

NRM Data and Knowledge Hub Pilot Project (Data Hub) Phase 1

Findings and Recommendations

October 2009

Queensland Regional NRM Groups Collective

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Executive summary

The Natural Resource Management Data and Knowledge Project Phase 1 (known as the Data Hub project) aimed to bring together natural resource management stakeholders to implement functions and structures to improve information and knowledge exchange for informed decision making. The objective of the project was to test the concept of introducing the dedicated function of Regional NRM Knowledge Brokers into natural resource management activities in Qld and to devise, test and promote collaborative solutions through regional and state-wide forums.

Stakeholders involved in the project developed a number of recommendations to guide future effort and investment in NRM data, information and knowledge exchange processes into the future.

Recommendations included:

- The knowledge broker function needs to be isolated from funding cycles as much as possible.
- The knowledge broker function needs to be unilaterally supported by stakeholders in order to prosper and survive in the long term.
- There is a need to develop and refine regional delivery models for knowledge brokers/mentors which foster cross stakeholder engagement and partnership agreements.
- Future NRM and related projects need to adopt better records of metadata as part of funding requirements.
- An integrated system needs to be investigated which combines existing systems and databases for storing, cataloguing and accessing all forms of NRM information/knowledge/data.
- There is a need for the development of a Qld NRM data, information and knowledge communication plan. This will ensure better communication across stakeholders about what other projects, systems and initiatives are in existence or being planned to assist collaboration and reduce duplication.
- The development of an independent state-wide steering committee is needed that coordinates and communicates across existing networks and working groups to ensure NRM information/data/knowledge is better integrated and delivered.

1.0 Introduction and Background to the Data and Knowledge Hub Pilot Project

1.1 Background - 2008 NRM Data Hub Scoping Project

The NRM Data Hub study commenced in December 2007 and was completed in May 2008. It was conducted under the auspices of the NRM Science Panel a partnership of regional natural resource management (NRM) bodies and State and Australian government agencies.

The objective of the study was to evaluate the business needs for data sharing (a two way process of knowledge exchange including data collection, data management and the availability of stakeholder data) between regional natural resource management groups, government agencies and industry stakeholders and to construct a business case for a project to improve data sharing.

Representatives of the following groups were interviewed to understand the cultures, priorities and methods used in sharing data: all Qld regional NRM groups; Qld Government NRM agencies (including system owners, information technology (IT) professionals, data providers and data users); the Local Government Association of Queensland (LGAQ); and the industry group GrowCom.

The final report of the project which was completed in May 2008 considered these interview responses together with a review of existing data sharing systems in Qld and elsewhere; as well as published and unpublished literature to analyse the observed behaviours and to recommend a solution.

The major finding of the study was that investment in additional IT based solutions would not materially improve data sharing in the short term. Rather, the report identifies that there is a functional gap missing in the management of natural resource management knowledge (including data and other information) in Queensland and that the skills required to perform these functions are those of a librarian/knowledge broker.

The report recommended the appointment of regionally based NRM Knowledge Brokers at locations throughout the State to facilitate knowledge transfer and exchange of data, information and knowledge between levels of government, industry and regional NRM groups.

The scoping report also recommended establishment of a high level forum where all stakeholders (regional NRM bodies, government agencies, local government and possibly other players such as industry bodies) are represented, to identify priorities, direct resources, set targets, monitor progress and respond to knowledge management issues.

1.2 Introduction to the NRM Data and Knowledge Hub Project Phase 1 2009

Following the NRM DataHub Scoping Project, funding was sourced to trial the recommendations through a pilot project. The NRM Data and Knowledge Project Phase 1 aimed to bring together natural resource management stakeholders to implement functions and structures to improve information and knowledge exchange

for informed decision making. The project was funded by the Qld Department of Environment and Resource Management (DERM) (\$140 000) and the Qld Regional NRM Groups Collective (\$30 000).

Stakeholders involved in the project included state agencies, local government, the Qld Regional NRM Groups Collective, interested regional NRM groups, industry groups, research organisations and Aboriginal Corporations.

The first phase of the NRM Data and Knowledge Hub Project conducted between March and September 2009, utilised two pilot areas and state-wide coordination to test the scoping project's recommendations. Two regional natural resource management groups were engaged to employ dedicated knowledge brokers, with the Qld Murray Darling Basin Committee (QMDC) coordinating in the south west of Queensland and Terrain NRM in North Queensland.

The project was managed by the Qld Regional NRM Groups Collective (who represent regional natural resource management groups in Qld) in partnership with DERM who provided state-wide coordination for the project.

The objective of the project was to test the concept of introducing the dedicated function of Regional NRM Knowledge Brokers back into natural resource management activities in Qld and to devise, test and promote collaborative solutions through regional and state-wide forums.

The project had a number of key deliverables including:

- A dedicated regional knowledge broker in the North and South West areas of Queensland to develop cross regional collaborative networks to improve NRM knowledge sharing;
- A state coordinator position to support regional projects and progressed issues and opportunities at a state level;
- A regional data catalogue for each pilot region to demonstrate the issues and gaps in collating all NRM related data, information and knowledge for a particular area of Queensland;
- A state steering committee to further the outcomes of the project; and
- Regional knowledge sharing workshops and a state-wide forum to inform the future delivery of the project.

Many natural resource management processes, tools and products have been established with databases, web portals, libraries, search engines, publications etc but still there remains the issue of people knowing that these exist; knowing how to use them and having the time to search out the information they need. On the flipside, many of these things we have created are at risk of falling by the wayside if they are not used, championed and continually improved.

This project aim was not to devise a new information technology system but rather to reintroduce dedicated "Knowledge Broker" positions, which once existed within natural resource management activities in Qld but have dwindled due to a lack of resourcing in this area. Figure 1 below highlights the role of the Knowledge Broker with the focus being on searching, brokering, transferring and exchanging data and information with stakeholders. This role will understand where different data and information sources can be found, what they consist of and how this can be used; and will communicate this to their stakeholders. Figure 1 also highlights the breadth

of data, information and knowledge that brokers will need to be aware of or can link stakeholders to including local and indigenous knowledge.

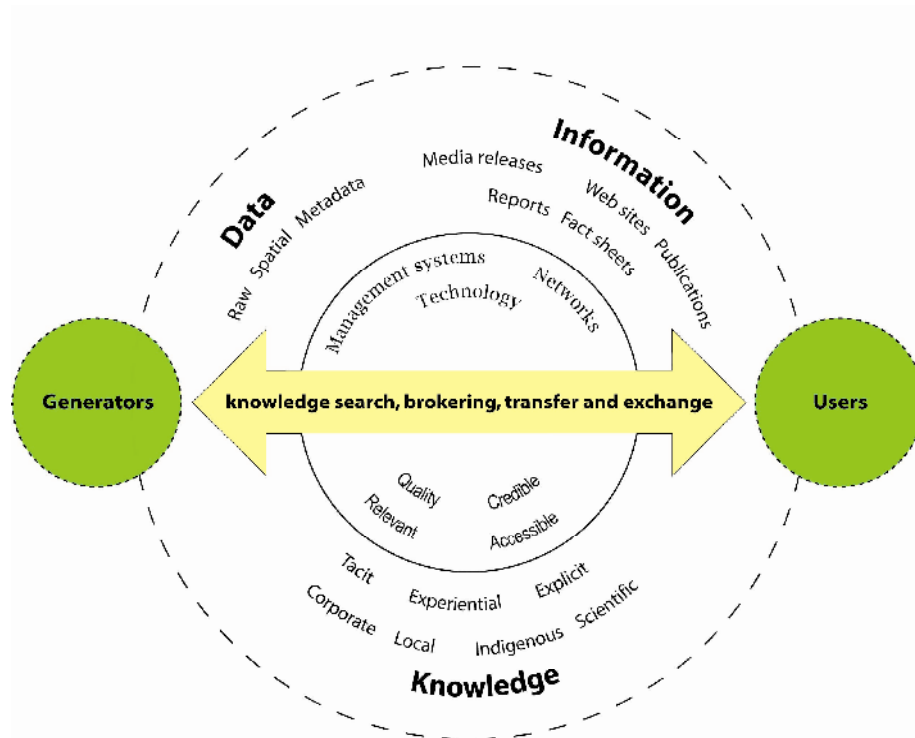


Figure 1: Funding the arrows - knowledge broker roles in natural resource management.

2.0 State-wide and regional coordination

2.1 State-wide coordination

The state-wide coordination component involved employing a part-time state-wide coordinator within the Department of Environment and Resource Management (DERM) who reported to DERM and the Qld Regional NRM Groups Collective. The main role of this position was to support the activities of the two regional pilots; liaise with state and national level stakeholders about the project and linkages to other initiatives; provide executive support to the project's state steering committee; coordinate a state-wide workshop to culminate findings; communicate the outcomes of the project to interested NRM stakeholders and ensure project milestones were met.

To support the implementation of the regional pilots, advice and guidance was provided by the state coordinator to the two Regional DataHub Knowledge Brokers. This advice and guidance involved holding planning meetings; project teleconferences; brokering relevant information from DERM and other organisations about data, information and knowledge management initiatives; supporting the delivery of regional workshops and the overall project management for Phase 1 of the project.

2.2 Statewide Steering Committee

The Statewide Steering Committee was established as a recommendation from the 2008 NRM DataHub Scoping Project that a high level committee be established to provide guidance to the project team in the delivery of the project (see Appendix 3).

The roles and responsibilities outlined in Terms of Reference for the state steering committee members included:

- Provide advice to the Project Team in the implementation of the Regional Data Hub Project Phase 1;
- Represent their particular business groups/organisation and associated initiatives relevant to the Regional Data Hub Project and communicate linkages to the steering committee;
- Support the development of a state wide workshop and attendance of representatives from their organisations to progress the recommendations from the Regional Data Hub Project Phase 1;
- Review and provide critical evaluation and recommendations to the Regional Data Hub implementation processes and outputs.
- Report back to respective organisations on the Regional Data Hub Project and gain support for the project; and
- Identify future pathways for Regional Data Hub implementation and deliver recommendations and linkages into other senior level decision making forums within their organisations.

The membership of this group was established through extensive consultation by the state coordinator with key champions in the natural resource management data, information and knowledge areas in Qld and then a subsequent invitation to participate on the committee. Of all who were invited, all accepted to be members on the committee and agreed on the terms of reference for the committee. The members included decision makers from pilot regions, the Qld Regional NRM Groups Collective, DERM and other identified key partners. Through the course of the two meetings held with the committee, representatives from local government and the Australian Government were identified as potential future members to be invited to participate in phase two of the project.

The Statewide Steering Committee met twice in Phase 1 and provided useful linkages to initiatives from the members' own business areas and guidance on the delivery of the DataHub pilots and state coordination. The state coordinator and regional knowledge brokers attended these meetings in order to address any questions or issues.

2.3 Reflections from state coordination in Phase 1

The state coordination of the project provided a unique opportunity for a number of different stakeholders to come together and discuss ways to improve natural resource management knowledge sharing across Queensland.

Historically natural resource management state agencies, regional NRM bodies and industry organisations have discussed issues such as data sharing or the development of information management solutions to address the lack of cohesive knowledge in NRM, but these discussions have been in isolation from each other,

have focussed mainly on the data and have occurred without the involvement of the end users of the information.

Government agencies, regional NRM bodies, industry groups and research organisations have many databases, websites, publications all trying to get information and knowledge out to end users but are often siloed from each other (see appendix 1 and 2). This is usually due to government Departments developing systems which are not integrated with other government systems; and regional NRM bodies, industry groups and research organisations having their own websites and repositories of knowledge due to how they are funded on an individual project basis.

From an end user perspective, stakeholders are confused about where to go for information and how one dataset relates to another. Throughout the course of Phase 1 a list of databases, systems and related knowledge tools were collated to identify how many different types of data, information and knowledge activities are currently underway in NRM in Qld or nationally (see Appendix 1). This list identified the breadth of data and information available and how this project should not reinvent the wheel by creating yet another information management system but rather communicate the various systems and tools in existence and assist stakeholders to make the link between these.

State agencies are trying to rectify some of these issues by creating the Qld Government Information Service <http://www.information.qld.gov.au/> (which provides a way to search for all Queensland geographic data) making it easier for stakeholders to find data and information in one central place. However through the state component of the project it was evident that such solutions only provided part of the answer. The issue remained of there being a lack of people available who had as their dedicated role to broker this information across stakeholders. The state coordinator role is trialling this at a state level and the regional knowledge brokers at local and cross regional levels.

It was also found through Phase 1 that government agencies, regional NRM bodies and associated stakeholders needed more investment in their knowledge management systems to ensure linkages across business areas to share knowledge and retain knowledge once staff move on or a project is completed. Stakeholders involved in the project acknowledged that for effective knowledge management to occur all stakeholders need to recognise it as good business and build into their own organisation's project management and business systems. Unfortunately for agencies and stakeholders this type of activity is rarely funded adequately and is often only undertaken by those willing to invest the time.

Finally an issue that arose at both the state and regional level was the use of the term "DataHub" which originated from the scoping study completed in 2008. In the scoping study this term was used to imply that what was needed was a "hub" where people could centrally access data and information as well as having a broker type person to assist with this process. However for many stakeholders involved in phase1 of the project, this term has caused confusion with existing information technology "datahubs" and the image it conjures in one's mind of the project only being interested in data sharing solutions and not on knowledge sharing between people. Towards the end of phase 1 the word "knowledge" was introduced into the project's title to move away from the project being seen as data focussed. In future phases the project name will be revised.

3.0 North Qld regional pilot

3.1 Northern regional area and stakeholders

Terrain NRM facilitated the North Qld pilot which included the six natural resource management regions of Torres Strait, Cape York, Northern Gulf, Southern Gulf, Wet Tropics and Northern Dry Tropics. Natural Resource Management (NRM) stakeholders are many and the geographic area of the northern pilot was extensive.

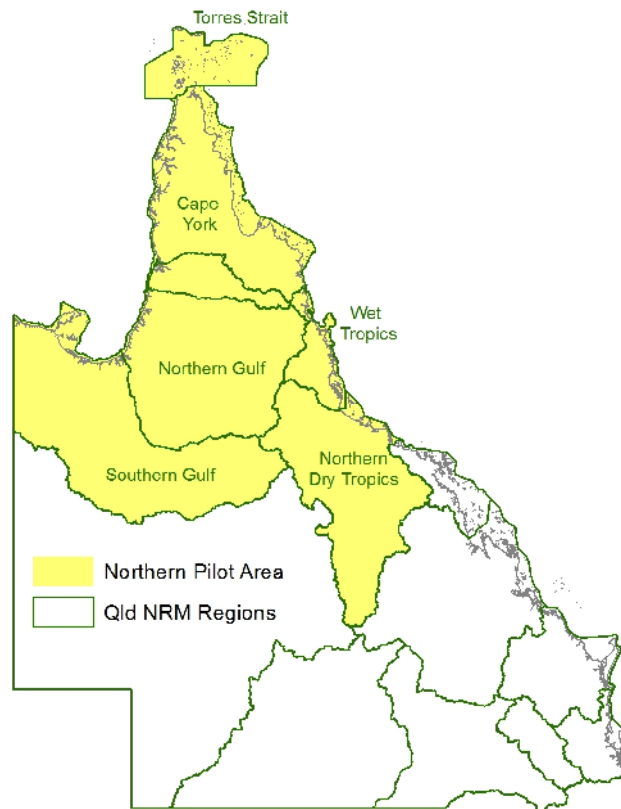


Figure 2: Data Hub Northern Pilot Region

It was discovered through the course of the project in the North that a number of key stakeholders were simply restricted or unable to participate due to resource constraints and competing priorities of key staff. Misinterpretations of the original project name “datahub” also caused some confusion.

These barriers were noted and will inform some of the recommendations during the next phase. The time frame for this first phase was short and it is acknowledged that continued consultation will be required as further stakeholders are engaged.

3.2 Project scope in Northern Qld

In response to the 2008 Datahub scoping study the northern pilot sought to gain a clearer understanding of the barriers and drivers, opportunities and challenges experienced in the sharing of data, information and knowledge relative to natural resource management across the north of Queensland.

Defining the boundaries or scope of this project presented a significant challenge in itself. In the broadest sense all information or knowledge plays some role in underpinning decisions on how we manage our natural resources. A variety of information and knowledge is required to furnish the decision making needs of each stakeholder sector be they a land manager, town planner, landcare group, infrastructure manager, Aboriginal corporation, mining company, government agency and so on.

These stakeholders have many different needs and responsibilities in regards to their use of the natural resources or impact upon them. The northern pilot sought to identify ways to improve the sharing, availability, access, quality and quantity of data, information and knowledge required to service these needs and responsibilities.

To include all information, data and knowledge sources applicable to NRM, presented a risk of the project becoming unmanageable. The original project plan for the regional pilots identified it would be easier to restrict the project scope to only a few key asset areas of the community based NRM agenda i.e. weeds, water and biodiversity. However, advice from stakeholders during the initial pilot planning in the northern pilot emphasised that the broader approach was more desirable and the project plan was revised.

The northern pilot concentrated on how to support stakeholders interacting and using information tools, systems and processes, rather reinventing a new IT system. This involved:

- Identifying ways to encourage the use of processes which will allowed for improved information sharing across northern Qld;
- Assisting the development of a cross-regional/cross-sectoral collaborative network to improve knowledge and information exchange; and
- Testing the validity of establishing cross regional and cross-sectoral data/librarian knowledge brokering positions and identify what functions these roles may provide.

3.3 Methodology/process

A northern cross-regional/sectoral advisory group comprising of NRM stakeholders was invited to advise and assist the project officer in project tasks. The project officer engaged with stakeholders to be a part of the advisory group through extensive engagement across the North. Key stakeholders initially identified are listed below. As the project progressed further stakeholders were engaged and included in advisory group communications.

Invitations to form a northern advisory group were sent to the following organisations.

Qld Regional NRM Groups Collective	Tropical Savannas CRC
Torres Straight Regional Authority	Carpentaria Land Council
Northern Gulf Resource Management Group	Cape York Land Council
NQ Dry Tropics NRM	North Qld Land Council
Southern Gulf Catchments	Reef and Rainforest Research Centre Ltd
Cape York Sustainable Futures	Agforce (Agforward)
Balkanu Cape York Development Corporation	Queensland Farmers Federation
Cape York NRM Working Group	Great Barrier Reef Marine Park Authority
FNQ Regional Organisation of Councils	Wet Tropics Management Authority
Gulf Savannah Development Inc	James Cook University
North Qld Regional Organisation of Councils	Qld Dept Environment & Resource Management
Regional Organisation of Councils of Cape York	Qld Dept Employment, Economic Development & Innovation
CSIRO	

Stakeholders were asked to provide a key contact determined by their respective organisations. In response to the initial invitation to participate 18 stakeholder organisations provided 28 representatives. As pilot progressed this grew to 38 representatives from 29 stakeholders (*see appendix 4 for advisory group list*). Competing priorities and resourcing issues restricted the level of involvement from most stakeholders with approximately a quarter primarily interested in being kept informed of progress.

The Terms of Reference for the Northern NRM Data and Knowledge Hub Advisory Group were to:

- Represent their particular business groups/organisation and associated initiatives relevant to the Regional Data and Knowledge Hub Pilot Project.
- Provide advice to the Project Officer (Reuben Sinclair – Terrain NRM) in the implementation of the Regional Data and Knowledge Hub Pilot Project - Phase 1 (April- August 2009).
- Support the development of a regional workshop and attendance of representatives from their organisations.
- Provide recommendations to the Regional Data Hub implementation processes and outputs.

This group participated in the following activities:

- **Cataloguing data and knowledge sources and related initiatives**

The catalogue was used to test the amount of data, information and knowledge systems that are already in existence and how this is currently accessible to end users.

The original proposal sought to develop a catalogue and description of data sets and information across multiple Regional NRM bodies, state agencies, industry bodies etc. The intention was to select a NRM asset 'data' theme i.e. water, weeds or biodiversity etc that is identified through consensus of the working group to benefit all NRM regional participants.

Through advisory group feedback the project officer decided to look at one river catchment in the north and identify how much data and information is available. However, after progressing with this idea there was seen to be a number of overlaps with broader systems and processes so a more holistic approach was taken to look at NRM related data, information and knowledge sources relevant to the north. To test the role of a 'NRM Knowledge Broker' and inform future investment in this area

we needed to get a better idea of what people are using and what other initiatives are underway or proposed.

Advisory Group members identified information sources and related initiatives relevant to their business activities. The next phase of the project will provide an opportunity to further identify strengths and weakness or possible synergies with initiatives that support or could be better supported by NRM stakeholders.

- **Questionnaire**

An online survey was undertaken asking people who work in or who are involved in the natural resource management business about how they go about finding information they need to help do their jobs or business and how they think information discovery and sharing could be improved. There were only a dozen responses to the questionnaire, but this provided information for future engagement with these stakeholders and provided advice to inform the regional workshop from those who were unable to attend.

- **Regional Workshop 25 June 2009, Cairns**

The Northern Data and Knowledge Hub Regional Workshop was an opportunity for stakeholders to come together to learn more about the objectives of the project and identify regional issues for future action. The workshop mapped the NRM data and knowledge landscape across Northern Queensland; identified areas of improvement and linkage; and developed recommendations for future work in NRM data and knowledge brokering.

3.4 Learnings from the Northern Pilot

The following is a list of the learnings identified by the Northern Pilot developed through the course of the pilot.

- **The advisory group identified a strong desire to provide information for informed decision making at the local level across a wide spectrum of uses, ownership and sectors, etc.**
 - They suggested that this is delivered in 'language' understood by those 'sectors' which *is important for engagement in NRM of non tech practitioners and for facilitators delivering to end users*. If this is achieved then all other needs 'up the ladder' would be catered for and well informed.
- **There are so many sources of data, information and knowledge; local, region, statewide, national and global.**
 - This impacts' upon the time required by stakeholders to find the right information.
 - The knowledge of sources and their suitability is not well understood across sectors.
 - It is difficult for any one person to keep abreast of what's happening, needs to operate as part of a network.
 - When data and information is found, not enough of it at desired scale, accuracy and affordability to suit on ground planning or actions.
 - There is a bias towards biophysical information and is often harder to access socio-economic and cultural information.

- All data and information needs to be spatially referenced and searchable.
- o **Most NRM stakeholders are at various stages of addressing data and knowledge management.**
 - There are a number of initiatives relative to Northern Qld underway or proposed in information and knowledge management. However there is a perceived lack of coordination across sectors which need to be resolved.
 - There is a lack of clear direction for information generators to which system/library is 'the one' to enter information and data into and no clear understanding/confirmation that numerous existing or planned systems can or will to talk to each other.
 - There is a lack of connectivity/collaboration with state and national library system which should be used more widely for better searching.
 - Further consultation needed in the North about what users require from information discovery systems and processes and how this can be addressed.

3.5 Northern pilot recommendations

The Northern Advisory Group provided recommendations to the state wide steering committee and state workshop on the outcomes of the work undertaken. These are listed below. In future phases of the Northern work it is hoped that some of these can be actioned.

1. Future NRM and related projects to improve metadata recording and ensure entry into a central repository. Write into policy as part of reporting and funding requirements.
2. Development of a Qld NRM data, information and knowledge communication plan, to ensure better communication across stakeholders about what other projects, systems and initiatives are in existence or being planned to assist collaboration and reduce duplication.
3. An integrated system which combines existing systems and databases which has processes for storing, cataloguing and accessing all forms of NRM information, knowledge and data.
4. Develop regional delivery models for knowledge brokers/mentors which foster cross stakeholder engagement and partnership agreements. Needs to include non NRM agencies/orgs to encourage shared and alternative delivery methods to better serve remote and regional communities.
5. Development of regional working groups and a state-wide steering committee that coordinates and communicates across existing networks and working groups to ensure NRM information, data and knowledge is better integrated and delivered.
6. Current and future database websites to be Google searchable.
7. Data download service is easy to search and download.

8. Unblock data blockages by creating a system of validating confidentiality and access levels.
9. Implement system of permanent URLs to be used by government agencies and funded programs when designing websites so if content is removed it can still be accessed.
10. All government funded data is free and freely useable.
11. Develop a consistent structure for data collection across stakeholders.
12. Establish a peak body to coordinate aggregated data.

4.0 Southern Region

4.1 South West Pilot Project Details

The aim of the southern pilot was to test the data and knowledge management/sharing concepts in the South West area, and develop solutions to improve activity in this area.

The long term expected outcomes:

- Increased availability and effective access to data and information in the South West areas of Qld;
- Effective sharing of information and efficient management of this information.

The key deliverables for the south west area included:

- Having a dedicated regional knowledge broker in the south west area of Queensland who developed cross regional collaborative networks to improve NRM knowledge sharing;
- Developing a regional data and information catalogue to demonstrate the issues and gaps in collating all NRM related data, information and knowledge for a particular area of Queensland;
- Facilitating a regional knowledge sharing workshop to engage with stakeholders around data, information and knowledge issues and inform the future delivery of the project.

This south west pilot collaborated with the Regional NRM Groups' Collective, South West NRM Ltd, Condamine Alliance, Queensland Murray-Darling Committee and relevant state government agencies.

4.5 South West Qld DataHub Pilot Initiatives

A steering committee was established to oversee and provide strategic guidance for the South West Pilot activities. The 'Water' theme was chosen to identify information sharing issues and trial dissemination techniques.

The South West Data Hub Project has initiated several projects to improve information access and retrieval, including the development of databases, compilation and analysis of geospatial data; and establishment of communication networks which were achieved or linked to the Data Hub Pilot Project.

Centralised Databases

Lending Library Database

The project team started with a list of approximately 2000 resources identified in the previous CRIS project. These records were loaded in to the freeware BookDB. While the software function well and worked internally it did not have online search facilities. The same records were then migrated to the LibCode system which is a Toowoomba (Qld) based company that supports a number of school and community libraries and can be found at <http://qmdc.cmeweb.libcode.com.au/>. The new database supports both internal (hyperlinked to files on internal servers) and external users. The Database supports multiple locations, borrowing restrictions, lending reports and asset tracking.

Research & Publication Database

This was originally intended as a means for the 'DataHub Knowledge Broker' to keep a track of research publications and to facilitate report writing. The new functionality means that multiple databases can feed in to the local system (e.g. National Library of Australia).

Reference lists and annotated bibliographies can be created for sharing.

<http://www.qmdc.org.au/qmdc-library-services/datahub-water-theme.html>

Improving access to spatial information: Data Catalogues

One of the milestones of the project was to develop an NRM data catalogue for the South West area of Qld. Following initial investigation it was found that it was difficult to design one complete data "catalogue". Instead it was decided a number of products should be compiled to suit a variety of needs and long term maintenance effort. The information collected concentrated on water, the theme chosen for the South West Pilot. It was assumed that the audience of this catalogue would include land managers, 'water' professionals and GIS professionals in search of water related information relevant to South West Qld.

The following products have been published on the Qld Murray Darling Basin Committee website <http://www.qmdc.org.au/qmdc-library-services/datahub.html> and will be maintained:

- Generators, Repositories & Brokers of Information (data downloads)
- Gateways & Data Doors (machine to machine access)
- Modelling GIS (data sets for partners)
- Sub-Catchment planning GIS (data sets for land managers)

4.6 Mapping Qld Murray Darling Committee's (QMDC) Water Quality Information through Social Network Analysis

To identify the underlying social network that constitutes QMDC's water quality information resource, during June and July 2009 a Social Network Analysis study was successful undertaken by the Qld Department of Environment and Resource Management (DERM).

The study's primary function supported the identification of key relationships between people and institutional barriers to collaboration in data sharing and access between related organisations. Additionally the engagement built a knowledge base in the use of this research approach for further deployment within successive Data Hub projects and projects supporting the Department of Environment and Resource Management's key NRM stakeholders.

Key outputs provided a profile of QMDC's key data conduits and sources (both internal and external) whilst to a lesser degree providing Queensland Government South West Region staff a clearer understanding of their role within this network.

The successful Social Network Analysis study highlighted the need for further development of the methodology through the next phase of the Data Hub program development. Key reflections from the pilot study for consideration:

1. Identification of the study population should be developed and agreed upon by a 'reference group' that constitutes representatives from various organisations to ensure inclusivity and greater exploration of network members.
2. Deeper understanding of scenario mapping "what if we introduce another type of actor into this social relationship ecosystem" is difficult with small population pool. Literature suggests a minimum population of at least 28 entities to provide appropriate confidence.
3. Bounded survey requires total commitment from organisations and the population. Bounded surveys are extremely useful in identifying group dynamics and relationships, and for the purpose of the pilot study produced beneficial and cost effective results for the participating organisations.
4. Further Data Hub network analysis investment should consider the use of open survey (accumulative population growth) to ensure data confidence and analysis integrity.
5. Cost savings in future Data Hub network analysis will be found by using third party online survey and data aggregation tools to save in data preparation and readiness for importation to each software platform. Specialised companies off this service as part of the online survey product.
6. The ability to provide personalised interviews with selected respondents to improve interpretation validity should be considered as part of future research investment. This is often required when survey analysis identifies inconclusive or distorted results, thus allowing the researcher to clarify the respondents' position.

4.7 Key Learnings from SW Qld Pilot

Important lessons are available from the experience of other organisations that have invested in improving knowledge processes. Key lessons that are relevant to the South West pilot and the project overall are summarised below:

- Adequate resourcing (time and dollars), support staff to improve knowledge, information and data sharing. That is, time to use and support existing systems such as National and State libraries, Meta search engines and GovDex/QDex.
- Measure and monitor the impact of knowledge creation and sharing on organisation(s) to enable continuous improvements.
- Promote and support networks of professionals with common interests or community's of practice to bring people together, build trust, and facilitate information sharing. Properly provide resource, support and empower networks to ensure their effective functioning.
- Statewide workshop and meetings helped to identify additional networks and have generated some commitment and familiarity with the DataHub project.

4.8 Recommendations from the SW Regional Workshop

It was universally agreed by participants at the workshop (water quality professionals from state agencies, industry and regional body staff) that the proposed 'librarian/knowledge broker' function was very appropriate in order to facilitate a greater capacity for information sharing across the state. The function/ position needs to have strong 'people' skills and be able to facilitate a strong cultural shift that will permanently support this function.

Workshop participants identified the following needs for the next phase of the project.

- The project should concentrate on networking and facilitation, as opposed to the development of an IT solution,
- The "librarian/knowledge broker" to be unilaterally supported in order to prosper and survive in the long term.
- The "librarian/knowledge broker" to strengthen and maintain cross regional support in order to function properly and to be supported by all stakeholders.
- The development of a marketing and promotion strategy in order to keep the function alive and vibrant.

5.0 State-wide workshop and recommendations

5.1 Statewide workshop objectives

As part of the project's milestones a state-wide workshop was held in July 2009 in Brisbane to pull together the learnings from the regional pilots and state coordination.

The objectives of the workshop were to:

- Report back from regional data and knowledge pilots about reflections, issues, opportunities and recommendations;
- Prioritise regional recommendations for future work in knowledge brokering and assign tasks;
- Provide information to stakeholders on selected initiatives in NRM data, information and knowledge management; and
- Develop state wide recommendations and actions for future work in natural resource management knowledge brokering in Qld.

The workshop attracted 45 participants from many regional NRM bodies, government agencies and industry organisations.

5.2 Recommendations from regional pilots and state workshop

The participants at the State-wide Data and Knowledge Hub Workshop were presented information about the outcomes and recommendations from the two regional pilots as well as information from current initiatives such as the Qld Government Information Service presented by DERM, data needs from the regional NRM bodies presented by the Qld Regional NRM Groups Collective and a presentation from the now defunct Land and Water Australia about AANRO (Australian Agriculture and Natural Resources Online) which will now be managed by Rural Industries Research and Development Corporation (RIRDC).

Participants were asked to review the recommendations from the project in terms of what may have already been done, or what actions might be contributing to this recommendation and what other recommendations may need to be put forward. As a whole group the participants were asked to prioritise all the recommendations including any identified new ones.

5.3 Prioritised recommendations and ideas for future delivery

The top three recommendations that state workshop participants saw as a priority were:

1. The development of an independent state-wide steering committee that coordinates and communicates across existing networks and working groups to ensure NRM information/data/knowledge is better integrated and delivered.

The first prioritised recommendation of creating an independent state-wide steering committee is to be actioned by broadening the existing membership of the Data and Knowledge Hub State Steering Committee.

This may include the addition of local government and Australian Government representatives in Phase 2. It was also discussed that regional level advisory groups need to be established to help inform the state steering committee.

The Northern Pilot has already established the Northern DataHub Advisory Group.

2. Development of regional delivery models for knowledge brokers/mentors which foster cross stakeholder engagement and partnership agreements.
To address the development of regional delivery models it was decided through the state workshop that Phase 2 of the project should build on the momentum established with the pilots in the North and South and ensure effective evaluation is built into their delivery to measure outcomes. Social Network Analysis which was used in South West pilot could be utilised across all future pilots to evaluate whether knowledge sharing improves by having dedicated knowledge brokers. It was also discussed that the project should continue to investigate how other states in Australia may be undertaking this type of activity and build the learnings of these into Phase 2 Pilots.

It was also recognised that the knowledge broker role to be truly successful needed to be owned by the stakeholders it was working with. One possible future model could be that regional stakeholders each fund a small proportion of the role and the culmination of this funding would allow enough funding for a broker. This broker would then seek guidance from the contributing stakeholders.

3. Future natural resource management and related projects need to adopt better records of metadata as part of funding requirements.

The final recommendation was that future natural resource management projects need to adopt better records of metadata as part of funding requirements. It was acknowledged that many metadata standards exist and there needs to be communication about these to stakeholders. In terms of funding requirements the Caring for Our Country funding reporting system for Qld “enQuire” contains metadata and this could be expanded in the future. For projects outside of this funding stream there would also need to be consistent metadata capture. To ensure better records of metadata, stakeholders should use utilise the ANZLIC standard for spatial information and library standards for reports.

4. An integrated system needs to be investigated which combines existing systems and databases for storing, cataloguing and accessing all forms of NRM information/knowledge/data.

To address this recommendation it was decided to look at existing systems such as AANRO (Australian Agriculture and Natural Resources Online), Qld Regional Groups Collective website and depositing publications for legal deposit with the State and National Libraries for future public reference (see Appendix 2)

6.0 Next steps

This project has secured funds from the Qld and Australian Governments to continue until June 2010. From the recommendations from the first phase, emphasis will be placed on:

- Ensuring the project has an effective monitoring and evaluation framework to demonstrate its effectiveness in improving data, information and knowledge exchange amongst NRM stakeholders;
- A Communication and Marketing Strategy to communicate more broadly about the outcomes of having cross regional knowledge brokers in place and marketing the concept for future investment in this area;
- Changing the name of the project to Qld NRM Knowledge and Information Network (KIN) and working as a network to achieve the project goals (three part time regional knowledge brokers and a part time state coordinator);
- Addressing the recommendations from the Phase 1 state workshop including continuing the State Steering Committee, further refine regional delivery of the concept including another region in Central Qld.
- Clearly identifying the information and knowledge needs of Qld regional NRM body staff and partnering stakeholders.
- Identifying and collating where the information and knowledge resides within Qld regional NRM bodies (including the people, business practices and systems available).
- Identifying the enablers and blockers of information and knowledge use and review systems which may be able to better overcome these issues (eg. RGC website or other IT solutions, key network linkages) and the
- Developing an agreed State NRM Knowledge Framework which articulates how regional NRM knowledge can be managed across Qld.

Appendix 1 (collated by DERM, Terrain NRM and QMDC)

NRM Data and Knowledge Hub Project Phase 1 - Catalogue of data, information and knowledge systems in Qld (some national/global included)

- **AANRO** - An integrated knowledge discovery tool for agriculture and natural resources <http://www.aanro.net/> . The latest upgrade of this site is now live. Stakeholders should consider housing their publications electronically on this site so information can be searched nationally.

- **Agforward** – *Agforce Qld*

AgForward has the tools and information to assist Queensland primary producers and land owners manage their property resources and infrastructure.

www.agforward.org.au

- **Australian Hydrological Geospatial Fabric (AHGF)**

Suite of well maintained, evolving, authoritative, data products containing a consistent representation of every hydrologic feature, and the connectivity between features, of the Australian water system. These products are capable of supporting a wide variety of uses for many users. As such, the AHGF will become the framework geospatial information upon which Australia's water information related activities are based and through which they are related.

- **ANRDL** – *Australian Natural Resource Data Library (Dept Agriculture Fisheries and Forestry, Bureau of Rural Science)*

Search and display metadata records and download datasets held at the Bureau of Rural Sciences. The BRS is the scientific bureau within the Department of Agriculture, Fisheries and Forestry. At the interface between science and policy, BRS is an essential part of the Government's capacity for integrated evidence-based policy development. BRS provides scientific advice to government in support of more profitable, competitive and sustainable Australian agricultural, food, fisheries and forestry industries and enhancing the natural resource base to achieve greater national wealth and stronger rural and regional communities.

http://adl.brs.gov.au/anrdl/php/basic_search.php

- **ANZLIC IM Guide** (www.nlwra.gov.au/toolkit/contents.htm)

The Natural Resources Information Management Toolkit (the Toolkit) has been prepared by the National Land & Water Resources Audit and ANZLIC – the Spatial Information Council - to assist regional natural resources management groups discover, access, visualise and manage their data and information. The Toolkit has been developed in close cooperation with all government jurisdictions and has been targeted at regional groups to help build capacity and facilitate the two-way flow of data and information.

- **Aquatic Conservation Assessments (AquaBAMM)**

AquaBAMM Department of Environment and Resource Management (DERM) have developed a method to assess conservation values of wetlands in Queensland called the Aquatic Biodiversity Assessment and Mapping Method (AquaBAMM). This comprehensive method identifies relative wetland conservation values within a specified study area. The method is used to produce an Aquatic Conservation Assessment (ACA) of wetlands using available data including data resulting from expert opinion. It is a powerful decision support tool that is easily updated and simply interrogated through a GIS platform.

ACA results contribute to the baseline ecological information available to support natural resource management and planning processes. An ACA can have application in:

- determining priorities for protection or rehabilitation of aquatic ecosystems;
- on-ground investment in aquatic ecosystems;
- contributing to impact assessment of large-scale development (e.g. dams); and
- water resource and strategic regional planning processes.

- **ARROW Discovery Service**

The [ARROW Discovery Service](#) searches simultaneously across the contents of Australian university research repositories. The list of currently participating universities, and the number of outputs currently in each repository (mostly university libraries). Where you can search 312,099 Australian research outputs, including theses; preprints; postprints; journal articles; book chapters; music recordings and pictures.

- **Ask Now** (www.asknow.gov.au)

Online access to librarians to gain assistance to locate information. An initiative of the national library of Australia.

- **Australian Spatial Data Directory** (www-b.ga.gov.au/asdd/about.htm)

The Australian Spatial Data Directory (ASDD) is a national metadata catalogue system supported by all governments under the auspices of ANZLIC - the cross-jurisdictional Spatial Information Council. The ASDD aims to improve access to Australian spatial data for industry, government, education and the general community through effective documentation, advertisement and distribution of information on spatial data. The directory comprises government and commercial nodes in each State/Territory and spatial data agencies within the Australian Government. The ASDD was launched in 1998 and has steadily grown in content to become the key source of spatial information in Australia.

- **Australian Water Resources Information System available in 2010**

http://www.water.gov.au/KeyMessages/AustralianWaterResourcesInformationSystem/index.aspx?Menu=Level1_1_13

- **AVH – Australian Virtual Herbarium (council of heads of herbaria)**

Australia's Virtual Herbarium (AVH) is an on-line botanical information resource accessible via the web. It provides immediate access to the wealth of data associated with scientific plant specimens in each Australian herbarium. Six million specimen records, of particular value in displaying geographic distribution, will be enhanced by images, descriptive text and identification tools. The AVH is a collaborative project of the State, Commonwealth and Territory herbaria. It is being developed under the auspices of the Council of Heads of Australian Herbaria (CHAH), representing the major Australian collections.

<http://www.chah.gov.au/avh/avh.html>

- **AWRIS - Australian Water Resource Information System**

Set of tools that will access information published through a distributed water data infrastructure to deliver future water resource assessments. "AWRIS will provide a comprehensive, credible, open view of Australia's water resources data and information. It will allow users to review and investigate this data, understand the data in context, and bigger picture details about the data. AWRIS will help further (and add value to) the discussion about water." For more information see the website maintained by the Australian Government National Water Commission [online](#). Publications up to July 2007. Provides links (now broken) to ANRA.

- **Bureau of Meteorology**

The Bureau of Meteorology provides several thousand products in a variety of formats using several delivery media. Most products are freely available, however some of the more specialised ones attract a cost recovery charge.

<http://www.bom.gov.au/>

- **Biomonitoring techniques for recycled water (WQRA)**

With a budget of over \$2 million, including \$1,015,000 from the Australian Government Water Fund under the Raising National Water Standards programme, this project will develop a toolbox of biomonitoring techniques for recycled water. The project will establish linkages with two other Raising National Water Standards projects: "Development of an Ecotoxicity Toolbox to Evaluate Water Quality for Recycling" managed by the Western Australian Department of Water, and "Recycled Water Quality Standards", managed by the National Environment Protection Council. This new project will also establish linkages with those developing the National Guidelines for Water Recycling - Phase 2. Water Quality Research Australia [project](#)

- **Central Queensland Regional Information System**

The Central Queensland Regional Information System (CQRIS) aims to provide access to accurate and timely information of an economic, social,

geospatial and/or demographic nature, focusing on the Central Queensland region.

- **CHRIS**

The Coastal Habitat Resources Information System (CHRIS) is a resource centre for Queensland coastal fish habitat, fisheries resources and environmental datasets (layers) developed by the Department of Primary Industries and Fisheries (DPI&F) and other agencies. The integration of these layers in CHRIS facilitates monitoring of the condition and trend of coastal fisheries habitats.

- **Corangamite** online data submission

Review of current/existing research list, existing/new research projects / reports.

The Corangamite CMA Knowledge Base is an extensive collection of publications and technical reports on all aspects of the catchment. The collection focuses on information written specifically for the Corangamite region. Current research projects occurring in the region can be viewed in the [current research list](#). The database has been indexed by subject and locality for information retrieval and analysis.

- **Datasmart** - *Office of Economic and Statistical Research in Queensland Treasury*

Data Smart is a calendar of professional development events and newsletter subscription service for OESR clients. It was established by the Office of Economic and Statistical Research in Queensland Treasury to further promote high standards in data and information use. It also encourages partnerships that assist agencies and organisations to share data, information and knowledge. The development of Data Smart was sponsored by the Queensland Spatial Information Infrastructure Council (QSIIC) as a whole of government initiative. If you coordinate and promote professional development events, newsletters or specialist networks that focus on data and information and or associated methodologies and standards, Data Smart is an online tool that can make your job easier.

<http://datasmart.oesr.qld.gov.au/>

- **Datahub and QRSIS- Office of Economic and Statistical Research in Queensland Treasury**

Data Hub is a data sharing site on GovNet managed by OESR. Queensland Government and Queensland Local Government users accessing this tool via Data Hub on GovNet can access more records. The publically available version of QRSIS displays a limited amount of data series.

The Queensland Regional Statistical Information System (QRSIS) is a regional database developed by Queensland Treasury's Office of Economic

and Statistical Research. QRSIS provides access to a wide range of time series regional data.

GOVT Users> <http://datahub.govnet.qld.gov.au/> **PUBLIC Users**> <http://qrsis.oesr.qld.gov.au>

- **Earth Science Data Interface (ESDI) Global Land Cover Facility**

[Web application](#) for searching, browsing and downloading data from online holdings. Users can look and search, but need to log in to download. Includes file download <http://ftp.glcf.umiacs.umd.edu/>

- **enQuire**

enQuire is a web based application, delivering an integrated state-wide system that assists the Queensland state government and Queensland Regional NRM Bodies in improving the quality of NRM activities by facilitating improved collaboration, coordination, management and reporting. enQuire was funded and developed under the Natural Heritage Trust 2 and has been operational since January 2006

www.enquire.net.au

- **ERIN – Environmental Resource Information Network - Dept Environment, Water, Heritage and the Arts**

The Environmental Resources Information Network (ERIN) is a unit within the Department of the Environment, Water, Heritage and the Arts, specialising in online data and information management, and spatial data integration and analysis. ERIN aims to improve environmental outcomes by developing and managing a comprehensive, accurate and accessible information base for environmental decisions. Information is drawn from many sources and includes maps, species distributions, documents and satellite imagery, and covers environmental themes ranging from endangered species to drought and pollution.

www.environment.gov.au/erin/

- **FarmPlus – InfoRM Knowledge Ltd/Hort Aust Ltd (HAL)**

InfoRM Knowledge Ltd, has developed FarmPlus, an agricultural specific search engine designed to access all key agricultural information in the fastest and easiest way to facilitate farmer and market access to industry research and knowledge.

www.farmplus.net.au

- **Fire Knowledge – Bushfire knowledge network**

The Fire Knowledge Network is an initiative of the Bushfire CRC. The Network is a focal point for fire knowledge within Australia, New Zealand and globally. It brings together the broad spectrum of research, both within the

CRC and from the many researchers in other organisations, local knowledge, and lessons from history.

- **GADDS – Geophysical Archive Data Delivery System**

This system provides magnetic, radiometric, gravity and digital elevation data from Australian National, State and Territory Government geophysical data archives.

<http://www.geoscience.gov.au/bin/mapserv36?map=/public/http/www/geportal/gadds/gadds.map&mode=browse>

- **GeoNetwork – Food and Agriculture Organization of the United Nations**
GeoNetwork's purpose is to improve access to and integrated use of spatial data and information, support decision making, promote multidisciplinary approaches to sustainable development, enhance understanding of the benefits of geographic information. GeoNetwork opensource allows to easily share geographically referenced thematic information between different organizations.

www.fao.org/geonetwork

- **Global Livestock Production and Health Atlas (GLiPHA)**

Interactive [electronic atlas](#) that provides a scalable overview of spatial and temporal variation in quantitative information related to animal production and health. Against a back-drop of selected maps of livestock densities, land-use or elevation, sub-national (in Australia's case State) statistics relating to increase awareness of socio-economic, human and animal demographic and health related issues. Maintained by the Food and Agriculture Organization of the United Nations. Ends at 2005. Include a number of useful background layers (climate zones)

- **Greening Australia – Exchange**

<http://www.greeningaustralia.org.au/resources/index.html>

Exchange is a service provided by Greening Australia to exchange knowledge between people and organisations that manage Australia's native vegetation. Exchange links practical knowledge with research knowledge, and can provide you with the resources and contacts to help resolve your vegetation management techniques.

- **Integrated Planning Geographic Information System**

Local Government Association of Qld operate the Integrated Planning and Geographic Information System - a GIS web service which allow searches on integrated planning information.

- **Lake Eyre Basin Regional Resource Information System - the LEB Regional Resource Information System (LEBRRIS)** is conceptualized as a dynamic, definitive go-to place that provides ready access to information (eg reports, spatial information, grey literature), both existing and in to the future.

This information will assist jurisdictions and other organisations in their decision-making and planning.

- **Libraries Australia - National Library of Australia**

Libraries Australia is a resource sharing service coordinated by the National Library of Australia for Australian libraries and their users. It is used for reference, collection development, cataloguing and interlibrary lending. The heart of Libraries Australia is the Australian National Bibliographic Database (ANBD), which records the location details of over 42 million items held in most Australian academic, research, national, state, public and special libraries. The Libraries Australia service replaces earlier systems, Kinetica and the Australian Bibliographic Network (ABN) - which was created in 1981 to foster resource sharing by Australian libraries.

<http://www.nla.gov.au/librariesaustralia/>

- **National Action Plan Regional Information System (RIS) Portal**
Information now on the Qld Government Information Service

<http://www.information.qld.gov.au/>

- **National Landscape Information Infrastructure**

Outcome: Government, industry and community have access to fundamental spatial data and information required to deliver safe, sustainable and prosperous communities.

- **NCRIS – National Collaborative Research Infrastructure Strategy**

Through NCRIS, the Government is providing \$542 million over 2005-2011 to provide researchers with major research facilities, supporting infrastructure and networks necessary for world-class research. See [website here](#) for an overview.

- **NEIS (under discussion) – National Environmental Information System**

The purpose of the NEIS is to provide a nationally coordinated approach to collection, collation, access to and management of environmental information. It will enable the enduring provision of policy relevant, consistent, accurate and timely environmental data at national to regional levels.

A successful system will contain information about all important aspects of the environment including data systems that facilitate the linking of environment indicators to economic and social indicators, so as to better inform the real world of complex decision-making and policy development.

- **NEO: NASA Earth Observatory**

NASA satellites give us a global view of what's happening on our planet. To explore how key parts of Earth's climate system change from month to month visit [Global Maps](#) or for data up to a month old use the WMS server. Includes: Water Leaving Radiance (Aqua/MODIS) at temporal intervals of 1 day, 8 day and 1 month and Water Vapour. Read about [WMS Services](#) here.

- **NRM Networking Groups - Qld NRM Regional Groups Collective**

Queensland's Regional NRM Groups are particularly strong in working together across the state to increase efficiency and results. The network portals on the RGC website allow the state groups to strengthen their coordination through shared work spaces.

<http://www.rgc.org.au/>

- **NRM Toolbar (www.nrmtoolbar.net.au)**

The NRM Toolbar is a set of online tools and databases that will make it easier for NRM professionals to find and share relevant information.

- **OnePlan – Blueprint for the Bush (Qld Govt)**

OnePlan is part of the Queensland Government's Blueprint for the Bush, a 10-year initiative to build a sustainable, liveable and prosperous rural Queensland. By providing guidelines, resources and access to information, the aim of the new Oneplan framework is to simplify the preparation of property-level management plans currently required by government.

<http://www.nrw.qld.gov.au/oneplan/index.html>

- **QDEX - The Geological Survey of Queensland manages the company exploration reports collection using an internet document management system called QDEX (Queensland Digital EXploration Reports system).**

- **Queensland Government Information Service** is a way to discover and access a range of free or saleable government geospatial and associated data. Data can be ordered for download or delivered on DVD.

<http://www.information.qld.gov.au/>

The Catalogue contains descriptions (metadata) of data and information resources, and links to the resource if available.

<http://gisbneprda01.iq.govnet.qld.gov.au/Portal/>

- **Queensland Spatial Information Council (www.qsic.qld.gov.au)**

The Queensland Spatial Information Council (QSIC) was established to lead the efficient and effective development and maintenance of Queensland's spatial information infrastructure. This infrastructure is valuable in supporting the state's economic and social development, and contributing to the

Queensland Government's Smart State vision. To achieve this, QSIC partners with all sectors of the Queensland spatial industry with representation from government, industry, academia and the professions.

- **Regional Ecosystem data (REDATA)**

This website enables you to obtain current remnant regional ecosystem (RE) data for a specified area defined by Lot on Plan. The data is distributed as ESRI shapefile format for up to 3 Lots on Plan at a time.

The current data is Version 5.0 released in Dec. 2005, based on the 2003 Landsat imagery. Certified map amendments, to the date of request are included, if applicable to the area.

RE data for larger areas are available on request, please contact regional.ecosystem@epa.qld.gov.au.

- **Regional Knowledge Resource Kit (RKRK) – Land & Water Australia**

The RKRK is an online resource for learning and developing skills in managing information and knowledge for regional natural resource management. With the Australian Government winding up Land & Water Australia (LWA), the Regional Knowledge Resource Kit will shortly be moving to a new home with the Australian River Restoration Centre (ARRC) www.arcc.com.au.

www.rkrk.net.au

- **SOE Online**

State of the Environment Online (*SoE Online*) provides access to the most recent data and information available on a range of indicators that inform the understanding and management of Queensland's environment.

http://www.epa.qld.gov.au/environmental_management/state_of_the_environment/soe_online/index.html

- **Statewide Landcover and Trees Study (SLATS)**

The Statewide Landcover and Trees Study (SLATS) project provides policy makers, industry and community interest groups, and landholders with:

- accurate information on woody vegetation cover
- information on changes in the cover
- mapping and statistical information.

<http://www.nrw.qld.gov.au/slats/>

- **Statistical Liaison Officers Network** - *Office of Economic and Statistical Research in Queensland Treasury*

The Queensland Statistical Liaison Officer (SLO) Network has a pivotal role as the principal mechanism for the efficient dissemination, coordination and review of statistical matters. The SLO Network is maintained and managed by OESR, with support from the ABS. Membership is sourced primarily from Queensland State and Local Government agencies, but in the regional centres also includes academics and private organisations. The OESR Regional Liaison Officers provide a regional contact point for the provision and coordination of economic, social and demographic data.

- **State Library of Queensland**

The State Library of Queensland is Australia's leading library of Queensland's documentary heritage, major reference and research collections, and an advocate for, and partner with public libraries across Queensland.

<http://www.slq.qld.gov.au/>

- **Surfacewater Resource Information (HYDSYS)**

HYDSYS stores all water resource time series data including stream level, flow, temperature, conductivity and bore levels. Related information includes site details, cross sections, gauging summary, instrument history, water quality, etc which are all stored in database files. The eight hydrographic districts in the state are responsible for the validation and storage of their local data.

HYDSYS is a propriety software package used by water monitoring authorities, including Resource Management, throughout Australia.

- **Strategic Water Information and Monitoring Plan (SWIMP) – DERM**

This report is being prepared for the Bureau of Meteorology (BoM) by the Department of Environment and Resource Management (DERM) in collaboration with the key water information and monitoring stakeholders in Queensland. It reports on the monitoring of surface water and groundwater resources from sites above the tidal limit. This document also includes water data gaps identified by stakeholders.

- **WaterSMart Pastoral Production™**

The WaterSmart Pastoral Production™ project combines the best of what is known about grazing management with the best technologies in stock water storage and delivery on pastoral properties. It aims to assist landholders on various types of pastoral country. [Visit website](#) to see additional information. *Information and extension project, includes stock water management technologies. Includes Hydraulic pipe design guide, Metric pipe friction chart and GAB Well Maintenance Guide for Artesian wells.*

- **Water Quality Online (NAP)**

Water Quality Online is the home of the [National Action Plan for Salinity and Water Quality's Queensland Water Quality program](#) (WQ SIP). The site is a

tool for disseminating information about the Water Quality program, as well as for distributing products. These products aim to assist with regional natural resource management in Queensland. *All projects wound up in early 2007*

- **Wetland Info** <http://www.epa.qld.gov.au/wetlandinfo>

DERM in conjunction with the Australian Government has produced Wetland Info a one stop shop website about wetlands.

Information includes maps and data, managing wetlands, science and research, legislation and planning maps.

WetlandMaps provides an interactive map service that aims to give users fast and easy access to wetland information via a web-based Geographic Information System (GIS).

- **Wildlife Online**

DERM's wildlife database contains recorded wildlife sightings and listings of plants, fungi, protists, mammals, birds, reptiles, amphibians, freshwater fish, marine cartilaginous fish and butterflies in Queensland.

This website enables you to access a list of wildlife that DERM has recorded for areas such as national parks, State forests and shires, or areas defined by the user. The information is in Adobe Portable Document Format (PDF) or tab delimited text file and can be emailed to a valid address. Wildlife lists for shires, basins and NRM body regions can be viewed online via the [WetlandInfo's Wetland Information Summary Search](#).

- **WISE - Water Information System for the Environment**

WISE does two essential things. It links publications to a part of the world, so people can find out what is known about a particular wetland, creek, river or catchment. Currently there are WISE reference databases for seven catchments available on the internet at <http://wiserivers.npws.nsw.gov.au> .

Northern Qld/Australia specific

- **Atherton Tablelands Geographic Information Services (ATGIS)** *is a business unit of the Tablelands Regional Council.*

ATGIS provides a wide range of GIS services for the Tablelands Regional Council and provides spatial information and mapping services in support of industry, government, educational and community projects.

www.atgis.com.au

- **e-Atlas- Australia's tropical land and seas**

Under construction, the e-Atlas is a partnership between many research providers in order to develop a portal to information about Australia's tropical terrestrial and marine environments. By providing the means to share and access data, maps and information on topics relevant to the region, the ATLAS aims to promote collaboration and support the work of management agencies, researchers, reef-based industries and community groups. Decades of research have generated a large amount of data and information on the Great Barrier Reef and the terrestrial tropical ecosystems. Until now this information has generally been under-used.

<http://e-atlas.org.au>

- **Herbert Resource Information Centre (HRIC)**

The HRIC is a non-profit catchment based Geographic Information System (GIS) facility that supports decision-makers in the Herbert River Catchment.

The HRIC is an unincorporated joint venture between Hinchinbrook Shire Council, CSR Sugar (Herbert) Pty Ltd., Herbert Cane Productivity Service Ltd (HCPST), CANEGROWERS, BSES Ltd and FNQ NRM (Terrain NRM).

www.hric.org.au

- **NAFI – Northern Australia Fire Information**

The NAFI site has been developed by the Tropical Savannas Cooperative Research Centre and north Australian fire managers. It sources relevant fire management data, such as hotspots (locations of recently burning fires as sensed by satellites) and fire scars (maps of recently burnt country as sensed by satellites) and presents them on maps that are useful to north Australian fire managers. Hotspots are sourced from Langate Western Australia (from NOAA and NASA satellites) and Geoscience Australia (from NASA satellites). Firescars are sourced from Bushfires NT (for NT and northern WA fire scars) and Cape York Peninsula Sustainable Futures (for Queensland).

- **NAILSMA** – *North Australian Indigenous Land and Sea Management Alliance*

The North Australian Indigenous Land & Sea Management Alliance (NAILSMA) is an unincorporated bioregional forum for Indigenous land and sea managers across North Australia. It aims to support practical Indigenous land and sea management using strategic approaches to care for country with an emphasis on practical management by Traditional Owners across the whole of the North.

www.nailsma.org.au

- **Northern Australia Water Futures Assessment Knowledge Base (NAWFA)** (*Aquatic Systems Health Branch Dept Environment, Water, Heritage and the Arts-DEWHA*)

The objective of the NAWFA is to provide an enduring Knowledge Base to inform development of northern Australia's water resources, so that development proceeds in an ecologically, culturally and economically sustainable manner. The Knowledge Base will provide easy access to information to assist in decision-making and planning of water resource development in Northern Australia.

<http://www.environment.gov.au/water/policy-programs/northern-australia/index.html>

- **North Australia Land Manager (NALM)**- *Tropical Savannas CRC*

Currently under redevelopment including map-driven entry, NALM provides information for NRM in northern Australia. It contains over 20,000 articles, references and links, with at least 200,000 items accessed by NRM practitioners annually.

www.landmanager.org.au

- **NQWMP** - *Northern Queensland Wildfire Mitigation Project*

NQWMP is a collaborative interagency mapping exercise managed by ATGIS and funded by all three levels of government through the DOTARS Natural Disaster Mitigation Programme.

Download fire-related GIS datasets and information relating to wildfire management.

The Rural Fire Brigade Resource Mapping strand of this project has produced 90+ fire district maps in A0 and A3 size. PDF's and JPG's of these maps are available for download.

Use the Create Maps feature of this website to create and print custom maps.

Submit updates directly to the data warehouse using the file exchange facility.

Create new spatial data sets by digitizing them directly online. Information that you digitize can be saved for your own use, or published, for sharing with other stakeholders.

<http://wildfire.atgis.com.au/>

- **Tropical Rivers and Coastal Knowledge - TRaCK**

TRaCK is a research hub under the Commonwealth Environmental Research Facilities scheme, managed by the Department of Environment, Water, Heritage and the Arts.

Providing the science and knowledge that governments, communities and industries need for the sustainable use and management of Australia's tropical rivers and estuaries. Contributing knowledge that can inform the National Water Initiative and be used as independent and objective advice by those making policy, planning and management decisions about northern Australia.

www.track.gov.au

Murray Darling specific

Geographic Research & Data Acquisition (and NTICI)

The capture, maintenance and provision of topographic data and related Spatial Data Infrastructure products to meet government priorities, emergency management mitigation response, industry development and community needs. Undertaken in collaboration with State and other Commonwealth agencies & industry partners through the National Topographic Information Coordination Initiative (NTICI). Includes: Farm dams in priority areas of the Murray Darling Basin.

Macintyre Brook Sustainability Initiative

The aim of the project is to build the capacity of landholders and the irrigation industry in the Macintyre Brook catchment to identify, assess and manage the on-farm natural resource base to ensure the maintenance and enhancement of productive landscapes and environmental services. This project is focused on multi-scale sustainability reporting systems being on-farm and catchment wide using the NRM regional standards and indicators to demonstrate sustainable food, fibre and ecosystem service delivery and to link in the regional, state, industry and national sustainability reporting systems. For contacts and more detail see: <http://www.fsaconsulting.net/mbia/about/mbisi.htm>

WaterCAST / E2 model of the Maranoa Balonne

The NAPSWQ team in collaboration with the Regional NRM Body, Queensland Murray Darling Committee (QMDC) used the E2 catchment modelling software to evaluate the likely changes in sediment and nutrient loads as a result of implementing on-ground works. The area modelled was the Condamine, Balonne and Maranoa Catchments at the headwaters of the Murray Darling Basin in Queensland.

Condamine Balonne Water Resource Assessment

The Condamine-Balonne WMA covers the most upstream reaches of the Murray-Darling Basin. It incorporates the catchments of the Condamine and Maranoa Rivers as well as the Balonne, Culgoa and associated rivers from their confluence to the New South Wales border. The WMA includes three Water Supply Schemes: the Upper Condamine, Maranoa and St George Water Supply Schemes. While the Water Resource Plan (WRP) for the area was completed in 2004, the Resource Operation Plan is currently under development. *Completed in 2005, no further updates*

SWAMP – Stanthorpe Water Assessment and Monitoring Project

The Stanthorpe Water Assessment and Monitoring Project (SWAMP) is an excellent example of community monitoring in action. The project is a partnership between local landholders and 12 organisations, including Granite Borders Landcare, Stanthorpe Shire Council and QMDC, and aims to collect long-term water quality data for the Stanthorpe area.

IAWM Development in the Border Rivers / Mungindi

Report written by 4T Consultants. Objective: to help landholders participate in, and understand, environmental monitoring and natural resource management. September 2004 – May 2007. Project included biophysical monitoring.

Pre-planning for groundwater resources in Central Condamine River &

Tributary Alluvium

The team will work with communities and agencies in pre-planning for groundwater resources of the Central Condamine River and Tributary Alluvium, which is an area located on the trunk floodplain and extending from near Pratten downstream to Warra-Jandowae. The groundwater resources of the area are extensively developed and used for a range of water supply purposes including irrigation, urban, commercial, industrial, stock intensive, aquaculture and stock/domestic. Visit [WaterPlanning](#) for more information.

Murray-Darling Basin Commission / Authority

The Murray Darling Basin Commission no longer exists. Functions of the previous Commission have been subsumed by the Murray-Darling Basin Authority. To find up to date information on the management of the Murray-Darling Basin please go to the Murray-Darling Basin Authority website This site can be found at <http://www.mdba.gov.au>

SRA - Sustainable Rivers Audit

The Murray-Darling Basin is a network of streams and rivers stretching from the Condamine in south east Queensland to the mouth of the Murray River in South Australia . What happens in one part of the Basin will impact on other parts and it is essential that we understand large scale changes to effectively manage the Basin's river resources. The Sustainable Rivers Audit is a program designed to measure the health of the rivers at this large Basin scale. SRA Report1 River Health check May 2008

Appendix 2

Strategies to improve Knowledge Management

Project Close-out Procedures

Legal Deposit (Australian Libraries)

A copy of any work must be deposited

Under section 201 of the *Copyright Act, 1968* and the *Queensland Libraries Act 1988*, a copy of any work

- book or
- periodical such as newsletter or annual report;
- map, plan, chart or table;
- a program, catalogue, brochure or pamphlet
- Includes material published in electronic format such as computer discs, CDs and DVDs

Published

- a work is deemed to be published if reproductions of the work or edition have been made available (by sale or otherwise) to the public;
- and in Queensland “reproductions of the material or edition have been supplied (sale or otherwise) to the general public”

in Australia must be deposited with the National Library of Australia and the appropriate State Library within 1 month of publication. Legal deposit of material is the sole responsibility of the publisher and extends to ... private individuals, associations and organisations.

Benefits include:

- Preservation of publications: works survive for the use of future generations
- Assisting research: records available through Libraries Australia (shared online national bibliographic database), EndNote and other search engines.
- Commercial and self-published work receive wide exposure

Procedure

One hard copy (best complete copy available) is to be forwarded within one month of publication to each of the following libraries.

Library Deposits (Queensland)
Resource Discovery Unit
State Library of Queensland
PO Box 3488
South Brisbane QLD 4101

Parliamentary Librarian
Parliamentary Library
Parliament House
George Street
Brisbane, QLD 4000

Legal Deposit Unit
National Library of Australia
Canberra, ACT 2600

**Appendix 3
State NRM DataHub Steering Committee Members**

Person	Position	Organisation
Fred Tromp (Chair)	Director, Regional NRM Programs	DERM
Phil Maher	Principal Project Officer	DERM
Andrew Drysdale	CEO	RGC
Michelle Hopgood	Regional Manager (Landscapes and Community Services)	DERM
Vicki Hall	Manager (State of Environment Reporting)	DERM
Steve Jones	Director (Environmental Information Systems Unit)	DERM
Richard Jefferies	Senior Advisor (GIS)	Main Roads
Alan Dale /Carol Sweatman	CEO /Business Manager	Terrain NRM
Geoff Penton	CEO	QMDC
Wayne Fry	Director	DERM
Greg Payne	Manager (Spatial and Scientific systems)	DERM
Phil Norman	Principal Scientist	DERM
Shane Marshall	Principal Advisor (Office of the Chief Information Officer)	DERM
Kirstin Kenyon (executive Support to the committee)	Principal Project Officer	DERM (NRW)

Appendix 4 – Northern Pilot Advisory Group Members

Organisation	Unit/Branch	Position
Torres Strait Regional Authority	Land & Sea Management Unit	Strategic Regional Facilitator
Cape York Sustainable Futures		
Cape York NRM Working Group -Cape York Marine Advisory Group -Cape York Landcare - South Cape York Catchments -Cape York Weeds and Feral Animals Program	South Cape York Catchments	Coordinator
Balkanu Cape York Development Corporation		
Balkanu Cape York Development Corporation	Balkanu Caring for Country Unit	Technical Advisor
Northern Gulf Resource Management Group		Tablelands Mapping Coordinator
Terrain NRM (FNQ)		Monitoring and Evaluation Coordinator
Terrain NRM (FNQ)		GIS Planner
Terrain NRM (FNQ)		Communications
Southern Gulf Catchments		Programs Manager
NQ Dry Tropics NRM		NRM Data Manager

Regional Organisation of Councils of Cape York & TI		Coordinator
Qld Regional NRM Groups Collective	Spatial Services	Manager, Spatial Services

FNQ Regional Organisation of Councils	Natural Asset Management Advisory Committee	Regional Natural Asset Management Coordinator
Tablelands Regional Council	Atherton Tablelands Geographic Information Services (ATGIS)	GIS Coordinator
AgForce	AgForce North (East)	Regional Manager
James Cook University	School of Earth and Environmental Sciences	Technical Officer – Cartography
Tropical Savannas CRC		Biodiversity Information Officer
Herbert Resource Information Centre		Centre Manager
Carpentaria Land Council Aboriginal Corporation		
Girringun Aboriginal Corporation		Cultural Heritage and Spatial Information Manager
Reef and Rainforest Research Centre		Research and Spatial Systems Director
CSIRO	Sustainable Ecosystems	Senior Research Scientist/Planner
CSIRO	Sustainable Ecosystems	Spatial Analyst
CSIRO	Sustainable Ecosystems	

Queensland Treasury	Office of Economic and Statistical Research (FNQ)	Senior Statistician and Regional Liaison Officer
Qld Dept Infrastructure & Planning	Local Govt - FNQ Region	
Qld Dept Infrastructure & Planning	Local Govt- NQ Region	
Qld Dept Infrastructure & Planning	Northern Region Division, Planning Group	Senior Planner
Qld Dept Infrastructure & Planning	Northern Region Division Planning Group	A/Manager
Qld Dept Infrastructure & Planning	Infrastructure & Planning	Regional Manager
Qld Dept Transport & Main Roads	Main Roads	Senior Spatial Scientist
Qld Dept Environment & Resource Management		Regional Manager (North)
Qld Dept Environment & Resource Management		Senior Spatial Information Officer
Qld Dept Environment & Resource Management		
Qld Dept Employment, Economic Development & Innovation	Mining Industry Liaison Unit - Northern Region	Manager
Qld Dept Employment, Economic Development & Innovation	Mining Industry Liaison Unit - Northern Region	Senior Spatial Information Officer
Queensland Fire and Rescue Service	Rural Operations, Far Northern Region	Area Director, Cairns/Peninsula