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# Natural resource spatial information assessing user needs

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# Natural resource spatial information: assessing user-needs

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RESOURCE MANAGEMENT TECHNICAL REPORT 357

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# Acknowledgments

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Last, but no means least, I would like to thank my colleagues in the Central Agricultural Region who have been participated at the workshops and completed the survey questionnaire.

# Summary

A wide range of mapped (spatial) natural resource issues and information—such as soil landscape mapping, soil landscape degradation hazards, native vegetation, wetlands, and hydrology—has been made available in various forms in recent years.

A survey of regionally based Department of Agriculture and Food development, research and technical officers was undertaken in June 2009 to identify gaps in the availability, accessibility of spatial NRM information. The survey also identified the ways in which spatial NRM information is used by these officers.

Survey questions were developed in conjunction with the members of the Central Agricultural Region NRM project. Interactive workshops were delivered in which the following questions responded to by a total of 33 officers based in Narrogin (9 people), Merredin (13 people) and Northam (11 people). Thirty (91 per cent) out of the 33 attendees completed or partially completed the questionaries.

The spatial natural resource information was not used much, though this is an important tool for a variety of project needs, ranging from paddock level assessments to broad scale regional land use planning. Nevertheless, soils information and the associated land degradation risks, aerial photos and property information are accessed most frequently.

# 1. Introduction

Members of the Central Agricultural Region NRM project (CAR NRM) identified situations in which departmental staff either did not use available spatial resource information or did not have access to spatial information that would have improved their analyses of problems or opportunities. As a rule, NRM managers believe that spatial information needs to be used in making well informed decisions about land and other resource use, and not using this information will lead to sub-optimal outcomes. Therefore, we planned to ask managers and their staff about their use and preferences for content and delivery of spatial resource information.

This paper outlines the results of a survey done in June 2009, of staff that do or could use spatial resource information in their work.

# 2. Survey purpose

The purpose of this survey was to identify:

- the level of experience of regional officers in the use of spatial NRM information, in particular, access and use of the information available of the SLIP NRM Info interface
- the unmet need for spatial resource information
- preferences for delivery of spatial resource information.

# 3. Survey methodology

Survey questions were developed in conjunction with the members of the Central Agricultural Region NRM (CAR NRM) project. Then interactive workshops were delivered in which attendees answered the survey questions. Workshops were held in Narrogin (9 people), Merredin (13 people) and Northam (11 people). Thirty (91 per cent) of the 33 total attendees completed or partially completed the questionaries.

# 4. Key findings

The key findings were:

- The mapped natural resource web information was not used much, though this is an important tool for a variety of project needs, ranging from paddock level assessments to broad scale regional land use planning.
- Soils information and the associated land degradation risks, aerial photos and property information are accessed most frequently.
- The online ‘NRM Info’ interface is a good entry point for officers to get snapshots of information, though is limited in its capability to provide detailed levels of analysis.
- Some users of ‘NRM Info’ said that the interface and ability too analyse information did not meet their needs.

# 5. The key recommendations

The key recommendations from this survey include:

- Increase awareness of the available datasets and how to access them, and the limitations/legalities of their use.
- Consider the different needs and level of skill of regional officers in accessing spatial information by creating different levels of access to datasets through the existing interface, perhaps linked to training competencies. This would have the effect of increasing the competency of the region in the use of GIS and spatial information.
- Create a series of quality assured, standardised queries or common use analyses for use by regional officers. Make these available to all staff through Agweb or the DAFWA webpage.
- Mapping information at paddock/farm scale is necessary for effective and productive use.

# 6. Results

## 6.1 Level of experience and current use of spatial information

**Q1. Have you ever used mapped (spatial) information for Natural Resource Management?** If yes, please list what and explain how, including the effectiveness. If no, please explain why.

***Summary:*** *In total there were 30 respondents. The majority of respondents used soil mapping information (63 per cent), aerial/satellite photos (53 per cent) and property information (50 per cent). The table below shows the overall responses in descending order.*

Table 1 **The spatial information currently used by respondents**

| Sl no. | Information currently used by respondents | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Soil maps for the region/shire | 19 | 63 |
| 2 | Aerial photos and satellite images | 16 | 53 |
| 3 | Property/parcel information for farm address/owner, roads and location | 15 | 50 |
| 4 | Common soils issues for an area (such as salinity, wind erosion, compaction, waterlogging) | 11 | 37 |
| 5 | Basic maps of selected property (such as property boundary map) | 10 | 33 |
| 6 | Vegetation maps and NDVI | 6 | 20 |
| 7 | Contours maps (DEM) and catchment hydrology | 5 | 17 |
| 8 | Ground water and surface water information | 5 | 17 |
| 9 | Background information for selected trial/monitoring sites (such as soil properties, crop, pasture and vegetation) | 4 | 13 |
| 10 | Locust information for locust campaigns/survey | 4 | 13 |
| 11 | Land capability maps for selected area | 3 | 10 |
| 12 | Weather information for specific location and patch point dataset | 2 | 7 |

## 6.2 The ways in which spatial information could be used

**Q2. What questions are you trying to answer through your work; and how might mapped information help you answer those questions?** For example, you may be interested in what soils types occur in a study area—and want to know where they are and if there are any management hazards associated with them.

***Summary:*** *The majority of respondents were attempting to find information with regard to soils and the associated risk information for the region (77 per cent) followed by characteristics of local soils to check the suitability for cropping/pasture/farm forestry (57 per cent) and property ownership (27 per cent). The table below shows the overall responses in descending order.*

Table 2 **The question that respondents try to get an answer through their work**

| Sl no. | The question that respondents try to get an answer through their work | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Soils and associate risks (such as soil pH, salinity, wind erosion, compaction, waterlogging, etc.) for the region | 23 | 77 |
| 2 | Characteristics of local soils to check the suitability for cropping, pasture and farm forestry | 17 | 57 |
| 3 | Property ownership—so can talk/contact to relevant parties | 8 | 27 |
| 4 | Land use and trend of property sizes in an area | 7 | 23 |
| 5 | Pest and diseases information—survey, risk, spread, resistance, etc. | 5 | 17 |
| 6 | Climate change impacts and biodiversity | 5 | 17 |
| 7 | Surface/ground water availability and trend for the catchment, shire, district, region | 4 | 13 |
| 8 | Site suitability for earthworks (such as grade banks, drains, dams) | 3 | 10 |
| 9 | Contour maps for determining catchment/dam sizes | 3 | 10 |
| 10 | Analysis of natural resources assets and threats | 3 | 10 |
| 11 | Investment and project information—who is doing what | 2 | 7 |
| 12 | Priority agricultural land by shire or district, where does this intersect with other datasets (population) | 2 | 7 |
| 13 | Infrastructure (such as roads, pipes, power) and demographic information for regional development | 2 | 7 |
| 14 | Rainfall distribution and patterns for yield map by shire/district | 2 | 7 |

**Q3. What type of mapped Natural Resource information do you think would be useful to you and your colleagues in the Central Agricultural Region?** Please list as many types of information (topics, themes, resources, etc.) as you want.

***Summary:*** *The majority of respondents (70 per cent) considered mapped information of the soil hazard and risks and extent for the region (such as acidity, salinity, wind erosion, etc.) would be useful to them and their colleagues in the Central Agricultural Region. The table below shows the overall responses in descending order.*

Table 3 **The spatial information of use by the attendees in the CAR**

| Sl no. | Information of use to agency staff in the CAR | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Soil hazards and risks and extent for the region—acidity, salinity, wind erosion | 21 | 70 |
| 2 | Soil maps/DEM and soil characteristics at farm/paddock scale | 19 | 63 |
| 3 | Water resources information including groundwater level | 15 | 50 |
| 4 | Vegetation, land clearing history and agro forestry information | 14 | 47 |
| 5 | Property/parcel boundaries and land ownership information | 13 | 43 |
| 6 | Biosecurity and associate risks including weeds | 12 | 40 |
| 7 | Priority agricultural land mapping to identify target area for cropping or perennial pasture and land use information | 11 | 37 |
| 8 | Land capability and sustainability for—industrial development, intensive livestock, tree crop, horticulture, dryland cropping, perennial pasture, saltland pasture | 9 | 30 |
| 9 | Linked available publications/reports, datasets and census | 8 | 27 |
| 10 | Climate and weather information | 7 | 23 |
| 11 | Locations for on ground agricultural and natural resource management projects | 5 | 17 |

### *6.2.1 Other information that attendees want:*

- Social information—population, infrastructure (water, roads, rail)
- Economic information—production value/estimated yields from land, land values
- Proposals under assessment by EPA
- Power supply and existing powerlines information
- Local planning strategies/schemes being developed/reviewed.

## 6.3 Desired medium to access spatial information

**Q4. In what format or medium would you prefer NRM information?** This may be in the form of spreadsheets and charts, direct access to data or GIS layers, maps and on-line interactive systems. Please explain your preference.

***Summary:*** *The majority of respondents (70 per cent) prefer an on-line interactive system with an analytical function. The table below shows the overall responses in descending order.*

Table 4 **The format/medium preferred by the despondences in the CAR**

| Sl no. | The format/medium preferred by agency staff in the CAR | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | On-line interactive system with analytical function | 21 | 70 |
| 2 | Printable maps with a choice of reporting formats and embedded reports | 17 | 57 |
| 3 | Direct access to datasets including a download function for offline use | 16 | 53 |
| 4 | Spreadsheets and charts to present results/reports | 13 | 43 |
| 5 | Layers of information that can be overlain on photos/DEM | 7 | 23 |
| 6 | Background information on datasets and data linked to the geographic points | 6 | 20 |
| 7 | GeoMedia currently used by GIS team, but ArcGIS might be easy to use for other staff | 4 | 13 |

## 6.4 Level of analysis and complexity

**Q5. What level of analysis is required of the information? Do you need to combine layers of information—such as native vegetation by shire or catchment?**

***Summary:*** *The majority of respondents would prefer paddock/farm scale (77 per cent) and combined layers of mapped information (70 per cent). The table below shows all responses in descending order.*

Table 5 **The levels of analysis required by the respondents**

| Sl no. | The levels of analysis required by the respondents | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Farm/paddock scale information on soils, vegetations and land use | 23 | 77 |
| 2 | Combining layers of information by shire/catchment (such as wind erosion risk by soil types, soil types overlay on soil pH/vegetation, etc.) | 21 | 70 |
| 3 | Trends over time and by geographic boundary (such as property maps over time for a shire, land use change over time by shire, etc.) | 10 | 33 |
| 4 | High level of analysis—spatial queries, intersections, digitising, creation of thematic maps, etc. | 9 | 30 |
| 5 | Images (MODIS) and NDVI by shire | 5 | 17 |
| 6 | Crop production information by shire | 2 | 7 |

## 6.5 The strengths and weaknesses of the current mechanisms

### Q6. Please list the strengths and weaknesses of the current mechanisms through which this information is available.

***Summary:*** *The majority of respondents thought there was a great amount and variety of information available (37 per cent) through current mechanisms; though the online NRM Info system was considered very slow (57 per cent). Listed below are the strengths and weaknesses of the current mechanisms through which this information is available in descending order.*

Table 6 **The strengths of the current mechanisms identify by respondents**

***A. Strengths of the current mechanisms***

| Sl no. | The strengths of the current mechanisms identify by respondents | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Great amount and variety of information is available | 11 | 37 |
| 2 | Easy to use, specialist skills not required | 7 | 23 |
| 3 | Good will of GIS team and commitment to improve | 5 | 17 |
| 4 | Fantastic for NRM and great that this now exists | 4 | 13 |
| 5 | Provides a snapshot of datasets when required | 2 | 7 |
| 6 | Very productive but need to think about DAFWA policies to govern its use | 2 | 7 |
| 7 | Good aerial views and able to access externally | 2 | 7 |

***B. Weaknesses of the current mechanisms***

| Sl no. | The weaknesses of the current mechanisms identify by respondents | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | On-line system is very slow (NRM Info) | 17 | 57 |
| 2 | Not interactive and not able to manipulate or generate data/maps for specific areas | 13 | 43 |
| 3 | Very generic/static information and poor metadata | 10 | 33 |
| 4 | Sometimes very difficult to find out the most basic information and has no analysis capability | 9 | 30 |
| 5 | It does not provide farm/paddock scale information | 8 | 27 |
| 6 | Lack of staff knowledge about what's available | 4 | 13 |
| 7 | Map products get out of date quickly and difficult to trace origins of map | 4 | 13 |
| 8 | Aerial photos often have big white lines where maps do not overlap and often get error messages | 3 | 10 |
| 9 | Legends are not clear and weak reporting (?) | 2 | 7 |
| 10 | Need some sort of QA and review process on output | 2 | 7 |
| 11 | Level of interpretation still required—who do you contact for help? | 1 | 3 |

## 6.6 Other comments and suggestions

**Q7. Please add any additional suggestions or comments on how we can more effectively deliver mapped NRM information to you.**

***Summary:*** *The majority of respondents (37 per cent) were thinking we need to raise the awareness of available mapped NRM information and dataset. The table below shows the overall responses in a descending way.*

Table 7 **General comments and suggestions by the respondents on how we can more effectively deliver mapped NRM information**

| Sl no. | General comments and suggestions by the respondents on how we can more effectively deliver mapped NRM information | Frequency of responses | Percentages of responses (%) |
|---|---|---|---|
| 1 | Need to raise awareness about what datasets are out there, their use and limitations | 11 | 37 |
| 2 | Make it simple and access to higher speeds | 10 | 33 |
| 3 | Organise training program for new user | 6 | 20 |
| 4 | Develop standardised queries or intersections for NRM and related information, make these available on the web, and update regularly if required | 6 | 20 |
| 5 | We need mapping information at property level/farm scale | 5 | 17 |
| 6 | Take advantage of strengths and fix weakness | 3 | 10 |
| 7 | Provide a list of dataset and basic instruction | 2 | 7 |
| 8 | Divert money from industry R&D to this as a program | 2 | 7 |
| 9 | ArcGIS may be easy to use for general user | 2 | 7 |
| 10 | Glossary of items/directory for NRM info could be useful | 2 | 7 |

# 7. Points discussed at the workshops

- Usefulness of 'NRM Info' interface is generally low because it doesn't give ability to analyse and present tabular information.
- A significant problem cited by officers was gaining access to datasets including metadata (custodian, how up to date are they) and being aware of analysis that has already been undertaken to prevent "reinvention of the wheel".
- The SLIP NRM Info web interface was deemed useful to get snapshots of basic information. Google Earth is a good way to quickly view a landscape/aerial photos.
- ArcGIS/GeoMedia is required for more detailed analysis but requires technical knowledge and training/support.
- Landgate/WALLIS is useful but very generalised.
- Inspection, Quarantine and Compliance (IQC) interface is good but can be continuously improved.

# 8. Appendices

**Appendix 1:** Assessment Form

**Appendix 2:** List of questions asked and responses

**Appendix 3:** Spatial NRM information user-needs table

# Appendix 1. Assessment Form

A wide range of mapped (spatial) natural resource issues and information—such as soil landscape mapping, soil landscape degradation hazards, native vegetation, wetlands, and hydrology—has been made available in various forms in recent years. These are accessible internally as GIS layers, through on-line facilities (such as the portal @ http://spatial.agric.wa.gov.au/slip) and, more recently, as on-line data services—layers available to desktop applications such as Google Earth.

The NRM and Information Services divisions are now looking a new opportunities to improve the use of this information. To help us improve the delivery and use of NRM mapping information that will meet your needs, please complete the following questionnaire.

1. **Have you ever used mapped (spatial) information for Natural Resource Management?** If yes, please list what and explain how, including the effectiveness. If no, please explain why.

2. **What questions are you trying to answer through your work; and how might mapped information help you answer those questions?** For example, you may be interested in what soils types occur in a study area—and want to know where they are and if there are any management hazards associated with them.

3. **What type of mapped Natural Resource information do you think would be useful to you and your colleagues in the Central Agricultural Region?** Please list as many types of information (topics, themes, resources, etc.) as you want.

4. **In what format or medium would you prefer NRM information?** This may be in the form of spreadsheets and charts, direct access to data or GIS layers, maps and on-line interactive systems. Please explain your preference.

5. **What level of analysis might you need to do with the information? Do you need to combine layers of information—such as native vegetation by shire or catchment?**

**6. Please list the strengths and weaknesses of the current mechanisms through which this information is available.**

**7. Please add any additional suggestions or comments on how we can more effectively deliver mapped NRM information to you.**

**8. Please provide your Name and contact address (optional).**

**9. Would you be prepared to work with the Central Agricultural Region NRM project to improve presentation and usefulness of spatial information?**

If you are, please contact Dr Shahab Pathan on 9881 0227 or shahab.pathan@agric.wa.gov.au

*Thank you for your time and feedback*

# Appendix 2. List of questions asked and responses

The following questionaries have been asked and completed by the regional staff through three interactive workshops organised at each DAFWA district office in the Central Agricultural Region. Below is a list of collected information.

**Q1. Have you ever used mapped (spatial) information for Natural Resource Management?** If yes, please list what and explain how, including the effectiveness. If no, please explain why.

**List of spatial information that currently used by respondents:**

- Aerial photos/satellite images for selected area/property boundary
- Soil landscape mapping and degradation hazards
- Local soil types for crop and pasture varieties
- Common soil issues for an area
- Salinity risk maps
- Land capability for selected area
- Background information for trials site such as soil types, vegetation, aerial photos, etc.
- Contours maps
- Vegetation and soil maps
- DoW water info
- Ground water and surface water information
- Property and parcel information for farm address, roads and location
- Determining water catchment size and digitising dams
- Identify monitoring sites/locations
- Property database to identify owner/manager of particular property
- Produce basic maps of property boundary
- Investigation of land degradation complaints
- Wetlands information
- Prepared and published maps
- Locust information for locust campaigns/survey
- IQC interface for inspection data
- Rainfall data for specific location—patch point dataset
- Climate and weather information
- Water info for farm water audit
- Small Landholder Services info

**Q2. What questions are you trying to answer through your work; and how might mapped information help you answer those questions?** For example, you may be interested in what soils types occur in a study area—and want to know where they are and if there are any management hazards associated with them.

**The question that respondents try to get an answer through their work:**

- Soils maps and associate risks (such as salinity, wind erosion, waterlogging, etc.) for the region
- Soils maps for RCM project works (such as soil pH, wind erosion, etc.)
- Wind erosion risk by soil types
- Area of compact soil and acid soil for the region
- Local soil characteristics at property/farm scale—suitability for cropping and pasture
- Land capability information for variety of crop and pasture, and where are non productive soils located
- Local soils info for Field Day preparation and presentation
- Priority areas for us to work in various NRM issues (such as salinity, wind erosion, etc.)
- Climate change impacts and biodiversity
- Sandplain aquifer size
- Information on regional development—roads, pipes, power, demographic, etc.
- Property ownership—so we can talk to relevant parties about biosecurity issues
- Relative activities to see who is doing what
- Analysis of natural resources assets and threats
- Access to regional reports, research, cost studies
- Drainage information—current, proposed
- Weeds in formation—survey, risk, spread, resistance, etc.
- Reserve and land ownership info
- Tree species for specific soil types
- Up-to-date areal photographs of properties and what is the trend for property sizes in an area
- Site suitability for earthworks such as grade banks, drains, dams
- Contour maps for determining catchment sizes
- District rainfall distribution and patterns for yield map
- What land degradation hazards exist for a defined area—paddock, property, catchment, shire, region
- Intersections of degradation hazards with other datasets (roads, properties, parcels, vegetation, agricultural land, shire boundaries)
- Rainfall data/maps by shire
- What is the availability of water via piped scheme water
- What is the potential for surface or ground water in the catchment, shire, district, region
- What is the groundwater trend for this region, catchment
- Where is priority agricultural land in the district, where does this intersect with other datasets (population)
- What is the land used for in a certain area, how does it relate to water availability, road and rail, distance to towns, etc.

- Where do areas of wind erosion risk correspond to wind strength
- Waterways and creek lines info

**Q3. What type of mapped Natural Resource information do you think would be useful to you and your colleagues in the Central Agricultural Region?** Please list as many types of information (topics, themes, resources, etc.) as you want.

**The following spatial NRM information would be useful to agency staff in the Central Agricultural Region:**

- Property and parcel sizes, land ownership information
- Soil maps and characteristics at farm/paddock scale
- Land capability and sustainability for—industrial development, intensive livestock, tree crop, horticulture, dryland cropping, perennial pasture, saltland pasture
- Priority agricultural land mapping to identify target area for cropping or perennial pasture
- Regional wind erosions area and saline land
- Salinity and acid soils in eastern wheatbelt
- Soil hazardous risks for the region—acidity, salinity, wind erosion, etc.
- Weather and climate information
- Crop production data by shire
- Land clearing history
- Subcatchment boundaries
- Historic NRM project locations such as trial sandalwood trial by FPC 2007
- Thematic mapping info on 1080 risk
- Regional and local water resources
- Major catchment delineations
- Surface water potential and water supply
- Groundwater levels for bores
- Land use information (either local government planning schemes, or by enterprise)
- Salinity risk and extent
- Salt affected area for the CAR
- Wind erosion risk area
- Wind and dust information
- Surface water monitoring
- DEM/contours maps
- Linked in with ABS survey/census for lime use by area/region/grid
- Frost information
- Surface water landscapes (shedding and receiving areas)
- Soil moisture levels and PAW
- Native tree species
- Remnant vegetation and agro forestry info
- Location of groundwater drains
- Clearing permits
- Water resource mapping (all water resources)

- Wetlands and waterways
- Geophysical information
- Locations for on ground agricultural and natural resource management projects
- A set of maps for each Shire outlining degradation hazards
- Link info about available publications/reports
- Social information—population, infrastructure (water, roads, rail)
- Economic information—production value/estimated yields from land, land values
- Proposals under assessment by EPA
- Power supply and existing powerlines info
- Local planning strategies/schemes being developed/reviewed

**Q4. In what format or medium would you prefer NRM information?** This may be in the form of spreadsheets and charts, direct access to data or GIS layers, maps and on-line interactive systems. Please explain your preference.

**The following format/medium is preferred by the respondents:**

- Direct access to data and GIS layers with analysis function
- Access to data including downloadable so that can be used offline
- On-line printable data as charts for usual presentation
- Maps and on-line Interactive system with a choice of reporting formats and embedded reports
- Interactive GIS and able to digitise trial plots location
- Need background information on NRM data
- Data linked to the geographic point
- On-line interactive system to interrogate datasets
- Maps and online interactive systems might be useful for some layers of information that are updated continually (like water monitoring, drainage, clearing, etc.)
- Data and report by catchment and shire
- The system needs to cope with acc formats including open source product such as grass
- Having a set of datasets tailored to my use would be ideal. I also need someone to refer to if I believe I need a further dataset, or an updated version.
- Spreadsheets and charts to present results/reports
- Ability to save what you looking at
- An online system could have a set of “standard queries” flexible enough to be applied at different scales—i.e. for parcels, properties, catchments, your own delineation, shires, etc.
- GeoMedia is currently used by GIS team, but I think ArcviewGIS might be easy to use for other staff

**Q5. What level of analysis might you need to do with the information? Do you need to combine layers of information—such as native vegetation by shire or catchment?**

**The levels of analysis required by the respondents:**

- High level of analysis—spatial queries and intersections, geometry analysis (areas, distance, etc.), digitising, catchment delineation, aggregations, buffer zones, creation of thematic maps (i.e. a map showing properties of varying sizes, etc.)

- Trends over time and by geographic boundary—comparison of aerial photographs and property maps over time for a shire—to indicate land use change over time
- Combining layers of information on a catchment/shire basis would be very useful
- Ability to add external information (data layers) to current information
- Soils and vegetation information at property level/farm scale
- Paddock scale info would be more useful
- Soil types overlay on water table
- Wind erosion risk by soil types
- Soil types overlay on soil pH/vegetation/land use, etc.
- Native vegetation by shire
- Land clearing history overlay vegetation/groundwater level/salt area
- Geology overlay DEM/soils/catchments
- Vegetation overlay soil/salt/pH
- Wetlands/salinity information by shire
- Information on what database exist so we can determine it may be useful for analysis
- Crop production information by shire
- The highest level of analysis would be the best as sometimes complex questions are required
- Point data, representativeness of point in landscape
- Images (MODIS), NDVI, surface temperature, soils by Ag area/region

**Q6. Please list the strengths and weaknesses of the current mechanisms through which this information is available.**

**The strengths and weaknesses of the current mechanisms through which this information is available identified by the respondents:**

| Strengths | Weaknesses |
|---|---|
| Easy to use, specialist skills not required | 'NRM Info' interfaces is poor and very slow |
| Zooming in and out are very easy but slow | Legends are not clear |
| Provides a snapshot of datasets when required | It does not provide paddock scale information |
| Good aerial views | Does not provide soil data to 6 m depth |
| Good will of Damian S and his team | Not interactive and cannot able to manipulate or generate data/map |
| Commitment to improve | No control over data presentation such as colour, symbols, legend placement, etc. |
| Drop down interface list looks good | Has no analysis and weak reporting |
| Great amount and variety of data | It doesn't give the opportunity to pose questions based on the various datasets |
| IQC interface is good | Difficult to use and can't run queries |
| Very productive but need to think about DAFWA policies to govern its use | Based on dodgy data and very slow |
| Able to access externally | Sometimes very difficult to find out the most basic information |
| Lot of information is available from so many sources | Map polygons are very broad—not at farm scale |
| Good local support | Lack of staff knowledge about what's available |
| Fantastic too for NRM and need to improve | Poor metadata collection |
| Great that this now exists | Trouble accessing and locating datasets |
| | Very generic and static information |
| | Limited level of analysis is possible |
| | Cannot intersect and overlay datasets |
| | Cannot create your own datasets, or contribute/access certain information (password protected site?) |
| | Data formats are sometimes incompatible with other applications |
| | Web based means internet connection must be fast |
| | Complicity of finding the data that we want and knowing the limitations of that information |
| | Level of interpretation still required—who do you contact for help? |
| | Data outdated and can be hard to use |
| | Does not meet the demand and requirements |
| | Does not include regionally linked reports, data, etc. |
| | Map products get out of date quickly and difficult to trace origins of map |
| | Need some sort of QA and review process on output |
| | Aerial photos often have big white line at bottom of maps |
| | Often get error messages |

**Q7. Please add any additional suggestions or comments on how we can more effectively deliver mapped NRM information to you.**

**General comments and suggestions by the respondents on how we can more effectively deliver mapped NRM information:**

- Make it simple and easy to use
- Access to higher speeds
- Make it user friendly and faster
- We need mapping information at property level/farm scale
- Take advantage of strengths and fix weakness
- Take care of all problems discussed in this seminar
- Possibly add list of people to discuss problems with
- Provide a list of dataset and basic instruction
- Need to raise awareness about what datasets are out there, their use and limitations
- Be open about existing support and systems (who, what, where, how)
- Provide a system of support for users—could be a one stop shop for information requirements, a list of contacts to help interpret information, or build up skills in interpretation using existing networks
- Organise training program for new user
- Regular contact and update on what available
- Develop processes or systems to enable a search on products or analyses that have been undertaken for certain topics
- Develop standardised queries or intersections for NRM and related information, make these available on the web, and update regularly if required
- Explore how NRM information integrates with economic and social information
- Divert money from industry R&D to this as a program
- Mapping information could be available on CD
- ArcView GIS may be easy to use for general user
- Glossary of items/directory for NRM info could be useful

**Q.8. Please provide your name and contact address (optional).**

Name: _____

Address: _____

**Attendees:**

- Merredin – 13
- Northam – 11
- Narrogin – 9

**Q9. Would you be prepared to work with the Central Agricultural Region NRM project to improve presentation and usefulness of spatial information?**

If you are, please contact Dr Shahab Pathan on 9881 0227 or shahab.pathan@agric.wa.gov.au

**The following people are interested to follow-up the outcome of the project:**

David Bicknell, Renee Manning, Glenice Batchelor, Damian Priest, Rosemary Smith, Ric Sutton, Kara Hatch, Doug Abrecht, Pam I'anson, Rebecca Heath and Trevor Lacey

# Appendix 3. Spatial NRM information user-needs table

| User group and their characteristics | What do they want/need from us? (Or if different—What do we think they *should* need from us?) What questions are they asking? How are they using it? |
|---|---|
| **Regional DAFWA staff**<br>(specialist and non-specialist)<br>• Have range of skills and knowledge regarding datasets and GIS applications.<br>• Staffs have different levels of awareness and capability of the datasets or have access to, or even how their data can contribute to value adding datasets.<br>• Have varying levels of knowledge and skill regarding the systems used to display and analyse datasets.<br>• Intellectual capacity exists within region—need time to train and learn, with support from CRIS.<br>• Different levels of usage of NRM information require different skills and systems.<br>• High levels of skills and knowledge in technical resource based fields—landscape water management, soils, hydrology, trees, modelling.<br>• Building better relationships with GIS officers may help build the skill set within regional areas.<br>• Well connected with next users. | • Natural resource condition, trends and reports with interactive web mapping patrol.<br>• Resource threats information and data with trends and targets (such as climate change, salinity, wind erosion, sub-soil acidity, waterlogging, sub-soil compaction, etc.).<br>• Soil-landscape maps and description of specific soil groups/types.<br>• Overlay soil maps with other NRM information (such as productive saltland, wind erosion risk, sub-soil acidity, sub-soil compaction, etc.).<br>• Agricultural land resource values and ratings.<br>• Land capability mapping and suitability analysis with data for all common agricultural, horticultural land uses.<br>• Priority agricultural land mapping and data for key land uses.<br>• Technical information for detailed assessment report and methodology.<br>• Direct access to dataset/interface can play with it.<br>• Property parcel information with infrastructure (such as power, transport, water schemes, towns, industry, bulk storage, etc.).<br>• Groundwater and surface water mapping, condition, trends and use.<br>• Natural reserves and biodiversity.<br>• Policy, regulations (including long-term development plans), technical reports and other publications.<br>• Regional NRM and shire boundaries (not just catchment boundaries).<br>• Demographics data and technical/research reports. |
| ***Other regional NRM and non NRM DAFWA staff**<br>• Have a lower awareness of NRM datasets and the analytical capability GIS systems afford.<br>• These staff are analysts of farming systems and therefore require access to not only agricultural production datasets, but a wide range of economic, environmental and social information.<br>• Might be searching for a static interface—need to determine their needs.<br>• High level of knowledge in technical fields—livestock and cropping systems, weeds, biosecurity, engineering.<br>• Some have access to desktop GIS—perhaps more in-time. | • To undertake meaningful analysis of datasets when investigating issues—find trends to highlight risks and opportunities to management/other projects/clients.<br>• To work with other 'analysts' to make sense of datasets and to add value to their own analysis.<br>• Maps of priority agricultural land to inform planning and industry groups (industry, NRM).<br>• How NRM risk translates into economic impact (industry/NRM).<br>• Access to historical datasets over time periods—to identify change over time/trends.<br>• Spatially available enterprise or management information, including location of related agri-food industries.<br>• Training if required and key contacts/support from spatial experts.<br>• Centrally located analyses 'products' —i.e. maps, tables, databases, to prevent reinvention.<br>• May want to access to internal corporate dataset. |

| User group and their characteristics | What do they want/need from us? (Or if different—What do we think they *should* need from us?) What questions are they asking? How are they using it? |
|---|---|
| **Program and project managers for planning (DAFWA)/Project managers and staff for project operations (DAFWA)**<br>• Most don't have time to use full desktop GIS<br>• Varying levels of interest in the detail of spatial analysis, looking for something quick and influential. | • Want readily accessible and updateable series of analyses for their project<br>• Want quick access to mapping products (regional and district overview) and statistics on key issues (need both current and historical).<br>• Identification and presentation of key issues of importance to their regions/projects. |
| ***Local Govt, DPI, ROCs (including Shire land use planners)**<br>• High influence in achieving on ground outcomes through planning.<br>• Seeking quickly accessible and interpretable information.<br>• Range of analytical and technical skills, lack of 'professional planners' in the region.<br>• Potentially good local and regional knowledge of economic, social and natural system interactions.<br>• Local capability is highly variable (particularly for regional offices)—most have no, or very limited, desktop GIS.<br>• Internet access and communications can also be a problem. | • Map portal for exploring data and answering key questions/generating simple maps (salinity, rare and threatened flora and fauna, threatened ecological communities, wetlands, reserves and tenure. For example, *WALIS Regional workshops and SLIP NRM workshops, Data and geospatial product requests.*<br>• Want to access GIS data in various formats.<br>• Land capability maps and reports. Important issues are subdivision for rural residential and increases in tree plantations sterilising land in their shire. (Land capability has not helped them as much as they had hoped).<br>• They want priority agricultural areas (or something similar) and/or specific policy that is defensible in planning appeals, etc. linked to specific areas or regions. (which has resulted in our current drive for PAL mapping).<br>• Priority agricultural and priority environmental areas for protection, how does this relate to our current land subdivision and lot size?<br>• A filter for the plethora of information—want info that relates to their immediate patch (and region)—need a way to process all that information into something manageable.<br>• A one stop shop for economic, NRM, social data—an 'atlas' of information.<br>• Rates of parcel division/amalgamation (industry)—social and economic impacts on community, impact on land stewardship.<br>• Where are the NRM risk areas in our region/Shire—flood levels, areas of salinity—potential for production, and wind or water erosion risk? How can we plan our region to minimise the impact of these risks on the environment, the economy and our people?<br>• What land has potential for further economic development—land—solar, wind, raw materials, water, biodiversity, carbon, agroforestry? |
| ***Consultants and contractors for NRM activities (e.g. GHD, non-land use planners, engineers, earthworks)**<br>• Potentially high level technical and analytical skills.<br>• Have their own GIS systems and fast internet access. | • Property maps, access to geospatial data in various formats. Map portal for exploring data and answering key questions / generating simple maps (salinity, rare and threatened flora and fauna, threatened ecological communities, wetlands, reserves and tenure). For example, *Data and geospatial data requests, presentations to Environmental Consultants Association and WALIS Forum.*<br>• Access to datasets, but also a process to interpret and apply to their project work.<br>• Many are simply looking for land capability information that can be used to assist the development proposal or subdivision they have been contracted to help with. Those involved in more strategic regional planning often have the opposite objectives, and want to mark out high capability land and land with degradation issues. |

| User group and their characteristics | What do they want/need from us? (Or if different—What do we think they *should* need from us?) What questions are they asking? How are they using it? |
|---|---|
| **Farm consultant and land use planners**<br>• Potentially high level technical and analytical skills.<br>• Lack of regionally or locally specific knowledge.<br>• Highly influential in the process of using data to aid planning decisions.<br>• Many have access to desktop GIS, and fast internet access. | • Access to geospatial data in various formats—'point of truth' data (rather than searching through piles of metadata), summary statistics. For example, *Data and geospatial product requests.*<br>• Information the opportunities for proactive and positive development/growth in the region/Shire?<br>• Want regional/subregional land capability and soil information, but also more technical information such as soil water properties as input data for yield prophet. |
| **Regional NRM Councils**<br>• Range of skills in spatial analysis.<br>• Internet access is variable, but reasonable in larger regional offices. | • Access to geospatial data in various formats—'point of truth' data (rather than searching through piles of metadata), summary statistics. For example, *Regional Spatial Data Management Council*<br>• Interested in catchment/sub catchment level information. |
| **Individual farmers**<br>• Very diverse skills.<br>• Virtually no desktop mapping capability—although some use farm planning software that incorporates some mapping.<br>• Time poor—some don't have much time to use map portals. | • Simple and fast maps—static maps ok. Looking for climate and season forecasts and near real time tracking. For example, *WALIS Agriculture Group (WALIS Advisory Group Working Group)*<br>• Anything else needs to be farm scale (soil maps, threats, etc.).<br>• Interested in small scale situations. |
| **Farmer producer/grower groups (Facey, Liebe, etc.)**<br>• As above—some groups have employees with higher level specialist skills | • Similar to previous—farm scale satellite imagery interpreted as production (pasture and crop growth), summary statistics. For example, *Meetings with Kondinin Group and small farmer cropping groups (e.g. Corrigin Farm Improvement Group)*<br>• NRM risk maps of their "groups" catchment areas, how this relates to production loss, identification of areas to target R&D. |
| **NRMO's and other 'next users'**<br>• Mostly generalist NRM practitioners<br>• They are on the ground, well connected with other NRMOs and individual farmers, farmer groups and Shires<br>• Many have desktop GIS, but may not have much training, or be able to use this very effectively. Support arrangements from Local Government, Regional NRM Group or other sponsors are highly variable. Poor internet access in many offices. | • Farm maps for on-site visits. Orientation maps when starting-out in a new district (high turn-over of staff). Maps illustrating key issues for the area—salinity, rare and threatened flora and fauna, threatened ecological communities, wetlands, reserves and tenure), summary statistics. For example, *SLIP NRM workshops and ad hoc requests from NRMO's and Sub-Regional staff (e.g. Blackwood Basin Group).*<br>• One stop shop for NRM information—generally farmer or catchment level mapping. Also want to access to the datasets.<br>• Want to interpret data with a level of QA or support from spatial experts<br>• May need training in GIS applications to fully use the datasets available. |
| **Agronomists for specialist soil mapping (less important?)**<br>• Very limited desktop GIS capability, if any. Reasonable internet access.<br>• Experience shows that many find it hard to use existing map and imagery products—not seen as cost effective compared with 'traditional' approaches. But these consultants are the key conduit to many farmers. | • Farm scale satellite imagery and soil mapping (including interpreted radiometric data—magnetics, etc.). Climate data (rainfall, etc.) as inputs to production. Foe example, *GRDC project SIP09 and WALIS Agriculture Group (WALIS Advisory Group Working Group.*<br>• Want to interpret data with a level of QA or support from spatial experts. |

| User group and their characteristics | What do they want/need from us? (Or if different—What do we think they *should* need from us?) What questions are they asking? How are they using it? |
|---|---|
| **Land developers**<br>• Variable access to desktop GIS. Good internet access. | • Location of infrastructure, land tenure and zoning, sensitive areas (rare and threatened flora and fauna, threatened ecological communities, wetlands).<br>• For new agricultural industry development need access to maps of priority agricultural land, groundwater and infrastructure. For example, *Projects for DAFWA Food and Trade Development*. |
| **Students**<br>• Variable access to desktop GIS. Good internet access. | • Geospatial data (for GIS) and overview maps of agricultural production and NRM issues, summary statistics. For example, *Data and map requests from University students (under and post-graduate, and academic staff).*<br>• Want everything, but have no idea what to do with it. Some requests can burn many hours of time. |
| **Other state agencies and industry groups (Lucerne growers, SPA, AVONGRO, FPC, Oil Mallee Assoc, carbon conscious)**<br>• Range of skills and expertise in NRM and spatial analysis.<br>• Generally experts in their field of choice (lucerne, saltland pastures, oil mallees, carbon).<br>• Most have very good desktop GIS capability and good internet access. | • Want everything and often don't understand limitations of the data or how to use and present it.<br>• A process to use the information at hand to identify policy responses.<br>• Geospatial data (for GIS), summary statistics.<br>• Tailored NRM information—e.g. the 'best' land for their system—e.g. agroforestry for deep soils and potentially wind erosion risk areas; e.g. SPA—'good saltland' with access to water and shepherding potential<br>• CO2—Carbon farming—areas for planting riparian zones, wind erosion risk areas, deep sands. |
| **NGOs**<br>• Variable access to desktop GIS. Good internet access. | • Geospatial data (for GIS)—to pass onto consultants for analysis, summary statistics. For example, *WALIS Council and Regional Spatial Data management Council and data and product requests from NGOs.* |
| **Federal agencies**<br>• Geospatial data consumers. | • Very diverse requirements. Want access to statistics/models. |
| **International users**<br>• This covers a huge range of users—mostly comes to DAFWA through Land Developers (see above). | • Very diverse requirements. General land resource statistics down to farm level.<br>• Technical information for detailed assessment of land use or production. |
| **Funding bodies**<br>Variable access to desktop GIS. Good internet access. | • Very diverse requirements. Increasingly seeking map-based evidence on completion of work (location of on-ground works, etc.). |