WHEATBELT NATURAL RESOURCE MANAGEMENT ANNUAL COMMUNITY SURVEY 2010 (REF: P7B100V1/100)

REPORT PREPARED FOR WHEATBELT NATURAL RESOURCE MANAGEMENT INC

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Centre of Excellence in Natural Resource Management
The University of Western Australia

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TITLE: **WHEATBELT NATURAL RESOURCE MANAGEMENT ANNUAL COMMUNITY SURVEY 2010 (REF: P7B100V1/100)**

PRODUCED BY: **COLIN MACGREGOR**

Centre of Excellence in Natural Resource Management
The University of Western Australia
Unit 1, Proudlove Parade, Albany, 6332
Telephone: (08) 9842 0839
Fax: (08) 9842 8499
Email: Colin.Macgregor@uwa.edu.au

PRODUCED FOR: **WHEATBELT NATURAL RESOURCE MANAGEMENT INC**

CONTACT: **MICHELLE KIDMAN**

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EXECUTIVE SUMMARY

The Centre of Excellence in Natural Resource Management (CENRM), the University of Western Australia (UWA), were contracted by Wheatbelt Natural Resource Management Inc. (Wheatbelt NRM) to conduct two surveys (July 2010 and June 2011) of landholders in the Avon Catchment, Western Australia. This report details of the findings from the 2010 survey.

Landholders' contact details were obtained from Telstra's *Yellow Pages* by identifying 'farmers' from known localities within Avon Catchment. There were 112 positive responses (a response rate of 56.3%).

The distribution of respondents across the Avon region was fairly uniform and broadly representative of the catchment. The majority of respondents were male (76.8%), less than 10% were under 40 years old and 66.1% were over the age of 50 years. Most had lived in the Avon region for periods longer than 40 years (75.9%). Nearly all respondents were managing properties larger than 100ha and more than 90% said their primary income was derived from their properties.

In the 2006 survey it was found that 41.7% of large property owners were involved in NRM. In 2010 it was found that 61.6% were involved in NRM. Notably, 24.1% said they were not involved while 14.3% were unsure whether they were involved in NRM or not.

Involvement in NRM across the sub-regions varied marginally. Lockhart had the lowest involvement (55.5%) and the Avon the highest (69.7%).

The 2010 survey explored respondents' associations with NRM and industry groups. Seven options were provided: landcare/catchment groups; grower groups; farm forestry groups; Land Care District Committees (LCDCs); Wheatbelt NRM; farm improvement groups; and, indigenous groups. More than 72% of respondents said they were involved with community groups of one form or another. Of the 81 positive responses 24 were members of more than one group, 18 were members of two, five were members of three and one was a member of four groups.

Involvement with NRM groups outweighed involvement with all other groups. Landcare and catchment groups had 34 positive responses (30.3% of the 81 positive responses) and if LCDCs are included it adds another 10 positive responses taking involvement with NRM groups to 39.3% (similar to what was found in the 2006 survey where there was 36.4% involvement). There was a slight difference in involvement with farm improvement groups between 2006 and 2010 – 22% in 2006 but just 8.9% in 2010. None of the respondents in the 2010 survey said they had any involvement in Indigenous groups.

Despite the results indicated above, NRM appears to be very much a part of respondents' typical land management activities. Notable NRM activities from the 2010 respondents were:

- No/reduced tillage (83%)
- Liming (66%)
- Grazing to maintain 40% cover (63.4%)
- Pest/weed management (85.7%)
- Recycling (67.8%)
- Use of rainwater tanks (75.9%)
- Surface water harvesting (82.1%)
- Surface water management (54.5%)
- Tree planting to help control salinity (44.6%)
- Use of saltland pastures and protecting remnant vegetation with fencing (50%).

NRM activities not so widely adopted were:

- Perennial pastures (40.2%)
- Waterway protection activities (39.3%)
- Tree planting for biodiversity purposes (25.9%)
- Tree planting for wind protection (25%)
- Protection of remnant vegetation through use of covenants (12.5%)
- Use of deep drains to help control salinity (17.8%)

In the 2006 survey, tree planting was not split across its main purposes (e.g. salinity control, biodiversity, wind protection) so a direct comparison on this indicator across the two survey years was not possible. However, tree planting, for whatever purpose, was being carried out by

97.7% of the large property holders in 2006.

NRM indicators that are directly comparable across the two survey periods were:

- Surface water harvesting (83.3% in 2006; 82.1% in 2010)
- Pest/weed management (76.5% in 2006; 85.7% in 2010)
- Surface water management (73.4% in 2006; 54.5% in 2010)
- Monitoring NRM condition (41.7% in 2006; 42% in 2010)
- Taking part in field days and/or walks (38.6% in 2006; 36.6% in 2010)
- Trialling new NRM techniques and/or technologies (37.5% in 2010)
- Involved in a NRM funded project (20.5% in 2010)
- Developing new industries (14.4% in 2006; 14.3% in 2010)

The majority of respondents in the 2010 survey said they did not want to receive any NRM information (66.1%).

Sources of information used by respondents were explored in both 2006 and 2010. There were two components (a) the people that provided information (b) media and published sources used. Again, some indicators are directly comparable over both surveys. For people consulted:

- Landcare coordinators are apparently most popular (17.4% in 2006; 32.1% in 2010)
- Government officers (59.1% in 2006; 20.5% in 2010)
- Farm consultants (19.7% in 2006; 8.9% in 2010)
- Rural merchandisers and stock agents (41.7% in 2006; 10.7% in 2010)
- Farmers and peers (56.1% in 2006; 20.5% in 2010)
- Wheatbelt NRM/ACC (22% in 2006; 9.8% in 2010)

For published sources:

- Local newspapers (80.3% in 2006; 11.6% in 2010)
- ABC radio (78% in 2006; 24.1% in 2010)
- *Farm Weekly* (78% in 2006; 51.8% in 2010)
- *Countryman* (weekly paper) (58.3% in 2006; 44.6% in 2010)

- Government publications (58.3% in 2006; 13.4% in 2010)
- Internet (50.4% in 2006; 31.2% in 2010)

For 2010, a total of 64 respondents (57.1%) said they never received any Wheatbelt NRM information. Of the four types of information identified (newsletter, ENews, Annual Report and Calendar), none of them especially stand out as being more popular than any other.

For those that have not received information from Wheatbelt NRM (n=49), the following was requested: Newsletter (42.9%), ENews (40.8%), Annual Report (22.5%), Calender (20.4%). This question was not asked in 2006 so a comparison is not possible but it is notable that 58.3% of large landholders and 8.6% of small landholders said they did receive information from the Avon Catchment Council (ACC).

The 2006 survey also explored the form of information preferred by respondents. The large property holders said they would prefer to receive information via newsletter (66.8%), publications from relevant industry groups (60.6%), the Internet (59.1%) and email (50.8%). Small landholders said they would prefer newsletter (62.9%), the Internet (41.8%), email (33.9%), workshops and seminars (25.4%) and publications from relevant industry groups (24.3%).

It was found in the 2010 survey that Wheatbelt NRM is widely known across the region (91.1%), including the three sub-regions. A similar finding emerged from the 2006 survey where 100% of large landholders and 72.2% of small landholders said they had heard of the ACC.

More than half the 2010 respondents said they were unfamiliar with any Wheatbelt NRM managed projects (52.7%). Of those known, most have a water quality context (42%).

Most respondents in the 2010 survey (80%) identified at least one of Wheatbelt NRM's main purposes. Most thought the management of waterways (42%) was their main role but their advisory role (33%), seeking funding role (28.6%) and promoting the protection of natives (26.8%) were all noted.

The majority of respondents in the 2010 survey had not heard about the Avon NRM Strategy (2005) (65.2%) and while there is virtually no difference in responses between the Avon and

Yilgarn sub-regions (both approx. 61%) the Lockhart sub-region appears to be have been slightly less exposed to the Strategy (77.8%).

Wheatbelt NRM was found to be the most popular organsiation to be custodian of a regional Wheatbelt NRM Strategy (17.9%) with the Department of Agriculture Food WA (DAFWA) coming a close second (16.1%).

Salinity is the most important environmental concern (73.2% of 2010 respondents). Lack of rain was regarded as the second most important issue (32.1%). Other issues identified include wind erosion, soil erosion, climate change, biodiversity/vegetation decline, water degradation/management, soil fertility and farm sustainability/production.

Environmental concerns across the three sub-regions (Avon, Yilgarn and Lockhart) varied only marginally. Again, salinity was highlighted more in the Lockhart sub-region (55.6%) compared with the Avon (47.1%) and Yilgarn (45.5%). Lack of rain is significantly more of a concern in Yilgarn (33.3%) compared with Lockhart (14.8%) and Avon (7.8%).

In the 2006 survey respondents were asked about NRM issues they were involved in managing. For the large landholders the following issues emerged:

- Weeds (100%)
- Erosion (98.5%)
- Vegetation (96.2%)
- Soil (82.6%)
- Surface runoff (78%)
- Groundwater (59.1%)
- Salinity (37.1%)
- Waterways (22%)
- Biodiversity (22%)
- Agricultural business management (19.7%)
- Farming systems (19.7%)

Nearly half the respondents indicated they volunteer for environmental work (42%) and there may be a statistically significant difference between the Yilgarn (where 51.5% volunteer) and

Lockhart where 33.3% volunteer.

The majority of respondents appear to be favourable to the idea of using Nyungar names for plants, animals and places in any signage at reserves and community sites (55.4%).

Of the 112 respondents in the 2010 survey, 54.5% said they would like to receive a summary of the results from the survey.

INTRODUCTION

1.0 Project Background

In 2006 Wheatbelt Natural Resource Management (formerly Avon Catchment Council) undertook a survey of the Avon River Basin community to determine stakeholders' understanding of the organisation, satisfaction of services and functions of the organisation, and levels of knowledge of natural resource management. As part of the 2010-2011 Caring for Our Country (CfOC) program, Wheatbelt NRM (WNRM) commissioned the Centre of Excellence in Natural Resource Management (CENRM), the University of Western Australia (UWA), to conduct two more surveys (one for July 2010 and one for June 2011) to determine landholders' levels of knowledge and skills in natural resource management and engagement with WNRM.

Under the terms of the project, CENRM is required to: plan, conduct, analyse and report on the two surveys of the Avon River Basin community on behalf of Wheatbelt NRM in August 2010 and June 2011. Specific activities and tasks included:

- Complete a planning process for two annual surveys (one conducted in August 2010 and one conducted in June 2011).
- Regular inclusion of review points in the planning and implementation process with WNRM.
- Review 2006 survey outcomes (to enable comparison with new data).
- Review existing draft 2010 survey questionnaire to determine soundness of data and format.
- Provide advice to WNRM to enable decision on postal or telephone survey; it was determined that the survey should be conducted by telephone.
- Determine survey sample size.
- Arrange, prepare and maintain complete and accurate contact list of survey respondents.
- If a mail survey is used, the following activities will be required:
- Since a telephone survey approach was chosen, the following activities were also required:

    ⇒ Anticipate respondent questions

    ⇒ Develop call logs

    ⇒ Establish guidelines for no answers, hesitant participants, etc

    ⇒ Pilot test the questionnaire and procedures

⇒ Develop advance notice material

⇒ Arrange for facilities and callers to conduct surveys

⇒ Assemble materials

⇒ Train callers if necessary

⇒ Undertake advance notice

⇒ Schedule interviews

⇒ Collect data

⇒ Process data

⇒ Analyse and interpret data (by itself and in comparison previous years survey data)

⇒ Write reports (including trend analysis using previous surveys where possible)

⇒ Communicate findings to Wheatbelt NRM and Board.

SURVEY METHODOLOGY

2.0 Project approach

It was determined the project would contain eight principal stages: project and survey planning; review of previous survey findings and proposed draft questionnaire; survey design (telephone); development of telephone questionnaire; conducting the surveys (2010 and 2011); analysis and interpretation of survey data (2010 and 2011); reporting survey findings (2010 and 2011); and, communicating major findings and providing datasets to WNRM.

2.1 Project and survey planning

The project was initiated with a Scoping Meeting between WNRM and CENRM (21st July 2010). Dr Colin Macgregor (the Project Manager & Principal Investigator) from CENRM, Michelle Kidman and Elizabeth Kington from WNRM attended this meeting. The meeting provided the opportunity to refine the nature and scope of the project, confirm the methodology, discuss 'need to know' background information, clarify areas of uncertainty, confirm key requirements from the project, and confirm the communication and reporting framework required. The meeting also provided the opportunity to identify material held by WNRM that needed to be considered in the project.

2.2 Review previous survey findings and existing 2010 draft questionnaire

There were a number of documents and a draft 2010 survey questionnaire that required consideration in the project. WNRM made these available to CENRM and their content was reviewed. Following document reviewal and discussions with WNRM it was decided that a telephone survey instrument would be the most effective manner of engaging the Avon community. Phone surveys usually achieve higher response rates than mail-out questionnaires and they have greater flexibility which allows for the collection of more qualitative data.

2.3 Survey design (telephone)

Survey design is principally concerned with sampling. Often *random sampling* is used – where everyone in the defined population has an equal chance of being selected for interview/questionnaire. However, *structured random sample*, where random selection is controlled according to some pre-determined criteria, e.g. geographic location, was considered to potentially provide useful insights into the Avon community. In this case, potential respondents were identified from 30 shires within the Avon Catchment.

WNRM did not have access to landholder/stakeholder contact details so these were obtained from Telstra's *Yellow Pages*[1] using a cross-tabulation in the on-line search engine i.e. using 'farmers' and local district locations to identify potential respondents. In essence, this identified all farmers that listed themselves in the *Yellow Pages* and identified themselves as farmers.

Local community telephone directories were also obtained for all localities within the Avon Catchment to provide a back up should a larger sample population need to be identified.

The sampling process will be carried out twice – once in 2010 and again in 2011.

2.4 Develop questionnaire/telephone survey

The decision about whether to use a telephone survey approach was made previously so the goal of this stage of the project was principle straightforward – to design a suitable survey instrument that would allow longitudinal analysis over the three years under consideration (2006, 2010 and 2011).

The draft 2010 instrument was reviewed and advise about its effectiveness and time implications was provided to Wheatbelt NRM. The final version of the questionnaire may be seen in Appendix E. It is notable that this is not a typical telephone survey instrument in that it is relatively long but both CENRM and WNRM felt that it was important to obtain data on all the themes within the questionnaire.

2.5 Undertake and manage survey processes (2010 & 2011)

The survey process began by testing the questionnaire (pilot). The pilot test allowed minor adjustments to be made to ensure the language etc within the survey instrument was clear and unambiguous. It was noted during the pilot process that the survey took a mean of nearly 17 minutes to complete. As noted above, this is rather long for a telephone survey, which ideally should be less than 10 minutes, but the decision was made to go with the survey and collect data on all themes, rather than eliminating questions. It is also notable here that identifying willing participants to take part in the survey proved unusually time-consuming in the 2010 survey; on average, just over 32 minutes was spent obtaining each completed questionnaire (N=112). Reasons for this are explained in the next section (results).

[1] It is notable that not all farmers list themselves in the Yellow Pages directory for two reasons; first, Telstra imposes a cost for listing and secondly, not all farmers want to be listed in the Yellow Pages because of the potential for market research cold calling.

Potential respondents were identified using *structured random sampling* (as described above). The introduction supplementary information about the project along with a verbal agreement from the respondent that they were willing to take part in survey[2] (see Appendix E).

Data from the survey were initially entered into appropriate software (Microsoft Excel), which will be suitable for storage and transfer purposes, but it was analysed from within the Statistical Package for Social Sciences (SPSS).

The start of the project was started slightly later than anticipated so the 2010 survey was carried out during August/September.

The above procedure will be conducted twice – once in 2010 and again in 2011.

2.6 Analyse and interpret survey/questionnaire data – by themselves and previous years surveys (2010 & 2011)

In terms of data analysis, there are essentially two procedures of note; first, data from each year will be analysed as stand-alone i.e. it will be considered within the year of concern. Secondly, longitudinal analysis will look at how responses to variables change over the three time periods where data has been collected. There is no need for complex statistical techniques in either process; of central concern are the frequencies and distributions of responses (e.g. the degree of agreement with particular statements etc). Cross-tabulations were also used to explore the relationships between variables e.g. location with knowledge about WNRM.

2.7 Produce reports (2010 & 2011)

One of the main purposes of the reports is to assist Wheatbelt NRM meet their CfOC monitoring and evaluation requirements. Two reports are required – one for each year (2010 and 2011). Draft reports were provided to Wheatbelt NRM so that comments may be offered before they are finalised.

[2] It is notable that UWA has an ethics approval procedure for any research involving human subjects and this applies to social research of the kind in this project; consequently, the University's Ethics Committee reviewed the questionnaire. The main feature of concern is protection of personal data and the anonymity of respondents if requested. Also required for ethics approval is an explanation of how the data will be used along with consent about participation. Since the survey was carried out by phone, respondents were asked to agree to statements concerning these rights.

2.8 Communicate findings and deliver data (2010 & 2011)

As part of the reporting process two seminars were provided at the conclusion of each survey year (2010 and 2011) to provide WNRM staff, and any other stakeholders with an interest in the project, the opportunity to hear about the findings of the project.

Datasets containing respondent details and survey results were provided to WNRM as Excel worksheets. SPSS data files were not provided since SPSS is a specialised social sciences analysis package and only useful for such purposes.

RESULTS

The results of the 2010 survey are arranged in this section according to the seven main themes within the questionnaire. These were: (a) the demographic profile of respondents; (b) respondents views and involvement with NRM; (c) respondents knowledge and views of Wheatbelt NRM Inc; (d) respondents views about the Avon NRM and Wheatbelt Regional NRM Strategies; (e) respondents views about NRM priorities; (f) respondents that would like results of the survey; and, (g) geographic distribution of selected results. Finally in this section, the implications of the survey findings will be discussed, which will include a comparison of the main survey findings with the 2006 survey findings.

Firstly, the response rates for the 2010 survey are reviewed.

3.0 Survey response rates

Table 1 displays the response rates for the 2010 survey.

Table 1: 2010 survey response rates

	Frequency	Percent
Not actively farming	27	4.5
Not interested/willing to take part	172	28.9
Calls not answered	285	47.8
Positive responses	112	18.8
Total	596	100.0

Response rates for telephone surveys are usually based on the number of positive responses as a proportion of those that answered the phone (either positively or negatively). Calls that are unanswered usually don't enter into the equation. In this case, there were 112 positive responses, 172 weren't interested and 27 didn't want to take part because the said they were not actively farming. Therefore, the response rate is 112 out of (172+27), which is a response rate of 56.3%. This would generally be regarded as a 'fairly good' response to a survey of this type.

In essence, unanswered calls were those where (a) the phone was unanswered after two attempts had been made to contact, (b) the phone was answered by an answering machine or (c) the surveyor was asked to call back but there was no reply when the second call was made. It is notable that nearly half of all calls made were unanswered and most of these were because phones were not answered despite the fact that all calls were made between 6.30 and 8.30pm on weekdays.

4.0 The demographic profile of survey respondents

Question 16 asked respondents about their gender. Table 2 and Figure 1 display the responses to this question.

Table 2: Gender of respondents

	Frequency	Percent
male	86	76.8
female	26	23.2
Total	112	100.0

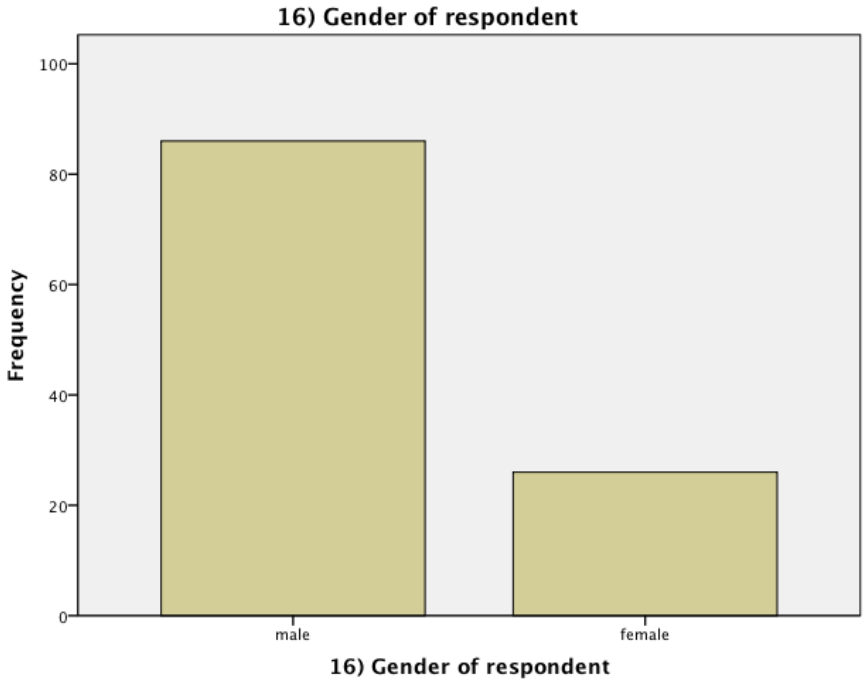

Figure 1: Gender of respondents

The majority of respondents were male (76.8%). Part of the explanation for this gender bias is that many women who answered the telephone preferred to pass on the responsibility for taking part in the survey to their husbands, which is typical in surveys of this nature.

Question 17 considered the age profile of respondents. Often, respondents are unwilling to reveal their age so this question was framed to ask about which category they belonged to, which is usually perceived as a slightly less invasive question (Table 3, Figure 2).

Table 3: Age groupings of respondents

	Frequency	Percent
18-19 years	1	.9

20-29 years	1	.9
30-39 years	9	8.0
40-49 years	27	24.1
50-59 years	33	29.5
60-64 years	18	16.1
65+ years	23	20.5
Total	112	100.0

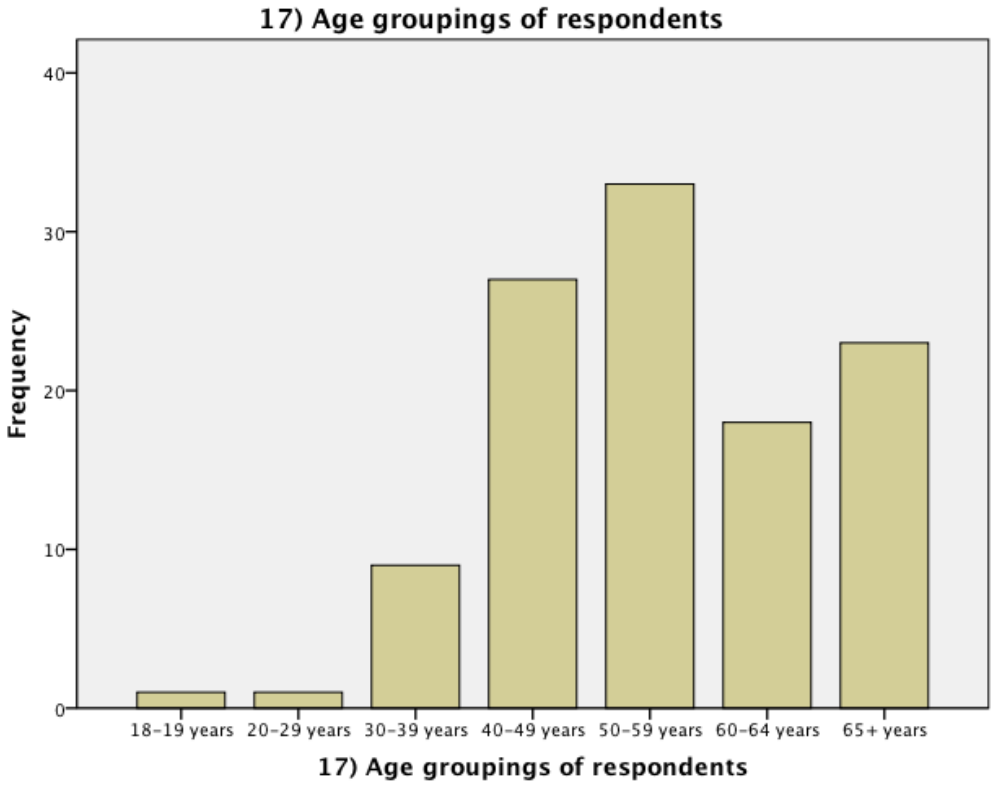

Figure 2: Age groupings of respondents

Table 3 and Figure 2 reveal a fairly typical age profile for Australian farmers and it is one that reflects the aging of the farming population. Only eleven out of 112 respondents were under 40 years old (less that 10%); in fact, 66.1% were over the age of 50 years.

The literature surrounding the question of age and NRM is an interesting one because it has both positive and negative implications. On the positive side, increasing age has been associated with a more positive attitude to NRM and members of Landcare and Catchments groups also tend to be older. The issue of succession is also relevant here as older farmers are usually keen to pass on an environmentally healthy farm to their offspring. However, age can and does impair one's

capacity to carry out NRM action on the ground. Thinking more broadly about this issue; with fewer younger people taking up farming as a profession, there is concern about the prospects of future NRM intentions.

Question 18 asked respondents which Shire they lived in. As noted in the previous section, the structured random sampling approach was deployed with the intention that there would be respondents from across the Avon Catchment region. Table 4 displays the distribution of respondents according to the Shire they live in.

Table 4: Shires respondents live in

	Frequency	Percent
Wongon-Ballidu	6	5.4
Koorda	4	3.6
Mt Marshall	6	5.4
Mukinbudin	6	5.4
Westonia	2	1.8
Yilgarn	3	2.7
Goomalling	8	7.1
Dowerin	6	5.4
Wyalkatchem	4	3.6
Trayning	2	1.8
Nungarin	2	1.8
Toodyay	3	2.7
Northam	7	6.3
Cunderdin	5	4.5
Tammin	2	1.8
Kellerberrin	5	4.5
Merredin	7	6.3
York	5	4.5
Quairading	5	4.5
Bruce Rock	4	3.6
Narembeen	13	11.6
Beverley	1	.9
Wickepin	1	.9
Kulin	2	1.8
Lake Grace	1	.9
Kent	2	1.8
Total	112	100.0

Overall, the distribution of respondents across the Avon region is fairly uniform and broadly representative of the catchment although the shires of Brookton, Corrigin, Kondinin and Pingelly are not represented, mainly because of time constraints in conducting out the survey.

As will become apparent in a later sub-section, shire locations provided the basis of a spatial analysis for the three sub-regions of the catchment.

Question 19 asked respondents about the length of time they had lived in the Avon Catchment region. For the purpose of analysis, the responses have been grouped into 10-year categories (Table 5 and Figure 3).

Table 5: Years respondents have lived in the Avon region (categories)

	Frequency	Percent
up to 9 years	1	.9
10-19 years	8	7.1
20-29 years	6	5.4
30-39 years	11	9.8
40-49 years	24	21.4
50-59 years	28	25.0
60-69 years	26	23.2
70+ years	7	6.3
Total	111	99.1
Missing	1	.9
	112	100.0

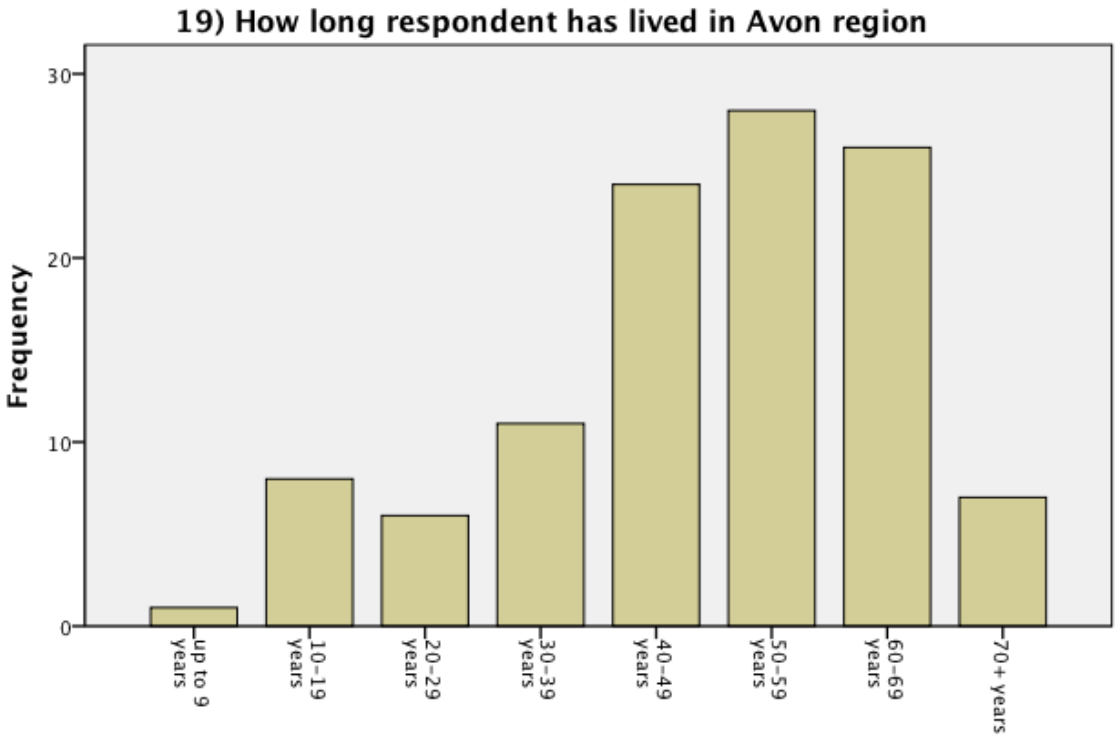

Figure 3: Length of time respondents lived in Avon region

As one might expect (given the age profile of respondents), most respondents have lived in the region for periods longer than 40 years (75.9%). This is potentially useful for NRM because positive responses to NRM are usually associated with a strong sense of place/community that is correlated with length of stay. It therefore implies there is potentially considerable 'good will' in the Avon community for NRM initiatives.

Question 20 asked respondents about the size of their properties and Table 6 and Figure 4 display the responses to this question.

Table 6: Respondents' property sizes (categories)

	Frequency	Percent
up to 999 ha	15	13.4
1000-1999 ha	10	8.9
2000-2999 ha	12	10.7
3000-3999 ha	16	14.3
4000-4999 ha	15	13.4
5000-5999 ha	10	8.9
6000-6999 ha	8	7.1
7000-7999 ha	2	1.8
8000-8999 ha	3	2.7
10000+ ha	13	11.6
Total	104	92.9
Missing	8	7.1
	112	100.0

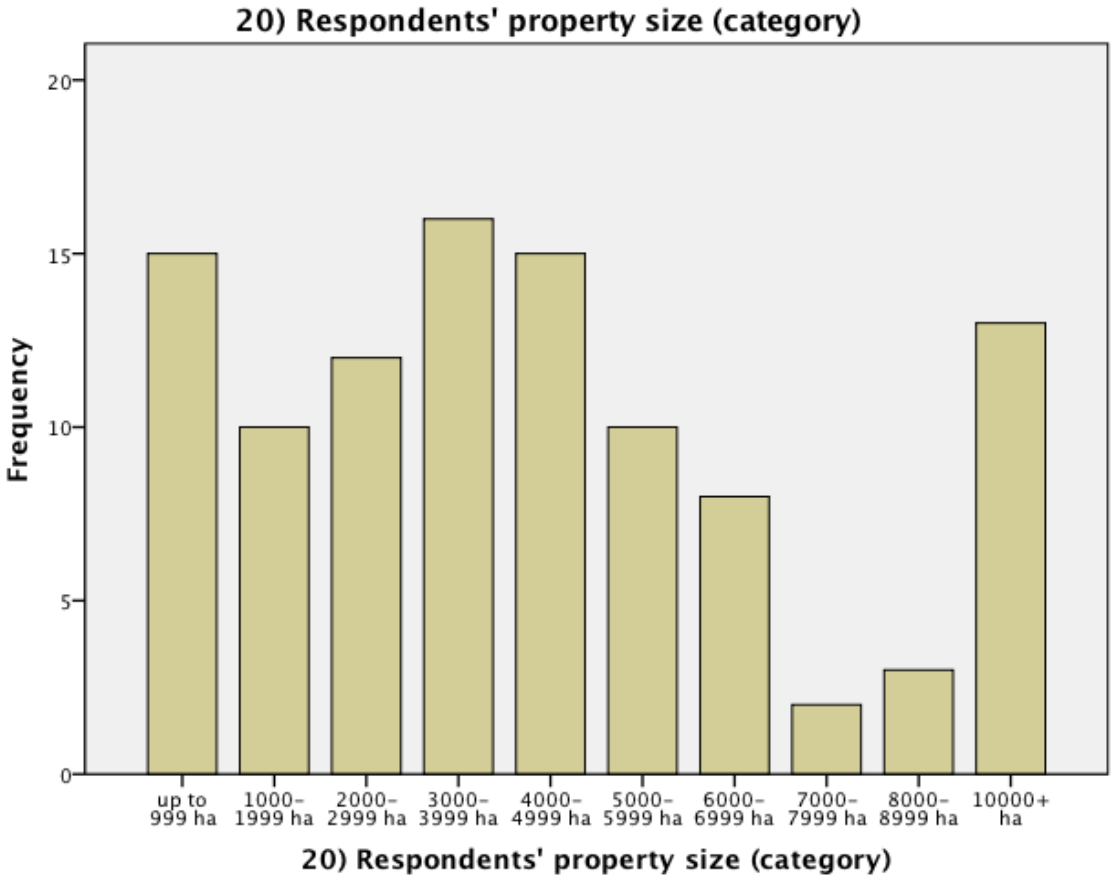

Figure 4: Length of time respondents lived in Avon region

The 2006 survey of the Avon Catchment community conducted by Asset Research (Asset Research 2008) carried out an analysis of survey results based on 'small' and 'large' landholdings (from now on referred to as the '2006 survey'). Unfortunately it is unclear from this report what size of properties was used to determine 'small' and 'large'. The Department of Agriculture and Food Western Australia (DAFWA) regard 'small landholdings' (in the Northam Advisory District) as anything between 1 and 100ha (DAFWA 2006); however, farms in this category constitute just 3.9% of the total in the district[3].

Consequently, the DAFWA classification of 'small' property size (1-100ha) is not regarded as meaningful for the wider Wheatbelt region and since there are just two respondents with properties <100ha in this sample any analysis on that basis would not yield useful findings. Instead, an analysis will be carried out with some questions to show any differences across the region i.e. this will use a geographic split based on the Avon's sub-regions i.e. Avon, Yilgarn and Lockhart.

Question 21 asked respondents about their dependency on the land for their income (Table 7, Figure 5).

Table 7: Respondents' primary income source (from their land?)

	Frequency	Percent
yes	102	91.1
no	9	8.0
Total	111	99.1
Missing	1	.9
	112	100.0

[3] Importantly, if the 100ha category was used to determine 'small' landholdings in the 2006 survey then the sample is heavily skewed towards the small landholdings because the sample contained 268 small landholdings out of at total of 400 i.e. there were only 132 large landholdings which means the sample poorly represents the total population of landholdings in the region.

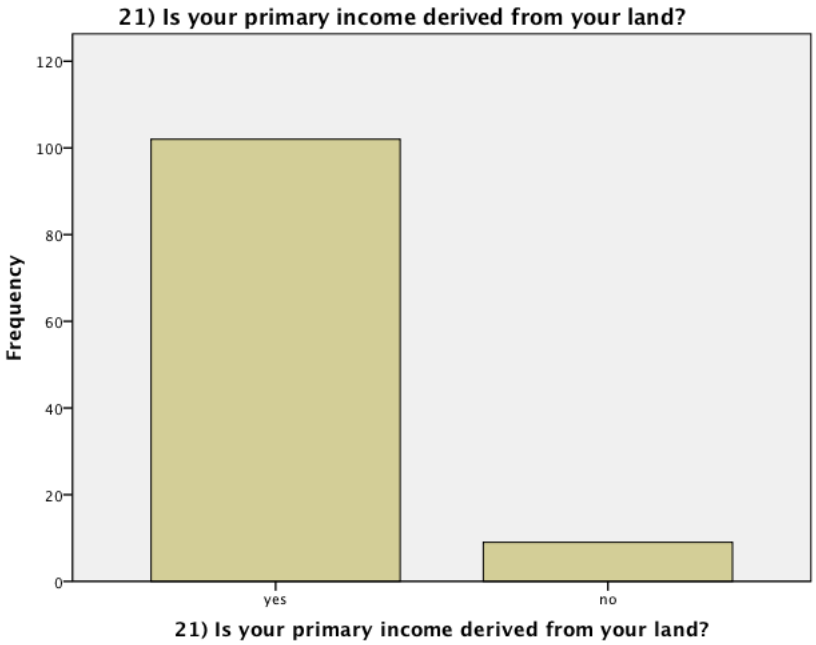

Figure 5: Respondents that are dependent on the land for their income

By implication, this question is concerned with off-farm income even though the question asks about on-farm income. The response is quite interesting because over 90% of respondents said their primary income was from their properties, which is relatively high compared with findings from other similar surveys. However, what is not indicated in this response (or asked by the question) is the proportion of income that is derived from off-farm income. Some previous studies have found that where there are higher proportions of off-farm income in the households of farmers, adoption of sustainable land management practices is more feasible because it improves financial capacity.

5.0 Respondents views and involvement with NRM

Questions 1 to 6 are concerned with respondents' views and involvement with natural resource management. Question 1 asks respondents whether they are involved in natural resource management (Table 8, Figure 6).

Table 8: Respondents involved in NRM

	Frequency	Percent
yes	69	61.6
no	27	24.1
not sure / don't know	16	14.3
Total	112	100.0

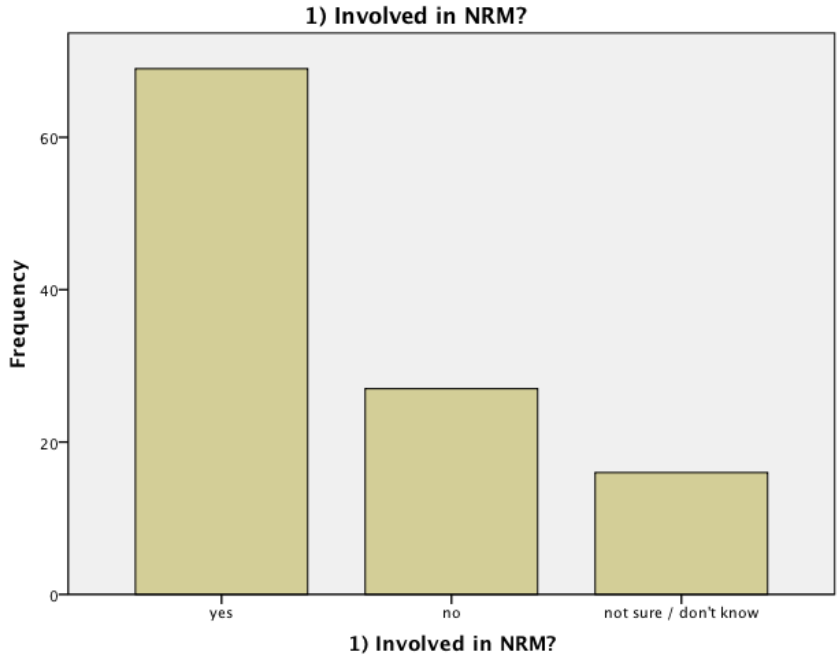

Figure 6: Respondents involved in natural resource management

In the 2006 survey it was found that 41.7% of large property owners were involved in NRM (58.3% were not).[4] In this survey it is evident that the majority of respondents feel they are involved in NRM in some way (61.6%). The difference between these two results is likely to be the result of sampling other than an indication of an increase in adoption of NRM.

Perhaps the most notable point about the results from this question is the fact that 24.1% feel that they are not involved in NRM. This may seem surprising to some readers since nearly all respondents are from farming families even if they are not farming themselves (they were all selected from a dataset where they identified themselves as farmers). It may be hypothesised that the 'no' response primarily came from the female respondents because they may not regard themselves as farmers i.e. they see their husbands (partners) as the farmers and involved in

[4] No result from small property owners is reported in the 2006 survey – perhaps because these properties are largely urban/peri-urban and so the question may not have been asked.

NRM. However a Pearson's test of correlation did not show this to be the case (p=0.262, n=112)[5] and a cross-tabulation of the two variables also demonstrated there was no gender bias in the responses to this question (Table 9).

Table 9: Cross-tabulation showing respondents gender with involvement in NRM

1) Involved in NRM? * 16) Gender of respondent Crosstabulation

			16) Gender of respondent		
			male	female	Total
1) Involved in NRM?	yes	Count	51	18	69
		% within 1) Involved in NRM?	73.9%	26.1%	100.0%
	no	Count	21	6	27
		% within 1) Involved in NRM?	77.8%	22.2%	100.0%
	not sure / don't know	Count	14	2	16
		% within 1) Involved in NRM?	87.5%	12.5%	100.0%
Total		Count	86	26	112
		% within 1) Involved in NRM?	76.8%	23.2%	100.0%

The other notable feature about the results from this question is that 14.3% were unsure whether they were involved in NRM or not. This could indicate that many respondents were unclear about what exactly is meant by NRM.

Table 10: Cross-tabulation of respondents location (sub-region) and involvement in NRM

WNRM Sub-region * 1) Involved in NRM? Crosstabulation

			1) Involved in NRM?			
			yes	no	not sure / don't know	Total
WNRM Sub-region	Avon	Count	31	11	10	52
		% within WNRM Sub-region	59.6%	21.2%	19.2%	100.0%
	Yilgarn	Count	23	5	5	33
		% within WNRM Sub-region	69.7%	15.2%	15.2%	100.0%
	Lockhart	Count	15	11	1	27
		% within WNRM Sub-region	55.6%	40.7%	3.7%	100.0%
Total		Count	69	27	16	112
		% within WNRM Sub-region	61.6%	24.1%	14.3%	100.0%

[5] Typically, for a significant correlation to exist between the two variables, the *p* value should be below 0.05 i.e. there is a greater than 95% confidence that a correlation exists. Note: in social science research the 95% confidence measure is typical but given the nature of social science some researchers argue that a 90% confidence as sufficient (p = 0.1).

Table 10 indicates marginal differences in involvement in NRM across the sub-regions. Lockhart is lowest with 55.5% saying they are involved and this is significantly lower than Avon, where involvement is highest, at 69.7%.

Question 2 takes Question 1 further by exploring respondents associations with NRM, industry and community groups. Seven options for this question were provided: landcare/catchment groups; grower groups; farm forestry groups; Land Care District Committees (LCDCs); Wheatbelt NRM Inc.; farm improvement groups; and, indigenous groups. Multiple responses were permitted in this question so respondents could be involved with two or even more groups. The results are displayed in Figure 7.

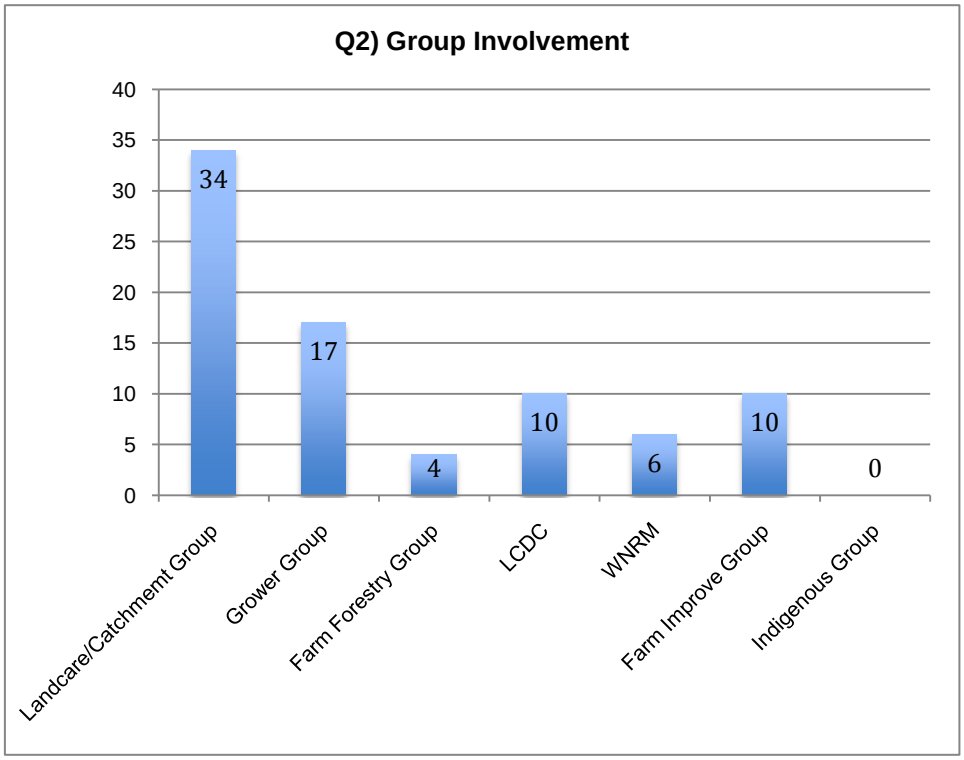

Figure 7: Respondents involvement is groups

It is notable that it is not uncommon for those people that are members of community groups of one form or another, that they are members of more than one such group. This is bourn out by the results from this survey. Out of the 81 positive responses to this question (72.3%), 24 of these respondents (29.6%) were members of more than one group (18 were members of two groups; five were members of three groups; and, one was a member of four groups).

Groups that attract the greatest membership are the landcare and catchment groups – 34 positive responses, equal to 30.3%. This is slightly less than that reported by large landholders in the 2006 survey (36.4%). Arguably, LCDCs also fit within this category which would add another 10 positive responses making a total of 39.3%.[6] However one wishes to consider this result, it is very similar to that found in 2006 and it means that involvement with NRM groups outweighs involvement in all other groups including production groups.

There is a slight difference in farm improvement groups between 2006 and 2010; 8.9% of respondents in the 2010 survey said they were members whereas it was 22% in 2006.

As may be seen from Figure 7 no respondents in the 2010 sample had any involvement in Indigenous groups.

Question 3 explored the extent of NRM practices used by respondents. A total of 18 possible practices were provided (Figure 8) and again, respondents could nominate multiple responses.

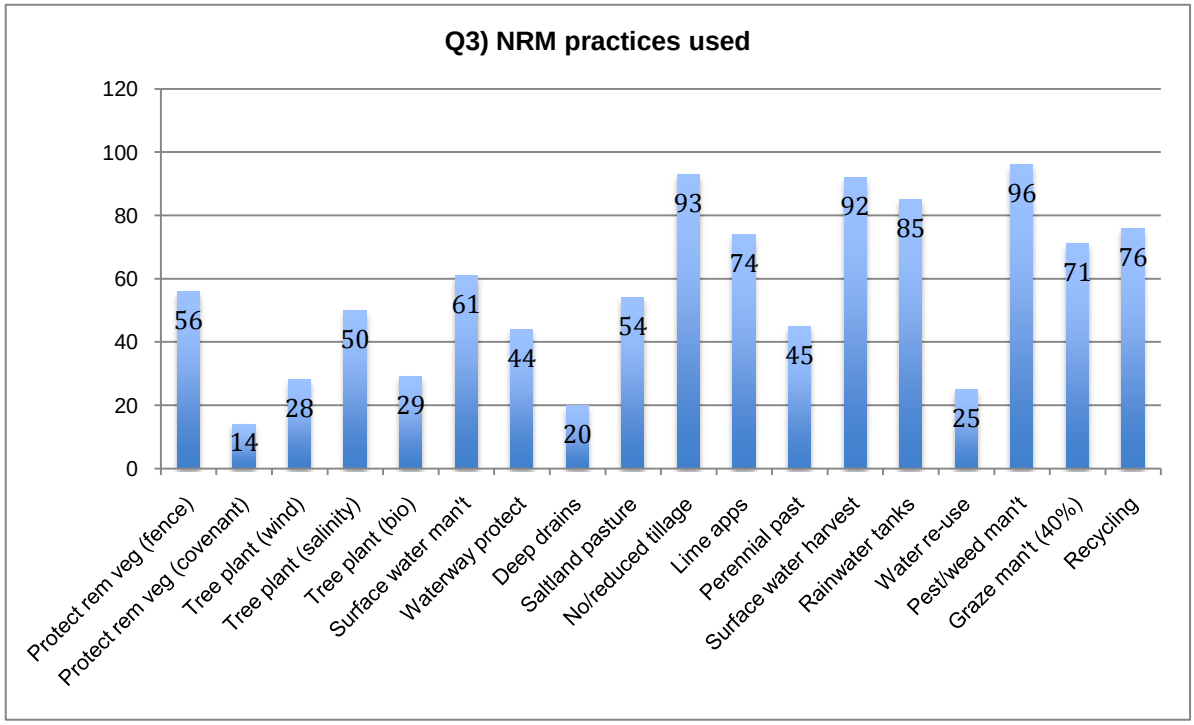

Figure 8: NRM practices adopted by respondents

[6] The results from the 2006 survey may not be directly comparable with this question because in the 2006 survey, catchment planning groups were identified separately; 29.5% of large property owners were involved.

As one might expect, with such a broad range of activities, there was no respondent that was not practicing at least one of these activities; indeed, most were practicing more than one.

Given the size of the sample (n-112) in the 2010 survey, the number of positive responses would appear to indicate that practicing some form of NRM is very much a part of respondents' typical land management activities. The same finding emerged from large landholders in the 2006 survey. From an agricultural perspective it is encouraging to see practices such as no/reduced tillage (83% of respondents), liming (66%) and grazing management (to maintain 40 percent cover) (63.4%) all well supported; that said, perhaps use of perennial pastures (40.2%) could have a greater up-take.

NRM activities that are well supported include pest/weed management (85.7%), recycling (67.8%), use of rainwater tanks (75.9%), surface water harvesting (82.1%), surface water management (54.5%), tree planting to help control salinity (44.6%), use of saltland pastures and protecting remnant vegetation with fencing (50%). Other NRM activities that are not so widely adopted would include perennial pastures (40.2%), waterway protection activities (39.3%), tree planting for biodiversity purposes (25.9%), tree planting for wind protection (25%) and protection of remnant vegetation through use of covenants (12.5%). The other NRM practice in this list is use of deep drains to help control salinity. This engineering approach to salinity control is controversial mainly because of the negative ecological impacts the drained water can have on the natural waterways the drains are linked with; nevertheless, this has been adopted by 17.8% of respondents.

In the 2006 survey, tree planting was not split across its main purposes (salinity control, biodiversity, wind protection) so a direct comparison for this indicator across the two years is not possible; but, tree planting, for whatever purpose, was carried out by 97.7% of large property holders. Most of these respondents also said they were planting native plant or tree species (89.3%).

NRM indicators that are directly comparable across the two survey periods were: surface water harvesting (83.3% in 2006; 82.1% in 2010), pest/weed management (76.5% in 2006; 85.7% in 2010) and surface water management (73.4% in 2006; 54.5% in 2010). For pest and weed management, it could be argued that adoption has increased marginally.

Question 4 asked respondents if they would like to receive information about NRM practices (Table 11, Figure 9).

Table 11: Respondents that would like to receive information about NRM practices

	Frequency	Percent
yes	38	33.9
no	74	66.1
Total	112	100.0

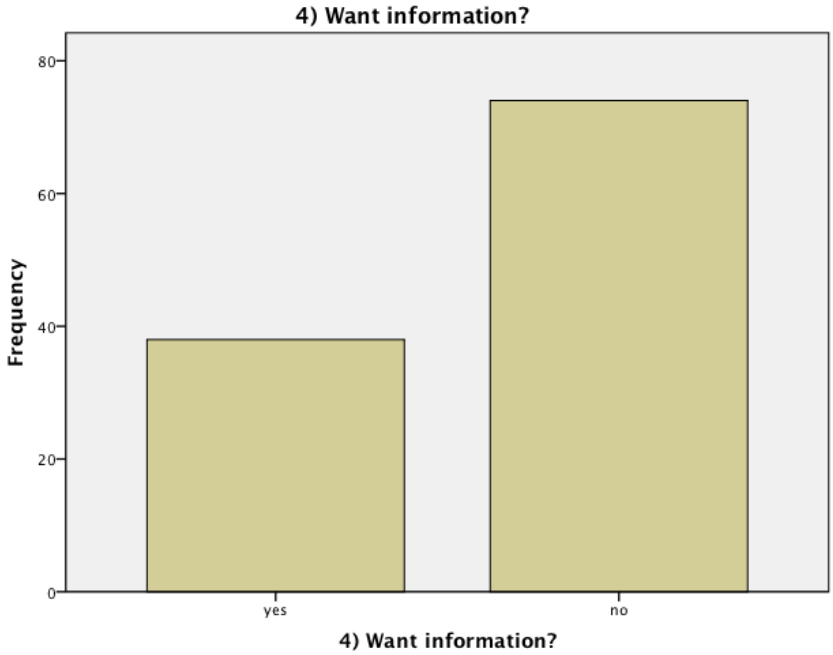

Figure 9: Respondents that want NRM information

The majority of respondents said they would not want to receive any NRM information (66.1%). This is not an unusual response to this type of question because most farmers complain about the amount of information (especially marketing) they receive in the mail and they may feel that NRM information will only add to this. Also, other studies have shown that many farmers believe they understand the NRM issues and solutions very well (because it's a normal everyday part of their business) so they don't need to be told about such practices by anyone. Given these perceptions, one might conclude that a 33.9% positive response to this question is actually quite encouraging.

It is perhaps notable that in the 2006 survey, respondents were asked about how they would like to receive NRM information. The large property holders said they would prefer to receive their

information via newsletter (66.8%), publications from relevant industry groups (60.6%), the Internet (59.1%) and email (50.8%). Small landholders, who are not directly comparable with the respondents in the 2010 survey, said they would prefer to receive their information via newsletter (62.9%), the Internet (41.8%), email (33.9%), workshops and seminars (25.4%) and publications from relevant industry groups (24.3%).

Question 5 asked respondents about their activities that are associated with NRM and which they may have taken part in. However, these are not NRM 'practices' (see Question 3 above). A list of activities was provided and respondents could nominate multiple responses where appropriate. Activities identified were as follows:

- Monitoring natural resource condition (e.g. water quality, soil health, flora/fauna surveys)
- Field days or farm walks
- Land management training courses
- Developing new industries
- Environmental Management Systems (EMS)
- Trialling new NRM techniques and/or technologies
- A funded NRM project
- NRM training or workshops
- NRM conferences or seminars
- Cross-cultural awareness training
- Naidoc celebrations

Figure 10 displays the frequencies of responses to Question 5.

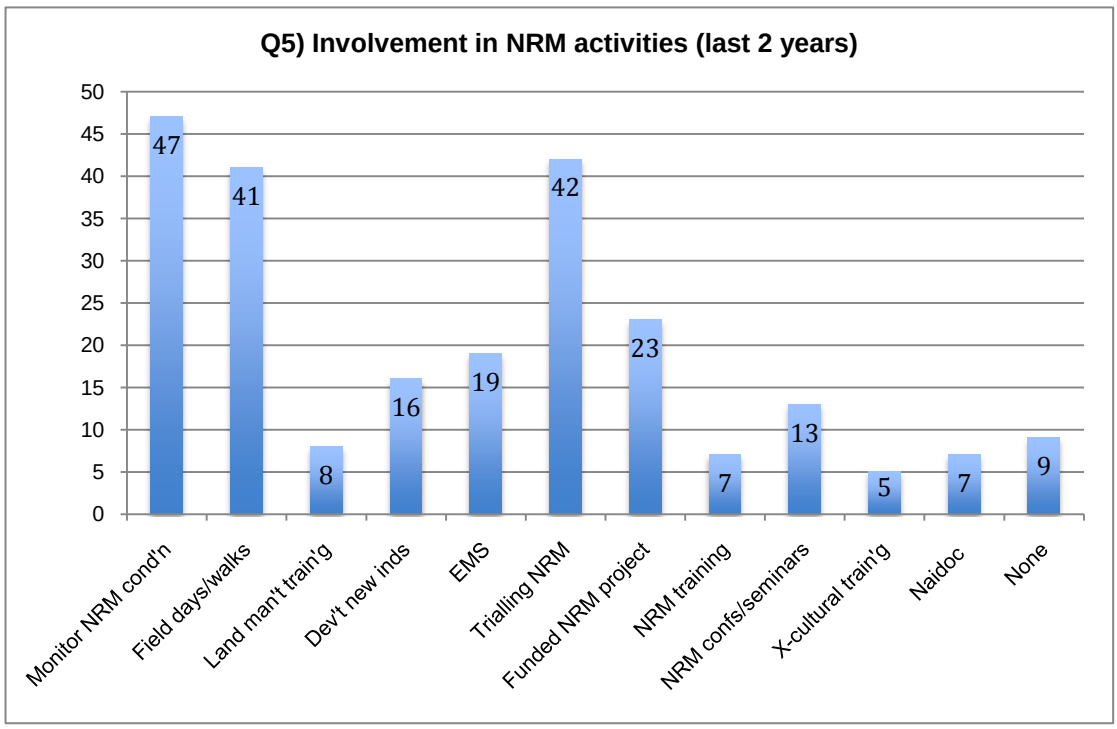

Figure 10: Respondents involved in natural resource activities

Activities that featured strongly included monitoring NRM condition (42% of participants), taking part in field days and/or walks (36.6%) and trialling new NRM techniques and/or technologies (37.5%). Another encouraging result here is that 20.5% of respondents are involved in at least one NRM funded project.

Three of the indicators presented in Figure 10 were also considered in the 2006 survey – monitoring natural resource (NR) condition, field days/walks, and developing new industries. A comparison of the results for these indicators across the two survey years is presented in Table 12.

Table 12: Comparison of results from 2006 & 2010 surveys for those involved in NRM activities

Sources of NRM information (people)	2006 survey (large landholders)	2010 survey
Monitoring NR condition	41.7%	42%
Field days/walks	38.6%	36.6%
Developing new industries	14.4%	14.3%

Table 12 suggests that, for the three indicators in the table, there would appear to be very little difference across the two survey periods.

The more common NRM techniques and/or technologies being experimented with in 2010 were direct drilling/seeding (n=9), no/minimum tillage (n=6), use of GPS technologies (n=4) and trialling different fertilisers/methods (n=2). The most common NRM projects cited were tree planting for biodiversity (n=4), tree planting for wind erosion control (n=2), fencing off remnant vegetation (n=3), saltbush seeding (n=3), planting for sandalwood (n=2) and planting for oil mallee (n=2).

Question 6 explored sources of information respondents used about NRM. There were two components to this question (a) the people that provided the information (b) the media and published sources used. Figure 11 displays the results for Q6a (part 1).

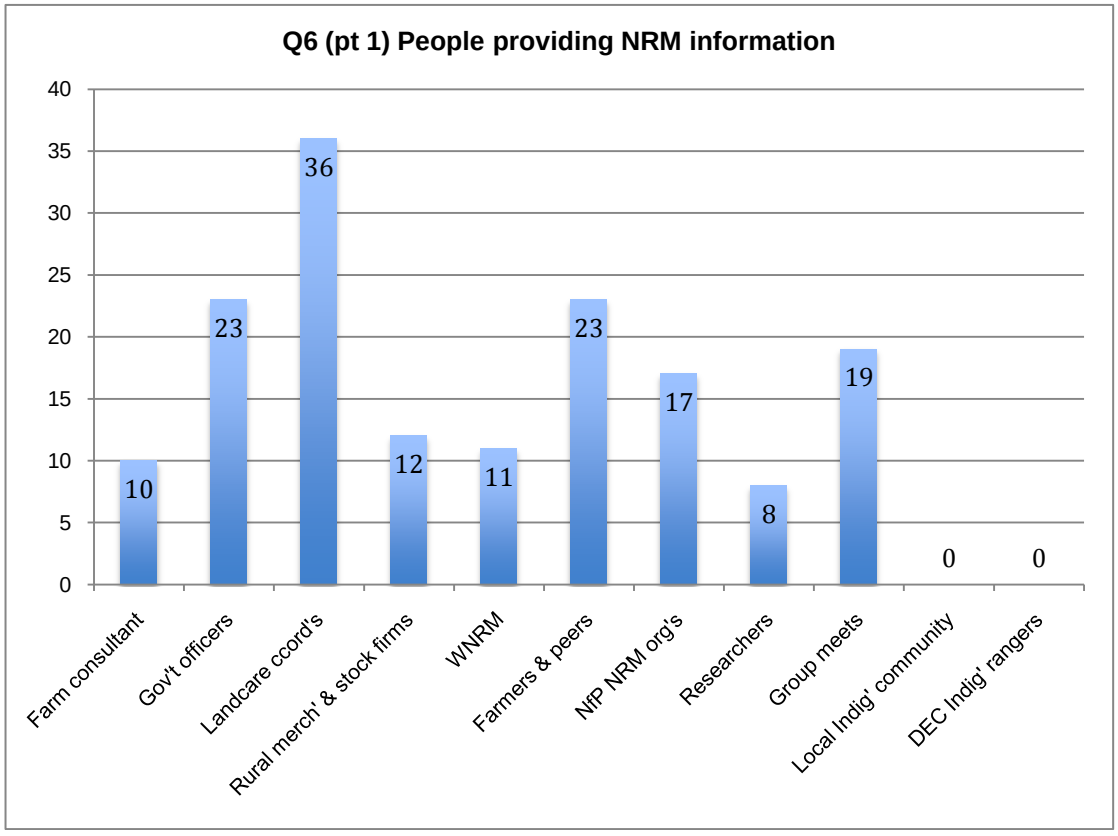

Figure 11: Sources of NRM information used by respondents (people)

Landcare Coordinators are apparently regarded as the most useful source for providing NRM information with 32.1% of respondents saying they use them. State Government Officers and fellow farmers/peers come equal second with 20.5% saying they use them. It is perhaps notable that Indigenous people are never been consulted on NRM matters.

Table 13 displays the sources of information (people) that were considered in both the 2006 and 2010 surveys.

Table 13: Comparison of results from 2006 & 2010 surveys of people information sources

Sources of NRM information (people)	2006 survey (large landholders)	2010 survey
Farm consultants	19.7%	8.9%
Government officers	59.1%	20.5%
Landcare coordinators	17.4%	32.1%
Rural merch' & stock firms	41.7%	10.7%
Wheatbelt NRM/ACC	22%	9.8%
Farmers & peers	56.1%	20.5%

The results from the 2010 survey do not appear to compare with those obtained by the 2006 survey on any of the indicators displayed in Table 13. Even though the finding from Q5 would appear to indicate two similar populations (2006 and 2010) it is possible that the two sample populations may be radically different from one another.

Figure 12 displays the results for Q6b (part 2).

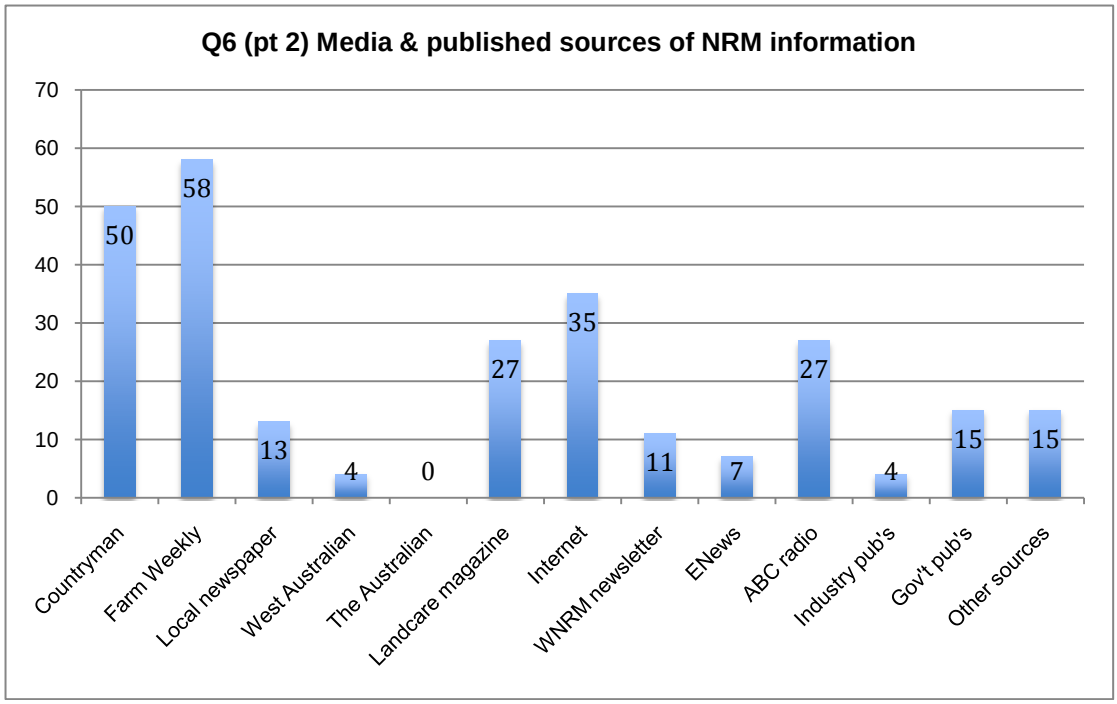

Figure 12: Sources of NRM information used by respondents (media & published)

The two most frequently used sources of published media for NRM information are the Farm Weekly (51.8%) and the Countryman (44.6%). This is perhaps not surprising since these publications cover a whole range of issues of concern to the farming community – especially the Farmers' Weekly (the Countryman is a rural newspaper). The Internet is the third most popular in this sample with 31.2% of respondents saying they access it for this purpose. ABC radio is also quite popular (24.1%). It is notable that the source most frequently 'other' source is the TV; in particular, ABC's 'Landline' show.

Again, there are some indicators for published sources that are common to both the 2006 and 2010 (Table 14).

Table 14: Comparison of results from 2006 & 2010 surveys of published information sources

Published sources of NRM information	2006 survey (large landholders)	2010 survey
Local newspaper	80.3%	11.6
ABC radio	78%	24.1%
Farm Weekly	78%	51.8%
Countryman (paper)	58.3%	44.6%
Government publications	58.3%	13.4
Internet	50.4%*	31.2%

* Note: the Internet question was only applied to small landholders so the direct comparison implied by Table 14 may not be completely valid.

Like Table 13 (above), the results for published sources of information (Table 14) appear radically different across the two survey periods (2006 and 2010) e.g. local newspapers (80.3% in 2006 compared to 11.6% in 2010).

6.0 Respondents knowledge and views of Wheatbelt NRM Inc

Questions 7, 8 and 9 are concerned about respondents' knowledge and understanding of Wheatbelt NRM's roles and responsibilities. Question 7 first asks whether respondents have even heard of Wheatbelt NRM or the Avon Catchment Council, as it was previously known.

Table 15 and Figure 13 display the results about respondents that have heard of Wheatbelt NRM or the Avon Catchment Council, as the organisation was previously known.

Table 15: Respondents that have heard of WNRM (or ACC)

	Frequency	Percent
yes	102	91.1
no	10	8.9
Total	112	100.0

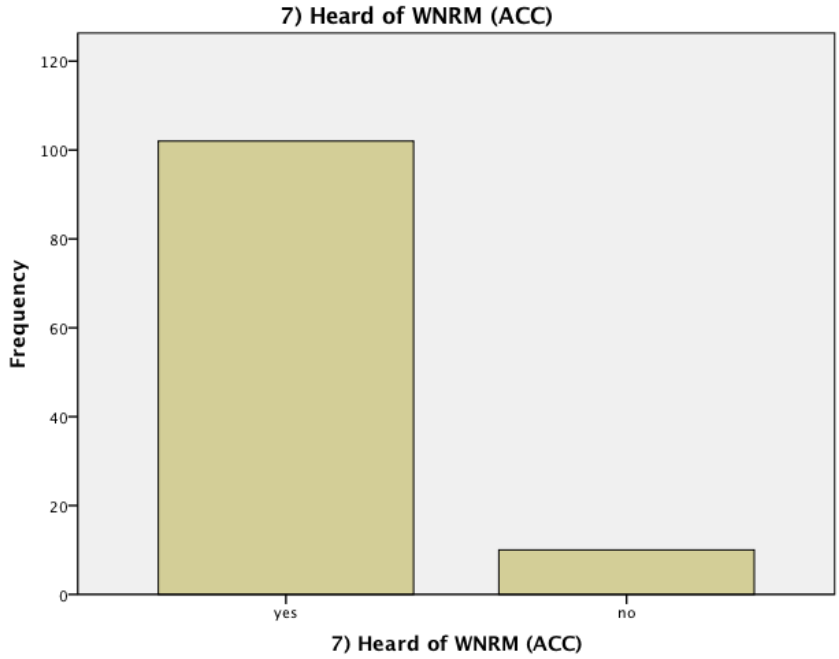

Figure 13: Respondents that have heard of WNRM (or ACC)

It is clear from the response to Question 7 that Wheatbelt NRM is widely known across the region. The response to this question is similar to what was found in the 2006 survey where 100% of large landholders and 72.2% of small landholders had heard of the Avon Catchment Council (ACC).

To interrogate the results of the 2010 survey to this question a little further, a cross-tabulation with the sub-regions of the Avon region was carried out (Table 16).

Table 16: Cross-tabulation of respondents location (sub-region) and heard of WNRM

WNRM Sub-region * 7) Heard of WNRM (ACC) Crosstabulation

			7) Heard of WNRM (ACC)		
			yes	no	Total
WNRM Sub-region	Avon	Count	47	5	52
		% within WNRM Sub-region	90.4%	9.6%	100.0%
	Yilgarn	Count	31	2	33
		% within WNRM Sub-region	93.9%	6.1%	100.0%
	Lockhart	Count	24	3	27
		% within WNRM Sub-region	88.9%	11.1%	100.0%
Total		Count	102	10	112
		% within WNRM Sub-region	91.1%	8.9%	100.0%

Table 16 demonstrates that approximately 90% of respondents in all three sub-regions had heard of Wheatbelt NRM; and, the variation between sub-regions is not statistically significant. This would suggest that staff at Wheatbelt NRM have been very successful in at least making people across the region aware of the organisation's existence.

Questions 8 and 9 explore respondents' knowledge of Wheatbelt NRM's projects and purposes. Figure 14 displays the results for Question 8 – known projects.

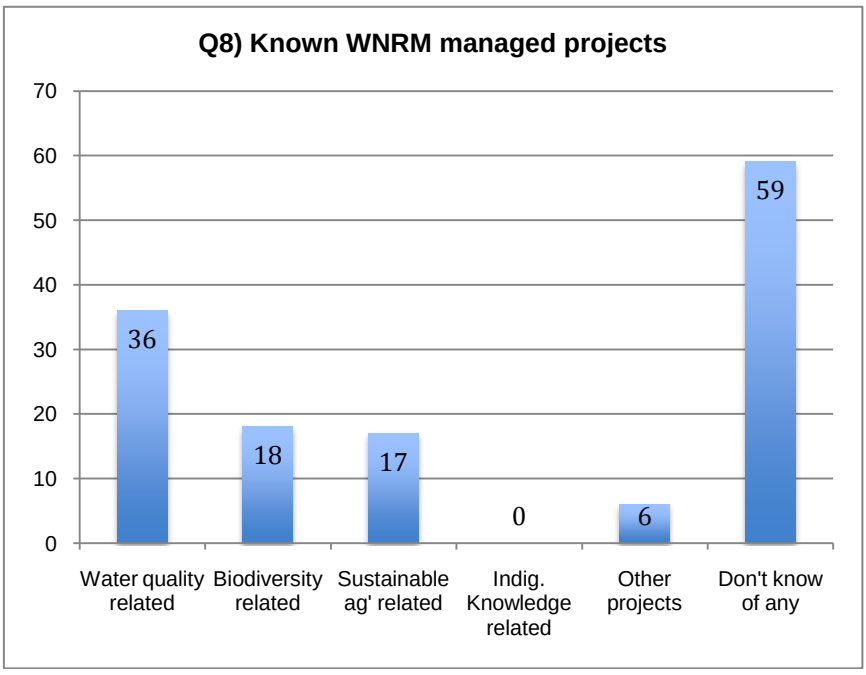

Figure 14: Wheatbelt NRM projects known to respondents

Slightly more than half of the respondents are unfamiliar with any projects managed by Wheatbelt NRM (52.7%). Of those that are known, those related to water quality appear to be most widely known with 42% of respondents answering positively to this item. Table 17 provides further details of the waterways projects mentioned by respondents.

Table 17: Wheatbelt NRM waterways projects known to respondents

Waterway project type	Count of responses
Deep drains (various locations)	4
Wallatin Catchment Demonstration Initiative	4
Mortlock River (tree planting)	2
Drainage to the Avon (not specific)	2
Pessometers (not specific)	2
Kelleberin drainage trial	2
Salinity (not specific)	1
Catchment management (not specific)	1
Saltwater in dam (not specific)	1
Surveys (not specific)	1
Recycling (not specific)	1
Water management (not specific)	1
Tammin water quality	1
Revegetation of the Avon	1
Lake Bride catchment project	1
Gwymbine fencing project	1

As will be apparent from Table 17, most of the waterway 'projects' identified by respondents are general in nature i.e. in most cases they have not identified specific projects, perhaps indicating they are unfamiliar with the details of projects. Similarly with biodiversity projects, those identified were principally either remnant vegetation protection (fencing) or tree planting e.g. mallee; specific projects were not identified. General projects indicated under sustainable agriculture were pastures, liming and saltbush.

Question 9 asked respondents about the main purpose/s of Wheatbelt NRM. Again, a list was provided (below) and multiple responses were accepted.

- Helping the to distribute government funds and information to farmers.
- Managing catchment waterways and water quality.
- Working with people and communities to advise and assist them to manage the environment better.

- Conserving and protecting native plants and animals.
- Helping the community to achieve their vision for natural resources in the region.
- Working with Local Indigenous communities to record and integrate traditional bush knowledge into natural resource management.
- Other.
- Don't know

The results of from Question 9 are summarised in Figure 15.

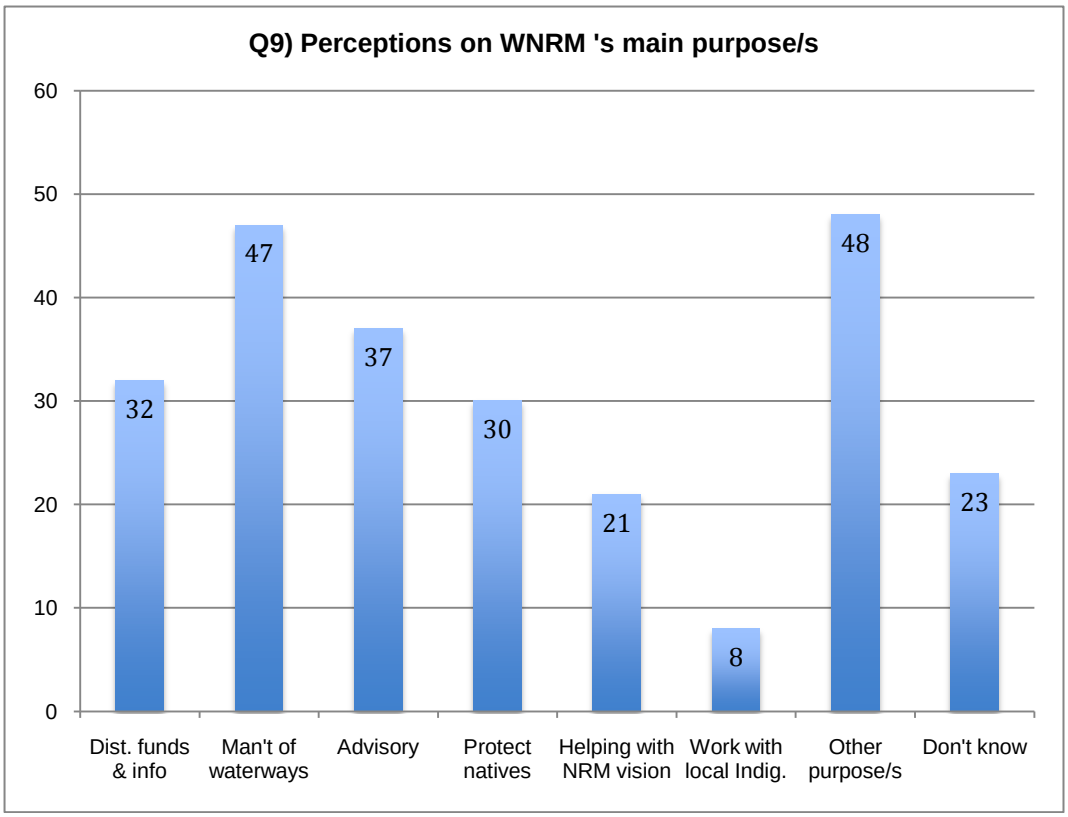

Figure 15: Respondents perceptions of Wheatbelt NRM's main purpose/s

Perhaps the most notable finding from Question 9 is the total number of positive responses; nearly 80% of respondents responded positively to this question and because there were 223 positive responses implying that respondents identified 2.5 'main purposes' on average. In a few cases, some respondents identified all the purposes suggested in the questionnaire.

Again, (similar to results from Question 8), it was management of waterways (42%) that respondents believe in the main role of Wheatbelt NRM but their advisory (33%), funding (28.6%) and protection of natives (26.8%) roles all scored well.

The other notable result from Question 9 is the number of 'other purposes' identified by respondents. Table 18 displays the responses in detail.

Table 18: Perceived 'other purposes of Wheatbelt NRM

Wheatbelt NRM 'other' purposes	Count of responses
Manage salinity	12
NRM in the Wheatbelt	6
Sustainable development	3
Education/extension	3
Landcare	1
Improve the landscape	1
Catchment management	1
Manage soils and water	1
Manage land degradation	1
Protect the countryside	1
Manage biodiversity	1
Revegetation and agroforestry	1
Obtain funding	1
Support local NRMOs	1
Produce brochures	1
Water quality	1
Manage the Swan River	1
Assist in developing sustainable agriculture	1
Alternative 'green' energies	1
Land management	1
Reduce unsustainable practices	1
Environmental conservation	1
Trialling new technologies/techniques with landholders	1

It is evident from Table 18 that salinity is regarded as the most pressing single NRM issue in the region and while its management has been identified as a purpose for Wheatbelt NRM, perhaps what is implied is that the organisation's role should be its promotion (since it is ultimately landholders that must do the management).

Details about Wheatbelt NRM's role/s was not asked in the 2006 survey so a direct comparison is not possible. However, a generic question about whether the 2006 respondents 'awareness of the role of what the Avon Catchment Council does' was asked. At that time it was found that

100% of large landholders and 77.4% of small landholders said they were aware of the ACC's role/s.

7.0 Respondents views about Avon NRM & Regional Wheatbelt NRM Strategies

This section contains two questions that seeked the views of the respondents about two NRM strategies – the Avon NRM Strategy (2005) and a regional Wheatbelt NRM Strategy.

Question 10 simply asked if respondents had heard of the Avon NRM Strategy (2005) (Table 19, Figure 16).

Table 19: Respondents that have heard of the Avon NRM Strategy

	Frequency	Percent
yes	39	34.8
no	73	65.2
Total	112	100.0

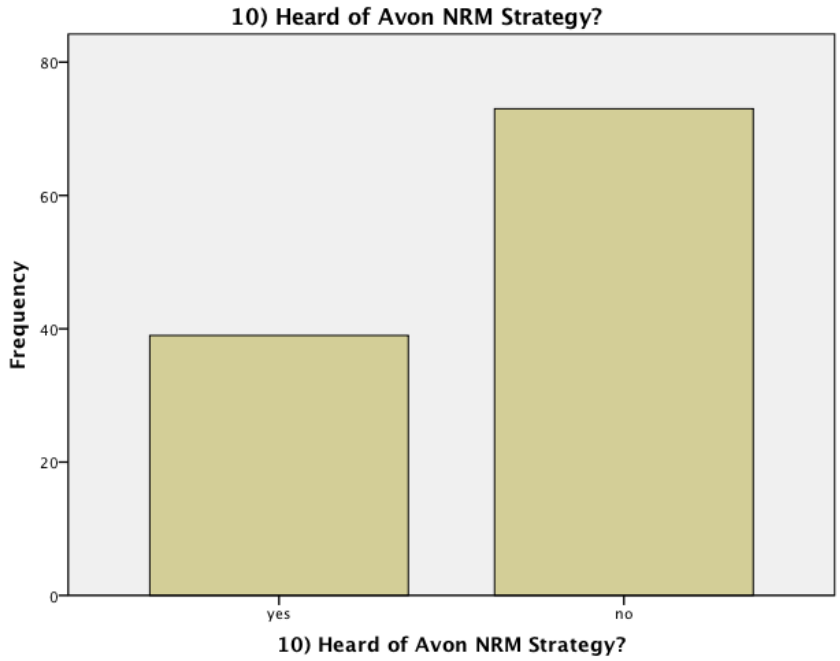

Figure 16: Respondents that have heard of the Avon NRM Strategy

Quite a significant majority of respondents had not heard of the Avon NRM Strategy. Again, to determine if there is any sub-regional variation to this response, a cross-tabulation with respondents' location was carried out (Table 19).

Table 19: Cross-tabulation of respondents location (sub-region) and heard of Avon NRM Strategy

WNRM Sub-region * 10) Heard of Avon NRM Strategy? Crosstabulation

			10) Heard of Avon NRM Strategy?		
			yes	no	Total
WNRM Sub-region	Avon	Count	20	32	52
		% within WNRM Sub-region	38.5%	61.5%	100.0%
	Yilgarn	Count	13	20	33
		% within WNRM Sub-region	39.4%	60.6%	100.0%
	Lockhart	Count	6	21	27
		% within WNRM Sub-region	22.2%	77.8%	100.0%
Total		Count	39	73	112
		% within WNRM Sub-region	34.8%	65.2%	100.0%

Table 19 indicates there is virtually no difference between the Avon and Yilgarn sub-regions in terms of them hearing about the Avon NRM Strategy (2005) but is appears the Lockhart sub-region may have been slightly less exposed to the Strategy[7].

Question 11 is concerned with who should be custodian of a regional Wheatbelt NRM Strategy (Table 20, Figure 16).

Table 20: Respondents' beliefs about custodianship of a regional Wheatbelt NRM Strategy

	Frequency	Percent
Greening Australia	3	2.7
DAFWA	18	16.1
WNRM	20	17.9
DEC	5	4.5
Local Gov't	8	7.1
Other organisation	30	26.8
Don't know/no opinion	28	25.0
Total	112	100.0

[7] It must be noted that the number of responses (when split across sub-regions) is small – just 27 for the Lockhart sub-region. Readers should be cautious about making assumptions about the wider population based upon the data presented.

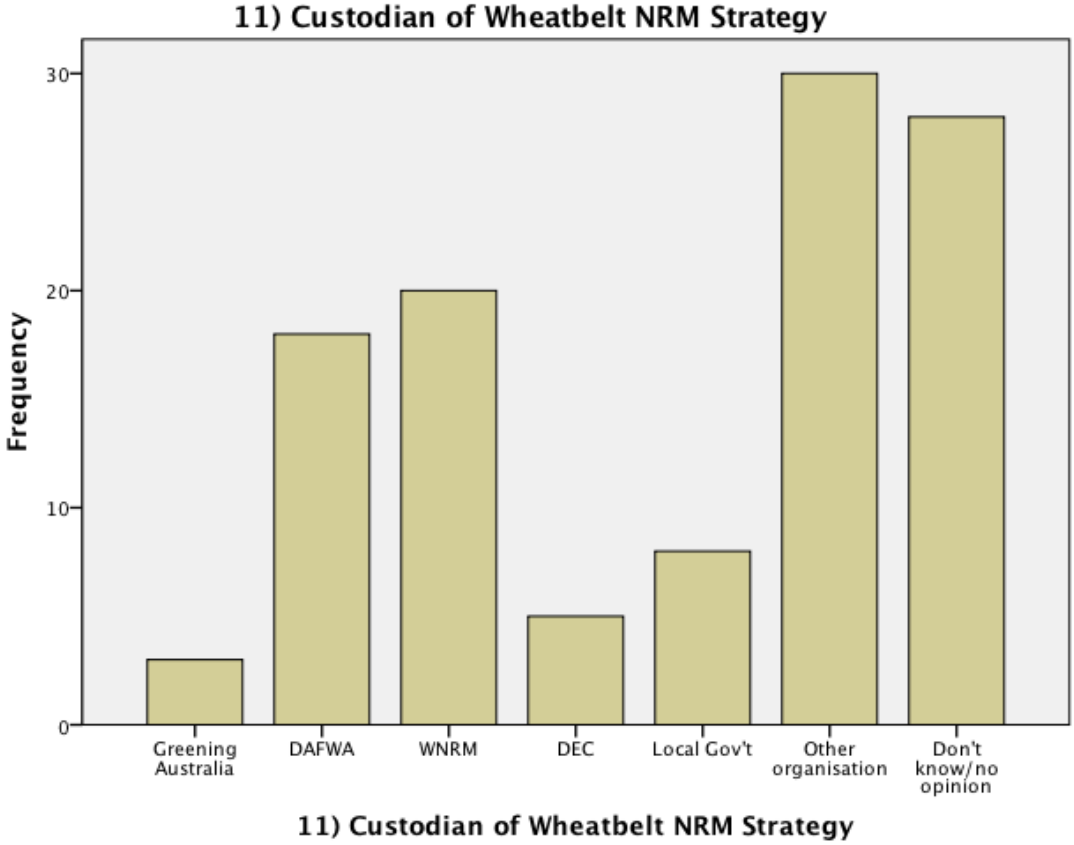

Figure 16: Respondents' beliefs about custodianship of a regional Wheatbelt NRM Strategy

It is apparent from Table 20 and Figure 16 that Wheatbelt NRM is the one organisation nominated by most respondents to be custodians of the Wheatbelt NRM Strategy (17.9%). However, the 'don't know / no opinion' response was actually the largest single response (25%).

There were also 30 respondents that nominated 'other' organisations of one form or another (26.8%) but it is also notable that out of these, eight suggested there should not be a Wheatbelt NRM Strategy at all (26.7%). Table 21 summarises the count of comments received from respondents regarding 'other' organisations.

Table 21: Respondents' beliefs about 'other' organisations that should be custodians of a Wheatbelt NRM Strategy

Comment / Group indicated	Count
Shouldn't be a Strategy	8
Local Landcare/Catchment group	6
Farming group	3
A group that can represent all groups	3
State government organisation	2
Regional organisation	2
Local conservation group	1
Wheatbelt Catchment Alliance	1
State level landcare organisation	1

Why eight people believe there shouldn't be a Wheatbelt Strategy is unclear from the data collected in the survey but it is possible they see potential clashes with the Avon NRM Strategy. And again, why six people identified landcare/catchment groups, as the preferred custodian is also unclear. Perhaps this reflects a negative view that the regional NRM structure that, some other studies have indicated, some people believe was imposed on the local landcare structure that was in place in the late 1990s.

8.0 Respondents views about NRM priorities

Question 12 explored the Wheatbelt NRM information received by the respondents. Four main categories of information were offered: newsletter; ENews; Annual report; and, Calendar. Three options were also available as a response: always receive it; sometimes receive it; and, never receive it.

Figure 17 below displays the frequencies of responses for the five categories of information (including 'other information').

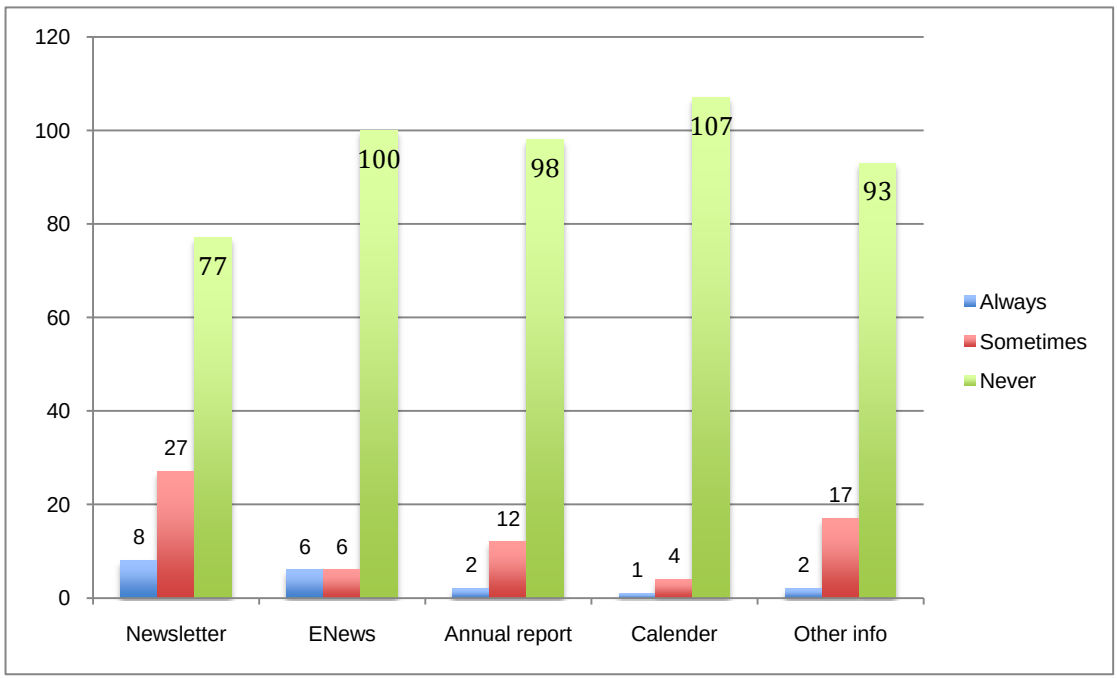

Figure 17: Information respondents receive from Wheatbelt NRM

A total of 64 respondents (57.1%) said they never received the Newsletter, the ENews, the Annual report, a Calendar or any other WNRM information. Of the four types of information offered, none of them especially stands out as being more 'popular' than any other (no significant difference).

The second part of Question 12 (Part G) asked whether respondents would like to receive information of the above type (Table 22, Figure 18).

Table 22: Respondents that would like information from WNRM

	Frequency	Percent
yes	49	43.8
no	63	56.3
Total	112	100.0

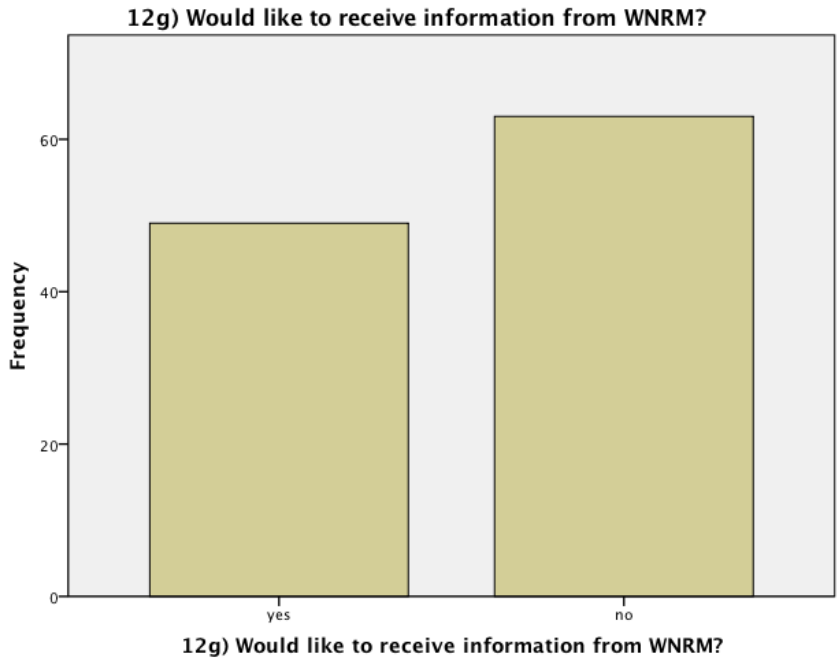

Figure 18: Respondents that said they would like information from WNRM

Of the respondents that requested the itemised information (n=49) the following was requested:

- Newsletter 21 (42.9%)
- ENews 20 (40.8%)
- Annual Report 11 (22.5%)
- Calender 10 (20.4%)

There were six requests for 'other information' in the 2010 survey: advertising; magazines; rural press; pamphlets/brochures/flyers; notices of meetings; and, information about 'Ribbons of Blue'.

Question 12 was not asked in 2006 so a comparison is not possible but it is notable that 58.3% of large landholders and 8.6% of small landholders said they did receive information from the Avon Catchment Council.

Question 13 explored respondents views about what they believe are the main NRM priorities. This was an open question so respondents had the opportunity to identify whatever concerns they felt were important. The responses have been sorted thematically and a frequency count was then made to determine priorities (Figure 23).

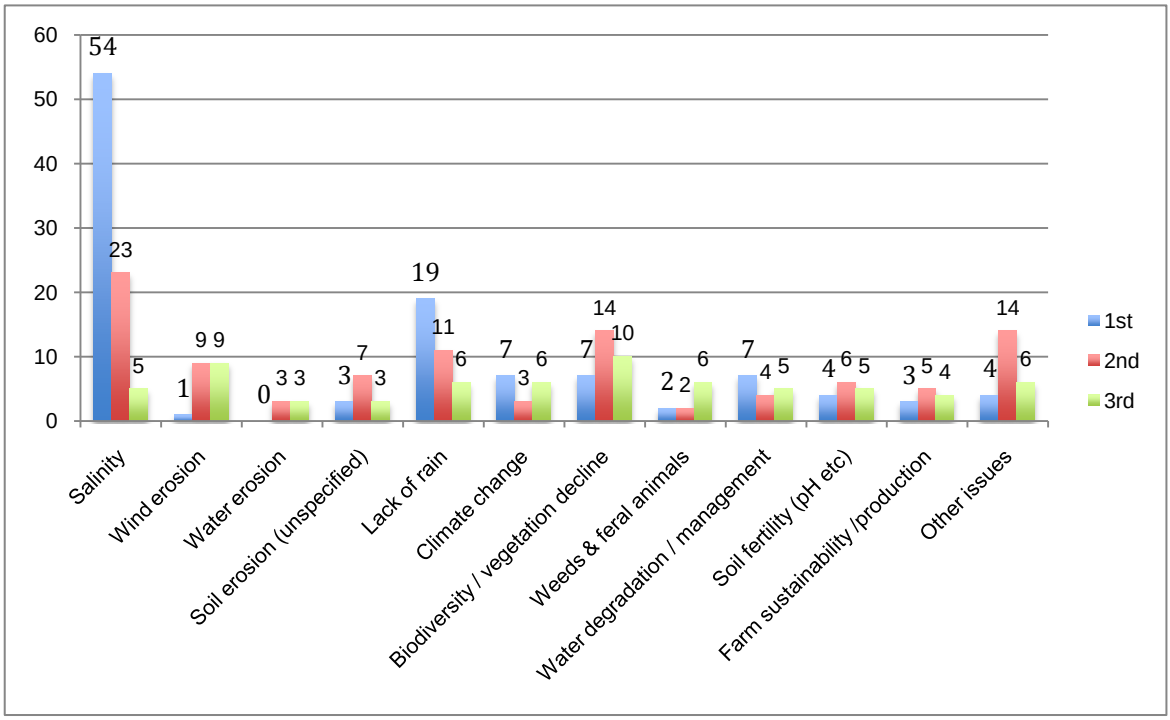

Figure 23: Top three environmental concerns identified by respondents

By far the concern of greatest concern is salinity. This single issue was identified by a total of 82 respondents, which is 73.2% of all respondents – more than double the next issue of greatest concern, which was lack of rain (n=36, 32.1%). Other issues identified by respondents (in no hierarchical order) were: wind erosion; soil erosion; climate change; biodiversity / vegetation decline; water degradation / management; soil fertility; farm sustainability / production; and, other issues. None of these especially stand out in terms of frequency counts.

The top three environmental concerns question was not asked during the 2006 survey. However, there was a question that asked respondents about the NRM issues they are involved in managing. For the large landholders these were weeds (100%), erosion (98.5%), agricultural business management (19.7%), farming systems (19.7%), waterways (22%), salinity (37.1%), biodiversity (22%), groundwater (59.1%), surface runoff (78%), vegetation (96.2%) and soil (82.6%). It is notable perhaps that salinity would now appear to be of more of a concern in 2010 than it was in 2006.

Question 14 explored respondents' involvement in volunteering for environmental work. It simply asked if respondents volunteered (Table 24, Figure 19).

Table 24: Participation in voluntary environmental work

	Frequency	Percent
yes	47	42.0
no	65	58.0
Total	112	100.0

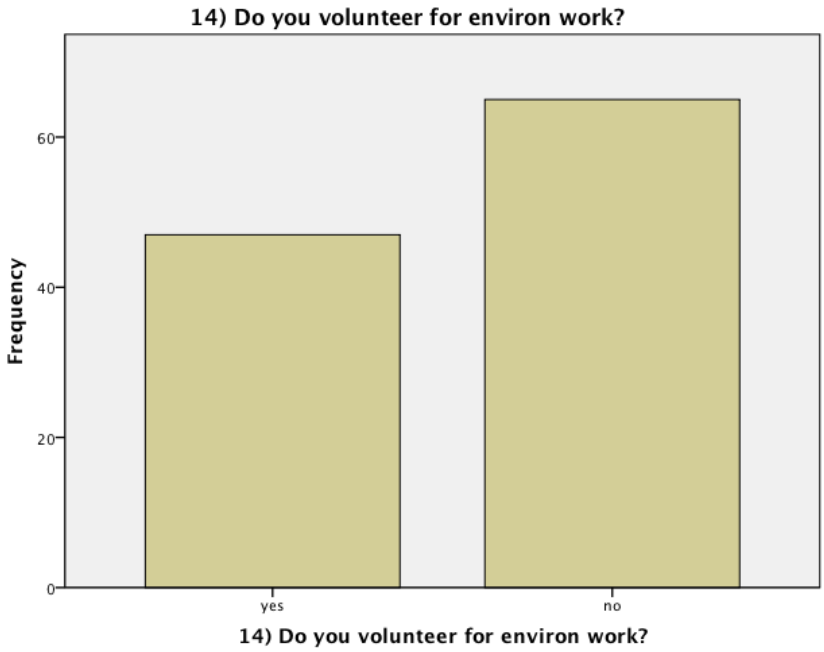

Figure 19: Participation in voluntary environmental work

Nearly half the respondents indicated that they do volunteer for environmental work (42%). Again, as a check for regional variation, a cross-tabulation of the responses to this question across the three sub-regions was carried out (Table 25).

Table 25: Cross-tabulation of respondents location (sub-region) and volunteering for environmental work

WNRM Sub-region * 14) Do you volunteer for environ work? Crosstabulation

			14) Do you volunteer for environ work?		
			yes	no	Total
WNRM Sub-region	Avon	Count	21	31	52
		% within WNRM Sub-region	40.4%	59.6%	100.0%
	Yilgarn	Count	17	16	33
		% within WNRM Sub-region	51.5%	48.5%	100.0%
	Lockhart	Count	9	18	27
		% within WNRM Sub-region	33.3%	66.7%	100.0%
Total		Count	47	65	112
		% within WNRM Sub-region	42.0%	58.0%	100.0%

The variation in volunteering across the region doesn't vary enormously but it is statistically significant between the Yilgarn (where 51.5% of respondents volunteer) and Lockhart (where 33.3% volunteer). Again, with just 27 respondents in the Lockhart sub-region, caution should be exercised in extrapolating to the larger population.

The final question (Q15) is this section was concerned with the use of Nyungar names; specifically, the question was: 'Do you think that it is important to include Nyungar names for plants, animals and places in signage erected at reserves and community sites? Table 25 and Figure 20 display the results for this question.

Table 25: Important to use Nyungar names

	Frequency	Percent
yes	62	55.4
no	37	33.0
Don't know / no opinion	13	11.6
Total	112	100.0

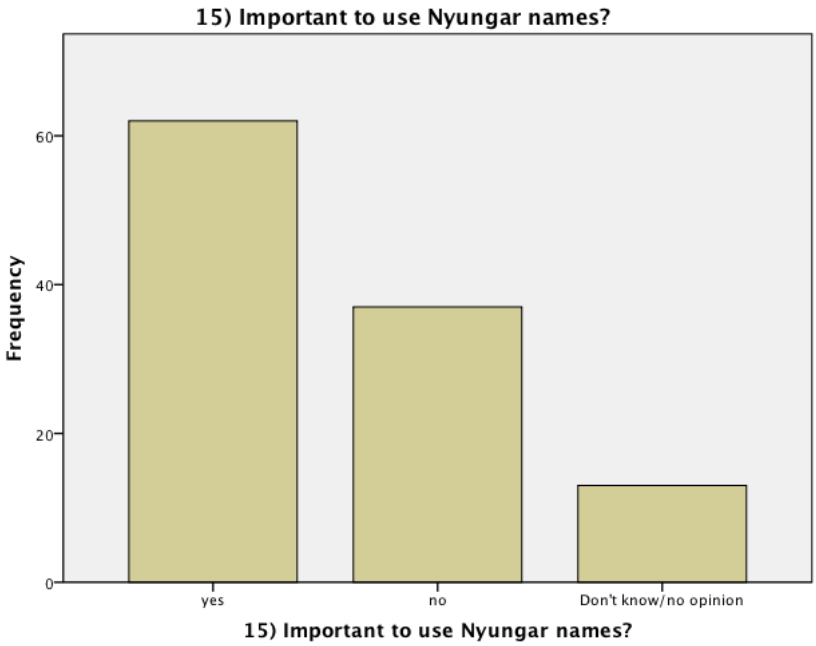

Figure 20: Important to use Nyungar names

The majority of respondents appear to be favourable to the idea of using Nyungar names (n=62, 55.4%) compared with 37 (33%) who were against.

9.0 Respondents that would like results of survey

The last quantitative question in the survey simply asked respondents whether they would like to receive a summary of the results of this survey (Table 26, Figure 21).

Table 26: Respondents wishing to receive summary of survey results

	Frequency	Percent
yes	61	54.5
no	51	45.5
Total	112	100.0

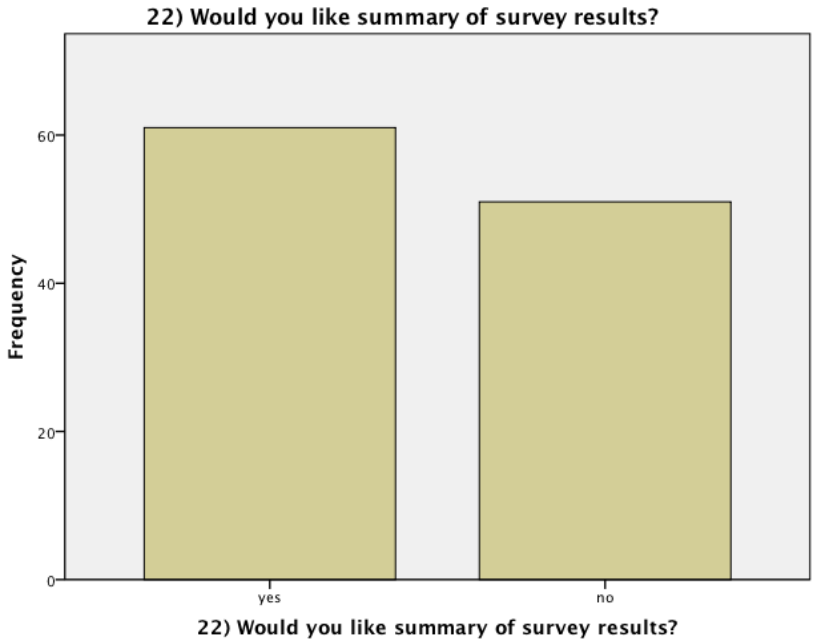

Figure 21: Respondents wishing to receive summary of survey results

Respondents were fairly evenly split on this question with 54.5% saying they would and 45.5% saying they would not. On the whole, this may be regarded as quite a positive response since it reflects respondent's interests in NRM in the Avon region generally.

10.0 Open-ended question (additional comments)

A total of 46 respondents offered comments after the survey were completed. Many of the comments are about Wheatbelt NRM but that is the only obvious common theme. Most of the comments are unique and vary enormously in their concerns so they are presented below in their 'raw' form in no particular order.

- It is all a matter of economics – I can't afford to do it [NRM]. I'm wondering when any politicians will stand up for our industry as it can't survive as it is.
- A lot of energy and money goes into it [NRM] without anything to show for it.
- People on the land don't really count for much [politically].
- The Catchment group movement seems to have died and needs to be brought back to life again.
- I think it [NRM] is important.
- We need to receive continual and up-dated information. We started NRM efforts 10

years ago and would like to see funding for local NRMOs continued.

- Changes in the way landcare is delivered has made it more removed from day to day farming for a lot of people. This has limited our ability to work as a community on projects. Economic pressures also limits our ability to do necessary NRM.
- Maybe they [WNRM] need to contact local nurseries to see if they'll provide trees in local areas.
- We need all the help we can get to subsidise tree planting.
- Perhaps WNRM's profile should be lifted somehow. If it wasn't for local landcare we would know very little about them, their programs and their efforts to access funding.
- Sometimes it's not recognised that most farmers are interested in the land and do much valuable work funded out of their own pocket.
- I understand the broad boundaries and the Nyungar may not be properly represented in these areas.
- I know the difficult task they do. I am disappointed in the general attitude of farmers lately. Farmers don't read much. We have planted large tracts of saltbush, and yet a lot of farmers don't do anything at all.
- We started a project to plant 35,000 trees over three years. We've done two years but WNRM lost our recent application for the final year of planting. I think this is poor management.
- It's a disgrace they changed the name as they don't represent all the wheatbelt. When a member of ACC saw communications from ACC it was to like-minded groups and not to farmers in general i.e. through newspaper media. Their activity should be worthy of wider news coverage rather than glossy little brochures to a closed shop.
- I wasn't aware that the WNRM came out this far. It is a battle farming, we are short on labour and there is a limit to what we can be involved in.
- In regard to Nyungar names, we are really all one race, so what names are given need to remain. Newsletters; we get too many in the mail and many get thrown out as junk mail. It would be good to add their newsletter with the Ag. Dept's, which is read more by farmers.
- They [WNRM] need to consult more with the farmers and the community and be amongst the community to know what is happening and what they are doing. Q3-q [grazing man't to 40% cover] is a dumb question by someone who doesn't know farming systems.
- Most of the damage done to the environment is the result of over-clearing and salinity requires a courageous solution that will involve drainage. It is too big a problem for

individuals, and requires an engineering solution.

- I went to WNRM looking for help to design a wetland. I was given glossy brochures but got no real help.
- They [WNRM] need to talk to local shire councils, farmer groups and landholders. There is no money coming to the landholder and it seems like most funds go to employ their staff.
- It was 10 years ago; I spent three days putting together a project for tree planting and nothing eventuated from it. People are sick and tired of doing these things – it is a waste of time. The Avon Catchment/Wheatbelt covers too large an area - from high rainfall to at present no rainfall. I don't think WNRM can cover all this area.
- Landcare, as it was in the 90s, has lost its way. People still are interested and farmers are farming with more technology which is overshadowing best practices for the land agriculturally and also landcare management.
- They [WNRM] have to be very flexible in their solutions to the different problems as it is such a wide area to cover. We are getting too many glossy brochures from organisations blowing their own trumpet.
- I think they [WNRM] are doing a good job by letting everyone know what is going on.
- They [WNRM] need to confer more closely with farmers. They are very close to wrecking the landcare movement when they closed valley floor funding.
- DEC need to go. They are like a mini Hitler.
- There's too much government bureaucracy, which doesn't work well with landholders.
- There needs to be a balance between agriculture and conservation.
- Some of the things are organised by the well educated, but common sense does not always prevail.
- The landcare movement started well, with good interest for the first 5 years, but it has waned.
- If I were younger, I would have had more to say, but I'm sceptical of government departments.
- Deep drains are installed along the saline drainage lines and are saving a lot of land. Communities and people are still out here, needing assistance, but being in the minority we are no longer being listened to.
- The ACC didn't communicate very well with landholders. They were too Northam-centred. Local people should have greater influence in solving local problems.

- I would like to some more money for on-ground work.
- It's not a level playing field for Australian farmers. Europeans are heavily subsidised and have much better soil. This gives them huge advantages over us.
- Women often have difficulty with attending workshops because there are no childcare facilities - yet women are often more the prime movers in NRM.
- Would be best to give all the money to DAFWA.
- It would have been better if you could've surveyed younger people.
- Government does not listen to local people and they don't understand what they have been told. They took away the LCDC group to stop local input.
- We find it hard to convince people of the success we are having with deep drainage; they at least should come and have a look. If you plant trees on salt country, they will die, it needs to be drained first.
- They [WNRM] should be monitoring water tables, planting trees further up the slope and not hold water up the slope where it will work down to the flats. As for recycling, we have been recycling tonnes of stubble for years. I drive to Perth a lot, and as you drive around, it's clear people are planting the trees too close together and then during the dry years they die off because of competition. This is just a waste of resources.
- The applications [for funding] are lengthy and full of red tape. Farmers despise red tape. Workshops are a waste of money that should be spent on trees.
- Lack of government funding has resulted in loosing the local landcare groups. If we could get 100% tax deduction for environmental work, there would be much more achieved.

11.0 Geographic distribution of results for environmental concerns

As was apparent with some questions above, it is often useful to consider whether there are any geographic variations in the responses. Analyses of this kind may help Wheatbelt NRM, and any other interested organisation/party, to target their information dissemination.

Details about respondents' location according to Shire are contained in Appendix D but for the purpose of analysis, respondents have been sorted into their respective sub-regions. Table 27 displays the distribution of respondents across the region (according to the three sub-regions – Avon, Yilgarn and Lockhart).

Table 27: Respondents location according to WNRM Sub-region

	Frequency	Percent
Avon	52	46.4
Yilgarn	33	29.5
Lockhart	27	24.1
Total	112	100.0

There is a slight bias in the sample towards the Avon sub-region but this is quite an accurate reflection of the distribution of the Avon population since this region does contain more people than the other two regions.

Tables 28a, 28b and 28b (below) consider the responses to Question 13 (environmental concerns) across the three sub-regions of Avon, Yilgarn and Lockhart. Table 28a contains data for the first priority concern, Table 28b the second priority, and Table 28c the third priority. The figures of most interest in these tables are the second % figures down in each column, which indicated the proportion of respondents from the sub-region that indicated their issues of concern e.g. Table 28a, for the Avon, salinity was identified by 47.1% of respondents. Comparisons of these data reveal sub-regional variations for the environmental concerns identified.

Considering first environmental concerns (Table 28a) two observations are notable. First, salinity is more of a concern to respondents in the Lockhart sub-region (55.6%) compared with the Avon (47.1%) and Yilgarn (45.5%). Second, lack of rain is significantly more of a concern in Yilgarn (33.3%) compared with Lockhart (14.8%) and Avon (7.8%). There is little difference in the proportions of respondents' concerns towards the other environmental concerns identified (wind erosion, soil erosion, climate change, biodiversity / vegetation decline, weeds and feral animals, waterway degradation, soil fertility and farm sustainability / production. And, a review of data contained in Tables 28b and 28c reveals that geographic variation over these concerns levels out so that all three regions vary only very marginally on all concerns.

Table 28a: Cross-tabulation of respondents (sub-region) with 1st environmental concerns (Q13)

WNRM Sub-region * 13_1) 1st environmental concern Crosstabulation

			13_1) 1st environmental concern											
			salinity	wind erosion	soil erosion (unspecified)	lack of rain	climate change	biodiversity / vegetation decline	weeds & feral animals	waterway degradation / management	soil fertility (pH etc)	farm sustainability / production	other issues	Total
WNRM Sub-region	Avon	Count	24	0	3	4	5	4	2	4	1	3	1	51
		% within WNRM Sub-region	47.1%	.0%	5.9%	7.8%	9.8%	7.8%	3.9%	7.8%	2.0%	5.9%	2.0%	100.0%
		% within 13_1) 1st environmental concern	44.4%	.0%	100.0%	21.1%	71.4%	57.1%	100.0%	57.1%	25.0%	100.0%	25.0%	45.9%
		% of Total	21.6%	.0%	2.7%	3.6%	4.5%	3.6%	1.8%	3.6%	.9%	2.7%	.9%	45.9%
	Yilgarn	Count	15	0	0	11	1	1	0	2	0	0	3	33
		% within WNRM Sub-region	45.5%	.0%	.0%	33.3%	3.0%	3.0%	.0%	6.1%	.0%	.0%	9.1%	100.0%
		% within 13_1) 1st environmental concern	27.8%	.0%	.0%	57.9%	14.3%	14.3%	.0%	28.6%	.0%	.0%	75.0%	29.7%
		% of Total	13.5%	.0%	.0%	9.9%	.9%	.9%	.0%	1.8%	.0%	.0%	2.7%	29.7%
	Lockhart	Count	15	1	0	4	1	2	0	1	3	0	0	27
		% within WNRM Sub-region	55.6%	3.7%	.0%	14.8%	3.7%	7.4%	.0%	3.7%	11.1%	.0%	.0%	100.0%
		% within 13_1) 1st environmental concern	27.8%	100.0%	.0%	21.1%	14.3%	28.6%	.0%	14.3%	75.0%	.0%	.0%	24.3%
		% of Total	13.5%	.9%	.0%	3.6%	.9%	1.8%	.0%	.9%	2.7%	.0%	.0%	24.3%
Total		Count	54	1	3	19	7	7	2	7	4	3	4	111
		% within WNRM Sub-region	48.6%	.9%	2.7%	17.1%	6.3%	6.3%	1.8%	6.3%	3.6%	2.7%	3.6%	100.0%
		% within 13_1) 1st environmental concern	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	48.6%	.9%	2.7%	17.1%	6.3%	6.3%	1.8%	6.3%	3.6%	2.7%	3.6%	100.0%

Table 28b: Cross-tabulation of respondents (sub-region) with 2nd environmental concerns (Q13)

WNRM Sub-region * 13_2) 2nd environmental concern Crosstabulation

			13_2) 2nd environmental concern												
			salinity	wind erosion	water erosion	soil erosion (unspecified)	lack of rain	climate change	biodiversity / vegetation decline	weeds & feral animals	waterway degradation / management	soil fertility (pH etc)	farm sustainability / production	other issues	Total
WNRM Sub-region	Avon	Count	10	3	1	3	3	0	6	1	2	3	4	9	45
		% within WNRM Sub-region	22.2%	6.7%	2.2%	6.7%	6.7%	.0%	13.3%	2.2%	4.4%	6.7%	8.9%	20.0%	100.0%
		% within 13_2) 2nd environmental concern	43.5%	33.3%	33.3%	42.9%	27.3%	.0%	42.9%	50.0%	50.0%	50.0%	80.0%	64.3%	44.6%
		% of Total	9.9%	3.0%	1.0%	3.0%	3.0%	.0%	5.9%	1.0%	2.0%	3.0%	4.0%	8.9%	44.6%
	Yilgarn	Count	6	5	2	3	3	1	5	1	0	2	0	3	31
		% within WNRM Sub-region	19.4%	16.1%	6.5%	9.7%	9.7%	3.2%	16.1%	3.2%	.0%	6.5%	.0%	9.7%	100.0%
		% within 13_2) 2nd environmental concern	26.1%	55.6%	66.7%	42.9%	27.3%	33.3%	35.7%	50.0%	.0%	33.3%	.0%	21.4%	30.7%
		% of Total	5.9%	5.0%	2.0%	3.0%	3.0%	1.0%	5.0%	1.0%	.0%	2.0%	.0%	3.0%	30.7%
	Lockhart	Count	7	1	0	1	5	2	3	0	2	1	1	2	25
		% within WNRM Sub-region	28.0%	4.0%	.0%	4.0%	20.0%	8.0%	12.0%	.0%	8.0%	4.0%	4.0%	8.0%	100.0%
		% within 13_2) 2nd environmental concern	30.4%	11.1%	.0%	14.3%	45.5%	66.7%	21.4%	.0%	50.0%	16.7%	20.0%	14.3%	24.8%
		% of Total	6.9%	1.0%	.0%	1.0%	5.0%	2.0%	3.0%	.0%	2.0%	1.0%	1.0%	2.0%	24.8%
Total		Count	23	9	3	7	11	3	14	2	4	6	5	14	101
		% within WNRM Sub-region	22.8%	8.9%	3.0%	6.9%	10.9%	3.0%	13.9%	2.0%	4.0%	5.9%	5.0%	13.9%	100.0%
		% within 13_2) 2nd environmental concern	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	22.8%	8.9%	3.0%	6.9%	10.9%	3.0%	13.9%	2.0%	4.0%	5.9%	5.0%	13.9%	100.0%

Table 28c: Cross-tabulation of respondents (sub-region) with 3rd environmental concerns (Q13)

WNRM Sub-region * 13_3) 3rd environmental concern Crosstabulation

			13_3) 3rd environmental concern												
			salinity	wind erosion	water erosion	soil erosion (unspecified)	lack of rain	climate change	biodiversity / vegetation decline	weeds & feral animals	waterway degradation / management	soil fertility (pH etc)	farm sustainability / production	other issues	Total
WNRM Sub-region	Avon	Count	2	4	1	1	4	2	4	4	3	3	1	1	30
		% within WNRM Sub-region	6.7%	13.3%	3.3%	3.3%	13.3%	6.7%	13.3%	13.3%	10.0%	10.0%	3.3%	3.3%	100.0%
		% within 13_3) 3rd environmental concern	40.0%	44.4%	33.3%	33.3%	66.7%	33.3%	40.0%	66.7%	60.0%	60.0%	25.0%	16.7%	44.1%
		% of Total	2.9%	5.9%	1.5%	1.5%	5.9%	2.9%	5.9%	5.9%	4.4%	4.4%	1.5%	1.5%	44.1%
	Yilgarn	Count	2	3	2	2	2	2	5	0	1	1	1	4	25
		% within WNRM Sub-region	8.0%	12.0%	8.0%	8.0%	8.0%	8.0%	20.0%	.0%	4.0%	4.0%	4.0%	16.0%	100.0%
		% within 13_3) 3rd environmental concern	40.0%	33.3%	66.7%	66.7%	33.3%	33.3%	50.0%	.0%	20.0%	20.0%	25.0%	66.7%	36.8%
		% of Total	2.9%	4.4%	2.9%	2.9%	2.9%	2.9%	7.4%	.0%	1.5%	1.5%	1.5%	5.9%	36.8%
	Lockhart	Count	1	2	0	0	0	2	1	2	1	1	2	1	13
		% within WNRM Sub-region	7.7%	15.4%	.0%	.0%	.0%	15.4%	7.7%	15.4%	7.7%	7.7%	15.4%	7.7%	100.0%
		% within 13_3) 3rd environmental concern	20.0%	22.2%	.0%	.0%	.0%	33.3%	10.0%	33.3%	20.0%	20.0%	50.0%	16.7%	19.1%
		% of Total	1.5%	2.9%	.0%	.0%	.0%	2.9%	1.5%	2.9%	1.5%	1.5%	2.9%	1.5%	19.1%
Total		Count	5	9	3	3	6	6	10	6	5	5	4	6	68
		% within WNRM Sub-region	7.4%	13.2%	4.4%	4.4%	8.8%	8.8%	14.7%	8.8%	7.4%	7.4%	5.9%	8.8%	100.0%
		% within 13_3) 3rd environmental concern	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	7.4%	13.2%	4.4%	4.4%	8.8%	8.8%	14.7%	8.8%	7.4%	7.4%	5.9%	8.8%	100.0%

SECTION D: SUMMARY AND CONCLUDING REMARKS

Background

The Centre of Excellence in Natural Resource Management (CENRM), the University of Western Australia (UWA), were contracted by Wheatbelt Natural Resource Management Inc. (Wheatbelt NRM) to conduct two surveys (July 2010 and June 2011) of landholders in the Avon Catchment, Western Australia. This report provides details of the findings from the 2010 survey.

Survey methodology

Landholders' contact details were obtained from Telstra's *Yellow Pages* by identifying 'farmers' from known localities within Avon Catchment. A *structured random sampling* method was then used to identify a geographically representative sample from across the region.

Data from the surveys were entered into Microsoft Excel for storage and transfer purposes and most of the statistical analysis was carried out from within the Statistical Package for Social Sciences (SPSS).

There were 112 positive responses, 172 were not interested in taking part in the survey and 27 did not want to take part because the said they were not actively farming or managing land. The overall response rate was 56.3%.

Results

For the purpose of this summary, the findings are organized under six headings: (a) the profile of respondents; (b) respondents' views and involvement in NRM; (c) NRM information acquired by respondents; (d) perceptions about Wheatbelt NRM's roles and responsibilities; (e) Avon Regional Strategies; and, (f) perceived NRM priorities.

The profile of respondents

The distribution of respondents across the Avon region was fairly uniform and broadly representative of the catchment. The majority of respondents were male (76.8%); less than 10% were under 40 years old (66.1% were over the age of 50 years).

The Department of Agriculture and Food Western Australia (DAFWA) regard 'small landholdings' (in the Northam Advisory District) as anything between 1 and 100ha (DAFWA 2006); however, farms in this category constitute just 3.9% of the total in the district so nearly all respondents in the 2010 survey were managing properties larger than 100ha.

Most respondents had lived in the Avon region for periods longer than 40 years (75.9%) and more than 90% said their primary income was derived from their properties.

The literature surrounding the question of age and NRM has both positive and negative implications. On the positive side, increasing age has been associated with more positive attitudes towards NRM e.g. members of Landcare and Catchments groups tend to be older. However, age is generally correlated with diminishing capacity. As landholders get older their ability to spend time on activities outside the 'core business' of running the farm may decline. Age also raises the question of succession however and studies have also found that, older farmers are usually keen to ensure they pass on an environmentally healthy farm.

Similarly, length of residence is usually associated with a strong sense of place/community and the results here may imply there is considerable 'good will' in the Avon community for NRM. But, there is concern in the industry generally that fewer younger people are taking up farming as a profession so there is concern about future human capacity for NRM.

Respondents' views and involvement in NRM

In the 2006 survey it was found that 41.7% of large property owners were involved in NRM (58.3% were not). In the 2010 survey it was found that 61.6% of respondents were involved in NRM. Notably, 24.1% said they were not involved while 14.3% were unsure whether they were involved in NRM or not. A Pearson's test of correlation did not show any gender bias in the responses to this question ($p=0.262$) so why more than 24% of farmers said they were not involved in NRM remains unclear but perhaps they feel they are only involved in farming and/or perhaps respondents were unclear about what exactly is meant by NRM.

Involvement in NRM across the sub-regions varied marginally. Lockhart had the lowest involvement (55.5%) and the Avon the highest (69.7%).

Question 2 took Question 1 further by exploring respondents associations with NRM groups and industry groups. Seven options for this question were provided: landcare/catchment groups;

grower groups; farm forestry groups; Land Care District Committees (LCDCs); Wheatbelt NRM; farm improvement groups; and, indigenous groups. Multiple responses were permitted so respondents could state their involvement with two or even more groups. More than 72% of respondents said they were involved with community groups of one form or another. Of the 81 positive responses to this question 24 were members of more than one group, 18 were members of two groups, five were members of three groups and one was a member of four groups.

Involvement with NRM groups outweighs involvement with all other groups. Landcare and catchment groups had 34 positive responses (30.3% of the 81 positive responses) but if LCDCs are included it adds another 10 positive responses taking it to 39.3%. This is similar to what was found in the 2006 survey which revealed 36.4% involvement.

There was a slight difference in involvement with farm improvement groups between 2006 and 2010 – 22% of respondents in 2006 but just 8.9% in 2010. None of the respondents in the 2010 survey said they had any involvement in Indigenous groups.

Despite the results indicated above, NRM appears to be very much a part of respondents' typical land management activities (this was also evident in the sample of large landholders in the 2006 survey). Notable NRM practices from the 2010 respondents were:

- No/reduced tillage (83%)
- Liming (66%)
- Grazing to maintain 40% cover (63.4%)
- Pest/weed management (85.7%)
- Recycling (67.8%)
- Use of rainwater tanks (75.9%)
- Surface water harvesting (82.1%)
- Surface water management (54.5%)
- Tree planting to help control salinity (44.6%)
- Use of saltland pastures and protecting remnant vegetation with fencing (50%).

NRM practices that are not so widely adopted were:

- Perennial pastures (40.2%)
- Waterway protection activities (39.3%)
- Tree planting for biodiversity purposes (25.9%)
- Tree planting for wind protection (25%)
- Protection of remnant vegetation through use of covenants (12.5%)
- Use of deep drains to help control salinity (17.8%)

In the 2006 survey, tree planting was not split across its main purposes (e.g. salinity control,

biodiversity, wind protection) so a direct comparison on this indicator across the two survey years has not been possible. However, tree planting, for whatever purpose, was being carried out by 97.7% of the large property holders in 2006. Most said they were planting native plant or tree species.

NRM indicators that are directly comparable across the two survey periods were:

- Surface water harvesting (83.3% in 2006; 82.1% in 2010)
- Pest/weed management (76.5% in 2006; 85.7% in 2010)
- Surface water management (73.4% in 2006; 54.5% in 2010)

Similarly, Question 5 (2010 survey) asked respondents about their 'activities' that may be associated with NRM. A similar question was also asked in 2006. Activities that featured strongly were:

- Monitoring NRM condition (41.7% in 2006; 42% in 2010)
- Taking part in field days and/or walks (38.6% in 2006; 36.6% in 2010)
- Trialling new NRM techniques and/or technologies (37.5% in 2010)
- Involved in a NRM funded project (20.5% in 2010)

Another activity considered in the 2006 survey was developing new industries. Very similar results were found in the 2010 survey (14.4% in 2006; 14.3% in 2010).

NRM information acquired and provided

The majority of respondents in the 2010 survey said they did not want to receive any NRM information (66.1%). This is not an unusual response to this type of question because most farmers complain about the amount of information (especially marketing) they receive and they may feel NRM information will only add to this. Also, other studies have shown that many farmers believe they understand the NRM issues and solutions very well (because it's a normal everyday part of their business) so they don't need to be informed about such practices. Given these perceptions, one might conclude that a 33.9% positive response to this question is actually quite encouraging.

Question 6 explored sources that respondents did use to access NRM information. There were two components to this question (a) the people that provided information (b) media and published sources used. Some of the indicators are directly comparable over both surveys. For people consulted:

- Landcare coordinators are apparently most popular (17.4% in 2006; 32.1% in 2010)
- Government officers (59.1% in 2006; 20.5% in 2010)
- Farm consultants (19.7% in 2006; 8.9% in 2010)
- Rural merchandisers and stock agents (41.7% in 2006; 10.7% in 2010)
- Farmers and peers (56.1% in 2006; 20.5% in 2010)
- Wheatbelt NRM/ACC (22% in 2006; 9.8% in 2010)

For published sources:

- Local newspapers (80.3% in 2006; 11.6% in 2010)
- ABC radio (78% in 2006; 24.1% in 2010)
- *Farm Weekly* (78% in 2006; 51.8% in 2010)
- *Countryman* (weekly paper) (58.3% in 2006; 44.6% in 2010)
- Government publications (58.3% in 2006; 13.4% in 2010)
- Internet (50.4% in 2006; 31.2% in 2010)

There is quite a high degree of variation across the two survey periods and it is difficult to explain the reasons for this from the data obtained. The popularity of the *Farm Weekly* and the *Countryman* is perhaps not surprising since they are publications produced principally for farmers and they contain stories and information on a broad range of topics of interest to farmers and rural people – not just NRM.

Question 12 asked about Wheatbelt NRM information received by respondents. A total of 64 respondents (57.1%) said they never received the Newsletter, the ENews, the Annual report, a Calendar or any other Wheatbelt NRM information. Of the four types of information offered, none of them especially stands out as being more popular than any other.

For those that have not received information from Wheatbelt NRM (n=49), the following was requested:

- Newsletter 21 (42.9%)
- ENews 20 (40.8%)
- Annual Report 11 (22.5%)
- Calender 10 (20.4%)

This question was not asked in 2006 so a comparison is not possible but it is notable that 58.3% of large landholders and 8.6% of small landholders said they did receive information from the ACC.

It is also notable here that in 2006 respondents were asked about how they would like to receive

NRM information. Large property holders said they would prefer to receive information via newsletter (66.8%), publications from relevant industry groups (60.6%), the Internet (59.1%) and email (50.8%). Small landholders said they would prefer to receive information via newsletter (62.9%), the Internet (41.8%), email (33.9%), workshops and seminars (25.4%) and publications from relevant industry groups (24.3%).

While the form of information wasn't considered in the 2010 survey, it may be assumed that people's views about the form of information hasn't changed; for example, newsletters are still likely to be popular. However, despite the finding indicated above, it is conceivable that adoption of the Internet and email may have increased over the last four years.

Perceptions about Wheatbelt NRM's roles and responsibilities

Wheatbelt NRM is widely known across the region with 91.1% of 2010 respondents saying they had heard of the organisation. This was true across the entire survey area of the Avon Catchment. A similar finding emerged from the 2006 survey where 100% of large landholders and 72.2% of small landholders said they had heard of the ACC.

More than half the 2010 respondents said they were unfamiliar with any Wheatbelt NRM managed projects (52.7%). Of those that are known, most have a water quality context (42%) but the vast majority of respondents could not be specific about projects indicating perhaps that they are unfamiliar with the details of projects.

Question 9 asked respondents about the main purpose/s of Wheatbelt NRM. The most notable finding was that nearly 80% responded positively. Most thought that management of waterways (42%) was their main role but their advisory role (33%), seeking funding role (28.6%) and promoting the protection of natives (26.8%) were also highlighted. Responses here also indicated the importance of salinity perhaps implying is that one of Wheatbelt NRM's roles should be the promotion of its management. Details about Wheatbelt NRM's (ACC's) role/s was not asked in the 2006 survey.

Avon Regional Strategies

The majority of respondents in the 2010 survey had not heard about the Avon NRM Strategy (2005) (65.2%) and while there is virtually no difference between the Avon and Yilgarn sub-regions (both approx. 61%) the Lockhart sub-region appears to be have been slightly less exposed to the Strategy (77.8%).

Question 11 asked respondents who should be custodian of a regional Wheatbelt NRM Strategy. Out of the options provided Wheatbelt NRM was nominated to first place (17.9%) with the Department of Agriculture Food WA (DAFWA) coming a close second (16.1%). Eight respondents thought there should not be a Wheatbelt NRM Strategy at all but why they are of this opinion is unclear from the data collected but they believe there will be clashes with the Avon NRM Strategy (2005).

Perceived NRM priorities in the Avon region

Salinity was the single most frequently sited land degradation issue in the 2010 survey. This was identified by a total of 82 (73.2%) of all respondents. Lack of rain was regarded as the second most important issue (32.1%).

Other issues were identified but none especially stand out as notable in terms of frequencies but they include wind erosion, soil erosion, climate change, biodiversity/vegetation decline, water degradation/management, soil fertility and farm sustainability/production.

The same question was not asked in the 2006 survey but there was a question that asked about NRM issues they were involved in managing. For the large landholders the following emerged:

- Weeds (100%)
- Erosion (98.5%)
- Vegetation (96.2%)
- Soil (82.6%)
- Surface runoff (78%)
- Groundwater (59.1%)
- Salinity (37.1%)
- Waterways (22%)
- Biodiversity (22%)
- Agricultural business management (19.7%)
- Farming systems (19.7%)

It seems notable that salinity was apparently far less of a concern in 2006. Again, why this may be the case is not evident from the data obtained but the difference may be a function of the questions posed rather than a reflection of changing values or concerns.

Environmental concerns across the three sub-regions (Avon, Yilgarn and Lockhart) varied only marginally. Salinity was more of a concern to respondents in the Lockhart sub-region (55.6%) compared with the Avon (47.1%) and Yilgarn (45.5%). Lack of rain is significantly more of a

concern in Yilgarn (33.3%) compared with Lockhart (14.8%) and Avon (7.8%), which could reflect the drought conditions that have afflicted this sub-region. There is little difference in the proportions of respondents' concerns towards other environmental concerns e.g. wind erosion, soil erosion, climate change, biodiversity / vegetation decline, weeds and feral animals, waterway degradation, soil fertility and farm sustainability / production.

Nearly half the respondents indicated they volunteer for environmental work (42%). A cross-tabulation of the responses across the three sub-regions indicated there might be a statistically significant difference between the Yilgarn, where 51.5% volunteer, and Lockhart where 33.3% volunteer.

The majority of respondents appear to be favourable to the idea of using Nyungar names for plants, animals and places in any signage at reserves and community sites (55.4%).

The last question in the survey asked respondents whether they would like to receive a summary of the results from the 2010 survey. Respondents were fairly evenly split with 54.5% saying they would and 45.5% saying they would not. Again, some readers may regard this as a fairly positive response since it reflects respondents' interests in NRM in the Avon region generally.

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Department of Agriculture and Food Western Australia, 2006. Current Property Size Distribution of Landholders in the Northam Advisory District, Bulletin 4716, Farming Systems Research, Northam, WA 6401.

APPENDIX A: ABBREVIATIONS

ACC: Avon Catchment Council

CENRM: Centre of Excellence in Natural Resource Management

WNRM: Wheatbelt Natural Resource Management Inc. (formally Avon Catchment Council)

DEC: Department of Environment and Conservation

DAFWA: Department of Agriculture and Food Western Australia

DoW: Department of Water

M&E: Monitoring and Evaluation

NRM: Natural Resource Management

UWA: University of Western Australia

APPENDIX B: DEFINITIONS

Catchment: Extent of land where water drains into a body of water.

Farmer: In this report farmers have identified themselves because they listing themselves under the 'farmers' heading in Telstra's *Yellow Pages*.

Landholders: In this report landholders are all survey respondents since all respondents are responsible for the management of property/s – in this case, farms.

Small landholders: respondents that are managing properties 1-100ha.

Large landholders: respondents that are managing properties greater than 100ha.

Sub-catchment: Smaller catchments which make up catchments.

Stakeholder: Individuals, groups or organisations which affect or may be affected by land/waterway management responses.

Respondent: A person that completed the telephone survey.

Region: In this report, 'region' refers to a natural resource management region. There are six such regions in WA and the Avon Region (the area of concern to Wheatbelt NRM) is the geographic region considered in this survey.

Statistical significance: Statistical significance is a measure of the confidence (denoted by *p*) that an observed difference in the sample population is real. In social science, statistical significant differences arise when the *p* value is lower than 0.05, which is the 95% confidence level i.e. one may be 95% confident that there is a difference in the two datasets being analysed. In some circumstances a *p* value of 0.1 is an acceptable level of confidence (90%).

Sub-region: NRM regions are split into sub-regions for management purposes and Sub-regional Management bodies are appointed to oversee NRM activities in sub-regions. For the Avon Region, the sub-regions are: Avon, Lockhart and Yilgarn.

APPENDIX C

Data tables associated with Q13

Table AC13-1: 1st Environmental concern

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	salinity	54	48.2	48.6	48.6
	wind erosion	1	.9	.9	49.5
	soil erosion (unspecified)	3	2.7	2.7	52.3
	lack of rain	19	17.0	17.1	69.4
	climate change	7	6.3	6.3	75.7
	biodiversity / vegetation decline	7	6.3	6.3	82.0
	weeds & feral animals	2	1.8	1.8	83.8
	waterway degradation / management	7	6.3	6.3	90.1
	soil fertility (pH etc)	4	3.6	3.6	93.7
	farm sustainability / production	3	2.7	2.7	96.4
	other issues	4	3.6	3.6	100.0
	Total	111	99.1	100.0	
Missing	System	1	.9		
Total		112	100.0		

Table AC13-2: 2nd Environmental concern

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	salinity	23	20.5	22.8	22.8
	wind erosion	9	8.0	8.9	31.7
	water erosion	3	2.7	3.0	34.7
	soil erosion (unspecified)	7	6.3	6.9	41.6
	lack of rain	11	9.8	10.9	52.5
	climate change	3	2.7	3.0	55.4
	biodiversity / vegetation decline	14	12.5	13.9	69.3
	weeds & feral animals	2	1.8	2.0	71.3
	waterway degradation / management	4	3.6	4.0	75.2
	soil fertility (pH etc)	6	5.4	5.9	81.2
	farm sustainability / production	5	4.5	5.0	86.1
	other issues	14	12.5	13.9	100.0
	Total	101	90.2	100.0	
Missing	System	11	9.8		
Total		112	100.0		

Table AC13-3: 3rd Environmental concern

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	salinity	5	4.5	7.4	7.4
	wind erosion	9	8.0	13.2	20.6
	water erosion	3	2.7	4.4	25.0
	soil erosion (unspecified)	3	2.7	4.4	29.4
	lack of rain	6	5.4	8.8	38.2
	climate change	6	5.4	8.8	47.1
	biodiversity / vegetation decline	10	8.9	14.7	61.8
	weeds & feral animals	6	5.4	8.8	70.6
	waterway degradation / management	5	4.5	7.4	77.9
	soil fertility (pH etc)	5	4.5	7.4	85.3
	farm sustainability / production	4	3.6	5.9	91.2
	other issues	6	5.4	8.8	100.0
	Total	68	60.7	100.0	
Missing	System	44	39.3		
Total		112	100.0		

APPENDIX D

Data table associated with respondents location

Table 29: Cross-tabulation of respondents location according to Shire & WNRM Sub-region

	Avon	Yilgarn	Lockhart
Wongan-Ballidu	6		
	5.4%		
Koorda	5		
	4.5%		
Mt Marshall		6	
		5.4%	
Mukinbudin		6	
		5.4%	
Westonia		2	
		1.8%	
Yilgarn		3	
		2.7%	
Goomalling	7		
	6.3%		
Dowerin	6		
	5.4%		
Wyalkatchem	4		
	3.6%		
Trayning		2	
		1.8%	
Nungarin		2	
		1.8%	
Toodyay	3		
	2.7%		
Northam	7		
	6.3%		
Cunderdin	5		
	4.5%		
Tammin	2		
	1.8%		
Kellerberrin		5	
		4.5%	

Merriden		7	
		6.3%	
York	5		
	4.5%		
Quairading			5
			4.5%
Bruce Rock			4
			3.6%
Narembeen			13
			11.6%
Beverley	1		
	.9%		
Wickepin	1		
	.9%		
Kulin			2
			1.8%
Lake Grace			1
			.9%
Kent			2
			1.8%

APPENDIX E

Survey questionnaire (telephone)

Background & Purpose of Survey
The University of Western Australia (UWA) has been contracted by Wheatbelt Natural Resource Management (WNRM) Inc to undertake a survey of landholders (farmers) in the Avon region to determine their understanding of WNRM, their level of satisfaction of services and functions of the organization, and landholders' knowledge of natural resource management. Potential survey participants have been identified randomly from Telstra's *Yellow Pages* and only landholders that are located within the Avon region that have identified themselves as 'farmers' have been selected.

The information provided by participants in this survey will be used by WNRM to report on the quality of the services they provide to the community under Commonwealth Government's *Caring for Our Country* (CfOC) program. WNRM will also use the information to enhance the services they provide – especially the provision of NRM information to the Avon region community.

Ethical Considerations
Participation in this study is voluntary. Participants are free at any time to withdraw their consent to further participation in the survey without prejudice in any way. Participants need not give a reason or justification for their decision and in such a case the record of their participation will be destroyed.

The confidentiality of participants will be preserved at all times. The information provided by participants in this survey will not be released to anyone not directly involved in the project. The information provided by participants will only be used for the purposes described above.

Information about the results of the study will be provided to participants if interested. The Principal Investigator, Dr Colin Macgregor, or the Assistant Investigator, Geraldine Janike, is happy to answer any questions concerning the research.

The Human Research Ethics Committee at UWA requires that all participants are informed that, if they have any complaint regarding the manner in which a research project is conducted, this may be given to the researcher or alternatively to the Secretary, Human Research Ethics Committee at The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, telephone number: (08) 6488 3703.

How the survey will be completed
The telephone survey will take approximately 15 minutes to complete. During the survey a number of questions will be asked for which we are seeking your answer. Most answers require a 'yes' or 'no' response but some also include multiple-choice options where you will be asked to nominate an answer (or answers) form a list of possible answers. In a few cases, you will be asked to provide further details to your answers. As we work through the questions we will enter your answers into an electronic database. If there is a pause for a moment after you've given an answer it is because we're in the process of entering your answer into the database.

We would like to stress that there are no right or wrong answers and we encourage you not to spend too much time thinking about any one question.

Agreement to participate
First, do you have any questions concerning the survey?

1. Are you satisfied that you have been advised as to what information is being collected, the purpose for collecting the information, and what will be done with the information upon completion of the research?

2. Do you agree that research information gathered for the project may be published provided your name or other identifying information is not used?

3. Are you willing to take part in the survey?

A 'yes' response to each of these three questions constitutes agreement to participate in the survey and to the conditions described above.

4. When would it be convenient to call (time, date) in order to conduct the survey?

Survey Questions:

1. Are you involved in natural resource management (NRM)?

Yes (1)
No (2)
Not sure or don't know (3)

2. Are you currently involved in any NRM, industry or community groups?
(multiple responses accepted)

a. A landcare or catchment group (yes = 1; no = 2)
b. Grower group (yes = 1; no = 2)
c. Farm forestry group (yes = 1; no = 2)
d. Land Conservation District Committee (LCDC) (yes = 1; no = 2)
e. Member or associate of Wheatbelt Natural Resource Management (WNRM) (formerly Avon Catchment Council) (yes = 1; no = 2)
f. Farm/land improvement groups (yes = 1; no = 2)
g. Local Indigenous community (yes = 1; no = 2)
h. Other (yes = 1; no = 2, enter a suitable title in next column)
i. No, I am not involved (enter 3 – in (a) column)

3. Have you used any NRM practices over the last two years?
(multiple responses accepted)

a. Protecting remnant vegetation (e.g. fencing) (yes = 1; no = 2)
b. Protecting remnant vegetation (through covenants) (yes = 1; no = 2)
c. Tree planting for wind erosion (yes = 1; no = 2)
d. Tree planting for salinity and/or water logging (yes = 1; no = 2)
e. Tree planting for biodiversity (yes = 1; no = 2)

f. Surface water management (yes = 1; no = 2)
g. Natural waterway protection (e.g. creeks, rivers) (yes = 1; no = 2)
h. Deep drains to control salinity (yes = 1; no = 2)
i. Use of saltland pastures (yes = 1; no = 2)
j. No tillage or reduced tillage cropping (yes = 1; no = 2)
k. Lime application (yes = 1; no = 2)
l. Use of perennial pastures (yes = 1; no = 2)
m. Surface water harvesting (e.g. dams) (yes = 1; no = 2)
n. Rainwater tanks (yes = 1; no = 2)
o. Water re-use (yes = 1; no = 2)
p. Pest/weed management (yes = 1; no = 2)
q. Grazing Management to 40% cover (yes = 1; no = 2)
r. Recycling (yes = 1; no = 2)
s. None (3 – in (a) column)

4. Would you like any information about any NRM practices to be sent to you?

Yes (1) No (2)

If 'yes', enter appropriate letters in next column and enter address in next column

5. **Have you been involved in any NRM activities over the last two years?** *(multiple responses accepted)*

a. Monitoring natural resource condition (e.g. water quality, soil health, flora/fauna surveys) (yes = 1; no = 2)
b. Field days or farm walks (yes = 1; no = 2)
c. Land management training courses (yes = 1; no = 2)
d. Developing new industries (yes = 1; no = 2) *Specify* & enter title in next column)
e. Environmental Management Systems (EMS) (yes = 1; no = 2)
f. Trialling new NRM techniques and/or technologies (yes = 1; no = 2) *Specify* & enter title in next column)
g. A funded NRM project (yes = 1; no = 2) *Specify* & enter title in next column)
h. NRM training or workshops (yes = 1; no = 2) *Specify* & enter title in next column)
i. NRM conferences or seminars (yes = 1; no = 2) *Specify* & enter title in next column)
j. Cross-cultural awareness training (yes = 1; no = 2)
k. Naidoc celebrations (yes = 1; no = 2)
l. None (99 – in (a) column)

6. Where do you obtain information relating to NRM?
(multiple responses accepted)

Information from people:

a) Farm consultant (yes = 1; no = 2)

b) Government officers (for example from the Department of Agriculture and Food, WA) (yes = 1; no = 2)

c) Community landcare coordinators or NRMOs (yes = 1; no = 2)

d) Rural merchandise and stock firms (yes = 1; no = 2)

e) Wheatbelt NRM (formerly Avon Catchment Council) (yes = 1; no = 2)

f) Farmers or peers (yes = 1; no = 2)

g) Not for Profit NRM organisations (e.g. Oil Mallee Association, WWF etc) (yes = 1; no = 2)

h) Researchers (yes = 1; no = 2)

i) Groups (e.g. Workshops, field days, seminars) (yes = 1; no = 2)

j) Local Indigenous community (yes = 1; no = 2)

k) DEC Indigenous Rangers (yes = 1; no = 2)

Information from media or other publications:

l) Countryman (yes = 1; no = 2)

m) Farm Weekly (yes = 1; no = 2)

n) Local Newspaper (yes = 1; no = 2)

o) The West Australian (yes = 1; no = 2)

p) The Australian (yes = 1; no = 2)

q) Landcare related magazine (yes = 1; no = 2)

r) Internet (yes = 1; no = 2)

s) Wheatbelt NRM Newsletter (yes = 1; no = 2)

t) ENews (yes = 1; no = 2)

u) ABC Radio (yes = 1; no = 2)

v) Publications from relevant industry related groups (yes = 1; no = 2)

w) Government publications (yes = 1; no = 2)

x) Other (*Specify* & enter source in next column)

y) I don't seek out information about NRM (99 – in (a) column)

7. Have you heard of Wheatbelt Natural Resource Management (formerly Avon Catchment Council) before today?

Yes (1) CONTINUE TO NEXT QUESTION

No (2) GO TO QUESTION 10

8. Which projects do you know of that are managed by Wheatbelt NRM?

(multiple responses accepted)

a. Water quality related. Yes (1); no (2). Enter title in column
b. Biodiversity related. Yes (1); no (2). Enter title in column
c. Sustainable Agriculture related. Yes (1); no (2). Enter title in column
d. Aboriginal Traditional Knowledge related. Yes (1); no (2). Enter title in column
e. Don't know (99 in (a) column)

9. What do you think Wheatbelt NRM's main purpose or purposes are?
(multiple responses accepted)

a. Helping the to distribute government funds and information to farmers. Yes (1); no (2)
b. Managing catchment waterways and water quality. Yes (1); no (2)
c. Working with people and communities to advise and assist them to manage the environment better. Yes (1); no (2)
d. Conserving and protecting native plants and animals. Yes (1); no (2)
e. Helping the community to achieve their vision for natural resources in the region. Yes (1); no (2)
f. Working with Local Indigenous communities to record and integrate traditional bush knowledge into natural resource management. Yes (1); no (2)
g. Other. Yes (1); no (2). If 'yes', summarise purpose/s in next column
h. Don't know. (99 in (a) column)

10. Have you heard of the *Avon Natural Resource Management Strategy* (2005) before today?

Yes (1)

No (2)

11. Which organization do you feel should be the custodian of a regional Wheatbelt natural resource management strategy:
(one response only)

a. Greening Australia (1)
b. Department of Agriculture and Food, WA (DAFWA) (2)
c. WWF (World Wide Fund for Nature) (3)
d. Wheatbelt Natural Resource Management (4)
e. Department of Environment and Conservation (DEC) (5)
f. Local Government (6)
g. Department of Water (DoW) (7)
h. Other, *please specify*: (8) – enter name of organization in next column
i. Don't know or have no opinion (99)

12. What type of information do you receive from us?

Type of Information	*How often do you read the information?*
a. Newsletter (hardcopy)	always (1) / sometimes (2) / never (3)
b. ENews (via email)	always (1) / sometimes (2) / never (3)
c. Annual Report	always (1) / sometimes (2) / never (3)
d. Calendar	always (1) / sometimes (2) / never (3)
e. Other (specify)	always (1) / sometimes (2) / never (3)

f. I don't receive any information (99)
g. Would you like to receive any of the items listed above? Yes (1); no (2)

(If 'yes', enter appropriate letters in next column and enter address in the following column if different from previous address.)

13. What are your top three environmental concerns? No concerns or don't know – enter (99) in column 1

1st Enter summary in column 1

2nd Enter summary in column 2

3rd Enter summary in column 3

14. Do you volunteer for environmental work in your community?

Yes (1)

No (2)

15. Do you think that it is important to include Nyungar names for plants, animals and places in signage erected at reserves and community sites?

Yes (1)

No (2)

Don't know or I have no opinion on the matter (99)

About you

The following questions will help us to make sure that we're getting responses from a good cross-section of people.

16. What is your gender?

Male (1)

Female (2)

17. Which of the following groupings best represents your age

18 – 19 (1)	50 – 59 (5)
20 – 29 (2)	60 – 64 (6)
30 – 39 (3)	65+ (7)
40 – 49 (4)	

18. Which shire do you live in? Responses will be 1-34 (see list for allocations)

19. How long have you lived in the Avon Catchment region? (Enter number of years in column)

20. What size (hectares) property do you manage? Enter number in column

21. Is your primary income derived from the land that you live on?

Yes (1)

No (2)

22. Would you like a brief summary of the survey results sent to you:

Yes (1)

No (2)

23. If not already given, please provide your postal and/or email address if you have requested information to be sent to you:

Address:	Enter in column
and/or	
Email:	Enter in column

Thank you for taking the time to complete this survey.

The information you have provided will help us to improve our services to the community, and to plan and deliver programs aimed at making living and working in our region more sustainable.

24. Do you wish to offer any additional comments that might be relevant to our study?

Additional Comments: