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INVASIVE SPECIES PROGRAM

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COMMUNITY INVOLVEMENT IN OFF-RESERVE AND ON-RESERVE MANAGEMENT OF ENVIRONMENTAL WEEDS

Environment Australia

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COMMUNITY INVOLVEMENT IN OFF-RESERVE AND ON-RESERVE
MANAGEMENT OF ENVIRONMENTAL WEEDS by AACM International

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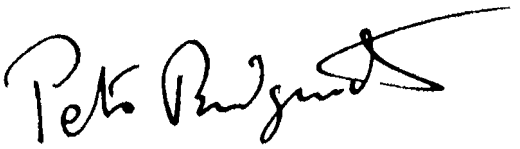
FOREWORD

Community group involvement in managing areas for conservation purposes is an often underestimated resource. The management of environmental weeds requires a long-term commitment and, in times of limited resources, effectively involving community groups in the management of weeds can be an efficient way of tackling the problem. Involving community groups in appropriate projects can lead to a number of things, such as increasing the resources available to manage weeds, empowering the community and increasing their ownership of the management difficulties associated with environmental weeds.

This report reviews existing work in community weed management, examining hours, money spent, weed control methods used, regions covered and geographic locations. It also identifies the advantages and limitations of using community groups for environmental weed management. It is interesting to note that the most successful community groups to date are those that receive appropriate support from the local agency with which they are working. It is critical for government agencies to provide experienced personnel to train and support groups that are supplying their time to control environmental weeds, an often tedious job.

I trust that this report will be a valuable resource to government bodies about to embark on the management path with community groups, and should also be of use to those agencies currently operating community group programs. This work was commissioned by the Australian Nature Conservation Agency (ANCA) - but we are now known as the Biodiversity Group (Environment Australia). Please note: this is not extinction - it is evolution!



Peter Bridgewater
Head
Biodiversity Group

ABBREVIATIONS AND ACRONYMS

AABR Australian Association of Bush Regenerators, WA

ALCOA Aluminum Company of America Ltd

ANCA Australian Nature Conservation Agency

APACE Appropriate Technology and community Environment

APB Agriculture Protection Board

AQIS Australian Quarantine and Inspection Service

ATCV Australian Trust for Conservation Volunteers

CALM Conservation and Land Management, WA

CSIRO Commonwealth Scientific and Industrial Research Organisation

DCNR (now DNRE) Department of Conservation and Natural Resources, VIC

DNRE Department of Natural Resources and Environment, VIC

DPIF Department of Primary Industries and Fisheries, NT

FTE Full Time Equivalent

GAQ Greening Australia - Queensland

LCDC Land Conservation District Committee

LEAP Landcare and Employment Action Program

MPWC Melbourne Parks and Waterways Corporation

NCSSA The Nature Conservation Society of SA Inc.

NLP National Landcare Program

NPWS National Parks and Wildlife Service

OBT One Billion Trees

OH&S Occupational Health and Safety

REAP Rural Employment and Action Program

SGAP Society for Growing Australian Plants Inc

STB Save the Bush

SWEEP Strategic Weed Eradication and Education Program

TAFE Technical and Further Education

TCT Tasmanian Conservation Trust

TFN Trust for Nature

EXECUTIVE SUMMARY

Management of environmental weeds is still in its infancy in Australia. Currently, diverse community groups lead many of the activities that address the threat posed by environmental weeds across the country. This review of community involvement in off-reserve and on-reserve management of environmental weeds presents a `snap shot' of the types of groups involved, the advantages and limitations of community weed control programs, the costs and benefits of community involvement, and the current funding system in place to manage environmental weeds.

USE OF VOLUNTEER GROUPS TO MANAGE ENVIRONMENTAL WEEDS IN AUSTRALIA

Volunteer groups are leading the field

Volunteer groups are a primary source of environmental weed management in Australia. The lack of recognition of environmental weed threats in Australia by the wider community has meant that large scale programs and funding for environmental weeds is not a priority, and the responsibility has fallen largely onto volunteers. They attempt to manage a large spectrum of environmental weeds using hand tools, physical labour, minimum disturbance, native vegetation management and Bushcare techniques.

These groups operate with limited resources, and typically evolve skills and strategies as they proceed in the absence of existing experience and techniques. These volunteers often start with only an established emotional interest in environmental issues. Community groups that survive the learning process, benefit from increased community ownership and a sense of responsibility for managing environmental weed problems. These are the two major benefits of current volunteer involvement. An additional benefit is the low labour cost for intensive environmental weed management.

Groups often try to do too much

Many groups indicated in their early stages that they tried to control the entire weed population either in one year, or alternatively, attempted to tackle the area with the highest weed density, rather than seek the areas that have minor infestations and manage those first. This lack of strategic planning means that many groups do not fulfil their early expectations. Some people feel that they have wasted their time and give up.

If a group survives this initial phase, they are likely to have learnt lessons from previous experience and realistically plan for the eradication of weeds.

Successful programs usually have regular contact with officers from a government agency for support, training and education, and assistance with controlling major infestations or difficult weeds.

RECOGNISING THE NEED FOR FOLLOW UP MAINTENANCE PROGRAMS IS NOT ALWAYS UNDERSTOOD

Community groups often have a short term, output focussed life cycle which is unsuited to the long term, outcome focussed timeframes needed for successful environmental weed management. To effectively manage environmental weed problems, groups need to plan strategically and allow for a long term maintenance program. Groups can eliminate a weed, but without ongoing management may find that the weed has re-established itself to similar densities over a small number of years. Monitoring the managed area is vital if the program is to be successful over the long term.

Local people can manage local problems

Projects aimed at local people managing local environmental weed problems appear to be most

successful because the benefits of group action are more tangible. There is a greater level of community ownership and responsibility for the problem if the problem occurs in a groups' ` backyard'. This raises concerns about the effectiveness of volunteer community groups in managing isolated extensive environmental weed problems.

Environmental weeds have a lower priority than economic weeds

Targeted funding, programs and corporate interests at managing economic weeds clearly outweighs the funding and programs targeted at the management of environmental weeds. The costs of economic weeds are tangible to most stakeholders. The role for public investment in management of economic weeds is less clear and should be more widely debated. The cost of lost biodiversity or degraded habitat and related economic significance is less tangible and is not understood by the wider community. The management of environmental weeds, therefore, has reduced political importance. This emphasises the need for community education to establish a general community willingness to pay, and to increase the political priority for management of environmental weeds.

There is a current reticence in each state by Government to include environmental weeds under weed control regulations with supporting eradication, control or education programs. At a community level, this has implications for resource support to undertake weed control and management, and for the availability of research and science to provide new directions for environmental weed management.

FINANCIAL BENEFITS AND COSTS OF COMMUNITY INVOLVEMENT

Community involvement can be cost effective

Volunteer labour can be extremely cost effective with the ratio of community resources: public resources ranging from 22:1 to 1:1 for groups reviewed. If these groups are committed for the long term and undertake successful programs, they can be an enormous asset in any weed control program.

Low cost effectiveness using community participation occurs when groups have little knowledge or support and attempt to manage a problem for which they are technically and financially under-resourced. The loss of interest, waste of time and dampening of enthusiasm are not quantified, but are likely to be the major costs to managing environmental weeds by volunteer groups.

Volunteer involvement is generally undervalued ($10 an hour) and the non-market values of managing environmental weeds is difficult to accurately quantify. If appropriate values could be expressed that indicate the economic value of environmental weed control, then people would place greater importance on it and be prepared to act.

Interagency and community coordination could improve efficiency and success

Low cost effective programs can also be attributed to poor support and coordination by public sector agencies. Interagency planning and discussion between funding bodies, groups involved and agency staff would reduce the inefficiencies within community weed programs as well as increase the chances of success. Local government and some government funded organisations have started to address this issue by employing 'Bushcare' coordinators and managers for their areas.

What do community groups need to be more effective?

Most volunteer groups had some successful outcomes, even if the bid to control the environmental weed was unsuccessful. Consistent themes that groups identified that would assist their success included:

- locally trained support staff that can assist with advice, coordination and planning;
- chemical free weed management techniques;

- coordinated programs between agencies and community groups to improve strategic management of weed infestations;
- group development and management training to build skills;
- recognition for successful work undertaken by volunteers;
- commitment by governments in the form of legislative support, funding and programs that clearly acknowledges the significance of environmental weeds;
- education programs specifically targeted at landholders, the ornamental horticultural industry, nurseries and gardeners; and
- clarification of economic and environmental weed species.

Conclusion

The growth of environmental weed threats in Australia is alarming. Volunteer groups are currently the main resource available for implementing activities to reduce, control and manage the spread of environmental weeds. Management of economic weeds is supported by legislation and government programs. Volunteer groups require similar support for their efforts to control and manage environmental weeds.

Tighter controls on plant distribution and the introduction of new species needs to be initiated. Nurseries and agricultural organisations need to consider the impacts of plant species entering the country or being used in new locations within the country *before* they become an environmental problem.

Broader strategies aimed at eradicating weeds need to be implemented. The SWEEP program in Queensland is a good example of this because it recognises that problems need to be managed at their source, before dealing with the symptoms further downstream.

Volunteer groups have struggled with limited resources, knowledge and coordination to achieve significant advances in the management of environmental weeds in Australia. With new environmental weeds constantly emerging, it is imperative that volunteer groups are supported with policy and regulatory mechanisms which tackle environmental weed problems at the source, rather than when they become such a large problem that groups feel incapable of effective control. Once volunteer groups feel overwhelmed by a weed infestation, there are few other management options currently available to address the threat.

To determine the level of community involvement in weed management in Australia, various existing networks were utilised to develop a broad picture of the current situation. This included contact with and recommendations from personal contacts, special interest groups, professional organisations and local action committees, as well as reviews of existing literature and conference proceedings. The most active and widespread organisations and individuals involved in weed management were contacted to help draw broad conclusions and trends relating to current community weed management in Australia.

Contact was primarily by telephone and supported with written papers and conference proceedings where available. The overwhelming evidence is that volunteer involvement is significant and that voluntary organisations are a major contributor to environmental weed management in Australia.

1.1 NEW SOUTH WALES

1.1.1 Australian Trust for Conservation Volunteers (ATCV)

Figures for ATCV are presented in Table 2 in the following section.

1.1.2 Save the Bush

Save the Bush

The Save the Bush (STB) position is currently vacant. Total grants to NSW from STB in 1995/96 were worth $231,700. Using the figure of 10 percent of bush work is environmental weed work, the figure for environmental weed work for 1995-96 would be $23, 700.

1.1.3 Local Government

NSW has a burgeoning program for environmental weed control work on private and public lands. There are specific bush management educational programs run by both Technical and Further Education (TAFE) and National Trust of NSW for volunteers and professional bush management people. There are also several professional fee for-service bush management companies that manage bush areas for councils and paid staff on a number of councils.

Approximately thirty councils also have volunteer programs of significance known as 'Bushcare Programs' which are managed by salaried staff. These salaried staff have formed a `Volunteer Coordinators Network' as a support group to increase the professionalism of the programs. Most of these volunteer programs have been operating formally for 3-4 years although some of these councils had smaller friends groups or a volunteer program of some sort before this time.

1.1.3.1 Volunteer Coordinators Network

There are almost 5000 registered Bushcare volunteers in the greater Sydney area, which equates to about $1m-$2m of contribution. It may be too soon to determine the long term value of this volunteer program and to quantify any value-adding that the use of volunteers provides but a first survey has been conducted by Rees (1996 in press).

The volunteer coordinators network in the Sydney area combines local government, some national parks, statutory authorities and groups such as the NSW National Trust. It is a network of individuals responsible for the management of volunteers undertaking environmental weeds work in over 40 local council and other natural area agencies, mainly in the greater Sydney area. Most coordinators have undertaken training at the Volunteer Centre of NSW in the Management of Volunteers Program. There is a mailing list of members in the network available from Christine Guttery, Sutherland City Council.

1.1.3.2 Council Details

Surveys of Volunteers in the Greater Sydney Region Survey

During 1996, Lynn Rees from Lane Cove National Park', undertook a survey of the 45 councils and related land management agencies in the Greater Sydney Region with respect to bush management in areas within their responsibility. Of these, 30 had some sort of volunteer program. The total number of registered volunteers was 4730, in a total of 375 groups. They contributed about 80,000 hours of time in 1994-95, which, at commercial bush management company rates, equates to over $2 million contribution to environmental weeds control in the Greater Sydney Region (Rees, pers. comm.). At standard Landcare volunteer contribution rates this would be $800,000.

The greatest limitation to these programs, in addition to the commonly understood limitations of any volunteer program, is the very low volunteer to trainer ratios (Rees, pers. comm.).

In a similar manner, it is estimated by Brodie of the National Trust NSW, that there are 2000-3000 registered volunteers in environmental weeds work in council areas in the Sydney region. It is estimated the there are 4 councils with over 300 volunteers, 8 with between 150-300 volunteers and 12 with smaller numbers of volunteers (Brodie, pers. comm.). If each volunteer spent 30 hours per year on environmental weeds work, this would be 90, 000 hours and worth almost $1 million per annum.

Most shire councils combine volunteers, paid staff and contract bush regeneration workers. Some council budgets reach $1 million for Bushcare work.

There are 4-5 professional bush management companies in NSW including the National Trust NSW, Urban Bushland Company and the Total Earth Care Company.

Ku-ring-gai Municipal Council

Ku-ring-gai Council covers 8500 ha and it manages 1100 ha of this as bushland for its natural values.

The total Conservation Division budget for 1996-97 is about $1m of which $220,000 is for the education program about bush areas, $100,000 is specifically for noxious weed work by paid staff, $ 265,000 for the paid staff bush rehabilitation program to oversee the protection of species and vegetation associations, $310,000 is for fire management (worked with the bush management program), and $170,000 is for the management of the Bushcare Program for conserving native vegetation which includes the volunteer program. This $170,000 operating budget includes salary for one coordinator (currently job-shared) and two supervisors (Couston, pers. comm.).

Although there have been small numbers of volunteers working in the Council from 1984, the Bushcare Program was formally started in 1991 firstly, for economic reasons because volunteers could supplement the funds expended and secondly, for social reasons with the pressure of ratepayers wanting to have the bushland ares near their own homes well managed.

The Bushcare Program has 800 registered volunteers with about 400 of these actively involved under a permit system, who are undertaking environmental weeds work within the Council area. It is estimated that these volunteers contribute 10,000 hours per year. At standard Landcare rates of $10 per hour, this is worth $100,000, (for direct input costs of $170,000) but at contract labour rates of $ 22 per hour, worth $220,000. However, as with most Bushcare programs, the costs include an educational component. As Lamond (unpublished) outlines, the Bushcare Program has "resulted in the conservation and rehabilitation of numerous hectares of bushland, contributed to community spirit and pride as well as provided a source of healthy living and exercise, has increased community awareness of our natural landscape and in doing so has promoted active participation in outdoor bushland activities."

Volunteers undertake a mandatory operation and safety workshop and one on-site training session. They have their own umbrella group, the Ku-ring-gai Bushcare Association and Committee,

to assist with and enhance the Bushcare program. There are three paid staff to manage the program. Council supplies tools and equipment, technical support, training and workshops. Volunteers nominate their work site which is often close to their own property and the tasks and abilities are matched (Lamond, pers. comm.).

Ku-ring-gai Municipal Council has a published Bushcare Volunteer Policy which outlines the aims, philosophies, rights and responsibilities of both parties, and the legislation framework. They also have a published Weed Management Policy which outlines the legislation framework, aims, policies, control methods, and lists the weeds that are declared under legislation and urban environmental weeds identified by the Council. The Ku-ring-gai Bushcare program can be considered to be a good working model for such volunteer programs (Burton, pers. comm.).

Hornsby Council, NSW

Hornsby Council manages over 6000 ha of bushland for its nature conservation values. It has about 180 volunteer groups involved in bush management, with between 600-700 registered volunteers, of which about 60 percent are active. The present Council structure is being examined to increase the ability of staff to provide a more professional support service to the large number of volunteers more effectively. This will include examining policies about occupational health and safety, the training program, rights and responsibilities of both Council and volunteers plus an improved education program (Burton, pens. comm.).

For 1995, volunteer hours are estimated to be 4000 hours, with a value of about $100,000, while the Council budget to support this program was $75,000 including operation costs, salaries, and some grant funding. In addition, the Council has a $220,000 budget for paid bush management contracts and staff (Burton, pers. comm.).

Volunteers manage a wide range of weeds, while staff concentrate on Noxious Weeds under the Noxious Weeds Act.

Sutherland Council, NSW

Sutherland Council has been operating their environmental weeds volunteer program officially for 3 years, since 1993, although several volunteer groups have been working for over 10 years in the Council area. The program was a response to community interest and pressure with people expressing ownership of the problems in their local bush. The Council manages 900 ha of bush for its nature conservation values. There are about 600 registered volunteers. The value of the volunteer work has been calculated at $500,000 worth of labour at $15 per hour. Council budget for the program is $30,000 operating costs, $ 120,000 salaries plus about $60,000 in grants from other sources, total $210,000, giving a leverage of about 2:1.

Volunteers interact with the four Bushcare Officers and through a Volunteer Forum. Bushcare Officers are responsible for managing the program including training, workshops and newsletters (Graham, pers. comm.).

Wollongong Shire Council

Wollongong Shire Council has 2177 ha of community land and manages 650 ha of these for bushland values. Although there have been some environmental groups operating for a number of years, the Bushcare program was officially established in 1993. It has 31 groups and 325 registered volunteers for environmental weeds work. They contributed over 9000 hours work in 1994-95 year. At $22 per hour, this is worth $198,000 or, at the standard Landcare volunteer rate, $90,000. This is a leverage of 2:1 or 1:1 as the Council budget to support this volunteer program is $95,000. Part of this includes $25,000 sponsorship from a well-known national business for publicity, advertising and other related costs. This sponsorship is indicative of a well constructed program with an environmental weeds strategy and good management and recognition of individual volunteers and the volunteer programs. Recent improvements to the program include (Formosa, pers comm):

• better data collection;
- establishing a volunteer support group/ forum; and
- developing a charter of rights and responsibilities for both parties.

1.1.4 National Trust of New South Wales

The NSW National Trust provides professional fee-for-service bush regeneration teams to local government and to some national parks in the Sydney region to manage the environmental weeds and the restoration of bushland areas. It has 70 individuals working on a casual basis, with a full time equivalent of 20 people and an annual turnover of $800,000. This program has been in place for 20 years.

The National Trust also assists local government and volunteers with training. This includes specific 5 full-day session courses on Bush Management, ` An Introduction To The Theory And Practice Of Bush Regeneration', run twice a year, costing $150.00 per person. Approximately 40 people attend per year. It also provides training in up to 10 workshops per year in council areas for council workers and volunteers (Brodie, pers. comm.).

Arguments for the use of professional bush regenerators rather than volunteers were summarised by Brodie (1991) as:

- dollar input into bush areas increases public recognition of its value;
- interest by community cannot always be equated with available time and/or physical work needed (while they are essential for lobbying for funds and policies);
- volunteer programs require significant funds for support and often provide little leverage of these funds; and
- the community is not always able to commit to the long term where environmental weeds control is almost always long term.

1.1.5 National Park Friends Groups

Lane Cove National Park

The Lane Cove National Park Bushcare program has 240 volunteers. It is a highly structured program with strong commitment to the volunteers including sponsoring volunteers to undertake the professionally presented Bush Management courses run by the National Trust of NSW and/or by the TAFE at $150 per volunteer. A case study of the operations at Lane Cove National Park will be presented at the 11th Australian Weeds Conference in October 1996 (Rees, pers. comm.).

The benefits accruing to the agency include leverage of the funding. In 1994-95, funds expended were $114,000 and volunteer contribution was $164,000. The Lane Cove National Park Bushcare program can be considered to he a very good working model for such volunteer programs (Burton, pers. comm.).

1.1.6 New South Wales Environmental Trust Grants

This grant program in 1993-94 funded 11 projects in its Restoration and Rehabilitation line for a total of $716,442. Projects funded included both specific weed projects and general bush management and restoration projects.

1.1.7 Murray Darling Basin Commission

The Murray Darling Basin Commission provided $151,210 in funding for projects with a weed component in 1995-96. Assuming that 20 percent of this funding is used directly for weed control, this would give a value of $30,242 for environmental weed work.

1.2 VICTORIA

1.2.1 ATCV

Figures for the ATCV in Victoria are presented in Table 2 in the following section. Environmental weed control work occupied 53 percent of the total ATCV time in this period, in 30 separate projects. The most common weeds removed were Cape Broom, Gorse, Wandering Dew, Blackberry, Monterey Pine and Sweet Pittosporum. The percentage of work done on public land was 75 percent and on private land 25 percent (Spiroviski, pers. coram.).

1.2.2 Save The Bush/Tree Victoria

Figures supplied by Caroline Douglas indicate that the STB grants are included in their Tree Victoria grant system. Under these grants, Victoria has offered $500,000 - $600,000 per year for the last eight years to tree planting and revegetation work. It is estimated that 17 percent of this money has been spent on environmental weed control, however this figure is probably an underestimate because it does not include weed work that is undertaken as part of a remnant vegetation protection project. This would equate to about $800,000 (Douglas, pers. comm.).

1.2.3 Local Government

Shire of Eltham (now part of Nullibik) proposed a set of by-laws to restrict the sale and presence of a range of environmental weeds. This Shire also employed a Land Protection Officer with the responsibility of environmental weeds control (Stevenson, 1991).

Councils listed by Stevenson (1991) with environmental weeds on the agenda and/or Conservation Officers include:

- Sandringham;
- Eltham;
- Mornington;
- Springvale;
- Sherbrooke;
- Flinders; and
- Hastings.

1.2.4 National Trust of Victoria

The National Trust (Victoria) provides a professional fee-for-service program for environmental weeds and bush management work, mainly to local government. It has 3 full time staff and about 10 full time equivalent (FTE) staff in casual positions who undertake, on average, 12,000 hours of regeneration and environmental weeds per year in the Melbourne area. This program was started with two Save The Bush grants of $50,000 in 1989 and $20,000 in 1990 but is now self-funding. Much of the local government funding comes from the Melbourne Parks and Waterways Corporation grant program.

The Trust also provides training for local government, Landcare Employment Action Program (LEAP), Jobskills, and volunteers on environmental weeds and bush management through two 14-week courses per year, for 40-60 people per year, of which tip to one third will be volunteers.

The National Trust of Victoria has only two properties with bush, managed by Friends groups.

1.2.5 Greening Australia, Victoria

Greening Australia does not coordinate or manage volunteer groups directly. Greening Australia Victoria produces a publication called "Greening What Where?" which lists all volunteer groups engaged in volunteer work on environmental issues including environmental weeds control and revegetation and regeneration. It includes a contact list. The 1996 edition includes 219 volunteer groups. Of these, Greening Australia listed bush regeneration and habitat restoration as major activities for most groups.

1.2.6 Victorian National Parks Association

A survey was conducted by James Ross in 1991 of the Volunteer Friends Groups in Victoria. He found that at that time there were 79 Friends of Parks and Friends of Flora and Fauna groups in Victoria with an estimated total membership of

58 members per group, (total would be 4582) but range from 8 to 380 per group. Of the 31 activities listed by groups as activities undertaken by volunteers, `removal of non-indigenous vegetation' was second in priority. If we use the figures kept by Friends of Sherbrooke Forest for voluntary environmental weed work at 850 hours total (or 11 hours/member), the total value of the Friends volunteers would be 50,400 hours, a value of $0.5m.

Penny Gillespie, Resource Conservation Officer, Dandenong Ranges National Park, outlines a volunteer program to manage environmental weeds and an education program called `ParkCare'.

1.2.7 Melbourne Parks and Waterways Corporation

The Melbourne Parks and Waterways Corporation (MPWC) manages the funds generated by an annual $40 levy on all Melbourne ratepayers through the Melbourne Parks and Waterways Program. This program aims to coordinate the funding and development of parkland and waterways throughout Greater Melbourne. In 1995-96 this was a $8.3 million grant program distributed across 226 projects, to agencies and community groups.

Eligible projects are divided into three groups:

- Environmental Protection and Improvement;
- Trail Extensions and Links; and
- Park, Waterway and Coastal Improvements.

Grants were provided for:

- 93 projects to 81 community groups (limit of $5,000) totalling $240,000;
- 55 projects to 27 local government councils totalling $2.4 million in a 1:1 funding arrangement; and
- 78 projects for other agencies including MPWC and Department of Natural Resources and Energy (DNRE) totalling $5. 6m.

Probably about 1/3 of these have some environmental weeds management and bush regeneration component (MPWC, pers. comm.).

Significantly, according to the MPWC Newsletter, Grants Edition 1995, "vegetation restoration features in no fewer than 101 projects. The majority of vegetation projects will be implemented by community groups."

1.2.8 Land for Wildlife Program

Land for Wildlife is a voluntary membership in a `club' which promotes the management of private bushland for its wildlife values and the surrounding land in a sympathetic manner. In a newsletter survey conducted in June 1995, with a 24 percent response rate, the respondents indicated that (collectively) 8267 days plus $203,755 had been spent directly on managing the wildlife habitats on their properties. This work can be estimated to be worth $865,115 for the response group and if indicative of all groups, worth $3.4m over the total membership. Input costs are 2 full time staff, newsletter and administration, plus 15 part time staff at $500,000. The leverage is therefore about 7:1.

A total of 83 percent indicated that they thought the environmental health of their property was improving. In terms of the nature conservation extension program, 75 percent thought that their wildlife management skills had improved and 90 percent thought their biological knowledge base had improved as a result of the Land For Wildlife scheme and newsletter (Prescott, 1996).

1.2.9 Department of Conservation and Natural Resources (DCNR) Conservation Grants Program

The Victorian DCNR has a $500,000 per annum conservation grants program which provides small grants for community groups. The 1995-96 program funded 128 projects for a total of $463,863. The projects included:

- environmental projects;

- revegetation;
- weed control;
- restoration projects;
- visitor facilities; and.
- bush tracks.

Of the 128 projects, 64 percent were on reserves managed by DCNR, and 21 percent specifically included environmental weeds control and/or eradication. These projects were allocated 21.5 percent of total grant money, or $99,730 (van de Meene, pers. comm.).

Land Protection Incentive Scheme, Victoria

The Victorian government provides grants to landholders for land degradation control works, which includes weed control under the Land Protection Incentive Scheme, Victoria. The scheme provides 51.5m in incentives annually (Douglas, pers. comm.).

Good Neighbour Program, Victoria

DCNR runs a Good Neighbour Program aimed at controlling the spread of weeds and pest animals from Crown Land onto adjoining freehold land and vice versa. Much of the $2 million per annum is spent on weed control (Douglas, pers. comm.).

1.2.10 Trust for Nature, Victoria

Trust for Nature, Victoria (TFN) has 250 covenants registered, with 200 being processed. Many covenants have very few weed problems. There are 400 Friends of TFN members but these members are not currently active in environmental weeds management.

1.3 TASMANIA

1.3.1 ATCV

Figures for the ATCV in Tasmania are presented in Table 2. The most common weeds removed include Crack Willow, Boxthorn, Blackberry, Rosehip, Gorse and Ragwort. The land use where work was undertaken was 66 percent on public land and 33 percent on private land. Methods were hand methods of pulling, cut and swab and root digging (Blake, pers. comm.).

1.3.2 Save the Bush

In Tasmania, since 1990, $930,000 has been spent funding 233 community projects related to bush retention and management. Of these 17 specifically deal with environmental weeds, with a funding total of $125,000. This is 13 percent of the total funds but only 7 percent of projects.

This high percentage funding includes the salary for the coordinator of West Coast Weed Strategy and also related costs such as fencing.

STB does not fund weed work for declared noxious weeds (Lawrence, pers. comm.).

1.3.3 Local Government

Clarence City Council

The Clarence City Council has about 10,000 ha of bushland and many kilometres of coastline in the Council area. Mr Phil Watson, Bushland and Coastal Management Officer, runs an extensive environmental weeds program in the Council area in partnership with over 20 volunteer groups, totalling 300-400 individuals. Total volunteer hours are in the order of 10,000 hours per annum.

The work is carried out on bushland regardless of the tenure; that is, both Council land and private land, with consent of the owner. Council commitment to the environmental weed program is S300,000. There are five trained environmental weed control officers on staff who work alongside the volunteers on weekends. Mr Watson estimates the leverage of using volunteers at 10:1 over the Council financial commitment. However, figures would indicate $200,000 of volunteer time and $50,000 coordinator and costs would be 4:1.

The Council provides a large amount of bush management tools and equipment for the volunteer days in two trailers, along with educational and promotional panels with information about the program. Work is augmented using LEAP programs and/or ATCV programs.

There is a strong social asset in the program, with the social fabric strengthened amongst residents.

In 1994, along with three other Councils, the Clarence City Council produced educational material "Garden Plants are Going Bush and Becoming Environmental Weeds" applicable for the whole of Tasmania, encouraging residents not to plant known environmental weeds. The weeds listed included Boneseed, Blackberry, and Scotch Broom. It also lists several Australian species not native to Tasmania which are environmental weeds in Tasmania:

Hobart City Council

Hobart City Council has a newly formed volunteer Bushcare program with four Friends Groups and one paid bushland management crew. Their priority weeds are Boneseed, Scotch Broom, Blackberry, Gorse, Golden Wattle and Mediterranean Daisy.

The program has a reserve-by-reserve strategy for weed control but also has an overview of all public and private bushland in the Council area with conservation value. Ms Heatley considers that there is a state gap in funding environmental weeds work compared to agricultural weeds, although this gap has been partially addressed by the National Landcare Program (NLP) (Heatley, pers. comm.).

1.3.4 National Trust of Tasmania

National Trust in Tasmania does not own any native vegetation and has no vegetation management activities.

1.3.5 Greening Australia, Tasmania

Greening Australia works with community groups to prepare submissions for funding, for example through the NLP. Their highest priority is to manage existing bush and a high percentage of grants are for weeds management and weed mapping.

Greening Australia suggests that the fact that the NLP will not fund noxious weeds has been translated by many community groups to mean that all weed work has a low priority (Thompson, pers. comm.).

1.3.6 Landcare Groups

A survey of Landcare groups in Tasmania by *Curtis et al.* (1994) indicated that in 1994 over 3500 people belonged to a community Landcare/bushland group at a ratio of almost 1: 2 in favour of urban groups. This evaluation of the NLP found that the top issue of concern identified by both rural groups and urban groups was weeds, with over 70 percent of groups listing this as a top priority (Curtis *et al.* 1994). This was matched by 71 percent of groups having organised activities for weed control, although only 12 percent of educational field days addressed this issue.

In addition, a report by McKay (1993, p46) about rural Landcare to the Tasmanian Farmers and Graziers Association cited by Curtis *et al.* (1994) indicated that "Weeds are the major Landcare concern in Tasmania."

For urban groups the weeds priority was followed by other conservation concerns such as declining native vegetation, habitat and wildlife, and threats to native fauna. This shows a strong commitment to nature conservation issues.

Unfortunately, similar evaluations of Landcare by Curtis and others in SA, Victoria and WA did not clearly distinguish between rural Landcare and urban Landcare groups so a similar analysis is not possible.

The NLP database has details of 137 funded programs, of which 45 (or 33 percent) have a component of weed mapping, weed control or education about weeds. Of the $4m allocated under the NLP, about 25 percent or $1m was for

these projects. A very high percentage of these grants are concerned with three weeds in particular Gorse, Ragwort and Willows (Boughey, pers. comm.). NLP Tasmania publishes a directory of all groups involved in Landcare and other environmental issues, including environmental weed work.

1.3.7 West Coast Weed Strategy

The current coordinator for the West Coast Weed Strategy, Tasmania, considers the major weeds of the area to be Scotch Broom, Gorse, Blackberry and Pampas Grass. The priority program is to reduce the seed banks of Scotch Broom on abandoned agricultural land, where the cost to slash and mulch is $450 per acre (Talbot, pers. comm.).

1.3.8 Tasmanian Conservation Trust

Tasmanian Conservation Trust (TCT) has recently appointed a native vegetation officer, John Robin, who provides advice about bushland. A significant proportion of his time is providing recommendations about environmental weeds and environmental weeds management. Clients are:

- primary producers (25 percent);
- bush block owners (50 percent); and
- Landcare groups (25 percent).

Major weeds of concern to rural communities are Ragwort, Gorse, Pampas Grass and Willows. Robin lists a range of other environmental weeds of sclerophyll forests such as Foxgloves, Sycamore, Rice Grass and Spanish Heath, and is also concerned with non-indigenous natives and genetic invasion by using non-local provenances (Robin, pers. comm.).

1.4 SOUTH AUSTRALIA

1.4.1 ATCV

ATCV is an organisation that uses volunteer labour for conservation projects, but the costs of running the program is charged to the client at about $300 per day for a team of volunteers. Clients include state authorities, private organisations, friends groups and local councils.

ATCV (SA) figures are presented in Table 2. The six major weeds managed in this program were Broom, Olive, Blackberry, Boxthorn, Radiata Pine and *Monadenia bracteata,* a South African orchid (ATCV, pers. comm.).

1.4.2 Save the Bush

Cumulative figures for the STB grants in SA from 1989-90 to 1995-96 (including drought Landcare grants) indicate a total funding of $1,172,036. Of this funding, a careful breakdown of activity between fencing costs, weed control, vermin control, surveys and management plans, and educational activities show that overall $126,127 or 10.8 percent of funding was environmental weeds work.

If the fencing component of 8643,995 (54 percent of total funds) is removed from this sum, the figure for environmental weeds work is 23.8 percent of the work done by community groups. This can be further broken down by regions.

In the high population and urban fringe region of Mt Lofty Ranges, in 57 separate projects, 31 percent of the activity was environmental weeds work. This represents $87,715 of total regional funding, with an average figure of $1,538 per project. Thus, almost 42 percent of activities (excluding fencing monies), was spent on environmental weeds work.

Hours contributed by volunteers were not available although the policy is that community groups must at least match the funding with a comparable volunteer contribution (Bellette, pers. comet.).

1.4.3 Local Government

There are few local government councils in SA with a Bushcare or equivalent Friends groups network as exists in Victoria and NSW. This is partially because many urban councils have a very low percentage of indigenous vegetation left in the council area and those councils with high percentages of native vegetation left are rural in nature with a small population base.

There are some recent Council Bushcare arrangements in place (see Bushcare-Trees for Life section).

Three Councils in the Adelaide Hills (urban fringe) are beginning to put into place a network of volunteers supported by a Bushcare coordinator position, but these are in their infancy.

Stirling Council

The Bushcare program was formed in 1995. The Bushcare coordinator position is part-time and with support funds, costs the Council about $25,000. There are 5 main friends groups with about 70 volunteers. The estimated contribution to environmental weed work by volunteers (1995-96) is 2520 hours, which at standard Landcare rates is equivalent to the input by Council. A recent survey on the Council open spaces demonstrated strong community support for expansion of the program and the creation of a full-time coordinator position (Williams, pers. comm.).

1.4.4 National Trust of SA

The National Trust (SA) has a number of bushland reserves. In 1988, Friends groups were set up for four of these reserves. A part time paid staff officer, the Nature Conservator, oversees both the management of 28 of these reserves and the volunteer programs.

This total program cost approximately $36,000 for a total of 1,800 paid hours in 1994. Of this about 10 percent ($3,600) would be expended on organising volunteer work. In 1994, 549 volunteer hours were spent in the four reserves with Friends groups, worth approximately $5,490 at standard Landcare rates. This is a leverage of about 2:1. The major weeds controlled are Blackberry, Gorse, Watsonia, Bridal Creeper, Boxthorn and Heath. This figure is an underestimate as several reserves have separate management committees.

1.4.5 Friends of Parks

Statistics for the Friends of Parks groups in SA have been collated on a yearly basis from 1986 to 1995. The 1995 figures indicate that there were 76 Friends Groups with 5976 registered volunteers providing *35,437* volunteer days (6 days per volunteer) to 430 environmental projects. Cordes (pers. comm.) estimated that the total contribution by volunteers is equivalent to approximately $3,775,000 (based on a current basic ranger salary of $25,000) to the National Parks and Wildlife Service (NPWS) per year. If 20 percent of these were environmental weeds projects, the commitment to environmental weed control in 1995 would be 7087 volunteer days, worth $750,000.

If the costs of running this program with two full time staff was $100,000 plus one Ranger day per group per month requiring 5 salaries and costs of $180,000, the total administration cost can be calculated at $280,000 or $56,000 for environmental work specifically. The leverage of costs to benefits would therefore be almost 14:1. We can be fairly confident that a safe conservative figure would be a leverage of 10:1.

1.4.6 Landcare Groups

Landcare figures in SA show very low figures for grants for environmental weed work in the state, with these projects being channelled into the STB program.

1.4.7 Bushcare

The South Australian Trees for Life have recently established a cooperative program with local councils called Bushcare. Bushcare works on managing vegetation remnants, particularly roadsides, mainly with weeding of environmental weeds. The Bushcare program uses trained volunteers, with training provided by Trees for Life.

Administration and operating costs such as tools are borne by the local council, at $500 per site per year. There are 49 sites ($24,000), and currently 124 trained volunteers. Total hours worked was conservatively estimated as 3000 hours in 1995-96. At standard Landcare rates this can be valued at $30,000 (Allanson, pers. comm.).

1.4.8 Conservation Groups

There are a range of other groups with a strong nature conservation emphasis which undertake

environmental weed work for specific purposes such as weeding around known populations of rare and endangered species. These groups include the Adelaide Plains Flora Association, the Nature Conservation Society of SA, Threatened Species on Kangaroo Island, SA Threatened Species Network and the Threatened Species Action Group. These groups are predicted to have a high interest and understanding of native plants, and the value of their work may need to estimated at higher than the standard Landcare rates. Figures for work undertaken by these groups are not available.

1.4.9 Catchment Programs

Mt Lofty Ranges Catchment Program

The Mt Lofty Catchment program has a small seed money grants program for community groups within the catchment (source is a NLP Regional Grant). Of the $100,000 per year allocation, it is estimated that 25 percent over the last three years ($75,000) was used by community groups for environmental weed work, largely riparian weeds such as Willows, Blackberry and Gorse. The grant program requires at least an equal contribution by the community (Harvey, pens. comm.).

Torrens River Catchment Board

The Torrens Catchment Board is funded through a rate levy on all residents in the catchment. In 1995-96, $190,000 of this community generated funding was used by professional vegetation managers to remove environmental weeds along the catchments, mainly Ash, Willows, Blackberry and Gorse. Community group leverage of these funds comes from community groups collecting, growing and planting indigenous plants to replace the weeds.

In addition, of the annual $100,000 funds available to individual landholders along river systems for riparian work, about 20 percent is used for environmental weed work. Leverage of these grants is expected to be a minimum of 1:1 but it is estimated to range from 2:1 to 5:1 (Harvey, pers. comm.).

1.5 QUEENSLAND

1.5.1 ATCV

North Queensland

ATCV level of involvement is dictated by the client. Figures for Queensland are presented in Table 2 in the following section.

The main species being targeted by ATCV are Siam Weed, Chinee Apple, Rubber Vine, Prickly Acacia, and Leucaena. Major weed control methods being used are herbicides and, around water waterways, cut and swab. Chemicals used are starane, access and AF Rubber Vine.

ATCV have difficulties measuring their level of success and usually gauge their effectiveness only by being asked back the following year, or alternatively, receiving correspondence as a form of recognition. This does not regularly occur.

Hudson (pers. comm.) stated that from an ATCV viewpoint the coordinated weeds program achieved a lot for a reduced cost - particularly in urban areas, and encouraged a coordinated effort.

Brisbane

Queensland ATCV work has a high weed control component in contrast to other parts of Australia. Harrison (pers. comm.) believes that of 70-80 projects a year, 50 percent of these would be relating to weed management issues. In the urban bush region, the main species that ATCV tackles are Lantana, Privet, and Camphor Laurel. In remote areas the major species include Rubber Vine, Chinee Apple, Prickly Acacia and Para Grass.

The areas covered by ATCV include Shoalwater Bay, Burketown, Townsville, Winton and Croyden. ATCV in Queensland generally do not undertake much spraying and tend to work on isolated outbreaks using cut and swab, stem injection or basal bark methods (Harrison, pers. comm.).

Harrison believes that 99 percent of the projects achieve what ATCV are asked to do. They are not resourced to do any follow up work and they measure their success by rate of call back (not in a formal manner).

1.5.2 Save The Bush

The STB Officer position in Queensland is currently vacant, hence information direct from the officer was not possible. The lack of alternative people to supply information in this instance indicates a weakness within the program.

The Australian Nature Conservation Agency (ANCA) figures indicate that in the 1995-96 period 25 grants totalling $248,400 was allocated. Of this figure, those projects with a weed management component totalled $54,050. It is considered that approximately $10,810 is used directly for environmental weed control.

1.5.3 Lot al Government

Brisbane City Council

The Brisbane City Council has a Bushcare program (similar to the New South Wales examples) for ` hands on' bush management in the Brisbane area by community volunteers. It has gone from 60 volunteers in 1989, to over 800 in 1993.

Redland City Council

The Redland City Council has a bushland management program that is approximately 12 months old including a community Bushcare program. There are now 12 groups operating with numbers varying between 8-20 people in each group, although most are in the planning stages. On average, one new group starts each month and there is now approximately 150 volunteers in the Bushcare Program. Most volunteers work about 4 hours a month which includes planting, weeding, flora and fauna inventories and community education.

The Redland City Council, currently spends $80,000 a year on their bush management program. Currently they have five full time people and three trainees for bush management on the mainland, and two full time staff and two trainees on North Stradbroke Island.

The Redland Shire Council conservation estate is approximately 3000 hectares, and this is managed as bushland. Species managed depend on the site but, major concerns are Ipomoeas, Singapore Daisy and Lantana. Other problems are Chinese Elm, Climbing Asparagus Fern, Asparagus Fern, Easter Cassia, Camphor Laurel, Corky Passion Vine, Mickey Mouse Bush and Guinea Grass.

Community Bushcare provides a basic training program on safety, procedures, bush regeneration principles and weed/plant identification, followed by on-site workshops on plant identification and other topics as needed. The volunteers use hand tools only and the cut and paint method with glyphosate. There is the potential for counterproductive clearing, but if the program is followed and volunteers are trained, the likelihood of this occurring is diminished.

1.5.4 National Trust Queensland

Unlike the National Trust in other states such as South Australia, the National Trust in Queensland is primarily concerned with conservation of heritage buildings. They do not have any Friends groups or associated bush management courses.

1.5.5 Greening Australia, Queensland (GAQ)

Practical community involvement in environmental weed programs is through the GAQ Volunteer programs and through the programs organised by GAQ/Council Extension Officers throughout Queensland. Participants in the GAQ Volunteer Program include members and non-members of GAQ.

Volunteers assist in the management of environmental weeds directly and practically, through bush regeneration programs, mainly in Council Parks, but also in other areas such as Prince Charles Hospital, sites which often contain remnant bushland. These programs focus on managing weeds to allow local species to regenerate, or to replant likely original vegetation.

Other less practical and perhaps less direct involvement is the role volunteers play in assisting GAQ to provide information to the broader community about environmental weeds and associated problems, therefore curtailing the continued spread of these plants. Prevention

rather than cure is the emphasis promoted by GAQ. Volunteers receive information on environmental weeds and associated issues through on-the-job training and in relevant publications made available by GAQ. Word of mouth to displays and stalls allows for broader dissemination of information.

Volunteers are also currently involved in research on `ornamental escapees.' Information on known plants that escape from gardens and invade bushland is being compiled to help the invasive trend of these plants be more clearly understood.

GAQ currently has approximately 110 volunteers registered within the Volunteer Program, with varying levels of activity; volunteers may participate 2-3 times weekly (6-8 hours), or just once a year (2 hours) depending on their circumstances and these may change regularly.

Most volunteer activities run for two hours and may include anywhere between 4 - 50 people. On average, each week, volunteers spend 20 hours on environmental weed management programs.

GAQ employs a permanent part-time Volunteer Coordinator to manage the Volunteer Program. Costs associated with running the Volunteer Program include: Volunteer Coordinator's wages, running expenses such as administration, volunteer newsletter, advertising and publicity, equipment, materials and miscellaneous expenses. An estimated annual cost for running the Volunteer Program would be $30,000 pa (Hyslop, pers. comm.).

As part of GAQ's Schools and Community Greening program there is an information package available on the topic of bush regeneration. This contains information on weeds. So far this year 43 schools have applied for that information.

1.5.6 Landcare Groups

A number of Landcare Groups are currently participating in weed work, although in many instances it is not clear whether it is for agricultural purposes rather than for environmental purposes. A number of the groups have applied for funding as part of the Strategic Weed Eradication and Education Program (SWEEP) including the Armac, McKinlay Shire, Wokingham Creek, Miriam Vale and Cracow Landcare Groups (Whitehead, 1995).

Kate Roberts (pers. comm.) is currently undertaking an evaluation of Landcare which will attempt to address the level of community involvement and projects amongst other things. Funding through the Drought Landcare Program (of which ANCA funded projects related to bushland management) is currently being evaluated, and these figures should be available in August 1996.

1.5.7 Queensland Department of Natural Resources

The Queensland Department of Lands (now Department of Natural Resources) recently undertook a state wide event known as Weedbuster Day (October, 1995) to raise awareness of weeds as a land degradation problem. Urban residents throughout Queensland were invited to take part in local weed clean up days.

The emphasis was on garden weeds, raising awareness about good gardening, and to help people to understand that many garden escapees can smother native vegetation, replace food sources and habitat for native animals, and choke waterways and wetlands.

A total of 90 events were undertaken during the year to raise awareness about good gardening. This included weekly displays, newsletters, public talks and demonstration days. It provided opportunities for existing Bushcare groups to attract new members, and also gave the community groups some recognition (Beck, pers. comm.).

The Queensland Government also initiated the SWEEP program. The aim is to develop a sense of community responsibility for the control of weeds. Investment by the State Government in forming the core of trained people on SWEEP in the 1995-96 financial year was $4.5 million (Moore, pers. COMM.). It is understood that the program has funds available for which community groups can apply to manage local weed problems (these may be agricultural or environmental) (Whitehead, pers. comm.).

The focus of SWEEP is to target three major pest

plants: Mesquite, Prickly Acacia and Rubber Vine and fund the strategic removal of other species from catchments or other areas where they have become newly established. The SWEEP program combines the resources of governments, Landcare and community groups and work skills/ employment programs to tackle these large scale problems by implementing strategic weed control projects.

1.5.8 Bremer River Improvement Trust

Probably similar to many other projects around Queensland, the Bremer River Improvement Trust is a project funded by the Ipswich Council and the Department of Environment and Natural Resources. The purpose of the work is to eradicate Chinese Elm *(Seltus sementus)* along the Bremer River in Queensland. This project has an allocation of $65,000 in the 1996-97 period. While most of the work will be undertaken by local contractors, it is anticipated that the follow up work will be undertaken by community groups. The expectation is that the community will undertake the maintenance and revegetation aspects of the riparian areas (Faulkner, pers. comm.).

1.5.9 Community Service Orders (Downfall Creek Bushland R eserve)

The Downfall Creek Bushland Reserve comprises 23 hectares of bushland which is a mixture of native heath, open woodland, forests and gullies. Of a 75 hour volunteer week, approximately 9-10 hours is spent on weeding. The people undertaking the weed control program are all part of a community service order program and averages 8 people a week. Weeding hours are kept low because it is felt that the people who do weeding for awhile get bored and are ineffective. The Downfall Creek Bushland Reserve employs 1 coordinator full time and a part time administrator and field officer and is part of the larger Brisbane City Council Bushcare Program

1.6 NORTHERN TERRITORY

1.6.1 ATCV, Northern Territory

Figures for the ATCV Northern Territory are presented in Table 2 in the following section. The ATCV in the Northern Territory mainly utilises overseas backpackers with minor involvement from the local community. Many of the overseas students have a requirement of study from their country that requires practical work in an overseas country. Hence, they get involved with ATCV.

Currently ATCV people pay for the privilege of weeding. A team is charged out at $300 per day. The areas in which ATCV works are dictated by the groups that require their services. This includes groups such as councils, mining companies and national parks. They have limited involvement in rangelands areas in the Northern Territory.

ATCV undertakes management of predominantly *Mimosa pigra* and Coffee Bush. Main weed control methods being used by ATCV volunteers are hand pull techniques for smaller populations, and cut and paste for mature species.

ATCV have found that trying to overcome the lack of awareness within the community is best achieved through stalls at local markets and in areas such as the botanic gardens (in Darwin). They consider the biggest problem is lack of awareness within the community about the various weeds and the potential damage they can do (Beal, pers. comm.).

1.6.2 Save the Bush

ANCA figures indicate that in the 1995-96 funding period, 16 grants of $141,200 was allocated for STB Projects. Of this figure, projects with an environmental weed component totalled $13,300. It is considered that 20 percent of this figure is directly for weed management ($2,660).

In the Darwin Municipal area this year, a grant for $20,000 was given to undertake weed control and tree planting. It was considered that the community contribution in kind was 3-4:1 with $70,000 being contributed in kind in this instance,

and about three quarters of the entire project being dedicated to weed management (Panton, pers. comm.).

1.6.3 Greening Australia, Northern Territory

Greening Australia in the Northern Territory has limited figures relating to community input into their program. It is estimated that an average of 4 volunteers work one day a week on weed management. According to Clarke (pers. comm.) the number of volunteer hours is in the vicinity of 1200 hours per annum. This would he worth $12,000 at standard Landcare rates.

The existing officer currently contributes about half of their time managing environmental weeds. This figure is approximately $18,000 in wages.

Greening Australia mainly has on the job training for volunteers, with the major emphasis on seed collection, native plant protection and revegetation. The limited amount of time spent on environmental weeds directly, is a consequence of time constraints (Clarke, pers. comm.).

The major species that the Volunteer Program concentrates on includes Mission Grasses (the annual and perennials), Ipomoeas, Leucaena, Candle Bush, Golden Shower, Clopo, Siratro, Coral Vine, Fish Tail Palm and Poinciana.

1.6.4 Landcare Groups

A number of Landcare groups exist in the Territory that are undertaking weed management programs. These are often managed for agricultural production reasons rather than environmental needs. The Victoria River Downs Conservation Association is currently undertaking an Integrated Weed Management Program.

Another Landcare group in the Katherine region, have undertaken management of an ephemeral wetland, largely infested with Parkinsonia. The impacts of Parkinsonia were creating practical (interfering with fishing) and sociological issues for those that lived in the area. With some visits to other sites of similar problems experienced by other Aboriginal groups, the group was able to overcome some of their cultural concerns and manage the problem with the assistance of the local Department of Primary Industries and Fisheries Officers.

The Lower River Mary Landcare Group has 30 active members with every member of the area involved. This includes people from the army training base, gold mining, horticulture (cashew - farm), pastoralists (cattle and buffalo), reserves and tourist operators.

This group generally meets to discuss issues and ideas, while most of the work occurs individually on their own properties. People are much more aware of the consequences of their actions because of the group diversity and has worked in instances where pastoralists working side by side with conservationists results in ecologically sensitive planning (eg planting of introduced grass species is restricted near park boundaries to prevent spread). The major weed species managed in the area is *Mimosa pigra.* Others include Hyptis, Cassia and Sida species.

The amount of money spent on weed control varies significantly from $60,000 to $100,000 annually by larger weed companies to control major mimosa weed infestations. Others are more likely to spend $1,000 if they are smaller infestations and on the smaller family owned properties. Smaller properties can find it hard to generate the capital to do environmental work. A variety of techniques are used with manual control for most of the smaller infestations and by the family properties, and herbicide applications for larger infestations.

Most of the members of the group have mimosa infestations GPS (global positioning system) plotted to ensure ongoing monitoring in areas to prevent regrowth. Local people are aware of the issues, and often if people are mustering with helicopters and see an infestation they will plot it immediately. The group also has agreed to 'no go' areas to minimise spread of mimosa where there are major infestations.

The group is aware of the pasture species versus the native grass option, however, because of the

vigour and aggressiveness of mimosa they feel they have limited options to control regrowth other than by using species that are hardy. If native alternatives existed, then they would be happy to use them (O'Brien, pers. comm.).

There is an acceptance that there is an individual responsibility to manage weeds, and that other options apart from fire need to be considered (biological control, grazing). One of the few projects that the group has sought funding for has been the purchase of a carpet weed wiper roller which is a drum roller that is pulled behind a tractor and drips chemicals from the rollers onto the weed carpet. This minimises spray drift and cost by more effective use of chemicals. Timing has proven to be an important factor here.

1 .7 ACT

The majority of the information for community work in the ACT comes from the ACT Weeds Strategy (draft). Figures are not yet available for the number of volunteers, hours worked and funding for groups within the ACT. However, a comprehensive review of volunteer work which includes these figures is currently nearing completion. This work is being undertaken by Catherine Potter.

Judy Rawling is currently preparing a Community Bushcare Works Manual for the Canberra Nature Parks and ACT Parks and Conservation (Rawling, pers. comm.).

1.7.1 ATCV

Figures for voluntary work in the ACT are presented in Table 2 in the following section.

1.7.2 National Parks Association of the ACT

This group is currently active in the control of Sweet Briar and Radiata Pine wildings in specific locations within Namadgi National Park. The control of Sweet Briar involves `cut and dab' whilst Radiata Pine wilding control requires physical removal.

1.7.3 Parkcare

Parkcare groups have been functioning in Canberra since 1989. These groups provide opportunities for participating in management activities in national parks and nature reserves under the guidance of park managers and rangers.

Canberra Nature Park

Thirteen Parkcare groups have been involved in removing *Cotoneaster* species, Blackberry, Hawthorn, Firethorn, Pampas Grass and Sweet Briar using both manual and chemical methods. Rangers train volunteers in the sage use of herbicides.

Tidbinbilla Nature Reserve

The Friends of Tidbinbilla, have been involved in ` one-off' control of Blackberry, Poplar, Burgan and Willow species, mostly by `cutting and dabbing'. They are trained by rangers in herbicide use.

Murrumbidgee River Corridor

Two Parkcare groups have been involved in general weed removal related to planting programs, removal of Willow species, Sweet Briar and assisting with African Lovegrass trial plots. An Outward Bound group has removed Elm suckers.

1.7.4 Landcare Groups

A database of community groups is being compiled and indicates there are up to 100 community groups in the ACT with an interest in the environment and its management. Most groups' interest include consideration of weeds management issues.

A classification of the composition these groups shows the following:

- Waterwatch 13;
- General Landcare 4;
- Urban landcare 13;
- School care 30;
- Rural landcare 7 and;
- Paddockcare 13.

1.7.5 Catchment Management Groups

The earliest established catchment management group in the ACT is the Paddy's River Landcare group. This group has recently secured funds to carry out their own weeds survey and strategy for their catchment area.

1.7.6 Paddockcare

Horse paddocks are particularly susceptible to weed invasion and can act as a source of further weed spread. Sixteen Paddockcare groups are known to be involved with the care of horse paddocks being managed by the Agriculture and Landcare Section. These groups have received funding from the National Landcare Program, ACT Environment Grants and from the Decade of Landcare to carry out their work.

1.7.7 The Conservation Council of the South-East Region and Canberra

The Conservation Council is the peak conservation body in the region, representing the interests of over 40 community and conservation groups in the ACT and nearby parts of NSW. The Council acts as an advocacy group, working by research and presenting submissions, education, publication, lobbying governments, arranging public meetings, and coordinating more direction where necessary.

Recently the Council commissioned a weed survey project funded by Landcare. This project surveyed open space and nature conservation areas in the ACT to record the presence of environmental weed species.

1.8 WESTERN AUSTRALIA

There is a great deal of work being carried out in the Perth area and in some country areas on weed management. Work is carried out in local reserves on weeds identified as most threatening in that particular situation, for example Bridal Creeper in Yanchep National Park and *Tlpha* species at Forrestdale Lake.

1.8.1 ATCV/Ecoplan

The Ecoplan program is run by the Department of Environmental Protection and is aimed at fostering community involvement and awareness in System 6 areas. It has worked together with ATCV on a number of projects. Generally ATCV volunteers are contracted by Ecoplan to provide volunteers working beside community groups on weed control. ATCV provides transport and offers insurance to members of the local group for the day. Figures for ATCV Western Australia are presented in Table 2.

1.8.2 Save the Bush

STB has been active in Western Australia for many years, with funding figures available since 1989. Funding provided since that time totals 51.15 million, with $40,000 having been allocated to weeds. This is less than 3 percent of the funds provided.

These funds have been used by a variety of groups including:

- Wildflower Society of WA, weed brochure produced;
- Ucathy catchment group, weed spraying;
- Friends of Signal Hill, weed control and replanting;
- WA Naturalist Club, weed removal;
- Yunderup Delta Society, Watsonia eradication;
- Shenton Park Bushland Inc, weed management;
- Kent River Land Conservation District Committee (LCDC), control of Bridal Creeper; and
- Friends of Trigg Bushland, mapping and weeding of Geraldton Carnation weed.

1.8.3 Local Government

While some councils (for example Sterling and Kalamunda) have been active in working with volunteer groups for weed control, in general, shire councils in Western Australia do not devote large

amounts of money or labour towards the control of environmental weeds. This problem will be exacerbated by the merger of the APB with the Department of Agriculture, resulting in councils being responsible for the control of weeds of roadside vegetation.

Because of the limited funds of councils, their response to this merger appears to be to make farmers responsible for spraying verges adjacent to their properties. This has resulted in serious concern for the survival of native plants, which are likely to be hit by non selective and/or residual herbicides used by farmers for weed control.

In urban areas many councils simply do not have the resources available to control weeds on land under their control, and there is a real threat of an explosion in weed populations.

Kalamunda Shire

Kalamunda Shire currently spends $50,000 on chemical barriers around bush reserves and, along with the Mundaring Shire, obtained Lotteries Commission funding to publish a brochure of weeds in their area so that residents are aware of the problems faced by councils in controlling environmental weeds.

Albany Shire

The shire of Albany developed a Pampas Grass eradication program after being made aware of the problem by concerned community members as to' how the Pampas Grass had spread into reserves from developed land.

1.8.4 Greening Western Australia

Greening WA does not work directly with volunteer groups, and could not provide information of work undertaken by themselves with the community.

1.8.5 Environmental Weeds Action Network

Environmental Weeds Action Network has recently been established in Western Australia. This combines government and non-government people who are wanting to make sure that weeds get attention at Federal, State and local levels. Assistance for community groups can be obtained from the ATCV and Community Corrections Service as well as LEAP programs.

2.1 The Type of Community Groups Involved

A wide variety of groups are involved in community weed control work. These include:

- Greening Australia;
- Save the Bush groups;
- Australian Trust for Conservation Volunteers (ATCV);
- Society for Growing Australian Plants Inc (S GAP);
- Friends of National Parks;
- National Trust;
- Conservation Groups;
- Tree Planting Groups;
- Landcare Groups;
- Volunteers registered with local councils;
- People with Community Service Orders; and
- LEAP and Rural Employment Action Program (REAP).

Timmins (1996) outlines the eight types of groups involved in New Zealand in volunteer work as those with specific interests:

- conservation-minded groups;
- people with vested interests;
- desire to do community work (community-minded groups);
- opportunity for social contact (community groups);
- social groups;
- purpose formed groups
- opportunities for personal growth; and
- individuals brought together for a specific program.

The types of groups that are involved in tree planting are perceived to differ slightly from the groups which become involved in environmental weeds work on a regular basis. This is because:

- tree planting is promoted in the media to be a useful project;
- tree planting can show results quickly;
- tree planting is seen as a life affirming activity (while weeds work kills things and uses herbicides);
- tree planting can be done in single bursts with a big untrained workforce; and
- environmental weeds work relies on a better understanding of ecology than average.

Therefore, to improve the number and quality of volunteers involved with environmental weeds work, an increase in the educational opportunities and access to good training and education will be necessary.

2.2 Hours and Money Spent

A summary of the available figures indicating the estimated number of volunteers, hours worked, value of volunteer work, direct funding and indirect funding is presented in Table 1.

Many volunteer groups contacted did not keep any records and therefore could not provide information for this section, while others kept only partial records. All figures presented in the table are on an annual basis, and are usually for the year 1994-1995. The estimated work value has normally been calculated using $10-$15 labour costs.

Table 1 : Summary of hours and money spent on environmental weeds work

State/Program Volunteers	Estimated Number of Hours	Estimated Volunteer Value ($)	Estimated Work	Direct Funding Grants	Indirect Funding/
South Australia					
Save the Bush					126,127
Friends of parks	5,976	7,087	750,000	56,000	
National Trust		549	5,490	3,600	
Bushcare	124	3,000	30,000		24,000
Mt Lofty Catchment			75,000+		75,000
Torrens catchment				190,000	50,000
Stirling Council	70	2,520	25,000	25,000	
New South Wales					
Greater Sydney area	4,730	80,000	2 million*		
Sydney Council areas	3,000	90,000	1 million		
Ku-ring-gai Council	800	10,000	100,000	170,000	
Hornsby Council	700	4,000	100,000	75,000	
Sutherland Council	600	33,300	500,000	150,000	60,000
Wollongong Council	325	9,000	90,000	70,000	25,000
Lane Cove NP	240		164,000	114,000	
Victoria					
Save The Bush				800,000'	
Land for Wildlife		66,136	3.4 million	500,000	
Friends of Parks	4,582	50,402	0.5 million		
DCNR					99,730
MPWC	101 groups				80,000
Tasmania					
Landcare groups	2,500				1 million
Save the Bush					125,000#
Clarence City Council	400	10,000	3 million	300,000	

* estimated commercial value of work done
\# total funding since 1990

' total funding over 8 years
\+ over 3 years

Table 1 cont: Summary of hours and money spent on environmental weeds work

State/Program	Estimated Number of Volunteers	Estimated Volunteer Hours	Estimated Work Value ($)	Direct Funding	Indirect Funding/ Grants
Western Australia					
York LCDC				1,000	
Boomerang Gorge BCRG 1993/1994&1995	20 105 114	50 328 326			
Save the Bush				40,000'	
Community funding+		166,000	2.5 million	5.5 million	2.5 million
Queensland					
Greening Australia	4-50 people per week	23,920	239,200	30,000	
Bushcare - Brisbane City Council	800				
Bushcare - Recllancl City Council	150				
Bushcare - Downfall Creek - community service program	416	520	5,200		
SWEEP				4.5 million	
Save the Bush				10,810	
Northern Territory					
Greening Australia	4 average per week	1,200	12,000		18,000
Landcare (Lower River Mary L/C group)	30				1,000 100,000 (personal funds)
Save the Bush				2,660	

this includes funding from Federal and State Governments, ALCOA and Gordon Reed Foundation. Estimates of community work and grants are extremely conservative, true figures are probably 2 to 3 times this amount.

+ over 3 years

total funding over 8 years.

2.3 Australian Trust for Conservation Volunteers

This summary of volunteer information for the ATCV has been provide by Madeline Townsend.

2.3.1 Income Source for 1995

International exchange programs	2%
Membership fees	2%
Sponsorship and donations	5%
Commonwealth Government grants	15%
State Government grants	16%
Commonwealth Government labour market programs	22%
Landholder contributions	38%
Total Income	**$3,326,567**

In the period July 1995 to June 1996 the ATCV weekend and midweek teams spent 711 volunteer days on weed control. At seven hours a day this comes to a total of 4,977 hours. ATCV worked on a cost recovery basis of $1,500 to $1,200 per week during this period and also operates a weekend team which is active twice per month free of cost.

It is estimated the cost of the activities total about $ 30,000 and the worth of the projects (at $10 per volunteer hour) to be $49,770.

ATCV recruits the volunteers and employs an experienced team leader to coordinate each project and also supplies a vehicle for transport and basic hand tools.

2.4 Species Managed

Table 3 presents the major species managed in each State by community groups. Common and scientific names are provided in Annex 3.

Table 2 : Summary of ATCV volunteer figures for 1995

State	**Estimated Number Days**	**Estimated Volunteer Hours**	**Estimated Work Value** ($)
Western Australia	291	2328	23,280
Queensland	1076	8608	86,080
South Australia	968	7744	77,440
Victoria	922	7376	73,760
New South Wales	916	7328	73,280
ACT	582	4656	46,560
Northern Territory	1217	9736	97,360
Tasmania	236	1888	18,880
Total value of weed eradication and control	**6,208 days**	**49,664 hrs**	**$496,640**

Table 3 : **Species managed for nature conservation**			
South Australia	**Tasmania**	**Victoria**	**NSW**
Bridal Creeper	Scotch Broom	Saint John's Wort	Saint John's Wort
Olive	Other broom species	Wandering Dew	Lantana
Boneseed	Gorse	Blackberry	Camphor laurel
Gorse	Blackberry	Brooms	Privet
Watsonia	Pampas Grass	Erica spp	Bitou Bush
Boxthorn	Ragwort	Pittosporum	Scotch Broom
Heath	Willow	Cape Broom	Blackberry
Broom (several species)	Boneseed	Monterey Pine	Balloon Vine
Blackberry	Mediterranean Daisy	Sweet Pittosporum	Madeira Vine
Radiata Pine	Foxglove	Mirror Plant	Arrowhead
African Weed Orchid	Crack Willow	Karamu	Pampas Grass
Willows	Boxthorn	Holly	Morning Glory
Ash	Rosehip	Boneseed	Indian Hawthorn
South African Daisy	Spanish heath	Sycamore Maple	Tree of Heaven
Tagasaste	Golden wattle	Cestrum	Honeysuckle
Polygala	Sycamore	English Ivy	Ochna
Some grasses such as Ehrharta	Rice Grass		Exotic Grasses
Soursob	Himalayan honeysuckle		
Calomba daisy	Holly		
Aleppo pine	Ivy		
Hawthorn			
Briars or dog roses			

Table 3 cont. : Species managed for nature conservation

Western Australia	Northern Territory	Queensland	ACT
Bridal Creeper	Athel Pine	Asparagus Fern	Saint John's Wort
Blackberry	Bellyache Bush	Balsam	Blackberry
Arum Lily	Buffel Grass	Bitou Bush	Broom
Golden Dodder	Butterfly Pea	Camphor Laurel	Horehound
Sydney Golden Wattle	Candle Bush	Cat's Claw Creeper	Cotoneaster spp
Guildford Grass	Centro	Chinee Apple	Hawthorn
Watsonia	Clopo	Chinese Elm	Firethorn
Pampas Grass	Coffee Bush	Climbing Asparagus Fern	Pampas Grass
Mimosa Bush	Coral Vine	Corky Passion Vine	Sweet Briar
Buffel Grass	Devil's Claw	Easter Cassia	Poplar
Athel Pine	Fish Tail Palm	Green Panic Grass	Burgan
Tree Lucerne	Gamba Grass	Groundsel	Willow
Pink Gladiolus	Gmelina	Guinea Grass	Elm
Bulrush	Golden Shower	Lantana	
Blue Lupins	Guinea Grass	Leucaena	
Tree Mallow	Hyptis	Madeira Vine	
Wild Oats	Ipomoeas	Mickey Mouse Bush	
Boxthorn	Leucaena	Mile a Minute	
One Leaf Cape Tulip	Macroptilium	Morning Glory (coastal)	
Victorian Tea Tree	Mesquite	Mother of Millions	
Rose Pelargonium	Mexican Poppy	Para Grass	
Veldt Grass	Mimosa	Parkinsonia	
	Mission Grass	Prickly Acacia	
	Neem Tree	Privet	
	Paddy's Lucerne	Rubber Vine	
	Para Grass	Siam Weed	
	Parkinsonia	Singapore Daisy	
	Parthenium Weed		
	Poinciana		
	Purple-Top Chloris		
	Prickly Acacia		
	Rhodes Grass		
	Rubber Bush		
	Sicklepod		
	Siratro		

2.4.1 Weed Control Methods Being Used

Most groups and coordinators surveyed indicated that they used:

- the Bradley Technique;
- a modified Bradley Technique, now usually called Bush Management; or
- the Minimum Disturbance Technique.

These are very similar philosophical approaches to the issue of environmental weeds work. This method or philosophical approach embodies the process of working first in the areas of best or most intact native vegetation where the weed component is smallest. These areas are cleared progressively of weeds so that the resilience and regeneration abilities of these areas of native bush allows recovery. A variation of the method used by some groups is to manage areas of habitat value (for example presence of endangered species) first, regardless of weed content.

The work then progresses *towards* the areas of greatest infestation, at a rate that allows the native vegetation to regenerate and, in theory, crowd out the weeds. Further explanations of this philosophy can be found in Bradley (1988) *Bringing Back The Bush. The Bctdiey Method of Bush Regeneration,* and Robertson (1995) *Stop Bushland Weeds.*

The importance of phases of weed control are described by Dixon and Keighery (1995):

- It is not possible, nor is it desirable, to remove all the weeds from a site in one visit. In most cases the factors causing the weed invasion are still operating. For a weed control program to be successful, it is important to re-weed the site. A successful weed control program has three phases:
  - primary weeding - the first time weeds are removed form the site;
  - secondary weeding - removal of weeds germinating at the site following the primary weeding and associated disturbance of the soil. Often the removal of one weed species encourages the growth of other weeds. Secondary weeding may last a few months or even a year and is vital to allow the regenerating native plants to survive; and
  - long term maintenance - within a few months to a year the site may need a visit every six months or annually to remove any scattered weeds that may be present.

The amount of time spent in each of the three phases of weed control will vary with the site and the weed species present.

Methods used by volunteer groups are fairly consistent throughout the nation. These are limited usually to hand tools and a limited range of herbicides that are painted onto stumps or stems, or sprayed from a knapsack. Methods include:

- hand methods such as pulling seedlings and small woody plants;
- grubbing;
- root digging,
- spot spraying;
- stem injection;
- stem frill and swab; and
- stem cut and swab.

Use of heavy motorised equipment and herbicide techniques is limited because of occupational health and safety issues. Thus in most programs volunteers do not spray with herbicides or use machines. No program was found where volunteers used prescribed burning.

Further details of the current acceptable and promoted methods that are common to volunteer groups can be found in Robertson (1995) *Stop Bushland Weeds,* and Buchanan (1989) *Bush Regeneration: Recovering AustralianLctndscapes.*

Government officers are sometimes reluctant to spend large amounts of time training volunteers because of the high turnover (mainly people use the volunteer program for work experience so that they can get a job, and subsequently leave).

3. CASE STUDIES OF SUCCESSFUL AND UNSUCCESSFUL PROGRAMS

3.1 What Makes a Success ?

A number of studies and surveys have been conducted. Masters (1996) outlines the requirements for success, of volunteer groups in Western Australia both by agencies and by the volunteers themselves. For agencies these include:

- acceptance that a top-down approach to management does not work;
- good analysis of the groups needs, expectations, virtues and limitations;
- understand their own strengths and limitations;
- acknowledgment of the groups talents, skills and expertise;
- flexibility on how and when to work, to the groups timetable; and
- reduction of jargon and red tape.

For volunteers these points for success include:

- commitment to tasks that might not originally been foreseen, if necessary to achieve goals;
- realistic commitment to time and effort required;
- accept the team approach and accept the team goals; and
- willingness to learn new skills and knowledge and to change own views.

Masters also outlines some components of both government and volunteer contributions to the failure of volunteer groups. These points of failure include, by agencies:

- the mismatch between the metropolitan location and well resourced agency staff and the hidden costs'borne by country volunteer group without faxes, photocopiers, computers or use of vehicles;
- the mismatch between the language and methods of scientists and desire of public servants for outcomes and the needs of the community group;
- discounting of the knowledge and skill base available in the community group;
- excessive red tape for accountability;
- lack of support by state or Federal Government; and
- inconsistencies in the messages presented by governments.

On the community group side, points of failure include:

- mismatches between expectations and achievements by the community groups such as misunderstanding of the amount of hard work which will be required by volunteers;
- strong beliefs or views held by volunteers with little scientific foundation which are counter to the ecological needs of the project;
- members of groups with other agendas such as personal goals, political outcomes or the need for involvement and power; and
- discounting of the expertise of agency staff.

Blyth *et al.* (1996) includes a summary of features that are likely to be present in a successful cooperative volunteer - government linked conservation program as:

- the problems must be clearly defined, solvable, with good short term progress indicators;
- the problem should be relevant to the group with the result having a benefit for the group;

• nature conservation aims are embedded into the social and economic parameters in the community;

• frequent personal contact between government and volunteers, a coordinated approach, trust and fairness demonstrated, and the group small and largely self sufficient; and

• a legislative base for the work.

The 1991 survey of Friends groups in Victoria by Ross outlined what the Friends groups themselves identified as elements for success:

• a good relationship with ranger staff;

• worthwhile projects;

• defined targets and goals;

• a dedicated core group;

• good communication and consultation within the group;

• opportunities for everyone; and

• participation by locals.

3.2 Successful Case Studies

3.2.1 Case Study 1: Watiparinga Reserve, South Australia

Watiparinga Reserve is a National Trust of SA property in the Adelaide foothills. It is 32 ha of mainly steeply sloping land clown to an ephemeral creekline. It is part of a number of adjoining open space reserves with different owners such as the Mitcham City Council, SA National Parks and Wildlife Service and National Railways. It was a gift donated in 1957 by Alison Ashby, from part of the family farming property owned from 1922. The vegetation had originally been a *Eucalyptus mmzicrocarpa/Eucalyptus leucoxylon/ Allocasuar na verticillata* open grassy woodland but had been modified by woodcutting, removal of wattles for tannin industry, grazing with sheep and cattle, and top dressing with superphosphate by hand.

The management of the reserve was undertaken by several different volunteer organisations for the National Trust between 1957 and 1973. This management allowed for the continuation of grazing, and agistment of stock continued in portions until 1969. There were also two areas

In 1973, partially as a result of agitation by local residents about the increased fire hazard after grazing ceased, the Watiparinga Management Committee of volunteers was formed.

The major management program objectives were:

• fire reduction along the sensitive boundaries using a hand directed tall wheel mechanical slasher-mower;

• revegetation with local indigenous species by tube stock or direct seeding; and

• environmental weeds eradication by hand, hand tools and herbicide using cut-and-swab techniques.

Since 1975 volunteers and student labour have been managing the Watiparinga Reserve (and later parts of the adjacent Council land) for these three objectives. The total budget for this work for the National Trust reserve has been in the order of $3,000 per annum. Hours spent would be up to 1000 hours per year (estimate).

Woody weeds removed include hundreds to thousands each of Ash (Fraxinus) from creeklines, Blackberry, Brooms, Olives, Briars (Rosa), Boneseed, South African Daisy and Hawthorns.

There are, in essence, no woody weeds left on the reserve. In a neighbouring reserve, under different management, there would he an (estimated.) density of up to 40 trees per ha of mature Olives *(Olea europea).*

At the time the Watiparinga Management Committee took over, a native plant species list of 24 species found in the reserve was prepared. The species list has risen from 24 native plant species to over 130 species from natural regeneration.

Enid Robertson was the pioneer in this reserve, for the development, trialing, establishment and demonstration by volunteers of the Minimum Disturbance Approach for management of degraded bushland. The Minimum Disturbance Approach as developed in the Watiparinga Reserve is now entrenched in SA as the most appropriate method of work for volunteers in environmental weeds management work.

As a testimony to the quality of the volunteer management, this reserve is now on the Register of the National Estate and has a SA Heritage Agreement over it.

Indicators of success are:

- there are, in essence, no woody weeds left on the reserve;
- there has been a ten fold increase in native species recorded;
- the Minimum Disturbance Approach of management is now widely used in SA; and
- the Management Committee has managed adjacent reserves for the Mitcham Council and the National Railways.

The components that made this project work include:

- the reserves location on the urban fringe, making volunteer and student labour available;
- the local committee was of local residents;
- the dedication of one of the key volunteers;
- ecological knowledge and land management skills available to the group;
- a small amount of money that could be used for student labour, hand tools and materials;
- the visible success of the weeding and revegetation program;
- continuing watching brief for minor reinfestations or new weeds; and
- support of a professional weed officer for major Blackberry infestations.

(Robertson (1984) and Robertson, pers. comm.)

3.2.2 Case Study 2: Overcoming the Kochia Invasion, Western Australia

The following case study is extracted from a paper presented by Rex Edmondson at the ` Invasive Weeds and Regenerating Ecosystems Conference' held in WA.

In March of 1992 the Jerramungup Land Conservation District Committee held a seminar on methods of rehabilitating saline country. At that seminar a farmer held up a plant which was beautifully green and lush. The plant was Kochia.

This plant had been imported by a reputable seed company, but the plant had not been well researched. As the seed met all Australian Quarantine and Inspection Service (AQIS) rulings, the four farmers who had sown it were victims of circumstance. Understandably, the farmers were angry once the APB confirmed that the plant had definite deleterious effects on agriculture.

From the information that the APB collected on control, distribution and potential spread of the weed, control of it was beyond the resources of individual farmers and therefore a community based control program was required.

By galvanising neighbours, informing voluntary groups and others, the problem of the weed was shared, and control and responsibility was placed at the community level. The community program was initiated by treating the Kochia problem as one that affected everyone. This meant that all extension activities were addressed and coordinated at a group level. Information dissemination was performed by using the wider media services.

As the season progressed, it became more apparent that the Kochia had spread to a level that was beyond community financial resources. Therefore funding was provided from the Federal Government, in conjunction with other states, for broaclacre chemical control.

In 1992 and 1993 the total infected area was sprayed by air. Community involvement was

also intense. By February 1993 one of the first work days was held and 90 volunteers turned up. On further days during that month 20, 30 and 40 volunteers turned up from a community of only 1,400 who live in 6,500 square kilometres of land. Additionally, individuals put in an enormous amount of time and expenses on their own.

Some of the costs for the period 1991/92/93/94 included:

- APB labour, $348,000; and
- expenses $113,000.

Had the plant been allowed to run it could have cost Western Australia $7.2 million per year.

Sadly, for those farmers who had spent considerable money and effort on well planned rehabilitation programs involving this plant the consequences are not as originally anticipated. However, it is expected that they will be assisted through the public purse to rehabilitate their land.

Indications are that this weed will be eradicated in the shire this year. This project won the McKell Medal for Land Conservation.

3.2.3 Case Study 3: Ecoplan/ATCV Bushland Care Days, Western Australia

The Ecoplan study (1995) details the results of a pilot program `Bush Care Days' which involved working with the Australian Trust for Conservation Volunteers (ATCV). ATCV was contracted to work alongside local volunteers for their workdays, with ten community groups taking part in the most successful program.

Costs

For the workday, ATCV provided six to ten insured volunteers supervised by a team leader with first aid and environmental qualifications. ATCV provided transport to the workplace, and working hours were typically Sam to 4pm. A cost of $1.00 per person was met by the local group for public liability and personal injury insurance. Actual numbers of volunteers on the workdays varied from 5 to 19 ATCV volunteers and added to a similar variance in numbers from the local group.

The cost to Ecoplan of contracting ATCV for one workday was $230, representing 11.5 percent of Ecoplans operating budget. Administration, in kind support and publicity represented a further 15 percent of Ecoplan office time.

Results

The 1995 Bushland Care Days are viewed by Ecoplan as an outstanding success. However, in 1996 costs will increase to $300/work day as the ATCV found that the charge of $230/workday did not adequately cover time and costs incurred in providing their services.

The two City Councils involved in the work (Stirling and Melville) both noted the considerable monetary value of the work completed, with the Melville Council equating the work and effort of the volunteers with that of fully paid employees. Given maintenance budget constraints, Melville achieved work which would otherwise not have been completed that year.

Other benefits included:

- the lifting of the perception of Urban Bushland;
- raising of group profiles;
- exchange of information and ideas;
- a boost in group membership; and
- psychological boost to those involved in the program.

3.2.4 Other Success Stories

Friends of Sherbrooke Forest National Park have been managing environmental weeds in this 802 ha park for 16 years. There are currently 75 members in the groups, 46 of which do volunteer work in the park and 18 of whom are core members, doing volunteer work regularly. The Friends put in 850 person hours per year on environmental weed work, and have refined many useful methods of controlling their woody weeds.

Major weeds managed are Sweet Pittosporum, Holly, Sycamore Maple, Cestrum, Wandering Dew and English Ivy. After a recent survey in the park, they refined their work to target significant habitats. One of their success stories is the hand weeded removal of 10 hectares of English Ivy (of 70 hectares total area) in lyrebird habitat. English Ivy prevents lyrebirds from scratching for food. After Ivy removal there was `fantastic natural regeneration' and the lyrebirds are now found in this area (Freshwater, pers comm.).

The volunteer Bushcare program in Clarence City Council has been successful to the point of eradicating specific environmental weeds from specific land areas, such as Gorse from Waverley Flora Park (Watson, pers. comm.).

Tangible successes cited by Greening Australia Queensland include the hundreds of the square metres relieved of weeds and the thousands of trees planted to take the place of these weeds once removed, preventing them from growing back. Projects have included:

- Corinda `Operation Cats Claw'- cats claw vine removed from mature *Eucalyptus tereticornis* and dry rainforest vegetation on the banks of Oxley Creek;
- Teralba Park, Mitchelton - regeneration/ revegetation of a gully with dry rainforest species;
- West End - regeneration/revegetation of remnant dry rainforest;
- Balun Park, Newmarket - regeneration/ revegetation of a part of Enggera Creek with local dry rainforest species;
- Merri Merri Park, Kenmore - removed cats claw vine from remnant dry rainforest allowing regeneration; and
- Stradbroke Island - assisting Redland Shire with regeneration/revegetation of coastal vegetation.

These areas receive ongoing maintenance to ensure that they remain `successes'.

The Waverley Flora Park program in the Clarence City Council has been successful in eradicating specific environmental weeds from specific land areas, such as Gorse eradication (Watson, pers. comm.).

3.3 What Causes a Failure?

In the context of this document, "failure" is defined to mean the inability of a community group or individual to control and manage a particular environmental weed.

The following case studies document some of the major problems facing groups and their efforts to control environmental weeds. As indicated, the studies were failures in respect to management of the targeted weed, but outcomes in the form of improved understanding about environmental weed management, lessons learned as a consequence of not achieving the desired outcome and changing wider community attitudes may still be successes that eventuate out of an unsuccessful project.

Masters (1996) found that greatest discouragements to volunteers surveyed in WA to be:

- lack of regular support and help;
- lack of funding and inadequate understanding of the magnitude of the tasks; and
- red tape.

The 1991 survey of Friends groups in Victoria by Ross outlined what the Friends groups themselves identified as elements for failure:

- fanaticism about projects and approach;
- too few people left to organise and to do the work; and
- too much formality and seriousness.

3.4 Unsuccessful Case Studies

3.4.1 Case Study 1: African Weed Orchid *(Monadenia bracteata)* in South Australia

This is both a successful and an unsuccessful case study. It is successful in that it demonstrates the size of volunteer commitment to an environmental weed issue that can be generated by a small group of dedicated volunteers. It is unsuccessful in that the major objective of totally eradicating African Weed Orchid *(Monadenia bracteata)* from South Australia before it became established was not successful.

The presence of a small perennial herbaceous exotic orchid in the SA ecosystems may not be considered important to many people. However, of the approximately 1000 native species present in the Mt Lofty Ranges, 100 species are orchids. So, although they form a negligible component of the biomass, they might be considered 10 percent of the plant biodiversity. An aggressive competitor to the native orchids, such as *Monadenia bracteata* was considered to be, could therefore have, say, a 2-3 percent effect on biodiversity.

Monadenia bracteata clearly has the capacity to spread rapidly and out-compete many other plants. It is apparently currently most common in grassy paddocks and `disturbed areas in the Hills such as previously cleared areas and firebreaks. Some people argue that *Monadenia bracteata* is non-competitive in native scrub. However, in the ecological zone where *Monurdenia* is currently found, grassy woodlands are a major ecosystem. Ecologists predict that *Monadenia bracteata* will become established in native grasslands, one of the rarest and most biologically valuable types of habitats in South Australia and where some of the rarest orchids and other understorey species occur. For example, *Monadenia bracteata* has already been found in the close vicinity of nationally declared rare and endangered species such as Small Scurf-pea *(Psoralea parva)* and Tepper's Sundew *(Drosera praefolia).*

In locations where eradication work has been carried out for the last four years, the infestations have been contained, with over 95 percent of plants being pulled or dug before seed set and a shift in the age of plants found, from flowering specimens to juveniles. In these areas, the design of the campaign appears sound and indicates that volunteer time was generally well spent.

However, in 1995-96 over 500,000 plants of *Monadenia bracteata* were dug, pulled or sprayed in the Adelaide Hills. It was this years work, in the end, which made it apparent that a number of populations of *Monadenia bracteata* had not been located despite the equivalent of one person searching almost full time for 6 months of each of three years. The infestations were more widespread and more established than outlined at the time the campaign was designed. It is now clear that eradication is impracticable.

The facts and figures for this weed invasion are impressive in their completeness compared to most other weed stories. The locations of each infestation discovered, the number of plants dug, pulled or sprayed, both juvenile and adult, and the number of hours spent by volunteers are recorded over a 5 year period.

This species was first officially recorded in SA in 1988. It took several years of concerted effort by one volunteer ecologist in particular, Enid Robertson, firstly, to try to generate government or official concern which resulted in the production of an information leaflet, and secondly, to generate community concern. The commitment of volunteers to hours spent searching for and digging or pulling the orchid can be calculated conservatively at 2541 hours in 1995-96 (318 person days) (underestimate), 1139 hours in 1994-95, about 1000 in 1993 and 500 in 1992. This translated to almost 500, 000 weed orchid plants removed by volunteers, ATCV and students during 1995-96, 81,928 weed orchids removed in 1994-95 on 48 sites, 51,522 plants in 1993, and 55,227 plants in 1992. Total support through the Save The Bush funds was $15,000 and agency support was about $8,000.

The successful elements of this program include:

- an increasing awareness of the *Monadenia* issue;
- more volunteers contributing significantly more time to the project in each year;
- infestations where work had been carried out for several years are under control;
- local councils, government departments, and private industries have taken more responsibility for their own areas, including several agencies which commenced spraying in the major new infestations in degraded grasslands;
- local councils have undertaken more responsibility for education campaigns in their own areas;
- local councils, government departments, and private industries have contributed funds and in-kind work for *Monadenia* infestations that had been found on their lands; and
- the high profile of this case may lead to a change in government policy about environmental weeds in the draft state weed strategy currently under preparation.

The components that made this program fail:

Government

- The species was not listed under noxious weeds legislation so funding was not officially available;
- misunderstanding of the autecology of the orchid compared to native orchids, such as:
  - believing that it would have `limiting requirement' for unique mycorrhiza; and
  - believing that it would have `limiting requirement' for unique insect pollinators;
- no formal mechanisms to alert volunteer individuals and groups to the problem;
- no government officer with the formal responsibility or watching brief for potential new environmental weeds;
- no government action plan and sound education campaign rapidly put in place; and
- little government support for what was clearly understood by volunteers in the nature conservation arena to be an issue worth pursuing.

Volunteers

a commitment to hand control rather than herbicides, to minimise the impact on native species, reduced the numbers that could be controlled;

- a commitment to total removal of the plant by digging rather than pulling out of the stalks of flowering heads, reduced the numbers that could be controlled; and
- a despondency in the volunteer ranks as the size of the problem increased beyond capacity to respond.

Chance

- several major infestations were discovered in 1995 that had not been known previously and which had obviously been flowering for several years.

(Prescott and Robertson, pers. comm.)

3.4.2 Case Study 2: Bridal Creeper Control in Yanchep National Park, Western Australia

In 1976 groups of volunteers worked together to remove Bridal Creeper from tracks in Yanchep National Park. At the time, Bridal Creeper was not a serious problem, so the possibility existed of eradicating it from the park.

Even though volunteers removed the weed in the first year, there was no follow up work in subsequent years. Thus the weed was able to come back and spread, and is now throughout the park.

This case study highlights the importance of follow up work in controlling environmental weeds. It also demonstrates the necessity for

employing a coordinator who will be responsible for the organisation of volunteer groups as part of a complete weed control program (Hussey, pers. comm.).

3.4.3 Case Study 3: Control of Mexican Poppy and Athel Pine along the Finke River, Northern Territory

As part of the Drought Landcare Program funding, control of Mexican Poppy and Athel Pine were undertaken along the Finke River, with Aboriginal communities working with Department of Primary Industries and Fisheries (DPIF). According to Panton (pers. comm.) there were mixed results for the following reasons:

- nature of the weed and terrain - the location was not `local' for people and they had to travel long distances, transport had to be arranged;
- rural community - general lack of understanding about the science of weed control, why chemicals need to be mixed and applied properly; and
- thoroughness of work that is undertaken - missing one or two plants in a control/ eradication program can jeopardise the whole program, this requirement is sometimes not clearly understood by people.

Panton considered that it was important to involve the community. Even though the success rate of programs in the short term may be doubtful, the long term commitment from the community is imperative. The ultimate responsibility has to be with the local community for ongoing management.

3.4.4 Case Study 4: Eradication of Chinee Apple, ATCV, Northern Queensland

Lack of experience is often a major cause of activity failure. In an instance where ATCV (Northern Queensland) was using the cut-stump method to eradicate Chinee Apple, they found that they did not apply the right quantity of herbicide and the plants did not all die (Hudson, pers. comm.). Subsequent to this, ATCV then sought assistance from the Department of Primary Industries to provide advice for appropriate control methods.

3.4.5 Other Unsuccessful Stories

In one area of Sydney (location and name of organisation withheld) where bush management teams had been working and had reached an 85 percent weed free vegetation community, the program was stopped after 8 years. Four years later, Privet and Lantana were again abundant and over 1.6 metres tall (Rawling, pers comm.).

In other areas, community groups have been keen to `have a go' at weed management and attack the weeds with a 'gung-ho' attitude, often as a social activity along with activities such as barbecues, but were not prepared to have a long term view of the time commitment needed.

This, along with other cases demonstrates that the weed program can be very ineffective if there is no long term maintenance program and while a large seed source (such as that moved by birds or by watercourses) remains outside the area managed.

LIMITATIONS AND ADVANTAGES OF COMMUNITY INVOLVEMENT

Coordinators of community environmental weeds management programs were asked to identify the limitations and advantages of using volunteers and community groups for environmental weeds work. In addition, they were asked to identify the costs and benefits of such a program. In particular, information was personally provided by Weis, Rees, Brodie, McDonald, Burton, Couston, Formosa, Lamond, Graham, Richards, Eustice, Hudson, Harrison, Beal and O'Byrne. A comprehensive list of people contacted and the organisation or group they represent is provided in Annex 1.

4.1 What the Limitations are

Although it is clear that the size of community involvement in environmental weed work is substantial in numbers of individuals, numbers of groups and hours contributed to the issue of weed control, there are real limits to the amount that can be achieved by community groups. The major constraints identified by Landcare/bushland groups (urban) in Tasmania (Curtis *et al.* 1994) affecting the work of their group in the coming 12 months were time, distances, attitudes, and lack of people resources. An overall strategy for weed removal is required or the best intentions and efforts are found to be of little 'value.

4.1.1 Limitations which are Inherent

Distance from Population Centres

The further weed infestations are from a centre of population, the less likely it is to be able to be managed by volunteers. The successful groups are usually those where the area managed is located close to the homes of the groups members. The survey by Ross (1991) showed that membership in volunteer groups was:

- 69 percent very local;
- 14 percent in the region; and
- 85 percent very local when high profile national parks which draws volunteers from further afield were excluded.

There are, in all areas, limits to the number of people interested enough in an issue to volunteer, and this is exaggerated in country areas.

In Western Australia the size of the state relative to the population has made this problem particularly difficult. There are many more environmental officers in metropolitan regions than there are in the bush and this, when combined with low rural populations, makes the control of rural environmental weeds impossible. For example Terry Jacobson, the local government Landcare Coordinator, based at the Shire of Mingenew, has to cover twenty shires in the vicinity of his region.

Requirement for Mechanised Equipment

Most volunteer groups which work in association with a local government or State Government agency have specified limits to the use of tools and machinery, for union and Occupational Health and Safety (OH&S) reasons. The use of tools and machinery is usually limited to hand tools such as trowels, shovels, pruners, clippers and hand saws. Where mechanised equipment such as bulldozers or chainsaws are required, paid agency staff with the necessary certificates must be involved. This requires a commitment by the agency to the concept of volunteer workers.

Demographic Limits to Volunteer Abilities

The demographics of volunteers can limit the activities in which volunteers can participate, especially in the physical tasks of pulling weeds or handling sawing equipment through lack of strength, older age, or poor health. The limitations

of older volunteers in retirement age are often physical. In other cases the limitations are the time commitments by volunteers. For example, Barnes' (1994) survey of volunteers in a WA program showed 62 percent of them to be women with young children and only 40 percent were part-time workers.

The Need for Use of Herbicides/ Prescribed Burning

Most volunteer groups which work in association with a local government or State Government agency have specified limits to the use of herbicides, for union and OH&S reasons. Chemical usage is usually limited to liquid herbicides in a cut-and-swab technique. Spray units are usually managed by professional individuals with the required certificates. Prescribed burning was not found, in this review, to be an allowed activity for volunteer groups.

4.1.2 Limitations which are Difficult to Overcome

The Size of the Problem Seems Insurmountable to the Group

The psychology of undertaking a volunteer program, especially when members of the group have a limited knowledge base and understanding of bush ecology, or a limited commitment to conservation, is complex. However, it appears to be human nature to be discouraged, to lose interest, enthusiasm and momentum if the problem is not being overcome or the size of the problem is insurmountable. For example, Bridal Creeper in South Australia is reaching this point and the eradication program for *Monadenia bracteata* in South Australia has passed this point.

The Group has an Ethical Objection to the Use of Herbicides

McDonald (pers. comm.) indicates there is considerable community opposition to the use of herbicides, even for cutting and painting weeds such as Camphor Laurel *(Cinnamomum camphora)* in the-Lismore area. In another example cited by McDonald (pers. comm.), while the aerial spraying of Bitou Bush on the NSW coast (as a component of environmental weeds control) has strong support by some people, other groups are " positively obstructive".

The Group Loses a Key Group Leader or has a Problem Personality

The control over the types of individuals that volunteer for projects is significantly less than the control an organisation can exert over paid staff through the selection and employment process.

Often in a group, there will be a volunteer(s) with:

- a different agenda to that of the host organisation or other group members;
- volunteers who join for the `wrong' reasons; and
- volunteers with a `macho' view of weed control and not interested in care and follow-up.

In addition, many groups find themselves with an individual with a `problem personality' or a genuine dysfunctional personality. These situations can significantly reduce the size, effectiveness and enthusiasm of the group.

Physical Limitations

Where weeds are in inaccessible terrain such as cliff edges or very steep land, volunteer work is inappropriate.

In the Northern Territory and Queensland particularly, many commented on the difficulties using volunteers in remote and rugged terrain, as well as the oppressive environmental conditions in the tropics. This was particularly evident in the build up to the wet season, where volunteers could only be expected to work until about 11. 00am because of the humidity (Clarke, pers. comm.).

Cultural Values and Beliefs

Aboriginal held values of land, plants and animals is often reflected in a different attitude to environmental weeds which influences their approach to weed management. Officers need to

be aware of, and sensitive to, these values and flexible in work methods with these communities for the best outcome.

When the Community Weed is on Private Land

There are examples where the source of weed infestation (such as a seed source that is moved by birds or by watercourses) is on private land and the owners are not interested in, and/or antagonistic to, weed management on their property. Where these species are not listed under any legislation, a solution can be very difficult (Rawling, pers. comm.).

4.1.3 Limitations which can be Overcome

There are Limits to, or Lack of Funds for Technical Support

The perceived lack of support from vesting agencies was found to be a key issue which determines the limitations of community involvement. Community groups need the direction of technical resource people on the ground, and in general there are very low volunteer to trainer ratios (Lynne Rees, pers. comm.) resulting in limits to the training of volunteers. This can have detrimental effects, leading to damage to the bush (wrong plants removed). The best situation is seen to be the combined efforts of community groups and local/State Government agencies and land holders.

Landcare/bushland groups (urban) in Tasmania identified time, distances, attitudes, and lack of people resources the major constraints affecting the work of their group in the coming 12 months (Curtis *et al.* 1994).

A survey conducted by Barnes (1994) of volunteers in WA, cited in Masters (1996), found the greatest discouragements to volunteers to be lack of regular support and help, lack of funding, inadequate understanding of the magnitude of the tasks and red tape.

Agencies should not attempt to undertake a volunteer program without dedicating the necessary funds needed to run the program. See `Costs To The Lead Agency' below.

Poor Quality Work, Inconsistent Levels of Skill and Ability, and Damage to the Bush

Agencies can achieve adequate control of the quality of work by establishing sound training programs providing information on OH&S issues, use of tools, chemicals and equipment, plant identification and appropriate weed control techniques. Educational programs about the ecology of the bush are important. Agencies should also provide a paid and trained supervisor of the volunteer work until an agreed level of skill and knowledge is reached.

High Turn over of Volunteers, Volunteers only Work for a Short Term

Agencies can minimise the turn over of volunteers by having written agreements which address expectations about the rights and responsibilities of both parties to the agreement. Agencies also need to pay "psychological wages" to their volunteers; that is, recognising the volunteer contribution by way of newsletters, badges, meetings, and certificates.

Coordinator staff should be selected for their ` people skills' in equal importance to their bush management skills. The areas to consider in a well run program are:

- recognition;
- training;
- resources; and
- supervision.

4.2 Advantages of Community Involvement

Despite the limitations to which community participation in environmental weeds work can be subjected, there are some advantages that are not necessarily directly economic.

The Opportunity to Educate the Community about General Environmental Issues

Several coordinators identified that Bushcare and related programs have a significant flow-on benefit to the local community in terms of

education and understanding of the bushland. There was a general improved awareness/ education of ratepayers who are neighbours to bushland areas which, for example, reduced garden refuge dumping.

Fostering the Bushcare volunteer networks also allows for cross-education and training *between* volunteers as most groups have highly educated and skilled people with a wide range of talents amongst their memberships.

Involvement also exposes ratepayers to the issues of responsible choices of ornamental garden plants that are known not to be environmental weeds.

The Political Lobbying Power of the Trained Volunteers for Bush Management

The knowledge about and commitment to local areas of bushland can provide strength for lobbying at the local and state level for the necessary financial commitment to managing the land for conservation.

A Sense of Community, Social Cohesion, Community Involvement, Community Spirit

The use of local residents and local participation in weed programs was seen to improve the sense of ownership of bushland areas and create an ongoing input into bush management.

A Significant Increase in Quality of Bushland where Reserves have Friends Groups

Anecdotal evidence and some photographic records indicate an `improvement' in the quality of many bush areas where volunteer groups have been working. However, many of these groups do not have the skills or inclination to record measurable changes in terms of numbers of weeds removed and native species regenerating, or ecological studies of changes to the composition, function and structure of the vegetation.

Figures for direct economic gains or measured ecological changes to the quality of bushland were not found for this review. Buchanan (1991) outlines limitations such as lack of ecological training, lack of reference areas, and the lack of specified goals or outcomes for the appearance of the managed vegetation community as limitations to measures of improved bushland.

4.3 Community Groups Contribution to Weed Burden

Community involvement in the control of environmental weeds in the urban/rural fringes of many cities is beginning to become substantial. However, they may also contribute to the weed burden. This is a result of a number of factors including:

- inappropriate techniques for environmental weeds work which favours spread of species;
- removal of native species from bushland in an environmental weeds campaign by persons with poor plant identification skills;
- the planting of species which are, or have potential to become environmental weeds; and
- transfer of responsibility for problems to the state agencies when it is a noxious weed or if the infestation is too large to physically or psychologically deal with.

The size of this problem is well documented. Much of the information is the educated estimate of informed ecologists and/or anecdotal. However, the importance of the use of introduced species for land management purposes on the current weed control burden can be extrapolated from the effects of this practice in the past. For example, the historic use of Bitou Bush for dune stabilisation and mine rehabilitation, and the use of Blackberry for soil erosion control and horticulture has resulted in a current serious environmental weed problem.

4.3.1 Agricultural Introduced Weeds

Tagasaste

State agricultural agencies are strongly advocating

the planting of Tagasaste for deep rooted perennial pasture and rising watertable control throughout large areas of the agricultural region. This is despite Tagasaste being recognised as an environmental weed in Australia. Tagasaste, *Chamaecytisus pahnensis* (Christ) which is promoted as a fodder plant, is widely naturalised (Hnatuik, 1990) and is considered to be an environmental weed (Carr *et al.* 1992). It is also found naturalised in higher rainfall areas of SA and is "an up and coming weed" (Carter, pers. comm.). McDonald (pers. comm.) states that some groups in country towns in NSW are also removing Tagasaste.

Grasses

A range of grasses introduced for agricultural purposes are now invasive species. Puccinella and Tall Wheat Grass are promoted for use for dryland salinity control (Carter, pers. comm.). In NSW Giant Parramatta Grass is a problem (Storrie, pers. comm.).

Panton (pers. comm.) suggested that problems may occur with species that are still be advocated by Primary Industries (NT) such as Gamba, Para and Buffel Grass which are environmental weeds elsewhere. He also reflected concerns of others that emerging weed problems are not yet of significance in an agricultural production sense so they are not considered important.

Olives

The importation of Olives for production in SA occurred soon after European invasion/settlement. The descendants of these varieties of Olive now constitute one of the major woody environmental weeds of the grassy woodlands of states where the rainfall is over 400 mm. However, after a long decline in interest, promotion of Olives is now occurring again, with varieties selected for lower rainfall areas. Carter (1995) predicts that this will lead to an increased rate of invasion into new ecosystems.

4.3.2 Australian Plants Becoming Weeds Outside their original Ecological Range

It can be predicted that with the significant increase in tree planting, (with its media attention and government support through such programs as One Billion Trees and Landcare) there will be a new suite of environmental weeds in the coming years if the tree selection for each area is not on ecological grounds.

For example, the Hobart City Council includes in its weed eradication program as one of the priority weeds, the non-indigenous native species Golden Wattle *(Acacia pycnantha).* It is included in the public information brochure produced in 1994 called "Garden Plants are Going Bush and Becoming Environmental Weeds" applicable for the whole of Tasmania, encouraging residents not to plant known environmental weeds. It also lists several other Australian species not native to Tasmania which are environmental weeds in Tasmania.

Similar campaigns to remove species planted in good faith, particularly in the 1970s when Australian plants were fashionable, have occurred in other states. This list is substantial.

4.3.3 Commercial Nurseries and others Selling Environmental Weeds

There is a demand for a wide range of species in commercial nurseries. McDonald (pers. comm.) suggests that community lobby groups in NSW have so far been unsuccessful in efforts to persuade the nursery industry not to sell environmental weeds, presumably because there is still a strong demand for the species from some sections of their customer base.

However, community lobby groups have had an effect on some councils with environmental

weeds lists being deferred to in planting programs. Individuals in a community also buy and plant known environmental weeds from neighbours, dug out from the bush, from trash-and-treasure markets or from Trading Tables.

4.3.4 Exotic Species as 'Cultural Objects'

Weed eradication programs have run into trouble in some areas when members of the community have protested that the `environmental weeds' are ` cultural components' in the landscape and should not be removed. Willows along the River Murray in SA and Hawthorn hedges in Tasmania (Lawrence, pers. comm.) are examples, where the Tasmanian protests have been supported by legislation to protect cultural heritage.

5COST/BENEFIT ANALYSIS OF COMMUNITY VERSUS AGENCY BASED PROGRAMS

5.1 Costs To The Lead Agency

Volunteer groups cannot function well for long periods in a vacuum of funding and/or a lack of support from the lead agency with whom the volunteer work is being undertaken. All programs require some financial input by the lead agency.

The costs include:

- salary of a coordinator;
- salary for the supervisor of the volunteer work (daily provision of tools etc);
- salary for paid workers to undertake support work such as use of mechanical tools and spray equipment and herbicides;
- cost of training, especially where there is a high volunteer turnover and differing aptitudes;
- cost of tools and materials for the volunteers;
- cost of plant material (weeds) collection and removal or mulching;
- cost of insurance, administration, recruitment, advertising;
- costs associated with paying " psychological wages", that is, the recognition of volunteer contribution by way of badges, meetings, certificates, newsletters;
- potential costs due to inefficiencies of staff ' on call' to volunteer timetables; and
- costs of effort put into some `demanding" individuals.

These costs can be substantial. For example, the Ku-ring-gai Council's Conservation Division budget for 1996-97 is about $1m of which $220,000 is for education, $100,000 is specifically for noxious weed work by paid staff, $265,000 is for paid staff to oversee vegetation association protection , $310,000 is for fire management, and $170,000 is for the Bushcare volunteer program (Couston, pers. comm.).

5.2 Benefits

5.2.1 Direct Financial Benefit

If the volunteer groups are functioning well, and if the costs of the program can be justified and contained, the major financial benefits to the lead agency can include the following.

5.2.2 The Leverage of Available Funds

The bush weed removal cost can be at less cost to the lead agency than using paid staff or professional contractors. There are many examples from which extrapolations can be made. For example, in South Australia, the leverage of Friends of Parks groups over the input cost by NPWS is estimated at 10:1 (See Section 1 for more detail).

5.2.3 Decreased Side Costs such as Repairing Vandalism where Local Interest Exists

Bushcare coordinators list examples where the local vandalism in parks and the associated anti-social behaviours such as dumping garden refuse and lawn clippings into reserves decreases when there is an active local volunteer group.

5.2.4 Sources of Funding Available Because of Community I nvolvement

The figures for the money available to community groups through such programs as STB, MPWC, Tree Victoria grant system and catchment boards is substantial. Many of these programs are not available to individuals or to agencies and the formation of a community group can provide both the indication that the issue has community support and the infrastructure to apply for community grants. For example, Stevenson (1991) pointed out that Frankston City Council, Victoria, had environmental weeds control crews, but it was Council policy to work only where there is also community support and assistance. This allowed the Council to access grants and assistance for community grants outside the normal local government revenue base.

5.3 Benefit/cost analysis

The costs and estimated benefits of community based programs have been presented in Section 1 of this report. From the leverage figures shown it is clear that those projects run by community/volunteers groups have a much greater benefit cost ratio than do programs carried out by salaried agency groups.

The leverages presented in this report range from 1:1 to 14:1 depending on the number of volunteers, the value placed on the work they do and the initial funding. While training and supervision of workers is often required, these costs are more than covered by the amount of works volunteer groups are able to undertake.

Where agencies simply employ contractors or provide employees to undertake weed eradication work there is no opportunity for leverage, and hence a reduced return from the investment compared with community run programs. Further examples of the costs and benefits of community based programs are presented below.

5.3.1 Friends of Helmeted Honeyeater

Detailed records for the contribution of volunteers to a conservation project has been undertaken for the Friends of the Helmeted Honeyeater.

The financial contribution to the group was i19,118 for a part-time coordinator plus costs. The contribution by the volunteers was calculated at $44,332 for attendance at meetings and other administration, $8,480 for community education such as a newsletter, $5,780 for field work assistance to the part-time coordinator, 539,350 for seed collection and plant propagation, and $38,328 for the revegetation planting. Total volunteer input was 5136,270.

This was leverage for the funding provided of 7:1. (Ross, pers. comm.). It should kept in mind that as this program has a high government profile and is a specific fauna recovery program, it may have higher appeal (higher volunteer contribution) than would a general bush management by weeding program.

5.3.2 New Zealand Example

Susan Timmins (1996), in a paper specifically about community involvement in environmental weed control in NZ, includes a discussion on costs and benefits.

Several case studies are presented. For example, control of *Pious contaia* in Tongariro National Park with volunteer labour was worth $22,464 in volunteer hours between 1982 and 1986. In 1993-94, 572 volunteer days (worth say $45,760 at Australian Landcare standard rates) was achieved with a total cost of $NZ19,000 for transport and supervisor salary. Costs per ha were estimated at $ NZ38. It was estimated that 170,000 trees were removed in heavily infested areas in one weekend.

Comparable costs for a Mt Tarawera project removing pines were $NZ40 per ha for volunteers and $NZ100 -$NZ150 for contract labour.

Timmins asserts that it is hard to obtain figures for the real direct cost to benefit assessment of operating a volunteer program because of:

- underestimating staff time and effort;
- possible diversion from projects with higher conservation need; and
- no comparisons of effectiveness compared to using contractors or other techniques, it is not known what it would have cost using other methods.

Non-market benefits are outlined as significant, with the most important being the flow-on educational value about environmental weeds and conservation to the public, with improved support by the public for environmental weeds budgets.

5.3.3 Other Examples

A self-analysis estimate by urban Landcare groups in Tasmania as to the value of their contribution in terms of materials and labour compared to that contributed by funding agencies indicated that this value was rated as "much more" by 67 percent of groups (Curtis *et al.* 1994).

James Ross, Victorian Friends Network, National Parks Association says that costings exist for Friends of Warrandyte State Park and Friends of Buckley Falls.

5.4 Non-Market Value of Community Work

The costs and benefits of community work have been presented in Table 1 and in Section 4.4.1. However, these costs and benefits only refer to the values of goods and services that are traded between buyers and sellers in a market place (for example the value of labour, the cost of administration), and do not take into account non-traded values such as the increased potential for tourism from weed removal, and the improved habitat for native fauna.

Non-traded (or non-market) values of the environment are difficult to measure, however, for optimal decision making the full set of values - market and non-market - need to be considered. The most commonly used methods to determine non-market values are:

- **Replacement Cost** method, the minimum value of a benefit is the cost of the cheapest meansof replacing it, while the maximum that would be spent to replace it is a measure of its.maximum value. For example, what is the cost of replacing native vegetation if it was to be over-run by weeds.
- **Travel Cost** method measures the value of non-traded goods by observing the costs one incurs to acquire and consume the environmental good in question. In Australia, Travel Cost techniques have been used to value the Grampians of Victoria, the Great Barrier Reef and Kakadu National Park, by determining how much people are willing to pay to travel to these sites.
- **Hedonic Pricing** attempts to measure value indirectly by examining the impact the good in question has on related normally traded goods and services. For example if Blackberry is allowed to take over waterways, and thus prevents people fishing, we can determine the value of the lost catch.
- **Contingent Valuation** seeks to directly measure these values by way of a survey that creates a hypothetical `contingent' market upon which respondent's answers are based. The simplicity of the technique has led to widespread application and widespread comment on its perceived accuracy. The most prominent example in Australia was in 1991 when the non-use benefits of Kakadu National Park were valued.
- **Value Transfer** method obtains non-market values by transferring the values obtained in other closely related case studies and using it for the particular non-market value being considered. This is the most straight forward method by which to obtain non-market values, however, inaccuracies can occur when the item from which the value was drawn differs even slightly from the item currently being examined. Despite this, transferred values

are regularly used in smaller scale projects such as local government funding requests, Soil and Water Conservation Board Action Plans and economic cost benefit analysis.

Therefore, in order to determine the value of community work for weeds, we might ask the question `If the weeds were to remain in a national park, and to damage it to such an extent that tourism is affected, what will be the loss in tourist income?' Asking this question would indicate the community's value of visiting healthy and relatively untouched national parks. Alternatively we may ask "what is the value to you (and the community) of the scenario where weeds are allowed to take over from and damage native vegetation". This approach would indicate the value held by people of healthy natural eco-systems regardless of whether they visit wilderness areas and national parks or not.

In order to accurately answer these questions a comprehensive study of each area from which weeds are removed would be necessary. Because this is not always either practicable or possible, we can use the value transfer method and extrapolate figures already determined for other environmentally sensitive areas. Often the direct impact of an activity is adjusted to reflect the likely overall impact on the local economy. This is expressed *as a Multiplier.*

Table 4 below gives examples of the non-market value of environmental regions in Australia, and provides us with an indication of the value maintaining these areas by removing environmental weeds.

Table 4 : The non-market value of maintaining environmental regions in Australia

Region	**Value** $	**Measured as**	**Multiplier**
Great Barrier Reef tourism	1,157 million per year	Tourism expenditure	1.7
Wet Tropics	678 million per year	Tourism expenditure	1.7
Tasmania wilderness	59 million	Tourism	
Grampians	3 per visitor day	Recreational value of NP	
Gerringong-Gerro NSW	104 per visitor day	Recreational value of NP	
Ovens and Knight rivers	23 clay visits 40 camping visits	Recreational value of river	
Sale wetlands	3 per person per visit	Recreational and water value	
Baramah wetlands Vic	29 per person per year	Recreation, use bequest and existence value	
Coorong SA	108 million	Environmental value	
Ramsar region SA	670,000	Value of Native vegetation to Honey industry	
SA	350/ha	Replacement value of native trees	
Native vegetation and wetlands SA	230/ha	Regional valuations for Heritage agreement	

5.4.1 The Status of Non-Market Valuation

Each method of non-market valuation has its own advantages and disadvantages. Contingent Valuation has been the most popular alternative to value non-market goods. However, most economists agree that all techniques have yet to reach a mature stage in their evolution. This is largely due to a growing recognition among resource valuation practitioners of the potential biases and weaknesses inherent in the techniques. The current consensus regards the results of these techniques as potentially, but not necessarily, useful and unbiased; any findings should be carefully scrutinised before being relied upon too heavily.

While most states are beginning to recognise the value of non-market benefits, and some funding bodies are requiring such figures to be included in project submissions, in general, non-market values are not used. This is for several reasons:

- lack of knowledge of how to calculate the values themselves;
- poor access to trained environmental economists;
- perception that the values are `soft' and therefore unsound;
- a small data hank of good studies to provide figures for different regions; and

lack of understanding of the importance of including non-market values in economic analysis.

Burke (1995) posed the question `Who's going to pay' at the forum run for land managers by the Australian Association for Environmental Education (WA). He concluded that:

- a framework that integrates economics with ecological viability needs to be developed;
- a multi disciplinary approach that analyses theoretical tools as well as policies, structures and strategies needs to be used; and
- in general, a broader awareness of the links between ecology and economics is needed in the community at large.

5.5 How Funding for Community Work is Best Administered

5.5.1 Source of Funds

Grants for environmental weed control are available from:

- Federal Government,
- State Government;
- local government;
- rate levies in catchments;
- operating budgets in State Government (eg Friends coordinators);
- local government programs (eg Bushcare); and
- sponsorships.

5.5.2 Current Funding Bases

One Billion Trees (OBT)

Greening Australia is a private organisation which promotes the retention and management of bush areas and the revegetation of land by seedlings and direct seeding methods. The emphasis on these two aspects varies significantly between states. The Federal Government contracts, to Greening Australia, the delivery of the One Billion Trees Grant program which are grants available to community groups for revegetation programs, although the Federal Government retains ultimate control over grant allocation. Total allocation in 1995-96 was $1,094,700, of which $159,600 was identified for environmental weeds.

Save the Bush (STB)

Save the Bush is a Federal Government grant program. The program funds community groups to undertake hush conservation and management programs. Delivery of the program is contracted to the states, via support for a STB coordinator in each state, although the Federal Government retains ultimate control over grant allocation.

Total allocation in 1995-96 was $1,554,600 of which $291,100 was identified for environmental weeds.

Other Federal Government Grant (ANCA) Programs

Figures provided from the ANCA database on grant programs, searching the data for any environmental weed component, for the year 1995-96 include the following additional grant programs with an environmental weeds component:

- Aboriginal Program $195,295.
- Endangered Species Program $68,235.
- Grassland Ecology Program $34,582. (

SUBTOTAL of $299,112).

If we include the two other programs, STB at $299,112 and OBT at $159,600, the total allocation for these programs is $748,812.

Clearly not all funding in all the projects is totally committed to environmental weeds control work. Some would appear to be 100 percent for environmental weeds control (such as STB02329 Successfully Stamp Out African Weed Orchid *Monodenia bracteata* and STB02331 Removal of Woody Acacia from Goat Hill) while others have only a component for weed control (such as STB02088 Training and Implementing of Bush Regeneration Practices and STB02707 Restoration and Revegetation of Hughes Buffer Area).

In addition, the Drought Landcare Program funding of $3,550,000 has a component of environmental weeds control work. If we use the extrapolation that 20 percent of bush management time and money goes to environmental weeds control work (other components include such things as fencing), the funds expended would be $710,000.

Total ANCA grants to environmental weeds control work for the year 1995-96 could then be estimated at approximately $1.5m.

National Landcare Program (NLP)

The NLP is a Federal Government initiative to fund community groups to undertake soil, water and sustainable agricultural demonstration and restoration projects. Delivery of the program is contracted to the states, via support for administration in each state, although the Federal Government retains ultimate control over grant allocation,

NTLP, STB and OBT grant applications are managed as a collective group. NLP does not fund noxious weeds programs and environmental programs are generally directed to the OBT and STB programs, but a small proportion of NLP funds would have a benefit to environmental weed work, such as the Tasmanian willow eradication programs.

Catchment Funds

A number of catchments such as Metropolitan Parks and Waterways Corporation and South Australian Catchment Boards levy ratepayers for environmental work. A component of the levies is then distributed through grants to community groups.

State Government Grant Funds

Several State Government departments have a grant program for community groups to undertake environmental work. This includes such programs as the Victorian Tree Grant Program and the NSW Environment Trust.

State Government Programs

There are a number of recurrent funded programs at the state level which have an environmental weed component as part of community bush management programs. These include such programs as Coordinators for Friends of Parks Groups in South Australian and the Victorian Land for Wildlife program.

Local Councils

Some councils, particularly in Sydney and Melbourne, but now in all states, allocate rates to a Bushcare program of some description to assist groups in volunteer environmental weed programs.

Private Support for community Work

Organisations such as Trust for Nature (Victoria) and National Trust in SA have a program funded

from bequests and/or grants to manage Bushcare programs or environmental training programs.

Sponsorship

Several environmental programs have been able to attract significant sponsorship. These include:

- Wollongong City Council in NSW which has sponsorship for the promotion, publicity and advertising of its Bushcare program ($75,000 over three years);
- the Foundation for National Parks in NSW which has recently obtained sponsorship for a statewide coordinator of Friends of Parks groups (estimate $40,000); and
- the survey of Tasmanian rural and urban Landcare groups by Curtis *et al.* (1994) has shown that the value of non-government assistance such as money or materials was about $1,500 per group, with about 35 percent of all groups receiving some non government assistance.

Frequently groups receive funding from a variety of sources for one project:

- on average, sample groups in Tasmania received $9,300 from State and Federal Government grants if the group was rural and half that ($4,900) if the group was urban. In the survey, non-government assistance was about 1 percent of their total funding and another 1 percent came from local government. The rest was State and Federal Government grants; and
- a survey by Ross (1991) showed that the Victorian Friends of Parks groups received funds from subscriptions, grants from Federal Government, State Government, local government, donations, and sales.

There are also education/training grants such as LEAP programs and leverage using unpaid supporters for specific short projects (eg Rotary for tree planting days) and ATCV volunteers for which the costs are significantly lower (estimate at $8/hour) than paid labour forces.

5.5.3 Funding Administration

The administration of these funds is via a wide range of government and other agencies, with Federal grants administered by State Governments, and State grants administered by local agencies including:

- Agricultural Protection Boards;
- Agricultural Departments;
- Department of Employment and Training;
- Conservation and Land Management Departments;
- National Trust; and
- local government.

The ratio that each receives from these funding sources varies from State to State.

In all States community group applications for NLP funding are assessed by a panel of government and community ecologists who have a knowledge of what is going on and who are active participants in the community (O'Byrne, pers. comm.).

Many participants expressed dissatisfaction with the way currents funds are administered. The largest problems were seen to be:

- the National Landcare Program specifically excludes noxious weeds from its funding program;
- lack of coordination;
- no apparent framework or strategy for the control of specific weed species;
- lack of follow-up work funded in previous years;
- time required to apply for funding;
- lack of accountability for weed control in government areas;
- general dissatisfaction with control of environmental weeds in national parks; and
- legal restrictions to environmental weed control.

Legal restrictions to environmental weed control can have serious impacts. In Victoria only plants

declared under the Vermin and Noxious Weeds Act can officially be controlled by local government. This establishes legal barriers (and so restricts time and finances) to the control of environmental weeds. There is some discretion under the Country Fire Authority Act 1958 where control of "other weeds" is allowed.

However, local governments are involved in environmental weeds work. For example, Frankston has environmental weeds control crews, but it is council policy to work only where there is also community support and assistance. This allows for councils to access grants and assistance for community grants outside the normal local government revenue base (Stevenson, 1991).

6. EDUCATION OPPORTUNITIES FOR EMPOWERING AND ENTHUSING COMMUNITY GROUPS FOR ENVIRONMENTAL WEED MANAGEMENT

There are a range of informal and formal training programs underway that encompass elements of environmental weeds education and training available across the states. These are often not specifically about environmental weeds but more on bush management, of which environmental weeds is a component.

6.1 Informal Training Programs

The informal training programs include one-off field days by non-government organisations such as individual Landcare groups, Trust for Nature (Victoria), and short courses such as Bushcare (Trees for Life, SA), National Trust NSW, National Trust Victoria, and by government departments such as the SA Department of Environment and Natural Resources. A summary of some examples of these programs follows.

Landcare, Tasmania

Although only a proportion of topics were about environmental weeds, the capacity for informal education can be judged by the fact that 60 percent of rural and urban Landcare groups held field days, on-site demonstrations, with a participation rate almost equal to total Landcare membership (3077 people) (Curtis *et al.* 1994).

Interestingly, although urban Landcare groups in Tasmania showed a high understanding of conservation issues (see section in Tasmanian programs) over 65 percent of their contacts were with DPIF (agriculture) and Greening Australia rather than with primarily nature conservation agencies (Curtis *et al.* 1994). This may indicate a gap in resources for nature conservation extension.

In Victoria, the comparable figures for 1990-92 were that 40 percent of the Landcare groups surveyed addressed weed activities (Curtis *et al.* 1993).

Trust for Nature (Victoria)

The Trust for Nature's major interest in environmental weeds at this stage is educational. It has run a series of workshops and field days covering a range of native vegetation management issues including environmental weeds control. Of the 15 field days run in 1994-95, with 150 people attending, one was specifically on environmental weeds. Funding source was Save The Bush (Henderson, pers. comm.).

Bushcare, SA

The Trees for Life Bushcare Program includes a training component. Since the program began in 1994, they have trained 124 volunteers to manage bush areas for environmental weeds.

Greening Australia, Queensland

As part of their Community Education and Training Program, GAQ has developed a range of short workshops/training courses. The first is to be run in September. Title of the training sessions include `Weed Ecology' and the `Basics of Bushland Regeneration.' Target audiences are community group members, students (eg secondary/tertiary), interested public and local government/agency staff.

GAQ also offers a nationally accredited course `Certificate in Bushland Regeneration.' One subject is called bushland regeneration which includes weed control and the use of herbicides. Another subject, Forest Ecology includes ecology of weed invasion. To date approximately 50 participants have been involved in the Bushland Regeneration subject (Low, pers. comm.).

SA Department of Environment and Natural Resources

A series of field days and full clay workshops about the biology of bush on farms was conducted between 1989 and 1993. The objective of these field days was to put native vegetation on farms into context within the whole farm plan, and to increase the information and concepts about bush on the property by undertaking activities and educational exercises in vegetation which demonstrated ecological principles or concepts. Typical workshop topics are outlined in Morley and Prescott, 1991.

Over 50 field days were held over 4 years between 1989 and 1993. The average attendance rose to 70 during the first two years and has remained at that level. Each field day was held on the properties of farmers willing to hold and promote a conservation oriented field day on their property. Traditionally rural oriented groups held joint field days with the department. In the fourth year, the South Australian Farmers Federation took the initiative to hold native vegetation oriented Field Days in their own right.

A series of workshops and field clays were run specifically for rural women. Rural women were identified as an important distinct market segment and target group. The content was similar to the regular field days, however, they took into account the differences in womens' socialisation and ways of learning in the method of delivery of the program (Hogan and Weston, 1990). Women presenters were used wherever possible. For further information on the rationale and details of this program, see Morley and Prescott 1991 and Gunnell 1991 (Prescott, 1996).

National Trust of NSW

National Trust assists local government and volunteers with training. This includes specific 5 full-clay session courses on Bush Management, *"An Introduction To The Theory And Practice Of Bush Regeneration",* run twice a year, at a cost of $150.00 per person. About 40 people attended in 1995-96. It also provides training in up to 10 workshops per year for council workers and volunteers (Brodie, pers. comm.).

The National Trust of Australia, Victoria

The National Trust of Australia (Victoria) provides training for local government, LEAP, Jobskills, and volunteers on environmental weeds and bush management through two 14 week courses per year. It trains a total of 40-60 people per year, of which up to one third will be volunteers.

Strategy for Environmental Weed Management in Community Managed Remnant Vegetation in Rural Landscapes, Victoria

This project was conducted by Kate Blood and was undertaken to strengthen links with land management and community groups to protect remnant vegetation from the spread of environmental weeds. It involved the preparation of a folder package which included information entitled:

- Helping the community to manage environmental weeds in Victoria.
- Environmental weeds strategy for remnant vegetation in rural Victoria.
- Environmental weeds management survey.
- Environmental weeds management handbook for Victoria.
- Environmental weeds resource directory for Victoria.
- Environmental weeds resources pack.

Weeding Western Australia

In the last two years a variety of education programs have been conducted in Western Australia to raise the profile of environmental weeds and to provide community education.

These have included:

- a seminar entitled 'Bushland Plants: Why Worry"' organised by the Main Roads Department, CALM and Greening Western Australia and Landcare. This seminar was aimed at the general public but attracted more of the 'converted' or already aware members of the public;
- Jan Knight from the Department of Agriculture organised a variety of features in print and radio media;

- the Department of Agriculture developed a ' Weeds Kit for Kids' consisting of weeds information and activity sheets. These were sent to schools;
- the Department of Agriculture also held an in-house weed identification competition. The materials used in the competition are available for loan to other government departments, Landcare groups, district officers and regional shows;
- the Plant Protection Society and the Department of Agriculture organised weed identification walks in the bush near the Department of Agriculture in Como;
- Whiteman Park coordinated a field day for small landholders to demonstrate weed control and identification;
- the Department of Agriculture and Commonwealth and Scientific Industrial Research Organisation (CSIRO) ran workshops in the wheatbelt areas focusing on weed identification, practical management and economic and environmental impact of weeds; and
- the Soil and Land Conservation Council of Western Australia coordinated work on a draft State Weeds Strategy.

Appropriate Technology and Community Environment (APACE), Western Australia

APACE is a loose acronym for appropriate technology and community environment. It is an independently run, non-profit, community-based organisation. It is in its 11th year and is dedicated to employment and delivery of training programs that attempt to counter environmental problems through locally initiated action. It employs 16 full-time and 8 part-time staff, 40 casual staff, 10 consultants and provides training for 52 trainees in environmental projects.

Since 1991 an arm of APACE `Greening Schools Program' has run training programs funded by Greening Australia. These courses are now in their fourth year and have been attended by over 2,500 students and 40 schools. APACE also runs Landcare and LEAP projects funded by the Federal Department of Employment Eduction and Training.

APACE Greenskills is now running six Landcare and Environmental Action Programs aimed at young people between 15 and 21 years to provide hands on and formal training in areas such as bush regeneration, landcare and environmental rehabilitation.

Introduction to Bush Regeneration, Western Australia

The Introduction to Bush Regeneration course was initially funded by ANCA and Save the Bush, and is run for adults. These courses are in their fourth year, are now self-funded, with each participant paying $200 for the course. To date 180 people have been trained from community groups, government departments and other organisations and interested individuals.

The course is a mixture of practical and theoretical subjects and comprises nine lessons, a half day each. On completion of this course participants must work for 200 hours over a two years period to become a full member of Australian Association of Bush Regeneration WA.

6.2 Formal Programs

A range of formal educational opportunities occur in TAFE Institutes in several states. These are often not specifically about environmental weeds but are instead on bush management or natural resource management, of which environmental weeds is a component. Examples of these programs follow.

TAFE, New South Wales

There is a specific bush management course in the TAFE system in NSW coordinated by Robin Buchanan. This course is for local government officers and volunteers.

TAFE, South Australia

There is a new, as yet unaccredited course, called Certificate in Natural Resources, which includes units on Bushcare, weed management and control and which is increasing its environmental weeds

focus in other units. There is a "real unrealised market" for the course according to the interest and applications to date (Lehman, pers. comm.). There is not sufficient local government support for a full Bushcare course, as few councils in high population areas, or the urban fringe, have large areas of bushland within council boundaries (Lehman, pers. comm.).

TAFE, Tasmania

Hobart Institute of TAFE has recently established a course called "An Introduction to Urban Bushland Management" which is suitable for local government and volunteers for environmental weed management. The course is 112 hours, for a cost per individual of $130. There have been 5 courses, mainly with council employees, and a waiting list for 3-4 other courses. There is a real market for this course according to the TAFE. The TAFE is examining setting up a flexible delivery for volunteers taking account of suitable times and locations (Miller, Pers. comm.).

TAFE, Victoria

TAFE in Victoria does not have a specific course in bush management. There are certificates and traineeships in Land Conservation and Restoration, for people already in trades or jobs, with units on weed control and vegetation restoration (Lee, pets. comm.).

TAFE Queensland

TAFE Queensland has two certificate courses in Conservation Skills (I & II) which are provided by TAFE and private providers. The combined numbers for both courses in 1996 are as follows: 1200 students completing a total of 160,000 hours of tuition.

Approximately 50 percent of students were enrolled in either alternative or chemical weed control courses.

TAFE, Western Australia

TAFE in Western Australia does not have a specific course in bush management. There are certificates in Horticulture which include some bush management classes.

6.2.1 Currently Used Books for Education and Training about Environmental Weed Work

Animal and Plant Control Commission (1991) Save the Bush from Weeds. Loose-leaf Information Kit. The PCC, Adelaide, SA.

Anon (1991) Bush Regenerators Handbook. National Trust Of Australia (NSW)

Bradley, J. (1988) Bringing Back The Bush. The Bradley Method of Bush Regeneration. Lansdowne-Rigby, Sydney.

Buchanan, R.A. (1989) Bush Regeneration. Recovering Australian Landscapes. TAFE Student learning Publications, New South Wales.

Friends of Sherbrooke Forest and the Department of Conservation, Forests and Lands (1989) Weeds of Forests, Roadsides and Gardens. A Field Guide for Students, Naturalists and Land Managers. Revised Edition. The Authors. Melbourne, Victoria.

Hocking, H. & Truchanas, M. 1992. `Caring for Your Local Reserves - A Workbook for Friends of Reserves'. Society for Growing Australian Plants Inc. (Tasmania), Hobart.

Kirkpatrick, J.B. (1991) Editor. Tasmanian Native Bush: A Management Handbook. Tasmanian Environment Centre, Hobart.

Regional Pest Plants Strategy Working Group (1991) Garden Plants are Going Bush and Becoming Environmental Weeds. Colour Poster and pamphlets on individual weeds species' control. Victoria.

Robertson, M. (1995) *Slop Bushlcand Weeds. The* Nature Conservation Society of SA Inc. (NCSSA), Adelaide, SA.

SGAP 1994. `Garden plants are going hush and becoming environmental weeds.' A brochure produced by Society for Growing Australian Plants Inc. (Tasmania), Hobart.

Dane Panetta	Previously of WA Department of Agriculture
Gerry Parlevliet	Department of Agriculture Department of
Robert Parr John	Agriculture Department of Agriculture
Glauert Adrien	Municipal Association
Vlok	

ACT

Catherine Potter	ACT Parks and Conservation
David Cooke	ATCV
Geoff Butler	Conservation Council of the South Eastern region of Canberra
Stella Humphries	CSIRO
John Lumb Mike	ANCA
Mulvaney Lee	Heritage Commission
Adamson Kay	Landcare
Collins Barry	Parkcare Volunteer Manager
Griffith	Parks and Conservation

SOUTH AUSTRALIA

Ann Prescott	Ann Prescott & Associates
Terry Peacock	ATCV
Dene Cordes	Friends Groups, SA.
Peter Lehman	Greening Australia, SA.
Andrew Curtis	Landcare SA Landcare, SA
Paul Moran Glen	Local Council SA Mt Lofty
Williams Paul	Catchment National Trust,
Harvey Brad Weis	SA
Susan Bellette,	Save The Bush Program, SA
Andrew Allanson	Trees for Life, SA Volunteer
Enid Robertson	Ecologist SA
Richard Carter	Animal and Plant Control Commission

TASMANIA

Laura Blake Vivien	ATCV
Freshwater Don	Friends of Sherbrooke Forest
Thompson Simon	Greening Australia, Tasmania
Boughey Jill Hickie	Landcare, Tasmania Local
	Government Tasmania National
Naomi Lawrence	Trust of Tasmania
Laurie Miller	Save The Bush Program, Tasmania
ATCV	TAFE, Tasmania
John Robin	Tasmania
Judith Rawling	Tasmanian Conservation Trust
Eddie Talbot	Urban Bushland Company West
Kerry Heatley	Coast Weed Strategy
Phil Watson	Bushcare Coordinator, Hobart City Council.
	Clarence City Council

ANNEX 1: NAMES OF PEOPLE CONTACTED

QUEENSLAND

Phil Harrison	ATCV, Brisbane
David Hudson	ATCV, North Queensland
Geoff Faulkner	Bremer Catchment Coordinator, Queensland
Stacey McLean	Brisbane City Council
Marilyn Connell	Downfall Creek Bushland Reserve, Brisbane
Brian Lund Karen	Greening Australia, Brisbane Greening
Low Kieren Hyslop	Australia, Brisbane Greening Australia,
Kate Roberts	Brisbane Landcare Evaluation Program,
Deborah Beck	Queensland Project Officer, Queensland
Richard Stone	Redland City Council, Queensland Redland
Rosalie Eustice	City Council, Queensland SWEEP, Brisbane
Murray Whitehead	

NORTHERN TERRITORY

Alistair Clarke	Greening Australia, Northern Territory
Bill Panton	Save The Bush Program, Northern Territory
Clair O'Brien	Lower River Mary Landcare Group ATCV
Kathryn Beal	Landcare Evaluation
Maria Kratz	DPIF
Mark Ashley	

WESTERN AUSTRALIA

Robert Moore	
Patrick Piggot	CALM
Greg Keighery	CALM
Penny Hussey	CALM
Marie McDonald	CALM
Mark Street Sue	City of Melville
Masterson	Coordinator Blackwood Catchment
Jonathan Dodd	Department of Agriculture
Margo O'Byrne	Department of Environmental Protection
John Elder Rod	Ecoplan
Sastrum Rob	Environs Consulting
Giblet Dorothy	Friends of Forests
Redreau Colma	Greening WA
Keeting Nick	Greening WA
Dodson Terry	Landcare Bridgetown
Jackson Garry	Local Government Landcare Coordinator
Burke	Murdoch University

VICTORIA

Danny Spiroviski	ATCV
Madeline Townsend	ATCV, Ballarat
	Melbourne Parks and Waterways Corporation
Denys Cox	Coastwatch, Victoria
Anne Van De Meene	DNRE community Grants, Victoria
Kate Blood Roger	DNRE, Victoria
Hollaway Mark Coffey	GA Victoria
Diana Domonkos Rob	GA Victoria
Youl	Greening Australia, Victoria
Glen Terry	Landcare, Victoria Local
James Ross	Council Victoria
Roger Oxenbould	National Parks Association, Victoria
Caroline Douglas	National Trust Victoria Save The Bush
Ian Lee	Program, Victoria TAFE, Victoria
Marianne Henderson	Trust for Nature, Victoria

N.S.W

Adam Richard Paul	
Ellis Wendy Kelly	ATCV
Deb Tkachenko	Foundation for National Parks, NSW
Paul Formosa Mark	Landcare, NSW
Couston Brendon	Local Government NSW
Graham Robyn	Local Government NSW
Lamond Louise	Local Government NSW
Brodie Lynn Rees	Local Government NSW
Jeff Burton ATCV	National Trust NSW NPWS,
Tein Macdonald	NSW NSW Local Council
Julianne Smart	NSW
Robin Buchanan	Phd Student In Environmental Weed Research, NSW
Andrew Storrie	Save The Bush Program, NSW TAFE, NSW
	NSW Agriculture

ANNEX 2: REFERENCES

ACT Weeds Strategy. Initiating a 10 year weed control program for the Australian Capital Territory (DRAFT) (February 1996). ACT Agriculture and Landcare Section ACT Department of Urban Services.

Animal and Plant Control Commission (1991) Save the Bush from Weeds. Loose-leaf Information Kit. The APCC, Adelaide, SA. pp 72.

Anon (1991) Bush Regenerators Handbook. National Trust of Australia (NSW).

Berry, S. and Mulvaney, M. (1995). An Environmental Weed Survey of the Australian Capital Territory. A report prepared for the Conservation Council of The South-East region and Canberra. 68pp.

Blyth, J.D., Burbidge, A.A. and Brown, A.P. (1996) Achieving Cooperation Between Government Agencies And The Community For Nature Conservation, With Examples From The Recovery Of Threatened Species And Ecological Communities. *In* Nature Conservation 4: The Role of Networks. ed. D.A. Saunders, J.L. Craig and E.M. Mattiske. Surrey Beatty and Sons. NSW.

Bradley, J. (1988) Bringing Back The Bush. The Bradley Method of Bush Regeneration. Lansdowne-Rigby, Sydney.

Buchanan, R. (1991) Bush Regeneration - Measuring Success. Plant Protection Quarterly 6(3): 105108.

Buchanan, RA. (1989) Bush Regeneration. Recovering Australian Landscapes. TAFE Student Learning Publications, New South Wales.

Burke, G. (1995). Invasive Weeds and Regenerating Ecosystems in Western Australia. Conference Proceedings. The Institute for Science and Technology Policy, Murdoch University (Pub). 106pp.

Carr, G., Yugovic, J. and Robinson, K. (1992) Environmental Weed Invasion in Victoria. Department of Conservation and Environment and Ecological Horticulture, Melbourne.

Carter, R (1995) Planning for Integrated Weed Control. Weeds of Conservation Concern. Seminar and Workshop Papers pp 36-42. Ed Cooke, D and Choate, J. DENR and APCC, South Australia.

Curtis, A., De Lacy, T., Keane, D. and Boughey, S. and the Johnstone Centre of Parks Recreation and Heritage (1994) Landcare In Tasmania: Getting the Job Done. Charles Strut University NSW.

Curtis, A., De Lacy. T, and Lloup, N. (1993) Landcare In Victoria: Are We Gaining Ground? Aust. J. Soil and Water Cons. Vol 6(2).

Dixon, B and Keighery, G. (1995). Suggested methods to control -weeds. *In* Managing Perth's Bushlands. Ed. M. Scheltema and J. Harris (1995), Greening Western Australia, Perth, WA.

Edmondson, R. (1995). Overcoming the Kochia Invasion in Invasive Weeds and Regenerating Ecosystems in Western Australia. Conference Proceedings, Ed. G. Burke, Institute for Science and Technology Policy, Murdoch University, WA, pp42-44.

Friends of Sherbrooke Forest and the Department of Conservation, Forests and Lands *(1989)* Weeds of Forests, Roadsides and Gardens. A Field Guide for Students, Naturalists and Land Managers. Revised Edition. The Authors. Melbourne, Victoria, *pp72.*

Gillespie, P. *(1991)* Woody Weeds control in the Dandenongs NP. PPQ *p130-31*

Gunnell, P. *(1991)* Promotion of Conservation Heritage to Rural Women. Report to the Save the Bush Program. South Australian Department of Environment and Planning: Adelaide, S.A.

Hnatiuk, R.J. *(1990)* Census of Australian Vascular Plants. AGPS, Canberra.

Hocking, H. & Truchanas, M. *(1992).* `Caring for Your Local Reserves - A Workbook for Friends of Reserves'. Society for Growing Australian Plants Inc. (Tasmania), Hobart.

Hogan, L & Weston T. *(1990)* Women in Agriculture: Part of the Team. Victorian Department of Agriculture and Rural Affairs, Victoria.

Kirkpatrick, J.B. *(1991)* Editor. Tasmanian Native Bush: A Management Handbook. Tasmanian Environment Centre. Hobart.

Masters, B.K. *(1996)* Why community Networks Fail: The Role Of Public Servants And The community. *In* Nature Conservation *4:* The Role of Networks. ed. D.A. Saunders, J.L. Craig and E.M. Mattiske. Surrey Beatty and Sons. NSW.

Morley, S. and Prescott, A. *(1991).* Working with Country Women to promote a conservation ethic. *Australian Ranger Bulletin 23:19-22.*

O'Burn, M. *(1994).* Weeding Western Australia, A forum for Land Managers. Forum Proceedings. Australian Association for Environmental Education. *26pp.*

O'Burn, M. and Elder, J. *(1995).* Ecoplan/ACTV Bushland Care Days. Perth Western Australia.

Prescott, A.M. *(1996)* A Review of The NSW Wildlife Refuge Program with Reference to the Victorian ` Land for Wildlife' Scheme. Ann Prescott & Associates Pty Ltd for The New South Wales National Parks and Wildlife Service, NSW.

Prescott, A.M. *(1996) Monadenia bracteata.* NOSSA Journal, June *1996.*

Prescott, A.M. *(1996)* Successful Extension Programs for Nature Conservation in South Australia's Rural Areas. *In* Nature Conservation *4:* The Role of Networks. ed. D.A. Saunders, J.L. Craig and E. M. Mattiske. Surrey Beatty and Sons. NSW.

Regional Pest Plants Strategy Working Group *(1991)* Garden Plants are Going Bush and Becoming Environmental Weeds. Colour Poster and pamphlets on individual weeds species' control. Victoria.

Robertson, E.L. *(1984)* Watiparinga Reserve Management Plan. National Trust of South Australia. Adelaide, SA.

Robertson, M. *(1995)* Stop Bushland Weeds. The Nature Conservation Society of SA Inc. (NCSSA), Adelaide, SA.

Ross, J. *(1991)* Options and Opportunities for Friends of Flora and Fauna in Victoria. Victorian National Parks Association. Victoria.

S.G.A.P. *(1994)* `Garden plants are going bush .... and becoming environmental weeds. A brochure produced by Society for Growing Australian Plants Inc. (Tasmania), Hobart.

Scheltema, M. and Harris, J. *(1995).* Managing Perth Bushlands. Greening Australia, WA. (Pub).

Stevenson, I. (1991) Role of Local Government in Environmental Weed Control. PPQ (6)3 134-36.

The Draft National Weeds Strategy: A Strategic Approach to Weeds Problems of National Importance Draft Recommendations (April 1995) Standing Committee on Agriculture and Resource management, Standing Committee on Conservation and Standing Committee on Forestry, Canberra.

Timmins, S. (1996) community Groups and Weed Control in New Zealand. *In* Nature Conservation 4: The Role of Networks. ed. D.A. Saunders, J.L. Craig and E.M. Mattiske. Surrey Beatty and Sons. NSW.

ANNEX 3: SCIENTIFIC & COMMON NAMES OF PLANTS MENTI0NED IN THE TEXT

LIST SORTED BY COMMON NAME

African Lovegrass	*Eragrostis curvula*
African Weed Orchid	*Monadenia bracteata*
Aleppo Pine	*Pinus halapensis*
Arrowhead	*Sagittaria montevidensis*
Arum Lily	*Zanldeschia aethiopica*
Ash	*Fraxinus rotundifolia*
Asparagus Fern	*Protasparagus plumosus*
Athel Pine	*Tamarix aphylla*
Balloon Vine	*Cardiospermum halicacabum*
Balsam	*Impatiens spp*
Bellyache Bush	*Jatropha gossypifolia*
Bitou Bush	*Chrysanthemoides inonilifera spp rotundata*
Blackberry	*Rubus fruclicosis L. agg*
Blue Lupins	*Species undefined*
Boneseed	*Chrysanthemoides monilifera spp monilifera*
Boxthorn	*Lycium fer ocissimum*
Briar, Rosehip Or Dog Roses	*Rosa spp*
Bridal Creeper	*Myrsiphyllum asparagoides*
Brooms Of Several Species	*Genista spp and Cytisus spp*
Buffel Grass	*Cencbrus ciliaris*
Bulrush	*Species undefined*
Burgan	*Species undefined*
Butterfly Pea	*Clitoria ternalea*
Calomba Daisy	*Penlzia suffriticosa*
Camphor Laurel	*Cinnamomum, camphor a*
Candle Bush	*Senna alata*
Cape Broom	*Genista monospessulana*
Cat's Claw Creeper	*Macfadyena unguis-cati*
Centro	*Centrosema pubescens*
Cestrum	*Cesirum elegans*
Chinese Apple	*Ziziphus mauritiana*
Chinese Elm	*Celt is sinensis*
Climbing Asparagus Fern	*Asparagus densiflorzus*
Clopo	*Calopogonium mucuraoides*
Coffee Bush	*Senna occidentails*
Coral Vine	*Antigon leptopus*
Corky Passion Vine	*Passiflora suberosa*
Cotoneaster species	*Cotoneaster spp*
Crack Willow	*Salix alba x fragilis*
Devil's Claw	*Martj'nia annua*

Easter Cassia	*Senna pendula*
Elm	*Ulmuss spp*
English Ivy (also referred to as Ivy)	*Hedera helix*
Firethorn	*Pyracantha spp*
Fish Tail Palm	*Caryota mitis*
Foxglove	*Digitalis purpurea*
Gamba Grass	*Andropogon gayanus*
Geraldton Carnation Weed	*Euphorbia terracina*
Giant Parramatta Grass	*Sporobolis indica spp major*
Gmelina	*Gmelina arborea*
Golden Dodder	*Cuscuta campestris*
Golden Shower	*Cassia fistula*
Golden Wattle	*Acacia pycnantha*
Gorse	*Ulex europaeus*
Green Panic Grass	*Panicum spp* or *Digitaria spp*
Groundsel	*Baccharis halimifolia*
Guildford Grass	*Romulea rosea*
Guinea Grass	*Panicum maximum*
Hawthorn	*Crataegus spp*
Heath	*Erica lusitanica*
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera japonica*
Horehound	*Marrubium vulgare*
Hyptis	*Hyptis sauveolens*
Indian Hawthorn	*Rhaphiolepis indica*
Ipomoea species	*Ipomoea pes-tigridis* *Ipomoea quamoclit* *Ipomoea triloba.*
Ivy (also referred to as English Ivy)	*Hedera helix*
Karamu	*Coprosma robusta*
Lantana	*Lantana samara*
Leucaena	*Leucaena leucocephala*
Macroptilium	*Macroptilium atropurpureum*
Madeira Vine	*Anredera cordifolia*
Mediterranean Daisy	*Ureospermum sp*
Mesquite	*Prosopis limensis*
Mexican Poppy	*Argemone subfusifbrmis*
Mickey Mouse Bush	*Ochna serrulata*
Mile A Minute	*Ipomoea indica*
Mimosa	*Mimosa pigra*
Mimosa Bush	*Acacia farnesiana*
Mirror Plant	*Coprosma robusta*
Mission Grass (Annual)	*Pennisetum pedicillatum*
Mission Grass (Perennial)	*Pennisetum polystachion*
Monterey Pine (referred to as Radiata Pine)	*Pinus radiata*
Morning Glory	*Ipomoea spp*
Morning Glory (Coastal)	*Ipomoea cairica*
Mother Of Millions	*Kalanchoe tubiflora*

Neem Tree	*Azadirachta indica*
Ochna	*Ochna serrulata*
Olive	*Olea europaea*
One Leafed Cape Tulip	*Homeria flaccida*
Paddy's Lucerne	*Sida rhombifolia*
Pampas Grass	*Cortaderia selloana*
Para Grass	*Brachiaria mutica*
Parkinsonia	*Parkinsonia aculecita*
Parthenium Weed	*Parthenium hysterophort.ts*
Pink Gladiolus	*Species undefined*
Poinciana	*Delonix regia*
Polygala	*Polygala myrlifolia*
Poplar	*Populus spp*
Prickly Acacia	*Acacia nilotica*
Privet	*Ligustrum spp*
Puccinella	*Species undefined*
Purple-Top Chloris	*Chloris inflata*
Radiata Pine (referred to as Monterey Pine)	*Pinus rcidiata*
Ragwort	*Senecio jacobea*
Rhodes Grass	*Chloris inflata*
Rice Grass	*Species undefined*
Rose Pelargonium	*Species undefined*
Rubber Bush	*Calitropis ricara*
Rubber Vine	*Cryptostegia grandiflora*
Saint John's Wort	*Hypericum perforatum*
Scotch Broom	*Cytisus scopariu*
Siam Weed	*Chromolaena odorata*
Sicklepod	*Senna obtusifolia*
Sida species	*Sida spp*
Singapore Daisy	*Wedelis trilobata*
Siratro	*Macroptilium atropurp*
Soursob	*Oxalis pes-caprae*
South African Daisy	*Senecio pterophorus*
Spanish Heath	*Erica lusitanica*
Sweet Pittosporum	*Pitlosporum undulatum*
Sycamore Maple	*Acer pseudoplatanus*
Sydney Golden Wattle	*Acacia longifolia*
Tagasaste (also known as Tree Lucerne)	*Chamaecytsus palmensis*
Tall Wheat Grass	*Agropyron elongatum*
Tree Lucerne (also known as Tagasaste)	*Chamaecytisus pahnensis*
Tree Mallow	*Laratera arborea*
Tree Of Heaven	*Ailanthus altissima*
Typha species	*Typha spp*
Veldt Grass	*Ehrharta calycna*
Victorian Tea-Tree	*Species undefined*
Wandering Dew	*Tradescantia albiflora*
Watsonia	*Watsonia bulbillifera*
Wild Oats	*Avena spp*
Willow	*Salix spp*

Acacia farnesiana	Mimosa Bush
Acacia nilotica	Prickly Acacia
Acacia pycnantha	Golden Wattle
Acacia longifolia	Sydney Golden Wattle
Acer pseudoplatanus	Sycamore Maple
Agropyron elongatum	Tall Wheat Grass
Ailanthus altissima	Tree Of Heaven
Andropogon gayanus	Gamba Grass
Anredera cordifolia	Madeira Vine
Antigon leptopus	Coral Vine
Argemnone subfusiformis	Mexican Poppy
Asparagus densiflorus	Climbing Asparagus Fern
Avena spp	Wild Oats
Azadirachta indica	Neem Tree
Baccharis halimifolia	Groundsel
Brachiaria mutica	Para Grass
Calitropis ricara	Rubber Bush
Calopogonium mucunoides	*Clopo*
Cardiospermum halicacabum	Balloon Vine
Caryota mitis	Fish Tail Palm
Cassia fistula	Golden Shower
Celtis sinensis	Chinese Elm
Cenchrus ciliaris	Buffel Grass
Centrosema pubescens	Centro
Cestrumn elegans	Cestrum
Chamaecytisus palmensis	Tagasaste (also known as Tree Lucerne)
Chamaecytisus palmensis	Tree Lucerne (also known as Tagasaste)
Chloris inflata	Purple-Top Chloris
Chloris inflata	Rhodes Grass
Chromolaena odorata	Siam Weed
Chrysanthemoides monilifera spp monilifera	Boneseed
Chrysanthemoides monilifera spp rotundata	Bitou Bush
Cinnamomum camphora	Camphor Laurel
Clitoria ternatea	Butterfly Pea
Coprosma robusta	Karamu
Coprosma robusta	Mirror Plant
Cortaderia selloana	Pampas Grass
Cotoneaster spp	*Cotoneaster* species
Crataegus spp	Hawthorn
Cryptostegia grandiflora	Rubber Vine
Cuscuta campestris	Golden Dodder
Cytisus scoparius	Scotch Broom
Delonix regia	Poinciana
Digitalis purpurea	Foxglove
Ehrharta calycina	Veldt Grass
Eragrostis curvula	African Lovegrass

Erica lusilanica	Heath
Erica lusitanica	Spanish Heath
Euphorbia terracina	Geraldton Carnation Weed
Fraxinus rotundifolia	Ash
Genista monospessulana	Cape Broom
Genista spp and *Cytisus spp*	Brooms Of Several Species
Gmelina arborea	Gmelina
Hedera helix	English Ivy (also referred to as Ivy)
Hedera helix	Ivy (also referred to as English Ivy)
Homeric flaccida	One Leafed Cape Tulip
Hypericum peforatum	Saint John's Wort
Hyptis sauveolens	Hyptis
Llex aqufolium.	Holly
Impatiens spp	Balsam
Ipomoea cairica	Morning Glory (Coastal)
Ipomoea indica	Mile A Minute
ipomoea pes-ligridis	
Ipomoea quamocili	
Ipomoea triloba	*Ipomoea* species
Ipomoea spp	Morning Glory
Jatrophu gossypifolia	Bellyache Bush
Kalanchoe tubiflora	Mother Of Millions
Lantan camara	Lantana
Lavalera aarberoa	Tree Mallow
Leucaena leucocephala	Leucaena
Ligustrum spp	Privet
Lonicera, japonica	Honeysuckle
Lycium frocissimum	Boxthorn
Macfadyena unguis-cati	Cat's Claw Creeper
Macroptilium atropturp	Siratro
Macroptilium atropurpureum	Macroptilium
Marrubium vulgare	Horehound
Mariynia annua	Devil's Claw
Mimosa pigra	Mimosa
Monadenia bracteata	African Weed Orchid
Myrsiphyllum asparagoides	Bridal Creeper
Ocbna serrulata	Mickey Mouse Bush
Ocbna serrulata	Ochna
Olea europaea	Olive
Oxalis pes-caprae	Soursob
Panicum maximum	Guinea Grass
Panicum spp or Digitaria spp	Green Panic Grass
Parkinsonia aculecitca	Parkinsonia
Parthenium hysterophorus	Parthenium Weed
Passiflora suberosa	Corky Passion Vine
Pennisetum pedicillatum	Mission Grass (Annual)
Pennisetum polystachion	Mission Grass (Perennial)
Penizia suffriticosa	Calomba Daisy

Pinus halapensis	Aleppo Pine
Pinus radiata	Monterey Pine
Pinus radiata	Radiata Pine
Pittosporum undulatum	Sweet Pittosporum
Polygala myrtifblia	Polygala
Populus spp	Poplar
Prosopis limensis	Mesquite
Protasparagus plumosus	Asparagus Fern
Pyracantha spp	Firethorn
Rhaphiolepis indica	Indian Hawthorn
Romulea rosea	Guildford Grass
Rosa spp	Briar, Rosehip Or Dog Roses
Rubus fructicosis L. agg	Blackberry
Sagittaria montevidensis	Arrowhead
Salix alba x fragilis	Crack Willow
Salix spp	*Willow*
Senecio jacobea	Ragwort
Senecio pterophorus	South African Daisy
Senna alata	Candle Bush
Senna obtusifolia	Sicklepod
Senna occidentalis	Coffee Bush
Senna pendula	Easter Cassia
Sida rhombifolia	Paddy's Lucerne
Sida spp	*Sida* species
Species undefined	Blue Lupins
Species undefined	Bulrush
Species undefined	Burgan
Species undefined	Pink Gladiolus
Species undefined	Puccinella
Species undefined	Rice Grass
Species undefined	Rose Pelargonium
Species undefined	Victorian Tea-Tree
Sporobolts indica spp major	Giant Parramatta Grass
Tamarix aphylla	Athel Pine
Tradescantia albiflora	Wandering Dew
Typha spp	Typha species
Ulex europaeus	Gorse
Ulmuss spp	Elm
Ureospermum sp	Mediterranean Daisy
Watsonia bulbillifera	Watsonia
Wedelis trilobata	Singapore Daisy
Zantdeschia aethiopica	Arum Lily
Ziziphus mauritiana	Chinee Apple