

REGIONAL WEED MANAGEMENT PLAN

1.1 PLAN TITLE: Serrated tussock Regional Management Plan

1.2 PLAN PROPONENTS

Regional Weeds Advisory Committee: Southern Tablelands & South Coast Noxious Plants Committee

Address:

Contact person:

Telephone number:

Facsimile number:

Email address:

Signature: Chairperson: Date:.....

1.3 NAME OF PLANT(S)

WONS Y/N

Yes

Botanical name(s): *Nassella trichotoma*

Common name(s): serrated tussock

1.4 PLAN PERIOD

Starting date: 1st July 2003 Completion date: 30th June 2008

1.5 AREA OF OPERATION: Southern Tablelands & South Coast Region

1.6 AIM:

To strategically contain and control infestations of serrated tussock

1.7 OBJECTIVES¹:

1. To stop the spread of serrated tussock into the uninfested areas identified in the 2002 mapping
2. To control all rare, isolated and new infestations
3. To strategically reduce infestations in marginal areas
4. To improve species identification by landholders and practitioners
5. To establish and make available to land managers best management practices (including rehabilitation) to help reduce infestations in core areas
6. To protect vulnerable high conservation areas from infestation
7. To develop and implement protocols to reduce the risk of seed spread

¹ Time frames and measurable performance indicators are contained within Section 7 – Strategic Actions.

ACRONYMS

ACT	Australian Capital Territory
ACTDUS	ACT Department of Urban Services
ACTWWG	ACT Weeds Working Group
ARMCANZ & ANZECCFM	Agriculture and Resource Management Council of Australia and New Zealand, Australian and New Zealand Environment and Conservation Council and Forestry Ministers
BLCS	Bush and Land Care Services
BMA	Biodiversity Management Action
BMT	Biodiversity Management Target
CMB	Catchment Management Boards
CMBp	Catchment Management Blueprint
CRC	Cooperative Research Centre
DLRA	Department of Lands and Rural Affairs (formerly Department of Lands and Water Conservation)
LCA	Local Control Authority
LGA	Local Government Area
NHT	Natural Heritage Trust
NSW	New South Wales
NSW Ag	NSW Agriculture
NSWNPWS	NSW National Parks and Wildlife Service
NWAC	Noxious Weeds Advisory Committee
RIRDC	Rural Industries and Research Development Corporation
RLPB	Rural Lands Protection Board
RTA	Roads Traffic Authority
SCA	Sydney Catchment Authority
SEMT	Social and economic Management Target
SLMA	Soil and Land Condition Management Action
SLMT	Soil and Land Condition Management Target
SRA	State Rail Authority
ST	serrated tussock
ST&SCNPC	Southern Tablelands and South Coast Noxious Plants Committee
TSC Act	Threatened Species Conservation Act 1995
VA	Vegetation and Biodiversity Action
VBMT	Vegetation and Biodiversity Management Target
WONS	Weeds of National Significance

2.0 EXECUTIVE SUMMARY

Serrated tussock is a Weed of National Significance which seriously threatens the viability of grazing land and land values throughout the Region. Many high conservation grassland and grassy woodland areas in the region are also vulnerable to invasion. Regionally, serrated tussock infestations are widespread, although it is thought to have only reached 20% of its possible range. If control works are not undertaken cooperatively and strategically, the range of serrated tussock in NSW and the ACT would rapidly and significantly expand as will the density of existing infestations. The financial losses may be over \$50 million per annum in loss production and important agricultural lands and natural environments, threatened species and communities will be either totally lost or forever degraded.

Councils of the Region, Department of Lands and Rural Affairs, Catchment Management Boards and NSWNPWS are major signatories of the Plan. Implementation of the Plan by these stakeholders and other land managers and authorities listed within the Plan (Section 3 and Section 4.6) is considered critical to its success.

The Plan details strategies for the management of serrated tussock in the region for the period from 2003 to 2008. These strategies include:

- **Mapping of infestations (Section 7):** Improvement to the accuracy of location map (Map 1) with input from all land management authorities; standardisation of techniques and criteria; and updates to the map every two years. Two categories of 'absent' areas are also to be mapped during the next update.
- **Prioritising operational and control response (Section 7):** Operational responses have been prioritised within 'absent', 'rare and isolated', 'marginal' and 'core' infestations. Further prioritisations are based on the 'cleanliness' of catchments.
- **Improvement to grazing, pasture and land management practices (Section 6.2 and Section 6.3):** Promotion through education and extension of improved land management practices. Landuse change, revegetation and reforestation in areas with intractable infestations will be actively promoted with the possibility of customised management plans for core infestations.
- **Improved hygiene and quarantine procedures (Section 6.2.1 and Section 7):** Promotion of hygiene methods and protocols and other initiatives to restrict the movement of serrated tussock outlined within this Plan is considered essential.
- **Training, extension and education (Section 6.3 and Section 7):** Development and promotion of best-practice management and control techniques and strategic targeting of extension programs is highlighted within the Plan.
- **Improve availability of resources (Section 6.1 and Section 7).**
- **Targeted control operations for the protection of threatened species and communities (Section 7).**

It is anticipated that at a regional scale, the successful implementation of the actions contained within the Plan should restrict the spread and reduce the abundance of existing serrated tussock infestations. This will save industry both control and opportunity cost and will benefit the Region's agricultural industry, threatened species and communities, the environment, and the community.

3.0 STAKEHOLDERS

3.1 Signatories

The following organisations have signed an agreement to support and implement the Plan [This is still to be achieved]:

- Councils of the Southern Tablelands and South Coast – Bega Valley, Bombala, Cooma-Monaro, Crookwell, Eurobodalla, Goulburn, Gunning, Wollongong, Shellharbour, Kiama, Mulwaree, Queanbeyan, Snowy River, Shoalhaven, Southern Slopes (Boorowa, Harden, Yass and Young), Tallaganda, Wingecarribee, Yarrowlumla.
- WONS Serrated Tussock Steering Committee
- Rural Lands Protection Boards
- Murrumbidgee, Warragamba, South East, and Southern Catchment Management Boards
- NSW National Parks and Wildlife Service
- Department of Land and Water Conservation / Land and Rural Affairs
- ACT Department of Urban Services
- NSW State Forests
- Sydney Catchment Authority

3.2 Other Stakeholders

The following organisations have been involved in the planning process, either through notification or actual participation:

- NSW Agriculture
- National Farmers Association
- Landholders / Dairy Farmers / Cattle Producers
- Landcare
- Coastcare State Rail Authority
- Roads and Traffic Authority
- Country Energy
- Integral Energy

4.0 BACKGROUND

4.1 Reason for Plan

Serrated tussock is a highly invasive species that is impacting pasture, native grassland communities and roadside environments in southeastern Australia. The viability of grazing land and land values throughout the Region are threatened. Serrated tussock is a weed of national significance (WONS) and is so problematic that it seriously threatens the viability of grazing land and land values throughout the Region. Many high conservation grassland and grassy woodland areas in the region are also vulnerable to invasion. Regionally, serrated tussock infestations are widespread, although it is thought to have only reached 20% of its possible range (ACT Weeds Working Group 2001). Recent widespread fires and drought in the Region further exacerbated the threat posed by serrated tussock by creating ideal conditions for seedling establishment (BLCS 2002).

Serrated tussock has been described as potentially causing greater reductions in carrying capacity than any other plant in Australia (ARMCANZ & ANZECCFM 2000). It is arguably the

most problematic weed on the Tablelands and Monaro, costing over \$50 million per annum in lost agricultural production and control costs (ACTWWG 2001). Australia currently spends over \$45 million on its management per annum (Blood 2001). Sub-regional social and economic impact studies of serrated tussock are also detailed in iCAM (2001) and Jones and Campbell (1999) for the Monaro Region and BRS (2002) for the Lachlan Catchment.

The Scientific Committee, established by the *Threatened Species Conservation Act* (TSC Act), has made a preliminary determination to support a proposal to list the *invasion of native plant communities by exotic perennial grasses* as a Key Threatening Process in Schedule 3 of the Act. If final determination is approved landholders, occupiers and government land management authorities will have additional legal responsibility under this legislation to control this and other exotic perennial grasses (implementation of *Threat Abatement Plans*).

Serrated tussock is a declared noxious weed in all LCAs within the Region. Despite this, current control measures and strategies have not prevented the continued spread of the species or reduced its impact. A more effective management strategy for the weed requires a coordinated and integrated approach with committed involvement from all stakeholders.

Null hypothesis: The range of serrated tussock in NSW and the ACT would rapidly and significantly expand as will the density of existing infestations. Agricultural and environmental losses will be irreversible. Native species and communities will be lost. Other largely irreversible losses may be more specific to individual landholders or communities if they are forced to sell-up and leave. The financial losses will be valued at over \$50 million per annum in loss production and important agricultural lands and natural environments will be either totally lost or forever degraded.

4.2 Description of the problem

Serrated tussock has a fibre content of 86% and a protein content as low as 4%. This makes the plant indigestible and often fibre balls (undigested tussock leaves) lodge in the intestines of grazing stock, leading to poor condition and may eventually lead to starvation and stock deaths. Selective non-grazing by stock increases serrated tussock pasture competitiveness. Heavy infestations lead to a dramatic reduction in carrying capacity, rendering valuable land almost useless.

It can remain unnoticed in unimproved pastures, native grasslands and grassy woodlands until significant infestations have developed. It persists in native grasslands and will eventually form a monoculture unless control measures are taken.

The *Natural Temperate Grasslands of the Southern Tablelands and the ACT* are listed as an endangered ecological community under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. Remnant sites with these communities in the Region also provide habitat for a wide range of threatened species under the Commonwealth and NSW threatened species legislation including the striped legless lizard (*Delmar impar*), little whip snake (*Suta flagellum*), grassland earless dragon (*Tympanocryptus lineata pinguicolla*), mauve burr-daisy (*Calotis glandulosa*) creeping hopbush (*Dodonea procumbens*), Monaro golden daisy (*Rutidosis leiolepis*) and Austral toad-flax (*Thesium australe*). Serrated tussock, as well as a range of other weeds including, African lovegrass (*Eragrostis curvula*) and St Johns wort (*Hypericum perforatum*) are seen as threatening processes to temperate

grasslands through modification of community composition and habitat (Environment Australia Website 2002).

Invasion of native plant communities by exotic perennial grasses, such as, serrated tussock, is also an identified threat to a number of communities, and flora and fauna species listed on Schedule 1 and Schedule 2 of the TSC Act (NSW NPWS Website 2003, see reference list for link).

4.3 Distribution of infestations

Serrated tussock is thought to have been introduced into Australia in horse saddle stuffing from Argentina in the early 1900s but was not recorded in Australia until 1935. It now occupies more than 700,000 hectares in NSW and 100,000 hectares in Victoria and has the potential to infest more than 30,000,000 hectares nationally. The estimated area covered by serrated tussock in Australia in 1999 was 1,000,000 hectares (ARMCANZ & ANZECCFM 2000).

It invades dry coastal vegetation, lowland grassland and grassy-woodland, dry sclerophyll forest and woodland, rock outcrop vegetation, river corridors, roadsides, pastures and waste places. Hot summer temperatures limit the distribution of serrated tussock, as does salinity waterlogging and heavy tree and/or shrub canopy. Serrated tussock is tolerant to poor soils, drought, fire and grazing, and has few natural enemies in Australia.

Serrated tussock occurs in the following Local Control Authority areas: Goulburn, Mulwaree, Wingecarribee, Queanbeyan, Shoalhaven, Crookwell, Boorowa, Cooma-Monaro, Snowy River, Gunning, Wingecarribee, Yass, Tallaganda, Bombala, Yarrowlumla, Bega Valley and the ACT.

Coastal LCAs, such as, Wollongong, Kiama, Shoalhaven and the Eurobodalla are currently less affected by serrated tussock (Map 1).

4.4 Weed biology / ecology

Serrated tussock belongs to the Poaceae grass family and is a perennial, drought resistant species that is native to the pampas grasslands of Argentina, Chile, Peru and Uruguay. In its natural environment it is rarely a dominant species as there are more competitive unpalatable perennial grasses that dominate its niche (Badgery 2002). The species grows to a height of approximately 50 cm and a diameter of 25 cm at the base. Mature plants have drooping leaves that may extend the plant diameter to 75 cm.

Seeds germinate mostly in autumn and winter. Plants rarely flower in the first year but continue to grow vegetatively until the spring or summer of their second year. Mature plants can produce up to 100,000 seeds that are well adapted to wind dispersal spreading in excess of 30 km. (ACTWWG 2001). Soil seed banks are typically large. Although the vast majority of the seed has either germinated, been eaten by ants, or otherwise lost within three years, some seed may still be viable after several decades (ARMCANZ & ANZECCFM 2000). Seedlings are slow growing and weak, however, once established individual tussocks live for more than 20 years (NSW Agriculture 1995).

4.5 Method and rate of spread

Serrated tussock is a prolific seeder and a single plant can produce as many as 100,000 seeds and a hectare of dense serrated tussock has been estimated to produce over 2 tonnes of seed per year (McLaren undated).

The main method of spread is via wind dispersal with seeds travelling typically up to 1.2 km, but sometimes in excess of 30 kilometers. Seed is also carried in wool or hair of livestock and in the gut of grazing animals (seeds can remain in the gut of an animal for 10 days).

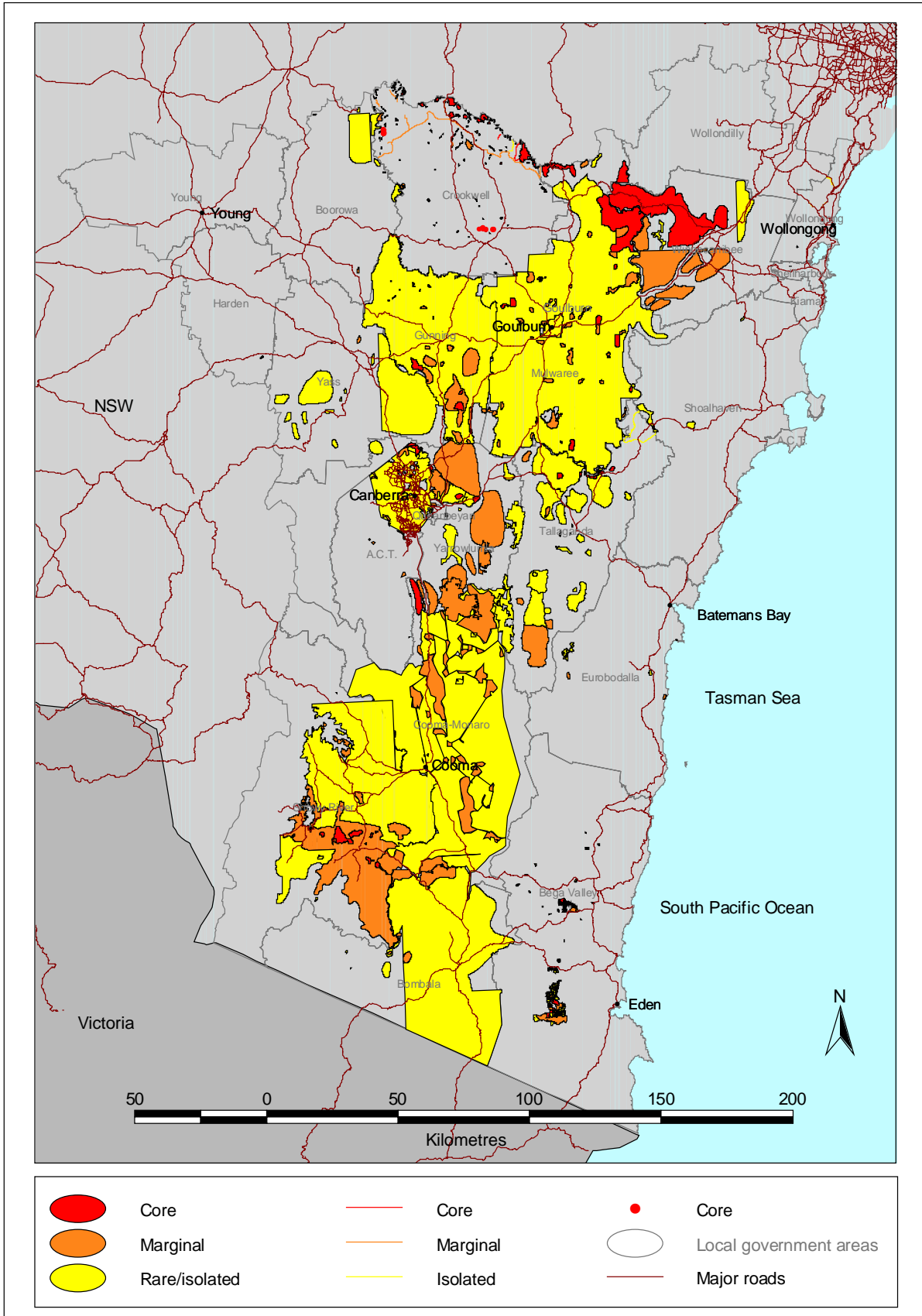
The greatest long-distance dispersal hazards are through human-mediated vectors, such as, movement in hay, machinery and motor vehicles.

4.6 Roles and responsibilities of land managers

Implementation of the Regional Plan by the following land managers is considered critical to its success:

- Private landholders to control serrated tussock on their own land and to participate in regional/catchment/Landcare groups.
- Roadside, easement and corridor managers (e.g. RTA, State Rail, Actew/AGL, Australian Pipeline, Country / Integral Energy) who are to ensure adequate plant and equipment hygiene is undertaken and that their works/operations are conducted in such a way to reduce the risk of serrated tussock spread.
- Land management authorities (Environment Australia, SCA, Councils, Defence, DLRA, ACT Department of Urban Services, Rural Lands Protection Boards, NSW National Parks and Wildlife Service, Forest industries, and local councils) to restrict movement of weeds, develop cooperative management programs and ensure serrated tussock control is undertaken on crown lands, especially in threatened communities and where critical to support strategies on local agricultural lands.
- Catchment Management Boards to implement catchment management blueprints, to provide clear direction and cooperation of all land managers, to develop cooperative management programs and to assess projects submitted for funding under Commonwealth and State natural resource management grant programs.

Map 1: Serrated tussock distribution and density



5.0 LEGISLATIVE SITUATION

5.1 Current declaration

Serrated tussock is a prohibited species under *The Quarantine Act 1908* and may not be brought into, or sold in Australia (ARMCANZ & ANZECCFM 2001). The Commonwealth Government through Biosecurity Australia / AQIS prevents introduction of all *Nassella* species into Australia.

The species has been declared noxious under the *Noxious Weeds Act 1993* in all LGAs within the Region. The Southern Slopes County Council (Boorowa, Harden, Yass and Young) have declared serrated tussock at the W3 level, the Bega Valley Shire a split W2/W3 level, and the remaining LCAs have declared serrated tussock at the W2 level. It is a declared pest plant under the *Land (Planning and Environment) Act 1991* in the ACT.

5.2 Declaration changes

Declaration changes for local councils in the Region are probable as economic realities place questions on the ability to enforce W2 and W3 declarations in extensive heavily infested non-arable, low-productive lands where the cost of control is far greater than the economic return from the land. A new declaration is to be investigated that would allow councils to develop individual management plans for affected landholders. These management plans will be enforceable and will allow a more flexible and strategic approach to the control of core and intractable serrated tussock. For instance, it could focus available resources on creating buffer or strategic control areas nominated by the council enabling more efficient use of these resources or on the protection of threatened grassland or woodland communities. LGAs that are suitable for this type of declaration include the Snowy, Tallaganda, Wingecarribee, Gunning and the Mulwaree Shire.

The implementation of enforceable management plans in W2 declared areas is currently being investigated through NSW Agriculture. If this is acceptable, many LCAs within the region should consider the use of this strategy. In the interim and where local weed officers consider appropriate, the attachment or inclusion of property or weed management plans to weed notices is recommended. To ensure compliance, these plans must be agreeable to all parties and unambiguous. Notices must also be unambiguous when referring to such plans.

Sub-regional or split declarations could also be investigated in W2 declared LCAs with isolated intractable infestations. A W3 or a new declaration with enforceable management plans as described above, could be used in the creation of buffer or strategic control zones surrounding isolated core and intractable infestations. Other parts of the region with marginal to rare infestations would remain at W2 level. LCAs that should consider this type of declaration include Crookwell and the Yarrowlumla Shire.

6.0 CONSIDERATIONS AND OPPORTUNITIES

6.1 Opportunities to be exploited

Mulwaree Shire is currently (2002/3) developing an intractable serrated tussock strategy for core infestations within the shire. The project will focus on alternative strategies to the conventional chemical control programs. It will also investigate funding sources to assist in on-ground control actions by landholders, groups and agencies within targeted areas. If successful, methods and actions identified in the Strategy could be extended to assist in the control of serrated tussock in similar locations and circumstances throughout the Region.

Funding and resource opportunities to be investigated in the control of serrated tussock include;

- the Noxious Weed Grant scheme for control on Council and RLPB land (administered through NSW Agriculture);
- funding from the Federal Government under National Weed Strategy;
- grants to Landcare, Rivercare and Bushcare groups that meet objectives of catchment strategies and the Natural Heritage Trust;
- funding from Rural Industries and Research Development Corporation (RIRDC) and other wool and meat bodies; and
- grant funding from agencies or trusts that can assist in reforestation including Greening Australia, Greenfleet, Farm Forest Program, EPA Environment Trusts *etc.*

6.1.1 Priority for additional funding

Additional funding opportunities are to be actively and continually sought through the means outlined above. The following is a list (not necessarily in order) of priority uses for additional funding:

- The employment of a Regional serrated tussock and African Lovegrass agronomist or extension officer. The position would oversee the implementation of Regional Plans (in particular extension and education) and facilitate coordination amongst all stakeholders.
- The employment of property weed management planning officer. The position would develop standard property management proforma and provide extension and implementation training to all weed officers.
- Improve roadside control. Additional funding could allow every road-side to be checked for all noxious weeds, and infestations controlled and rehabilitated every year.
- Increase inspections and control operations. Additional funding could allow performance indicators for strategic actions listed in Section 7 to be met earlier than the indicated timeframes. Additional funding will also enable marginal and core areas to be further reduced than that specified in Section 7.
- Development of intractable serrated tussock strategies.

6.1.2 Other opportunities

The Rural Assistance Authority's *Special Conservation Scheme* also provides additional funding resources for landholders. The Scheme is an incentive-based initiative aimed at promoting improved land management practices within NSW. This scheme provides a concessional interest rate loan for serrated tussock control of up to 90% of the net cost of the works to a ceiling of \$100,000. To be eligible, landholders must be able to show, among other things, that the farm enterprise provides the majority of the landholders gross income and demonstrate the work will have a significant beneficial impact on the land, the community and the environment and are not purely productivity based. The former criterion unfortunately prevents small landholders who do not rely on their land for income from applying for these loans. This is unfortunate as a significant portion of the Region's serrated tussock problems occurs on land in these situations.

An improved incentive scheme for large and small landholders is to be investigated through Natural Heritage Trust (NHT). Dollar for dollar (or other proportions) payments or other incentives (e.g. provision of chemical, purchase and time-share of equipment through Landcare groups etc.) to all landholders for serrated tussock control aligning with an approved program (either the Regional plan or Council project) is to be investigated.

Opportunities exist to obtain better practices from current weed management research. Benefits may also be obtained from low-key involvement in the projects. The current research includes:

- biological control of serrated tussock by CSIRO and CRC Weeds;
- the National coordination of serrated tussock demonstration sites and the development of the national best practice management guide and Website by NSW Agriculture and CSIRO;
- best practice testing and demonstrations for serrated tussock by the University of New England;
- a community education and control project by the University of New England;
- a strategic serrated tussock management project by the *Upper Murrumbidgee Landcare Inc.*; and
- the integrated management of serrated tussock using native grasses to out-compete serrated tussock by Warwick Badgery, A PhD student funded by the CRC for weed management systems.

Joint management ventures may be pursued through:

- coordinated control programs with Rural Lands Protection Boards on and adjoining Travelling Stock Reserves; and
- coordinated control programs with NSW National Parks & Wildlife Service, ACT Department of Urban Services and other public land managers.

No specific region-wide agreements have been reached on the above opportunities, however given the threat potential of the weed, the plan has recommended a forum to investigate the above opportunities.

Serrated tussock's weaknesses (*i.e.* weak seedlings and intolerance to a heavy canopy cover) also create important opportunities for control through herbicide, grazing management, and forestry (see Section 6.2 for more details).

6.2 Species management

Management techniques for serrated tussock are not always effective and may seriously impact on desirable vegetation. Methods to achieve management of serrated tussock need considerable development, extension and integration. The combination of chemical, mechanical, rehabilitation, competition, grazing management, biological control, hygiene protocols and vigilance are required to reduce the spread and impact of serrated tussock. Other opportunities requiring development and investigation exist in several areas including biological control, herbicide technologies, pasture management, agri-forestry, fire and revegetation (McLaren undated).

Serrated tussock infests three broad categories of land. These are arable, non-arable- high fertility and non arable-low fertility and/or acid soils. On arable land there is a wide choice of suitable control measures and on non-arable high fertility land success can be achieved using aerial application of herbicides followed by aerial pasture establishment or strategic pasture management to encourage background pasture species. Non-arable, low fertile and/or acid soils are the most problematic. In some cases the most viable long-term solution is to retire the country from agriculture (Leech *et al.* 2002).

One of the most important factors in managing serrated tussock is to ensure pastures remain vigorous to maintain groundcover and competition. Repeated applications of low dosage rates of Flupropanate can aid pasture establishment by killing the weak serrated tussock seedlings. Dr Malcolm Campbell (McLaren undated) has shown that rates as low as 0.1-0.2 L/ha can kill serrated tussock seedlings, a great advantage when establishing new pastures.

In addition, Mr Warwick Badgery's research is suggesting that C4 native grasses such as kangaroo Grass (*Themeda spp.*) and red grass (*Bothriochloa spp.*) may be more competitive against serrated tussock than any other native or introduced grasses in marginal areas. Initial findings have suggested that under low fertility conditions C4 grasses are very good competitors, and a management strategy to encourage these grasses may be desirable.

Reforestation using plantation pine or sugar gum (*Eucalyptus cladocalyx*) reduces serrated tussock density after about 10 years and has proven an economic option in parts of New South Wales and Victoria (Anderson 2001), however in other parts of the state the economic returns have been inconsistent. Reforestation with native species is usually a better option as it requires less maintenance and has potentially less environmental effects (*e.g.* pine wildling invasion of native bushland). In some situations, care is required however to ensure reforestation does not provide refuge for pest animals leading to increased pest control costs on adjacent lands.

There are no biocontrol agents released in Australia for serrated tussock. Research into three possible fungal pathogens has been occurring in Argentina over the past three years. There appears, however, to be problems with host specificity for all three pathogens (Leech pers.comm. 2002) and releases of agents are not expected to occur during the life of this plan.

6.2.1 Hygiene and Quarantine procedures

Practices such as implementing plant, equipment and material hygiene, and restricting livestock movement during 2-3 months of the year during seeding, from infested areas to clean areas are important in reducing the species spread. Local quarantine methods and zones should be established to address seed dispersal issues. Further initiatives to restrict movement of serrated tussock seed may include:

- Identification training for land managers, road-side management authorities and utility employees, National Park Staff and other agencies. This should focus primarily in localities where serrated tussock is absent, rare and/or isolated;
- Development and dissemination of contact lists, maps and web sites to improve communications between weed officers, land management authorities and roadside, utility easement and corridor managers.
- Altering roadside slashing and mowing regimes, *i.e.*, improve hygiene, prevent roadside slashing occurring in infestations when species is seeding; and prevent roadside slashing starting in core infestations and moving out into clean or marginal areas; and
- hygiene requirements included in tender or contract specifications.
- Promoting on-farm quarantine methods, for example, using holding paddocks for contaminated stock prior to or after transportation, minimising stock movement from infested paddocks to clean paddocks and cleaning of on- or off-farm vehicles that have passed through serrated tussock.
- Suppressing serrated tussock along roadsides.

Councils, weed officers and road and utility easements authorities should undertake the following as a minimum:

- avoid where possible organising and travelling/working in known serrated tussock areas when seeding (late spring to summer) and only travel through serrated tussock areas when it is absolutely necessary;
- work from clean areas towards the infested areas;
- develop and implement procedure manuals for the prevention of the spread of noxious weeds and plant and animal diseases and ensure relevant employees/contractors are aware of the provisions of the procedure manual;
- obtain up-to-date weed distribution maps from local weed officers or from the Regional Weeds Committee;
- avoid regular maintenance work along roadsides and utility easements during seeding period (late spring to summer).;
- contact the land management authority prior to entering known serrated tussock areas;
- clean vehicles and all other tools and equipment before leaving, or immediately after leaving, any known serrated tussock areas. Cleaning of vehicles and tools is to be carried out in accordance with the requirements of the land manager or by the following methods (adapted from Country Energy unpub.);
 - Liaise with the landowners/mangers as to the availability of washdown facilities;

- Use portable or existing washdown facilities immediately after working in known serrated tussock infested areas and before leaving the area; and
- Carry out cleaning in, or as near as possible to, the infested area.
- When washdown facilities are not available, vehicles and tools area to be broomed down to the best of the employees or contractors ability.

6.3 Extension and education

Public awareness of serrated tussock and its impacts are to be raised through:

- involvement of community groups in identification and mapping of serrated tussock infestations e.g. Landcare, Bush Care, Friends groups *etc.*;
- regionally coordinated publicity campaigns aimed at seasonal situations e.g. in winter the importance of ground cover to control emerging plants, and in spring the importance of preventing seed set;
- priority on using property inspections as the major tool in developing management plans and Property Management Agreements (ACT) with landholders;
- articles in targeted magazines, newspapers and journals; and
- education and training of stock and pasture management through initiatives such as Prograze

Strategic targeting of extension programs is an important ancillary measure to other aspects of a strategic and integrated weed control program. The extension and education program identified in the plan is premised upon the following strategies;

- extension programs are to be integrated with other weed management activities where possible *i.e.* inspection programs or Landcare initiatives;
- targeting awareness and identification programs for serrated tussock in rare and isolated, and absent areas;
- targeting extension and training towards landuse change options in areas with intractable weed infestations;
- targeting extension programs towards absentee landholders and those not working the land;
- aligning the detail and volume of extension materials and programs with the scale of the weed problem;
- undertaking extension programs in partnership with organisations such as Landcare;
- targeting extension post drought or other disasters particularly where fodder has been imported or restocking programs implemented;
- targeting areas effected by wildfires and wildfire suppression activities (*i.e.* where disturbances such as control lines have been established particularly through existing infestations).

An extension strategy currently in production for the Region is to target problems associated with the continued subdivision of rural land, which has created many landholders who do not

require their land for income and who derive no benefit from expensive control programs. Actions (see Section 7) within the Regional Plan commit in-principle support to this Strategy.

6.4 Links to other strategies

This Plan is linked to the Southern Tablelands and South Coast Regional Weed Strategy (currently in production). All direct funding proposals and priorities for the serrated tussock Regional Plan will support the goals of the NSW Weeds Strategy and the Regional Weeds Strategy.

In addition the Plan conforms to the following strategies:

- NSW Weeds Strategy
- ACT Serrated Tussock Management Plan
- ACT and NSW Biodiversity Strategies

The Regional Plan links with and supports the majority of regional responsibilities and actions outlined in the National Weeds Strategy and the Weeds of National Significance Serrated Tussock Strategic Plan. Details of supporting links are contained within Appendix 2 (p.27)

The Regional Plan is also consistent and supports the target outcomes of the Lachlan, Murrumbidgee, South East, Warragamba and Southern Catchment Management Blueprints. Details of supporting links are contained within Appendix 3 (p.31).

6.5 Barriers and contingencies

Barriers and contingencies identified in Table 1 may limit the success of serrated tussock programs. Actions identified in the Plan to overcome these barriers and contingencies are identified in Table 1.

Table 1: Responses to identified barriers and contingencies

Barrier / Contingency	Responses	Strategic Actions (Section 7)
The current known distribution of the weed is likely to be inaccurate and the species is difficult to positively identify when it is not flowering.	<ul style="list-style-type: none"> • Additional mapping effort., maps updated every second year, absent areas identified and mapped, and monitoring system and database to be developed • Extension and training strategically aimed at increasing awareness of ST and the ability of stakeholders to identify it. 	<p>Actions 1, 2 and 3</p> <p>Actions 10 and 12. See also Section 6.3</p>
Natural disasters can promote Serrated tussock spread and density	<ul style="list-style-type: none"> • Implementation of Disaster Strategy Actions and priority given to areas affected by recent wildfires 	Action 12

Barrier / Contingency	Responses	Strategic Actions (Section 7)
The skills, motivation, money or infrastructure to control ST may not exist for some private landholders, occupiers and government departments.	<ul style="list-style-type: none"> • Development of incentive schemes, tailored property weed management plans, intractable infestation strategies, pasture and grazing management schemes, effective distribution of best practice serrated tussock management guidelines and extension and training initiatives. • Government departments are to be signatories to the implementation of the Regional Plan. Plan is to support targets of the National Strategy and Catchment Management Blueprints. 	<p>Actions 6, 12 and 14</p> <p>Section 2.1 and Appendices 2 and 3</p>
Seed spread over 2 to 3 months of the year is difficult to control especially via wind, plant and equipment and movement of livestock from infested areas to clean areas. This problem is exacerbated by natural disasters such as droughts, floods and fires.	<ul style="list-style-type: none"> • Strategic control in areas currently weed free and other priority areas. Encouragement and assistance to landowners with clean properties in core areas. • Promotion and Implementation of quarantine and hygiene protocols for properties, roadsides, utility easements and those who work in ST infested areas. Promotion of risk-minimising fodder feeding and stock movement practices during natural disasters. 	<p>Actions 3, 4, 5 and 6</p> <p>Action 7 and Action 12</p>
Knowledge of locations of isolated infestations can be lost when staff leave or transfer in government and other land management agencies	<ul style="list-style-type: none"> • Additional mapping effort, maps updated every second year, absent areas identified and mapped, and monitoring system and database to be developed 	<p>Actions 1, 2 and 3</p>
Land rehabilitation may be required after control works to avoid reinvasion by serrated tussock propagules and other invasive weed species	<ul style="list-style-type: none"> • Use of property weed management plans as a control tool; encouragement of community groups such as Landcare; promotion of pasture training programs; effective dissemination of best-practice management; and the promotion of off-target mortality reduction methods 	<p>Actions 8, 9, 12, and 13</p>
Insufficient funding is available to promote awareness and response to problem	<ul style="list-style-type: none"> • Mechanisms and opportunities to access additional funds are identified. 	<p>Action 14 (see also Section 6.1)</p>
Coordination and cooperative management is currently lacking along roadsides and riparian zones	<ul style="list-style-type: none"> • Seeking dialogue with roadside and easement managers, focus on clean catchments and managing roadsides strategically based on infestation levels. 	<p>Action 5</p>
Serrated tussock occurs in agricultural areas where the economic return from the land is often less than the costs of controlling the weed, or the weed occurs in non-arable land where rehabilitation will be extremely difficult	<ul style="list-style-type: none"> • Development of incentive schemes, tailored property weed management plans, intractable infestation training schemes, effective distribution of best practice serrated tussock management guidelines and extension and training initiatives. 	<p>Actions 6, 12, and 14</p>
The continued subdivision of rural land has created many landholders who do not require	<ul style="list-style-type: none"> • Rural- residential and rural lifestyle extension strategy (currently in production) is to be implemented. 	<p>Action 12</p>

Barrier / Contingency	Responses	Strategic Actions (Section 7)
their land for their income and who derive no benefit from expensive control programs		
The maintenance of effective on-going control in core areas may be difficult and may result in the infestation of currently clean properties within these areas.	<ul style="list-style-type: none"> • Encouragement and assistance to landowners with clean properties in core areas. • Management strategies are to be developed in intractable infestation areas that use effective and long-term management techniques. 	<p>Action 6</p> <p>Action 6</p>

7.0 ACTIONS AND PERFORMANCE INDICATORS

Strategic actions for the control of serrated tussock during the period 2003 - 2008 are given below. Actions flagged with an asterisk (*) are considered essential components of the plan.

Actions have been guided by the aims and objectives and also by the underlying strategic directions of the Serrated Tussock Regional Plan, which are to;

- prevent and initiate rapid control of new infestations;
- control rare and isolated infestations as a priority;
- significantly reduce marginal infestations and core infestations in priority areas;
- integrate serrated tussock control with best land management practices and other weed management programs; and
- seek regional cooperation to overcome barriers (Section 6.5) to effective ST management.

ACTION		Performance Indicator	Who is to be responsible (add others involved)	Objective number
Mapping				
1	a) Complete more accurate mapping of serrated tussock (ST) throughout the Region (e.g. at 1:25 000 scale (or larger). b) Update mapped information (preferably on GIS) at least every second year. c) See also Action 2 and 5 below (mapping in absent and core areas)	a) More accurate map produced by July 2004 (note that ID is difficult outside flowering, therefore should be completed between October and January) b) Maps updated at least every second year.	ST&SCNPC (LCAs, NPWS, ACT Department of Urban Services, DLRA)	1
Strategic response				
2*	Absent areas a) Areas identified as absent to be remapped as 'absent-confirmed' or 'absent - not confirmed' b) Confirmed absent areas to be inspected or surveyed every five years. c) 'Absent but not confirmed' areas to be prioritised for surveying programs	a) Next update of maps to include new classifications. b) Confirmed absent areas are checked prior to 2008 c) 50% of 'Absent – not confirmed' areas surveyed prior to each map update.	LCAs and all stakeholders	1, 2
3	New, Rare and Isolated populations a) All new infestations eradicated* ¹ b) All known rare and isolated infestations eradicated* ¹ or at an appropriate level* ² . c) All locations with rare and/or	a) New infestations eradicated* ¹ within a year of detection. b) Currently known isolated infestations eradicated* ¹ or at an appropriate level by July 2006. The eradication work schedule is as follows: Year 1: seek funding and map exact locations of isolated	Affected LCAs	2

	ACTION	Performance Indicator	Who is to be responsible (add others involved)	Objective number
	<p>isolated populations to be inspected every two years.</p> <p>d) Isolated infestations in otherwise clean areas are prioritised</p> <p>e) To assist in annually inspections of rare and isolated populations an appropriate monitoring system and database is to be developed</p>	<p>infestations (GPS grid referenced and recorded) and commence control program, Year 2 - 3: 50% of eradication work completed annually.</p> <p>c) Annual reports indicate inspections occurred.</p> <p>d) Annual reports indicate that sites in otherwise clean areas have been prioritised</p> <p>e) Monitoring system and database developed and implemented by December 2005</p>		
4	<p>Marginal populations</p> <p>a) All known marginal infestations significantly reduced.</p> <p>b) Isolated marginal populations are prioritised for control</p>	<p>a1) At least 50% of properties affected inspected and appropriate action taken within 1 year of inspection.</p> <p>a2) Currently known marginal infestations reduced by 75% (region-wide) by July 2008. This is to be verified through annual reports.</p> <p>a3) Majority of sites where control has occurred are rehabilitated within 1 year.</p> <p>b) Marginal populations in otherwise clean catchments reduced by 75% by December 2008</p>	Affected LCAs	3
5	<p>Roadside populations</p> <p>a) Full roadside control undertaken in rare and isolated areas – suppress to the fenceline</p> <p>b) Full control of roadsides in marginal areas which then pass through into rare, isolated or absent areas</p> <p>c) Approach RTA regarding joint control ventures and cooperative management programs.</p> <p>d) RTA and council to develop and adopt hygiene protocols for working in ST infested areas</p> <p>e) RTA and utility and easement managers to be provided with ST distribution maps on an annual basis</p>	<p>a) and b) Annual control programs are undertaken along roadsides</p> <p>c) Correspondence to RTA sent by end of December 2003</p> <p>d) Protocols developed and in place by July 2004</p> <p>e) RTA and other utilities receive ST distribution maps on an annual basis.</p>	LCAs, NSW Agriculture	1, 2,3 and 5

	ACTION	Performance Indicator	Who is to be responsible (add others involved)	Objective number
6*	<p>Core populations</p> <p>a) Identify and map those parts of existing core areas where:</p> <ul style="list-style-type: none"> - control programs over next 5 years could reduce ranking to marginal - natural barriers/control lines could be expanded - control is a priority (e.g. boundary of core areas, approaching river systems, important native grassland and woodland communities) <p>b) Encourage and where possible assist landowners with clean properties in core areas.</p> <p>c) Identify and map those parts of existing core areas where serrated tussock is considered intractable.</p> <p>d) Develop management strategies for areas with intractable ST, using best practice techniques that minimise chemical use (e.g. reforestation, cropping, fertilisation, promotion of perennial grasses and grazing management)</p>	<p>a) Core area mapping completed by July 2004. Identified priority areas reduced to marginal ranking prior to the 2008 distribution map update.</p> <p>b) Actions recorded in annual report</p> <p>c) Intractable serrated tussock infestations identified and mapped by July 2004</p> <p>d) Mulwaree Shire Intractable ST Strategy Plan developed and implemented by Dec 2003. Other LCAs to develop similar strategies by Dec 2006. Areas covered by intractable core areas reduced by 25% by 2015.</p>	Affected LCAs	5
Prevention, regulation and rehabilitation				
7	<p>a) Develop and promote on-farm and regional hygiene methods, including a code of practice and hygiene protocols as outlined in Section 6.2. (for all weeds)</p> <p>b) In consultation with RTA and other utility stakeholders develop code of practice and protocols for roadside and easement maintenance as outlined in Section 6.2.</p>	<p>a) Extension material concerning hygiene methods developed and promoted by LCAs through means outlined in Strategic Action No. 12 by July 2005</p> <p>b) Roadside and easement maintenance codes of practice and protocols developed and implemented through out the region by July 2005</p>	ST&SCNPC, NSW Agriculture, RTA and other utilities. Land Care and Catchment Management Boards	5, 7

ACTION		Performance Indicator	Who is to be responsible (add others involved)	Objective number
8	a) Support declaration changes outlined in section 4.2	a) Proposal discussed in an extra-ordinary ST&SCNPC meeting by Dec 2003 b) Submission sent to NWAC and the Department of Agriculture by Feb 2004 c) Implementation of changes within a year of acceptance by NSW Ag., NWAC, Councils and other authorities.	LCAs and ST&SCNPC	1,2,3 and 5
9	a) Liaise with Landcare groups and landholders to promote rehabilitation of native ecosystems following ST control works. b) NPWS, Environment Australia and ACT Department of Urban Services identify strategies for protection of threatened grasslands and grassy woodlands (i.e. Threat Abatement Plans) c) Information provided is to be included in revised Regional Plan	a) Letter sent to Landcare groups in serrated tussock affected areas by Dec 2003. Majority of Landcare groups in affected areas involved in rehabilitation works by July 2006 b) NPWS and ACT Department of Urban Services has addressed a ST&SCNPC meeting by July 2004 or Threat Abatement Plans and/or Recovery Plans address ST threat mitigation strategies c) Strategies are included in revised plan	ST&SCNPC Landcare, Bushcare, NPWS and ACT DUS.	6
Training, Education and Extension				
10 *	a) Undertake species identification training for Weeds Officers, Catchment Officers, Landcare Coordinators, agronomists and selected field staff in land management agencies. This is to focus on staff in areas currently relatively less-affected by serrated tussock (Map 1).	a) 80% of targeted people can distinguish serrated tussock prior to January 2005 (i.e. when the species is flowering and seeding: October - February) and 100% by January 2007.	NSW Agriculture Regional Coordinator, Affected LCAs, land management agencies and Landcare	4
11	a) Results from research projects (see Section 6.1) to be sought and reviewed	a) Results obtained and disseminated at the completion of each project.	ST&SCNPC, NSW Agriculture regional coordinator	5
12	a) Update best practice management, including treatment details as relevant to the region on completion of trials b) * Promote sustainable pasture and grazing training programs such as 'Prograze' c) *In affected and potentially	a) Updates provided as information increases, with initial update prior to July 2004 b) At least one 'Prograze' (or similar) course to be held with each Council area annually. c) Information regarding ST sent to all landholders within rare and/or isolated and marginal areas by July 2004.	ST&SCNPC, LCAs, and NSW Agriculture	5

	ACTION	Performance Indicator	Who is to be responsible (add others involved)	Objective number
	<p>affected LCAs, information on identification, legal obligations, impacts and control of ST to be disseminated in one or more of the following:</p> <ul style="list-style-type: none"> - Rates notices - Council pamphlets - Field day material <p>Absentee and small acreage landholders to be specifically targeted</p> <p>d) Extension material, including information identifying relevant programs, is to be disseminated to landholders and occupiers with inspection notification</p> <p>e) Landholders with intractable infestations are targeted for appropriate extension material/programs</p> <p>f) Landholders adjacent to core or marginal infestations specifically targeted for extension programs aimed at promoting practices that improve resilience to ST invasion</p> <p>g) Implement relevant actions in Regional disaster strategy particularly promoting appropriate quarantine standards where fodder and stock have been imported</p> <p>h) Implement Regional rural-residential /rural lifestyle extension strategy (currently in production)</p>	<p>d) Appropriate extension information included with inspection notices</p> <p>e) Landholders with intractable infestations receive appropriate extension materials/programs</p> <p>f) Extension programs specifically targeting landholders adjacent to core and marginal infestations implemented throughout the region by July 2006.</p> <p>g) Relevant disaster strategy actions implemented as soon as practicable and at least by July 2004.</p> <p>h) All actions within the Extension Strategy completed within 4 years.</p>		
13	<p>a) Promote methods of reducing off-target mortality at field days and in information brochures</p> <p>b) Ensure Council spray contractors undertaking chemical control are trained in the identification of ST, in the calibration of equipment and the interpretation of chemical labels</p>	<p>a) Methods of reducing off-target mortality during weed control are specifically addressed at all field days during 2003-2008. Serrated tussock brochures include methods of reducing off-target mortality</p> <p>b) By Dec 2003 all council spray contractors are to be trained in serrated tussock identification and hold qualifications of Chemcert, SMARTtrain or equivalent</p>	Councils, NSW Agriculture	5

ACTION		Performance Indicator	Who is to be responsible (add others involved)	Objective number
Other actions				
14	<ul style="list-style-type: none"> a) Develop and implement incentive scheme options (e.g. monetary, equipment hire, tax rebates) b) Joint ventures and opportunities identified in Section 6.1 and in other Regional Plans investigated through Catchment Management Boards c) Contact appropriate government and industry bodies for support (e.g. Meat and Livestock Australia and Australian Wool innovation Pty Ltd.) d) Distribute to all weed officers and Landcare groups the national best practice management guide upon completion (NHT 2002/3 NSW Ag project) 	<ul style="list-style-type: none"> a) NHT funding application to be submitted before July 2004 (see Section 6.1) b) Catchment Management Boards approached to coordinate joint ventures among stakeholders by Dec 2004. c) (If appropriate) Government and Industry support canvassed in letter or by a committee delegation prior to March 2003 d) Guide distributed to all targeted officers within 3 months of completion 	ST&SCNPC, Catchment Management Boards, and NSW Agriculture	5

¹ refer to Appendix 1 for definition of "eradicate"

² reduced to an 'appropriate level' means the population can be "maintained at a level where it has insignificant environmental and economic effect, with a minimum and preferably decreasing expenditure/effort". Insignificant environmental and economic effect means that the level of expenditure and effort required to keep the species at a 'rare level' is insignificant, and the population does not adversely and 'significantly' affect natural (including biodiversity), cultural and social values (Appendix 1)

It is anticipated that at a regional scale the application of the above actions should restrict the spread and reduce abundance of existing serrated tussock infestations. Development of best practice control techniques, customised management plans for core infestations, the provision of education / extension programs and promotion of pasture and grazing techniques are essential if the Plan is to succeed. It is anticipated that by following this Plan, the range and potential impacts of serrated tussock will be reduced.

8.0 MONITOR AND REVIEW PROCESS

Stakeholders will provide an annual progress report that details their success in meeting the performance indicators within the Plan. This includes an updated distribution map required at least every second year. A brief regional report will be submitted to, the National Serrated Tussock Steering Committee, NWAC and Catchment Management Boards each year. The Regional report will address target outcomes of Catchment Management Blueprints and specify any modifications to actions and performance indicators that may improve the outcomes of the Plan. The report will meet State of the Environment Reporting Systems.

The Plan is to be reviewed and updated after five years *i.e.* prior to July 2008.

In the event of a stakeholder failing to meet an objective as given in the Plan, the Committee will assist the stakeholder to meet requirements: e.g. determine an appropriate action for the stakeholder and / or other members of the Committee. If the stakeholder is still unable to meet the objective, the Committee will review the mechanism and performance indicators related to the required action.

9.0 BENEFITS

Efforts to restrict the spread and abundance of serrated tussock infestations as outlined in this Plan will benefit industry, the environment and the community. Serrated tussock is estimated to cost primary industry \$25/ha with productivity estimated to decrease by up to 50% in heavily infested areas (ARMCANZ & ANZECCFM 2001). Efforts to prevent establishment of infestations will therefore save industry both control and opportunity costs.

The environment will benefit through serrated tussock control works and extension / education initiatives with alleviation of threatening processes affecting native flora and fauna species (see Section 4.2). Native grasslands are rare and marginalised, thus control of competitive introduced species such as serrated tussock may assist in conserving these vegetation communities and ultimately, assist in the conservation of biodiversity.

The community will benefit through serrated tussock control by avoiding trickle-down economic impacts from the agricultural sector.

10.0 RESOURCES

References

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<http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Invasion+of+native+plant+communities+by+exotic+perennial+grasses+-+proposed+key+threatening+process+declaration>

Appendix 1: Density classes used to map serrated tussock

Density / distribution class	Comment
Core	<p>A 'core' area is where, using realistic resource levels and advances in technology^{*1}, it is NOT FEASIBLE in the short term^{*2} to:</p> <ul style="list-style-type: none"> - significantly reduce^{*3} the density and distribution of the species, OR - maintain the current density and distribution of the species, with a decreasing amount of expenditure/effort^{*4} <p>Note: Although core areas are ultimately likely to be lower priority areas, they will continue to require at least site specific control measures.</p>
Marginal	<p>A 'marginal' area is where, using realistic resource levels and advances in technology, it IS FEASIBLE in the short term to,:</p> <ul style="list-style-type: none"> - significantly reduce^{*3} the distribution and density of the species, or - maintain the density and distribution of the species, with a decreasing amount of expenditure/effort
Rare and/or isolated	<p>A 'rare and/or' isolated area is where, using realistic resource levels and advances in technology, it IS FEASIBLE in the short term to:</p> <ul style="list-style-type: none"> - eradicate^{*5} the species where it occurs as an isolated^{*6} population - where the population is rare^{*7} to: <ul style="list-style-type: none"> - eradicate the species, OR - maintain it at a level where it has an insignificant environmental and economic effect^{*8}, with a minimum and preferably decreasing expenditure/effort
Absent	<ul style="list-style-type: none"> - requires a high level of certainty that weed is absent. Rare and/or isolated may be a better class to use if uncertain. - may represent all of the area not covered by the first 3 classes - where possible, indicate what environmental constraint or history is causing the absence

*1 'realistic resource levels and technology advances' should be based upon your experience over the last 5 years with some informed judgement on what is expected over the next five years. If in doubt assume a continuation of the same level of funding and effort. Resources include funding and labour. Technology includes new control techniques such as biological control and integrated management.

*2 'short term' means within 5 years.

*3 Significantly reduce means reduce by approximately 75% from 2001 levels of distribution and abundance in 5 years

*4 'Decreasing expenditure/effort' means that the amount of funding, resources and effort (including 'non-costed' labour from private land owners/managers) to control the weed over the past five years will decrease over the next five years.

*5 'Eradicate' means: (a) remove or destroy all above ground biomass of the weed species population. This definition recognises the weed seed bank will remain viable and follow up work may be required beyond the term of this plan.


(b) remove populations of the weed from the local area to the extent that little or no follow up is required *i.e.* the weed seed bank is largely exhausted. It is recognised that this may not be achievable within the currency of the plan.

*6 'Isolated' means the population is considerably separate from other local populations (*i.e.* seed source from other local populations can not re-establish the local population) and is small enough to be eradicated. If eradicated it is assumed re-invasion is unlikely to occur.

*7 'Rare' means a species is very uncommon, but unlike isolated may be scattered over a wider area at a very low density.

*8 'Insignificant environmental and economic effect' means that the level of expenditure and effort required to keep the species at a 'rare level' is insignificant, and the population does not 'adversely and significantly' affect natural (including biodiversity), cultural and social values.

Appendix 2: Links to the Weeds of National Significance Serrated Tussock Strategic Plan (Regional and local responses only)

National Serrated Tussock Strategic Plan		Regional Plan	
Strategy	Actions	Actions that support the National Strategic Plan	Details
2.1.1 Determine best practice serrated tussock management practices	1. Survey effectiveness of current treatments used.	<ul style="list-style-type: none"> No specific actions to survey effectiveness of current treatments used. However, promotion of best practise and integrated management is an important strategy within the Plan. 	Action 14, Section 6.3, Action 12 and Action 7
	2. Prepare recommendations on best practice and range of minimum accepted practices.	<ul style="list-style-type: none"> NSW Agriculture is currently preparing a best practice management guide for serrated tussock. An effective distribution of the guide through weed officers and Landcare is supported by the Regional Plan. Results from research projects will be actively pursued and disseminated to all stakeholders. Best practice management information is to be continually updated in regard to treatment details on completion of trials. On-farm, road-side and utility easement, hygiene practices are to be implemented based on best practice hygiene protocols. 	Action 14 Section 6.3 and Action 11 Action 12 Section 6.2 and Action 7
2.1.3 Ensure best management practices are applied in the field	5. Prepare strategies that will help land managers implement best practices.	<ul style="list-style-type: none"> Management of serrated tussock within the plan is at current best-practice standards Local and on-farm quarantine and hygiene methods will be developed and promoted. Serrated tussock best practice management guide (NSW Agriculture project) will be disseminated through local weed officers and Land Care groups. Sustainable pasture and grazing training programs will be promoted. Extension programs are strategically targeted and will be aimed at assisting land managers to implement best practice management. Methods or reducing off-target mortality will be promoted and all spray contractors are to hold appropriate qualifications. 	Section 6.2 Section 6.2 and Action 7 Action 14 Action 12 Section 6.4 and Action 12 Action 13 

National Serrated Tussock Strategic Plan		Regional Plan	
Strategy	Actions	Actions that support the National Strategic Plan	Details
	6. Highlight strategies that need support from external organisations	<ul style="list-style-type: none"> Strategies requiring extra funding are highlighted throughout the plan 	Section 6.1.1
	7. Regional and local strategies are implemented, monitored, and evaluated	<ul style="list-style-type: none"> Stakeholders will provide an annual progress report that details their success in meeting performance indicators within the Plan. A report will be submitted to NWAC, Catchment Management Boards and the National Serrated Tussock Steering Committee annually 	Section 7 Section 8
2.2.1 Promote best land management practices	1. Develop long-term, whole of landscape, conservation and vegetation plans and guides that promote practices to reduce serrated tussock invasion and impact.	<ul style="list-style-type: none"> NSW Agriculture is currently preparing a best practice management guide for serrated tussock. An effective distribution of the guide through weed officers and Landcare is supported by the Regional Plan. On-farm, road-side and utility easement, hygiene practices are to be implemented based on best practice methods. Sustainable pasture and grazing training programs will be promoted. In areas where economic realities place questions on the ability to enforce W2 declarations, property/weed management plans will be encouraged and enforced where appropriate. 	Action 14 Section 6.2 and Action 7 Action 12 Section 5.2
	2. Land managers helped to increase skills, finances, and abilities to implement best land management practices	<ul style="list-style-type: none"> Funding and resource opportunities for landholders, occupiers and stakeholders are outlined in the Plan. Training, education and extension programs will be aimed at weed and land managers, landholders and occupiers. Incentive schemes (e.g. monetary, equipment hire, tax rebates) are to be developed and implemented. Government and industry bodies will be contacted for additional financial support 	Section 6.1 Action 10 and Action 12 Action 14 Action 14

National Serrated Tussock Strategic Plan		Regional Plan	
Strategy	Actions	Actions that support the National Strategic Plan	Details
2.3.1 Stakeholder develop plans	1. Regional, catchment and local consultation and planning processes ensure integrated programs are developed and resourced.	<ul style="list-style-type: none"> • Through correspondence and workshops, all stakeholders have had input into the preparation of the Regional Plan. Organisations, which have signed an agreement to implement the Plan and/or have been involved in the planning process, are listed within the Plan. • Regional Plan has been developed to assist PAP and Noxious Weeds Grant funding applications. • Funding and resource opportunities for landholders, occupiers and stakeholders are highlighted in the Plan. • Regional Plan is linked and support all Catchment Management Blueprints 	Section 3.1 Section 6.1 Appendix 3
	2. Farm serrated tussock plans are developed	<ul style="list-style-type: none"> • In areas where economic realities place questions on the ability to enforce W2 declarations, property/weed management plans will be encouraged and enforced where appropriate. • Farm based strategies are to be developed for areas with intractable infestations 	Section 5.2 Action 6
2.3.2 Coordination and liaison occurs during plan implementation	3. Coordination and liaison occurs during plan implementation	<ul style="list-style-type: none"> • ST&SCNPC in association with respective catchment Management Boards are to coordinate stakeholders and implement Regional Plan. 	Section 7 and Section 8
	4. Progress and outcome reporting systems of plans occur	<ul style="list-style-type: none"> • Stakeholders will provide an annual progress report that details their success in meeting performance indicators within the Plan. • A Regional Plan will be submitted to NWAC, Catchment Management Boards and the National Serrated Tussock Steering Committee annually. The report will meet the State of the Environment Reporting Systems. 	Section 8 Section 8
	5. provide support and mechanisms to implement serrated tussock management plans	<ul style="list-style-type: none"> • Regional Plan has been developed to assist PAP and Noxious Weeds Grant funding applications. • Funding and resource opportunities for landholders, occupiers and stakeholders are highlighted in the Plan. • Regional Plan is linked and supports all Catchment Management Blueprints 	Section 6.1 Section 6.4 and Appendix 3

National Serrated Tussock Strategic Plan		Regional Plan	
Strategy	Actions	Actions that support the National Strategic Plan	Details
2.3.3 Maximise community concern and support	6. Implement community awareness programs	<ul style="list-style-type: none"> Methods to raise public awareness of ST and its impacts are listed. Targeting of extension programs to increase effectiveness and efficiencies are detailed within the Plan. 	Section 6.4 and Action 12
2.3.4 Dedicated serrated tussock groups provide a focus	7. State or regional serrated tussock working parties are supported to help meet the goals of this strategy	This action is not specifically supported. However, Regional stakeholders have in principle agreed to support all National, State and local ST Working Groups, whether they are National, State, regional or local.	

Appendix 3: Supporting actions and links to Catchment Management Blueprints

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
South East	Biodiversity Management Target 3 – by 2012 the area of public and private lands and waters (within specified sub-regions as per map on page 9) infested with the high priority weeds will not exceed year 2000 levels.	<ul style="list-style-type: none"> The aim and objectives of the Regional Plan are consistent with this target All new and known rare and isolated infestations eradicated or an appropriate level by July 2006 All known marginal infestations reduced by 75% by July 2008 Annual control roadside control is to occur Core areas will be prioritised and strategically managed and infestations reduced to marginal levels prior to 2008. Intractable in core areas are to be reduced by 25% by July 2015 	<p>Section 1.6 and 1.7</p> <p>Action 3</p> <p>Action 4</p> <p>Action 5</p> <p>Action 6</p>
	Biodiversity Management Action 2 – Develop and implement integrated control ² strategies for priority weeds.	<ul style="list-style-type: none"> The plan incorporates and promotes a range of strategies to manage serrated tussock, including, pasture and grazing management, legislation, herbicide control, exclusion techniques, extension and education. Successful implementation of the Regional Plan will be consistent with this action. The Regional Plan supports the objectives of the ST National Strategic Plan, The NSW Biodiversity Strategy and the NSW and Regional Weeds Strategy 	<p>Section 6.4 and Appendix 2</p>

² Authors clearly meant that programs are comprehensive, linking with all land management programs including the control of other weeds, pest and threatening processes.

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
South East (cont.)	Biodiversity Management Target 4 – by 2005 the processes will be in place to maintain the weed and pest free status of all areas that are weed free of pests and weeds (as at 2001 levels). The processes will include a combination of community education information sharing and coordination of all land managers	<p>The Plan places high priority on controlling all rare, isolated and new infestations. Actions listed within the Plan to meet this target include (Section 7);</p> <ul style="list-style-type: none"> • surveying 'clean areas' • eradicating new infestations • Rare and isolated infestations in otherwise clean catchments are prioritised for control • Controlling roadsides entering clean areas and prioritising control in relatively clean catchments • Providing community and agency extension programs especially targeted within areas currently clean and less affected by of serrated tussock • Hygiene protocols/methods are to be developed and promoted 	<p>Action 2</p> <p>Action 3</p> <p>Action 3</p> <p>Action 5</p> <p>Action 10 and Action 12 and Section 6.3</p> <p>Action 7</p>
	Biodiversity Management Action 5 - Maintain the weed and pest free status of all areas that are free of pests and weeds	See comment for BMT4	
	<p>BMA 10 – Negotiate reform for weed control and establish monitoring trial zones for a South East regional approach. This may include:</p> <ul style="list-style-type: none"> • review of current systems; • Research into biological and biological and other forms of control • Trialing of innovative approaches 	<ul style="list-style-type: none"> • There are no specific actions to negotiate reform or to establishing monitoring trials. This work is currently being effectively carried out by research organisations such as NSW Agriculture, CRC Weed Management Systems and CSIRO • Biological control agents are not expected to be released during the term of the Plan. • The Regional Plan remains flexible to allow innovation and new methods. Conclusions from trial investigations along with information concerning successful local practices are to be promoted across the region. 	<p>Section 6.2</p> <p>Section 6.1 and Action 11</p>

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
South East (cont.)	<p>Social and economic management target (SEMT) 1 – Develop a package of the most effective combination of incentives, regulation and extension programs to achieve catchment targets in the face of rural adjustment and demographic change for weed and pest control programs by 2005</p>	<p>The Regional Plan supports this target through:</p> <ul style="list-style-type: none"> Identifying additional resourcing and funding opportunities Strategic targeting of training, education and extension programs Property/weed management plans will be developed and enforced in areas where economic realities place questions on the ability to enforce W2 declarations. Farm or local based strategies are to be developed in areas with intractable infestations 	<p>Section 6.1 Section 6.3 and Actions 10 and 12 Section 5 and Action 8 Action 6</p>
Southern	<p>Sustainable Land Use Program</p> <p>Catchment Target - By 2012 the area of land affected by land degradation problems including weed infestations, will not exceed the 2003 baseline</p> <p>Management Target – by 2005, a regional weed control strategy will be implemented for priority weeds</p>	<ul style="list-style-type: none"> The Plan aims to considerably reduce the spread and reduce the impact and density of existing serrated tussock infestations. The aims and objectives of the Regional Plan are consistent with this target. All new and known rare and isolated infestations are to be eradicated or an appropriate level by July 2006 All known marginal infestations reduced by 75% by July 2008 Annual roadside control is to occur Core areas will be prioritised and strategically managed and infestations reduced by 85% by July 2008 The plan will be consistent with the ST&SCNPC Regional Weed Strategy (currently in production) 	<p>Section 1.6 and 1.7 Action 3 Action 4 Action 5 Action 6 Section 6.4</p>

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
Southern (cont.)	<p>L1.1 Establish a working group to :</p> <ul style="list-style-type: none"> • Agree on priority weeds • Create a regional priority weeds map; and • Negotiate reduction targets with state and local government and major stakeholders 	<ul style="list-style-type: none"> • Serrated tussock has been identified as a priority weed on social, environmental, and economic grounds by all major stakeholders in the Region • A serrated tussock weed map has been created during the development of the Regional Plan. • Serrated tussock reduction targets (including time-frames) for rare and isolated, marginal and core infestations, have been agreed to by major stakeholders in the Region 	<p>Section 3 and Section 4</p> <p>Map1</p> <p>Actions 3, 4 and 6</p>
	<p>L1.2 - Develop and implement an integrated weed control strategy, incorporating investment options.</p>	<p>This will be detailed in the Regional Weed Strategy (currently in production)</p>	
	<p>L1.3 Support the implementation of best management practices for the control of weed species by landholders through education, incentive programs and government planning instruments particularly:</p> <ul style="list-style-type: none"> • Information and training that addresses dispersal of weeds and land management for weed control • Protocol to manage new weeds • Code of practice for infrastructure developments that may create conditions favourable for weeds 	<ul style="list-style-type: none"> • The Plan details actions to provide education and extension programs for private landholders and occupiers to raise awareness and best practice control techniques, and land and pasture management techniques • Funding and resource opportunities for landholders, occupiers and stakeholders are outlined in the Plan. • Training, education and extension programs will be aimed at weed and land managers, landholders and occupiers Incentive schemes (e.g. monetary, equipment hire, tax rebates) and joint ventures are to be developed and implemented. • Methods to raise public awareness of ST and its impacts are listed. Targeting of extension programs to increase effectiveness and efficiencies are detailed within the Plan. • Hygiene protocols/methods are to be developed and promoted. Councils, RTA and other utility stakeholders are to develop codes of practice and protocols for roadside and easement maintenance. • New infestations of serrated tussock are to be eradicated within a year of detection. 	<p>Section 6.3 and Actions 10, 12 and 13</p> <p>Section 6</p> <p>Section 6.3 and Actions 10, 12, 13 and 14</p> <p>Section 6.3</p> <p>Section 6.2 and Action</p> <p>Action 3</p>

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
Southern (cont.)	<p>Biodiversity Program</p> <p>Management Target 4 - By 2012, areas of high conservation value will be managed for conservation and priority actions for threatened species recovery plans will be implemented</p> <p>Management Target 5 – By 2005, collaborative programs will be in place to manage targeted pest species</p>	<ul style="list-style-type: none"> Serrated tussock has been identified as a threatening process for the <i>Natural Temperate Grasslands of the Southern Tablelands and the ACT</i> which is listed as an endangered ecological community under the Commonwealth's <i>Environment Protection and Biodiversity Conservation Act 1999</i>. Serrated tussock in these areas will be prioritised for control. Implementation of the Regional Plan is to occur prior to 2004. Key stakeholders have been consulted and are signatories for the implementation of the Plan. 	<p>Section 4 and Action 6</p> <p>Section 3</p>
Warragamba	<p>Soil and Land Condition Management Target (SLMT) 1 – By 2012, the whole community aims to reduce the area infested by pest plants and animals to below 2002 levels through:</p> <ul style="list-style-type: none"> Maintenance of the pest free status of all areas of land infested by pest plants and animals. By 2007, reduce the rate of infestation of priority pest plants and animals (noxious, environmental and production) by 50%; and Management for long-term sustainable reduction in pest plants and animals. 	<ul style="list-style-type: none"> The Plan aims to considerably reduce the spread and reduce the impact and density of existing serrated tussock infestations. The aims and objectives of the Regional Plan are consistent with this target. All new and known rare and isolated infestations are to be eradicated or an appropriate level by July 2006 All known marginal infestations reduced by 75% by July 2008 Annual roadside control is to occur Core areas will be prioritised and strategically managed and infestations reduced by 85% by July 2008 The plan will be consistent with the ST&SCNPC Regional Weed Strategy (currently in production) 	<p>Section 1.6 and 1.7</p> <p>Action 3</p> <p>Action 4</p> <p>Action 5</p> <p>Action 6</p> <p>Section 6.4</p>
	<p>Soil Land Condition Management Action (SLMA) 1/d – Identify, in consultation with key stakeholders, the priority weeds (noxious, environmental and production), pest animals, including pest fish, for each subcatchment and the area of infestation or numbers, as relevant</p>	<ul style="list-style-type: none"> The development of the plan reflects the identification of serrated tussock as a priority weed by key stakeholders within the Southern Tablelands and South Coast Region. The area of infestations has been identified (Map 1). 	<p>Section 3 and Section 4</p>

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
Warragamba (cont.)	SLMA2/a – In consultation with key stakeholders, develop and implement integrated strategies for pest plant and animal control that agree on goals / strategies that keep clean areas clean, and also identify priority actions for pest plants, animals and fish. These strategies should ensure that areas free of pest plants and animals remain un-infested, as well as incorporate consistent, timely and appropriate local management of pest and weed control. Barriers to management and the current programs of individuals and organisations need to be reviewed	<p>Key stakeholders have been consulted. The Plan is integrated and prioritises efforts to keep clean areas clean through</p> <ul style="list-style-type: none"> • surveying of ‘clean areas’ • eradicating new infestations • prioritising for control, rare and isolated infestations in otherwise clean catchments • Control of roadsides entering clean areas • W2 declaration in the Crookwell Shire and the Queanbeyan City Council • Community and agency extension programs especially targeted within areas currently clean of serrated tussock 	Section 7 – strategic actions
Lachlan	Vegetation and Biodiversity Management Target (VBMT 4) - All identified terrestrial and aquatic weed and pest plant animals of concern for the Lachlan Catchment are managed through integrated management across land tenures	<ul style="list-style-type: none"> • Serrated tussock has been identified as a declared weed under the Noxious Weed Act, for the LGAs covered by this Plan. It is also a Weed of National Significance • Key stakeholders, within the area covered by this Plan, have been consulted and are signatories for the implementation of the Plan. • The plan incorporates and promotes a range of strategies to manage serrated tussock, including, pasture and grazing management, legislation, herbicide control, exclusion techniques, and extension and education. Successful implementation of the Regional Plan will be consistent with this action. 	<p>Section 5</p> <p>Section 3</p> <p>Section 7 – Strategic Actions</p>
	Vegetation Action (VA) 34 – Identify the terrestrial and aquatic weeds and pest animals of concern, develop status reports on the extent of the problem and the impacts of these on catchment health	<ul style="list-style-type: none"> • The extent of the serrated tussock problem and impact within the Region has been documented throughout the Plan. Serrated tussock impacts on the catchment’s economy, threatened species and communities, land values, grazing enterprises, and the social values of rural communities. • The economic impacts of serrated tussock have also been well documented by numerous studies (see reference list) 	Section 4.2 and 4.5 and Map 1

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
	VA35 – Develop integrated management plans for the control and management of the identified weed and pest animals	<ul style="list-style-type: none"> The plan incorporates and promotes various strategies to manage Serrated tussock including pasture and grazing management, legislation, herbicide control, extension and education. 	Section 7 – Strategic Actions
	VA36 - Support the implementation of the integrated weed and pest management plans	<ul style="list-style-type: none"> Strategies requiring extra funding are highlighted throughout the plan Regional Plan has been developed to assist PAP and Noxious Weeds Grant funding applications. Funding and resource opportunities for landholders, occupiers and stakeholders are highlighted in the Plan. Regional Plan is linked and supports all Catchment Management Blueprints 	<p>Section 6.1.1</p> <p>Section 6.1</p> <p>Section 6.4 and Appendix 3</p>
	VA37 – Community education and awareness programs targeted at how to limit the spread of weeds and pest animals of concern within the catchment	<ul style="list-style-type: none"> On-farm, road-side and utility easement, hygiene practices are to be implemented based on best practice hygiene protocols. Training, education and extension programs will be aimed at weed and land managers, landholders and occupiers Methods to raise public awareness of ST and its impacts are listed within the Plan. Targeting of extension programs to increase effectiveness and efficiencies are also detailed within the Plan. 	<p>Section 6.2 and Action 7</p> <p>Action 10 and Action 12</p> <p>Section 6.4 and Action 12</p>
	VA38 - Implementation of integrated management plans for the control and management of the identified weeds and pest animals	<ul style="list-style-type: none"> The Plan provides details to assist in the integrated management of serrated tussock. ST&SCNPC and LCAs, in association with respective catchment Management Boards, are to coordinate stakeholders and implement Regional Plan. 	

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
	VA39 – Develop and provide appropriate cost sharing arrangements to support the implementation of the integrated management Plans, with varying levels of public investment based on community gain versus private gain. Priority given to the weeds and pests that are identified as having a greater impact on catchment health	<ul style="list-style-type: none"> • Support is to be sought through appropriate government industry bodies for additional financial support • Incentive scheme options (e.g. monetary, equipment hire, tax rebates etc.) are to be developed and implemented. • Joint ventures and opportunities are to be investigated • Funding and resource opportunities for landholders, occupiers and stakeholders are highlighted in the Plan. 	<p>Action 14</p> <p>Action 14</p> <p>Section 6.2 and Action 14</p> <p>Section 6.1</p>
Murrumbidgee	Soil Management Target 6 activities – facilitate the development of a regional weeds strategy incorporating a regional protocol for prioritising weed management actions in order to prevent new, problem weeds and manage existing weeds. Encourage the adoption of the strategy by private and public managers.	<ul style="list-style-type: none"> • The Regional Plan can be readily adopted as part of the Regional Weeds Strategy. Key stakeholders have been consulted and are signatories for the implementation of the Plan 	Section 3
	BMA 4 – control weeds	<ul style="list-style-type: none"> • The plan will facilitate the integrated control of serrated tussock 	

Catchment	Relevant management targets / actions of the Catchment Management Blueprint	Regional Plan	
		Actions that support CM Blueprint	Details
	<p>BMT3 Activities –</p> <p>Identify, develop and implement integrated weed and pest control strategies. Manage problem weeds in context on the Regional Weed Management Plan.</p> <p>Research and encourage the adoption of best management practices to improve grazing management of native perennial pastures to enhance productivity and biodiversity.</p> <p>Manage medium and high conservation value stock routes and roadsides by controlling stock grazing and removing weeds</p> <p>BMT4 Activities -</p> <p>Identify weeds within the catchment that are having a detrimental effect on listed threatened species/ communities, especially those weed species which are included on the Alert list of Weeds and Weeds of National Significance. Implement control actions with particular reference to specified Commonwealth and State legislation. Any proposed on-ground actions should be done with reference to any relevant strategies such as those developed for the 20 weeds of National Significance and the National Weeds Strategy</p>	<ul style="list-style-type: none"> • The Plan is consistent with the draft Regional Weed Strategy. • The plan will facilitate the integrated control of serrated tussock • Sustainable pasture and grazing training programs (such as Prograze) will be promoted. • Management strategies for intractable serrated tussock infestations will be developed which may include the promotion and management of native perennial pastures. • High conservation value areas are prioritised for control. An integrated and prioritised system of road-side control is detailed within the Plan. • Serrated tussock has been identified as a threatening process for the <i>Natural Temperate Grasslands of the Southern Tablelands and the ACT</i> which is listed as an endangered ecological community under the Commonwealth's <i>Environment Protection and Biodiversity Conservation Act 1999</i>. • The Regional Plan supports the majority of Regional responsibilities listed under the WONS Serrated Tussock Strategic Plan. 	<p>Section 6.4</p> <p>Action 12</p> <p>Action 6</p> <p>Action 6 and Action 5</p> <p>Section 4.2</p> <p>Appendix 2</p>
	<p>BMA2 – Implement grazing management</p>	<ul style="list-style-type: none"> • The implementation of the Plan will promote pasture improvement and management at field days, in information brochures and through sustainable grazing and pasture management training programs such as 'Prograze' 	<p>Action 10</p>

