

REGIONAL WEED MANAGEMENT PLAN

1.1 PLAN TITLE: KUDZU – *Pueraria lobata*

1.2 PLAN PROPONENTS:

Regional Weeds Advisory Committee: North Coast Weeds Advisory Committee
Address: P.O Box 117, BELLINGEN 2454

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Signature: Secretary: Date:

1.3 NAME OF PLANT:

WONS: No

Botanical name: *Pueraria lobata* Common name: Kudzu

1.4 PLAN PERIOD: Starting date: 1/1/2003 Completion date: 31/12/2007

1.5 AREA OF OPERATION:

Area of North Coast Weeds Advisory Committee - Coastal LCAs from Nambucca to Queensland border

1.6 AIM:

To control and restrict the future spread of kudzu in the north coast region.

1.7 OBJECTIVES:

1. To restrict human spread of kudzu by 31/1/2004.
2. To coordinate management at the local and regional level by 30/6/2004.
3. To control all isolated infestations by 30/6/2005.
4. To reduce all scattered infestations by 70% by the end of the plan.

2.0 STAKEHOLDERS

2.1 Stakeholder LCAs

Far North Coast Weeds, Clarence Valley Weeds Authority, Coffs Harbour City Council, Bellingen Shire Council and Nambucca Shire Council (and initially written for Kempsey Shire Council)

2.2 Other Stakeholders

Wholesale & retail nurseries including chain stores, Public and private gardeners, Landscaping organisations, NSW Agriculture, Department of Environment and Conservation (including National Parks and Wildlife Service and Environment Protection Authority), Department of Infrastructure, Planning and Natural Resources, Northern Rivers Catchment Management Authority (formerly Northern Rivers, Upper North Coast, Mid North Coast Boards), Regional Native Vegetation Management Committees, Local Council's Environmental and Parks and Gardens staff, Rural Lands Protection Boards, Rail Infrastructure Corporation, Roads and Traffic Authority, NSW Farmers, National Farmers Association, Landholders / Dairy Farmers / Cattle Producers, Coast / Land / Dune care, Australian Association of Bush Regenerators, private land occupiers.

3.0 BACKGROUND AND JUSTIFICATION

Kudzu is included in the list "100 of the world's worst invasive alien species" and is a serious weed in at least 15 countries. It is a vigorous perennial vine capable of growing up to 30cm per day and 20m per year. Over 7 million acres of land are infested by the weed in south eastern United States; much of which has a similar climate to that of the north coast region. The expansion of the weed each year in the United States is estimated to increase management costs by nearly U.S\$6 million each year (AgJournal 2002).

The rampant growth of kudzu severely threatens biodiversity through restricting germination of plant seedlings, smothering established trees and other vegetation, reducing the amount and diversity of food resources for native fauna and impacting on other habitat values. Kudzu restricts human movement, smothers fences, power lines, rail lines and other infrastructure and reduces scenic values.

Kudzu currently has a limited distribution in the region, however, it already has significant environmental, agricultural and social impacts at the sites that it infests. Declaration of kudzu is required in order to eradicate the species before it becomes firmly established in the region. This will require all land managers to control their infestations; a situation that could not occur without declaration. This Regional Management Plan aims to restrict the sale of the species, educate and involve the community and commence eradication of the species in a strategic manner.

3.1 Biology

Kudzu is a perennial semi-woody vine in the 'pea' (Fabaceae) family. Each plant can produce numerous hairy vines up to 10cm wide from a large central root crown. New plants can form at each node every 30-60cm (Missouri Department of Conservation 2002).

Stems can reach up to 30m up trees. The tuberous roots, reaching depths of over 3m, are capable of storing large amounts of carbohydrates (SE-EPPC 2001).

Leaves are 3-foliolate (i.e produced in groups of 3 leaflets). Leaflets are green above and grey-green below. They are often (but not always) 2- or 3-lobed and are 7-15cm long and 5-13cm wide (Harden 2002). Heavy frosts cause leaf drop in winter.

Flowers are borne in elongated clusters of between 4 and 90, only when growing in full sun. The 2cm wide, purple, fragrant pea-like flowers form in summer after the third year.

Seed pods are flat, 5-9cm long and produced in autumn. They are densely covered by rusty brown hairs (Harden 2002, PIER 2002).

3.2 Current distribution

Kudzu is native to south east Asia. It grows vigorously in a range of environments and soil types, however, it especially favours deep, loamy soils.

Within Australia kudzu is a problem weed in south east Queensland and northern NSW. Within the north coast region kudzu infestations are located in the Tweed, Byron, Ballina, Lismore, Coffs Harbour and Bellingen Shires. Within Tweed Shire scattered infestations are located at Limpinwood and Couchy Creek. Scattered infestations occur in Byron Shire at The Pocket, Upper Main Arm, Palmwoods, Upper Wilsons Creek, Coopers Lane at Main Arm and several locations at Wilsons Creek. In Ballina Shire an infestation occurs at Cumberland. In Coffs Harbour one isolated infestation occurs along the Pacific Highway just north of the City. Fifteen isolated and one scattered infestation occurs in Bellingen Shire.

3.3 Null hypothesis

Ample evidence elsewhere in the world highlights the potential threat of kudzu in the north coast region. The climate of the region is ideal for the growth of kudzu. Local examples can already be found of kudzu growing over and smothering fences, infrastructure such as signs and bridges, trees and other vegetation.

If kudzu were not declared noxious within the region, the current isolated to scattered infestations will continue to climb and trail, establishing new roots at each node, sending out new shoots and smothering any vegetation or infrastructure in its path. Declaration of the species as soon as possible will provide an opportunity to eradicate the plant from the region before the negative impacts of the plant increase dramatically.

4.0 LEGISLATIVE SITUATION

4.1 Current declaration

Not currently declared noxious within the region.

4.2 Declaration changes

Proposed to be W2 (i.e must be fully and continuously suppressed and destroyed) in the LGAs of Kempsey, Nambucca, Bellingen, Coffs Harbour, Pristine Waters, Copmanhurst, Grafton, Maclean, Richmond Valley, Ballina, Byron, Kyogle, Lismore and Tweed.

4.3 Enforcement strategy

Where they are present on private or public lands, enforcement will be in accordance with provisions under the Noxious Weeds Act 1993.

5.0 CONSIDERATIONS AND OPPORTUNITIES

5.1 Opportunities to be exploited

The main opportunity existing with kudzu is its current isolated distribution in the north coast region. If declaration occurs as soon as possible they can be easily controlled.

Significant kudzu infestations can generally be easily located due to its rampant growth and characteristic leaf shape.

In Landcare and bush regeneration circles there is generally a good knowledge of kudzu. This will greatly assist in locating and managing infestations at an early stage.

Heavy and continuous grazing of kudzu by cattle can control infestations within a few years.

5.2 Industry sectors

Kudzu has been introduced in some areas for use as fodder for livestock. The negatives of this use (apart from it invading adjoining areas) are that repeated grazing will eliminate the plant within a few years and frosts will temporarily defoliate the plant. For this reason graziers will not oppose declaration. The substantial negative impacts of the plant to farmers will ensure that there is widespread support for declaration.

The Nursery Industry has been made aware of the proposal to declare kudzu a W2 noxious weed and no objections have been received. Kudzu has been used as a valuable medicinal plant for centuries in China; a fact that has contributed to its planting within the region. Kudzu is still sold at markets in the region by medicinal herb growers.

All major stakeholder organisations of the NCWAC are aware of the impacts and potential threat posed by the species through committee discussions, various publications, media releases and promotions by the regional Environmental Weeds Taskforce. These stakeholder organisations, which include NSW Agriculture, NPWS, DIPNR and NSW State Forests support declaration of the species in order to control it before it becomes more of a problem.

Catchment Management Board blueprints for the Northern Rivers, Upper North Coast and Mid North Coast, recommend resources being directed to restoring significant habitats such as riparian zones and important bushland corridors. As kudzu could potentially have a severe impact on these areas, there may be opportunities for funding and improved coordination and involvement from a range of stakeholders.

In some situations there are opportunities for environmental restoration projects using Green Corps, Work-for-the-dole and / or Conservation Volunteers Australia participants. Green Corps workers have already been involved in control programs on some kudzu infestations.

The growth and spread of kudzu restricts access in forest, roadside and riparian areas, reduces aesthetic values and impacts on infrastructure and hence can impact on tourism assets / values.

5.3 Ecological

Kudzu infestations dramatically alter natural ecosystems they invade to the detriment of native flora and fauna species. Native regeneration is substantially reduced through reduced light and smothering. Any mature species present are generally smothered and either killed or their growth severely restricted. Kudzu infestations often create dense monocultures and hence provide restricted habitat for native fauna.

No biological control agents or pathogens are currently available for the control of kudzu in Australia. Due to the restricted current distribution of the plant it is more economical to eradicate the plants using a range of other methods rather than biocontrol.

Great care is required in controlling infestations in riparian zones, wetlands and other significant environments in order to minimise any adverse environmental impacts such as off-target damage from herbicides to native plants and aquatic fauna species such as frogs.

5.4 Species management

Integrated management, where a combination of techniques is used against the weed, provides the best approach. The individual techniques used will depend on the location, size and character of the infestations and a range of other factors.

Small and isolated infestations should be given a high priority for control in most situations due to the relative ease of control and potential for them to infest larger areas. Actions should aim at controlling the plant before seeding. Care needs to be exercised to minimise off-target damage to any native species being crowded out by kudzu.

No herbicides are currently registered for control of kudzu in Australia. Preliminary results from trials undertaken in Bellingen Shire by NSW Agriculture indicate that Grazon DS (containing triclopyr and picloram) and Garlon 600 (containing triclopyr) may be successful at controlling the species. It should be noted that these two products (particularly Grazon DS) do show residual activity within the soil and may not be suitable for use in environmentally sensitive situations. More research on a range of control techniques is required. A number of herbicides, burning, grazing and mowing have been used against the weed with success in U.S.A (e.g Moorhead 1996)

5.5 Community

Some environmentally aware members of the community are aware of this plant. This is evidenced by the small number of infestations present, but the large number of people / groups acknowledging the potential impact of the species. The potential of this weed has been noted and NPWS, bush regenerators, Landcare groups and green corps participants have been undertaking some control.

5.6 Extension and education

Declaration will lift the profile of the weed in the minds of a wider cross section of the community. Many of the extension and education efforts will be funded by a number of different stakeholder organisations listed in section 2 of this plan. The role of local control authorities will be mainly one of enforcement and control.

Awareness raising activities will include workshops throughout the region aimed at mapping the distribution and abundance of this and other weed species. Workshops held in 2002 attracted nearly 200 people.

Future extension programs highlighting the threat posed by the weed and its identification include the following:

- Field days;
- Identification brochures;
- Media releases;
- Training days for community groups etc. on control options, and;
- Control trials.

5.7 Links to other strategies

The weed has been included on the Bushland Friendly Nursery list of environmental weeds not to be sold. The strategies listed below are consistent with the Draft North Coast Weeds Strategy, the NSW Weeds Strategy, the NSW Biodiversity Strategy and the National Weeds Strategy.

5.8 Contingencies

A. Hard to access some infestations;

Some infestations are located in rough terrain. The habit of the plant also restricts access. Control of these infestations will need to be undertaken in a gradual manner.

B. Lack of awareness of the weed within the general community;

Promotion needs to focus on identification and the potential threat posed by the species to as broad an audience as possible.

C. Rapid rate of spread;

Control programs focusing on small, isolated infestations as well as restricting further spread of the main infestation will address this important issue.

D. Some infestations may be hard to locate;

Wide community consultation will assist. Education (including identification) of key land managers will dramatically reduce this potential problem.

E. No herbicides currently registered for its control

Further trials of a range of techniques are required. Many infestations are located in significant environments and will require great care with the use of herbicides. A licence to pollute may be required from the EPA in some situations.

F. May still be sold by some nurseries, market stalls etc.

All nurseries and herb growers must continue to be consulted regarding the declaration.

G. The time taken to have the plant declared as a noxious weed;

Awareness raising programs have already commenced. Some control programs have commenced and the plant is being promoted as a plant not to sell in order to obtain a "Bushland Friendly Nursery" status.

6.0 ACTION PLAN

Abbreviations listed at end

Objective 1: To restrict human spread of kudzu by 31/1/2004.		
Action	Performance Indicator	Who
Liaise with nursery industry, distributors and market organisers regarding pending declaration	North Coast NIAN has been informed	NCWAC
All member LCAs to request declaration as a W2 noxious weed	Member LCAs to provide letters requesting declaration to Coordinator by February 2003	LCAs & constituent Councils
Kudzu regional plan submitted to NWAC	Finalised plan including declaration proposal submitted to NWAC Secretary by November 2002	NCWAC Project Officer
Train key officers in the ID of kudzu	LCA Weeds Officers, relevant Councils, NPWS, DIPNR staff and Landcare groups trained in the ID of kudzu by 31/12/2003	Project Officer, NCWAC, LCAs NSW Ag, NPWS, DIPNR Landcare

Implement a community awareness program upon declaration	Within 6 months of declaration: -A press release prepared -An information brochure prepared -Volunteer Care groups, bush regeneration groups, rural stores, affected landholders & garden clubs notified -WBW, local and regional displays to include kudzu	LCAs, NCWAC, NSW Agriculture
Promote suitable replacement species upon declaration	Replacement species list circulated to all key stakeholders and included in press releases, brochures and displays within 6 months of declaration	Environmental Weed Taskforce, Project Officer, NCWAC, Landcare
Enforce declaration	- Nurseries & market stalls inspected at least annually	LCAs

Objective 2: To coordinate management at the local and regional level by 30/6/2004.

Action	Performance Indicator	Who
Record and map infestations within each LCA area	- 1:25,000 scale distribution maps produced by October 2003 - Maps digitised by January 2004	LCAs, DEC, DIPNR, Project Officer, Landcare, community
Distribute kudzu maps to all key stakeholders	Digitised maps distributed by February 2004	NCWAC, Project Officer, NPWS
Further develop and promote effective control techniques	- QLD NRM, NSW Agriculture & other researchers consulted by December 2002. - Control techniques promoted in brochure and displays upon declaration.	NCWAC, PAP Project Officer, LCAs
Determine priority areas for control in-conjunction with key stakeholders	Establish priority areas by March 2004	NCWAC, LCAs, CMBs, NPWS, DIPNR, SF, NSW Ag, Landcare
Liaise with DEC regarding control near waterways	Licence to pollute waterways requested (if required) by April 2004	LCAs, DEC
Develop local kudzu management plans	Local kudzu management plans developed by 30/6/2004	LCAs

Objective 3: To control all isolated infestations by 30/6/2005.

Action	Performance Indicator	Who
Inspect public and private land as part of routine inspection programs	Inspection programs implemented upon declaration.	LCAs
Enforce declaration	- Landowners encouraged to control as soon as possible. - Control notices issued where required.	LCAs
Implement control programs for all isolated infestations	All isolated infestations controlled by 30/6/2005.	LCAs, Land managers

Ongoing inspection and control programs maintained	- Follow-up inspection and control maintained over life of the plan - New infestations recorded and mapped over life of the plan.	LCAs, Landowners, DIPNR, NPWS, Landcare
Implement control programs for new infestations	Programs in place for new infestations within 6 months of detection.	LCAs, Land managers, DIPNR, NPWS, CMA
Objective 4: To reduce all scattered infestations by 70% by the end of the plan.		
Control scattered infestations, commencing in high priority areas such as HCV areas, areas with good access, upstream infestations and highly visible sites.	- Control programs implemented by 30/12/2004 - 70% of infestations controlled by the end of the plan	LCAs, Land managers, NPWS, CMA, Landcare, DIPNR
Ongoing inspection and control programs maintained	- Follow-up inspection and control maintained beyond life of the plan - New infestations recorded and mapped beyond life of the plan.	LCAs, Land managers, NPWS, DIPNR, Landcare
LCAs report annually on the progress of programs	Regional report prepared annually and presented to NWAC	LCAs, Plan coordinator, NCWAC

Abbreviations:

CMA	Northern Rivers Catchment Management Authority
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources
ID	Identification
LCAs	Local Control Authorities
NCWAC	NSW North Coast Weeds Advisory Committee
NIAN	Nursery Industry Association of New South Wales
NPWS	National Parks and Wildlife Service
NSW Ag	New South Wales Department of Agriculture
NWAC	NSW Noxious Weeds Advisory Committee
PAP P.O	Planning Assistance Program Project Officer
Qld NRM	Queensland Department of Natural Resources and Mines
SF	State Forests of NSW
WBW	Weed Buster Week

7.0 MONITOR AND REVIEW PROCESS

The plan will be reviewed by the NCWAC on an annual basis to assess the achievements and performances of the various actions. The Plan Coordinator will then collate the relevant information and report back to the NSW Noxious Weeds Advisory Committee annually. The Regional Management Plan will be amended as necessary.

A full review of the Plan will be undertaken by 31/12/2007.

8.0 BENEFITS

Control of kudzu will provide many benefits to the region due to its incredible rate of spread and smothering habit. Declaration will limit impacts such as its ability to reduce flora and fauna habitat, restrict access and climb up and over fences, sheds, road signs and other infrastructure.

This Plan provides a unique opportunity to eradicate kudzu from the NSW North Coast region before it becomes fully established. A number of suitable alternative species are available, including several native species. The cost to eradicate the plant now is minuscule compared to the cost of maintaining it, should it continue to spread at current rates within the region. The plan requires relatively small amounts of funding from the NSW Noxious Weeds Advisory Committee as only small infestations are currently present and due to the number of stakeholders involved.

9.0 RESOURCES

AgJournal (2000) *Green invaders creep across the country. Finding alternatives to chemical control.* Country Roads Network. AgJournal February 2, 2000.
www.agjournal.com/story.cfm?story_id=677

Big Scrub Rainforest Landcare Group (2000) *Common Weeds of Northern NSW Rainforests.* A practical manual on their identification and control. ISBN 0 9585 439 1 7.

Bromilow, C. (1995). *Problem plants of South Africa.* Briza Publications, Arcadia.

Everest, J.W., Miller, J.H., Ball, D.M. and Patterson, M.G. (1991) *Kudzu in Alabama. History, uses and control.* Alabama Cooperative Extension Service, Auburn University, Alabama.
www.aces.edu/departments/ipm/kudzu.htm

Harden, G.J. (2002). *Flora of NSW.* Vol. 2, p. 586. University of NSW press, Kensington.

Missouri Department of Conservation (2002) *Vegetation management guideline. Kudzu.*
www.conservations.state.mo.us/nathis/exotic/vegman/fifteen.htm

Moorhead, D.J and K.D. Johnson (1996) *Controlling kudzu in CRP stands.* Conservation Reserve Program. Forest Land Opportunities. University of Georgia and Georgia Forestry Commission.

Pacific Island Ecosystems at risk (PIER) (2001) *Pueraria montana var. lobata.* Risk assessment results. www.hear.org/pier_v3.3/pumon-wra.htm

Randall, J.M. and J.Marinelli (1996) *Invasive plants: weeds of the global garden.* Brooklyn Botanic Garden Club, Inc. Handbook No. 149, 111pp.

Southeast Exotic Pest Plant Council (SE-EPPC) (2001) *Kudzu.* The Bugwood Network – University of Georgia. College of Agricultural and Environmental Sciences and Warnell School of Forestry Resources. www.se-eppc.org/doc.cfm?id=510