

**Plants, People and Planning:
Integrating national botanical information and
regional vegetation planning and management.**

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1 EXECUTIVE SUMMARY

Increasingly, the responsibility for the planning and implementation of native vegetation management, restoration and conservation activities has been devolved to the regional and catchment levels under the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust 2 (NHT 2). This has made the accessibility of high quality botanical information to regional end users such as Catchment Management Authorities or Boards, Landcare groups and landholders a priority for the Commonwealth.

The Plants, People and Planning Project has focused on how the information that national botanical databases contain is used in regional vegetation planning and management. This project, which was conducted between March and June 2003, investigated current levels of knowledge about, and application of, botanical information to regional vegetation planning, management and on-ground activities. It looked at the awareness, availability and suitability of data from national databases (for example *Australia's Virtual Herbarium*, which contains species distribution information, or the *Australian Natural Resources Atlas* Vegetation and Biodiversity data, which contains ecological information about vegetation types), relative to regional information sources.

The specific objectives of this project were to:

1. Examine the accessibility and usefulness of a range of national botanical datasets for regional groups in enabling them to incorporate botanical information into vegetation management planning.
2. Identify processes or fundamental elements that need to be in place to better incorporate botanical knowledge into vegetation management planning, and obstacles to such integration.
3. Provide advice to the Commonwealth on how it can improve access to and use of national botanical datasets for vegetation management planning.

Data were gathered on the accessibility, usefulness and use of national botanical information by a range of regional end users involved in vegetation planning and management in four target catchments in New South Wales and Victoria using a survey questionnaire (123 respondents) and focus group discussions. Groups represented included State agencies, Catchment Management Authorities or Boards, Greening Australia, Landcare and Buschcare Facilitators, Landcare group members and landholders. Additional data on the use of national botanical information in planning were obtained from the examination of published Natural Resource Management (NRM) documents for the four target catchments.

Results show that the majority of end users are primarily focused on planning for biodiversity conservation, but undertake multiple vegetation management tasks (e.g. revegetation and remnant vegetation management), work in a variety of complex landscapes and try to simultaneously achieve a range of vegetation outcomes (eg: waterway protection, salinity control and rare plant conservation). Nearly all identify botanical information as a critical input into their planning and management decision making.

Most end users primarily utilise local and regional sources of botanical information such as maps of current and past vegetation distribution and Ecological Vegetation Classes for their area. In contrast, national data are currently under-utilised despite their advantages of data accuracy, reliability, extensive geographical and species coverage and their spatially explicit nature. This is primarily due to difficulty of access.

Key factors determining the usefulness of botanical information sources were accessibility, scale, accuracy and ease of interpretation. The cost of obtaining information was generally not seen as being a barrier for those associated with management agencies, but was of concern to community users and landholders.

There appeared to be no relationship between end user role, scale of operation, landscape context or management goal and which sources of botanical information were used. This apparent lack of discrimination is probably due to a lack of access to the appropriate data and a limited local capacity to access and interpret the data that is available. Presumably, if information availability and access were ideal, there would be discrimination by end users, who are often knowledgeable about what botanical data they need.

While survey and focus group respondents reported using many primary botanical databases, a review of relevant NRM literature revealed that such databases are generally not referred to. This is true of national-level databases in particular. However, it is likely that these databases are used in background capacity building rather than in producing vegetation plans directly.

Based on these findings, key recommendations to improve the access to, uptake of and effective integration of national-level botanical data into regional vegetation planning and management include:

1. Knowledge Broker: Establishment of a full-time Knowledge Broker position to coordinate and facilitate the distribution of information from a range of national and regional botanical data sources to regional end users.
2. Information Kits: Development of information kits by the Knowledge Broker detailing the availability and utility of national botanical information and its role in complementing and extending currently used regional data.
3. Regional Revegetation Guides: Increased availability of funding for the development of regional revegetation guides, contingent on a) a standardisation of format and context so that resources can be pooled, and b) consultation with the Knowledge Broker to ensure that national data are incorporated where appropriate.
4. Internet Delivery: Development of a website that provides access to all electronic botanical information at the national, state and regional levels. Websites should also be designed to be easily printed and minimise downloading time.
5. National Databases: Continued development of national databases, especially their delivery systems, to ensure that they achieve their goals of national coverage and easy online access.

6. Recording of Botanical Information Sources: Establishment of a requirement for NAP and NHT funded projects to record all sources of botanical information used.

2 INTRODUCTION

In recent years there has been increased interest in the use of baseline biodiversity data for target setting to improve conservation decision-making and land management planning (e.g. Australia State of the Environment 2001¹). Botanical data represents the most developed and comprehensive form of biodiversity information currently available in Australia, followed by bird data. Under the National Action Plan for Salinity and Water Quality²(NAP) and the Natural Heritage Trust 2³ (NHT2) there has also been greater devolution of responsibility for planning and implementation of native vegetation management, restoration and conservation activities to the regional and catchment levels. Combined, these factors make accessibility of high quality botanical information to regional end users such as Catchment Management Authorities or Boards (CMAs or CMBs), Landcare groups and landholders an important part of effective long-term vegetation protection, restoration and revegetation planning.

Botanical information at the community, species and genetic level is now more readily available than ever. Demand for such botanical information is strong, particularly in highly modified landscapes such as south-eastern New South Wales and Victoria and the wheat belt of Western Australia, where landholders and managers are recognizing the value of basing vegetation management and rehabilitation programs on sound botanical information and scientific principles in order to achieve long-term sustainability. However, it is unclear whether the regional end user has the knowledge of, access to or capacity to effectively incorporate all this information into their vegetation planning and on-ground management actions. Furthermore, there is little information regarding what or who drives the inclusion of botanical information in the natural resource management planning process and what factors promote or limit the use of the various types and scales of information that are available.

2.1 What botanical information is needed for vegetation management planning?

The people involved in regional vegetation management and planning come from a wide range of backgrounds and may have very different knowledge requirements depending on their role, local objectives and landscape. People also work on a variety of different issues, such as remnant vegetation protection, weed control, or bush fire fuel load reduction, all of which require different types of information. Given this diversity of end users and end uses it is likely that a broad range of botanical information needs to be accessible in a variety of formats for it to be useful.

For example, data on the past and present distribution and abundance of native plant species is central to the choice of species for revegetation and remnant restoration activities at the regional scale, while propagation information is necessary to underpin on-ground planting. Botanical identification tools play a role in local capacity building, and knowledge of the functional attributes of a species such as salt tolerance, or nitrogen fixation ability, is useful in a restoration context when the emphasis is on reclaiming degraded land and rebuilding whole plant communities. For widespread species, data on

¹ Australian State of the Environment Committee (2001) *Australia State of the Environment 2001*. Department of the Environment and Heritage, Canberra.

² Council of Australian Governments (2000) *Our Vital Resources: National Action Plan for Salinity and Water Quality*.

³ Environment Australia & Agriculture, Forestry and Fisheries Australia (2002) *Framework for the Extension of the Natural Heritage Trust*. www.nht.gov.au/extension/framework/index.html

genetic provenance helps in deciding on locally adapted seed sources for revegetation that will maximize germination, early establishment and growth.

2.2 Types and availability of botanical information

Recently, a lot of resources have been put into the development of national-level botanical databases. This includes *Australia's Virtual Herbarium* (AVH), the *Australian Natural Resources Atlas* (ANRA) and other tools such as electronic forms of plant identification including *Euclid* (*Eucalyptus* and related genera), *Wattle* (the genus *Acacia*) and *Ausgrass* (the grasses).

National vegetation mapping databases (such as ANRA) are amalgamated from State-level data sets such as the Flora Information System in Victoria. Although they contain data at the same scale as the States, owing to a lack of consistency among States (mainly with regard to scale of reporting, definition of community types and verification of data) and the need for the data to be interpretable on a national map, national data are reported at a larger scale than the data from individual States. Point location databases, such as those maintained by State Herbaria, do not have this problem, which allows national-level tools such as AVH to present data at the same scale as individual States would.

There are currently a variety of botanical databases and tools that are widely available at a range of different scales (see Appendix I). Each of these tools has different objectives and is useful for tackling different problems. In addition to databases prepared by government departments or educational facilities (e.g.: the Charles Sturt University Virtual Herbarium) there are also databases that have been compiled by non-government organisations such as Greening Australia and the Association of Societies for Growing Australian Plants.

The integration of botanical data into regional natural resource management planning processes is essential to achieve both increased sustainability and improved long-term native vegetation conservation outcomes. In order to do this, a good understanding is required of how these national- and regional-level botanical data are currently being used, and how each influences vegetation management planning in relation to the diversity of end users and the range and scales of on-ground activities being undertaken.

2.3 The Plants, People and Planning Project

The Plants, People and Planning Project aimed to investigate current levels of knowledge and application of botanical information to regional vegetation planning, specifically the awareness, availability, and suitability of data from national databases, for example the AVH or the ANRA Vegetation and Biodiversity data, relative to regional information sources. The specific objectives of this project were to:

1. Examine the accessibility and usefulness of a range of national botanical datasets for regional groups in enabling them to incorporate botanical information into vegetation management planning.
2. Identify processes or fundamental elements that need to be in place to better incorporate botanical knowledge into vegetation management planning, and obstacles to such integration.
3. Provide advice to the Commonwealth on how it can improve access to and use of national botanical datasets for vegetation management planning.

To achieve these objectives the project took an analytical approach, obtaining information about the knowledge and use of a range of botanical information sources for a variety of end users. These end users had differing levels of experience in dealing with botanical data (e.g. landholders, members of CMAs and NGOs, State government officials) and were involved in addressing a range of different biodiversity issues (e.g. managing existing vegetation, revegetating fragmented landscapes and managing weeds) across two State/regional institutional and regulatory arrangements.

Several methods were employed to obtain information regarding the knowledge and use of national botanical information, and how this relates to the level of planning or management being undertaken, the regional vegetation issues and the infrastructural context within which activities are undertaken. There were four main steps in this process:

1. Primary data were obtained from a survey of regional vegetation planners and managers across each catchment stratified by agency and scale of operation.
2. Focus groups were held in each catchment to obtain similar information from a range of landholders who are actively involved in vegetation management. At each meeting information regarding national botanical information was presented, and feedback on use of these and other kinds of botanical information was obtained.
3. The formal integration of botanical information into long-term vegetation planning documents was assessed by examining Vegetation Management Plans and Native Vegetation Plans in the target catchments.
4. Draft recommendations for improving the utility and accessibility of national botanical data generating from steps 1 and 2 were circulated for comment to individuals who participated in these steps.

All information presented here is based upon the results of these four complementary approaches to assessing the role and relevance of national botanical information in regional native vegetation management planning. The results are broadly applicable to vegetation planners working in cleared catchments across southern Australia and to those undertaking vegetation management activities throughout the country. The findings were used to formulate recommendations to the Commonwealth.

3 PROJECT METHODS

This section describes the target areas (catchments) used in this study as well as the survey and interview methods, the composition of catchment focus groups and the method used to review NRM documentation.

3.1 Target Areas

In order to identify the most appropriate catchments to form the focus for this study, the resources of the project, representativeness of possible catchments and the existing knowledge, capacity and basic data availability in the catchments were taken into account.

3.1.1 Project resources

Given the timescale and funding available to the project, detailed information could be collected from a maximum of four regions. Catchments were selected as the 'regional' area as many groups in south-eastern Australia have undertaken some level of catchment planning for vegetation management. It was also clear that it would be necessary to visit these catchments for face-to-face discussions in order to obtain the quality of information (and confidence in it) required by Environment Australia. Hence, it would be necessary that the target catchments be within reasonable travelling distance of Canberra.

3.1.2 Representativeness

It was clearly important that the selected target catchments be broadly representative of those areas where planning for vegetation management and revegetation is likely to be a priority in the short- to medium-term. This focused attention on south-eastern Australia, on areas with a relatively highly cleared landscape, without the potential confounding factors of peri-urban or coastal tourist populations or with major forestry enterprises based on native vegetation throughout the catchment. It was also important to include areas where vegetation management and revegetation might be driven by a range of issues, including management of catchment hydrology and salinity, water quantity and quality for downstream users, a mix of land uses including extensive cropping and/or grazing, and the need to conserve biodiversity in the face of clear symptoms of decline in vegetation health.

3.1.3 Knowledge and capacity

It was important to select target areas that would cover most of the spectrum found in Australia across different regions in terms of knowledge and understanding of the current status of native vegetation and the key issues in planning and on-ground management, as well as differences in the capacity to act and undertake on-ground works. There are significant differences between Victoria with its well-established infrastructure of Catchment Management Authorities, many of which have developed a public plan for management of biodiversity and/or native vegetation, and New South Wales where there have been many changes to catchment management structures, where the Catchment Management Boards are largely advisory rather than having funds and staff for on-ground works, and where vegetation mapping and management strategies are often not yet well-developed. We therefore deliberately selected four regions that we thought would show considerable contrast in these factors, although we recognised that this might not turn out to be the case as the project progressed. We also selected areas where we could readily identify the key people involved in vegetation planning, so that we could obtain information about their use of and views about botanical information.

3.1.4 Availability of basic data

It was important to identify target areas that had a reasonable level of information already available about the extent, condition and trend in native vegetation and vegetation health, and a capacity to compare with pre-1750 vegetation maps. This basic information would be necessary to underpin the survey work and the more-detailed discussions of vegetation planning and management. Fortunately, this type of information, to at least a basic level, is available now for many catchments in south-eastern Australia, although the scale of the data and the level of validation vary substantially from region to region.

3.1.5 Target catchments

Based on the application of these criteria to a range of possible target areas, four catchments in Victoria and NSW were selected that provided a blend of representativeness with potential contrasts, and could be surveyed and visited for detailed discussions within the project budget and timeframe (see Figure 3.1):

1. Glenelg-Hopkins Catchment in Victoria;
2. North-Central Catchment in Victoria;
3. The Murray Catchment in New South Wales; and
4. The Lachlan Catchment in New South Wales

All further information gathering and analysis, including formal surveying, focus group meetings, analysis of Natural Resource Management literature, and testing and revision of recommendations was undertaken within these regions.



Figure 3.1: Map of target catchments in NSW and Victoria.

3.2 Survey

A questionnaire was used to gather information from regional users involved in vegetation planning, management and on-ground activities. Another large group of potential users of botanical information are landholders, who were sampled using focus groups (see 3.3), as this method was more likely to suit their availability and to elicit useful data. After discussion with people working in the field, a questionnaire consisting of 30 questions (see Appendix II) was designed to provide information regarding the following broad issues:

1. Who the respondent was, including what scale they worked at, which organisation they worked for, their level of experience, what were the main vegetation management issues in their area (e.g. salinity mitigation, biodiversity conservation), the main actions in which they were involved (e.g. remnant protection, utility planting, revegetation) and the planning context within which their work took place (e.g. had a vegetation plan been developed for the catchment?).
2. What type of vegetation information the respondent would ideally like to have access to in terms of type (e.g. extent and condition of current vegetation, characteristics of vegetation communities), format (e.g. vegetation maps or lists, revegetation guides), and scale.
3. What type of information the respondent currently had access to and how useful they found it.
4. What problems they had with the information available to them, including issues of scale, cost and ease of interpretation.

The survey was initially emailed to recipients and then followed up with phone interviews in order to increase the rate and consistency of reply. Market Attitude Research Services Pty Ltd conducted the phone interviews under contract to CSIRO.

A stratified sample of 184 people was selected to be part of this survey across the four target catchments. Participants were selected to represent different levels of vegetation management and planning activities and a variety of agencies in each of the four catchments, ranging from State government, Catchment Management Authorities and Boards, Greening Australia, Shire Councils and Landcare Groups. As much as was feasible, the participants were selected to give an even distribution across the four catchments and across vegetation management roles.

Of the 184 people in the sample, 123 completed the survey, with an even spread across the catchments: Lachlan 27, Murray 30, Glenelg-Hopkins 26, and North Central 40.

3.3 Focus groups

To obtain additional information on vegetation management activities and planning, focus group meetings were held in each of the four target catchments. These groups were designed to get feedback from end users that were likely to be under-represented in the survey data set, in particular landholders who often play a critical role in both local vegetation planning and on-ground vegetation management actions. The focus groups were run with the aim of providing the same general type of information as the survey questionnaire, but as the setting was much more informal the results were generally less quantitative – though often insightful. Participants were also invited to fill in the questionnaire to cross check the issues raised in the main survey, although these results are not included in the survey data analysis. Focus groups were set up in areas that could provide a number of interested individuals, thus biasing our sample towards those people who are more likely to go looking for botanical information themselves. Participants were involved in vegetation management and planning in a volunteer, landholder or Landcare member capacity.

The focus group in Glenelg-Hopkins was conducted in Ballarat and attended by 11 people who were landowners, Landcare facilitators, educators and volunteers. In North Central, the focus group was conducted in Bendigo and attended by six people, with the same range of roles as for Glenelg-Hopkins. The Lachlan focus group was conducted in

Crookwell, and attended by 8 people who were all landowners and Landcare members. Finally, in the Murray catchment discussions were conducted with two landholders who were involved in the recent development of the revegetation guide for the Riverina⁴.

3.4 Natural Resource Management documentation

The use of high quality botanical information in formal Natural Resource Management (NRM) strategy documents is important, as they provide the broad framework within which revegetation and remnant protection actions are undertaken at the regional level. In the course of the survey (see section 3.2 and Appendix II), respondents indicated what type of botanical data they used in their planning process. This section of the study looked at what types and scales of botanical data are being used in the development of NRM documents.

The main legislative vehicles for vegetation planning and management in NSW and Victoria are the Vegetation Management Plans (NSW) and the Native Vegetation Plans (Victoria). There are significant differences between how the NRM documents are produced in the two states involved in this study. In Victoria, the Catchment Management Authorities produce the Native Vegetation Plans, so the boundaries of the plans are the same as the catchment boundaries. In NSW the Vegetation Management Plans are produced by the Vegetation Committees, which are distinct from the Catchment Management Boards and have different boundaries, which may or may not fall within the boundaries of a catchment.

The plans that were reviewed for their use of botanical information were the Draft Native Vegetation Plans for Glenelg-Hopkins⁵ and North Central⁶, the Mid Lachlan Vegetation Management Plan and Strategy⁷ for the Lachlan catchment and the Riverina Highlands Vegetation Management Strategy and Plan⁸ for the Murray. There are additional documents that relate to the planning and management of native vegetation (e.g. Regional Catchment Strategies, Catchment Management Plans and Weed Action Plans), but these four were judged most likely to have references to the use of botanical data and to be those within which the use of such information is likely to have the most significant impact on regional vegetation planning and management activities in the target catchments.

These four documents were reviewed to examine what types (eg: guide, map, survey or flora) and what scales (eg: regional, state or national) of specifically botanical information were recorded as being used. They were also examined to discover whether there was any recorded use of the specific national data sources that were discussed in the survey (see Table 4.3 for a list).

⁴ Eds: Kylie Kent *et al.* (2002) *Native Vegetation Guide for the Riverina*. Wagga Wagga, NSW: Johnstone Centre, Charles Sturt University, NSW

⁵ Glenelg-Hopkins Catchment Management Authority (2000) *Draft Glenelg-Hopkins Native Vegetation Plan*. Department of Natural Resources and Environment, Victoria

⁶ North Central Catchment Management Authority (2000) *Draft North Central Native Vegetation Plan*. Department of Natural Resources and Environment, Victoria

⁷ Mid Lachlan Regional Vegetation Committee (2001) *Mid Lachlan Regional Vegetation Management Plan*. Department of Land and Water Conservation, NSW

⁸ Riverina Highlands Regional Vegetation Committee (2003) *Riverina Highlands Regional Vegetation Management Strategy and Plan*. Department of Land and Water Conservation, NSW

3.5 Comments on draft recommendations

The executive summary and recommendations of a draft report were circulated to all participants of the original survey who indicated their willingness to provide comment (approximately 100 individuals). Their feedback was then incorporated into the final recommendations.

4 RESULTS

4.1 Survey

An initial factor analysis of data from Questions 1-13 (see Appendix II for all question details) relating to respondent's role, experience, scale of operations, organisational affiliation, level of experience, main vegetation management issues and the planning context within which their work took place, indicated no obvious multivariate groupings, suggesting a broad range of end users was captured in the 123 respondents. It also suggested that respondents from each of the organisations were involved in a wide range of roles, scales of operation and vegetation management issues rather than people from one organisation undertaking any one role more than those from other organisations. The role, scale or vegetation issue that respondents worked at were not affected by the State or catchment they were based in.

4.1.1 Who uses botanical information?

The major affiliation of respondents surveyed mostly fell into the categories of State government (34%), CMA or CMB (18%), Landcare or Bushcare coordinators or facilitators (11%), local government and Greening Australia (both 8%). However, when looking at all the organisations that people were affiliated with, it emerged that most people using botanical information are in fact involved to at least some degree with several organisations, with 50% of those questioned being associated with four or more organisations. This is partly because of the integrative nature of many of these organisations: The boards of CMA's in particular are usually made up of people from a wide variety of other organisations.

Looking at all the roles of the respondents, 81% provided advice on vegetation management, with smaller numbers carrying out on-ground management (60%) and preparing management plans (53%), with people undertaking three different roles on average. In general, people had not worked in the area of vegetation management for long, with 50% working in that capacity for four years or less. Again, responses made it clear that people often fulfil multiple roles in their use of information, with half of those surveyed undertaking three or more different roles as part of their current position.

Overall these results indicate that respondents were people in a range of State, regional and non-government agencies who are active in a diverse range of vegetation management and planning roles. Interestingly, most of these people have relatively limited experience and are trying to perform several roles simultaneously, while working for, or interacting with, multiple organisations. This reflects the fluidity of vegetation management positions, which can often be short-term or part-time and the complexity of the landscapes within the target catchments. For example, someone may be a landowner, a Landcare member, and work for Greening Australia and the CMA as a consultant. As people spend a lot of time building up local knowledge and trust, rapid turnover in vegetation management positions is detrimental to the integrated management and effective long-term conservation of native vegetation. If new people continually have to find out how to access and interpret botanical information, and apply it to management decision making, easy, logical access to this information is even more crucial.

4.1.2 What vegetation management activities are people undertaking?

The scale of operation respondents worked at covered property sized areas (29%), shire or other local government areas (20%), whole catchments (22%) and regional areas, such

as large national parks (26%) fairly evenly, with few people working at the State-wide scale. Most vegetation management and planning is undertaken on freehold land (73%) that is used for dry-land grazing or cropping (53% vs. 20%) and mainly addresses either protection of remnant vegetation (51%) or revegetation (33%).

Biodiversity conservation was the main focus of developing vegetation management plans and on-ground actions, with 100% of respondents citing it as one of their issues, and 66% citing it as their main planning objective. Other issues that were considered important were waterway protection, salinity protection or mitigation, protection of rare or threatened species and soil erosion (88, 86, 79 and 76% respectively of “all issues”). Nearly all vegetation planning and actions that are taking place have multiple objectives.

4.1.3 Planning Infrastructure

Most end users within the targeted catchments work within the framework of an implemented catchment level vegetation management plan (41%) or a plan that is currently being developed (37%). At the sub-catchment and property level, there were fewer plans that had been implemented (29 and 15% respectively) or were being developed (24 and 20%), with 42 and 51% of people indicating that there was no vegetation management plan at these two scales.

Most of these plans have not been implemented for long, with the median time since implementation for catchment, sub-catchment and property level plans being 2, 2 and 3.5 years respectively. With such a short time since implementation, these plans are unlikely to have had much of an effect on biodiversity conservation as yet. The longest times that plans have been implemented for was 50, 20 and 20 years for these three scales respectively, although these are all outliers.

Satisfaction with the plans that had been implemented is generally high, with 82, 60 and 56% of people who had plans at the catchment, sub-catchment and property levels responding that they thought that the plans effectively addressed the major vegetation management issues in their area. However, when the results are broken down by catchment it appears that people are confused about the state of their vegetation management plans, with substantial variation among end users in their understanding of what stage their catchment planning process is up to.

4.1.4 What botanical information do people want?

Survey respondents rated all of the types of botanical information as important or very important (Fig. 4.1), with none of the types rated as “unimportant” by more than 21% of respondents (the result for identification tools). However, there were significant differences in how important people rated the usefulness of the various types of botanical information (heterogeneity G -test $p < 0.01$). These differences stemmed from people rating current vegetation maps and lists, maps and lists of the distribution of rare or threatened species, pre-1750 maps and information on the availability of suitable material for revegetation as being “very important”, and ranking information about pest plants in their area and comparative costings of alternative revegetation methods as only being “important”.

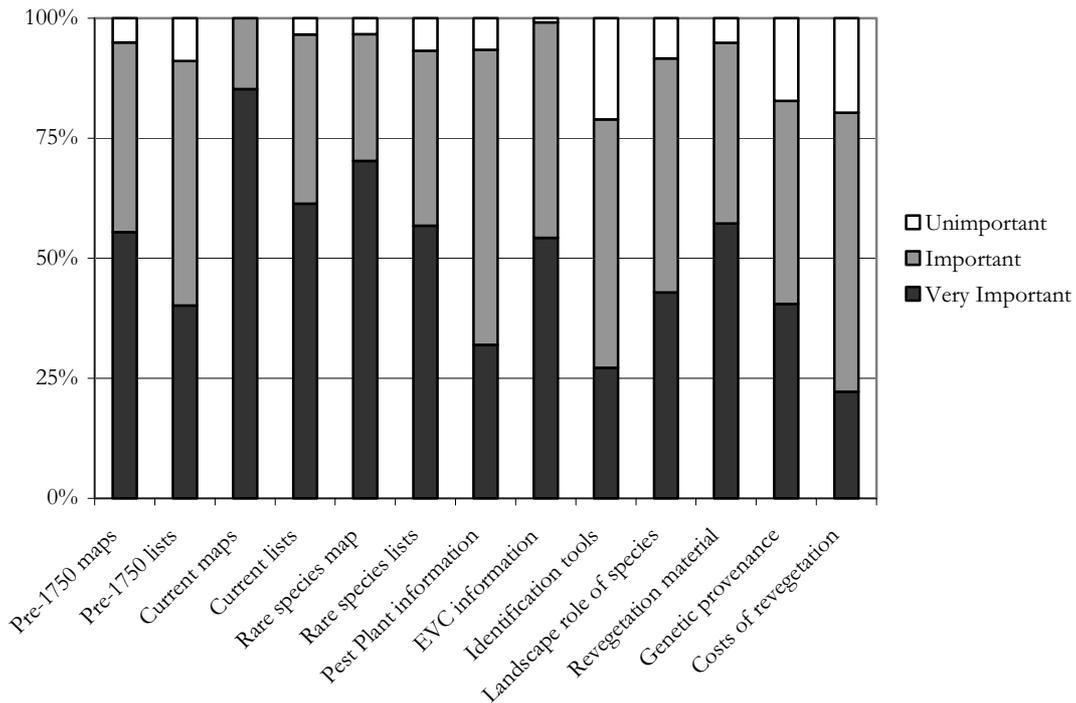


Figure 4.1: The relative importance of different types of botanical information (see Question 14).

Types of botanical information

In general, people considered the data types that they could access to be useful (mean = 94%) and used them in their vegetation planning or management activities (mean = 83%). The data types that were viewed as most widely accessible are vegetation community information, sources of suitable revegetation material, current vegetation maps, pre-1750 maps and identification tools (Table 4.1). When looking at how useful respondents found the data types that they had access to, and whether they used them, some interesting patterns emerge. While those who could access them considered most data types useful, some were not used by a significant portion (more than 10%) of respondents who could access them – even though they did consider them to be useful (results highlighted in bold in Table 4.1). These data types were pest plant information, tools for identification, costs of revegetation methods, sources of suitable revegetation materials and details of the landscape role of revegetation species. Although these data types may not be used in developing a plan, they are still being used in background work, such as identifying plants in the area, or deciding which particular revegetation method will be used.

When asked about which of the data types people considered to be the most useful, respondents identified current vegetation maps (44%), followed by pre-1750 vegetation maps (14%), and vegetation community information (12%). On average, accessibility was viewed as the most important attribute in determining the practical usefulness of botanical information, although all attributes rated highly (Table 4.2). A heterogeneity test showed that there was no difference in the pattern of how important respondents thought the different attributes were for each of the data types.

Table 4.1: The accessibility and usefulness of types of botanical information (Question 15). This table shows the percentage of respondents that could access each type of data, the percentage of those respondents who rated that type as “useful” or “very useful” and the percentage who used that type of information in their vegetation management and planning. Where the difference between the percentage of respondents finding each information type useful and the percentage that used that information type in their planning was greater than 10%, the result is highlighted in bold.

Type	Accessible (%)	Useful (%)	Used (%)
Pre-1750 vegetation maps	72	69	66
Pre-1750 vegetation lists	37	34	28
Current vegetation maps	76	73	71
Current vegetation lists	58	55	51
Maps of rare or threatened species	67	63	59
Lists of rare or threatened species	64	59	56
Pest plant information	67	62	46
Vegetation community information	85	84	80
Tools for taxonomic identification	72	65	53
Details of landscape role of revegetation species	56	55	44
Sources of suitable revegetation material	80	75	67
Information on genetic provenance	42	38	33
Costs of revegetation methods	63	60	48
Average	64	61	54

When asked about which data type, or actual data source, respondents considered to be least useful, and what attributes contributed to this, the results were unclear, as many respondents did not rate any attributes as important. Where other attributes were cited, they were mostly that they had not heard of this information, or that it was not relevant to their work. It is concluded that these questions (Questions 18, 19, 25 and 26) were difficult to answer, and the results are omitted from this report.

Table 4.2: Which data types are considered most useful, and which factors contribute to their usefulness (Questions 16 and 17). Table shows the number of respondents that rated each data type as the “most useful” and the proportion of those respondents who rated each attribute as “important” or “very important” for each data type.

Type	Responses	Accessible	Appropriate scale	Easily interpreted	Technical help available	Confident of Accuracy	Affordable
Pre-1750 vegetation maps	17	0.9	0.9	0.9	0.8	0.8	0.9
Pre-1750 vegetation lists	4	1.0	0.8	1.0	0.8	1.0	0.5
Current vegetation maps	54	0.9	0.9	1.0	0.8	0.9	0.8
Current vegetation lists	9	1.0	0.8	1.0	0.9	1.0	0.7
Maps of rare or threatened species	4	0.5	0.3	0.5	0.5	0.8	0.5
Lists of rare or threatened species	1	1.0	1.0	1.0	0.0	0.0	1.0
Pest plant information	1	1.0	1.0	1.0	1.0	1.0	1.0
Vegetation community information	15	1.0	1.0	1.0	0.9	1.0	0.7
Tools for taxonomic identification	6	1.0	0.7	0.8	0.7	1.0	0.7
Details of landscape role of revegetation species	5	1.0	0.8	0.8	1.0	1.0	1.0
Sources of suitable revegetation material	1	1.0	0.0	0.0	1.0	0.0	1.0
Information on genetic provenance	0	-	-	-	-	-	-
Costs of revegetation methods	2	1.0	1.0	1.0	1.0	1.0	1.0
Other	4	1.0	0.8	1.0	0.8	1.0	1.0
Average		0.94	0.87	0.93	0.79	0.92	0.77

Sources of botanical information

When asked where they obtained their botanical information from, respondents cited six different sources on average, with State government, books and local experts rating the highest. This indicates that people routinely use many different formats and sources of information when trying to get the botanical data that they need.

When the responses are broken down into the two States, a heterogeneity *G*-test showed there were significant differences ($p > 0.05$). This is due to Victorians using more CDs and approaching the local CMA and State government departments more than in NSW. Victorians used more data sources on average (8) than those in NSW (7).

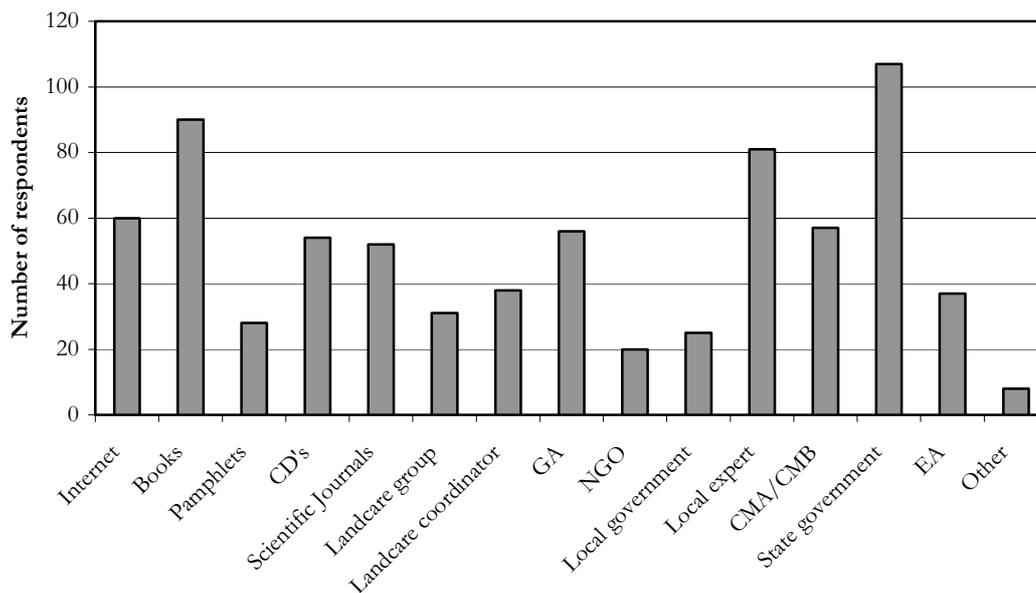


Figure 4.2: The number of respondents that indicated they got their botanical information from each of the sources listed in Question 20.

Scales of botanical information

When posed an open question (Question 21) about the scale of vegetation mapping that would be ideal for them in their work, the answers ranged from 1:1 000 to 1:250 000. The median scale reported was 1:25 000 (45% of respondents), with other commonly cited scales of 1:100,000 (18%) and 1:50,000 (15%). These scales relate well to national mapping projects such as ANRA as 1:25,000 is the preferred scale for metropolitan areas, wetlands and riparian zones and fragmented or specialised populations. 1:50 000 and 1:100 000 are also scales that are preferred for different levels of intensity of land use.

When the responses are broken down into the two States, it emerges that respondents in NSW have a preference for larger scales than those in Victoria. In NSW, 1:25,000, 1:50,000 and 1:100,000 were all equally preferred (27, 24 and 29% respectively), while in Victoria respondents predominantly chose 1:25,000 (59%). This may be a reflection of the different scales of information currently available, or it could be due to differences in the complexity of the landscapes or in the scale of catchment structures that people are working with in the two States.

4.1.5 What are their views on what they have?

When presented with a list of actual botanical data sources and asked which they could access (Question 22), the sources that scored highest were (in order) personal knowledge, local experts, information from Greening Australia, regional vegetation maps and local revegetation guides. All of these data sources were considered highly useful and were used in vegetation management and planning. Australia's Virtual Herbarium rated the lowest for accessibility (25 responses) with most of the other federal data sources also rating as not being widely accessible. Even when respondents could access the federal databases, they do not seem to use them much in planning (see data sources highlighted in bold in Table 4.3). This may be due to several factors:

1. Complexity: the information these databases contain may be presented in too complex a format for respondents to readily interpret.
2. Redundancy: people may already have access to this information through a more convenient source. For example, ANRA derives most of its information from State data.
3. Background Information: as for the data types that showed this pattern (see section 4.1.4), the information may be used for background capacity building, but not directly in planning itself.
4. Diminishing returns: these data sources may not contain enough novel information to make the effort of extracting that information worth the time required to do so.

Table 4.3: The accessibility and usefulness of actual sources of botanical information (Question 22). Table shows the percentage of respondents that could access each data source, the percentage of those respondents who rated that type as "useful" or "very useful" and the percentage who used that type of information in their vegetation management and planning. Where the difference between the percentage of respondents finding each information type useful and the percentage that used that information type in their planning was greater than 10%, the result is highlighted in bold.

Type	Accessible (%)	Useful (%)	Used (%)
Australian National Herbarium	32	27	15
State herbaria	43	40	34
Regional herbaria	32	31	19
<i>Australia's Virtual Herbarium</i>	19	12	8
Flora of Australia (printed)	54	46	34
Flora of NSW or Victoria (printed)	73	68	62
Regional Floras	58	56	54
Electronic identification guides (eg: <i>Euclid, Wattle</i>)	40	33	28
<i>Australian Plant Name Index/What's its name?</i>	22	15	11
<i>Australian Natural Resources Atlas</i>	28	22	17
Environmental Protection and Biodiversity Conservation Act web page	59	52	41
<i>Florabank</i> seed information	42	38	29
Information from Greening Australia	82	73	71
Regional vegetation maps	81	80	75
Local species lists	65	63	60
Local revegetation guides	78	73	74
Information from Landcare/Bushcare facilitator	68	65	62
Personal knowledge	92	90	89
Local expert	91	89	86
Average	56	51	46

When looking at how important respondents rated botanical information as opposed to whether they used it in their planning, 98% of respondents listed at least one type of botanical information in Question 14 as “very important” for vegetation planning and management, with the same proportion using botanical information sources in their planning process (Question 22). The remaining 2% weren’t able to access the botanical information sources they were asked about in the survey, or weren’t involved in the planning process.

When asked in Question 23 which of the actual data sources they thought was the most useful (Table 4.4), a large number of respondents chose regional vegetation maps, followed by local experts, local revegetation guides (the value of which were also highlighted in general interview comments and focus group discussions), the *Flora of New South Wales* and the *Flora of Victoria* and personal knowledge. All the national-level data sources rated much lower. Again, accessibility rated as highly important as did confidence in the accuracy of information as drivers of utility. Federal data sources such as AVH, ANRA and APNI are very accurate (which was seen as highly desirable), which suggests that the federal databases would be more widely used if they were more widely accessible.

Table 4.4: Which actual data sources are considered most useful, and which factors contribute to their usefulness (Questions 23 and 24). Table shows the number of respondents that rated each data source as the “most useful” and the proportion of those respondents who rated each attribute as “important” or “very important” for each data source.

Source	Responses	Accessible	Appropriate scale	Easily interpreted	Technical help available	Confident of Accuracy	Affordable
Australian National Herbarium	1	1.0	1.0	1.0	1.0	1.0	0
State herbaria	1	1.0	0	1.0	1.0	1.0	0
Regional herbaria	0	-	-	-	-	-	-
<i>Australia's Virtual Herbarium</i>	0	-	-	-	-	-	-
Flora of Australia (printed)	1	1.0	-	1.0	1.0	1.0	-
Flora of NSW or Victoria (printed)	13	1.0	0.9	0.8	0.5	1.0	0.8
Regional Floras	3	1.0	1.0	1.0	1.0	1.0	1.0
Electronic identification guides (eg: <i>Euclid, Wattle</i>)	0	-	-	-	-	-	-
<i>Australian Plant Name Index/What's its name?</i>	0	-	-	-	-	-	-
<i>Australian Natural Resources Atlas</i>	0	-	-	-	-	-	-
Environmental Protection and Biodiversity Conservation Act web page	3	1.0	0.7	1.0	0.7	1.0	1.0
<i>Florabank</i> seed information	0	-	-	-	-	-	-
Information from Greening Australia	7	1.0	0.7	1.0	1.0	1.0	1.0
Regional vegetation maps	34	1.0	1.0	1.0	0.9	0.9	0.8
Local species lists	4	1.0	0.8	1.0	0.8	1.0	0.5
Local revegetation guides	16	1.0	1.0	1.0	0.9	1.0	0.9
Information from Landcare/Bushcare facilitator	0	-	-	-	-	-	-
Personal knowledge	14	0.9	0.6	0.6	0.6	0.9	0.6
Local expert	18	1.0	0.8	0.8	0.8	0.9	0.8
Other	6	0.7	0.7	0.8	0.8	0.8	0.7
Average		0.97	0.83	0.89	0.81	0.95	0.75

When asked what they thought could be done to make botanical information more useful and available to them in their work, over half of the respondents said they would like more raw information, more information online, and training to increase their personal capacity to use the information available. The most common actions cited in the “others” field were better vegetation mapping and the production of locally specific botanical guides.

When the responses are broken down by State a heterogeneity g-test showed no significant difference between the responses in each state. However, there were differences in that people in NSW would prefer more information in print (47% in NSW vs. 32% in Victoria), and in Victoria, information on CDs is more popular than in NSW (47% versus 23%). People in Victoria also currently use CDs more than those in NSW, and so would have the capacity to use this format already.

When asked a general question in the survey about how they would like to see botanical information delivered to them (Question 30), respondents identified four main issues. The first was the lack of regionally relevant information. This information is necessary for any on-ground management, and also for any regional-level planning activities. Secondly, respondents raised the need for one central portal to access all the different levels (eg: national, State, local and NGO) and types (eg: taxonomic tools, propagation information, vegetation mapping) of botanical information in one place, so as not to have to spend a lot of time trying to locate this information. Thirdly, it is important to choose an appropriate format for the information (eg: CDs, the internet or books) depending on whom the information is targeted at. Finally, the importance of people in this process in terms of local experts or others with botanical and technical knowledge in the field is often under-appreciated. These people can adapt data to deal with specific local circumstances and directly facilitate local capacity building.

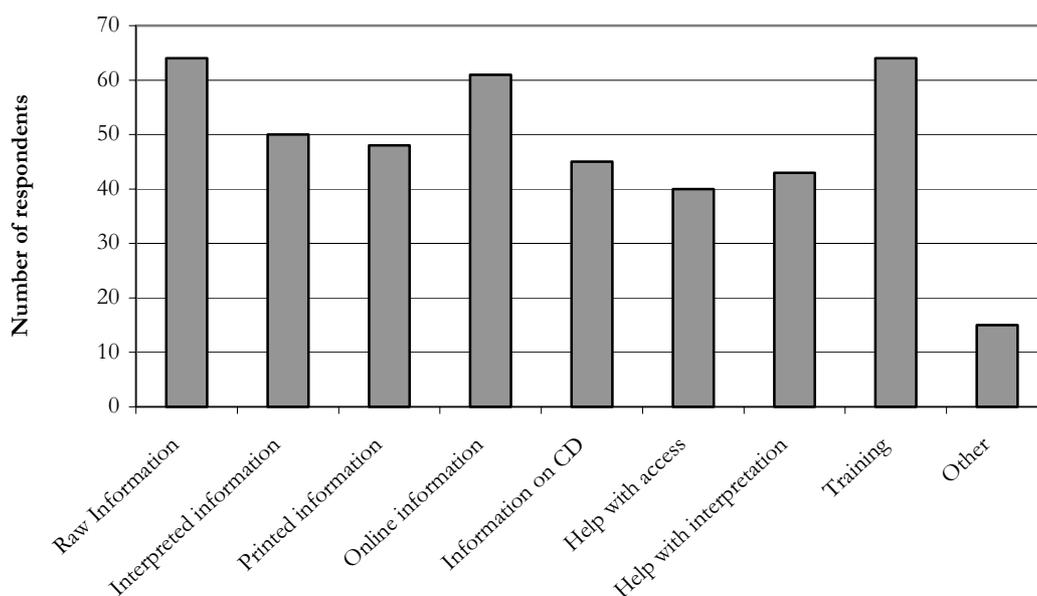


Figure 4.3: Number of respondents who cited each option as something that would make botanical information more useful and available to them in their work, from Question 27.

Some typical responses from Question 30 regarding improving delivery of botanical information were:

“Like to see systems that are compatible between States and local systems, one botanical system in Australia and one access point on the web, so that you could just go to a national website that has information“

“It is important to access the minds of local experts and consult with them as well as using data bases”

“It needs to be easy reading so that I can pass it onto farmers and lay people”

“More CD based information and guides, low cost - books are too expensive – and regular updates are also an issue”

“Information is variable and often not regionally or community specific. Need to have expert people in field as well as landholders to interpret and implement on-ground activities to maximise agriculture outcomes”

4.1.6 What drives the incorporation of botanical information into vegetation management and planning, and how important is it?

When asked about what stimulates them to identify botanical issues as relevant to vegetation planning and management (Question 28), people cited issues such as that it was part of their job, personal interest and commitment to biodiversity conservation. Generally, they regarded botanical information as absolutely fundamental to addressing land management issues and fauna conservation in an integrated way.

Some typical responses to Question 28 follow:

“Recognition that native vegetation is the fundamental component of both environmental management and biodiversity conservation”

”Seeing depleted ecosystems, where modification of the landscape has caused degradation issues such as erosion and salinity”

“To ensure that you get the right species in the right place to save time and money - to ensure you get a good strike rate and successful outcomes for the project”

“The need to provide good relevant information to landholders”

“My work with vegetation is to meet specific goals set by managers, and to have a better outcome for the environment”

“Importance of vegetation and community types to revegetation within the catchment and the provenance of seeds plays a major role in species selection for revegetation works”

“I know how important it is - I do not see how you can do vegetation planning and management unless you have good botanical information”

When asked about the relative importance of botanical information compared to other information relevant to vegetation management and planning (Question 29), the majority of respondents (72%) answered that they felt this information to be very important, or critical, to their work. Very few respondents (3%) answered that they thought it was not important, indicating that those who work in this field realise the importance of having accurate botanical data on which to base their decisions. Arguments for the use of botanical data as part of the planning process included the desire to accurately reconstruct native vegetation communities and re-establishing biological function.

Some typical responses to Question 29 follow:

“It is very important because it is essential to my role, the more information I have to supplement my role the better”

“Very important - I need to feel confident that what I am replacing (native vegetation) are the correct species for that area”

“Ranks in the middle of quite a wide range of decisions you have to make on a project, reasonably important but not the most important”

“Most important piece of natural resource information but needs to be combined with information on threatened species”

“You need to know the basics i.e. botanical information, to make decisions in the landscape area”

4.1.7 Does what people do influence the type of botanical information that they use and want?

A reasonable assumption would be that the scale at which someone works, their role and institutional affiliation and the goals of their vegetation planning, management or on-ground activities will affect what type of information they are interested in and use. Though there were no obvious multivariate groupings among the end users identified by the initial factor analysis, simple univariate comparisons of effects of several end user traits on botanical data use were undertaken. The four user characteristics for which class response sizes were large enough to allow quantitative analysis were:

- Question 2: their catchment
- Question 4b: their primary role,
- Question 6: the landscape scale that they worked at
- Question 10b: the main vegetation management activity they were undertaking.

For these four variables, heterogeneity *G*-tests were conducted to determine their influence on:

- Question 20: where people go to get the types of information they consider to be important
- Question 27: what they thought could be done to make botanical information more useful and available to them

None of these tests were significant, indicating that people get their information from essentially the same sources and think that the same actions could make botanical information more available to them regardless of where they work, the scale of operation and the management issues with which they deal. This is perhaps the most surprising result to come out of the current survey, particularly as the catchments were chosen to represent a broad range of capacities and baseline data availability and respondents encompassed a wide variety of roles.

4.2 Focus groups

Focus group attendees were mostly Landcare facilitators (or others with similar roles), Landcare members and landowners. What follows is based on statements made in the focus groups.

The focus groups highlighted some issues as being of general concern across all groups. Among these was the cost of information, particularly for non-professionals. Although this issue didn't come out of the broader survey, for people at this level it is a real factor inhibiting them from accessing botanical information.

Another issue was the importance of regionally relevant information. Although there has been an increase in the collection and assimilation of vegetation mapping data across the country, this is often not at an appropriate scale for use at an individual property level. In addition, there is often a lack of communication between different projects that means that the available resources are not used as efficiently as they might be. It was generally viewed that the best way to package the information (whether it is held in national or State databases) is in regional revegetation and vegetation management guides. These guides have been produced in some regions (such as the revegetation guides for the Riverina and South West Slopes in NSW) and are very popular.

It was recognised that the Internet is by far the cheapest format to access and distribute information, but at present poor Internet access prevents many people from obtaining this information. In addition, landowners and others don't take computers into the field with them, so information is of little help if it is not available either in print or a form that is easily printable. These problems could be alleviated if web pages were designed to be easily printed, so that the information could be distributed to those without easy access and taken into the field. CDs could also be developed that contained relevant information that is currently only available over the Internet and distributed widely.

It was felt that a series of workshops in the regions covering where to access the type of botanical information best suited to different needs would be very helpful. Many end users are trying to do vegetation management and planning as one of many activities and do not have the time, resources or capacity to find out this information for themselves. They are interested in finding out about this information however, as shown by the interest generated by the demonstration of the AVH that was conducted at the start of the focus group sessions.

Even given perfect information about which species should be planted in an area, people are limited by the realities of what is available to be planted. If there is no source of revegetation material with which to work then the appropriate species will not be planted. Changes due to human activities (eg: salinity and mining) may also make it inappropriate to replant with the species indigenous to the area. These practical restrictions highlight the importance of those in the nursery trade. These people provide most of the revegetation

materials, and often advise on functional equivalents when the desired species are not present, so it is important that they have access to accurate information on which to base these recommendations.

From the issues raised in the focus groups the following conclusions can be reached. Many of the issues of access to information (lack of technology, time and money) could be addressed by providing significant, on-going funding for a position to distribute regionally relevant information. There are a few people currently providing this service, but the short-term nature of their contracts and the frequent breaks in funding mean that they often move on to other positions, taking with them their personal knowledge. This is also an issue in terms of community enthusiasm and involvement in projects, as they too have to start over with new people once they arrive.

Funding could also be put towards the development of regional revegetation guides for more areas than are currently available. These guides are hugely popular as they are focused on a target area and hold all the information relevant to revegetation planning and management for that area in one place and are appropriately formatted. Potentially, these guides could draw more on national-level information with its benefits with regard to coverage and accuracy.

4.3 Natural Resource Management documentation

Despite the fact that the four plans reviewed were chosen for their specific native vegetation conservation management brief, there was relatively little evidence of the use of primary botanical information in their development. Many of the references were derived information that referred to planning and legislative documents and information about management techniques and options.

Among the four documents there were 74 sources of primary botanical information recorded, five of which were recorded in two documents. The spread of these references among the four catchment documents was: Murray, 27; Lachlan, 20; North Central, 26; Glenelg-Hopkins 6. The type of botanical information recorded was primarily botanical surveys or lists of species for a particular area and identification guides, as represented by the Floras (see Figure 4.3).

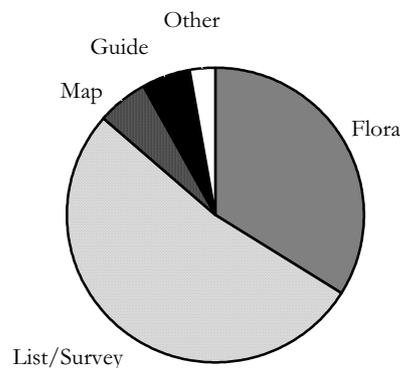


Figure 4.3: Pie chart of the types of botanical information referred to in the vegetation planning documents reviewed for the four target catchments.

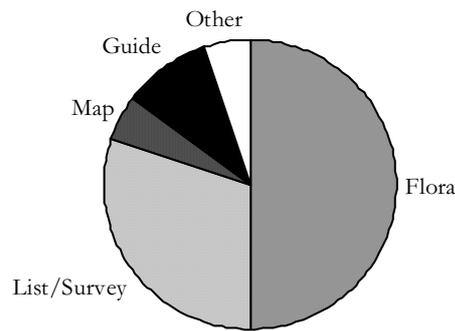


Figure 4.4: Pie chart of the types of national-level botanical information that are referred to in the vegetation planning documents reviewed for the four target catchments.

When the references to botanical information across all four documents are broken up by the scale of information that they contain, the most common scale is regional, followed by state and national (with 34, 20 and 20 different botanical information sources respectively). If the sources of national level botanical information are examined in isolation, the breakdown of types of information is as shown in Figure 4.4. Floras made up a larger proportion of the national data that have been referred to than in the total sample, and the proportion of surveys and lists was smaller.

When the documents were examined to determine whether any of the botanical data sources specifically asked about in the survey (Question 22) were utilised, most of the data sources were used by at least one of the documents reviewed. Very few webpages were referred to and none of these were at the national-level. Indeed, the only national-level information source from the survey that was referred to was the Flora of Australia. Data sources that were apparently not accessed at all were the various herbaria categories (national, state and regional as well as the AVH) and information that would have been transferred via word of mouth (eg: information from local experts and personal knowledge). It may be that these sources of information are used in background capacity building – especially in the identification of plants – rather than in the formal planning process. This suggests that herbaria data, with their high levels of accuracy, national scope (through the AVH) and spatially explicit information, are being significantly under-utilised at this stage in the planning process.

4.4 Comments on draft recommendations

Ten respondents provided feedback on this draft, which was mostly very positive. The lack of comment from the majority (90%) of survey respondents that were sent this information suggests that most people concur with the recommendations as they stood when they were sent out. A common theme of the feedback was the difficulty of finding appropriate information, either at the right scale and level of accuracy or for the right area. The recommendations for a Knowledge Broker (section 6.1), information kits (section 6.2), the development of a one-stop Internet portal (section 6.4) and an increase in the production of revegetation guides (section 6.3) were seen as productive ways to address these problems. Suggested changes have been incorporated into the final recommendations presented in this report.

5 CONCLUSIONS

The combination of survey and focus groups used in this study was effective in obtaining a broad range of data regarding patterns of use of botanical data in vegetation planning, management and on-ground activities across a range of different catchments.

Respondents represented a good spectrum of end users from landholders to regional planners associated with a diversity of agencies and dealing with a variety of landscape contexts and vegetation issues. From this, perhaps the most encouraging result is the broad recognition that botanical information is a crucial prerequisite to successful and effective vegetation planning and management, and the consistent desire expressed by practitioners for more and better botanical information. It must be noted that the people who answered the survey were to some extent a self-selected group who are enthusiastic about botanical information, so there may be some bias in the sample towards this kind of strong positive response.

While this interest in botanical information is encouraging, the results also clearly reveal the complexity of the roles and problems that planners, managers and on-ground practitioners face in their use of botanical data. While the vast majority of vegetation management and planning is apparently focused on biodiversity conservation, the “average” end user is in fact involved in a complex land management task. Generally, she or he works on private freehold land, in landscapes that have a variety of native vegetation issues that need to be addressed (e.g. dry-land salinity, weeds, rare species). They are involved in multiple activities (e.g. revegetation and remnant vegetation management) aimed at a range of goals. To achieve these goals they interact with or report to several agencies or community groups. However, they are often fairly inexperienced (with half working in the area for less than four years) and, despite using a broad array of botanical information sources, are generally unaware of, or unable to access, a good deal of the information they could use – especially national-level botanical data.

Variation in rates of uptake and use of different types and sources of botanical data was also a clear issue identified by this study both from the survey and focus groups results, though this generally didn't relate to a person's role, affiliation, vegetation planning, management or action objectives, or the scale at which they worked. The most popular types of information were Ecological Vegetation Community information, current vegetation maps, information on sources of suitable revegetation material and pre-1750 vegetation maps.

Respondents mostly sourced their information from State government agencies, books, local experts and personal knowledge, with the most used sources of information being regional vegetation maps, local revegetation guides and information from Greening Australia. In terms of actions that could be taken to increase the accessibility and usefulness of botanical information, increasing the amount of raw and online information and providing training to increase peoples personal capacity to access information were the most popular options.

There were some differences between the two States in where respondents went to source their information and at what scale they preferred vegetation mapping, with Victorians using CD's more often and utilising the local agencies for information more readily. The difference in the use of agencies probably reflects the simpler regional government structure in Victoria compared to NSW. However, there were no significant differences

between the four catchments for any of the questions analysed, despite the fact that the target catchments were chosen for their potential differences in capacity.

In general, when people could access botanical information, they were highly likely to use it in their planning. However, national databases rated poorly on accessibility, and even when accessible tended to be used by a smaller number of respondents. This is most likely because they are not seen to be as directly relevant as “local” data. For example, the AVH was only used or rated as accessible by a very small number of people, despite its advantages of free access, accuracy of information and national coverage at a fine spatial scale.

Although there was no direct question in the survey asking whether people had heard of the different data sources, only a few focus group members had heard of any of the national databases. This indicates a real need for effort to be put into raising people’s awareness of what these databases contain, and how they could be used in regional vegetation management and planning.

Key factors determining the utility of botanical information sources were accessibility, scale, accuracy and ease of interpretation. Cost of obtaining information was generally not seen as being a barrier to the use of particular data sources for end users associated with management agencies, but was of concern to community groups and landholders.

Regionally relevant botanical information comes out of this study as something that people find highly desirable. While large-scale vegetation community mapping is recognised as appropriate for planning purposes, at the level of on-ground management, local knowledge and maps are the type of information that is considered most necessary for sensible decisions to be made. Where this information is already available in an easy to use format such as in regional revegetation guides, people use it extensively. However, in most regions this information is not readily available at present.

Owing to time constraints, many of the people currently involved in vegetation management and planning are not able to devote the amount of time required into finding out about all the botanical information resources available to them. The Commonwealth actually caused some of these problems with the way that it distributed its NHT funding under NHT1. Positions such as Landcare coordinators were usually only funded for a year at a time, with no guarantee of continued funding. This, combined with the low rates of pay, discouraged people from staying in these positions for long. Given that people in these positions spend a lot of energy becoming familiar with the local situation and people, this represents a huge waste of resources and loss of capacity. It is also detrimental to the long-term success of the projects that are initiated, as even short interruptions in funding for positions or projects can have large negative effects on community enthusiasm and participation, even when the funding is restarted.

In response to identified problems, the Federal Government has undertaken a review of the facilitator and coordinator arrangements under NHT1. Based on the findings of the review and in consultation with stakeholders, including State and Territory governments, it has developed a new framework for NRM facilitators to support the activities of NHT2 and NAP. At this stage, the new arrangements are proposed to be in place for three years and should address the current problems.

In terms of what national-level botanical information is making its way into formal NRM documentation, as represented by Vegetation Management Plans in NSW and Native Vegetation Plans in Victoria, there is apparently little use of national-level data, especially of the type covered by the survey. There was less use of primary botanical data and national-level data than was indicated by the responses to the survey and a much higher usage of derived information. However, it is difficult to draw any clear conclusions from this, as it cannot be discounted that such primary information has played an informal contextual role in the production of documents but has not been explicitly cited.

6 RECOMMENDATIONS

Results of this study clearly indicate that the integration of botanical information into vegetation planning, management and on-ground activities at a regional level is of critical importance for successful development of sustainable land management practices that incorporate both production and conservation outcomes. Practitioners recognise that making full use of available botanical information will help to ensure that revegetation is self-regenerating, and that improved management of existing native plant communities will achieve biodiversity conservation goals. These are important outcomes if sustainability is to be achieved at a landscape scale, whether projects are funded with private or public monies.

Despite this, end users from a broad range of agencies currently show little uptake and use of national-level botanical information, preferring to use local data sources despite the advantages in terms of accuracy and coverage afforded by national data sets. In order for the information in these databases to become more widely used the key issues of awareness, accessibility and interpretation must be addressed. National-level information needs to be publicised to make people aware of what there is and how it is relevant to their projects, as well as how they can access it. The focus should be on integrating national data into current regional botanical information use practices, rather than superseding these. The following strategies utilise a combination of currently available and trusted conduits along with some new positions and practices.

6.1 Knowledge Broker

A key recommendation of this study is the establishment of a full-time medium term (three years) Knowledge Broker position. This position will coordinate and facilitate the distribution of relevant botanical information from a range of national and regional botanical data sources to regional end users, who currently do not have the time or capacity to identify, access and effectively utilise this information. In the absence of this type of assistance decisions are commonly based on only a sub-set of the relevant information that is available. This is clearly indicated by the results on national database access and usage, and by the lack of discrimination currently being applied by end users, who are using the same botanical data sources regardless of their landscape context and planning or management goal.

The importance of the Knowledge Broker role is further emphasised by both survey and focus groups results indicating the value of the local expert in providing and interpreting data – currently very little if any of this information is national-level information. To be of maximum benefit, the Knowledge Broker would need to know about all the types of information available and their limitations, not just the national-level information, and who the relevant contact people would be in each of the regions. It would be appropriate for the funding for this position to come out of national-level NHT funding. A critical role for this position would be liaison with the NRM facilitators in the regions appointed under NHT2.

6.2 Information kits

A second recommendation is the development of information kits explaining the availability and utility of national botanical information and its role in complimenting and extending currently used regional scale data. The Knowledge Broker could produce these information packages, firstly at a national scale and then tailored to each region. They would then be sent out to key people, such as NRM facilitators around the country for

them to use as a resource when providing information to landholders and other interested individuals.

Others that would also benefit from access to such information kits include those in the nursery trade, CMA or CMB staff, local council members, local libraries, and university, TAFE and school lecturers. For a relatively low cost, this would provide one document for people in the regions to refer to when considering where their information should be sourced. These kits could form the basis of regional information sessions that could be run across catchments to inform end users about national data and what it is, how to get it and why it is useful.

6.3 Regional revegetation guides

The widespread popularity and usefulness of regional revegetation guides is something that came out of this study. These guides have already been developed in some areas (e.g. the Riverina⁹ and South West Slopes¹⁰ regions in NSW and the North Central¹¹ and Goulburn Broken¹² catchments in Victoria), and uptake and use by regional end users has been strong. They are appropriately designed and provide a good deal of regionally relevant information that Landcare groups and private landholders need for their vegetation planning and management work. These guides could benefit greatly from the incorporation of national botanical data. They are an established and trusted tool for the transfer of botanical information and represent a cost-effective means to encourage the use of national-level botanical information in regional on-ground vegetation planning.

It is strongly recommended that more funding be made available for the production of these guides. The use of a standardised content and format, and a requirement for authors to share new information, would greatly cut down on replication of effort and make the task of compiling one of these guides much easier. A workshop would need to be convened to work out the appropriate standards for content and format. The use of national data, through consultation with the Knowledge Broker, would be part of the conditions of funding to ensure that all appropriate sources of information are used. Relatively modest funding would greatly assist the development of these guides for regions that do not currently have them. The Riverina guide was estimated to cost approximately \$150 000 to produce. It is a book that covers an area of 8 million ha, and is proving to be a useful tool for a wide range of people. This represents a very strategic investment for the Commonwealth.

6.4 One-stop website and Internet delivery

Many respondents reported the desire for a website that would provide access to all electronic botanical information in one place. A commonly reported reason for not using much of the web-based information was a simple lack of knowledge of 'what is out there'. This website could greatly help in providing straight-forward access to the myriad of information held by different departments at all levels of government, as well as that held by NGOs. It could also provide a useful service by hosting a map of the coverage of all

⁹ Eds: Kylie Kent *et al.* (2002) *Native Vegetation Guide for the Riverina*. Wagga Wagga, NSW: Johnstone Centre, Charles Sturt University, NSW

¹⁰ Ed: Fleur Stelling. (1998) *South West Slopes Revegetation Guide (south of the Murrumbidgee River)* Deniliquin, NSW: Murray Catchment Management Committee

¹¹ Ed: Scott Watson (1999) *Indigenous plants for North Central Victoria: a revegetation guide*. Compiled by Greening Australia, Victoria. East Melbourne: Department of Natural Resources and Environment

¹² Eds: Gill Earl *et al.* (2001) *Revegetation Guide for the Goulburn Broken catchment*. East Melbourne: Department of Natural Resources and Environment

the local revegetation guides around the country with contact details. This would assist people in locating the revegetation guides that are most relevant for their situation. This website could be hot-linked to other vegetation websites, including state and catchment organisations, so that their information could be easily accessed.

The Internet is a popular format for receiving information for many people, although the current patchy distribution of good Internet connections makes it difficult for people in regional areas to access websites. There are several things that could be done to minimise this problem. Firstly, web pages could be redesigned to offer a no-images option that would require a lot less downloading time, such as has been done for the Weeds Australia website. Secondly, as many people access the information on the Internet through a third party, it is also important to format websites so that they are easy to print. These steps need to be taken by all agencies that currently present botanical information on the Internet.

Until Internet access is more uniformly available across the country, an interim measure would be to design CD's that contain the information on the web that could be distributed at a low cost. These CDs would need to be updated every few years, but this would be a much lower cost than publishing the information. Although some of the national data sets are much larger than would fit on a single CD, it should be possible to prepare targeted regional subsets for local use in remote areas. The Knowledge Broker could play an important role in customising national data for regional use.

6.5 Continued development of national databases

Along with attempting to integrate national data into regional initiatives such as revegetation guides, and improving the overall awareness of these data through information kits and workshops, work should continue on the development of the delivery systems for the databases themselves. Several of these online data sources such as the AVH and ANRA are currently still under development and resources should be maintained for these to achieve their final goals of easy online access and comprehensive national data coverage. The results of this study provide a sound indication of the types of botanical information that practitioners require, and how the data could be displayed to best meet their needs.

6.6 Requirements for the recording of botanical information sources

In order for the Commonwealth to get feedback on which botanical information sources are being used for what purpose, there could be a requirement that the use of national-level botanical information is recorded in documents that are presented to the Commonwealth for funding under NAP or NHT2. The survey of NRM documents indicated that there might be national-level information sources that are used, but their use is not recorded in the formal documentation. Encouraging the recording of all sources of botanical information would also provide information about which areas of botanical information are currently lacking and require further research.

7 APPENDICES

Appendix I: List of Botanical Databases

Name	Level	Owner	Records	Other Relevant Data	Access	Goal
ABIF – Flora	National	Australian Biological Resources Study	Descriptions, keys, photos, illustration, maps		Online http://www.ea.gov.au/biodiversity/abrs/abif/flora	To make freely available, taxonomic and biological information on all algae, bryophytes, fungi, lichens and vascular plants known to occur in Australia
Association of Societies for Growing Australian Plants	National	Association of Societies for Growing Australian Plants	Species information	Photos, low-resolution map, conservation status, species description, propagation notes. Also has links to regional groups species lists	Online http://farrer.riv.csu.edu.au/ASGAP	To foster the interchange of ideas and information among people interested in Australian plants
AusGrass	National	ABRS, Qld Herbarium, Bushcare	Identification of Grasses	Photos, low resolution map, species description	CD	To provide a user-friendly introduction to the Australian Grasses
Australian Common Names Database	National	Australian National Botanic Gardens	Searchable database of common names and their scientific equivalents	Reference list	Online http://www.cpbr.gov.au/common.names	To document all common names that have been applied to Australian native plants
Australia's Virtual Herbarium	National	Council of Heads of Australian Herbaria (CHAH)	Point locations of herbarium data	High resolution, interactive map	Online http://www.chah.gov.au/avh	To provide immediate access to the wealth of data associated with scientific plant species in each Australian herbarium
Environmental Protection and Biodiversity Conservation Act	National	Environment Australia	An interactive map of the likelihood of the occurrence of threatened species or communities in an area	Mapped extent of WHA, RAMSAR wetlands, threatened species or communities. Links to advice for the minister on management, threats etc.	Online http://www.ea.gov.au/epbc/interactivemap	A searchable database to help determine whether matters of national environmental significance are likely to occur in your area of interest
FungiBank	National	CSIRO Forestry and Forest Products, Bushcare	Information about using native fungi in revegetation and advice on sourcing and propagating native fungi	Information about fungi collection, restoration methods, links to other information	Online http://www.fungibank.csiro.au	To encourage and enable people to find and recognize fungi and to use the fungi efficiently and responsibly in management and restoration of landscapes
Euclid	National	Center for Plant Biodiversity Research, Bushcare	Identification of <i>Eucalyptus</i> species	Photos, low resolution map, conservation status, species description	CD	Provide a flexible and detailed identification and information package for Australia's eucalypts

Name	Level	Owner	Records	Other Relevant Data	Access	Goal
Growing Native Plants	National	Australian National Botanic Garden	Cultivation notes on Australian Plants	Low resolution map, photos, species description, pest problems	Online http://www.anbg.gov.au/gnp	To update cultivation notes previously printed by the ANBG, and make them more widely available
National Vegetation Information System	National	NLWRA Australian Natural Resources Atlas in collaboration with States and Territories	Hierarchical database of vegetation types	Dominant species, community type, pre-clearance data	Under development	To pull together the data from the separate States/Territories into a coherent whole
Native Vegetation Types and Extent	National	NLWRA Australian Natural Resources Atlas, in collaboration with States and Territories	Information on vegetation types (answers to specific questions – not a searchable database, based on bioregions)	Vegetation profiles, pre- and post-clearance distribution	Online http://audit.ea.gov.au/anra Under “Vegetation and Biodiversity”	Provides an easily accessible and nationally consistent framework for describing and compiling data and information all vegetation types in Australia
The Families of Flowering Plants of Australia	National	Australian Biological Resources Study	Identification of flowering plants to family level	Photos, family descriptions, both native and naturalized	CD	An identification and information package for all of the plant families, native and naturalized, in Australia
Wattle	National	Australian Biological Resources Study	Identification of <i>Acacia</i> species	Line drawings, low resolution map, species description	CD	Provide a user-friendly introduction to the Australian Acacia
Weeds Australia	National	National Weeds Strategy	List of weeds of national significance; Database of government and community references	Strategic management plans for national weeds	Online http://www.weeds.org.au	A strategic approach to weed problems of national significance.
What's its name?	National	Australian Biological Resources Study	Nomenclatural information	Low resolution map	Online http://www.cpbr.gov.au/win	A concise database of plant names and name changes for Australia

Name	Level	Owner	Records	Other Relevant Data	Access	Goal
Atlas of NSW Wildlife	State (NSW)	NSW National Parks and Wildlife Service	List of sightings for a chosen area (“not exhaustive or scientifically verified”)	Legal status. For a fee can get coordinates, accuracy and dates of sightings	Online http://wildlifeatlas.npws.nsw.gov.au	Provide information about plant and animal sightings across NSW
Census of Vascular Plants of Victoria	State (Vic)	National Herbarium of Victoria	List of plants in Vic. Based on herbarium data	Conservation status, origin	Online http://www.rbg.vic.gov.au/biodiversity/database/viclist	Create an up-to-date list of the names of vascular plants in Victoria
Electronic Flora of South Australia	State (SA)	SA Plant Biodiversity Centre	Contains the Plant Distribution Mapper; Census of SA Plants, Algae and Fungi; Plant Fact Sheets	Names (scientific and common), species description, geographic and ecological distribution, notes on uses and relationships	Online http://www.flora.sa.gov.au	To provide a comprehensive Web-projected account of the flora of a large region
Florabase	State (WA)	WA Herbarium, Department of Conservation and Land Management	Searchable database of plant name (scientific or common) or description	Name, image, library information, distribution map, short species description	Online http://florabase.calm.wa.gov.au	Represents the latest information on the State flora.
Greening Australia NSW – vegetation advice	State (NSW)	Greening Australia NSW	Database of vegetation advice searchable by topic or region	Papers, reports, books and lists relating to technical vegetation advice	Online http://www.ga.org.au Under “Vegetation Advice”	To provide a practical means to address the need for large scale revegetation and management of Australia’s native vegetation
Greening Australia Victoria	State (Vic)	Greening Australia Victoria	Information about revegetation techniques	Manuals on direct seeding and revegetation for Victoria	Online http://www.gavic.org.au	Engaging the community in vegetation management to protect and restore the health, diversity and productivity of our unique Australian landscapes
PlantNet	State (NSW)	Royal Botanic Gardens Sydney	Location (subdivision of NSW) based on herbarium data	Conservation status	Online http://plantnet.rbg Syd.gov.au	Provide information about NSW plant names, distributions and conservation status

Name	Level	Owner	Records	Other Relevant Data	Access	Goal
Victorian Flora Information System	State (Vic)	NRE Victoria, Information Management Section	A fully-functional geographically-registered, relational database of distribution and descriptive data on Victorian plants	Species lists, descriptions, photos, survey/collection sites, species lists at these sites, maps.	The FIS may be purchased from Viridans provided a data-sharing agreement has been entered into with the Department of Natural Resources and Environment	
WattleWeb	State (NSW)	Royal Botanic Gardens Sydney	Point locations of herbarium data for NSW Wattles	Photos, low-resolution map, species description, habit.	Online http://plantnet.rbg Syd.gov.au/PlantNet/wattle	Provide information about NSW wattles
Wild Plants of Victoria	State (Vic)	Viridans Biological Databases	List of plant species in Vic., searchable by area	Photos, high resolution map	CD	Provide an interactive database that combines distribution data, maps, descriptive text and photos.

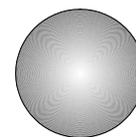
Name	Level	Owner	Records	Other Relevant Data	Access	Goal
“Basin-in-a-Box” and “River Murray”	Regional (Murray-Darling Basin)	Murray-Darling Basin Commission	Information on woody vegetation types based on Landsat classifications	Dominant over story species information (genus, density), geographical information	CD	A collection of geographic data for the Murray-Darling Basin
Charles Sturt University Virtual Herbarium	Regional (Murray, Murrumbidgee)	Charles Sturt University, Department of Land and Water Conservation, Murray CMB, Murrumbidgee CMB	Herbarium specimen information	Photos (specimen, landscape), data from specimen sheet, distribution, species description	Online http://www.csu.edu.au/herbarium	Helping to advance the understanding and sound management of the flora of the Upper Murray and Murrumbidgee region.
Greening the Grainbelt	Regional (Harden)	Center for Plant Biodiversity Research	Herbarium specimen information	Species description, associated species, habitat, cultivation and other propagation notes	Online http://www.anbg.gov.au/cgi-bin/harden	Provides botanical guidance for revegetating portions of Harden Shire with native vegetation
Revegetation Guide for the Goulburn-Broken Catchment	Regional (Goulburn-Broken)	Goulburn-Broken CMA, Department of Natural Resources and Environment	Information on revegetation issues and species information for the region	Species lists, species descriptions, vegetation descriptions, habit, habitat, propagation	Book or Online http://www.gbcma.vic.gov.au/publicationsframe Under “Native Vegetation”	Provide information about growing indigenous plants in the Goulburn-Broken catchment
Riverina Revegetation Guide	Regional (Riverina)	Charles Sturt University, Berrigan Shire, Native Dog Landcare Group	Information on revegetation issues and species information for the region (links to CSUVH)	Species lists, species descriptions, vegetation descriptions, habit, habitat, propagation	Book or Online http://riverinaguide.mur.csu.edu.au (or via CSU Virtual Herbarium site)	Provide information about growing indigenous plants in the Riverina
South West Slopes Revegetation Guide	Regional (Murray, Murrumbidgee)	Department of Land and Water Conservation, Murray CMB	Information on revegetation issues and species information for the region (links to CSUVH)	Distribution, habitat, habit, species description, characteristics, propagation, wildlife use	Book or Online http://www.csu.edu.au/herbarium (or via CSU Virtual Herbarium site)	Provide information about growing indigenous plants on the South West Slopes

Appendix II: Questionnaire

SUITE 18
20-24 GIBBS STREET
(PO BOX 214)
MIRANDA NSW 2228
AUSTRALIA

PHONE: (02) 9525 3200
FAX: (02) 9525 3656

International:
61 - 2 - 9525 3200
61 - 2 - 9525 3656



**M A R K E T
A T T I T U D E
R E S E A R C H
S E R V I C E S**

J591
07/04/03
Email/Telephone
N=160
Victoria and NSW

PTY LTD
INCORPORATED IN NSW
ACN 058 339 245

**PROJECT: 2003 SURVEY ON INTEGRATING BOTANICAL INFORMATION IN
REGIONAL NATURAL RESOURCE MANAGEMENT PLANNING**

I am calling from Market Attitude Research Services Pty Ltd. We have been given your name in confidence by CSIRO Plant Industry to assist CSIRO conduct a research study with people involved in regional natural resource management in south eastern Australia.

The interview will take around 10-15 minutes. The aim of the study is to discover how widely used national, or other, botanical databases are, and the impediments to their use. The main purpose of this study will be recommendations from CSIRO to Environment Australia as to how they can best encourage the incorporation of botanical information into the regional natural resource management planning process.

The study will draw together opinions from a wide range of people involved covering four catchments in south eastern Australia – the Murray and the Lachlan in New South Wales, and Glenelg-Hopkins and North Central in Victoria. We are speaking to people involved in vegetation planning and management in order for them to have input into how botanical information is made available to assist them in their work.

**TO ASSIST YOU DURING THE TELEPHONE INTERVIEW PLEASE REFER TO THIS
EMAIL VERSION OF THE QUESTIONNAIRE.**

I wish to confirm that your views will be treated in full confidence. We are conducting the project with over 160 people and your views will be aggregated with those of other people.

If you wish to confirm the bona fides of the survey you may contact – Ms Gudrun Wells, CSIRO Plant Industry, Canberra Ph. 02-6246 4894 or email: gudrun.wells@csiro.au

Q1. Thank you for your time. The first few questions relate to your role in vegetation planning and management. Firstly, which State do you work in?

- NSW 1
- Victoria 2

Q2. Which of the following catchments do you mainly work in?

- Lachlan 1
- Murray 2
- Glenelg-Hopkins 3
- North Central 4

Q3a. Which of the following categories of organisation are you affiliated with in your role in vegetation planning and management?

Q3b. What is your primary affiliation?

	Q3a All affiliations (you may tick as many as required)	Q3b Primary affiliation (please only tick one)
Federal Government.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Murray-Darling Basin Commission	<input type="checkbox"/> 2	<input type="checkbox"/> 2
State Government.....	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Catchment Management Authority or Board.....	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Vegetation Committee established under legislation.....	<input type="checkbox"/> 5	<input type="checkbox"/> 5
Shire or other local government.....	<input type="checkbox"/> 6	<input type="checkbox"/> 6
Landcare/Buschcare facilitator or coordinator	<input type="checkbox"/> 7	<input type="checkbox"/> 7
Greening Australia	<input type="checkbox"/> 8	<input type="checkbox"/> 8
Other not for profit group or non-government organisation	<input type="checkbox"/> 9	<input type="checkbox"/> 9
Agribusiness	<input type="checkbox"/> 10	<input type="checkbox"/> 10
Landholder	<input type="checkbox"/> 11	<input type="checkbox"/> 11
Consultant.....	<input type="checkbox"/> 12	<input type="checkbox"/> 12
Educational Facility	<input type="checkbox"/> 13	<input type="checkbox"/> 13
Self-employed.....	<input type="checkbox"/> 14	<input type="checkbox"/> 14
Other (please specify)_____	<input type="checkbox"/> 15	<input type="checkbox"/> 15

Q4a. Which of the following types of activities do you spend your time doing in your role with your primary organisation?

Q4b. What is your main activity?

	Q4a All activities (you may tick as many as required)	Q4b Main activity (please only tick one)
Develop vegetation management policy.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Prepare vegetation management plans.....	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Provide vegetation management advice	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Assess project proposals for funding.....	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Monitor/evaluate vegetation management plans.....	<input type="checkbox"/> 5	<input type="checkbox"/> 5
Research and development.....	<input type="checkbox"/> 6	<input type="checkbox"/> 6
On-ground vegetation management (eg: planting, fencing)	<input type="checkbox"/> 7	<input type="checkbox"/> 7
Other (please specify)_____	<input type="checkbox"/> 8	<input type="checkbox"/> 8

Q5. How long have you worked in this role? _____ year(s)

Q6. At what scale are you primarily involved in vegetation planning and management. That is, how large in relative terms would be the size of the area you are covering?

(Please only tick one)

- Property size areas such as a farming size area or smaller areas 1
- Shire or other local government areas including stock routes, cemeteries or nature reserves 2
- Catchment size area, larger nature reserves or smaller national parks 3
- Regional or large areas such as larger national parks 4
- State-wide areas 5
- National areas 6

Q7a. The following questions relate to what land system you are working in, and what the relevant issues for that system are. Which of the following land ownership categories do your vegetation planning and management activities fall into?

Q7b. What is the main land ownership category?

	Q7a All land ownership category (you may tick as many as required)	Q7b Main land ownership category (please only tick one)
Land leased from the Crown.....	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Land leased from a freeholder	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Freehold land.....	<input type="checkbox"/> 3	<input type="checkbox"/> 3
National Park or Reserve.....	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Other Crown land.....	<input type="checkbox"/> 5	<input type="checkbox"/> 5
All of the above	<input type="checkbox"/> 6	<input type="checkbox"/> 6
Other (please specify)_____	<input type="checkbox"/> 7	<input type="checkbox"/> 7

Q8a. Which of the following activities is the land area that you deal with used for?

Q8b. What is the main use?

	Q8a All land uses (you may tick as many as required)	Q8b Main land use (please only tick one)
Irrigation (dairy, horticulture etc)	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Dry-land grazing.....	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Dry-land cropping.....	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Forestry (exotic or native)	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Reserve (National Park, crown land reserves, travelling stock routes etc)	<input type="checkbox"/> 5	<input type="checkbox"/> 5
Urban	<input type="checkbox"/> 6	<input type="checkbox"/> 6
Other (please specify)_____	<input type="checkbox"/> 7	<input type="checkbox"/> 7

Q9a. Which of the following issues are important for vegetation planning and management in your land area?

Q9b. What is the main issue?

	Q9a All issues (you may tick as many as required)	Q9b Main issue (please only tick one)
Salinity protection or mitigation	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Soil erosion	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Waterway protection	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Pest plant management.....	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Bush fire fuel management (prevention or control)	<input type="checkbox"/> 5	<input type="checkbox"/> 5
Shade and shelter for stock	<input type="checkbox"/> 6	<input type="checkbox"/> 6
Production forestry.....	<input type="checkbox"/> 7	<input type="checkbox"/> 7
Harvesting plant products from wild populations ..	<input type="checkbox"/> 8	<input type="checkbox"/> 8
Biodiversity conservation	<input type="checkbox"/> 9	<input type="checkbox"/> 9
Protection of specific rare or threatened species..	<input type="checkbox"/> 10	<input type="checkbox"/> 10
Landscape planting.....	<input type="checkbox"/> 11	<input type="checkbox"/> 11
Provision of recreational facilities.....	<input type="checkbox"/> 12	<input type="checkbox"/> 12
Impact of recreation	<input type="checkbox"/> 13	<input type="checkbox"/> 13
Other (please specify)_____	<input type="checkbox"/> 14	<input type="checkbox"/> 14

Q10a. What types of vegetation management is actively happening in your area at the moment?

Q10b. What is the main activity?

	Q10a All activities (you may tick as many as required)	Q10b Main activity (please only tick one)
Remnant vegetation protection	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Revegetation.....	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Utility planting (eg: windbreaks).....	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Plantation development (native or exotic).....	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Other (please specify)_____	<input type="checkbox"/> 5	<input type="checkbox"/> 5

**Q11. The following questions are about the planning structure under which vegetation planning and management occurs in your area. Is there a vegetation management plan for the area you work in?
PLEASE ANSWER AS RELEVANT**

	Catchment level plan (a)	Sub-Catchment level plan (b)	Property level plan (c)
Yes – Vegetation Management Plan has been implemented	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Yes – But plan still currently being developed	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2
No – no vegetation management plan	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Unsure/Don't know	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4

**Q12. If you answered “yes – plan has been implemented” to question 11, how long has the plan been implemented for?
PLEASE ANSWER AS RELEVANT**

- (a) Catchment level plan: _____ year(s)
- (b) Sub-Catchment level plan: _____ year(s)
- (c) Property level plan: _____ year(s)

**Q13. In your opinion, does this/do these plan(s) ticked in Question 11 effectively address the major vegetation management issues in your area?
PLEASE ANSWER AS RELEVANT**

	Catchment level plan (a)	Sub-Catchment level plan (b)	Property level plan (c)
Yes	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1
No	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Unsure/Don't know	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3

Q14. The following questions relate to the usefulness of botanical information for vegetation planning and management at the regional scale. In your opinion, how important are the following types of information when undertaking vegetation planning and management?

	Very important	Important	Unimportant	Unsure/ Don't know
Pre-1750 vegetation maps.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Pre-1750 vegetation lists	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Maps showing the location, extent and condition of current native vegetation.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Lists showing the location, extent and condition of current native vegetation.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Distribution maps of rare or threatened species ...	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Lists of locations of rare or threatened species	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Information about pest plants in your area.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Vegetation community information.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Tools for taxonomic identification of local plants...	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Details of the landscape role or function of possible revegetation species.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Sources and availability of suitable material for revegetation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Information on genetic provenance.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Comparative costings of alternative revegetation methods (eg direct seeding vs seedlings).....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Other (please specify)_____	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q15a. Are you able to access the following information?

Q15b. For the information you access is it useful? → Q15c. Was it used in vegetation planning and management?

	Q15 a Accessible				Q15b Usefulness				Q15c Was it used?		
	No	Unsure/ Don't know	Yes		Not useful	Useful	Very useful		Yes	No	Unsure/ Don't know
Pre-1750 vegetation maps.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Pre-1750 vegetation lists.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Maps showing the location, extent and condition of current native vegetation.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Lists showing the location, extent and condition of current native vegetation.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Distribution maps of rare or threatened species	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Lists of locations of rare or threatened species	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Information about pest plants in your area.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Vegetation community information.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Tools for taxonomic identification of local plants.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Details of the landscape role or function of possible revegetation species.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Sources and availability of suitable material for revegetation.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Information on genetic provenance.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Comparative costings of alternative revegetation methods (eg direct seeding vs seedlings).....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		
Other (please specify)_____	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 →	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3		

Q16. Which type of information (in Question 15) did you consider to be the most useful?

PLEASE TICK ONE BOX ONLY

MOST USEFUL

- Pre-1750 vegetation maps 1
- Pre-1750 vegetation lists..... 2
- Maps showing the location, extent and condition of current native vegetation 3
- Lists showing the location, extent and condition of current native vegetation 4
- Distribution maps of rare or threatened species..... 5
- Lists of locations of rare or threatened species..... 6
- Information about pest plants in your area 7
- Vegetation community information 8
- Tools for taxonomic identification of local plants 9
- Details of the landscape role or function of possible revegetation species 10
- Sources and availability of suitable material for revegetation 11
- Information on genetic provenance 12
- Comparative costings of alternative revegetation methods (eg direct seeding vs seedlings)..... 13
- Other (please specify)_____ 14

Q17. For the type of information (in Question 15) that you consider to be most useful, what attributes made it useful? Please answer for each attribute.

	Very important	Important	Not important
Readily accessible	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Appropriate scale	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Easily interpreted	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Technical help available to access or interpret	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Confident of accuracy	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Affordable	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Other (please specify)_____	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

Q18. Which type of information (in Question 15) do you consider to be the least useful?

PLEASE TICK ONE BOX ONLY

LEAST USEFUL

- Pre-1750 vegetation maps 1
- Pre-1750 vegetation lists..... 2
- Maps showing the location, extent and condition of current native vegetation 3
- Lists showing the location, extent and condition of current native vegetation 4
- Distribution maps of rare or threatened species..... 5
- Lists of locations of rare or threatened species..... 6
- Information about pest plants in your area 7
- Vegetation community information 8
- Tools for taxonomic identification of local plants 9
- Details of the landscape role or function of possible revegetation species 10
- Sources and availability of suitable material for revegetation 11
- Information on genetic provenance 12
- Comparative costings of alternative revegetation methods (eg direct seeding vs seedlings)..... 13
- Other (please specify)_____ 14

Q19. For the type of information (in Question 15) that you consider to be least useful, what attributes made it not useful? Please answer for each attribute.

	Very important in lack of usefulness	Important in lack of usefulness	Not important
Hard to access	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Inappropriate scale	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Hard to interpret	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Technical help not available	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Not confident of accuracy	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Unaffordable	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Other (please specify)_____	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

**Q20. Where do you get the type of information you consider to be important?
YOU MAY TICK MORE THAN ONE ANSWER**

- | | | | |
|--|----------------------------|---|-----------------------------|
| Internet | <input type="checkbox"/> 1 | NGO or community group | <input type="checkbox"/> 9 |
| Books | <input type="checkbox"/> 2 | Local shire | <input type="checkbox"/> 10 |
| Pamphlets | <input type="checkbox"/> 3 | Local expert | <input type="checkbox"/> 11 |
| CDs | <input type="checkbox"/> 4 | Catchment Management Board/Authority | <input type="checkbox"/> 12 |
| Scientific Journals | <input type="checkbox"/> 5 | State government department (eg DPI, DSE, DLWC, NSW NPWS) | <input type="checkbox"/> 13 |
| Landcare group | <input type="checkbox"/> 6 | Environment Australia | <input type="checkbox"/> 14 |
| Landcare/Bushcare facilitator or coordinator | <input type="checkbox"/> 7 | Other (please specify)_____ | <input type="checkbox"/> 15 |
| Greening Australia | <input type="checkbox"/> 8 | | |

Q23. Which data source (in Question 22) do you consider to be the most useful? PLEASE TICK ONE BOX ONLY

MOST USEFUL

- Australian National Herbarium..... 1
- State herbaria 2
- Regional herbaria 3
- Australia's Virtual Herbarium* 4
- Printed copies of the *Flora of Australia*..... 5
- Printed copies of the *Flora of NSW or Victoria* 6
- Regional Floras..... 7
- Electronic identification guides, such as *Euclid* and *Wattle*..... 8
- Australian Plant Name Index* or *What's its name?* 9
- Information from the *Australian Natural Resources Atlas* 10
- The information on the Environmental Protection and Biodiversity Conservation Act webpage (location of threatened species and communities)..... 11
- Florabank* seed information 12
- Information provided by Greening Australia 13
- Regionally produced vegetation maps 14
- Locally produced species lists (eg those available from the Society for Growing Australian Plants)..... 15
- Locally produced revegetation guides (eg those produced for the Riverina and South West Slopes regions)..... 16
- Information provided by your local Landcare or Bushcare facilitator 17
- Personal knowledge 18
- Local expert 19
- Other (please specify)_____ 20

Q24. For the data source (in Question 22) that you consider to be most useful, what attributes made it useful? Please answer for each attribute.

- | | Very
important | Important | Not
important |
|---|----------------------------|----------------------------|----------------------------|
| Readily accessible | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Appropriate scale | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Easily interpreted | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Technical help available to access or interpret | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Confident of accuracy | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Affordable | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Other (please specify)_____ | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

Q25. Which data source (in Question 22) do you consider to be least useful? PLEASE TICK ONE BOX ONLY

LEAST USEFUL

- Australian National Herbarium..... 1
- State herbaria 2
- Regional herbaria 3
- Australia's Virtual Herbarium* 4
- Printed copies of the *Flora of Australia*..... 5
- Printed copies of the *Flora of NSW or Victoria* 6
- Regional Floras..... 7
- Electronic identification guides, such as *Euclid* and *Wattle*..... 8
- Australian Plant Name Index* or *What's its name?* 9
- Information from the *Australian Natural Resources Atlas* 10
- The information on the Environmental Protection and Biodiversity Conservation Act webpage (location of threatened species and communities)..... 11
- Florabank* seed information 12
- Information provided by Greening Australia 13
- Regionally produced vegetation maps 14
- Locally produced species lists (eg those available from the Society for Growing Australian Plants)..... 15
- Locally produced revegetation guides (eg those produced for the Riverina and South West Slopes regions)..... 16
- Information provided by your local Landcare or Bushcare facilitator 17
- Personal knowledge 18
- Local expert 19
- Other (please specify)_____ 20

Q26. For the data source (in Question 22) that you consider to be least useful, what attributes made it not useful? Please answer for each attribute.

- | | Very important
in lack of
usefulness | Important in
lack of
usefulness | Not
important |
|------------------------------|--|---------------------------------------|----------------------------|
| Hard to access | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Inappropriate scale | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Hard to interpret | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Technical help not available | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Not confident of accuracy | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Unaffordable | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Other (please specify)_____ | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

**Q27. What do you think could be done to make botanical information more useful and available to you in your work?
YOU MAY TICK MORE THAN ONE BOX**

- More raw information (eg species lists) 1
- More interpreted information (eg planting guides) 2
- More information in print 3
- More information online 4
- More information on CD 5
- Someone who can help you access the information available 6
- Someone who can interpret the information to meet your needs 7
- Training to increase your personal capacity to use data sources 8
- Other (please specify) _____ 9

Q28. The following questions relate to factors that influence the incorporation of botanical data onto vegetation planning and management. What stimulates you to identify botanical issues as relevant to planning and management?

Specify: _____

Q29. How important to you is botanical information relative to other sources of information in making planning and management decisions?

Specify: _____

Q30. Is there anything else you would like to tell us about your use of botanical information and how you would like to see it delivered?

Specify: _____

Q31. Would you be prepared to review the recommendations of the study?

Yes	<input type="checkbox"/>	¹
No	<input type="checkbox"/>	²
Unsure/Don't know	<input type="checkbox"/>	³

↓

May I record your name, phone number and address and indicate a preferred time to be contacted below:

PLEASE PRINT

Surname: _____ First Name: _____

Phone numbers: () _____ () _____

Postal Address: _____

_____ Postcode: _____

Email: _____

Q32. Preference for contact time

Contact during the day (9am – 5pm) preferred ¹

Contact during the evening (5pm – 8pm) preferred ²

Thank you very much for your time and honesty.