improved natural resource condition through the development of accurate, cost effective and timely information on the health of the nation's land, water, vegetation and biological resources; and of the performance of programs, strategies and policies which provide national approaches to the conservation, sustainable use and management of these resources. The Framework is based on a set of principles for the monitoring, evaluation and reporting on natural resource condition. It also provides a set of indicators for assessing change in resource condition and program performance. The roles and responsibilities for meeting national, state/territory and regional level reporting requirements are outlined.

- *National Framework for Standards and Targets*

  This framework for NRM Standards and Targets was agreed by the NRM Ministerial Council in 2002 and updated in 2003. It specifies the minimum set of 'matters for targets' or indicators for which all regions should set regional NRM targets. It was not prescriptive in specifying the target levels, but rather allowed for flexibility given each region's characteristics. It was recognised that targets formed a core component of NRM regional strategies and were required to be signed off formally by Australian and State Governments.

In recent years it has been generally recognised there have been significant shortcomings with these two policy frameworks, especially in regards to clarity and logic. The superseding Australian Government program "Caring for our Country" commenced on 1 July 2008 and has delivered a new policy framework and a new form of program delivery. The program will focus on six national priority areas and will focus on long term intended outcomes (i.e. asset targets) and short term (1 to 3) year output targets. Further details about the program are expected to be released in September 2008.

Other national policies relevant to NRM include the National Water Quality Management Strategy (2000), Australia's Oceans Policy (1998), National Strategy for the Conservation of Australia's Biodiversity (1996) and the associated National Objectives and Targets for Biodiversity Conservation (2001-2005), and the National Forest Policy Statement (1992).

4.2 State policy link to targets

State Government has the responsibility to identify matters of significance to the State and to develop relevant strategic natural resource management policies. WA policies have traditionally not focussed on specific natural resource assets. However, the protection and management of some of WA's iconic natural resource assets is covered under legislation; for example, the iconic Swan River (*Swan and Canning Rivers Management Act 2006*), national parks (*Conservation and Land Management Act 1984*) and protected species (*Wildlife and Conservation Act 1950*), soil resources (*Soil and Land Conservation Act 1945*), and some specific assets covered through regulatory policies under the *Environmental Protection Act 1986* (e.g. Peel Harvey Environmental Protection Policy, Gnangara Mound Environmental Protection Policy).

NRM related policies in WA have historically tended to focus on generic themes (water, biodiversity, planning, sustainability) or issues (salinity, greenhouse gases). Major State policies include the *State Planning Strategy* (1997), the *State Salinity Strategy* (2000), the *State Wetlands Conservation Policy* (2000), the *State Water Strategy* (2003), the *Government Response to the Salinity Taskforce Report* (2002), the *Regional Development Policy* (2003), the *Forest Management Plan (*2003*)*, the *State Sustainability Strategy* (2003), the *State Greenhouse Strategy* (2004), the *State Water Quality Management Strategy* (2004), the *Action Plan for Tree Farming in Western Australia* (2006), the *Draft 100 Year Biodiversity Conservation Strategy for Western Australia* (2006), the *Blueprint for Water Reform in Western Australia* (2007), the *State Water Plan* (2007) and the *State Plantations and Farm Forestry Strategy* (2008). Use of targets in these policy documents has been relatively scarce, with the exception of specific targets used in the *State Water Strategy*, *Forest Management Plan* and the *State Greenhouse Strategy*.

Without targets, many of these high level policy documents have little chance of measuring actual progress towards desired outcomes. Subsequently, outcomes tend to be judged on completing management actions while making the assumption that completed actions equals successful outcomes. However, this is a gross assumption that is often not recognised.

To date, there is no overarching NRM policy for WA although a State NRM Plan is currently being developed to provide a high level policy framework for all NRM stakeholders to work consistently towards. It is proposed that (in time) State-level targets will be presented in the Plan together with an implementation strategy. It is intended that State-level targets will be developed to be consistent with these Guidelines and provide guidance for development of related regional targets.

4.3 Regional policy link to targets

In WA, policy development at the regional level is scarce beyond regional planning schemes and regional development strategies and some regional sector strategies (e.g. tourism, regional development, forestry, water, etc). The most relevant regional policies are regional NRM strategies developed by the six WA regional NRM groups via the Natural Heritage Trust 2 and National Action Plan for Salinity and Water Quality. These strategies identify priorities for the region, relevant threats, and establish a framework for investment activity and management action. NRM targets, developed in conjunction with the government and community, are set out in regional plans. Accreditation of regional plans was dependent on criteria established by the Australian and State Government through the Natural Resource Ministerial Council. Accredited plans include:

- the *Avon NRM Regional Strategy 2005* developed by the Avon Catchment Council;
- the *Northern Agricultural Regional Natural Resource Management Strategy 2005* developed by The Northern Agricultural Catchments Council;
- the *A Strategy for Managing the Natural Resources of Western Australia's Rangelands 2005*, developed by the Rangelands Regional NRM Coordinating Group;

- the *South Coast Regional Strategy for NRM 2005*, developed by South Coast NRM Inc, formerly known as the South Coast Regional Initiative Planning Team;
- the *South West Regional Strategy for NRM 2005*, developed by the South West Catchments Council; and,
- the *Swan Regional Strategy for NRM 2004* developed by the Swan Catchment Council.

5. Models / frameworks and their relationship to targets.

Various models and frameworks are used to help explain the hierarchical and process relationships in environmental and natural resource management. Most models and frameworks have been in use for some time and some natural resource sectors (e.g. fisheries, forestry, agriculture) have been using them for years.

For the NHT2/NAP programs, consideration and integration of these models is relatively new. This is due (in some part) to the level of complexity involved in integrating NRM across various scales (national, State, regional, local), multiple sectors, the community and different modes of operating. Differing terminology has also played a significant part in complicating the implementation of these frameworks / models.

5.1 What is Program Logic?

Program logic is the rationale behind a program that helps define the interlinkage or the 'cause-and-effect-relationship' between its goals, activities, outcomes and outputs. The model illustrates how goals should systematically lead to a suite of activities or actions that in turn leads to various outputs and intermediate and long term outcomes. The program logic model used in this context is often referred to as the "theory of change". It attempts to rationalise how natural processes work and how human (management) activity can affect it.

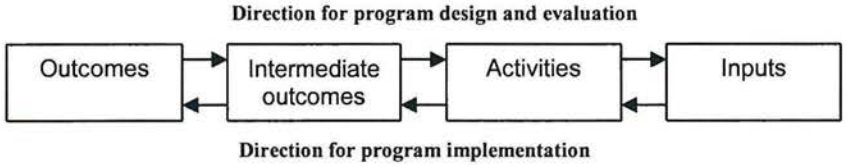
Program logic models helps to lay the foundation for an evaluation process that enables adaptive management to occur. It is sometimes represented as a diagram, matrix or table that shows a series of consequences – not just a series of events (Government of South Australia, 2006a). Although it is ideal for program logic models to be applied during the development stage of a program or strategy, it can be utilised during operation and evaluation stages too and gradually refined over time.

Program logic influences how targets are developed or refined. It is particularly relevant for management targets where the cause-and-effect pathway resides over a generally short time frame (e.g. 1-5 years). It is more difficult for the theory of change logic to be applied over longer time frames (e.g. 20-50 years) as the cause and effect pathway becomes more ambiguous and influenced by unforeseen events (e.g. climate change, land use changes, political change, policy change, etc). For this reason, assumptions about the cause-effect relationship need to be documented when developing targets.

In the context of the NHT2/NAP programs a logical hierarchy and sequential approach to developing targets existed for aspirational targets, asset targets and management targets. That is, aspirational targets or goals should have influenced the development of asset targets, that should in turn, influence the development of management targets, which should in turn influence the development of appropriate programs, projects, actions or activities necessary to achieve the target.

Outcomes and outputs result from the progress or completion of these programs, projects, actions or activities and are often used to assess progress towards the asset target. They may represent either intermediate outcomes (stepping stones towards final outcome) or the final outcome (endpoint achieved). Using program logic, it is possible to design a program that addresses each level of the logic hierarchy, which can then be implemented in a reverse order (Figure 1). Targets can be developed at any level of the program logic hierarchy.

Figure 1: Program logic hierarchy in relation to program design and implementation.



5.2 What is the Pressure-State-Response Model?

The Organisation of Economic Cooperation and Development (OECD) developed the Pressure-State-Response (PSR) model in the late 1980s to develop environmental indicators. The PSR model, and modified versions of it, is being used worldwide as an environmental reporting tool (Figure 2).

In WA, the State Government and some local governments use the model for undertaking State of the Environment Reports – reporting by environmental themes and indicators associated with pressures (threats or issues), state (or condition) and response components. It has enabled a form of environmental reports that helps to recognise and address problem areas and provide direction for improved policy or management activity.

The model is based on three key components that are linked in a perpetual cycle (Figure 2):

- Pressures that represent environmental issues, problems or threats that impact the environment or natural resources (e.g. greenhouse gas emissions; introduced animals; weeds; land salinisation, clearing of native vegetation; etc);
- State or the condition of the environment and natural resources (e.g. native vegetation extent and condition; river condition; soil condition; etc)
- Response represents the actions that society takes to address the pressures or the condition of the environment and natural resources (e.g. NRM actions; agricultural practices; waste management; etc)

The model recognises that there are both positive (beneficial changes to the environment) and negative (detrimental changes) feedback loops between each component (Figure 2).

The benefits of applying this model in relation to natural resource management include:

- It ensures that managers understand cause-effect pathways rather than treating symptoms;
- It ensures an integrated and whole-of-system approach to managing natural resources (i.e. considers social and economic forces with the environment); and,
- It promotes consistent use of indicators and reporting methods.

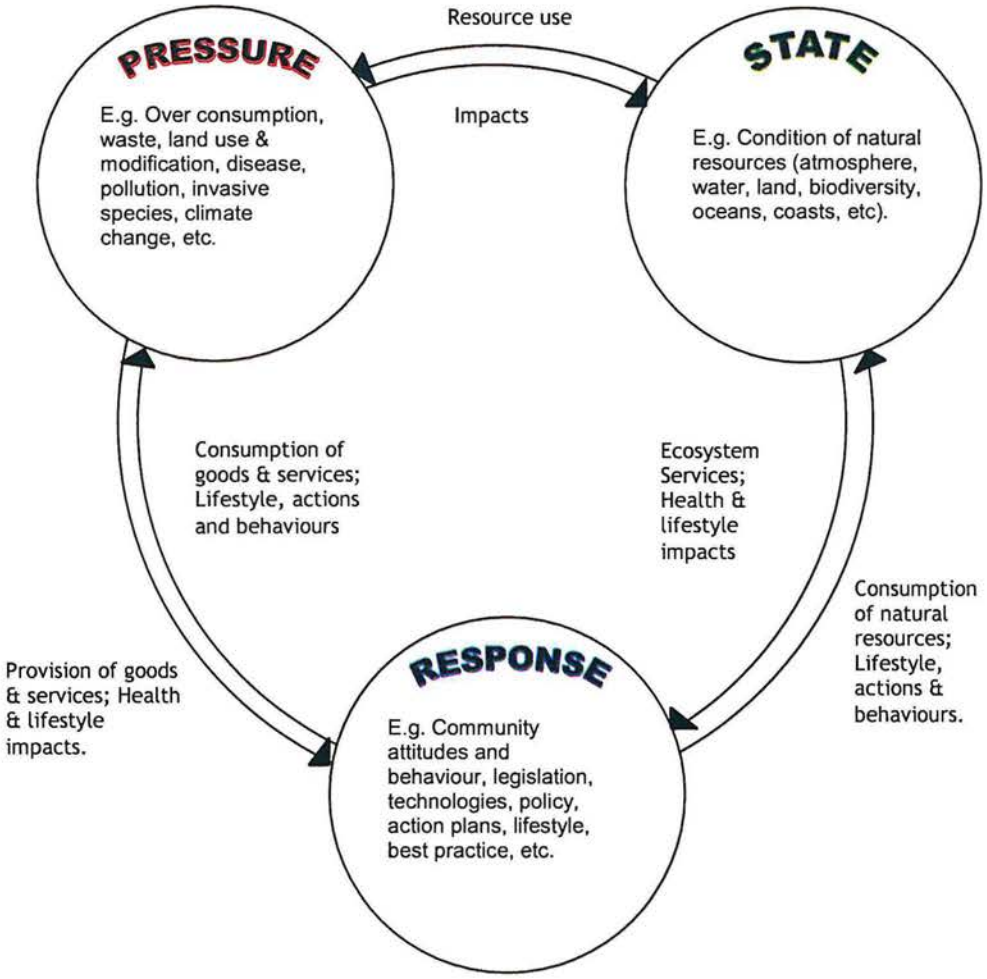
One modification of the PSR model that is becoming more widely adopted (including in WA) is the Driving Force – Pressure – State – Impacts – Response (DPSIR) model. The additional components to the original model are:

- Driving Force: considers the major social and economic factors that cause or contribute to a number of pressures (e.g. population growth, consumption of natural resources, climate change, etc).
- Impacts or Implications: considers the consequences for society and the economy of a persistent threat or a degraded environment. Possible implications need to be considered when considering appropriate management actions or responses.

The PSR model should be considered during the strategic planning and reporting phases. In the strategic planning phase the model is useful for establishing linkages between priority assets (current and desired condition) and the identification of pressures (threats) that affect them and appropriate management responses (actions). The model is also useful for understanding the cause-effect pathways between each component and these may influence the assumptions made in developing targets.

Application of the model will help to select appropriate indicators which can then be used to develop targets and management actions. Information generated from the indicators can then be presented to stakeholders and the community in the form of State of the Environment Reports, which can be applied at a variety of scales or themes (e.g. State of the Cockburn Sound Report; State of the Avon Region Report; State of the Water Resources Report). From applying the PSR model it should become apparent if there are natural resource management gaps or deficiencies and the need to review goals and develop or revise appropriate policies, programs, projects, actions and activities.

Figure 2: The simple Pressure-State-Response (PSR) model.



5.3 What is the Adaptive Management Cycle?

Adaptive management is learning while doing. The concept originated in the 1970s as a way to implement resource management policies as on-ground experiments (Holling 1978, Walters, 1986). Adaptive management is aligned with the 'precautionary principle' in that it does not advocate the delay of management action until there is enough knowledge about the natural resource asset, but acknowledges that time and resources are too limited to defer action – especially for urgent issues and important assets (Lee, 1999). Results of experiments help to develop knowledge about the natural resource asset, so better management decisions can be made in the future.

The adaptive management concept has been applied to various management structures attempting to make it into a systematic process. Many 'structural' versions of adaptive management exist from the simple version of "Plan-Do-Check-Review" (this is more relevant to landholders wanting a general approach) through to the more detailed versions underpinning Environmental Management Systems (EMS) (this is more suited to large organisations requiring significant integration or strategic approaches). Adaptive management cycles describe a sequential order of management steps that needs to occur to deliver continuous learning and improved outcomes.

This Guidance document focuses on the more detailed EMS style adaptive management cycle, having been advocated by the WA Environmental Protection Authority for use in NRM (EPA, 2005), used in WA's implementation guidelines of the National Water Quality

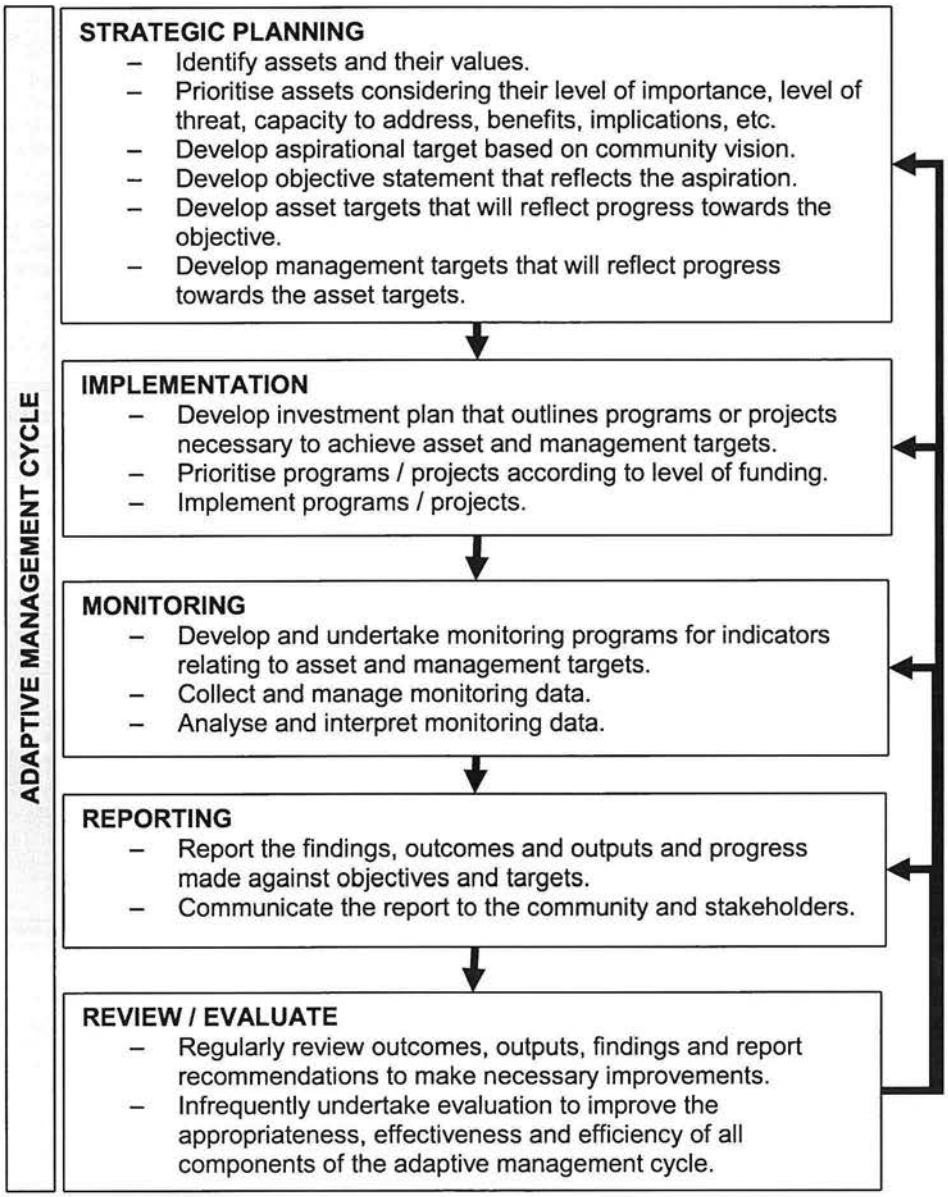
Management Strategy, and advocated by the Department of Environment, Water, Heritage and the Arts (2006) for use by Australian Government agencies. It is also the preferred model given NRM in WA requires significant integration among a large number of stakeholders.

The EMS approach has also been successfully used by industry and business worldwide for many decades. The standard for developing an EMS is ISO14001 developed by the International Standards Organisation, a non-government organisation responsible for developing a collection of voluntary standards. The EMS standard is designed to help organisations achieve environmental and financial benefits through the effective implementation of environmental management. While the EMS approach is traditionally used by organisations to minimise environmental impacts and enhance business efficiency, it can also be used by natural resource management agencies and regional NRM groups to enhance management performance.

In the context of NRM, the adaptive management cycle is beneficial for establishing a systematic and consistent approach to managing natural resources. It reinforces the program logic approach by applying a hierarchical approach to defining a vision or asset values and in turn developing objectives, targets and implementing appropriate actions, monitoring, reporting and evaluation components (Figure 3). It also ensures that multiple stakeholders are working towards a common set of agreed values, objectives and targets – as opposed to each organisation having their own approaches and working inconsistently.

The adaptive management cycle should ideally be considered at the strategic planning phase and integrated into business operations and regional NRM strategies to ensure all management components are considered and implemented sequentially. Successful application of the adaptive management cycle will see program logic and the PSR model being applied and targets being successfully integrated into the management cycle with a defined purpose.

Figure 3: The adaptive management cycle.



6. Principles for setting targets

These Guidelines recognise that targets need to be SMART - an acronym for Specific, Measurable, Appropriate, Realistic and Timebound. The acronym represents a suite of principles that need to be considered in developing asset targets. Successful application of the SMART principles will ensure that appropriate and effective targets are developed to deliver effective and efficient outcomes. While the principles relate to asset targets in general, many of the concepts can be generically applied to management targets. It should be noted that the principles are not well suited to aspirational targets which tend to be vision statements that are not necessarily specific, measurable or timebound.

6.1 (S)MART - Specific

Rationale: Unless targets are specific, they will lack purpose, clarity and direction.

Asset targets must relate to a specific asset

Asset targets should always refer to a specific asset (e.g. a waterway, a wetland, a native vegetation assemblage, an endangered native species, a threatened ecological community, a soil unit, a landscape, a national park, a coastal segment, a marine reserve, an airshed, a heritage icon, a landform, a landscape, a bioregion, etc). There is no limit on the defined shape, size or nature of an asset. This depends on what the community or government consider valuable and the scale of management attention, both of which may be influenced by community attitudes, demographics, spatial scales, available information, and management capacity.

At the State scale, Government has the responsibility to manage natural resources in a broad holistic sense (e.g. native vegetation, waterways, biodiversity, etc) and also for some priority or critical assets (e.g. Swan River, Fitzgerald National Park, Shark Bay, Wellington Dam, etc). At regional scales, State Government agencies and regional NRM groups work together to manage regionally significant assets and assets important to communities. At the local level, State Government agencies, regional NRM groups, industries, local governments and local community groups work together to manage local assets on public and private lands. Despite the number of natural resource managers, asset targets have the potential to integrate all related management activity. Consequently, depending on the scale of management attention, development of *broad* asset targets (relating to general asset condition) and *specific* asset targets (for assets receiving targeted investment) may both be required.

Assets need to have a well defined physical (i.e. geographic or administrative) boundary. For many assets, its boundary is readily defined by formally recognised management areas such as a national park, property or farm, local government area, a bioregion, a catchment, etc). It is vital that managers understand the physical or geographic limits of their managed asset. This requires that the boundaries for a natural resource asset to be well defined, so there is no ambiguity about the spatial extent of agreed management activity. Unless this occurs it may be argued that management activities outside of the agreed asset boundary may not be considered appropriate.

Difficulties may also be encountered in describing physical boundaries for some biodiversity assets, given they have various management scales (i.e. at the genetic, species, population or landscape levels). Some biodiversity assets such as endangered or threatened fauna species are also highly mobile and can't be constrained to one physical area. In this instance, it may be prudent to focus on a specific species (with no boundary per se) or alternatively establish boundaries for the species' habitat area/s (on the assumption that protecting the habitat also protects the species).

Some complex ecological systems (e.g. wetlands, waterways, groundwater systems and complex soil types) may also have ambiguous boundaries. Boundaries for these types of systems may vary depending on the catchment, its hydrology, peripheral vegetation and

nearby land use or seasonal factors. For many assets the availability (or absence) of data or information will a crucial factor in determining the asset boundary.

Where an asset target is to be developed for an asset with no previously defined boundary, then it will need to be properly defined using spatial recognition techniques (i.e. geosensing, satellite imagery, aerial photography, cadastral maps, etc). This foundation activity is necessary otherwise the extent of target's application or relevance can be misinterpreted or disputed among stakeholders thereby affecting the target outcome. If the boundary or size of the asset changes in the future (especially with future land use change) then this needs to be documented as it may affect the potential to realistically achieve the target.

Can asset targets make reference to threats?

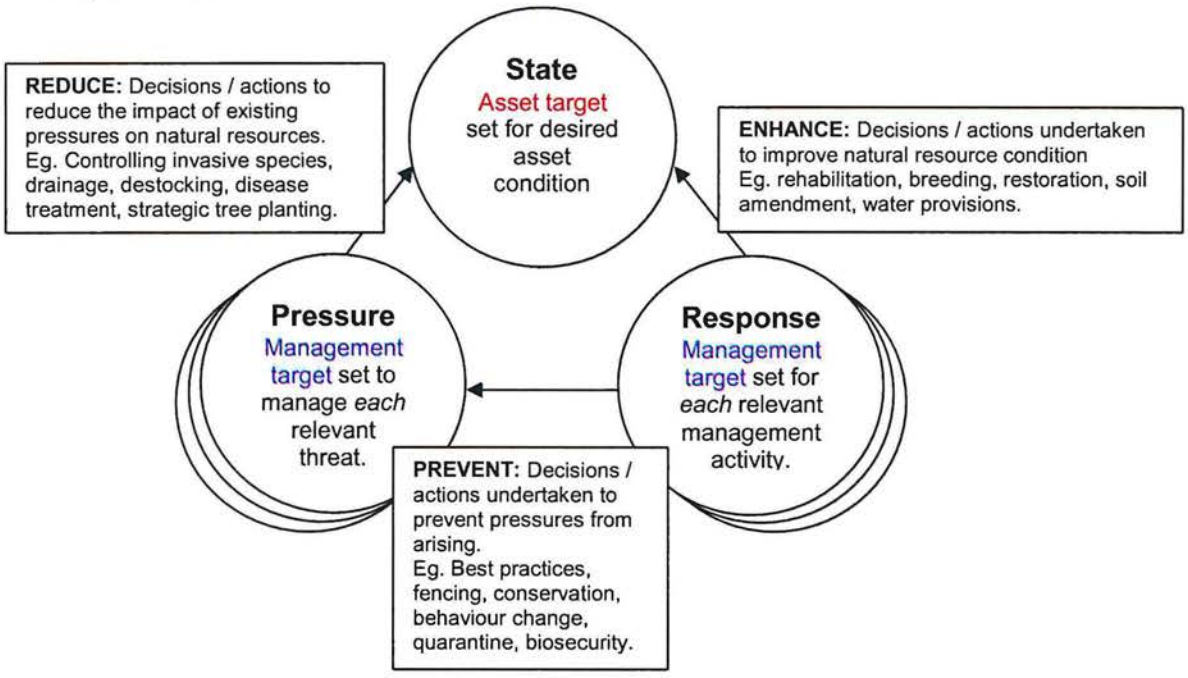
An asset target should refer to an asset's desired future state after considering the likely cumulative effect of undertaking both direct and indirect actions. However, the target should always be phrased in terms of the desired asset condition or end outcome. Asset targets primarily relate to improving or conserving resource condition. There are two major ways that the condition for any asset can be conserved or improved (Figure 4), including:

i) Direct action: acting to *enhance* an asset's condition directly through treatment action (e.g. rehabilitation, restoration, breeding programs, soil amendments, etc). In this instance, the direct actions contribute to a direct improvement in asset condition; or,

ii) Indirect action: acting to *prevent* and *reduce* the deterioration of an asset's condition indirectly by:
   - reducing the impact of existing pressures, issues or threats on the asset (e.g. removing invasive species, strategic tree planting, disease treatment, drainage, pollutant mitigation, etc); or,
   - by preventing pressures, issues or threats arising in the first instance (e.g. best management practice, quarantine, fencing, covenanting, adding to the conservation estate, behaviour change, etc).

   In this instance, there is an assumption that indirect actions are contributing to an improvement in resource condition.

Figure 4: Relationship of threats and responses to asset condition in NRM, using the Pressure-State-Response model.



Asset targets should not contain reference to threats (e.g. salinity, dieback, invasive species, sedimentation, etc). These refer to degradation processes associated with natural resource assets, are often not associated with one specific asset, and may or may not be linked to desired asset outcomes. Threats, problems and symptoms are best addressed using management targets. Addressing one particular threat does not automatically mean that the condition of a specific asset will improve. It should also be remembered that each asset may have multiple types of pressures / threats affecting it and all may need to be addressed before asset condition can improve.

Removing one type of threat may also result in another taking its place. For example, a management target dedicated to eradicating foxes from preying on a susceptible biodiversity asset (e.g. woylie) is a viable means of addressing a primary threat. The asset target would focus on the woylie and a management target would focus on fox removal. However, reduced fox populations could be replaced by opportunistic feral cats that could in turn impact woylie populations. Therefore, it should not be automatically assumed that reduced fox numbers means that woylie numbers will increase. In this case, the woylie asset target would not be met if addressing the fox management target was the sole management action.

Another example could be a management action to remove weeds from a riparian zone to meet a waterway asset target. The weed removal may in fact exacerbate erosion and sedimentation processes, in turn leading to nutrient enriched turbid water and associated loss of aquatic biodiversity. In this instance, the removal of weeds may actually result in deterioration in waterway condition and hinder progress towards the waterway asset target. If weeds were managed as the sole threat then it is likely the waterway would have degraded.

It also could be argued that managing a serious environmental issue such as Phytophthora dieback requires a broad asset approach for which an asset target on dieback may be needed. While this appears desirable from a program efficiency perspective, it is not the most effective way of delivering effective outcomes for the affected forest asset. Managing dieback should be considered part of the management process – but managing dieback effectively is not the desired outcome. The asset target should be focussed on the desired condition of the native forest asset as an outcome. Whilst managing dieback may be a useful management activity, if the overall outcome is a fully degraded native forest (due to other less obvious threats such as salinity, altered water regimes, climate change, etc), then managing dieback specifically may have been a wasted exercise.

Many assumptions are often made between addressing threats and improving / maintaining an asset's condition – and often these assumptions require testing in the 'real world' before they are found to be valid or invalid. Ecosystems are complex and simple cause-effect pathways should not be assumed to be generating effective outcomes for asset without adequate research or adaptive management experience. These assumptions should be documented in the development of targets to help refine learnings if there are unexpected outcomes.

Asset targets must be specific about their intent

Targets should have a clear, unambiguous statement of intent enabling it to be readily interpreted and evaluated. Targets should be simply written, easy to understand and reflect community aspirations and objectives / goals (see Section 5.3). They should be written in a simple, clear manner allowing multiple stakeholders without a scientific background to identify the intent or purpose of the target. This in turn encourages stakeholder ownership and understanding of the target which is important for communicating desired outcomes. If all stakeholders understand and can relate to the target there is more likely to be alignment and a unified sense of purpose and direction.

In contrast, targets written in a complex (technical) manner have little meaning other than for those directly involved in the target's development. These targets are difficult to communicate to other stakeholders and are more likely to be ignored or frequently altered due to dissatisfaction or confusion. A common reason for developing complex targets is the perception that the methodology must be incorporated in the target wording. This is not

necessarily true, although the target should be linked to an appropriate indicator and methodology (protocol). The most appropriate way to address this is to use annotations or footnotes in the target wording where appropriate (see case studies below). These annotations can be hidden when presenting to external stakeholders, but are available for technical experts or managers required to interpret or evaluate the target in detail.

There are four specific components to a well worded target. Asset targets should contain reference to:
i) a *specific* desired outcome,
ii) a *specific* indicator relating to asset condition,
iii) a *specific* asset (with spatial boundaries where applicable), and
iv) a *specific* timeframe (including a specific end year and a specific baseline year where appropriate).

Some case studies applying this format to asset targets are documented below.

Case Studies

- Example of asset target for Soil Condition:

Rehabilitate degraded land lost to agricultural production[1,2] in the Moora local government area[3] from 20,000 ha to 15,000 ha between 2005 and 2025[4].

> 1 = specific outcome is to rehabilitate 5000 ha of degraded (formerly productive) agricultural land. Primary pressures to degradation of soil condition include salinisation, acidification, waterlogging or erosion or a combination thereof.
>
> 2 = specific indicator is "area of agricultural land degraded or lost to production". This indicator can be linked to DAFWA methodologies or ABS data associated with land lost from production due to soil degradation. Use ASRIS database for baseline information on key parameters.
>
> 3 = specific asset is Moora local government area as defined by DLGRD (2000).
>
> 4 = specific timeframe refers to a baseline year of 2005 and a final endpoint year of 2025.
>
> Assumptions = that degraded land is able to be rehabilitated; full cooperation from landholders with access to and rehabilitation of degraded land; rehabilitated land is not lost due to unforeseen circumstances (e.g. fire, drought, flood, cyclone, etc); allowing for increase in degraded agricultural land.

- Example of asset target for Native Vegetation Communities Integrity:

Increase native vegetation extent[1,2] in the South West region[3] from 35% to 40% of the pre-1750 extent from 2005 to 2030[4].

> 1 = specific outcome is to increase native vegetation extent by 40,000 ha. Primary pressures contributing to loss of native vegetation include clearing, land salinisation, phytophthora dieback or a combination thereof.
>
> 2 = specific indicator is "native vegetation extent". This indicator can be linked to LandMonitor satellite imagery data in conjunction with ground truthing. Pre-1750 native vegetation extent uses Beard's modelled data.
>
> 3 = specific asset is the South West region as defined by DEC regional boundaries at 2004.
>
> 4 = specific timeframe refers to a baseline year of 1750 and a final endpoint year of 2040.
>
> Assumptions = LandMonitor ground-truthing and modelling elements are indicative of on-ground native vegetation coverage; current modelling indicates 35% of South West region is covered by native vegetation; full cooperation from landholders with access to and rehabilitation of degraded land; rehabilitated land is not lost due to unforeseen circumstances (e.g. fire, drought, flood, cyclone, etc)

- Example of asset target for Inland Aquatic Ecosystems Integrity:

Between 2010 and 2050[1], improve the per cent of foreshore for the Kalgan River (and its tributaries)[2] in good to excellent condition[3,4] from 40% to 75%.

1 = specific timeframe refers to a baseline year of 2000-2010 (duration of initial baseline surveys) and a final end year of 2040-2050 (allowing for time to complete surveys).

2 = specific asset is the foreshore of the Kalgan River and its tributaries as defined by Australian Water Resources Atlas (2000).

3 = specific outcome is to improve foreshore condition of waterways for biodiversity and water quality outcomes. Primary pressures contributing to foreshore condition include clearing, salinisation of inland waters, phytophthora dieback, weeds, altered water regimes, or erosion or a combination thereof.

4 = specific indicator is "foreshore condition". This indicator can be linked to Foreshore Assessment Surveys methodology developed by Water & Rivers Commission / Department of Environment / Department of Water.

Assumptions: baseline survey for entire Kalgan River and tributaries completed by 2010; foreshore condition surveys undertaken once every 10 years; modelling using existing survey information indicates 40% of foreshore is likely to be in good to excellent condition; assumption that foreshore condition is indicative of river health; full cooperation from landholders with access to and rehabilitation of degraded land; rehabilitated land is not lost due to unforeseen circumstances (e.g. fire, drought, flood, cyclone, etc); classification methodology for foreshore condition does not fundamentally change over the target timeframe.

- Example of asset target for Inland Aquatic Ecosystems Integrity:

Between 2005 and 2050[1], improve the per cent of monitored waterway sites in the Ord River catchment[2] that have macroinvertebrate diversity in good to excellent condition[3,4] from 25% to 50%.

1 = specific timeframe refers to a baseline year of 2005 and a final end year of 2050.

2 = specific asset are the waterways of the Ord River catchment as defined by AWRC 2000.

3 = specific outcome is to improve the waterway health for biodiversity and water quality outcomes. Primary pressures contributing to reduced macroinvertebrate diversity include loss of fringing or instream vegetation, salinisation of inland waters, weeds, introduced animals, altered water regimes, erosion, acidification, sedimentation, eutrophication or a combination thereof.

4 = specific indicator is macroinvertebrate diversity and observed diversity versus expected diversity at sites. This indicator can be linked to AusRivas methodology.

Assumptions: classification methodology for AusRivas does not fundamentally change over the target timeframe; AusRivas site selection remain relatively steady over time or that removed / additional sites are evenly distributed amongst good/bad sites; assumption that macroinvertebrate diversity is indicative of aquatic ecosystem health; full cooperation from landholders with access to AusRivas sites; rehabilitated land is not lost due to unforeseen circumstances (e.g. fire, drought, flood, cyclone, etc).

How do threats and management actions relate to asset targets?

Even though threats (such as salinity, weeds, greenhouse gas emissions, etc) and other management actions don't have an immediate role in asset targets, they still play a vital role in other types of management targets and ultimately towards delivering successful NRM outcomes.

While asset targets are phrased in terms of 'desired outcomes', it still requires 'means' by which to achieve the outcome. The 'means' may include management action by addressing threats, modifying behaviours or undertaking activities that directly improve the condition of natural resources (as outlined in Figure 4). These management actions / activities also

require targets so that progress in terms of implementation can be assessed for effectiveness and timeliness.

Therefore, management targets (formerly MATs) can be regarded as targets that measure progress of indicators for management actions or activities that contribute towards improving asset condition. There may be multiple management targets for each asset target depending on the various type of management options available and the scale and timeframe of selected management action / activities (Figure 5; see Section 3.3).

Management targets should be developed where it is expected that some management action or activity will occur for an asset. They may relate to one or more asset targets due to overlapping outcomes. For example, an activity such as planting native vegetation may relate to a biodiversity target, a soil condition target and an inland waterway target.

If management actions or activities can not be aligned with an asset target, it is likely that the action / activity lacks purpose or direction in contributing towards a desired asset outcome. This alignment is needed to prevent ad-hoc management actions / activities from being developed and implemented. It also requires natural resource managers to develop management actions / activities in the context of asset targets; rather than developing desirable management actions / activities (i.e. 'pet' projects) without regard for the 'bigger picture'.

Figure 5: Diagrammatic representation of how management targets should be developed for each asset target.

The specific components for a well worded asset target can be readily modified to suit management targets. As detailed above, the specific wording of an asset target should help guide the wording of related management targets.

Management targets should contain reference to:
i) a *specific* desired management outcome or output,
ii) a *specific* indicator relating to management activities / actions (may relate to threat, behaviour change, or on-ground action),
iii) a *specific* asset or management area (with spatial boundaries where applicable), and
iv) a *specific* timeframe (including a specific end year and a specific baseline year where appropriate).

Some case studies applying this format to asset targets are outlined below. It should be noted that the target examples are illustrative only and provide an examples on how asset targets and management targets are related across scales. The target hierarchy between State, regional and local scales is discussed in more detail in Section 6.3.

Case Studies

- Example of asset and related management targets for Soil Condition:
  (note: each target would require footnotes to clarify outcome, indicator, asset & timeframe)

Scale	Target type	Theme / Threat	Target description
State	Asset target	Soil condition	Rehabilitate degraded land lost to agricultural / pastoral production in WA from 150,000 ha to 110,000 ha between 2005 and 2025.
Region	Asset target	Soil condition	Rehabilitate degraded land lost to agricultural production in the Avon region from 20,000 ha to 15,000 ha between 2005 and 2025.
	Management target - threat	Land salinity	Reduce the extent of salt affected land in agricultural areas in the Avon region from 45,000 to 30,000 ha between 2005 and 2025.
	Management target - threat	Land salinity	Reduce the per cent of monitored bores in the Avon region with rising groundwater trends from 30% to 10% between 2005 and 2025.
	Management target – response	Land salinity	Increase the per cent of landholders using non-irrigated perennial pasture species in the region from 39% to 50% between 2005 and 2025.
	Management target – response	Land salinity	Rehabilitate 5% of salt affected areas (in 2005) within the Avon region with perennial native vegetation by 2025.
	Management target - threat	Soil acidification	Reduce the area of agricultural soils in the Avon region with strongly acidic topsoil from 10,000 ha to 5,000 ha between 2005 and 2015.
	Management target - response	Soil acidification	Increase the per cent of farmers applying lime to acid affected soils in the Avon region from 60% to 80% between 2005 and 2015.
	Management target - threat	Soil erosion	Reduce the area of soils susceptible to wind and water erosion in the Avon region from 18,000 ha to 15,000 ha between 2005 and 2020.
	Management target - response	Soil erosion	Improve the per cent of farmers practising stubble retention or mulching practices in the Avon region from 60% to 90% between 2005 and 2020.
	etc	etc	etc
Local	Asset target	Soil condition	Rehabilitate degraded land lost to agricultural production on the McMannon farm near Kojonup from 10 ha to 5 ha between 2005 and 2025.
	Management target – threat	Land salinity	Reduce the rate of rise of ground water levels at Katanning Site 24 (McMannon) by 40% between 2005 and 2010.
	Management target – response	Land salinity	Rehabilitate 5 ha of salt affected land (in 2005) on the McMannon farm near Kojonup with perennial native vegetation by 2025.
	etc	etc	etc

- Example of asset and management related targets for Inland Waters Condition:
  (note: each target would require footnotes to clarify outcome, indicator, asset & timeframe)

Scale	Target type	Theme / Threat	Target description
State	Asset target	Theme	Between 2005 and 2050, increase the per cent of monitored WA waterways that have macroinvertebrate diversity in good to excellent condition from 25% to 50%.
Region	Asset target	Theme	Between 2005 and 2050, increase the per cent of monitored waterways in the Swan region that have macroinvertebrate diversity in good to excellent condition from 15% to 30%.
	Management target - threat	Salinisation	Decrease the number of major river systems in the Swan region with rising salinity trends from 3 to 0 between 2005 and 2030.
	Management target - threat	Eutrophication	Decrease the per cent of monitored waterway sites in the Swan region that are above guideline levels for both nitrogen and phosphorus from 20% to 10% between 2005 and 2025.
	Management target - response	Altered flow regimes	Increase the number of major river systems in the Swan region that have environmental water requirements and provisions established in formal Government policy from 2 to 10 between 2005 and 2015.
	etc	etc	etc
Local	Asset target	Theme	Between 2005 and 2030, increase the per cent of monitored waterway sites in the Swan and Canning river system that have macroinvertebrate diversity in good to excellent condition from 12% to 25%.
	Management target - threat	Eutrophication	Decrease the per cent of monitored waterway sites in Swan and Canning river system that are above guideline levels for both nitrogen and phosphorus from 30% to 18% between 2005 and 2025.
	Management target - response	Altered flow regimes	Increase the number of major river systems in the Swan and Canning river system that have environmental water requirements and provisions established in formal Government policy from 1 to 4 between 2005 and 2010.
	Management target - response	Loss of fringing vegetation	Increase the per cent of foreshore in the Swan Canning river system that has at least 10m of intact fringing native vegetation from 20% to 30% between 2007 and 2027.
	etc	etc	etc

- Example of asset and management related targets for Potable Water Condition:
  (note: each target would require footnotes to clarify outcome, indicator, asset & timeframe)

Scale	Target type	Theme / Threat	Target description
State	Asset target		Increase the per cent of developed WA water supply source areas that are acceptable for drinking water supplies from 95% to 98% between 2005 and 2030.
Region	Asset target		Increase the per cent of developed South West water supply source areas that are acceptable for drinking water supplies from 90% to 95% between 2005 and 2030.
Local	Asset target		Improve water quality to a potable state in the Wellington reservoir (Collie water resource recovery catchment) between 2005 and 2015.
	Management target - threat	Salinisation	Reduce salinity (TDS) from 1000 mg / L to 550 mg/L in the Collie River inflow to Wellington reservoir (Collie water resource recovery catchment) between 2005 and 2015.
	Management target - threat	Other pollutants	Maintain other water quality parameters (for key threats*) for Wellington reservoir below Australian Drinking Water Guideline levels between 2005 and 2015.

6.2 S(M)ART - Measurable

Rationale: If targets are not measurable, there is no reliable means to assess progress or performance.

Are targets measurable in the absence of baseline data?

Setting of targets always requires baseline data – the level against which future progress will be measured. Ideally a target will be developed by considering baseline data and assessing current status and historical trends (rather than observing one single point in time). While it may be challenging to obtain historical baseline data series, it makes it much faster and easier to identify future change.

A target may aim to address an emerging issue or a poorly understood process or aspect of the ecosystem (e.g. climate change); therefore the prospect of setting targets when there is absence of trend or baseline data should not be necessarily dismissed. This follows the philosophy of the "precautionary principle" whereby '*the lack of scientific certainty should not preclude cautious action by decision makers where there is a risk of serious or irreversible harm to the environment*'. This allows NRM managers to set targets for natural resource assets where there is a risk of ecological harm - even if there is a lack of scientific data to inform target setting at the current time.

However, it should be emphasised that enough evidence (either as predictive modelling, expert forecasts, etc) should be available to develop a realistic and measurable target. Assumptions made in developing the target in this manner should also be documented. Targets developed in this manner should be referred to as *interim* targets and should include:

- Statements that proper targets will be developed within a nominated timeframe; and,

- Commitments to develop and implement foundational activities (research program, monitoring program, etc) to provide baseline data where needed.

This process may take several years to generate suitable baseline data, but is preferred if a reliable and measurable asset target is warranted.

Targets should link to measurable indicators.

Asset targets need to be based on the best available scientific understanding of the natural resource asset. Scientific understanding requires that monitoring data be collected for particular indicators, which are necessary to develop meaningful targets. Environmental indicators are simple measures that provide an insight into complex ecological systems. Targets should be developed in conjunction with indicators to ensure there is an understanding of how targets will be measured, evaluated and contribute to management decisions.

To ensure that progress of the asset target can be measured, it is imperative to ensure that appropriate indicators and monitoring methods (i.e. protocols) are selected (see Section 3.4). Preference should be given to indicators that align to those already being used or advocated by State Government agencies. If there is no preference given at the State level, then indicators being used or advocated at the national level should be selected. If there is still inadequate guidance at the national level, then direction should be sought from other State Government agencies or academic or research institutions with relevant experience on the topic is available. New indicators should always be developed in consultation with lead State and national agencies to ensure alignment and consistency with relevant legislation, policy and protocols.

Once an indicator has been confirmed, a monitoring program of repeated measurements of the indicator, in various places (covering the extent of the asset) and times and in a defined way, will provide a basis for detecting environmental change. This may encompass activities including data collection (sampling), data management, data interpretation and reporting. Normally, monitoring a complex natural system requires a suite of indicators; however the better the understanding of a natural system, the smaller the suite of indicators required (CSIRO website, accessed January 2008).

Once indicators have been selected for the asset target, the characteristics of the monitoring program need to be selected. Detecting changes in asset condition is a quantitative problem (i.e. "how much change?"), so statistics are usually needed to interpret whether any perceived change is real or is in fact a false impression. Some characteristics to consider in the design of the monitoring program for a asset target includes:

- Natural variability of the asset and its sensitivity to the indicator (how the asset and indicator varies according to time of day, time of year, weather conditions, etc);
- The amount of change required to detect (i.e. small vs. large change);
- Sampling methods (i.e. protocols);
- Sampling location (i.e. single vs. multiple vs. representative vs. random sites);
- Frequency of sampling (i.e. routine vs stratified vs opportunistic vs random; more frequent sampling helps detect smaller changes over shorter timeframes, but is very expensive);
- Acceptable level of error, usually in statistical terms (e.g. 90% confidence); and,
- Number of repeat samples collected (e.g. duplication helps reduce sampling error).

Care should be taken to ensure that monitoring data generated using a simple indicator isn't over-interpreted for a complex ecosystem. Ecosystems often involve complex ecological processes that are not well understood, so unexpected adverse progress should be treated as a beneficial learning outcome that will help to increase knowledge about the ecosystem or processes.

Because the scope of a single indicator is usually limited, indicators should be used in suites to provide a more complete picture of natural resource asset and overall condition.

Sometimes multiple indicators are integrated or aggregated to form an index to act as a summary measure, as used for Gross National Product and the All Ordinaries Index in economic terms. However, developing indices for the environment is more complicated than economic indices because many ecosystems are poorly understood, let alone monitored.

Ideally, targets should be linked to a State or National endorsed indicator with an operational monitoring program. Where current monitoring exists for an endorsed indicator, decisions will need to be made if the current level of monitoring is sufficient to meet the targets needs, or whether it will be necessary to invest in further monitoring.

Where no current monitoring or baseline exists, an evaluation may be required to determine the indicator of choice (where several options are available). It should be noted that development of new indicators and associated monitoring methodology can be an extremely complex and time-consuming process; especially where the proposed indicator and methodology has not been previously trialled or if it conflicts with another stakeholder-preferred indicator already in use.

Table 1: Relationship of NHT2/NAP 'matters for targets' to targets.

Matter for Target	Link to PSR model	Link to NRM terms	Type of target to use	Example indicators
Land salinity	Pressure	Threat	Management target	Depth to groundwater table; Area of land threatened by shallow or rising watertables.
Soil condition	State	Asset condition	Asset target	Soil condition index.
Native vegetation communities integrity	State	Asset condition	Asset target	Native vegetation extent and distribution; Native vegetation condition.
Inland aquatic ecosystems integrity	State	Asset condition	Asset target	River condition index; Wetland ecosystem extent and distribution; Wetland / waterway ecosystem condition.
Estuarine, coastal and marine habitat integrity	State	Asset condition	Asset target	Estuarine, coastal and marine habitat extent and distribution; Estuarine, coastal and marine habitat condition.
Nutrients in aquatic environments	Pressure	Threat	Management target	Nitrogen in aquatic environments; Phosphorus in aquatic environments.
Turbidity / suspended particulate matter in aquatic environments	Pressure	Threat	Management target	Turbidity / suspended solids.
Surface water salinity in freshwater aquatic environments	Pressure	Threat	Management target	In-stream salinity.
Significant native species and ecological communities	State	Asset condition	Asset target	Selected significant native species and ecological communities extent and conservation status.
Ecologically significant invasive species	Pressure	Threat	Management target	Selected ecologically significant invasive species extent and impact.
Critical assets identified and protected	Response	Management action	Management target	Critical assets register.
Water allocation plans developed and implemented	Response	Management action	Management target	Water allocation plan.
Improved land and water management practices adopted	Response	Management action	Management target	Adoption of improved management practice.

Table 1 outlines the National agreed 'matters for targets' as described by the National Standards and Targets Framework. Although nationally endorsed for the NHT2/NAP programs, this list actually complicated the setting of RCTs, where it was interpreted that RCTs needed to specifically address each 'matters for target'. It has since been recognised that the 'matters for targets' relate to a combination of indicators for resource condition and assets, threats and management responses (i.e. all components of the PSR model). It should

be noted that threats and management responses influence asset condition (see Section 6.1), but in themselves do not represent desired asset *outcomes* are therefore are not suitable for setting long term asset based targets. The table has been presented to show how existing targets in regional NRM strategies developing using 'matters for targets' relate to 'asset' and 'management' targets in these Guidelines.

Should monitoring data be collected for the entire duration of the target?

Monitoring will help determine whether progress is being made against a target. Adaptive management can only occur if monitoring data is providing active feedback on progress being made against a target. In this way, a manager can decide to evaluate management performance and make the necessary tweaks to management actions. For example, if an analysis of trends indicated insufficient progress has been made then actions may need to be enhanced or alternative approaches developed. In contrast, if trends indicated that progress was further ahead of schedule than projected, it may warrant a redistribution of resources to other priority areas. This gradual refinement over the life of the target will help improve program effectiveness and efficiency, improve learning outcomes and enhance asset outcomes.

It is therefore imperative to have a monitoring program for an indicator in place to measure progress over the target's timeframe. A monitoring program consisting of repeated measurements of the indicator, at various sites relevant to the asset, at regular intervals will form the basis for detecting changes in asset condition.

Regular monitoring is needed for a complex ecological system or asset to understand changes due to natural variation compared to changes due to human impact (whether positive or negative). For this reason, it is usually a good idea to have at least several years of baseline data to understand the possible indicator data range exhibited for an ecosystem or asset. In this way, a realistic target can be developed considering all sources of variation. Monitoring programs may also have to be adjusted (i.e. frequency of data collection, site location, etc) to accommodate the variation being exhibited by the asset. By considering these factors in a monitoring program, a manager will be able to determine if a target has been met with a given level or certainty.

An unfortunate complication of monitoring is that collecting too little data over time may not provide enough statistical certainty that a target has been met; whereas collecting too much data may waste available resources. In this way, statistics are useful to help optimise monitoring programs – that is, meeting monitoring and target requirements at least cost (see Section 7.3).

6.3 SM(A)RT - Appropriate

Rationale: If targets are not appropriate for stakeholders, then agreement and action from them is unlikely to occur.

What is the appropriate scale to apply asset targets?

The scale that the asset targets are developed may influence whether other related targets also need to be developed. As previously outlined, asset targets are designed for a specific purpose and at the most appropriate management scale to achieve the desired outcome. High level broad targets (i.e. State and regional) may be better suited for reporting and for high-level policy outcomes, while targets at lower scales (i.e. regional and local specific assets) may be better suited for directing on-ground management activities and community programs and projects.

Asset targets developed at the State scale may be included into strategic plans or policies for high level management direction (e.g. State NRM Plan, State Biodiversity Conservation

Strategy, State Greenhouse Strategy, etc). Regional asset targets will need to align with corresponding State targets. It should be noted that this may require a review of many existing regional RCTs, since most were developed without the direction of State asset targets as to be outlined by the State NRM Plan. Regional asset targets will then be inserted into regional strategies to coordinate related management and investment activity.

Priority assets in the region may also require asset targets to be developed at the local scale (e.g. farm, paddock, bushland, water supply, specific population of Declared Rare Flora) where they are receiving (or likely to receive) management attention or investment. Local scale asset targets may not need to be developed for every single asset in the region, rather the assets should be prioritised to reflect values, threats, stakeholder capacity, benefits, etc. There are a number of prioritisation methodologies available in the NRM literature and this document does not intend to elaborate on this topic. The development of asset targets at the local scale will be particularly useful for learning about desired outcomes from investment within relatively short time scales.

Is it appropriate to have "parent-child-grand child" targets?

Similar to the logical hierarchy between target types (between aspirational, asset and management targets), there may also be a pragmatic hierarchy between various types of asset targets. This practical hierarchy exists because targets can be developed at various levels, scales, or for different types of assets. This is necessary because asset targets need to be designed in the context of specific aspirations, goals, or for statutory purposes. For example, State targets need to consider how well natural resources across the State are being managed collectively; while a point of investment target will need to consider outcomes from a specific local project.

It should also be recognised that natural processes operate at a variety of scales. For example, soil condition may vary from paddock to paddock, whereas a particular type of marine habitat may be found over several hundred square kilometres. To provide another example, a declared rare orchid may be confined to one particular site, whereas an endangered cockatoo may rely on habitat spread over hundreds of kilometres at different times of the year. Targets should be set to a scale that is appropriate to achieve the desired asset outcomes.

While targets need to be scale appropriate, targets should developed to ensure a certain level of consistency between them (Figure 6; Tables 2 and 3). This type of relationship is often referred to as being "daughter", "child" or "nested" targets or said to be exhibiting a "parent-child" target relationship. This relationship allows for consistency of asset targets between various levels, so that similar targets at all scales can be aligned or "rolled up". In this way, targets become linked to one another and work together. It relies on a top-down approach, where the intent of the 'parent' asset target (whether at State or national level) provides the basis for developing 'child' asset targets (typically at region or local scales). Ideally, the specific attributes of the 'parent' asset target (i.e. specific outcome, specific indicators, specific asset boundary and specific timeframes) should be reflected or help guide development of related 'child' asset targets.

One of the current issues in WA is that there is a lack of guidance at the State level on the development of asset targets. The lack of "parent" targets at a State level to date has hindered the consistent development of "child" targets at the regional and local scales. State 'parent' targets are essential to help regions and agencies align their targets at lower scales. At the time of writing these Guidelines, it was intended that the State NRM Plan would contain State asset targets to help guide the development and review of 'child' and 'grand-child' targets.

Management targets should then be set at the appropriate scale to align with each asset target (i.e. parent, child, grandchild or State, regional, local). There may be considerable overlaps at the management target level, since any particular management action may be associated with several asset targets. For example, a management target associated with

reducing land salinisation (i.e. revegetation) may cross-link to asset targets to do with improving native vegetation extent, soil condition, and waterway condition.

Figure 6: Diagrammatic representation of the scales at which asset targets should operate.

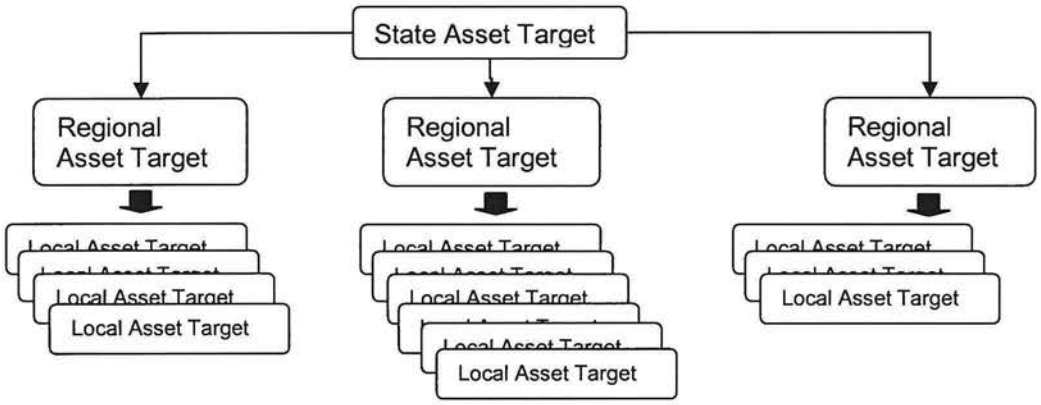


Table 2: Examples of the target hierarchy for an asset with an environmental outcome focus.

Scale	Target level	Parent-child hierarchy	Target description
State	1.	"Parent" target	Improve[1] the 2008 conservation status[2] for 5% of WA's listed threatened species and threatened ecological communities[3] and maintain[1] the conservation status[2] for others by 2028[4].
Region	1.1	"Child" target	Enhance[1] the 2008 conservation status[2] for 8% of South Coast region's listed threatened species and threatened ecological communities[3] and maintain[1] the conservation status[2] for others by 2028[4].
Local	1.1.1	"Grandchild" target	Maintain or improve[1] the 2008 conservation status[2] of the woylie [3] in the South Coast region by 2028[4].
	1.1.2	"Grandchild" target	Maintain or improve[1] the 2008 conservation status[2] of Montane thickets[3] in the South Coast region[3] to 2028[4].
	1.1.3	"Grandchild" target	Improve[1] the 2008 conservation status[2] of Gilbert's potoroo[3] in the South Coast region by 2028[4].
	etc	"Grandchild" target	Others.....
		Footnotes	1 = specific outcome to improve and / or maintain. 2 = specific indicator is current conservation status of listed threatened species and threatened ecological communities (as defined in WA Government Gazette). 3 = specific asset refers to listed threatened species and threatened ecological communities at various scales. 4 = specific timeframe is common between 2001 and 2031 in accordance with the Biodiversity Conservation Strategy's lifespan.
		Notes	"Asset" refers to fauna, flora or ecosystems that are threatened as defined under Wildlife Conservation Act 1950..
		Assumptions	Significant changes to conservation status methodology does not occur over nominated timeframe; conservation status of nominated flora or fauna is not dramatically diminished through unforeseen events (disease, wildfire, drought, climate change, etc); that new extensive species and / or populations aren't discovered; etc.

Table 3: Example of the target hierarchy for an asset with an economic outcome focus.

Scale	Target level	Parent-child hierarchy	Target description
State	1.	"Parent" target	Increase[1] the per cent of developed WA water supply source areas[3] that are suitable for drinking water[2] from 95% to 98% between 2005 and 2030[4].
Region	1.1	"Child" target	Increase[1] the per cent of developed South West water supply source areas[3] that are suitable for drinking water[2] from 90% to 95% between 2005 and 2030[4].
Local	1.1.1	"Grandchild" target	Improve[1] water quality to a potable state[2] in the Wellington reservoir (Collie water resource recovery catchment)[3] between 2005 and 2015[4].
Local	1.1.2	"Grandchild" target	Maintain[1] potable water quality[2] in the Stirling Reservoir[3] between 2005 and 2030[4].
	etc	"Grandchild" target	Others.....
		Footnotes	1 = specific outcome to improve potable drinking water quality where it is currently unacceptable; or to maintain potable drinking water quality where it is currently acceptable. 2 = specific indicators for potable water quality include physical, chemical and biological indicators as documented in the Australian Drinking Water Guidelines (NHMRC, 2004). Specific indicators and values aren't listed in target as this may vary between water sources depending on threats and current pollutants. 3 = specific assets refers to developed water supply source areas as at 2005. 4 = specific timeframe refers to previous target timeframes for water resource recovery catchments where appropriate.
		Notes	"Asset" refers to the reservoirs or water supply areas as defined under CAWS Act 1947 and the MWSS&D Act 1909.
		Assumptions	Significant changes to number of water source areas does not occur over nominated timeframe; that water sources aren't permanently closed due to lack of water (e.g. impacts of climate change, EWRs); etc.

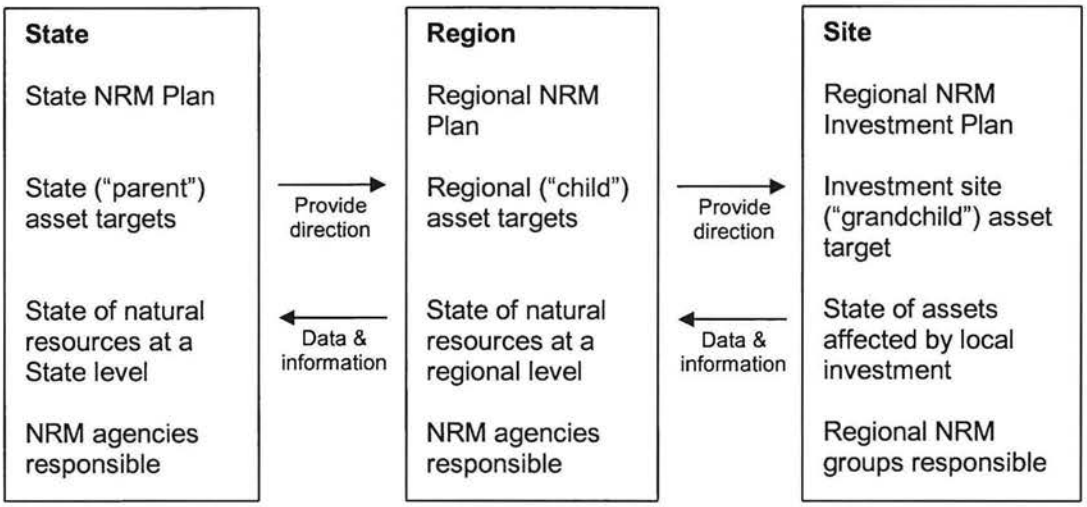
Who is the appropriate owner of the targets?

There has been considerable debate amongst WA NRM stakeholders about who owns asset targets considering multiple layers of government, regional and community groups all have a vested interest in managing natural resource assets. Some asset targets have been developed recognising that the State Government has existing statutory, policy and program responsibilities associated with iconic natural resource assets (e.g. forests, fisheries, water resource recovery catchments, biodiversity recovery catchments, etc) and others for measuring broad scale resource condition (general changes over time). Some regional groups have questioned the legitimacy of developing regional asset targets where they overlap with agency responsibilities.

Another issue causing debate is whether targets have been developed for the benefit of the "region" or for "regional NRM groups". If asset targets have been developed for the region, then the focus of asset targets in regional strategies should be on regional *assets* – which are considered important to everyone. If asset targets have been developed for regional NRM groups then the focus for asset targets should be on their specific assets where the group is investing and need to demonstrate that their investment is delivering desired asset outcomes.

The fact that State Government NRM agencies have a general (sometimes statutory) obligation to monitor broad scale regional asset condition indicates that regional-based asset targets should be owned by Government agencies. While regional NRM groups have a vested interest (through the regional strategies) in understanding regional asset condition change, the groups have an immediate responsibility for demonstrating that their investment is delivering outcomes – and (in the majority of instances) these changes are more likely to be demonstrated at local scales rather than regional or State scales in the short term.

Figure 7: Target and data / information relationships between State-region-site scales.



There seems to be a consensus that it is more appropriate for NRM agencies to own both State ("parent") and regional ("child") asset targets due to their vested interest in understanding and reporting on broad scale environmental change (Figure 7). Regional groups may still contribute to the development of regional ("child") asset targets as key stakeholders, but the bulk of the technical expertise required for target development, associated monitoring, analysis and reporting largely resides within government agencies. In turn, these "child" targets would inform the regional NRM groups to develop their own "grand-child" asset targets for specific investment sites. This arrangement in target ownership is also appropriate given that the State Government agencies have a long term statutory responsibility and stability in comparison with the relative uncertain future of regional NRM groups (i.e. financial, administrative and political uncertainty). This fact is highlighted with the recent (December 2007) change of government elect at the Federal level and the corresponding change in NRM philosophy, program design and the regional delivery model.

Is it appropriate for targets to be enforced?

While regional asset targets are becoming more clearly defined over time, it is still unclear whether meeting targets will be enforced, or if there will be punitive action for not meeting them. Punitive action for target non-compliance is likely to encourage NRM managers to regularly modify targets under the guise of 'adaptive management'. Under this arrangement, targets would be regarded as a flexible notional agreement and would have little value in the adaptive management cycle.

The only process for ensuring a robust approach to setting and enforcing asset targets is to incorporate them in high level policy documents (i.e. State environmental policies) or make the targets regulatory, such as in Environmental Protection Policies covered under the *Environmental Protection Act 1986*. Under the high level policy arrangement, there is an element of accountability and transparency in that the targets are in the public eye and there is an expectation that the targets will be met - but no immediate penalty. Under the regulatory arrangement, the ability to change asset targets would require Ministerial approval and penalties would be imposed where agreed targets are not met. While the regulatory approach is more "heavy handed" it is more likely that asset targets would be treated seriously and met in the long term.

An alternative approach is to use incentives to reward positive management progress for meeting targets. Incentives may take many forms including financial rewards, industry awards, community recognition or other benefits. Incentives can be used to motivate people and may even encourage innovative solutions to problems. However, the use of incentives over long periods of time required to achieve asset targets (i.e. over decades) becomes

somewhat problematic – especially if the need to modify targets arises, or if unforeseen events occur, or if the incentive is withdrawn.

The issue of targets enforcement and incentives is not easy and requires further debate and discussion. However, in most instances NRM targets are not likely to be enforceable.

Under what conditions is it appropriate to alter asset targets?

While adaptive management allows targets to be refined over time, it is a process that can be open to interpretation and abuse – especially where targets are modified too often. Adaptive management allows for the legitimate altering of asset targets where:

- Significant evaluation findings occur. Good adaptive management would include regular reviews to take into account the findings generated from monitoring and technical reporting. These reviews may result in tweaks to operations and not require changes to targets. However, a more formal evaluation into the effectiveness, appropriateness and efficiency of programs, projects, policies may result in significant modifications to targets.
- Changes to policy, legislation or regulation occur. Targets may require changes to conform with new (or changes to existing) State or national policy or planning priorities, new regulations or legislation.
- New data, knowledge or technology becomes available (see Section 6 - Measurable). New data (e.g. ABS, ABARE, monitoring, etc) and information (research, reports, modelling, best practice, etc) could affect the strategic approach, assumptions and management approach which may warrant target changes.
- A significant change to asset values occurs. An asset and its values may change as a result of a permanent impact (such as land use modification) or a significant community attitude change. These changes may affect the aspirational target and associated objectives, which in turn require asset targets to be reassessed. Alternatively, an asset may become a priority requiring the development of a new target.
- Target assumptions are proved to be incorrect (see Section 6 - Realistic). Many cause-effect assumptions are made when developing targets. If a key assumption proves to be incorrect this may require a target revision.
- A target has been met. In these instances, it should be decided if meeting the target means the management objective or aspirational target has been achieved. If not, it may be prudent to set a more stringent target. If an asset target has been achieved too quickly (i.e. within 5 yrs) it should be assessed whether the original target was unrealistic (too conservative) or if assumptions proved to be incorrect.

Altering asset targets on frequent basis (e.g. annually or biannually) undermines the adaptive management process and does not contribute to active learning or good management practice. Asset targets should not be changed due to:

- Insufficient or altered funding. It should be expected that where programs rely on sources of external funding that financial provisions will vary from year to year. Realistic levels of funding should be considered part of developing SMART targets, including the likelihood of receiving no external funding in some years or more than average in other years. It should be reinforced that asset targets need to focus on the desired asset outcome and not on management processes (which may include variation to budgets from year to year). Inadequate progress towards a target due to lack of funds is a learning outcome in itself that can be used to justify the need for future funding if desired outcomes are to be achieved. If lack of funding for a particular asset is persistent over several years then the initial assessment of asset values and priorities of the asset should be re-examined to determine if it is still valid. A relative shift in asset values or long term management priorities is a more appropriate reason for altering asset targets as opposed to reacting to short term funding fluctuations. Keeping an asset target during a period of non-existent funding and management activity does not represent a failure of management. While it may make the target more difficult to achieve, it can also emphasise a greater priority to take more action. Modifying the asset target in response to reduced funding can be counterproductive by communicating to funding sources that management can cope with a 'lesser' target and that the original (more ambitious) target was not that important. This

will only undermine the purpose and scientific rigor behind the development of the original asset target.

- Insufficient management progress. It is bad practice to revise targets when management progress is deemed inadequate or ineffective. Provided an evaluation is undertaken, the failure to meet a long-term target can provide just as many benefits as meeting it - and this should be recognised as an important management outcome. This aspect is often overlooked or dismissed in NRM due to the primary focus on *achieving* outcomes – and not necessarily the *learning* that occurs during adaptive management. For example, the learning that follows an evaluation of a failed target can lead to improved technology, processes, best practice, and / or behaviour changes which can then be applied at a much broader scale without repeating the same mistakes or having flawed assumptions. In contrast, it may be argued that without target modification to reflect insufficient management progress it may create a sense of hopelessness or defeat. Nonetheless, modifying targets under this pretence is not good practice and places more emphasis on achieving good *management* outcomes rather than good *asset* outcomes.
- Personal / stakeholder agendas. Targets should not be revised where it is apparent that personal or stakeholder agendas or opinions may be influencing the target. This includes scenarios that may result in more favourable funding outcomes for one stakeholder over another. It also includes situations where favourable outcomes need to be achieved for "pet" projects.

Which policies / models / frameworks are appropriate to use in developing asset targets?

Development of asset targets need to consider the appropriate policy context (see Section 4), especially if there are existing relevant State or National policy documents with targets currently in use. Asset targets will need to be developed with full consideration of a relevant policy's guidance and principles and full consideration of existing targets for adoption or guidance. Where a State or National policy is in use, but there are no recommended SMART targets for adoption, then targets should be developed considering policy guidance, principles, and indicators. This enables targets to be coordinated or developed in such a way so as to provide focussed coordinated action and to deliver improved asset outcomes.

The consideration of models / frameworks (see Section 5) should also be considered during the planning or review stages for asset targets. Use of these models during target development or review will help to provide a logical, consistent and accountable management approach that generates improved natural resource management outcomes.

6.4 SMA(R)T - Realistic

Rationale: If targets are not realistic, even considering assumptions, they will lack credibility and be designed to fail.

Should targets be designed from an ideological or practical perspective?

When targets are designed from a practical perspective, they are more likely to be accepted by stakeholders and more likely to contribute to successful management outcomes. In general, the use of ideal targets should be avoided where possible. This includes the use of concepts that 'sounds good in theory', but are 'bad in practice / reality'. The use of phrases such as "ecological integrity", "ecological health", "ecological productivity", "environmental sustainability", etc are largely ideological concepts that have not been well defined in the NRM literature – nor capable of being realistically measured. It is therefore not considered appropriate to incorporate ideology in target development as this will only serve to confuse stakeholders and set up the target for failure.

However, there may be some instances in NRM where targets need to be designed from an ideological, but rational perspective – particularly in the absence of baseline data or for a new indicator such as soil condition, river condition, etc (see Section 6.2). In these instances

targets can be used (via a hypothesis) to refine the understanding of an asset, its cause-effect pathways, or methodologies for new indicators. Where this occurs the use of conceptual models and assumptions need to be made explicit in the planning phase and tested during implementation. Targets can then be actioned and reviewed in the context of the relative assumptions made. This process of developing asset knowledge by field-testing a hypothesis is the foundational concept behind adaptive management (see Section 5.3).

This way targets can utilise both the best available information and also contribute to new knowledge. The later is particularly important in the field of restoration ecology where knowledge about many types of ecological systems is still considered inadequate (Lake, 2001 and Hobbs and Norton, 1996 in North East Catchment Management Authority, 2006).

What sort of things are needed to make asset targets realistic?

A realistic target in a sense essentially means that its "do-able". A realistic target needs to fit with the overall strategy and objectives. Although a realistic target may be a challenge to achieve, it shouldn't be too unrealistic either. Setting the target bar too high may set the stage for failure, but too low sends the message of not being committed to the aspirations or goals. Stakeholders need to maintain a sense of optimism and confidence that the target can be reached and meet their expectations. While this is important when developing a realistic target, it should not be used to justify target modification at frequent intervals (see Section 6.3).

A feasibility / risk assessment of the likelihood of achieving or not achieving the target (including assumptions) may be useful for ascertaining how realistic a target is. This may include the consideration of realistic levels of funding, institutional capacity, technological changes, and possible changes to assets and threats. Assumptions used in the development of a target can "make or break" them.

The following are examples of types of assumptions made in developing an asset target:

- Asset based assumptions: that the designated land use type does not fundamentally change over the life of the target (e.g. land development, rezoning, etc); that the asset values and attributes do not fundamentally shift over the target lifespan; that the asset is not re-prioritised to lesser importance.
- Pressure / threat based assumptions: that the asset is not impacted by unforseen pressures or threats (e.g. persistent drought, destructive weather events, disease); that the impacts and implications of a pressure on an asset are well understood.
- Institutional based assumptions: that stakeholder experience / management capacity is not significantly impaired due to a change in administrative / governance arrangements (e.g. change in government structures, legislative reform, program changes, etc).
- Financial based assumptions: that funding to support management actions is not significantly diminished over time; that allocated funding is sufficient to implement required management actions.
- Management based assumptions: that access to the asset does not become restricted (e.g. road closures, restricted access, landholder disputes, etc); that consistent monitoring of the asset is undertaken; that limited future technological and best practice advances are made over the life of the target.

The expectations for an asset target should be checked against what can be delivered. Those responsible for developing targets may have biases and preferences that distort the original intent behind a target. Biases may include technical or methodological bias, self-interest in program funding and perceived implications on their workload. Biases can be managed by establishing explicit criteria for those involved in developing targets, or by having a technical panel involved in the target development to allow for a diversity of opinion and experience, and then checking the target outcomes with a broad range of stakeholders.

Use of evaluation to understand the reasons behind previous successes and failures will also allow asset targets to be refined over time to become more realistic.

Are tradeoffs necessary for a target to be realistic?

A key consideration in setting asset targets is that it should incorporate an understanding of the social and economic consequences that may arise while making progress towards a target. Implications are considered in some variants of the PSR model (see Section 5). It involves considering the overall benefit offered by achieving a target for a specific asset in comparison with its disbenefits. In this context, it is useful to obtain relevant social and economic baseline data in addition to environmental baseline data when developing or revising NRM targets. This enables a target to be assessed if it is likely to have socio-economic implications, be sustainable over time, and whether it will be considered credible by stakeholders.

Scenarios may arise where competing values for a particular asset change and this may subsequently require a review of how realistic or achievable the target is. For example, a asset target that aims to include more native forest into a national park may have implications for the forestry industry and local communities dependent on this income may suffer. As another example, a target that aims to reduce diffuse nutrient inputs to a waterway may require local farmers to adopt the use of alternative low soluble fertilisers which may lead to farmers changing their work practices and methods, which may force up production costs for the farmer who must subsequently pass the costs onto the consumer .

Trade-off analysis may utilise a range of tools to develop and compare scenarios, including modelling, cost-benefit analysis, multiple-criteria analysis, prioritisation methods, etc. It should consider possible constraints including funding availability, regional capacity, and the protection of important assets (Hyder Consulting, Vic, 2006). Some natural assets may need to be sacrificed (in terms of management effort or attention) where it is not practical or feasible to undertake rehabilitation or improvement type activities. These decisions need to be made using a formal prioritisation process to justify the subsequent actions in a transparent and accountable manner.

Consideration of possible trade-off scenarios may also prompt discussions with relevant stakeholders and local community where competing asset values or desired outcomes have been identified. Asset targets have the potential to formally identify future asset condition, values or outcomes where they have previously not been recognised nor broadly discussed among stakeholders before. Negotiations may be required to facilitate agreed or desired future outcomes for an asset, which can then be used in the subsequent development of asset targets. In these instances, tradeoffs may need to be formally identified, agreed and documented for future reference during target evaluation.

At the very least, realistic targets need to consider the economic, social and environmental consequences or costs required when choices are made between potential asset targets and corresponding investment and management activity.

What is a realistic number of targets?

Initial attempts at developing RCTs by regional NRM groups resulted in a large number of targets (up to hundreds in some instances). Such a large number of targets was perceived as being unmanageable and therefore unrealistic. There is now a general recognition that RCTs should have only focused on natural resource assets as opposed to the inclusion of threats, symptoms or processes / means (e.g. behaviour change). Consequently, it has been recognised that fewer targets in revised NRM plans would be beneficial to enhance the focus and effort on priority natural resource assets and management action.

Different sets of asset targets may be needed to suit different needs, objectives or aspirational goals at different scales. At the State scale, a suite of broad high-level targets (possibly 10-15) may be needed to deliver broad scale outcomes. At the regional scale, a suite of corresponding broad high-level asset targets (possibly 10-15) may be needed to deliver regional asset outcomes. It is intended that the State NRM Plan (currently in development) will provide asset targets at the State scale, that will in turn provide direction for development of 'child' long term assets at the regional level (in regional NRM plans). Ideally,

at these scales, the number of asset targets should be limited to 1 to 3 targets per theme or broad asset class (e.g. land, inland waters, biodiversity, air, marine, etc)– see Section 10 for examples.

However, at the local scale (i.e. point of investment; asset) it may be necessary to have a "grandchild" asset target for *each* specific asset receiving management attention or investment. Potentially, this may result in a large number of local asset targets depending on the number of assets receiving investment or management attention, but is necessary for effective adaptive management to occur. Management targets for each asset target will also need to be developed, but there is greater flexibility in deciding which management actions will or wont require targets.

6.5 SMAR(T) - Timebound

Rationale: If targets are not time-bound, then there is no sense of duration and intensity.

What is an appropriate timeframe for asset targets?

Targets can have varied timeframes depending on the amount of natural resource condition or environmental change required to produce the desired outcome. In terms of measuring changes in environmental condition, there is some scientific evidence that the minimum length of time to detect change (for well designed monitoring programs) is a minimum of 5 years. Asset targets are intended to have timeframes in the order of 10-20 year timeframes – although longer timeframes may be required considering various factors such as monitoring frequency, natural variation in asset condition, incorrect assumptions, management setbacks, etc.

An essential component for any target is to have a timeframe to act as a reference point for decision making and convey to stakeholders the time required to deliver the desired outcome. The timeframe should be realistic when compared with the desired outcomes (see Section 6.4). If a significant amount of work / effort will be required to achieve the target over the nominated timeframe, then this implies that significant resources and funding will be necessary. It may be prudent in some instances to expand the timeframe, to reflect a more realistic level of work / effort / funding / etc and to allow for unexpected setbacks.

The timeframe for the asset target may or may not align with the duration of management activity. For some ecosystems a lag period of decades may exist between initial management activity and the desired outcome (e.g. time for trees to mature, time for fauna to breed, time for groundwater aquifers to respond, etc). This lag period is often experienced in managing natural resources. To this end, the target will still need to be monitored even though management activity may have ceased.

Should all targets have a start year and end year (i.e. timebound)?

By definition, a timeframe requires a reference or baseline year from which the target commences from, and an end year in which the target should (in theory) achieve the desired outcome. There are several factors to consider in selecting an appropriate baseline year and end year.

Selection of an appropriate baseline year for a asset target may consider:

- the first year in which baseline monitoring data became available and this has formed the basis for future monitoring of resource condition change;
- the year before significant management intervention or actions occurs;
- a past reference year where historical records, monitoring and / or modelling illustrates natural resource conditions were in a relatively un-impacted state (e.g. pre-European settlement, pre-clearing or pristine conditions);

- a year that corresponds with the launch of a relevant significant policy or strategy (e.g. the Kyoto Protocol uses 1990 as a baseline year in relation to setting targets for greenhouse gas emission reductions); and,
- how representative or normal is the baseline year compared to other years? It is not wise to select baseline years that represent extremes in natural resource condition or climate (e.g. water quality following a high rainfall year, native vegetation condition during a drought year, biodiversity surveys following destructive wildfires).

The selection of an appropriate end year for the asset target should consider:

- existing research – what timeframes have been required from previous research on similar restoration or rehabilitation activities; has there been any modelling undertaken for this type of scenario? Can existing models be used to project estimated timeframes for achieving desired outcomes?
- current trends in monitoring data – reversing an undesirable trend will take much longer to achieve compared to starting when trends are already progressing in a desirable direction. While it is desirable for many managers to have "maintain or improve" type resource condition targets, timeframes in the order of 10-20 years may be too short to effectively achieve this outcome. A more realistic target option might be to "reduce the rate of loss of", or "halt the declining trend in". This is especially relevant where widespread or significant problems exist that requires many decades to deliver effective outcomes (e.g. land salinisation, phytophthora dieback, climate change).
- assumptions – are there likely to be any perceived constraints in achieving the target by a desired year (see Section 6.4);
- frequency of monitoring – some monitoring programs such as biodiversity surveys over broad areas tend to have long intervals (e.g. rangeland monitoring intervals are likely to be in the order of 10-15 years); and,
- the expected cessation date for a long term policy or strategy – sometimes a policy and associated targets may have a nominated timeframe.

7. Implementing targets

7.1 Making targets relevant to stakeholders

Achievement of targets requires collaborative effort from a range of stakeholders including State Government agencies, industry, local Government, businesses, community groups and landholders. In developing targets there must be an appropriate level of consultation and consideration of social, economic and political contexts. The targets need to meet expectations of all stakeholders so as to encourage widespread 'ownership' or 'adoption' of the targets.

While asset targets are useful in the context of NRM organisations ability to plan and manage resources, a bulk of NRM activity is undertaken on individual landholder properties. Landholders need to be made aware how activities on their properties contribute to resource condition outcomes at a much larger scale (i.e. local, regional, State, national). Asset targets provide landholders with a reference point to judge the value or merit of an activity beyond the benefit to their own property. Without this, landholders may find it difficult to decide what actions are worthwhile to implement and for what purpose. Targets also provide a common reference point that allows neighbouring landholders and communities to work together more effectively (Natural Resources Commission, 2004).

From another perspective, it is important to recognise that progress made against targets at the regional and State levels can be attributed to improvements made at local levels on landholder properties. Reports outlining progress against the asset targets together with related performance stories at the landholder level may be a good means to encourage target 'ownership' and to provide recognition where good work is undertaken.

7.2 What role do asset targets have in supporting investment planning?

The role that asset targets have in relation to investment planning (funding of programs and projects) needs to be considered in the context of the adaptive management cycle and program logic (Section 5). Asset targets have a key role in influencing both the level of investment required to achieve the outcome over the nominated timeframe and the type of programs and projects required.

Once asset targets have been approved by relevant bodies, related management targets should be developed. Each asset target, irrespective of scale, will need to have related management targets developed. The strategic intent of the aspirational and asset targets should be examined to develop a range of suitable management targets. Thereafter, programs and projects should be developed in accordance with the targets that will achieve the desired outcomes with greatest effectiveness and efficiency. These programs and projects will help shape the investment plan.

Determining which asset and management targets are most important will involve some prioritisation and trade-off analysis. This is because sufficient resources are rarely available to immediately undertake all the targets and their associated management actions. Prioritisation therefore allows investment to be allocated to the most important / beneficial assets and their targets, as opposed to a widespread but thin application of investment across all assets. This process will result in a priority list of targets and corresponding programs / projects that matches the available level of investment.

Too often in NRM, program logic and the adaptive management cycle have been overlooked for the sake of expediency or to satisfy personal, organisational or political benefit. Investment plans developed in this manner tend to be justified by statements such as:
"We have always done it this way";
"It seemed like a good idea at the time";
"We were required to produce something quickly";
"This project should be supported as it already has significant stakeholder support"; or,

"Group X should receive funding before Group Y".

Development of an investment plan using these justifications not only represents a flawed management approach, but contributes to an ongoing lack of transparency and accountability. This was an identified flaw of the NHT1 program where funding was provided for "good idea" projects with stakeholder support, but there was a lack of transparency and accountability in strategic planning, decision making and reporting on outcomes (Australian National Audit Office, 2001).

Interviews undertaken with WA regional NRM groups in December 2007 (specifically for this project) found an ad-hoc approach regarding the use of RCTs (asset targets) in the investment planning process for NHT2/NAP. Most groups identified MATs (i.e. management targets) were the dominant driver for their investment planning. Some groups did not see any purpose or value in having aspirational targets and RCTs and consequently these targets did not play a major role in shaping their investment plan. One regional group believed RCTs to be an imposition on their business activities and only developed them to meet funding approval requirements. In this instance, RCTs were developed to "fit" existing investments, rather than vice a versa in a logical hierarchy. Unfortunately, developing management targets prior to asset targets and making subsequent investment decisions results in a focus on management activity rather than on natural resource outcomes.

In contrast, a couple of WA regional NRM groups are now using asset targets to drive the development of investment plans in a logical, transparent and systematic manner. These groups recognised that the investment plan is the *means* by which the asset targets will be achieved – not the *outcome*. Linking asset targets with investment activity, via a suite of management targets, ensures the adaptive management framework is operational and there is a purpose behind all activity (see Section 5). The diverse approaches used by regional NRM groups in linking asset targets to strategic planning and investment planning reflects the lack of guidance to date and the absence of a systematic, coordinated approach to NRM.

7.3 Monitoring progress made against asset targets

While it is recognised that the timeframe for asset targets is long (decades or longer), regular monitoring of progress should be undertaken to keep track of progress against the target. Regular analysis of monitoring data is necessary to ensure that beneficial management actions are in fact contributing to desired outcomes under current assumptions. If not, decisions can be made to refine management actions to generate better outcomes.

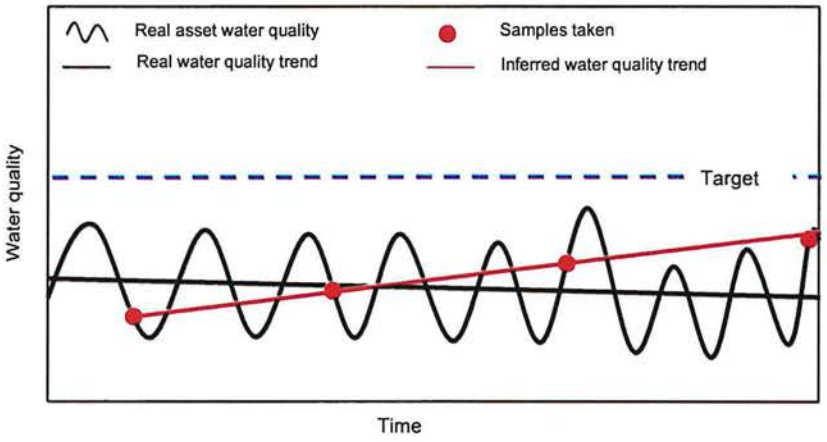
In many cases, analysis involving statistics is required to determine whether trends in monitoring data are reflecting real changes or if perceived trends are artefacts generated from sampling patterns or chance. For example, in its simplest form, trends can be inferred from 2 or more data points. However, if those 2 sampled data points are not representative of normal / average conditions experienced by the asset (e.g. samples unknowingly taken during an unusual cycle, extreme conditions, or pollution events), then the data points are considered anomalies. Any inferred trends from these anomalies will result in an incorrect interpretation of trends and progress made against targets (Figure 8). This is known in statistical terms as Type I (rejecting a correct assumption / hypothesis) and Type II (not rejecting a false assumption / hypothesis) errors . These errors are likely to have significant repercussions in terms of program accountability and management effectiveness. Other types of errors may also exist that may complicate the measurement of progress against targets.

The more intensive the monitoring effort (i.e. samples collected at very close intervals), the closer the samples are likely to reflect "real world" conditions and the more accurate the assessment of trends or progress against targets can be made. However, intensive monitoring programs are usually very expensive and resource demanding and this is why less-frequent, random and representative types of monitoring are generally used. Therefore the use of statistics becomes important to make accurate inferences from intermittent or representative data. In this way, statements referring to the level of confidence (e.g. 95%

confidence) of progress against targets can be made - opposed to guessing or making an invalid assessment of trends.

Regular monitoring may also help to reaffirm initial assumptions made during the development of the asset target. In some cases, the data may prove or disprove an initial hypothesis, especially if the target was developed with the lack of baseline data or in regard with the 'precautionary principle' (i.e. the need to do something in the absence of sufficient information). In this way, monitoring progress against targets can also provide useful management information to enable continuous feedback in decision making and allow adaptive management to occur.

Figure 8: Example of how errors in assessing progress against targets can be made from inadequate monitoring program design and absence of statistical analysis.



8. Reporting, reviewing and evaluating targets

8.1 Why report progress against targets?

Reporting progress made against targets is a necessary part of the adaptive management cycle (see Section 5.3). Reporting represents the interpretation of monitoring data into useful and meaningful information. Monitoring data by itself is meaningless unless experts can interpret the data into information that will enhance a manager's understanding of an asset, progress of outcomes and outputs and inform decision making. It also helps inform managers about actual progress versus expected progress and the 'distance' from the target.

Reporting can occur through progress reports, annual reports, technical reports or 'State of' reports and they are normally made available to the public. Reports help to assure investors and stakeholders that progress is being made and that investment is contributing to desired outcomes. Reporting also enables the community to understand potential changes that they may be observing in their environment and helps connect individual actions with broader goals (i.e. at region, State, or nation scales). Reports can be widely circulated to community and stakeholders to enhance learning outcomes thereby increasing knowledge and contributing to a sense of enhanced accountability and transparency. This in turn helps to build trust, interest and cooperation with stakeholders and the community which leads to enhanced NRM outcomes.

It is in the interest of all NRM stakeholders to make maximum use of data and information collected and to streamline reporting requirements. This is particularly relevant where there are multiple levels of targets (i.e. local, region, State and / or nation scales) and if the 'parent-child-grandchild' target relationship has been adopted.

Reporting of asset targets at the local scale is more likely to occur at regular intervals in the order of annually to bi-annually, so that management progress can be assessed and adapted quickly for maximum efficiency. For example, State of Cockburn Sound report cards are produced on an annual basis and some local governments have their own State of the Environment Reports to report local management progress. This may coincide with reporting on management targets or checking of progress being made against an asset target. In this way, information generated for multiple local assets or many local governments can be aggregated to form a larger picture that will be useful for regional or State reports.

Reporting against asset targets at the region and State levels usually require less frequent reporting timeframes, as natural resource changes over broad spatial scales require more time to happen. For this reason, reporting of environmental condition is generally undertaken via State of the Environment Reports at approximate five yearly intervals or longer. Other technical reports might also be undertaken infrequently to outline progress of management actions, the current state of the asset and trends, and make recommendations for improvements.

The WA State NRM Plan is currently in its final stages of development. Implementation of this Plan will require occasional reporting of the progress of the State asset targets. There is a possibility of incorporating this reporting element into future WA State of the Environment Reports, but this remains uncertain given there is no statutory requirement for routine SoE Reports in WA. Further consideration must be given on how to report progress of State asset targets in a collective manner.

Reports depicting progress made against targets is also extremely valuable from a review and evaluation perspective, allowing for a documented reflection of the history of events and decisions that led to the observed outcomes. Reports will be particularly useful to other NRM managers undertaking similar programs / projects and allow for a more rapid adaptive management learning circle.

8.2 Why review or evaluate asset targets?

Critical to the success of any adaptive management cycle is undertaking constant appraisals of performance to improve processes and actions. 'Review' and 'evaluation' are two terms commonly used interchangeably in NRM – however, there are subtle differences.

A 'review' tends to be a general assessment of performance for any program, project or activity, that can be undertaken anytime, by anyone recognising that an improvement can be made. Reviews tend to be on-going in nature allowing for ongoing improvement at all stages of the adaptive management cycle. Iterative reviews and improvements over the course of program, project or activity implementation can lead to enhanced progress being made against the asset target than would have otherwise occurred.

An 'evaluation' is a more formal review process (best undertaken by an independent body) to systematically assess the appropriateness, effectiveness and efficiency of a policy, program, or project with the intent of:

- providing a better information base to improve program performance;
- assisting in decision making and prioritisation (particularly in resource allocation); and to,
- contributing to improved accountability to stakeholders, investors and the community (ANAO, 1997).

Independent evaluations should be undertaken on an infrequent basis (e.g. 5 years) and provide a thorough and bias-free critique of programs. Evaluation findings provide an excellent opportunity for learning opportunities as well as helping to improve strategic direction for programs or policies.

In relation to asset targets, it would be more appropriate for them to be evaluated than reviewed. This implies that asset targets should not be subject to ongoing improvement (e.g. annual review) and should not be reviewed on a 'as-needs' basis. This is particularly relevant given Bellamy et al. (2002) found "it is difficult to yet find examples where targets have been in place long enough to allow judgment of the extent to which these targets have been helpful in measuring progress and guiding future action". When developed in the context of these Guidelines, the asset targets should be relevant for many years, unless legitimate circumstances arise requiring their modification (see Section 6.3).

An independent evaluation of a asset target offers the following benefits:

- Enables the asset target to be assessed on its own merit – free from any perceived bias from those who developed, own or use the target;
- Provides more rigour in critically assessing the target compared to reviews.
- Enables the asset target to be assessed for its appropriateness in achieving the desired objectives or aspirational targets. Was it the best target to select in relation to the given objectives, aspirations, vision or values? Were there any better alternatives?
- Enables the asset target to be assessed for its effectiveness in terms of comparing actual natural resource outcomes against desired outcomes. How well did the target achieve what it set out to achieve?
- Enables the asset target to be assessed for its efficiency in terms of investment allocated to achieve the target compared to outcomes / outputs. Was the target worth it in terms of money, time and effort spent?

9. Rapid checklist for target development

The following rapid checklist is for quick referral only – see previous Sections for more details.

STEP 1: PROPOSING TO MODIFY OR DEVELOP NEW TARGET – Consult Guidelines for appropriateness to alter existing target or to develop a new target. Is there a legitimate claim for revising targets?	TICK
STEP 2: CONSIDER STRATEGIC CONTEXT – Ensure the vision, values, aspirational target, and / or objectives are considered in developing the target. – Ensure target relates to national or State policies where appropriate. – If similar targets exist at higher scales (i.e. national, State, regional) ensure target development occurs in context of "parent-child" target relationship.	TICK
STEP 3: CONSIDER MODELS – Consider application of program logic to targets (align purpose with outcomes; target hierarchy). – Consider application of Pressure-State-Response model and selection of appropriate indicators. – Reaffirm targets role in the adaptive management cycle.	TICK
STEP 4: APPLY SMART PRINCIPLES – Ensure target is (S)pecific. Target must refer to specific outcome, specific asset, specific indicator, and specific timeframe. – Ensure target is (M)easurable. Ensure baseline data is available and that monitoring will occur over target lifespan. – Ensure target is (A)ppropriate. Ensure appropriate ownership of target. Check if any "parent-child" target relationships are relevant. – Ensure target is (R)ealistic. Ensure target is practical and not making unrealistic assumptions or tradeoffs. – Ensure target is (T)imebound. Ensure target has a start & end year.	TICK
STEP 5: TARGET APPROVAL – Undertake consultation with stakeholders & community about proposed target change or the new target. – Undertake relevant approval process for long term asset condition target.	TICK
STEP 6: DEVELOP MANAGEMENT RELATED TARGETS – Develop management targets to achieve the asset target. May address threats, on-ground action, best practice, behaviour change, etc. – Undertake relevant approval process for management related targets.	TICK
STEP 7: APPLY TARGETS IN INVESTMENT PLANNING – Develop programs / projects that are suited to achieving both asset targets & management targets. – Prioritise associated programs / projects according to level of investment. – Implement programs / projects.	TICK
STEP 8: DEVELOP MONITORING PROGRAM – Develop & undertake monitoring program/s for indicators in targets. – Collect monitoring data and store in a database.	TICK
STEP 9: INTERPRET DATA & REPORT FINDINGS – Analyse data & other information to assess progress against the targets. – Report progress, findings, outcomes and outputs to stakeholders & community.	TICK
STEP 10: REVIEW, EVALUATE AND IMPROVE – Undertake occasional reviews to determine if target evaluation is warranted. – Evaluate target appropriateness, effectiveness and efficiency.	TICK
STEP 11: PROVIDE NOTICE OF TARGET CHANGE – Update policy documents if target has changed, eg regional plan, strategy, etc. – Inform relevant stakeholders and community of target change.	TICK

10. Recommended State asset targets

The following table outlines some key natural resource themes in WA with associated indicators and recommended asset targets for inclusion in the State NRM Plan. It is advocated that these are considered as "parent" targets and would provide direction for developing similar "children" (i.e. regional) and "grandchildren" (i.e. local) targets. Indicators have been linked where possible to National Land and Water Resources Audit (NLWRA) endorsed / preferred indicators and those used in the *State of the Environment Report WA 2007*. These recommended asset target options are intended for discussion prior to formalising them in the WA State NRM Plan (in prep).

Theme	Indicator	Recommended asset targets for WA (note: does not include footnotes.	Monitoring data to support (lead agency)	Justification / Recommendation
Air quality	Climate change - Annual average temperature	Limit the annual average temperature increase in [area name] to [value]°C over the [base year] to [end year] period.	Existing monitoring data to support (BoM)	• Purpose: climate change outcomes. This target is focussed on a climate change outcome indicator rather than on greenhouse gas emissions (a threat or management response). • One of the accepted outcomes of climate change is a general rise in temperatures across WA. Although other outcome based indicators are also indicative of climate change (e.g. rainfall, storm patterns, sea level rise) there is greater variation across the State. This target can be linked to historic baseline data and compared to modelled temperature change scenarios.
	Exceedences of National Environment Protection (Ambient Air Quality) Measure standards.	Reduce the number of human settlements in [area name] where at least one air pollutant exceeds the NEPM (Ambient Air Quality) standards from [value] to zero between [base year] and [end year].	Monitoring data is confined to Perth and some pollutants in other towns (DEC)	• Purpose: air quality and associated impacts for human health (outcome). Note only relevant to populated areas. • No other way of measuring air quality en-masse. Any breach of NEPM standards represents an air quality problem. Generally sites are monitored where air quality problems have occurred previously or are likely to occur in future. • **Recommendation:** Improve surveillance monitoring of problem air pollutants in regional areas.

Soil condition	Soil condition	To be developed in 2010-11.	Some monitoring data collected for various indicators. Monitoring methodology needs to be refined to develop soil condition indices (DAFWA)	• Purpose: soil condition in agricultural areas (outcome). Assumes that soil condition in developed and under native vegetation is not a NRM issue. • There is currently no soil condition monitoring program in WA, even though some likely contributing indicators such as groundcover, soil pH and erosion are monitored / modelled. Indicators need to be integrated to form a soil condition indices. Some level of modelling using reference sites may be required. • **Recommendation:** Develop a soil condition monitoring program. NSW has developed and is trialling a monitoring program methodology that would suit this type of target. Develop target once monitoring methodology has been developed and trialled.
	Land capability	To be developed in 2010-11.	Land use / management information available. Monitoring program needs to be developed (DAFWA/DPI/ABS)	• Purpose: land uses where soil condition is suitable for agricultural uses (beneficial use). • This target is linked to the soil condition target in that land use and management practices are the primary drivers for soil condition changes. Land use should also match soil capability. • **Recommendation:** Develop a land capability monitoring program for WA. NSW has developed and is trialling a monitoring program methodology that would suit this type this target. Develop target once monitoring methodology has been developed and trialled.
Native vegetation communities integrity	Native vegetation extent and distribution	Maintain or increase native vegetation extent in [area name] from [base value]% to [end value]% of the pre-1750 extent from [base year] to [end year].	Existing data to support (DEC/DAFWA/ CSIRO)	• Purpose: native vegetation extent (outcome). • Beard's pre-1750 native vegetation data provides the only means of assessing a native vegetation extent baseline. LandMonitor / satellite imagery can be used to assess broad scale changes.
	Native vegetation condition	To be developed in 2010-11.	New monitoring methodology in development (DEC)	• Purpose: native vegetation condition (outcome). • Monitoring methodology for native vegetation condition is in development. Methodologies are likely to differ between South West and rangelands. • **Recommendation:** Develop a suitable target once monitoring methodology has been developed and trialled.

Significant native species and ecological communities	Conservation status of listed threatened species and threatened ecological communities.	Improve the [base year] conservation status for [value]% of listed threatened species and threatened ecological communities within [area name] and maintain the conservation of others by [end year].	Existing data to support (DEC)	• Purpose: biodiversity conservation (outcome). • Target wording aligns with conservation status method used in WA. Target aims for improvement for some high priority species and communities while not allowing deterioration in others.
Waterway ecosystems integrity	Estuarine ecosystem condition	To be developed in 2010-11.	Some monitoring data collected for various indicators. Monitoring methodology needs to be refined to develop indices (DOW)	• Purpose: estuarine condition (outcome). Estuaries need to have own category as their systems are part marine / part waterway. • Research project currently underway to develop suitable monitoring program and possible indices. • **Recommendation:** Develop a suitable target once monitoring methodology has been developed.
	Potable water supply condition	Reduce the number of identified potable water supply sources in [area name] that are unsuitable for production from [value] to [value] between [base year] and [end year].	Existing data to support (DOW)	• Purpose: water production (beneficial use). • Target focuses on existing and potential water supplies (bores, reservoirs) removed from production due to salinisation, toxicants, pollutants, microbiological, etc issues. • Target implies that all developed production sources should be sustainably managed to ensure they remain viable. • Target can be measured using existing data from water utilities.
	Waterway condition	To be developed in 2010-11.	Some monitoring data collected for various indicators. Monitoring methodology needs to be refined to support indices (DOW)	• Purpose: waterway condition (outcome). • Methodology currently in development through development and trial of National Water Commission's Framework for Assessing River and Water Health tool. • **Recommendation:** Develop a suitable target once monitoring methodology has been developed.
Wetland ecosystems integrity	Wetland extent and distribution.	Reduce or maintain the annual rate of net loss of priority natural wetland area in [area name] from [value] hectares to [value] hectares per year between [base year] and [end	Existing data to support (DEC)	• Purpose: wetland extent (outcome). Note that only priority wetlands are selected to be realistic. • Concept of 'no net loss' is consistent with wetland policy direction.

		year].		• Extent of priority wetlands largely covered through Directory of Important Wetlands and other policies. EIA process likely to identify significant impacts to priority wetlands.
	Wetland condition	To be developed in 2010-11.	Limited data collected for SW wetlands (DEC)	• Purpose: wetland condition (outcome). • Methodology currently in development through development and trial of National Water Commission's Framework for Assessing River and Water Health tool. • **Recommendation:** Develop a suitable target once monitoring methodology has been developed.
Marine and coastal habitat integrity	Fisheries condition	Maintain or improve the per cent of fisheries that meet both adequate breeding stock levels and acceptable catch (or effort) levels from [value]% to [value]% between [base year] and [end year].	Existing data to support (DOF)	• Purpose: fish production (beneficial use) • Breeding stock levels and acceptable catch levels are two key criteria for assessing sustainability of fisheries. Data is available for most fisheries.
	Marine ecosystem condition	To be developed in 2010-11.	Some existing data, mostly in DEC managed areas or for research projects. New monitoring program is in development (DEC)	• Purpose: marine condition (outcome). • Monitoring program currently in development which will consider a number of indicators at a number of reference sites around WA. Research into developing indices by aggregating indicators is also underway. • **Recommendation:** Develop a suitable target once monitoring methodology has been developed.

Appendix: Limitations and obstacles to setting asset targets in WA

Interviews were conducted with regional NRM groups prior to developing these Guidelines. Many challenges and difficulties were expressed relating to targets in the context of the NHT2/NAP programs. Some groups felt as though these challenges and difficulties needed resolution before SMART targets could be set. It should be noted these challenges and difficulties are not unique to WA, but have been similarly experienced by other regional groups across Australia (e.g. Government of South Australia, 2006b; O'Connor, 2006).

LINK TO POLICY

- Incomplete National M&E Framework: although the NAP/NHT2 program commenced in WA in 2003 the guidance on indicators, protocols, processes, reporting and evaluation requirements lack clarification or are still in development in 2008.
- The minimum Matters for Targets under the Standards and Targets Framework presented a mix of asset, threat and issue matters which complicated the development of RCTs.
- There has been very limited guidance from Australian and State Government on developing targets to date to provide guidance.
- Targets were initially developed as part of the planning process, but other components of the program (such as monitoring and evaluation frameworks) were delayed pending investment. Needed to consider all components together.
- Ongoing requests from Australian Government to refine targets following program clarification (e.g. including program logic) are seen as hurdles by regional NRM groups.
- There is a perceived conflict for regional NRM groups developing RCTs that relate to government agencies core business.

LINK TO MODELS

- Little historical use of program logic in connecting Aspirational Targets, RCTs and MATs with investment plans. Common perception that RCTs were developed for regional plan only.
- Progress against hierarchy of targets (i.e. MATs < RCTs < Aspirational targets) is not easily explained and communicated to stakeholders and community.

LINK TO TARGET DEVELOPMENT

- Uncertain & unrealistic timelines from Australian Government to develop targets, review and accredit targets.
- Little skills and experience within regions for target development – relying on government agency expertise.
- Little baseline data in many instances was available to inform target development, also leading to uncertainty about the current condition and trends of natural resource assets and threats.
- Uncertainty about appropriate indicator use for targets and their applicability in WA.
- Uncertainty about target ownership and responsibility.
- Initial focus on developing management action targets (MATs) as priority - which goes against target hierarchy (& program logic).
- Corporate knowledge of the target setting process is difficult to maintain over time. Related documentation for target setting history does not really exist.

LINK TO INVESTMENT

- Large degree of uncertainty in provision of funding to regional groups meant this influenced the development of targets by assessing what was perceived to be realistic and achievable under funding constraints.

LINK TO REPORTING

- Some targets have been reviewed and modified almost annually since original accreditation, leaving uncertainty around the focus of reporting activity.

LINK TO EVALUATION

- Some targets have been reviewed and modified almost annually since original accreditation, leaving uncertainty around the focus of evaluation activity.

Glossary

Accountability – is the obligation to demonstrate and take responsibility for performance in view of commitments and expected outcomes.

Adaptive management cycle – a management tool that describes a sequential order of management components that needs to occur to ensure continuous learning and improved outcomes are realised.

Aspirational targets – are statements about the desired future state or vision for an asset (~50 years) and usually reflect asset values.

Asset – refers to a physical environmental or natural resource object having some importance (e.g. a waterway, a wetland, a native vegetation assemblage, an endangered native species, a threatened ecological community, a soil unit, a landscape, a national park, a coastal segment, a marine reserve, an airshed, a heritage icon, a landform, a landscape, a bioregion, etc).

Asset targets – (i.e. formerly known as Resource Condition Targets) establishes a specific endpoint or desired outcome that makes a contribution towards an aspirational target or objective.

Baseline – refers to a starting or reference point, such as collecting baseline data for an indicator where no data has been collected previously. Some people use the term to refer to ambient or background environmental conditions.

Benchmarks – refer to the value for an indicator that has some defined environmental significance (usually scientific) or the value for an indicator that demonstrates achievement of best management practice (sometimes referred to as "standards").

Conceptual – involving abstract or generalised ideas, expressed in general form or notation.

Criteria – refer to the value for an indicator that helps managers to decide whether a management threshold has been crossed and / or if a different management response is required (e.g. as in 'performance criteria'). "Criteria" are sometimes referred to as "trigger values" or "benchmarks".

Environmental management systems – part of a management process for an organisation that enables it to organise, monitor and address environmental issues.

Evaluation – refers to a formal review process to systematically assess the appropriateness, effectiveness and efficiency of a policy, program, or project.

Guidelines – refer to a document, rules or principles that provide voluntary advice or instructions about setting "standards" or on taking a preferred course of action (e.g. Implementation guidelines for the National Water Quality Management Strategy (NWQMS); Guidelines for integrating capacity building into NRM planning).

Indicators – a physical, chemical, biological, social or economic variable that can be measured and used to assess management performance or progress.

Management targets – (i.e. formerly known as Management Action Targets) establishes a specific management outcome or output that (upon completion) will contribute towards improving the condition of the asset and ultimately helping to meet the asset target.

Issues – are problems, threats or matters of concern arising that are likely to complicate management decisions or operations. In the context of the environment and NRM, issues relate to problems, threats or things that are likely to cause harm or degrade assets.

Key performance indicators – an indicator used by organisations to measure management performance against its policy objectives.

Logic flow – the rationale or system of reasoning behind a situation

Management Action Target (MATs) – (NHT2/NAP program terminology) establishes a specific management outcome or output that (upon completion) will contribute towards achieving a Resource Condition Target.

Matters for targets – (NHT2/NAP program terminology) are mandatory indicators for developing RCTs for NRM regional strategies.

Milestones – mark the achievement of critical stages of program implementation. They may represent partial achievement of desired outcomes or mark a specified point of progress against a target.

Objective – refers to an aim or goal that expresses the desired end result or outcome.

Outcome – an intended result, effect, or consequence (beneficial or otherwise) that occurs from carrying out a program or activity. E.g. native vegetation rehabilitated, conservation of a DRF, lowered river salinity, etc.

Outputs – are the immediate products and services delivered from carrying out a program or activity. E.g. evaluation report generated, regional plan developed, best practice advice provided, fencing completed, etc.

Pressures – represent environmental issues, problems or threats that impact the environment or natural resources (e.g. greenhouse gas emissions; introduced animals; weeds; clearing of native vegetation; etc);

Prioritisation – the act of ranking a level of order or importance for management attention using defined criteria.

Program logic – is the rationale behind a program that systematically defines the interlinkage or the 'cause-and-effect-relationship' between its goals, activities, outcomes and outputs.

Resource Condition Targets (RCTs) – (NHT2/NAP program terminology) a specific endpoint or desired outcome that contributes progress towards an aspirational target.

Review – a general assessment of performance for any program, project or activity, that can be undertaken anytime, by anyone recognising that an improvement can be made.

Qualitative – description of subjective, observational or descriptive attributes.

Quantitative – description of measurable attributes.

Sector – a part of the economy that can be categorised according to common characteristics.

SMART – an acronym for Specific, Measurable, Appropriate, Realistic and Timebound that represents a suite of principles that ensures managers will develop and use effective targets to deliver effective outcomes.

Standards – are predefined levels of excellence, best practice or performance specifications usually defined by an established authority. They can be applied to inputs, processes, outputs or outcomes (e.g. water quality standards in the NWQMS; ISO14000 standard; National Environment Protection Measure standards).

Threat – a potential pressure or problem that may cause impact to the environment or natural resources.

Trade-off analysis – investigation of a situation that arises when choices or decisions involving giving up or trading something to gain something else.

Transparency – refers to the concept of ensuring openness and willingness to accept public scrutiny that diminishes the capacity for an organisation to practice or harbour deception or deceit.

Values – important attributes or characteristics of an asset that reflect firmly held beliefs of a social group or community.

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