

and educational organizations, community groups and many others.

Start-up funds have been contributed by key local organizations which has enabled a full-time Project Coordinator to be employed. The key roles for the Coordinator in the short term include development of a professional Business Plan, communication with the myriad of potential stakeholder groups and organizations, attracting funding for initial on-ground works, and seeking major ongoing sponsorship that will enable the project to reach its grand targets over the next 5–10 years.

This is a project that will develop and foster partnerships across many sectors of the community and will bring significant benefits for all of the partners. The scale of this work will ensure a very high public profile for the project itself and the organizations that are involved.

What's next

An ongoing level of on-ground work continues every year in this area and is slowly bringing the landscape vision to reality. But our aim is to accelerate this process 10 fold. The Business Plan will incorporate and link all elements of the project including the land use options and revegetation technology to be used, the project administration arrangements, cost sharing arrangements and mechanisms, investment and marketing strategies and economic justifications of the project.

The communication with and participation of all of the stakeholders will also be a focus for the coming year and beyond. Major corporate, government and philanthropic sponsorship will be sought and secured, particularly focusing on the marketing advantages of this project being so close to Melbourne, Victoria's capital city and home to 3.5 million people, with major road, rail and air links from Melbourne to regional Victoria, interstate and overseas.

Then the real fun begins as, with continued hard work, the new landscape takes shape and the multiple benefits of this integrated approach are realized.

Stipoid grasses as Weeds of National Significance

D.A. McLaren^{A,D}, R. Coventry^B and J. Thorp^C

^ADepartment of Natural Resources and Environment, Keith Turnbull Research Institute, PO Box 48, Frankston, Victoria 3199, Australia.

^BNSW Agriculture, Locked Bag 11, Windsor, New South Wales 2756, Australia.

^CNational Weeds Strategy, 16 Flowers Court, Launceston, Tasmania 7250, Australia.

^DCRC for Australian Weed Management.

Summary

The Commonwealth Government under the National Weeds Strategy, has recently implemented its Weeds of National Significance program. *Nassella trichotoma* (serrated tussock) and *N. neesiana* (Chilean needlegrass) were assessed as being two of the twenty Weeds of National Significance for Australia. In total 25 projects with total funding at just under \$2.8 million have been funded for these two species under the strategy and these are scheduled to begin during 2002–2003. The development of national strategic plans for these weeds will see a coordinated national approach to control that aims at reducing their spread and their impacts on natural and agricultural ecosystems.

The Weeds of National Significance process

The National Weeds Strategy (Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers 1997) was devised with the aim of reducing the impact of weeds on the sustainability of Australia's productive capacity and natural ecosystems. Goal 2 of the Strategy is 'To reduce the impact of existing weed problems of national significance'. Objective 2.1 of Goal 2 is to 'Facilitate the identification and assessment of weed problems of national significance' (Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers 1997). The process to determine which weeds are nationally significant began when the Commonwealth asked the States and Territories to nominate what they considered to be their worst weeds. In total, 71 weeds were nominated for assessment. Evaluation of these weeds was undertaken via assessment panels of technical experts covering the tropical, subtropical and temperate regions of Australia. Each State or Territory had representation for the regions they represented (e.g. Temperate weeds had Western Australian, South Australian, New South Wales, Victorian and Tasmanian representation). Each weed was assessed on six questions on 'invasiveness', seven

questions on 'impacts' and social impacts were documented with answers on a scale of one to six and a 'don't know' category. The current and potential distributions of each weed was assessed and this information was used to help rank the different species. Through the determination of the Weeds of National Significance, *N. neesiana* was ranked 12 and *N. trichotoma* ranked 15 out of the 71 nominated species (Thorp and Lynch 2000) (Table 1). In particular, both *N. trichotoma* and *N. neesiana* were assessed as being highly invasive, high impact weeds with great potential to spread and cause a number of socioeconomic and environmental problems (Thorp and Lynch 2000). *N. trichotoma* has been described as the worst weed in NSW and potentially the most serious weed of non-arable grazing land in Victoria (Parsons and Cuthbertson 1993). Chilean needlegrass has been described as being potentially the worst environmental weed of native grasslands in south eastern Australia (McLaren *et al* 1998).

Once the 20 Weeds of National Significance were unanimously endorsed by the three Ministerial Councils on 1 June 1999 (Thorp and Lynch 2000), each State and Territory set about producing National Strategies for the Weeds of National Significance they were nominated for as lead agency. Victorian Department of Natural Resources and Environment (DNRE) was nominated lead agency for Chilean needlegrass and New South Wales Agriculture as lead agency for serrated tussock.

The strategic plans provide a blueprint for directing where investments should be made to control and monitor these weeds. The plans combined the relevant knowledge known about the weeds impacts (agricultural, environmental and social), distribution, dispersal, life cycle, regulatory controls, current management options and identified gaps in research requiring development of new or better management options.

Strategic plans for Weeds of National Significance

National Strategic Plans (national strategies) were produced by convening national facilitated workshops with key stakeholders from community groups,

Federal and State Government Departments, Local Government, private land managers and industry. The Strategic Plans focus on:

1. Identifying the extent of the problem.
2. Developing best management options.
3. Putting in place prevention, containment and rehabilitation procedures.
4. Development of appropriate extension packages.
5. Ensuring that land managers adopt and embrace the plans.

Strategies went through extensive review and public consultation before publication. In Victoria, draft copies of the Chilean needlegrass strategic plan were sent out to all participants in the Chilean needlegrass workshop, Catchment Management Authorities, the Victorian Farmers Federation, environmental officers of major public utilities, industry and was posted on the National Weed Strategy WEB site for public comment. Copies were also sent to NSW Agriculture for distribution to Shires or to other groups with an interest in Chilean needlegrass. At final draft stage the strategies were reviewed by a panel of weed professionals identified by the program manager of the National Weeds Strategy. Once accepted, they were made available on the National Weeds Strategy Web Site and published copies were distributed to key stakeholders (Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers 2001a). Funding for Weeds of National Significance became available during 2001/2002 and groups responsible for facilitating the objectives of the strategic plans were invited to submit project submissions. For the agricultural weeds, provisional budgets of \$2.3 million across ten Weeds of National Significance for 2001/2002 and \$10.1 million for 2002/2003 were allocated from the Department of Agriculture Fisheries and Forestry – Australia (AFFA). The ten environmental Weeds of National Significance were assessed by Environment Australia that provided a budget of \$4.5 million. The State or Territory nominated as the lead agency for each weed coordinated project submissions. Individual submissions were ranked by a steering committee before being sent to AFFA for further assessment. For *N. neesiana*, the steering committee consisted of staff from six Victorian Catchment Management Authorities. For *N. trichotoma*, the panel consisted of representatives from the NSW and Victorian Serrated Tussock Working Parties. Projects were also assessed by a Federal Government assessment panel consisting of three members representing AFFA, the CRC for Australian Weed Management and the National Farmers Federation. After the assessments, meetings were held between

Table 1. Weeds of National Significance ranked in order of invasiveness and impact.

Rank	Common name	Scientific name
1	Parkinsonia	<i>Parkinsonia aculeata</i>
2	Mesquite	<i>Prosopis</i> spp.
3	Blackberry	<i>Rubus fruticosus</i> agg.
4	Lantana	<i>Lantana camara</i>
5	Rubber vine	<i>Cryptostegia grandiflora</i>
6	Bitou bush/boneseed	<i>Chrsanthemoides monilifera</i>
7	Prickly acacia	<i>Acacia nilotica</i> spp. <i>indica</i>
8	Hymenachne	<i>Hymenachne amplexicaulis</i>
9	Salvinia	<i>Salvinia molesta</i>
10	Mimosa	<i>Mimosa pigra</i>
11	Cabomba	<i>Cabomba caroliniana</i>
12	Chilean needlegrass	<i>Nassella neesiana</i>
13	Athel pine	<i>Tamarix aphylla</i>
14	Willows except weeping willows, pussy willow and sterile pussy willow	<i>Salix</i> spp. except <i>S. babylonica</i> , <i>S. × calodendron</i> and <i>S. × rehardtiji</i>
15	Serrated tussock	<i>Nassella trichotoma</i>
16	Parthenium weed	<i>Parthenium hysterophorus</i>
17	Pond apple	<i>Annona glabra</i>
18	Gorse	<i>Ulex europaeus</i>
19	Bridal creeper	<i>Asparagus asparagoides</i>
20	Alligator weed	<i>Alternanthera philoxeroides</i>

the lead agencies and AFFA to clarify project issues. In some cases, projects were modified or letters of justification provided by the project proponents.

Thirteen project proposals were produced for *N. trichotoma*, reflecting the needs of land managers trying to come to grips with the problem, and their common themes closely follow the goals of the National Strategy.

Those themes are:

- Need for accurate, region-specific, up-to-date **best practice guidelines** for land management which consider weed control in broader terms and advise on weed prevention and landscape resilience, not just herbicide treatment, and includes demonstration sites.
- Landholder **incentive schemes** – based on acknowledgment that the cost of weed management may not be readily affordable without assistance in various forms, and these should enable the building community partnerships and developing of property management plans in the process. Incentives include partial funding for chemical costs, collaborative employment of weed control crews for inaccessible country, rate rebates etc.
- Identifying knowledge gaps and seeking **research funds** to fill them, e.g. biological control, investigating improved herbicide options for control and following this through to label registrations with chemical company support.
- Implementation officers to follow through on strategies and management plans, forging community links and setting up frameworks for efforts to continue beyond current funding rounds.

The National Weed Program funds requested totalled just under \$1.5m for *N.*

trichotoma and just under \$1.3m for *N. neesiana*.

The divergence in in-kind contributions reflects the differences in legislation between Victoria and NSW. In Victoria, the State Government is responsible for weed management whereas in NSW the local councils have been delegated the authority to enforce the Noxious Weed Act.

Project proposals

A brief outline of the successful projects are outlined in Tables 2 and 3. The project title and a brief summary of the proposed outputs from the projects are presented.

Discussion

It has been estimated in 1987 that weeds cost Australia in excess of \$2 096 million every year (Combella 1987). The cost would be more like \$3 300 million on present day figures without considering losses to biodiversity (Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers, 1997). In contrast, estimates of the cost of salinity to Australia are in the range \$250–330 million per annum, one tenth that of weeds. Forty seven per cent of farmers consider weeds to be their greatest problem as compared to 21% for salinity (Australian Bureau of Statistics 2001). Salinity was a priority environmental issue at the Australian Federal Government 2002 election with budget allocations in the order of \$700 million to salinity and water quality (Senator Hill Media release 2001). The Weeds of National Significance program has been operating for five years and has an operating budget of approximately \$20 million.

Table 2. Successful National Projects for Chilean needlegrass.

Project title/organization	Project components/outputs – Chilean needlegrass
National Chilean needlegrass project officer DNRE, Keith Turnbull Research Institute	<ul style="list-style-type: none"> • Develop a Chilean needlegrass Taskforce and be the executive officer for this Taskforce. • Co-ordinate actions by local and state Governments, Landcare groups, industry, universities and other groups working on Chilean needlegrass throughout Australia. • Monitor progress of national projects and co-ordinate reporting. • Produce final report on achievements of program. • Increased acceptance and wider ownership of problems, especially on public lands. • Have Chilean needlegrass declared a noxious weed throughout its Australian distribution.
Victorian community coordination to minimize impacts of Chilean needlegrass DNRE, Catchment and Sustainable Agriculture	<p>Component 1. Mapping, Recording and Evaluation</p> <ul style="list-style-type: none"> • Maps highlighting the current distribution in Victoria. • Modelling of likely corridors of spread. • Monitoring potential infestation sites and recording all new infestations found. • Community engagement in management. <p>Component 2. Communication Strategy</p> <ul style="list-style-type: none"> • Produce framework document. • Develop regional communication Strategy. • Implementation of Strategy. • Develop and implement monitoring and reporting methodology. • Evaluate effectiveness of communication strategies. <p>Component 3. Codes of Practice to Prevent Spread</p> <ul style="list-style-type: none"> • Codes of practice available to all agencies for implementation. • All infestations on roadsides sign-posted for clear identification. • Training package developed and delivered to appropriate stakeholders. • Step-by-step Landcare Note on machinery hygiene for the people using the machinery. • Weed prevention techniques incorporated into municipality/agency contracts. <p>Component 4. Education, Extension and Awareness</p> <ul style="list-style-type: none"> • Training program outline for community groups. • Increased awareness of the threats and control mechanisms. • Improved identification skills by community stakeholders. • Community monitoring of infestations. • Roadside signs to promote further awareness (this is in 3 above) <p>Component 5. Demonstrations of Best Management Practice.</p> <ul style="list-style-type: none"> • Develop comprehensive treatment advice for land managers. • Provide competitive vegetation options for areas treated. • Demonstration sites on roadsides. • Ensure roadside management protocols are adopted into new and revised municipal and VicRoads Roadside management plans.
Landscape support – weeds on roadsides Rural City of Wangaratta	<ul style="list-style-type: none"> • Finalize roadside map showing severe infestations requiring treatment. • Assist community groups in management on roadsides to help preserve vulnerable roadside vegetation. • Provide coordinated approach to weed management by involving Rural City of Wangaratta, Indigo Shire Council, DNRE and community groups. • Revegetation of control sites.
Landscape support – weeds on roadsides Indigo Shire Council	<ul style="list-style-type: none"> • Combined effort of Council, landholders, DNRE, CFA and VFF to control Chilean needlegrass within the shire. • Revegetation works to enhance success of weed removal.
Chilean needlegrass (<i>Nassella neesiana</i>): Raising awareness, determining extent and targeting control South Australia Animal and Plant Control Board	<ul style="list-style-type: none"> • Raise awareness of the problem (including identification, impacts and control). • Determine the current limits of infestations, and identify areas at risk. • Identify appropriate control options, and prioritize, implement and evaluate control efforts. • Publicize information on the current distribution, potential distribution, and control trials.
Chilean needlegrass management in the ACT Environment ACT NSW National Parks and Wildlife Service	<ul style="list-style-type: none"> • Form a working group with key stakeholder groups, including ACT and NSW Government Land Management agencies, Community groups and Landcare groups. The working group will oversee the surveys, design trials, coordinate workshops and facilitate implementation of control by agencies and landholders. • Hold a series of CNG identification workshops in key locations in the region for landholders and site managers (inc. agency staff). • Survey and report on CNG distribution and abundance in ACT region and coordinate community surveys (consultant, agency staff and volunteers). • Develop management guidelines and implementation plans for CNG control in various land management areas, through targeting priority areas (consultant and agency staff). • Undertake and report on field trials for herbicide evaluation and timing of application for the control of CNG in sites replicated within the region (consultant, agency staff and volunteers).
Chilean needlegrass regional best practice management CSIRO, DNRE and NSW Agriculture	<ul style="list-style-type: none"> • Enhance links between community groups, professional land managers and researchers to better manage Chilean needlegrass through the development and implementation of best-bet management strategies within each region. • Work towards long-term decline in the density of Chilean needlegrass infestations and a consequent increase in production and conservation values in and adjacent to the southern pastures of Australia. • Facilitate development of a better understanding by the rural community of the costs and benefits of various control options available for Chilean needlegrass in different regions, and how to monitor the effectiveness of their control efforts. • Assist rural communities to become empowered to manage their Chilean needlegrass infestations using best-bet management practices for their regions.

Implementation of biological control of Chilean needlegrass CRC for Australian Weed Management, CSIRO and DNRE Keith Turnbull Research Institute	<ul style="list-style-type: none"> • Fast track identification of pathogens in Argentina. • Develop rearing techniques and conduct preliminary host specificity testing in Argentina. • Import biological control agents into Australia for detailed host specificity testing. • Mass rear and release agents if approval for release has been granted.
Grazing management for long-term utilization and control of Chilean needlegrass New England University Ph.D. project	<ul style="list-style-type: none"> • Fill a critical knowledge gap in Chilean needlegrass utilization and control, as identified in the National Strategy. • Establish a key display site to demonstrate to the grazing community and government agencies the benefits of grazing management for long-term utilization and control in Australian pastures. • Hold regular field days to raise general public awareness. • The community, landholders, local and State government agencies and the regional university will work in partnership to find long-term solutions to that will extend beyond the funding period of the project.
Testing and improving the effectiveness of best practice control of Chilean needlegrass in a range of practical land management contexts using combinations of competitive replacement, fire and slashing Victoria University of Technology	<ul style="list-style-type: none"> • Enhance links between land managers and weed control contractors and scientific researchers and advisers, to promote and further develop best practice management approaches. • Develop effective methods for competitive replacement with native grasses and exotic grasses across a range of practical land management contexts. • Improved methods for control and management of Chilean needlegrass which employ burning and slashing on roadsides, conservation reserves and a range of associated land management contexts. • Improve understanding of the biology and life cycle of Chilean needlegrass, its competitive relationship with native and exotic grasses and crops, how these contribute to the potential for invasion of Chilean needlegrass and what interventions in the life cycle are most effective and why. • Establish a series of demonstration sites used for transferring best practice to a wide range of landowners, managers and weed control contractors.
Reducing Chilean needlegrass spread through improved slasher hygiene RMIT University, DNRE Keith Turnbull Research Institute, Hume Shire Council Ph.D. project	<ul style="list-style-type: none"> • Modify existing slashing equipment to reduce spread of CNG. • Test slashers for effectiveness and if successful, ensure shires/utilities implement these modifications as a hygiene protocol. • Greatly reduce the spread along roadsides. • Slash at a time of year that will prevent seeding. • Ensure slasher users (i.e. Shires, Government Departments, Utilities etc.) adopt new slasher technologies to reduce weed spread.
Helping the community control Chilean needlegrass by investigating new herbicide options DNRE	<ul style="list-style-type: none"> • Develop new herbicide options. • Ensure chemical companies include new herbicide recommendations on labels. • Assist community groups to utilize herbicide recommendations.

Table 3. Successful projects for serrated tussock.

Project title/organization	Project components/outputs – serrated tussock
Serrated tussock regional best practice management CSIRO, NSW Agriculture and DNRE	<ul style="list-style-type: none"> • Set up demonstration sites over the range of tussock infestations in NSW and Victoria to test management options; results to form best practice guidelines. • Develop an interactive computer model and make available to farmers through councils/agencies (to predict management scenarios). • Facilitate development of enhanced links with community groups, professional land managers and researchers to better manage serrated tussock through the development and implementation of best-bet management strategies within each region. • Ensure a long-term decline in the density of serrated tussock infestations and a consequent increase in production and conservation values in and adjacent to the southern pastures of Australia. • Develop a better understanding by the rural community of the costs and benefits of various control options in different regions, and how to monitor the effectiveness of their control efforts. • Empower rural communities to manage their serrated tussock infestations using best-bet management practices for their regions.
New England best management practice testing and demonstrations for serrated tussock University of New England, New England Weeds Auth. Ph.D. project	<ul style="list-style-type: none"> • Set up a series of regional demonstration sites which will exhibit various management strategies and techniques, whilst refining and defining regional best practice. • Involve community and local and state Government in partnerships seeking long term best management options. • Reduce spread of serrated tussock in the New England region.
New England regional community education and control project Southern New England Landcare Coordinating Committee	<ul style="list-style-type: none"> • Increase acceptance of serrated tussock as a community problem. • Help the community to be better able to recognize the weed and take appropriate steps to control it. • Incorporate the best land practices into social, agricultural and environmental systems.
Upper Murrumbidgee Catchments serrated tussock management project Upper Murrumbidgee Landcare Committee	<ul style="list-style-type: none"> • Assist landowners to develop five year visions for property management integrating tussock control. • Control 2000 ha of tussock 'mother lode' areas. Install 50 km of fencing according to land capability class to regulate grazing pressure whilst pastures recover. • Require landholders to actively seek information to receive rebates. • Plan ongoing work.
Snowy River Shire Council serrated tussock control through incentives Snowy River Shire Council	Control serrated tussock and its spread through incentive scheme: 40% for contract work, 20% on chemical purchase, revegetation incentives, five year management plans, education awareness <ul style="list-style-type: none"> • Develop strategic planning maps showing all known serrated tussock infestations. • Increase awareness amongst farmers of the serrated tussock problem and how it can be tackled. • Eliminate long term threatening process for native grasslands. • Develop long term weed control management plans.

- Maclaughlin River native vegetation protection project**
Maclaughlin River Landcare
- Protection of native grasslands on the Monaro from invasion by serrated tussock through community action.
 - Build on previous work by the Maclaughlin River Landcare Group.
 - Spot spray tussocks.
 - Encourage regeneration of native grasses.
 - Monitor regeneration and reduction in spread of tussock.
 - Keep community active and informed.
- Status: Funded through NHT 'One-Stop Shop'
- Project officer for the implementation of Victorian serrated tussock Strategy**
Victorian Serrated Tussock Working Party
- Identify the scale of the problem.
 - Determine best management practices.
 - Improve control techniques.
 - Promote best management practices and ensure they are applied in the field.
 - Promote best land use for serrated tussock control.
 - Work with the community so they embrace their own serrated tussock management plans and these are implemented cooperatively.
 - Advertise serrated tussock issues to maximize community concern and support.
 - Foster support for program by empowering dedicated serrated tussock groups with decision making on program direction.
- Implementation of serrated tussock Strategy for Victoria**
Victorian Serrated Tussock Working Party
- Increase acceptance of the wider ownership of serrated tussock problems.
 - Increase acceptance of local government and community groups role in the coordination of on-ground activities.
 - Ensure legislation facilitates appropriate management.
 - Establish effective monitoring and evaluation mechanisms.
 - Introduce more appropriate incentives/assistance for land managers to comply with weed management responsibilities.
 - Increase the knowledge and technologies currently available for control.
- Prevention of further spread of serrated tussock**
Victorian Serrated Tussock Working Party
- Increase the capacity of industry to manage the WONS and other weed species now and into the future.
 - Further increase community awareness of WONS species.
 - Increase the number of local people capable of identifying new infestations of WONS.
 - Improve weed seed spread protocols within industry.
 - Decrease the amount of future funds required to control infestations that were initiated through poor weed-hygiene practices (e.g. dirty vehicles and machinery).
 - Target and provide benefits to industry; service utilities, tourists, producers, State and local governments and the broader community.
- Management through the implementation of the Tasmanian Serrated Tussock Strategy**
Tasmanian Department of Primary Industry, Water and Environment
- Implement a community awareness program.
 - Increase the number of affected landowners able to identify serrated tussock.
 - Implement adequate control measures and take ownership and responsibility for the problem.
 - Increase awareness of the threat in the wider community.
 - Review and evaluate Serrated Tussock Strategy.
 - Implement a management strategy that will result in sustainable management.
 - Develop community to engender community spirit and ownership and increase the number of community groups over time enabling development of regional strategies.
 - Ensure all priority infestations have a management plan.
 - Provide a basis for recommendations to the South East Weed Strategy Steering Committee on the design and strategic direction of future serrated tussock management strategies.
 - Record the Management Strategy's achievements.
 - Provide a model for similar weed management programs within Tasmania.
 - Contain and eradicate priority infestations in Tasmania by supporting new and existing groups in their control efforts, assisting in the development of property management plans, conducting on ground works using an incentive arrangement with landholders or community groups to eradicate high priority infestations, rehabilitating previously infested areas, containing spread by preventing seed set.
 - Develop existing and new community structures for enhanced management by producing an updated database of every infestation in Tasmania, including land owner and management plan in place, and informing community groups informed of database and priorities for on ground action.
 - Improve hygiene mechanisms and prevention of further spread by improving weed seed spread protocols within industry.
- Controlling serrated tussock at a catchment scale through landscape change (farm forestry and native revegetation)**
Port Phillip and Westernport Catchment and Land Protection Board
- Conduct farm walks/field days in target areas and focused events promoting and refining best practice management for degraded land systems
 - Produce a project outline brochure to extend information on the landscape scale program and win widespread community, investor, industry and agency support
 - Develop a local area action plan, an integrated plan that develops the framework for a successful landscape change program with maximum impact.
 - Develop a landholder willingness survey seeking assistance to improve management on steep land systems.
 - Enhance on ground skill development by undertaking large-scale landscape rehabilitation on degraded land systems to demonstrate land use capability, improvement and change and integrates with all land management issues and provides improved skill and confidence in tackling larger projects.
 - Improve community involvement by involving the Landcare community and Landcare groups to help plan and implement projects and to encourage ownership and long term management of the sites.
- Implementation of biological control of serrated tussock**
CRC for Australian Weed Management, CSIRO and DNRE Keith Turnbull Research Institute
- Fast track identification of pathogens in Argentina.
 - Develop rearing techniques and conduct preliminary host specificity testing in Argentina.
 - Import biological control agents into Australia for detailed host specificity testing.
 - Mass rear and release agents approved for release.
- Community control by investigating new herbicide options for serrated tussock**
Victorian Serrated Tussock Working Party
- Produce data to enable new label recommendations for serrated tussock control to fill current gaps (e.g. reduced rates, seedling management in pastures etc.)
-

Both *N. trichotoma* and *N. neesiana* are highly invasive species that can dominate pasture and native grasslands. It has been estimated that if left uncontrolled, *N. trichotoma* could increase its current distribution of approximately 1 million ha to occupy more than 32 million ha while *N. neesiana* has the potential to invade 41 million ha of Australia (McLaren *et al.* 1998). In 1988, *N. trichotoma* was estimated to be cost the Australian Wool Industry approximately \$12.9 million annually (Sloane *et al.* 1988). A conservative figure for the cost of *N. trichotoma* in Victoria is \$5 million per year (Nicholson *et al.* 1997) and for New South Wales \$40 million per year (Jones and Vere 1998).

The Weeds of National Significance program aims at restricting the invasion through a strategic process of developing new control techniques and integrating them into management programs while at the same time promoting and increasing awareness of current best management practices. The national approach will see increased cooperation and collaboration between organizations and recognizes that actions initiated to address these problems must be integrated and coordinated across a wide variety of land managers responsible for both agricultural and natural ecosystems. In total, 25 projects representing just under \$2.8 million dollars are being funded by the Weeds of National Significance program for control of stipoid grasses in Australia. Of the \$1.27 million Weeds of National Significance funding made available for *N. neesiana*, \$0.66 million will be for research into improved control technologies and \$0.61 million for on ground work, extension, awareness and mapping. Of the \$1.47 million available for *N. trichotoma*, \$0.43 million will be for research into improved control technologies and \$1.04 million for on ground work, extension, awareness and mapping.

The strategic plans for *N. trichotoma* and *N. neesiana* reflect the different levels of understanding of these weeds. *N. trichotoma* has been a recognized problem for the last half century and considerable research and extension work has been undertaken. By contrast, the impacts of *N. neesiana* have only begun to be appreciated in the past few years. As a consequence, the strategic plan for *N. trichotoma* concentrates on implementing best management practices and enabling communities and land managers to develop and implement *N. trichotoma* management plans while the strategic plan for Chilean needlegrass focuses on more basic research and on development of whole management options.

The funding process provides a 'snapshot' of collective expenditure on the weed in question, but only really shows part of the investment. For example, the regional *N. trichotoma* projects for NSW generally exclude day-to-day input from

Table 4. In-kind commitments to Weeds of National Significance projects.

In-kind Commitments	Serrated tussock 13 projects	Chilean needlegrass 12 projects
State Government input	842 000	913 000
Community and Local Govt	1 040 000	440 000
CSIRO, Universities and others	323 000	96 000
Total In kind contribution	2 205 000	1 449 000

local and state governments, such as the local agronomist, the council weeds officer, research programs underway and the contribution made by wider programs such as Prograze, which help develop better farm management and therefore assist generally in weed management. Only funds offered as new investment direct in-kind to each project can be shown, which omits all other work already undertaken or committed. Therefore in the WONS submission, NSW Agriculture input to projects was cited as \$180 000, whereas NSW Agriculture will conservatively spend over \$750 000 on *N. trichotoma* management in the current year.

However, it is useful to note commitments within the 13 Serrated tussock and 12 Chilean needlegrass projects (Table 4).

The National Weed Program funds requested totalled just under \$1.5m for *N. trichotoma* and just under \$1.3m for *N. neesiana*.

The Weeds of National Significance program will see a coordinated national approach which involves all levels of government in developing and implementing weed 'best bet' management options in partnership with industry, landholders and the community. The development of national strategic plans provides a blueprint that will ensure management is undertaken in a strategic and well-coordinated fashion. The CRC for Australian Weed Management will play a key role coordinating implementation of these projects. The initial funding of \$20 million for Weeds of National Significance during 2002–2003 kicks starts the program but given that weeds cost the community more than six times that of salinity, it would be expected that this program will continue for several more years to ensure the reduction in the detrimental impacts of weeds on the sustainability of Australia's productive capacity and natural ecosystems.

Acknowledgments

To Ian Faithfull for reviewing the manuscript and to Tom Morley and Sarah Keel for their help in coordination and administration of the Weeds of National Significance projects for Victoria.

References

Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and

Forestry Ministers (2001a). Weeds of National Significance Chilean needlegrass (*Nassella neesiana*) Strategic Plan. National Weeds Strategy Executive Committee, Launceston.

Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers (2001b). Weeds of National Significance Serrated Tussock (*Nassella trichotoma*) Strategic Plan. National Weeds Strategy Executive Committee, Launceston.

Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers (1997). The National Weeds Strategy: a strategic approach to weed problems of national significance. Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2001). Australia's environment: issues and trends Document 46130 at www.abs.gov.au/.

Combella, H. (1987). Weeds in cropping—their cost to the Australian economy. *Plant Protection Quarterly* 2, 2.

Jones, R.E. and Vere, D.T. (1998). The economics of serrated tussock in New South Wales. *Plant Protection Quarterly* 13, 70–76.

McLaren, D.A., Stajsic, V. and Gardener, M.R. (1998). The distribution and impact of South\North American stipoid grasses (Poaceae: Stipeae) in Australia. *Plant Protection Quarterly* 13, 62–70.

Nicholson, C., Patterson, A. and Miller, L. (1997). The cost of serrated tussock control in central western Victoria. Unpublished report prepared for the Victorian serrated tussock working group.

Parsons, W.T. and Cuthbertson, E.G. (1992). 'Noxious weeds of Australia'. (Inkata Press, Melbourne).

Senator Hill – Media release (2001). Coalition boosts environment budget by \$95.6 million www.ea.gov.au/minister/env/2001/mr22may01.html

Sloane Cook and King Pty. Ltd. (1988). The economic impact of pasture weeds, pests, and diseases on the Australian wool industry. Australian Wool Corporation, Melbourne.

Thorp, J.R. and Lynch, R. (2000). The determination of weeds of national significance. National Weeds Strategy Executive Committee, Launceston.