

**REVIEW OF PROGRESS TOWARDS THE
NATIONAL CHILEAN NEEDLE GRASS
STRATEGIC PLAN
2008 – 2009**



Prepared by: Matthew Sheehan
Weeds of National Significance
National Coordinator for Chilean needle grass

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Executive Summary

Background

The National Chilean needle grass Strategic Plan was written in 2001, with a stated objective to '*stop the spread and reduce the occurrence and impacts of CNG in natural and agricultural ecosystems*'. In early 2003 a full time coordinator was appointed to oversee the implementation of the strategic plan. This report outlines progress towards the National Chilean needle grass Strategic Plan and highlights achievements over the 2008/09 financial year. Activities outlined here build on a range of actions undertaken previously, made possible through substantial support from the Australian Government, six state and territory governments, regional NRM bodies, community groups, research organisations and local governments across Australia.

Major achievements toward the National Strategic plan in 2008/09, include:

Greater awareness of the identity, impacts and threat of Chilean needle grass (CNG)

- Improved identification of CNG and evaluation of its threats and impacts on the environment and agriculture through development of new targeted extension material for the Australian community and dissemination of other extension material.
- Establishment of six new partnerships between the National CNG program, NRM regions and municipalities to effectively manage CNG and other WoNS.
- Extensive surveillance and mapping activities completed in all states and territories.

Developing 'best' management options for CNG control

- Research into biological control options continued in Argentina
- Funding obtained for research on high priority knowledge gaps
- Research findings and recommendations have been adopted for on-ground control

Prevent, contain and rehabilitate Chilean needle grass infestations

- CNG infestations in Queensland and Tasmania have been contained and active control continues with the aim of eradication
- CNG (and Texas needle grass) controlled and contained in South Australia
- Increased investment in CNG treatment programs and containment strategies in the ACT

These and a range of other activities were made possible through significant investment from all partners. In 2008/09, the Australian Government invested approximately \$400,000 in CNG management nationally, primarily for research, strategic management and awareness raising. Additional contributions from a small cross section of stakeholders including State and Territory Governments, Natural Resource Management boards, local government and community volunteers has been estimated at \$300,000 and has largely been for on ground activities.

Proposed direction: The national CNG program is in a transitional phase – the focus of the program over the last six years has largely been on research. The future will see a reduced emphasis on research and an increase in effort to communicate research findings to weed managers and actively encourage the uptake of best practice management. There will be greater emphasis on asset protection and management of grassy weeds as a whole, with a shift away from a single species approach. Inability of weed managers to identify CNG has been identified as the single greatest impediment to the delivery of the National CNG Strategic Plan. Further development and dissemination of identification tools will help to address this.

Introduction

History and impact of Chilean needle grass in Australia

Chilean needle grass (*Nassella neesiana*) is a perennial tussock forming grass, native to South America, including Argentina, Bolivia, Chile, Ecuador, southern Brazil and Uruguay. It was first recorded in Australia in Northcote (a suburb of Melbourne), Victoria, in 1934 and in New South Wales in 1944. Since then, CNG has extended its range across Victoria and New South Wales and into the ACT, South Australia, southern Queensland and Tasmania. However, CNG has a much greater potential range, as it is climatically suited to more than 40 million hectares in Australia.

Chilean needle grass is a vigorous competitor in agricultural, natural and urban environments. It severely reduces pasture productivity and contaminates crops and hay. The needle-like seed can injure stock or pets and downgrades wool and sheep carcasses. Considered one of the worst environmental weeds, it is highly invasive in native grasslands, urban parks and gardens. The spread is facilitated by the movement of seed on vehicles, machinery and equipment particularly along roadsides.

A National Solution

In 1999, Chilean needle grass was listed as one of Australia's 20 Weeds of National Significance (WoNS). To help guide national coordination, the National CNG Strategic Plan was developed (ARMCANZ, ANZECC and FM 2001). This plan aims to deliver the following primary outcomes:

- Identify the CNG problem
- Develop best management options for CNG
- Prevent, contain and rehabilitate CNG infestations and
- Develop appropriate extension packages.

A National CNG Coordinator was appointed in April 2003 and the National CNG Taskforce (see Appendix A) was established in April 2003 to facilitate the implementation of the Strategic Plan.

Progress to date has been made possible through substantial support from the Australian Government, seven state and Territory governments, regional NRM bodies, community groups, research organisations and local governments across Australia (Refer to page 18 for an estimate of the 2008/09 investment in CNG-related activities).

Progress to date

Major successes to date include

- The appointment of a full-time National Coordinator in 2005, which has enabled efficient delivery of actions in the National Strategy and facilitated nationally coordinated projects.
- Declaration of CNG as a noxious weed in all States and Territories;
- Development of a methodology for mapping and the commencement of mapping across Australia
- Registration of flupropanate for CNG control (the only chemical specifically registered to control CNG);
- Declaration of CNG as a target for biological control and commencement of a biological control program;

- Development of a slasher cover and blowers that minimise spread of CNG seed on slashers (a major cause of CNG spread);
- Significant investment by local governments in CNG management;
- Infestations of CNG in Queensland have been successfully contained and a vigilant surveillance and control program continue;
- Best practice management manual, management guide and various extension materials have been developed and widely distributed.

The following report outlines key achievements made over the 2008-2009 year toward the goals of the National Strategic Plan.

GOALS AND ACHIEVEMENTS IN 2008/2009

GOAL 1: IDENTIFY THE CHILEAN NEEDLE GRASS PROBLEM

Desired outcome: "The Australian community is aware of the identity, impacts and threat posed by Chilean needle grass."

Key outcomes of 2008/2009:

- 1.1 Increased capacity for the Australian community to identify CNG and evaluate associated threats and impacts
- 1.2 New partnerships established between NRM boards for integrated and strategic management of CNG
- 1.3 Scoping and identifying the CNG problem
- 1.4 Determining the impacts of CNG on biodiversity

Analysis of key outcomes for 2008/2009

1.1. Increased capacity for the Australian community to identify CNG and evaluate associated threats and impacts

The vision of the Chilean Needle Grass Strategic Plan is 'to *stop the spread and reduce the occurrence and impacts of Chilean needle grass in natural and agricultural ecosystems.*' In order to achieve this, the CNG taskforce recognised that increasing the public awareness of CNG was a key priority for the 2008/09 year. One of the major achievements of the CNG program over the 2007-08 year was the completion of foundational activities that resulted in the development of extension materials such as the CNG best practice manual. Consequently the 2008-2009 year has been concerned with the dissemination and evaluation of this material followed by its refinement, which will increase our capacity to engage with the Australian community and educate them on both the identity of and the issues surrounding Chilean needle grass.

Revision and reprint of the CNG Best Practice Management Guide brochure

Following the original release of this document in 2007, many stakeholders provided feedback on the resource. The majority of stakeholders surveyed believed that the guide would be more useful if it included diagnostic illustrations of CNG seed and other closely related *Nassella* spp. and similar looking *Austrostipa* spp. In 2008 a revised guide was produced and 8000 copies printed. These are currently being circulated nation-wide.

Awareness flyers

The CNG awareness flyer, produced in 2007, has been found to be an effective way of communicating the key threats of CNG in a concise way that can be letterboxed or included in rates notices. During 2008-2009 a series of similar awareness flyers were designed that are tailored to specific regions and issues. For example, one flyer has been targeted at residents of Clarence City Council in Tasmania (an outlier CNG area), while another focuses on weed hygiene issues.

1.2 New partnerships established between NRM boards for integrated and strategic management of CNG

In the 2007-2008 *Review of progress towards the National Chilean Needle grass Strategic Plan*, it was recognised that there was a need to establish better relationships with NRM regions and municipalities. To address this, two pilot workshops were proposed in which NRM regions would host workshops on weed hygiene for municipal councils. Due to the timing of *Caring for Our Country*, these workshops were not held. Despite this, the need to establish these partnerships and raise the profile of the WoNS program was addressed in a number of other ways that are detailed below:

Engaging with municipalities at a regional scale through NRM bodies

A presentation on CNG and the issues resulting from inconsistent approaches to management of weeds on roadsides was given to at the 2008 Victoria Local Government Liaison Officers Meeting in Victoria, which consisted of representatives from each Victorian CMA and the Municipal Association of Victoria. This has resulted in the willingness of Victorian CMAs to engage directly with municipalities on weed issues, particularly roadside management and stock movement in consultation with WoNS coordinators. This has laid the foundations for future hygiene workshops if they are deemed necessary. More importantly it has resulted in the establishment of a multi-jurisdictional dialogue that will be valuable to the strategic management of CNG and the WONS Program.

Improving relations with CMAs in NSW

Chairs of The National willows, serrated tussock/CNG and lantana management groups met with the regional managers of the NSW Catchment Management Authorities to raise awareness of the WoNS program and encourage them to engage with the program to improve weed management and asset protection in NSW.

Regions encouraged to incorporate weed management into their core business.

The 2008-2009 *Caring for Our Country* Business Plan identified WoNS as a National Target. The National CNG Taskforce wrote to all NRM regions where CNG is present, alerting them to CNG issues in their region, the need for a coordinated and integrated approach and informing them of the opportunity to obtain funding for CNG through the Australian Governments *Caring for Our Country* program. Regions were also provided with a list of CNG national priority actions for their regions. Of the 27 regions approached, 11 responded by incorporating CNG control into their bids (Table 1). A key outcome has been the establishment and consolidation of partnerships between National WoNS programs and NRM regions.

Partnerships that have been established during 2008-2009 are listed below:

- West Gippsland CMA (Vic), National CNG Program, DPI Victoria, five West Gippsland Landcare networks (South Gippsland, Yarram, Lake Wellington, Maffra and Bass Coast), Latrobe and Wellington Shire Councils.
- East Gippsland CMA (Vic), National CNG Program, DPI Victoria, East Gippsland Shire Councils.
- Southern Rivers CMA (NSW), National Serrated Tussock Program, National CNG Program
- Central West CMA (NSW), National Serrated Tussock Program, National CNG Program
- Namoi CMA (NSW), National WONS Program

- National CNG Program, Southern Tasmanian Councils Association, Clarence City Council, DPIPWE.

Table 1: Number of NRM regions by state that were encouraged to include CNG activities in their *Caring for Our Country* bids against both the number of regions that submitted bids that included CNG and the number of regions that were ultimately successful in obtaining funding for a CNG-related activity.

	No. NRM regions contacted	No. NRM regions that submitted bids that included CNG	No. NRM Regions that received funding for CNG
NSW/ACT	10	2	2
QLD	2	2	0
SA	4	1	0
TAS	1	1	0
VIC	10	5	4
TOTAL	27	11	6

1.3. Scoping and identifying the CNG problem

Determining both the current and potential distribution and extent of CNG is crucial for both strategic planning and adaptive management of CNG throughout Australia. It is equally important to identify the distribution of environmental and agricultural assets that are threatened by CNG in order to prioritise management actions. Major scoping activities that have occurred throughout 2008/09 are described briefly below:

ACT

Approximately \$26,000 was spent on CNG mapping and control during the 2008/09 financial year with works concentrated on increased surveillance of priority areas including EPBC listed grassland and woodland remnants.

NSW

NSW mapping data for CNG and other priority weeds were produced 2007-08. These maps have now been published and are readily available, providing a baseline from which changes to CNG distribution can be measured.

Queensland

Surveillance in all known infestations, treated sites and surrounding areas was carried out in 2008/09. Surveillance and survey works have been routinely conducted by Biosecurity Queensland and the Toowoomba Regional Council downstream of the main infestation on the Condamine River since 2006. No further downstream spread has been detected to date and it appears that containment is effective. Two additional infestations were discovered in the Toowoomba area during 2008 and were consequently mapped and treated. Amalgamation of the several regional shires into the Toowoomba Regional Council has resulted in an increase in resources available for surveillance, mapping and control of CNG particularly in roadsides. There are now between 8-12 personnel available for these activities, whereas there were previously only four officers over four shires.

South Australia

Over the 2008/09 financial year, mapping efforts in SA were largely concentrated on CNG, with \$14,600 spent on surveying and mapping 355 ha at Kangarilla. Known infestations of CNG at Modbury and North Adelaide were also monitored and controlled with some control also being implemented at Wirrina Cove. Additionally, infestations of Texan Needle Grass (TNG) were controlled and mapped at Onkaparinga River National

Park, Belair National Park, Cherry Gardens, Clarendon, Happy Valley and Adelaide Parklands. Two previously unknown TNG infestations were discovered and controlled at Coromandel Valley. Needle grass awareness signage was erected at priority sites visited by the public such as reserves and along parts of the Tom Roberts Horse Trail. All TNG and CNG infestations are being monitored and further survey work will be implemented in 2009-10 in an attempt to establish the distribution and density of TNG and CNG. This will facilitate monitoring of the success of these control activities.

Victoria

The 2007/08 *Review Of Progress Towards The National Chilean Needle Grass Strategic Plan* identified the need for an update of CNG data recorded in Victoria's Integrated Pest Management System (IPMS). This was addressed during 2008/09, with a review of existing CNG data recorded in IPMS. These entries were reviewed for errors, inconsistencies and replication and now require some ground truthing and updating. New infestations were also mapped in East Gippsland and have been entered into IPMS. This review and actions have resulted in a better understanding of the CNG problem in Victoria and more confidence can be placed in the existing dataset. There is also an increased awareness of CNG amongst pest management officers in each catchment and an increased capacity and willingness to map CNG when mapping other weeds.

CNG surveillance and control has also been incorporated into several successful regional funding bids in Victoria, including West Gippsland CMA, East Gippsland CMA, Port Phillip and Western Port CMA, Corangamite CMA and North East CMA. It is anticipated therefore that the understanding of the CNG problem in Victoria will be greatly increased as a result of these projects by 2009-2010.

1.4. Determining the impacts of CNG on biodiversity

A PhD project on the biodiversity impacts of CNG on indigenous grasslands is nearing completion. This was funded by the Australian Government's Defeating the Weed Menace program and supported by DPI Victoria, Victoria University and Environment ACT. Overall conclusions of the research are listed below:

- Major biodiversity loss of grasslands often precedes CNG invasion and is a prerequisite for CNG establishment. Prior disturbance and degradation often results from senescence of native grasses, overgrazing, soil disturbance and herbicide damage.
- Loss of plant diversity by the competitive impact of CNG continues after invasion.
- Replacement of the native *Themeda. triandra* with CNG may have catchment-wide hydrological effects including reduced runoff and increased recharge, resulting in increased risk of salinity and soil acidification. Thus CNG invasions are likely to have ecological impacts beyond the areas infested.

This research has resulted in a greater understanding of the processes leading to CNG invasion in native grasslands and will inform future management of these ecosystems. The results and recommendations of this research were presented to an independent review of remnant grassland management in the ACT which has resulted in the adoption of the key recommendations and a significant increase in the investment in the management of grassy weeds in the ACT (refer to section 3.4, p. 14).

This research has also identified some further research questions, namely:

What are the hydrological impacts of C3 invasive perennial grasses replacing summer active native grasses? and

What impacts do ants have on CNG seed banks and how can these be best exploited for the management of CNG?

Investigating these questions will enable the landscape scale ecological impacts of CNG infestations to be quantified as well as enhancing our ability to manage CNG.

Future activities required

The 2009 review of the National CNG program found that the low level of CNG identification skills of many weed managers to readily identify CNG remained the single largest impediment to the delivery of goal 1 of the Strategic Plan. It is widely recognised that CNG is an inherently difficult weed to identify when it is not in flower hence, this will always limit the effective management of CNG. During 2008/09 the CNG taskforce recognised the role of the national program in addressing this impediment. The following two needs were identified as essential in order to facilitate early detection, mapping and subsequent control of CNG:

1. A need for the wider community within CNG areas to be sufficiently aware of CNG and its impacts so that suspected infestations or activities likely to spread CNG are reported, and
2. A willingness for weed managers to respond to reports of suspected infestations and be able to identify CNG or know where to go for assistance in identifying CNG.

The direction of the National CNG Program over the 2008/09 year has focussed on addressing these needs through new and innovative projects detailed below. Short term future activities will largely be concerned with delivery of these projects as well as continuing to raise the profile of CNG through field days, state weed conferences and the wider distribution of existing extension material.

Short – medium term (next 1 - 2 years):

- Intensify efforts to distribute awareness flyers and other resources prior to and during the 2009 flowering season.
- Engage with, support, encourage and build the capacity communities and land managers within or close to outlier populations to report on or manage CNG infestations. New signage in Tasmania and East Gippsland will be erected during Spring 2009.
- Twelve herbarium specimens of CNG and several resin casts of basal seeds are being prepared by the Tasmanian herbarium and will be distributed to regional weed authorities in key regions for use by pest management officers to improve their ability to identify CNG.
- Complete the *Nassella* deck project – a weed deck comprising of all *Nassella* spp. and other stipoid grass weeds, together with look-alike natives that are most commonly mistaken for them. This project commenced in 2008/09 and is supported by the national Serrated Tussock Program and weed managers nationally.
- Widely publicise the key findings from the biodiversity research and incorporate key messages into best practice management recommendations.

- A research project is currently underway which is using both molecular and morphological characteristics to develop diagnostic identification tools for CNG and other stipoid grass weeds. Developing easily accessible and affordable ID tools from this research will be a high priority for the National CNG Program over the next two years. Such tools will greatly increase the capacity of weed managers to deliver on the Goal 1 of the National CNG Strategic Plan.
- Develop communication strategies and partnerships that will increase the profile of the National CNG taskforce and develop its reputation as a key body for providing information and strategic advice on CNG management throughout Australia.

Long term (next 2-5 years):

- Develop a central repository for mapping data for use by CNG managers in the strategic planning of CNG control, prevention and awareness-raising. It must be capable of ranking data reliably, based on survey and mapping methodology and resolution etc. It should also incorporate other layers including native grassland and agricultural assets to help identify priority areas for investment and management.
- The National CNG Taskforce is recognised by all key stakeholders as the key body for providing information and strategic advice on CNG management throughout Australia.
- Investigate imagery options for mapping/identification of CNG. (LIDAR, Thermal, Infrared etc).

Ongoing

- Continue to strengthen existing partnerships with NRM regions, municipalities, Landcare networks etc that have been established through *Caring for Our Country*, and work on building new partnerships across Australia.
- Continue promoting an integrated approach to the strategic management and onground control of stipoid grass weeds as a whole (including CNG, serrated tussock all other *Nassella* spp., espartillos etc).
- Continue to improve the understanding of the distribution of CNG and identify priority areas for community engagement such as identification workshops and other forums.
- Continue to communicate the threat that CNG poses to livestock, agricultural products and native vegetation and develop innovative ways to engage with all sectors of the Australian community.

GOAL 2: DEVELOPMENT OF “BEST” MANAGEMENT OPTIONS FOR CHILEAN NEEDLE GRASS CONTROL.

Desired outcome: “Australia develops ‘best’ management options to reduce the prevalence and impacts of Chilean needle grass.”

Key outcomes of 2008/2009:

- 2.1 New research to address gaps in our knowledge of CNG and best practice
- 2.2 Applying research to on ground management of CNG

Analysis of key outcomes for 2008/2009

2.1 New research to address “gaps in our knowledge of CNG and best practice

In the 2008/09 year, four CNG-related research proposals were submitted to various funding opportunities to fill gaps in our understanding of best practice management. Three of these projects received funding and are now underway. Details of these projects are given in table 2.

Table 2: Summary table of CNG-related current research projects.

Project title	Project deliverer	Funding source	Description
<i>National Guidelines for Minimising Waterway Infestations of Chilean Needle Grass - Filling a Major Gap in Knowledge and Advice</i>	Victoria University	<i>Caring for Our Country</i> Open Grants	This project is developing best practice guidelines for the prevention and management of CNG in waterways across Australia. The capacity of CNG seed to spread via water flow will be documented and patterns of new CNG infestations mapped to increase understanding of waterway managers on the establishment of CNG from up-stream populations.
<i>Implementation of Biological Control of CNG and Serrated Tussock</i>	DPI Victoria	AWRC	Investigation into potential bio-control agents for CNG began in 1999. Host specificity work is currently being carried out on the rust pathogen, <i>Uromyces pencanus</i> in Argentina. This project will see the completion of host specificity testing by the end of 2009
<i>Developing Novel Diagnostic Tools for Weed Identification</i>	DPI Victoria EH Graham Centre for Agricultural Innovation	AWRC	This study is investigating both morphological and molecular characteristics of <i>Nassella</i> spp, <i>Amelichloa</i> spp and a number of native <i>Austrostipa</i> spp. to determine whether these features vary sufficiently between species to allow for their characterisation as diagnostic tools. It is expected that the tools will be available by June 2010.
<i>Addressing regional knowledge gaps – chemical control of two agricultural WoNS</i>	DPI Victoria	Not successful	This research project was proposed to address the issue of off target effects of flupropanate in both CNG and serrated tussock and the inconsistent efficacy rates achieved under varying climatic and soil type situations. This research was not funded but remains a high priority to the program.

2.2 Applying research to on ground control of CNG

The recent review of the CNG program found that there had been limited application of research findings to CNG management outside of initial trial situations. While it is recognised that there are still gaps in our understanding, the 2008-2009 year has largely been focused on disseminating the ideas and concepts that have come out of research in the hope that we can increase the uptake of best practice management of CNG throughout Australia. In 2007 a joint project between RMIT and DPI Victoria was established, funded through the Defeating the Weeds Menace program. Slasher covers were developed that reduced the spread of panicle seed from contaminated to clean sites by 99% during maintenance slashing operations along roadsides. In 2009 the National CNG program provided \$35,000 to develop extension material that will provide technical drawings and material lists for the slasher covers in an attempt to increase both the awareness and accessibility of best practice management. As part of this project a slasher cover will be transported to several municipalities so that they can trial it. It is anticipated that with co-investment from participating municipalities there will be uptake of this technology over the 2009-2010 financial year. This project will be completed in December 2009.

Future activities required

The development of best practice options through applied research is viewed as a particular strength of the national CNG program. The recent review of the CNG program identified Goal 2 of the Strategic Plan as being between 75 and 80% complete. Delivery of this goal is believed to be on track and self-perpetuating with knowledge gaps clearly identified and the focus of current and proposed research and funding bids. While research will remain an important aspect of the national CNG program, it is anticipated that over the short to medium term the current emphasis on new research will shift to a focus on the adoption and uptake of best practice management that has come out of recent research, hence contributing to Goal 1, 3 and 4 of the National Strategic Plan.

Short term (next 1 – 2 years):

- Complete research on the role of water in distributing CNG.
- Further advance bio-control research, finish host specificity testing.
- Complete research into diagnostic tools for the identification of CNG
- Acquire funding for further research into the off-target effects of flupropanate. This will provide advice on appropriate CNG control Australia-wide, taking into account regional climatic variations and soil type.
- Continue expanding research trials to farm-scale

Long-term (next 2-5yrs):

- Incorporate key findings of the research into the impacts of CNG on biodiversity into best practice management recommendations.
- Continue exploring biological control options
- Research the hydrological impacts of C3 invasive perennial grasses that replace summer active grasses (refer to section 1.4, page 7)
- Research the impacts that ants have on CNG seedbanks (refer to section 1.4, page 7).

GOAL 3: PREVENT, CONTAIN, AND REHABILITATE CHILEAN NEEDLE GRASS INFESTATIONS.

Desired outcome: "Australian communities implement best management practices to control Chilean needle grass."

Key outcomes of 2008/2009:

- 3.1 Distribution of CNG in Tasmania determined and contained
- 3.2 Control and containment of Queensland CNG infestations
- 3.3 Control and containment of SA needle grass infestations
- 3.4 Increased investment in CNG control and containment in the ACT

Analysis of key outcomes for 2008/2009

3.1. Distribution of CNG in Tasmania determined and contained

The distribution of CNG in Tasmania was determined in 2007/08 through a Defeating the Weeds Menace project titled '*Inter Regional Control and Eradication of Isolated and Outlier Infestations of WoNS Grasses*'. Treatment of all known sites was carried out during spring and summer of 2008/09. Subsequent monitoring has indicated that the effectiveness of the control program was low, with prolific regrowth at all treated sites. This was attributed to the use of glyphosate which does not control the existing seed bank or germination following treatment. The use of a residual herbicide, such as flupropanate, is being considered and follow-up spraying is planned for early 2009/10.

Prevention, containment and rehabilitation activities in Tasmania during 2009/10 are listed below:

Prevention

- Mail out of CNG warning brochures (approx 200) to all Landholders in the vicinity of the Montague Bay infestation prior to the 2008 flowering season.
- Implementation of hygiene protocols for two major construction/ earthwork projects within core infestation at Montague Bay.
- CNG interpretive signage developed for a walking track through the core infestation (to be printed and installed in October 2009).
- CNG road signs designed for major roads near Montague Bay infestation.
- New site-specific awareness flyers developed for Montague Bay

Prevention/containment:

- Montague Bay Primary School, which occurs within the core infestation, has purchased their own slasher for use in the school grounds where CNG occurs. Contractors are required to use the equipment on site, therefore reducing spread of propagules off site.
- All known sites were treated over spring and summer 2008/09. During spraying a further site was identified and treated. Post treatment monitoring has suggested that control was not particularly successful.

Rehabilitation:

- A major upgrade of the Montague Bay Primary School oval has resulted in the elimination of one of the largest infestations in Tasmania. Contaminated top soil was removed and disposed of via deep burial on site and the surface re-sown with desirable turf species. Hygiene protocols were put in place to minimise the removal of propagules off site. Monitoring of the site will be carried out by the Department of Primary Industries, Parks and Water and Environment over the coming years to ensure any re-establishment of CNG is detected and appropriately controlled.

3.2. Control and containment of Queensland CNG infestations

The northernmost infestation of CNG occur in southern Queensland and are all actively managed for eradication through partnerships between Biosecurity Queensland (DPI&F), Toowoomba Regional Council (formally Clifton and Cambooya Shires), Southern Downs Regional Council (formally Warwick Shire), Main Roads, Ergon Energy, the Condamine Alliance and farmers.

Above average rainfall over 2008/09 in southern Queensland resulted in ideal growing conditions for CNG. Flowering first occurred in October and again in December providing several opportunities for both surveillance and follow-up control.

Major outputs and outcomes of the 2008/09 year include:

Prevention

- The use of fan/blowers on slashers during roadside maintenance activities has reduced the transport of CNG seed from contaminated sites to clean areas. This innovative technique together with detailed mapping, signage of roadside infestations and vigilant surveillance has prevented the spread of CNG from core infestations.
- Mail out of CNG warning brochures (approx 15,000) to all landholders in the three affected Shires in Oct/Nov 2008 prior to flowering.

Prevention/containment:

- The last three years of the Queensland CNG program was reviewed in 2008 by Biosecurity Queensland. The panel felt that CNG was not eradicable in the core infestation at current levels of investment but agreed that every effort needed to be directed to containment of the known infestations and that further surveillance was required.
- Survey work was undertaken in 2008 along the Condamine River which confirmed there was no further spread of known infestations.
- Spray teams revisited and treated all known infestations in December 2008.
- All existing 13 Property Management Plans for CNG were reviewed.
- Integrated management of CNG has commenced at some properties under Property Management Plans using grazing, a method of preventing flowering.
- Due to the exceptional growing season and prolific flowering over 2008-2009, CNG was relatively easily identifiable compared to past years. As a result, two new outlier infestations were identified, one in Toowoomba City and one North of Toowoomba. These were treated with flupropanate and high efficacy was achieved.

Rehabilitation:

- The Wiedman floodway was blanket treated with flupropanate to reduce the loss of annual grasses. Excellent control has been achieved.
- The wick wiper trial established by Victoria University in 2007 was continued over the 2008-2009 year on one of the Polo fields at the Clifton recreation grounds. These trials have continued to show that very effective control of CNG can be achieved by exploiting the height differential between CNG and couch.

3.3. Control and containment of SA needle grass infestations

Known infestations of CNG at Modbury, North Adelaide and Wirrina Cove were controlled. Additionally, infestations of TNG were mapped and controlled at Onkaparinga River National Park, Belair National Park, Cherry Gardens, Clarendon, Happy Valley and Adelaide Parklands. Two previously unknown TNG infestations were discovered and controlled at Coromandel Valley. All TNG and CNG infestations are being monitored and further survey work will be implemented in 2009/10 in an attempt to establish the distribution and density of TNG and CNG. This will facilitate monitoring of the success of these control activities.

3.4 Increased investment in CNG control and containment in the ACT

It has been estimated that \$26,000 was spent on CNG surveillance and control activities over the 2008/09 year in the ACT which included mapping and treatment of all outlier and high priority infestations. This represents an increase of 84% in the investment in CNG surveillance and control activities compared to the previous financial year.

In 2008 an independent report was commissioned on weed invasion in remnant urban lowland grasslands that identified weed invasion (primarily CNG, serrated tussock and African love grass) as the major threat to these remnants. Consequently, funding for weed control in these grasslands will be increased to \$100,000 in 2009-2010. It is anticipated that CNG-specific expenditure on CNG surveillance and control throughout the ACT for 2009-2010 will be \$90,000, an increase of some 70 percent from the 2008-2009 investment (Figure 1).

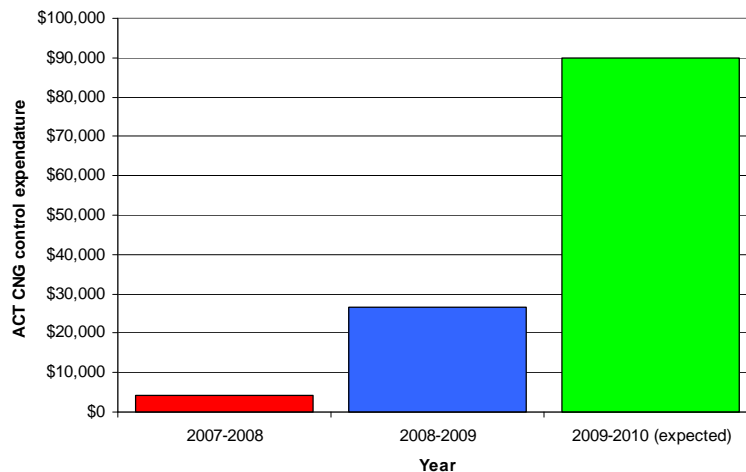


Figure 1: Comparison of funding for CNG surveillance, mapping and control between the 2007-2008 and 2008-2009 years in the ACT. The budget for CNG is expected to increase to \$90,000 in 2009-2010.

Emerging issues

Several control programs conducted during 2008/09 have identified an issue with the repeated use of glyphosate in the control of CNG. Glyphosate has no residual properties and therefore does not control seedling establishment following initial treatment. Low efficacy was reported following CNG control works in Tasmania and attributed to the use of glyphosate. Landholders in Queensland have also reported that the repeated use of glyphosate to control CNG has resulted in the loss of native pasture grasses and replacement with a monoculture of CNG.

An alternative chemical which does exert some control on seedlings is the residual herbicide flupropanate. Good results were achieved over 2008/09 by using flupropanate on the Wiedman floodway in Toowoomba, QLD. However there is growing concern about the use of flupropanate given that it is a residual chemical and there is currently no Maximum Residue Limit (MRL) for milk products of lactating animals grazed in flupropanate treated areas.

During 2009/2010 the National CNG Taskforce will need to show leadership in addressing these emerging issues. The first step will be to reiterate the recommendations detailed in the best practice manual on CNG management. The National CNG Taskforce recommends an integrated and holistic approach to CNG management that utilises chemical control in conjunction with other control methods such as grazing and fire. There will also be a need to investigate the feasibility of obtaining an MRL for flupropanate in lactating stock and to look into feasible alternatives to address the concerns about flupropanate use in Queensland.

Future activities required

The following activities have been identified by the National CNG taskforce as being required to fully achieve this goal and address the emerging issues outlined above. A proposed time frame for the completion of each activity has also been given.

Short term (Next 1 – 2 years):

- Carry out follow-up treatments of Tasmanian infestations and investigate options to reduce seed bank.
- Continue containment works in SA.
- A seed bank count was carried out three years ago at several infestations in Queensland. A follow-up count is required to determine if current management practices are resulting in a net decrease in the CNG seedbank.
- Investigate the feasibility of obtaining an MRL for flupropanate in lactating stock. Also investigate alternative options for addressing the concerns of flupropanate use in Queensland.
- Provide support and advice to successful *Caring for Our Country* bids that involve on ground control of CNG.
- Develop and promote case studies of successful integrated CNG management to provide management advice options and solutions to land managers

Long term (next 2-5 years):

- Continue and intensify eradication programs in Queensland and Tasmania.

- Continue to provide support and advice to successful *Caring for Our Country* bids that involve on ground control of CNG.
- **Ongoing**
- Ensure that best practice options are continued to be developed, tested and applied to CNG management Australia wide.
- Ensure best management options are integrated where appropriate for management of other stipoid weeds (ie, Serrated Tussock, Texas needle grass. Espartillos etc). This is consistent with the National CNG Strategic Plan.

GOAL 4: DEVELOP APPROPRIATE EXTENSION PACKAGES

Desired outcome: "Appropriate extension materials are developed to extensively publicise information on Chilean needle grass, and its "best" management in areas at risk."

Key outcomes of 2008/2009:

During the 2007/08 year, many extension packages were developed (for details on these materials refer to Goal 1 (Page 4-9). During 2008/09 with the National CNG program has focussed on the dissemination of this material, evaluation of its effectiveness and assessment of the remaining gaps. Key outcomes of this goal have been discussed elsewhere in the review and hence no analysis of these outcomes has been provided for this goal. Activities and outcomes related to this goal that occurred during 2008/09 are listed below:

- 4.1 Review and update of 13 existing Property Management Plans in Queensland
- 4.2 Update of the CNG National Best Practice Management Guide brochure to include a picture that compares panicle seeds of CNG to those of other grass species
- 4.3 Development of new region and issue specific awareness flyers.

Future activities required

It is acknowledged that there is considerable work still to be done on goal 4 of the Strategic plan, particularly in relation to the development and implementation of incentive schemes (Action 2.4.1c) and monitoring and evaluation of the effectiveness of CNG treatment (2.4.2 a & b).

The following activities have been identified by the National CNG taskforce as being required to fully achieve this goal. A proposed time frame for the completion of each activity has also been given.

Short – medium term (next 1-2 years):

- Publish a questionnaire on the Weeds Australia website that evaluates the effectiveness of all available extension material
- Evaluate responses to the extension material questionnaire and develop/revise extension material to address any gaps or deficiencies
- Distribute new CNG herbarium sheets to regional pest management officers throughout Victoria, NSW and other regions where requested (Refer to p. 8).
- Evaluate existing incentive schemes, evaluate the need for new schemes and produce case studies of incentive schemes if appropriate.
- Develop extension material on incentive schemes.
- Continue developing a 'Nassella deck' that allows comparison of CNG with other *Nassella* spp and native grasses.
- Develop new extension material based on the result of any current *Caring for Our Country* and the Australian Weeds Research Centre grants.

Long term (next 2-5 years):

- Publish new or revised extension material.
- Develop integrated extension material which incorporates other WoNS (ie serrated tussock) or broader NRM issues.

Ongoing:

- Continue focusing on extension materials as a key way to engage with the community.
- Continually investigate new ways to engage with CNG stakeholders and the wider community.

Estimate of investment in Chilean needle grass management

The total investment in CNG management by the Australian Government in 2008/09 was estimated at \$416,163 (Table 3). This includes funds for national coordination (\$123,042). In addition a small amount of funding was carried from 2007/08 and spent in 2008/09. This investment has come from a number of sources including Defeating the Weed Menace, *Caring for Our Country* and Australian Weeds Research Centre and are listed in Table 3.

Table 3: Australian Government contribution to CNG management, 2008/09

Program	Project	Lead Organisation	Australian Government Investment
Defeating the Weed Menace/ <i>Caring for Our Country</i>	CNG National Coordinator	Victorian Department of Primary Industries	\$123,042.
Australian Weeds Research Centre grant	Implementation of Biological Control of Chilean Needle Grass and Serrated Tussock	Victorian Department of Sustainability and Environment	\$115,500
Australian Weeds Research Centre grant	Developing Novel Diagnostic Tools for Weed Identification	Victorian Department of Primary Industries and the EH Graham Centre for Agricultural Innovation	\$92,621
<i>Caring for Our Country</i> open grant	National Guidelines for Minimising Waterway infestations of Chilean Needle Grass - Filling a Major Gap in Knowledge and Advice	Victoria University	\$85,000
Sub Total			\$416,163
Funds received in previous financial years but expended in 2008/09			
Defeating the Weed Menace	Inter Regional Control and Eradication of Isolated and Outlier Infestations of WoNS Grasses (Comm id: 64354)	Southern Regional Natural Resource Management Association	\$1,000
Sub Total			\$1,000
TOTAL			\$417,163

It is difficult to obtain an accurate estimate of investment in CNG management outside of these projects, as there is no reporting procedure that formally aggregates this data at a state or national level and many CNG activities are incorporated into broader NRM projects. It is known however that there has been significant investment and in-kind contributions in CNG-related activities from state agencies, regional NRM bodies, local governments, industry, contractors, Landcare and the community. An attempt to quantify this contribution has been made in Figure 2 by aggregating all known contributions to CNG management at a state level. An attempt has also been made to distinguish between research, awareness raising, strategic planning and on ground activities (surveillance, mapping and control).

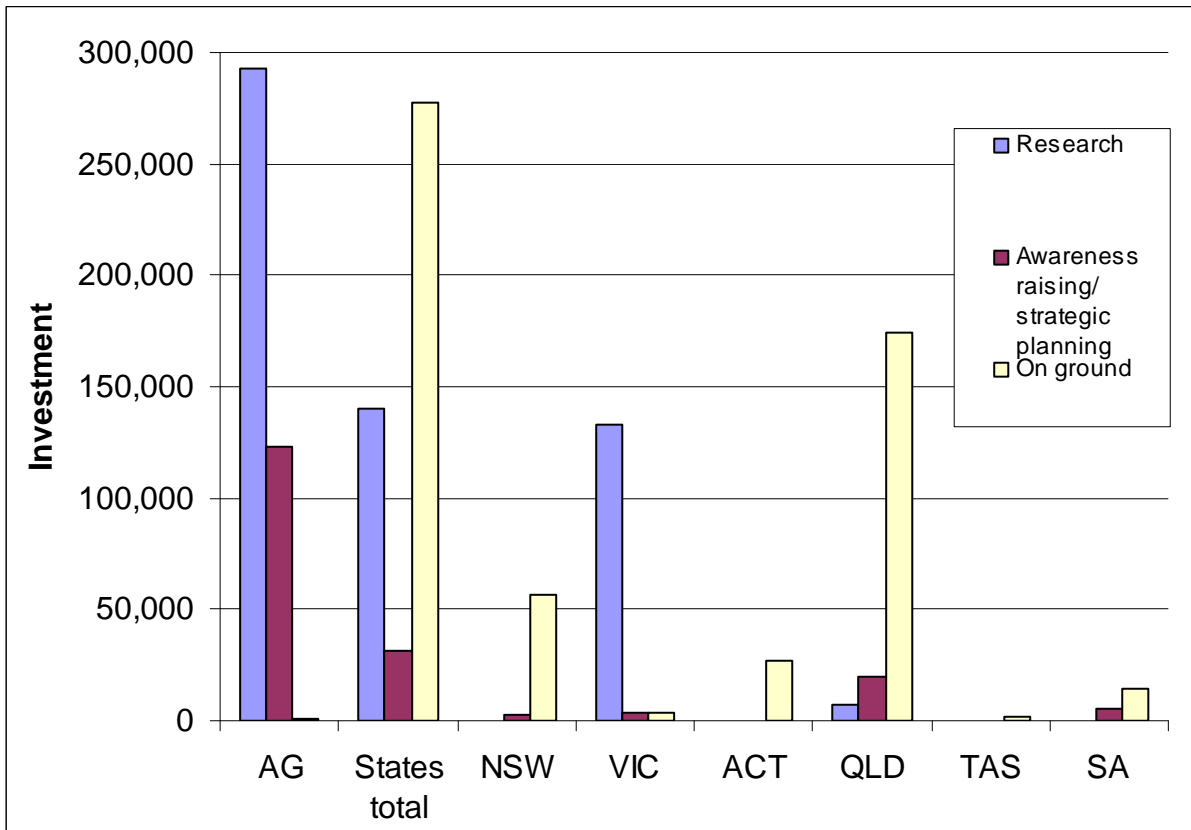


Figure 2: Estimate of the national, total state/territory and individual state/territory investment in CNG-related research, awareness raising/strategic planning and on ground activities during 2008/09.

APPENDICES

APPENDIX A: National Chilean Needle Grass Taskforce Members

Members as at 29 August 2009:

Scott Chirnside, Chair, VIC

Frances Overmars, Community representative, VIC

David McLaren, Department of Primary Industries, VIC

Michael Michelmores, Department of Primary Industries, NSW

Steve Taylor, Parks Conservation and Lands, ACT

Matthew Sheehan (Executive Officer), National CNG Coordinator, VIC

Colin Hocking, Victoria University, VIC

Ian Lobban, National Farmers Federation, VIC

Nigel Ainsworth, Department of Primary Industries VIC

Desley Darby, Department of Agriculture Fisheries and Forestry, ACT

Shauna Potter, Department of Water Land and Biodiversity Conservation, SA

John Thorp (ex-officio), National Weed Management Facilitator, TAS

Corresponding Members:

Karen Stewart, Department of Primary Industries and Water, TAS

APPENDIX B: Chilean Needle Grass Publications 2008/09

Papers

Anderson, F.E., Flemmer, A.C., Hansen, P.V., Barton, J. and McLaren, D.A. (2008) An update on progress towards biological control of *Nassella neesiana* in Australia and New Zealand. Proceedings of the 16th Australian Weeds Conference, eds R.D. van Klinken, R.D., V.A. Osten, F.D. Panetta and J.C. Scanlan. (Queensland Weeds Society, Brisbane) pp. 237-239.

Faithfull, I., Hocking, C. and McLaren, D.A. (2008) An assessment of the composition and cover of vascular plants associated with patches of *Nassella neesiana* (Trin. & Rupr.) Barkworth (Poaceae) in Australian native grasslands. Proceedings of the 16th Australian Weeds Conference, eds R.D. van Klinken, R.D., V.A. Osten, F.D. Panetta and J.C. Scanlan. (Queensland Weeds Society, Brisbane) pp. 206-208.

Faithfull, I., Hocking, C. and McLaren, D.A. (2008) An investigation of the effects of disturbance on the establishment of *Nassella neesiana* (Trin. & Rupr.) Barkworth (Poaceae) in an Australian native grassland. Proceedings of the 16th Australian Weeds Conference, eds R.D. van Klinken, R.D., V.A. Osten, F.D. Panetta and J.C. Scanlan. (Queensland Weeds Society, Brisbane) pp. 202-204.

Fox, J.C., Buckley, Y.M., Panetta, F.D., Boutgoin, J. and Pullar, D. (2009) Surveillance protocols for management of invasive plants: modelling Chilean needle grass (*Nassella neesiana*) in Australia. Diversity and Distributions. 15 (4), 577-589.

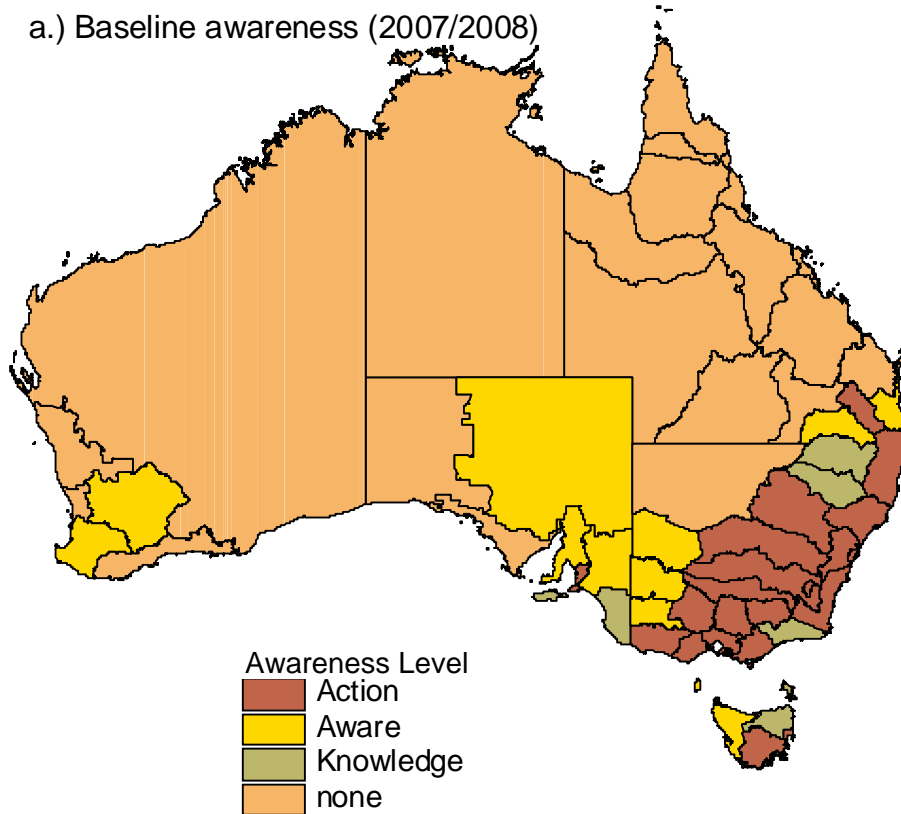
Grech, C.J., McLaren, D.A. and Sindel, B.M. (2008) Chilean needle grass - three years of Best Practice Management. Proceedings of the 16th Australian Weeds Conference, eds R.D. van Klinken, R.D., V.A. Osten, F.D. Panetta and J.C. Scanlan. (Queensland Weeds Society, Brisbane) pp. 487-490.

McLaren, D.A., Snell, K. and Butler, K. (2008) An assessment of native tree susceptibility to the simulated aerial application of the herbicide flupropanate, for management of exotic unpalatable grasses. Proceedings of the 16th Australian Weeds Conference, eds R.D. van Klinken, R.D., V.A. Osten, F.D. Panetta and J.C. Scanlan. (Queensland Weeds Society, Brisbane) pp. 323-325.

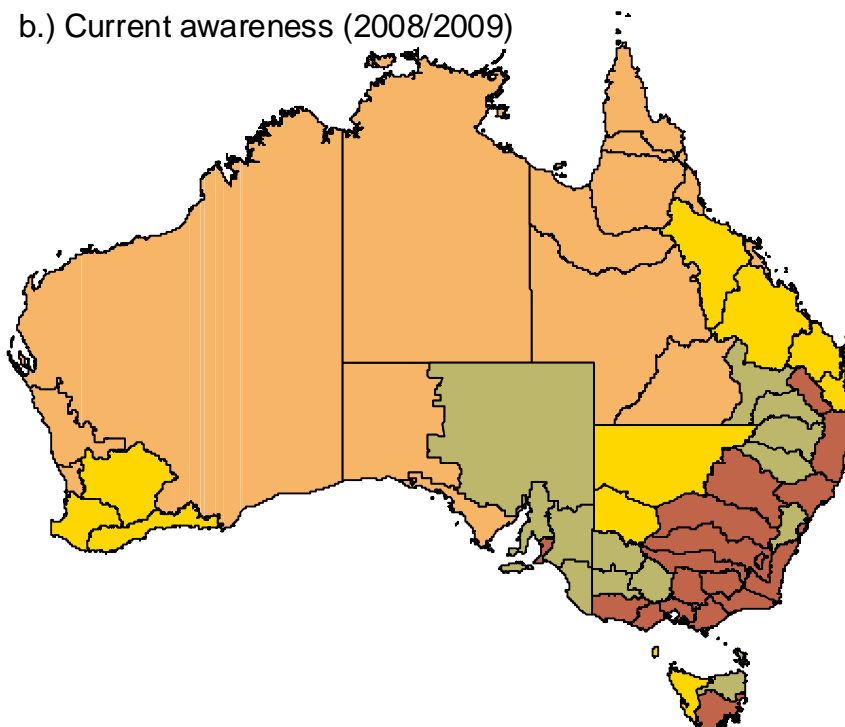
McLaren, D.A. (2008) Historical aspects of commercial weed invasions - Perennial grass case studies. Plant.Prot.Quart. 23(2) 9-13.

APPENDIX C: Change in awareness of the CNG threat in regions across Australia

a.) Baseline awareness (2007/2008)



b.) Current awareness (2008/2009)



APPENDIX D: Statement of expenditure of funds for national coordination

Please note: There are three statements of the expenditure. These reflect the fact that there were two contracts and two funding sources to report on for the National CNG coordination during the 08/09 financial year as a result of carryover.

First Statement of expenditure of funds: 1 JULY – 30 NOV

Jul - Nov 2008		Planned budget		Actual Expenditure	
Employees & Positions Held	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)	
National CNG management Co-ordinator		\$37,592		\$30,115.28 [^]	
0.1 Project Leader Vic Priority Weeds DPI	\$3,647				
Vic DPI Statewide Leader Weed Sciences	\$2,212				
Research Officers and DPI Extension officers	\$46,250				
National CNG Taskforce	\$24,500				
A Total Employment Costs	\$76,609	\$37,592		30,115.28	
Operating Cost Items	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)	
National Co-ordinator operating expenses	\$4,291	\$10,417		\$11,069.16	
WoNS Publications CNG best practice management brochure revision and reprint (8000)	\$1,250	\$3,000		\$3,369.08	
National CNG Taskforce operating	\$7,500	\$6,480		\$5810.14	
B Total Operating costs	\$13,041	\$19,897		\$20,248.38	
C Total Cost (without GST) (A+B)	\$89,650	\$57,489		50,363.66	
D GST (10%)	\$8965	\$5,749		\$5,036.37	
E Total Cost (including GST)	\$98,615	\$62,238		\$55,400	

[^]Underspend due to vacancy in the position whilst CNG coordinator was on secondment. The underspent funds were carried over (see Second statement of expenditure).

Second Statement of expenditure of funds: 1 JULY – 30 NOV (carryover only)

Jul - Nov 2008		Planned budget		Actual Expenditure	
Employees & Positions Held	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)	
	National CNG management Co-ordinator				
A	Total Employment Costs				
	Operating Cost Items	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)
	National Co-ordinator operating expenses				\$2,992.64
	WoNS extension materials <i>(including new region specific flyers and signage)</i>		\$7125.34*		\$0
	National CNG Taskforce operating				\$4132.70
B	Total Operating costs				\$7125,34
C	Total Cost (without GST) (A+B)				\$7125.34
D	GST (10%)				\$712.53
E	Total Cost (including GST)				\$7837.87

*For reasons stated in the final performance report and variation letter to DAFF, carryover funds allocated for the development of extension materials were redistributed to cover coordinator and taskforce operating expenses. WoNS extension material was transferred to the third expenditure report (shown below).

Third Statement of expenditure of funds: 1 DEC 08 – 30 JUNE 09

Dec08 Jun09		Planned budget		Actual Expenditure	
Employees & Positions Held	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)	
National CNG management Co-ordinator		\$52,630		\$50,715.80	
0.1 Project Leader Vic Priority Weeds DPI	\$5,106		\$4,901		
Vic DPI Statewide Leader Weed Sciences	\$3,096		\$2,972		
Research Officers and DPI Extension officers	\$64,750		\$62,160		
National CNG Taskforce	\$34,300		\$32,928		
A Total Employment Costs	\$107,252	\$52,630	\$102,961	\$50,715.80	
Operating Cost Items	Recipient's Contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's Contributions Expended (without GST)	Commonwealth Funds Expended (without GST)	
National Co-ordinator operating expenses	\$6,000	\$14,583	\$2,822	\$6,259.96	
Improving Local Government uptake of best practice management – slasher covers	\$20,000	35,000	\$2,200	\$0*	
Improving CNG identification resources - seed deck scoping project	14,800	16,489	\$300	\$0*	
WONS extension materials (including new region specific CNG Awareness flyers and signage)	5,750	\$7,083	\$500	\$0 [#]	
National CNG Taskforce operating	\$10,500	\$9,333	\$4,946	\$8,577.53	
B Total Operating costs	\$57,050	\$82,488	\$10,768	\$14,837.49	
C Total Cost (without GST) (A+B)	\$164,302	\$135,118	\$113,729	\$65,553.29	
D GST (10%)	\$16,430	\$13,512	\$11,372	\$6555.32	
E Total Cost (including GST)	\$180,732	\$148,630	\$12,5101	\$72,108.61	

*At time of acquittal the subcontract with the project deliverers (DPI Vic) had not been finalised This budget line has since been fully expended.

* Project still in planning stage and no funds have been expended

#Project nearing completion and payment is to be made in Sep 09.