

NATIONAL MONITORING & EVALUATION TRIALS PHASE II SYNTHESIS

Rob Richards



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Abbreviations

Audit	National Land and Water Resources Audit
CAMS	Catchment Activity Management System (Victoria)
CANRI	Community Access to Natural Resource Information (NSW)
CMA	Catchment Management Authority
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
LMD	Land Management Database (formerly SCAT) (NSW)
MfT	Matters for Target (under the NM&EF)
M & E	Monitoring and Evaluation
NAP	National Action Plan for Salinity and Water Quality
NHT	National Heritage Trust
NM&EF	National Monitoring and Evaluation Framework
NM&ET	National Monitoring and Evaluation Trials
NRM	Natural Resource Management
NVIS	National Vegetation Information System
SCAT	Spatial Capture Attribute Tool (NSW)
SoE	State of Environment Reporting

Key Findings

Background - Phase II

Phase II of the National Monitoring and Evaluation Trials (NM & ET) is a natural extension to Phase I. Where Phase I was focussed on discovering and reporting on the regional availability of data for reporting against the Matters for Target (MfT), Phase II is concerned with the availability and access to regional information products that can be used for regional, State and national reporting. During both Phase I and Phase II the discovery and usefulness of State data and information products has also been a positive outcome. The reliance of regional monitoring, evaluation and reporting on State/Territory agency data and programs has been highlighted during the trial. Phase I and particularly Phase II of the trials have also highlighted some of the data and information product gaps that exist at regional and State/Territory levels.

Phase II has helped in identifying not only component issues (data and information gaps) but also importantly many of the process issues involved in the production of natural resource information products. These include issues such as internal and external communication and cooperation of State/Territory agencies, data access and licencing arrangements, variations in data and information product standards, protocols and consistency and variations in jurisdictional capacity and desire to work within the National Monitoring and Evaluation Framework..

Key Findings

<p>Finding 1</p>	<p>The roles and responsibilities of agencies and organisations concerned with the implementation of the Bilateral Agreements are complex and will undergo continual revision. There is lack of clarity about the roles and responsibilities for NRM monitoring and evaluation particularly between regional NRM bodies and State / NT agencies.</p>
<p>Finding 2</p>	<p>The lack of currently available and potential information products agrees with the findings of Phase 1 that identified few suitable data sets or monitoring systems able to report against the indicators within the NM&EF.</p>
<p>Finding 3</p>	<p>It is evident from both the Phase I and Phase II findings that existing State data and monitoring programs will be relied upon heavily for regional resource condition reporting including the production and use of information products. It is therefore essential that there is alignment between the National M & E Framework and jurisdictional resource condition monitoring programs.</p>
<p>Finding 4</p>	<p>Data sharing protocols and information systems between jurisdictions and regions are currently being established. Lessons can be learnt from those jurisdictions that are well advanced in this area for those that are still in developmental stages.</p>
<p>Finding 5</p>	<p>The development of a standardised product definition template highlighted that there is little commonality between jurisdictional native vegetation extent and distribution data sets. Additionally there are many overarching issues concerned with the delivery and access of jurisdictional data. While all jurisdictions were able to deliver a vegetation product, there was little consistency and a number of important issues were identified including: communication between and within agencies, and issues surrounding system capacity and the skills required for data access.</p>
<p>Finding 6</p>	<p>The development of the native vegetation information product has highlighted the cooperation and integration of skills and resources needed in NRM, information management, information technology, data collectors and business management within State/Territory agencies and between agencies.</p>

Recommendations

<p>Recommendation 1</p>	<p>During the 2005 State Activities that the matrix be completed by jurisdictions for all Matters for Target for available and potential information products and for current gaps in products for regional plan target reporting.</p>	<p>NLWRA and jurisdictions</p>
<p>Recommendation 2</p>	<p>An assessment of the capacity of existing jurisdictional and joint jurisdictional natural resource condition monitoring programs to report against the National M & E Framework Matters for Target and Indicators be undertaken including recommendations as to what additions/modifications would be needed (and associated costs) to fulfil this objective.</p>	<p>NLWRA and jurisdictions</p>
<p>Recommendation 3</p>	<p>As part of the 2005 State Activities, the awareness of existing national data sets is increased within jurisdictions and regions.</p>	<p>NLWRA</p>
<p>Recommendation 4</p>	<p>Jurisdictions provide a more in depth description of available and potential native vegetation and extent distribution information products as part of the 2005 State Activities with guidance from the Audit using the lessons of the Phase II attempts. With more time greater expert input can be sought resulting in a more accurate product description.</p>	<p>Jurisdictions</p>

Roles and Responsibilities

Objective

One of the key findings from Phase I was the lack of clarity of the roles and responsibilities of State agencies and regional NRM bodies in natural resource monitoring, evaluation and reporting. Of particular concern to the Audit is confusion in regard to the roles and responsibilities of agencies and organisations concerned with the implementation of the National Monitoring and Evaluation Framework.

A “Roles and Responsibilities” matrix was consequently developed by the Audit and then further expanded and clarified at the Phase II Canberra workshop in consultation with all Trial Regions. It was agreed to complete the matrix using regional and State level input for inclusion in the Phase II report.

Overview

There is a wide range of legislation, programs, policies, plans and instruments concerned with the protection, monitoring, evaluation and reporting of resource condition. As a result there is complex array of roles and responsibilities of government and non-government organisations concerned with natural resource monitoring, evaluation and reporting. This exercise is concerned with the clarification of the roles and responsibilities of agencies and organisations concerned with the implementation of the NAP and NHT Bilateral Agreements with the States and Territories. It needs to be recognised however that clarification is needed of the roles and responsibilities of parties at all levels of natural resource management including and importantly in the implementation of regional or catchment plans. It also should be pointed out that “responsibility” does not necessarily translate to capacity.

Reviews, re-structures and changes to State Government NRM agencies have all added considerable confusion to the issue of roles and responsibilities. Victoria alone has undergone five re-structures in the last two years of agency sections responsible for natural resource management M & E (pers comm Les Rowell). The availability of NAP and NHT funds along with the accountability and reporting requirements associated with access to these funds has also considerably increased the complexity of roles and responsibilities within and between regional bodies and the States/Territories.

There are processes currently occurring in several States that will help to clarify agency and organisational roles and responsibilities in the implementation of the Bilateral Agreements. These include –

- Development of State NRM Plans
- Development of State M & E Implementation Plans such as the *Monitoring, Evaluation and Reporting of NRM investment in Tasmania* project.
- Development of State natural resource legislation such as the *SA Natural Resources Management Act 2004*

- Formation and effect of State natural resource Councils or Commissions such as the *NSW Natural Resources Commission*
- State/Territory Monitoring, Evaluation and Reporting projects and integration with existing reporting requirements such as SoE. An example is the proposed *Queensland State of Region Reporting Regime or the SA MDB Integrated Natural Resource Management Monitoring, Evaluation and Reporting Framework*.

Key Finding 1 The roles and responsibilities of agencies and organisations concerned with the implementation of the Bilateral Agreements are complex and will undergo continual revision. There is a lack of clarity about the roles and responsibilities for NRM monitoring and evaluation particularly between regional NRM bodies and State / NT agencies.

Findings

The clear message that comes from this Phase II exercise is that there is a considerable difference between jurisdictions in opinion or approach to the roles and responsibilities of in implementation of the National Monitoring and Evaluation Framework. Clearly this is an area requiring more attention to resolve or clarify by Australian and State / Territory Governments.

There are many consistencies shown in the completion of the Roles and Responsibilities matrix by the trial regions. These include agreement on –

- Regional plan accreditation should occur at the Australian Government and State/Territory level.
- With the exception of NSW, jurisdictions agreed that investment plan development should occur at the State/Territory or Regional level only.
- Resource condition baselines should be established at the jurisdictional level with the recognition that additional funding would be needed for filling baseline data gaps in some instances. It is also agreed that the Audit has a role in guiding the development of nationally consistent baselines of information for reporting.
- Setting of regional resource condition targets should be done at the jurisdictional or regional level with the recognition that targets must be accepted as part of the plan accreditation process. Interestingly it was generally agreed that the Australian Government has a role in the identification of indicators and protocols to be used at the regional level.
- Data access and management protocols should occur at all levels of government including the role of the Audit in working towards national consistency

It is worth looking also at some of the less consistent perceptions or approaches provided by the trial regions.

Several jurisdictions have identified the Australian Government as having responsibility to “identify roles and responsibilities for regional monitoring and evaluation”.

Regional NRM Plan development and implementation – While generally agreed that implementation should occur at the regional level, the development of regional NRM plans varied from responsibility of all levels of government to the region only.

Regional Information Products

Objective

It was agreed by all Trial Regions at the Phase II Canberra workshop that regions would provide a description of available and potential information products for all or some of the NM&EF Matters for Target given the tight timeframe of the project. The regional response was varied from a description of currently available information products for all MfT to those just for “Native vegetation extent and distribution”. Due to the incomplete nature of regional plans in WA the type of information products needed to report against the National Matters for Target is currently unknown. Plans are due for approval in March 2005. A similar situation exists for the Daly Region in the NT.

At the date of writing this report Victoria is currently working on documenting the availability of State information products for reporting against the Matters for Target.

Current and potentially available information products summary

In the scope of this brief report there is little value presenting a matrix of the details of each information product currently or potentially available by jurisdiction. In some cases the list of information products is quite extensive (refer to the NSW Phase II report). A summary of the number of currently available and potentially available information products under each Matter for Target is alternatively useful as a guide for determining efforts into delivery or access of products for specific Matters for Target.

Generally it can be shown that few currently available information products are available particularly those of a spatial nature that may be used to present a national picture relating to any particular Matter for Target. There are perhaps several reasons why this may be the case from a regional or State/Territory perspective –

- There is a lack of perceived clients for the production of State/Territory information products
- There is a lack of coordination and communication between and within agencies to produce information products involving multiple skills and data sources
- There is a lack of definition of what products are needed by agencies for resource management – moving goal posts of Departments
- Regional bodies have not yet defined what information products they will need to measure progress towards regional targets
- Some State/Territory data sets are unsuitable for information product development of a suitable nature
- Information product development is in the last phase of project life-cycles and often gets diminished or not completed.

There may also be several reasons why this assessment may not be an accurate representation of the current and potential availability of information products to report against the National Matters for Target -

- The short time frame in which the information was collected by the trial regions (six weeks)
- Not all regions were required to report on all Matters for Target
- Incomplete nature of regions plans

Given the above factors there are still some very concerning trends that have arisen from the information supplied by the trial regions. These include –

- Lack of currently available information products across all MfT
- Lack of potential information products where there are few or no currently available information products
- Lack of spatial data

The lack of potential information products where there are few or no currently available information products points to a lack of suitable data and perhaps monitoring programs to provide this data. These factors were identified in Phase 1 of the National Monitoring and Evaluation Trials.

Key Finding 2 The lack of currently available and potential information products agrees with the findings of Phase 1 that identified few suitable data sets or monitoring systems able to report against the indicators within the NM&EF.

While there are several significant point data sources available such as for “Inland aquatic ecosystems integrity” and “Ecologically significant invasive species”, there is little spatial interpolation of the data. There are many reasons for this including the lack of data point density to enable regional / catchment wide assessments.

Table 1 below provides a summary of the available and potential information products for each jurisdiction against each Matter for Target. It should be noted that trial regions were not required to report on information products for all Matters for Target.

Recommendation 1

During the 2005 State Activities that the matrix be completed by jurisdictions for all Matters for Target for available and potential information products and for current gaps in products for regional plan target reporting.

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
Land salinity	<ul style="list-style-type: none"> • Dryland Salinity Outbreak Mapping • Groundwater monitoring site location and trend data (Western Catchment) 		No		<ul style="list-style-type: none"> • Maps 		
Soil Condition	<ul style="list-style-type: none"> • Assessment of Soil Acidification Hazard in New South Wales • Acid Sulfate Soils Risk Mapping • 1985 – 1992 Soil Erosion & Landuse Survey and • 1984 –1986 (S.E. Region) Erosion Survey • 1988 Land Degradation Survey 	<ul style="list-style-type: none"> • Wind Erosion Index 	<p>No</p> <ul style="list-style-type: none"> • <i>Soil acidification map</i> • <i>Soil water erosion risk map</i> • <i>Soil carbon map</i> 		<ul style="list-style-type: none"> • Digital spatial products 		

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	<ul style="list-style-type: none"> • Soil Landscape Regolith Stability • SOE 2003: Assessment of Wind Erodibility of New South Wales (Draft) • SALIS (Soil and Land Information System) database- Soil Carbon Derivative Mapping for AGO • Draft Modeled Vegetative Groundcover Map for Western CMA 						
Inland aquatic ecosystems integrity	<ul style="list-style-type: none"> • <i>Mapping of in-stream habitat and riparian vegetation</i> • <i>Fish community assemblages in selected</i> 		<p>No</p> <ul style="list-style-type: none"> • <i>Potential maps, graphs and tables</i> 		<ul style="list-style-type: none"> • Point data sets • Web based reports 		

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	<ul style="list-style-type: none"> <i>areas</i> • <i>Map of interpolated point data for salinity and maybe nitrogen, phosphorus and turbidity</i> • <i>Mapping of areas of river connectivity</i> • <i>River height conditions necessary for wetland wetting, location mapping and classification according to wetland size.</i> 						
Nutrients in aquatic environments	<ul style="list-style-type: none"> • Discrete monitoring of phosphorus (Southern Catchment) • Discrete monitoring of nitrogen (Southern Catchment) • <i>Web feature server</i> 		No		As above		

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	<i>products</i>						
Turbidity/suspended particulate matter in aquatic environments	<ul style="list-style-type: none"> Discrete monitoring of turbidity (Southern Catchment) Border Rivers Commission Annual Statistical report (Western Catchment) 		No		As above		
Surface water salinity in freshwater aquatic environments	<ul style="list-style-type: none"> In-situ salinity assessment; discrete monitoring (Southern Catchment) Salinity Monitoring in the Far West Region – Annual Report (Western Catchment) 	<ul style="list-style-type: none"> End-of –valley Report Card 	No		As above		
Estuarine, coastal and marine habitat integrity	<ul style="list-style-type: none"> Estuarine Habitat Extent 		No		<ul style="list-style-type: none"> Digital spatial products Reports 		
Native vegetation community integrity	<ul style="list-style-type: none"> Native Vegetation Extent (Southern Catchment) Native vegetation types (Southern Catchment) 	<ul style="list-style-type: none"> Native Vegetation Extent: Change Detection 	<ul style="list-style-type: none"> No <i>Native Vegetation Priority</i> <i>Native Vegetation Extent</i> 	<ul style="list-style-type: none"> Regional ecosystem mapping <i>Vegetation extent – State level</i> 	<ul style="list-style-type: none"> TASVEG TASVEG – native vegetation priority 		

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	<ul style="list-style-type: none"> • Native Vegetation % Extant by Type (Southern Catchment) • Extent and distribution of native vegetation in Western Catchment of NSW • Existing Vegetation Mapping of the Western Division – Northern Floodplains and Cobar Shire, Far Western NSW. Edition 3. • Pre-clearing Vegetation Communities of the Western Division – Northern Floodplains and Cobar Shire, Far Western NSW. Edition 3. • Rangeland Assessment 			<ul style="list-style-type: none"> • <i>Vegetation extent – Regional level</i> 			

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	<p>Program (Western Catchment)</p> <ul style="list-style-type: none"> • <i>table of % remaining by veg type for the "Veg_Type_Preclear" template</i> • <i>GIS-based indices of landscape fragmentation / connectivity, calculated as part of the "Veg_All_Extent" template</i> 						
Significant native species and ecological communities	<ul style="list-style-type: none"> • Range of significant species • Extent of significant ecological communities (Southern Catchment) • Habitat of significant species (Southern 		<p>No</p> <ul style="list-style-type: none"> • <i>Selected species – maps, graphs and tables</i> 		<ul style="list-style-type: none"> • Text, database, spreadsheet 		

Matters for Targets	NSW	SA	NT	QLD	TAS	VIC	WA
	Catchment)						
Ecologically significant invasive species	<ul style="list-style-type: none"> • Kangaroo Management Program – aerial survey database (Western Catchment) • <i>Woody weeds extent and density in Western Catchment</i> 		Yes <ul style="list-style-type: none"> • <i>Selected species - reports</i> 		<ul style="list-style-type: none"> • Database 		

Table 1. Summary of available and *potential* information products against each Mater for Target

NB Available information products are shown in normal typeface and potential information products shown in italics. A blank means not reported, No meaning it was reported that there are no products and Yes meaning there are products but not reported. For NSW information products unless specified ie (Southern Catchment), the information product is a State-wide product.

Product developmental issues

Objective

There are many issues surrounding the development of information products at State and regional levels such as data quality, metadata maintenance and use of corporate databases. This section is aimed at highlighting some of the macro issues concerning information product development at the State and regional levels.

Data quality

As identified in Phase I there are some significant State/Territory held data sets relating to water quality and vegetation and soils extent and distribution. These data sets have resulted from projects aiming to establish a resource inventory or baseline data or have been established for specific project purposes. Often these relate to regional needs or State-wide government agency responsibilities. New needs and requirements for monitoring, evaluation and reporting on natural resource condition has placed unrealistic expectations on many data sets not established for this purpose.

In the case of resource condition monitoring programs, they have largely been established with specific aims and targeted audiences. These monitoring programs have produced targeted data sets that have a limited capacity to be interpolated or extrapolated for greater spatial or temporal dimension. Where this is possible greater resources are needed for interpretation, analysis, data storage and access issues. Clarity of purpose, specific clearly articulated outputs and expert skills are needed as pre-requisites for national requests for regional or State information products.

The information product template used in this exercise was orientated towards the description of spatial data. Many information products described by the trial regions were of a non-spatial nature including tables, graphs, text and reports. While these products may not be easily collated to present a national picture, they do represent valid and important sources of resource condition data.

Key Finding 3 It is evident from both the Phase I and Phase II findings that existing State data and monitoring programs will be relied upon heavily for regional resource condition reporting including the production and use of information products. It is therefore essential that there is alignment between the National M & E Framework and jurisdictional resource condition monitoring programs.

Recommendation 2 An assessment of the capacity of existing jurisdictional and joint jurisdictional natural resource condition monitoring programs to report against the National M & E Framework Matters for Target and Indicators be undertaken including recommendations as to what additions/modifications would be needed (and associated costs) to fulfil this objective.

Metadata

As identified in Phase I there is generally little or poorly detailed metadata available. The exception appears to be metadata for native vegetation spatial products. NSW and SA both report high quality metadata statements for several native vegetation extent and distribution data sets.

It is unclear if all jurisdictions have defined metadata entry protocols, policies or tools. In NSW spatial metadata is maintained using the MET Online metadata entry tool developed under the Community Access to Natural Resource Information (CANRI) system. There is however no compulsion to register all spatial data with CANRI and consequently many regional and local data sets have no available metadata records.

Corporate database issues

The main issues identified by the trial regions concerning corporate databases are-

- There are significant jurisdictional corporate databases. For example those relating to the Matter for Target “Inland aquatic ecosystems integrity” are :
 - Hydro Tasmania (Tas)
 - Hydstra (SA)
 - Triton (NSW)
 - Hydsys (NSW)
- The lack of resource condition data sets that reside on corporate databases ie they are located on personal PC’s with limited access and security.
- Jurisdictional data collection and storage standards such as the NSW Standard Technical Operating Procedures (STOP)
- There is a recognised need to centralise significant natural resource databases
- There is little information on corporate databases relating to management actions this includes spatial capture of areas of activity. Victoria does have Catchment Activity Mapping System (CAMS) and NSW is developing the Spatial Capture Attribute Tool (SCAT) (Now called Land Management Database (LMD)). Management actions should also include areas that are actively cleared as these will affect the extent and distribution of native vegetation for example.

Other Issues

- There are difficulties in amalgamating spatially or temporally disparate data sets. Problems are associated with local, regional and jurisdiction mapping boundaries.
- There are current programs aimed at addressing many of the information product development issues raised such as the new NRM component of the SLIP in WA.

Information access & collation

Objective

The development of information products is not only dependent on good data but also on good data systems. The development of nation-wide NRM regional bodies has added another layer of complexity to information collection, storage, interpretation and access. Data and information sharing arrangements and protocols are still yet to be formulated in many jurisdictions. At the same time technological advancements have provided opportunities for data and information be made publicly available, to be shared simultaneously between users, accessed, modified and downloaded on line. This increased availability has associated with it a raft of issues concerning data security, access, licensing and intellectual property rights. This section aims to describe some of the main issues concerned with access to data, protocols or systems for data storage and collation and delivery mechanisms.

Overview

The Audit aims to present a national picture of resource condition against at a minimum the National Matters for Target. This can only be achieved with the ongoing cooperation of jurisdictions who collect, house, maintain and interpret the data. Unlike the development of the National Vegetation Information System (NVIS) which was a process of information delivery from the jurisdictions, the Audit aims to establish pathways for jurisdictional data access. Through an interoperable approach national information products on resource condition can be compiled with secure access to up to date and point of truth jurisdictional data and information.

Data and information sharing and delivery pathways between regions and State/Territory are still largely being formulated. The table below indicates the main corporate natural resource information systems potentially suitable for natural resource information access.

Jurisdiction	Information System	Comments
NSW	<ul style="list-style-type: none"> Community Access to Natural Resource Information NSW Natural Resources Data Directory 	<ul style="list-style-type: none"> Include Web Map Service and Web Feature Service Search interface for metadata
VIC	<ul style="list-style-type: none"> Catchment Activity Mapping System Victorian Catchment Indicators Online Victorian Resources Online Victorian Water Resource Data Warehouse 	<ul style="list-style-type: none"> Web-based reporting of on-ground activities Interactive web site – in recess Part of the Victorian Resource Atlas Web based access to raw and summary data on water quality and quantity

TAS	<ul style="list-style-type: none"> • Water Information System Tasmania • Land Information System Tasmania • <i>NRM Tracker (CIT?)</i> 	<ul style="list-style-type: none"> • Provide public access to five key water related data sets.
SA	<ul style="list-style-type: none"> • DWLBC website 	
WA	<ul style="list-style-type: none"> • SLIP • CLIENT 	<ul style="list-style-type: none"> • See www.walis.wa.gov.au
NT	<ul style="list-style-type: none"> • NT Water Resources 	<ul style="list-style-type: none"> • Uses HYDSTRA to serve information products via the internet
QLD	<ul style="list-style-type: none"> • NAP Regional Information Service • NAPSWQ Portal • Community Resource Information System • <i>Environment for Natural Resource Information Integration</i> • <i>Queensland Spatial Information Infrastructure Strategy</i> 	<ul style="list-style-type: none"> • Delivery of State data sets from 7 agencies to 15 regional NRM bodies. • Provide access to government agency data from NAPSWQ NRM bodies. • Web site contains data and mapping information. • <i>Provide regional NRM body access to agency data outside departments firewall</i> • <i>Cooperation between all levels of government</i>

NB: Existing information systems are shown in normal typeface and *potential or developing information systems* are shown in italics.

While the development of these systems is relatively immature in some jurisdictions such as the Northern Territory and Tasmania, it is well advanced in other States such as Western Australia, NSW and Queensland.

In NSW a whole of government approach is taken to the management of natural resources information. Current data exchange agreements are at the State level through the Natural resources Information Management Strategy (NRIMS). This is the key NSW agreement and covers largely state-wide data sets and some local data sets. The NSW Natural Resources Information Management Strategy is aligned with the *Australian Spatial Data Infrastructure* and the *National Natural Resource Management Framework*.

Queensland also has a State-wide approach to natural resource information management, access and delivery. The *Environment for Natural Resource Information Integration* initiative aims to provide solutions to information management issues such as maintaining consistency in standards and protocols, defining custodianship roles and efficient network

delivery methods. Other initiatives in Queensland are working towards efficient state-wide information management and access such as the *Regional Information Service Portal* and the *Queensland Spatial Information Infrastructure Strategy Initiative*.

Key Finding 4

Data sharing protocols and information systems between jurisdictions and regions are currently being established. Lessons can be learnt from those jurisdictions that are well advanced in this area for those that are still in developmental stages.

Access and Licensing Issues

Little information was provided by the trial regions in regard to data access and licensing issues. Much of this information was provided in Phase I reports under the descriptions of State/Territory and regional data sets.

From the information supplied there is a variety of access requirements and restrictions. Access and license requirements are associated with data perceived to be sensitive such as:

- Land Salinity (NSW and Tasmania)
- Soil Condition (NSW and Tasmania)
- Native Vegetation (NSW clearing and cropping data)
- Inland Aquatic ecosystems (Tasmania)
- Estuarine, coastal and marine habitat (Tasmania –digital data license)
- Nutrients in aquatic environments (Tasmania)
- Turbidity/Suspended particulate matter (Tasmania)
- Surface Water Salinity (Tasmania)
- Significant native species and ecological communities (NSW – threatened species)
- Ecologically significant invasive species (Tasmania and NSW – weeds)

Use of National data sets

Trial regions identified a number of issues concerned with the use of national data sets at the regional level. While problems with incompatible scale was an issue commonly identified other issues such as perceptions on access and usability were also mentioned. Findings from Phase I suggest that there is little awareness of the type and nature of many national data sets by the regions or jurisdictions.

Recommendation 3

As part of the 2005 State Activities, the awareness of existing national data sets is increased within jurisdictions and regions.

NSW identified the following three areas where there is logic in having data collected through a nationally coordinated program –

- Provision of socio-economic data – Data collected by the Australian Bureau of Statistics and the Bureau of Rural Science. Important for regions considering social and economic consideration in regional planning.
- Establishing a nation-wide standard – Nation-wide snapshots of natural resource inventory or condition must be undertaken using a nationally coordinated and standardised methodology. Examples of this include the First National Assessment of River Health, the National Vegetation Information System and the 2001 National Land and Water Resource National Assessment.
- Predictive modeling – there can be greater efficiencies (resources, skills and outputs) of natural resource modeling at national scales. National modeling efforts may be coordinated by non-jurisdictional intelligence such as CRC's or CSIRO. There are regional benefits in national modeling exercises such as National Aussie GRASS model and Normalised Difference Vegetation Index (NDVI).

Native vegetation case study

Objective

It was agreed by all jurisdictions at the Phase II Canberra workshop that one NM & EF Matter for Target would be selected to act as a test case for “delivery” of data relevant to that Matter for Target. The Matter for Target selected was “Native Vegetation Communities Integrity”. Phase 1 of the National M & E Trials found that the indicator “The extent of each present native vegetation type by IBRA sub-region measured in hectares” had the highest capacity to be reported against by the trial regions. Another factor in the selection is the proven existence of such data that has been previously used by of the National Vegetation Information System.

A product definition template was devised by the Audit and modified with jurisdictional comment. The completed template was then used by the trial regions as a descriptive tool for information products relating to native vegetation extent and distribution. While trial regions were only asked to provide available and potential information products relevant to the Matter for Target, if possible trial regions could report on products able to be used at the indicator level. The three relevant indicators are-

- The extent of each priority native vegetation type by IBRA sub-region measured in hectares,
- The extent of each present native vegetation type by IBRA sub-region measured in hectares and
- The proportion remaining of each native vegetation type by IBRA sub-region measured as a percentage of the pre-European extent

Overview

The collation of a national “picture” of native vegetation distribution and extent would superficially appear a straightforward exercise.....after all it had successfully been done by the creation of the NVIS and all jurisdictions collect the data. The reality is that there is a convoluted process requiring many levels of standardisation to collate data from different jurisdictions. The main phases/considerations involved in collating jurisdictional data for national reporting can be summarised as follows –

1. Data collection objectives – will determine scale and resolution of data collection, methods and data attributes
2. Data collection methods – remote sensing, aerial photo interpretation, ground based etc
3. Establishment of primary data set – storage, format, custodian and security
4. Data interpretation – need to satisfy objectives

5. Derived data set attributes – spatial coverage, scale, parameters, limitations, confidence
6. Data set format – processing software, storage platform, available formats, spatial, textual
7. Data access – security, misinterpretation, corporate database, business rules.
8. Data validity, longevity, planned updates, data hygiene etc
9. Data standards, national application, national interpretation

Ideally almost all of the above processes require some level of standardisation for end point national collation. The reality is that very little standardisation of jurisdictional data sets occurs until the last step – national application. The trial regions product definitions delivered for native vegetation extent and distribution highlight this point.

Key Finding 5

The development of a standardised product definition template highlighted that there is little commonality between jurisdictional native vegetation extent and distribution data sets. Additionally there are many overarching issues concerned with the delivery and access of jurisdictional data. While all jurisdictions were able to deliver a vegetation product, there was little consistency and a number of important issues were identified including: communication between and within agencies, and issues surrounding system capacity and the skills required for data access .

The Phase II trial native vegetation case study process has been important in highlighting the communication needed within and between government agencies dealing with M & E, natural resource data, information management and information technology. The development, delivery or access of a native vegetation extent and distribution information product has involved the cooperation and integration of skills from many different areas and agencies. This task alone is significant and is indicative of the future cooperation needed for regional, State and National monitoring and evaluation activities. The 2005 State Activities will further reinforce this developing integration of skills and resources at different levels of NRM.

Key Finding 6

The development of the native vegetation information product has highlighted the cooperation and integration of skills and resources needed in NRM, information management, information technology, data collectors and business management within State/Territory agencies and between agencies.

Table 2 . Capacity of the trial regions to deliver information products for the Indicator Heading “Native vegetation extent and distribution” showing scale of product and standard if used.

	Extent of each priority native vegetation type by IBRA sub-region	Extent of each present native vegetation type by IBRA sub-region	Pre-European proportion remaining of each native vegetation type by IBRA sub-region	Standard Used
NSW(W)	<i>Partial coverage 1:100,000</i>	Partial coverage 1:100,000	Partial coverage 1:100,000	No
NSW(S)	Complete coverage 1:100,000	Complete coverage 1:100,000	Complete coverage 1:100,000	NVIS
TAS	Complete coverage 1:25,000	Complete coverage 1:25,000		NVIS
SA (MDB)	<i>1:40,000 & 1:100,000</i>	Almost complete 1:50,000 Partial coverage 1:25,000		NVIS
QLD(C)	Complete coverage 1:100,000 Partial coverage 1:50,000	Complete coverage 1:100,000 Partial coverage 1:50,000		??
NT		NT coverage 1:1,000,000	NT coverage 1:1,000,000	NVIS
VIC	VIC coverage 1:100,000 Partial (BCS100) 1:25,000	VIC coverage 1:100,000 Partial (BCS100) 1:25,000	VIC coverage 1:100,000 Partial (BCS100) 1:25,000	NVIS
WA		WA coverage 1:100,000	Complete State coverage 1:250,000	NVIS

NB: Existing products are shown in normal type face while *potential or products under development* are shown in italics

(W) is Western Catchment, (S) is Southern Catchment, (C) is Condamine Alliance

Fundamental Issues

Jurisdictional data

Collection of vegetation attributes at large scales is expensive and time consuming and as a result unless there has been demonstrated and priority need, there has been no consistent, standardised and comprehensive assessment of native vegetation undertaken in most jurisdictions. Only Tasmania, Queensland and Western Australia report having state-wide native vegetation mapping coverage at scales of less than or at 1:100,000.

In NSW plans for comprehensive State-wide priority native vegetation mapping have been canned with new native vegetation legislation and reform. As a result, native vegetation mapping in NSW is a collage of information at varying scales, methods, coverages and accessibility. Future vegetation mapping will be focussed on the property level and while being a valuable product at this level, its utility and accessibility for State and National use is uncertain.

The only comprehensive NT wide native vegetation map is that produced for the NT component of the NVIS at 1:1,000,000. There is no agency that regularly monitors or maps NT wide native vegetation. An NT wide native vegetation map has been produced using three surrogate data sets – Total Clearing in NT, Permitted Clearing 2003 and LUMP, a database that indicates properties where it is likely that native vegetation has been disturbed.

In South Australia vegetation mapping that is currently occurring is designed to develop a baseline data set. There are no plans to update this data on an ongoing basis. The trial region currently uses data that has been compiled from existing mapping data sets for floristic mapping regions. These have been derived from aerial photography interpretation, field survey and available literature.

Trial Region data

From the table above it can be seen that data for “the extent of each present native vegetation type” does exist at a scale of 1:100,000 or less for all jurisdictions with the exception of the NT. This data is NVIS compliant in all trial regions with the exception of NSW Western and Queensland Condamine. While this is positive from the trial region perspective it is unfortunately not reflective of State/Territory wide coverage.

Native vegetation product definition template

Trial regions have identified several issues with using the product definition template to describe native vegetation distribution and extent. These issues include –

- The template is designed to describe spatial data. Some important regional data is the form of tables or text.
- There are difficulties using the template where data is to be sourced from a number of repositories and substantial interpretation is involved
- There is no ability to describe the methods involved in the data analysis
- Different users may require different information products from the same data set
- There maybe several custodians involved in the process of product development
- There needs to be alignment with regional information product needs

Access and availability

Trial regions identified the following issues in regard to access and availability of data for production of the information products –

- Duplicate data may need to be kept outside agency firewalls where there are access issues
- In some instances licence agreements will be required or data request fees paid
- In some jurisdictions updates are not planned

Communication

Information product development requires close communication and cooperation of those working in M & E with those involved with natural resource information management, information technology, data collectors and business managers. Without this close cooperation production of information products will be slow, inefficient and less accurate. The 2005 State Activities will assist in increasing communication within agencies, between agencies and regional bodies.

Attributes and format

Trial regions identified the following issues concerning information product data attributes and format –

- Despite a standard and recommended short list of data attributes being given to the trial regions there was a wide variety of attributes provided for information products. Some misunderstanding contributed to this.
- In two jurisdictions surrogate data sets were used to produce desirable native vegetation information products. These contained information relating to native vegetation clearing and disturbance. In rangeland regions of largely intact ecosystems this approach may be suitable.

Recommendation 4

Jurisdictions provide a more in depth description of available and potential native vegetation and extent distribution information products as part of the 2005 State Activities with guidance from the Audit using the lessons of the Phase II attempts. With more time greater expert input can be sought resulting in a more accurate product description.

Working towards a standard product

Despite the differences between the information products supplied by the trial regions there are threads of consistency that may be used as building blocks for further work to achieve a nationally consistent data set. A positive result from the native vegetation case study is the coverage of *present native vegetation* spatial data at a scale of 1:100,000 or less. All the trial regions with the exception of the NT have this data available. For almost all of the trial regions this data is NVIS compliant also. The results that have been delivered by the trial regions for this exercise in a very short time frame do show potential for a nationally consistent product. The 2005 State Activities phase of the NM & ET should add some clarity and further insight to this potential.

The trial region results have highlighted also many issues that need to be worked through with the jurisdictions in order to achieve a nationally consistent product for native vegetation extent and distribution. In some instances this may involve simple tasks such as delivery of the data in a different format or negotiation with State/Territory agencies for data access. In other cases there are issues that cannot be resolved in the short-term these include –

- Data set coverage – While data sets such as NVIS provide a “default” jurisdictional baseline there is a considerable amount of data at finer scales. Unfortunately this data is commonly patchy and has been project driven.
- Data updates – In some jurisdictions there are no plans for updating of existing data sets including NT and NSW.
- Dates – There is little uniformity of dates between jurisdictions. National coordination may help to pre-define a “date window” for standardising future data collection.
- Availability – Data availability protocols to be defined with jurisdictional agencies so that duplicate data may reside for example outside agency firewalls.
- Access – Access to data must be formalised with appropriate licenses, MOU’s and agency cooperation.
- Capacity – Continued capacity to deliver information products is dependent on continued perceived agency need for resourcing appropriate areas.

The table below attempts to indicate the main impediments of each native vegetation information product supplied to the Audit for each trial region or jurisdiction. This can provide some direction for future jurisdiction efforts to be directed towards these areas.

	Extent of each priority native vegetation type by IBRA sub-region	Extent of each present native vegetation type by IBRA sub-region	Pre-European proportion remaining of each native vegetation type by IBRA sub-region
NSW(W)	<ul style="list-style-type: none"> ▪ Restricted coverage ▪ Non-NVIS compliant ▪ Not web enabled ▪ Location – corporate server ▪ “Priority” to be defined 	<ul style="list-style-type: none"> ▪ Restricted coverage ▪ Non-NVIS compliant ▪ Not web enabled ▪ Location – corporate server 	<ul style="list-style-type: none"> ▪ Restricted coverage ▪ Non-NVIS compliant ▪ Not web enabled ▪ Location – corporate server ▪ Value questionable of pre-European data.
NSW(S)	<ul style="list-style-type: none"> ▪ Accessibility – license required ▪ Location to be clarified 	<ul style="list-style-type: none"> ▪ Accessibility – license required ▪ Location to be clarified 	<ul style="list-style-type: none"> ▪ Accessibility – license required ▪ Location to be clarified
TAS	<ul style="list-style-type: none"> ▪ Updates – not planned (State) ▪ Access – data licence required 	<ul style="list-style-type: none"> ▪ Updates – not planned (State) ▪ Access – data licence required 	?
SA (MDB)	<ul style="list-style-type: none"> ▪ State coverage not complete ▪ Updates – not planned ▪ Inter-agency cooperation required ▪ Regional “priority” not yet defined ▪ Licence agreement required 	<ul style="list-style-type: none"> ▪ State coverage not complete ▪ Updates – not planned ▪ Inter-agency cooperation required ▪ Polygon “edge matching” to be completed ▪ Licence agreement required 	?
QLD(C)	<ul style="list-style-type: none"> ▪ EPA custodian – cooperation required with DINR&M ▪ Access – restricted access (State data) ▪ RIS portal access conditions apply (State data) ▪ Format constraints (Regional data) 	<ul style="list-style-type: none"> ▪ EPA custodian – cooperation required with DINR&M ▪ Access – restricted access (State data) ▪ RIS portal access conditions apply (State data) ▪ Format constraints (Regional data) 	
NT	<ul style="list-style-type: none"> ▪ Scale – 1:1,000,000 ▪ Updates – none planned 		
WA	<ul style="list-style-type: none"> ▪ Access – licence and fees apply 	<ul style="list-style-type: none"> ▪ Access – licence and fees apply 	<ul style="list-style-type: none"> ▪ Access – licence and fees apply

Future Directions

The NM & ET have achieved greater synergy that originally anticipated. They have increased the jurisdictional awareness of M & E issues and stimulated greater cooperation, discussion and direction within jurisdictions. In several jurisdiction new M & E initiatives have been born from the trials. The trials have catalyzed many areas of State and regional monitoring and evaluation. The roles and responsibilities of government agencies in monitoring, evaluation and reporting, data and information gaps, data management such as the importance of metadata and the value of resource condition indicators are just a few examples.

It is agreed that while the M & E Framework is not perfect, it has provided a platform or sounding board for development and moulding into a robust and dynamic framework with the assistance of the jurisdictions and trial input. The NM & ET has been progressive and ambitious. The duration of the trial has seen the development and accreditation of many regional plans. While this has caused some need for “best guess” input to the trials it has also been timely to assist in the planning for reporting needs for those regions.

The future direction of the implementation of the National Monitoring and Evaluation Framework can be improved though -

- Increase the awareness of the value and findings of Phase I and II of the trial in all NRM regions Australia wide (2005 State Activity)
- Progress the discovery and access to resource condition information products for all Matters for Target within the jurisdictions (2005 State Activity)
- Maintain positive engagement with the jurisdictions (2005 State Activity)
- The development of a set of key national information products required along with product description templates
- Continued facilitation of the clarification of roles and responsibilities of all levels of government in monitoring, evaluation and reporting under the NM & EF
- Streamline and clarify the relationships between the Matters for Target and the recommended indicators
- High level agreements between regions, jurisdictions and Australian government to establish data sharing protocols
- Integration of information product needs for resource condition reporting at State/Territory and regional levels. These can then be adapted for national reporting.