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Making National Weed Laws Work

A WWF-Australia Issues Paper

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Executive Summary

From a national viewpoint, the current regime of Commonwealth, State and Territory legislation forms an inefficient, inconsistent, *ad hoc*, and only partially effective national regulatory framework for weed prevention and control.

This state of affairs is a legacy of the narrow, reactive and mismatched weed policies and laws in place at Commonwealth and State levels. Reforms over the past decade have been gradually addressing these shortcomings. For example the Commonwealth closed Australia's front door to new weeds: all international mail is now scanned for quarantine material, and as of late 2006 *all* proposed imports of new plant species are subject to a weed risk assessment with only those determined to be low-risk permitted for import. At the State level, Western Australia has played a leadership role by also enacting biosecurity legislation that takes a pro-active approach to weed management.

Australia now has a once in a decade opportunity to put in place an effective national weeds regulatory framework that forms an integral part of the emerging AusBIOSEC system, and actually ensures that the goals of the *Australian Weeds Strategy* are realised. Tinkering around the edges is no longer an option.

The economic benefits of implementing a strong national regulatory framework are large. A recent study found that the Commonwealth quarantine border permitted list system alone will save Australia $20 billion over the next 100 years (Keller *et al* 2007).

This paper outlines the strategic approach, design factors and policy objectives and instruments needed to construct a strong and effective national regulatory framework for weeds.
The major elements include:

- **National border controls** that apply the dual permitted-prohibited list system. This element is already in place under the Commonwealth's *Quarantine Proclamation, 1998.*
- **National post-border controls** that enables both the legal and efficient movement of specified low risk plant species and prohibits the movement of controlled high risk weeds throughout the whole country. This element needs to include a national post-border risk assessment (which builds on the Standards Australia post-border weed risk assessment protocol), a dual national post-border permitted list-prohibited list system, and fully harmonised State and Territory biosecurity legislation and weed control classes. A mandatory plant labelling scheme would be applied to certain medium risk invasive plants already in trade under the national post-border permitted list.
- **State border controls** that enable the import of additional specified plant species and prohibit the trade and movement of additional high risk weeds to the national post-border permitted-prohibited list system into specific jurisdictions. This would include implementation of statutory State permitted-prohibited list systems, exemplified by the Western Australia's *Biosecurity and Agriculture Management Act, 2007*.

Given the strategic risk of invasive plants to Australia's environment and agriculture, governments have an important responsibility and unique opportunity to finally put in place a coherent and consistent nation-wide weed regulatory framework that actually works.

1 Introduction

This issues paper makes the case for a national weed regulatory framework, and outlines its proposed key objectives, design features, and elements.

It complements the recent WWF report, *Audit of State and Territory Weed Legislation* which assesses the effectiveness of State and Territory weed legislation, and the degree to which it operationalises the *Principles of Weeds Legislation* agreed by the Australian Weeds Committee (the peak national officials weeds body under the Natural Resource Management Ministerial Council (NRMMC).

The title of this report also mirrors the 2005 report, *Making State Weed Laws Work* (Glanznig 2005) to explicitly highlight that this report builds on the approaches and policy solutions put forward in this earlier report, though the frame of reference has been moved from the State level to the national level in this issues paper.

1.1 A national policy of prevention

The Australian, State and Territory governments markedly elevated and broadened the focus of the nation's biosecurity and weed prevention policy response from the mid-1990s. A watershed was the independent review of Australia's quarantine arrangements, published in 1996 as *Australian Quarantine: a shared responsibility* (Nairn 1996). It emphasised that:

- Australia's policy response should be framed in terms of a quarantine continuum spanning from pre-border to post-border incursion control rather than a narrow quarantine border approach
- a strong scientific capacity is central to the development of sound strategies for preparedness and response to plant and pest incursions
- responsibilities and costs should be shared between government and industry, and
- Australia's new plant import protocols should be based on comprehensive 'guilty until proven innocent' weed risk assessment - permitted plant system.

This review coincided with the development of Australia's first *National Weeds Strategy*, which was adopted by the Australian, State and Territory governments in 1997. The Strategy committed all governments to the national policy goal of preventing new weed problems (Agriculture and Resource Management Council of Australia and New Zealand [ARMCANZ] *et al*. 1999).

Its successor, the *Australian Weeds Strategy* has further enshrined the tenet of preventing new weed problems at all levels from a key principle down to specific objectives and actions (NRMMC 2006).

One of the three goals of the Strategy is to prevent new weed problems, to be achieved through four objectives including:

- 1.1 Prevent the introduction into Australia of new plant species with weed potential
- 1.2 Ensure early detection of, and rapid action against new weeds
- 1.3 Reduce the spread of weeds to new areas within Australia.

Another of the Strategy goals is to enhance Australia's capacity and commitment to solve weed problems, through amongst other objectives, by managing weeds through consistent policy, legislative and planning frameworks (Objective 3.3).

The major national instrument to frame and focus action is the *National Weed Spread Prevention Action Plan*. The draft objectives of the Plan are to identify and address all pathways for weed spread, achieve national consistency in weed spread prevention, minimise the spread by human agency, and meet the requirements of the *Australian Weeds Strategy* (NRMMC 2006, pg.12).

Importantly, the draft action plan is focussed on changing human behaviours that intentionally or accidently contribute to weed spread. As the plan states, the:

> scope of the draft action plan is limited to the management of the human-induced spread of weeds within Australia. This action plan is restricted to human caused spread because it is amenable to preventative actions and is the dominant method of long distance and local dispersal for most weed species (NWSPC 2006, pg. 2).

A central approach to the draft action plan is to identify and mitigate the risk associated with human-induced weed spread pathways. For the purposes of the draft action plan, a pathway is defined as 'any means that allows the spread of a pest within Australia' (NWSPC 2006, pg.4).

The policy of weed prevention and the emerging Australian Biosecurity System

Since the early 2000's, the Australian, State and Territory governments have sought to consolidate and implement a more consistent approach to Australia's overarching biosecurity arrangements through what is now termed the Australian Biosecurity System. The Australian Biosecurity System for Primary Production and the Environment or AusBIOSEC is a framework of common principles and guidelines to enable biosecurity arrangements to be applied consistently across Australia.

According to the Department of Environment, Water and Heritage (DEWR 2008), the aim is to bring together all biosecurity activities being undertaken by the Australian Government, state and territory governments, industry, landholders and other key stakeholders in primary production and the environment. The scope of AusBIOSEC covers all invasive plants, animals and diseases, of the terrestrial and aquatic environment that could be harmful to primary industries, the natural and built environments, and public health.

The expected outcomes of the AusBIOSEC process include:

- Whole-of-government approach to biosecurity delivery across primary production and the environment.
- Agreed principles to provide nationally consistent policy direction.
- Greater clarity of roles and responsibilities for managing biosecurity matters.
- Cost-effective solutions to biosecurity risks.
- Clear linkages within and between government agencies and jurisdictions.

- Opportunities to identify and address gaps, commonalities and potential efficiencies in biosecurity delivery.
- Enhanced capacity to reduce the establishment, spread and impact of invasive organisms.

Invasive species group and sectoral national strategies, such as the *Australian Weeds Strategy* nest under AusBIOSEC. Together, AusBIOSEC and the *Australian Weeds Strategy* provide major policy drivers to translate the national policy of weed prevention into a robust regulatory and operational response that addresses current glaring gaps and weaknesses.

1.2 The economic benefit of weed prevention

There are large economic benefits associated with policies and legislation that effectively prevent the introduction and naturalisation of invasive plant species in Australia. For example, a recent study estimated that the implementation of the Commonwealth quarantine permitted list system will prevent the legal importation of new invasive ornamental plants that would have otherwise cost Australia $20 billion over the next 100 years (Keller *et al* 2007, pg.205).

Within Australia, the economic benefit of action to ban the sale of the ornamental tussock grass, Mexican feathergrass (*Nassella tenuissima*), by several jurisdictions, combined with eradication of any known infestations and specimens, has been estimated to be worth $39 million (which is the cost to just agriculture from impacts associated with its early invasion phase) (CIE 2001).

1.3 Strategic weed prevention: the importance of controlling weed spread pathways and reducing propagule pressure

A cornerstone of effective weed prevention and containment is to identify and mitigate the risk associated with major weed spread pathways. This applies to both pathways that lead to the introduction of new weedy plants into Australia, and the movement of weedy plants from one jurisdiction or region to another.

Given the high number of weedy plant species in Australia, pathway based weed prevention is one of the most strategic actions that governments can take to deal with Australia's growing weed problem. In particular, an opportunity exists to apply policy instruments to comprehensively halt the intentional human movement of high risk plant species that results in high propagule pressure and therefore increased risk of these species naturalising and becoming invasive.

The *National Weed Spread Prevention Draft Action Plan* (NWSPC 2006) identifies 10 major weed spread pathways.

Table 1: Major Weed Spread Pathways

Pathway	Examples
Transportation over land including all methods of moving across the ground	Agricultural machinery, stock carriers, cars, trucks, buses, all-terrain vehicles, construction equipment
Transportation over water including all methods of moving through the water	Recreational boats and other craft, barges, industrial, tourism, recreational and law enforcement vessels, military craft
Tourism including travel for recreation, business or for relocation	Tourists (including those using air travel), golfers, campers, fossickers, recreational hunters
Movement of plants and plant parts including fruits, vegetables, nuts, roots, seeds, edible flowers; plants 'in trade' (intentionally released—authorised or unauthorised—or escaped)	'Hitchhiker seed' such as weed seeds that have contaminated other seed for sowing or eating or in water, food, growing medium.
Transportation of live food, animals and animal parts including movement of stock and/or their contaminated waste containing viable weed seed from food source	Hitchhiker seed on or in live animals and in water, food, growing media, nesting or bedding.
Plant and aquarium trade including deliberate introductions of plants	Botanical gardens, nurseries, research facilities, public and private plantings, and aquariums/water gardening facilities
Movement of construction and landscape material including extraction	Movement and storage of soil, gravel, sand, mulch and rocks.
Gas, power and mineral resources including mining resources and developing and maintaining movement corridors.	Exploration, survey, movement of material, construction and maintenance of facilities.
Waste disposal including illegal dumping, unsafe disposal and movement of weed waste.	Garden/green waste dumping, composting, mulching.
Ecosystem disturbance including activities promoting environments more suitable for weed establishment.	Vegetation clearing, restoration, forestry, fire management, grazing, agriculture, and extreme weather events (e.g. cyclone, drought

Source: NWPC (2006, pg. 25)

The importance of propagule pressure

Introduction or propagule pressure has been found to have strong explanatory power in explaining successful invasion and degradation by novel exotic invasive species (Lambrinos 2006, Lockwood *et al* 2005, Mulvaney 2001, Sullivan *et al* 2004, Williamson 2001). As a 2008 study of propagule pressure explains:

> Recent work has shown that the number of arriving invaders (propagule pressure) plays an important role in the establishment of invasive species. First this is due to the larger numbers of colonists offsetting the extinction risk that faces many small populations due to environmental or demographic factors. Second, repeated introductions may sustain initial populations below survival thresholds and also provide sources of additional genetic variability. Thus propagule pressure allows invasive species to overcome stochastic factors, which may doom the vast majority of incipient invasions.
>
> However, despite the importance of propagule pressure to the establishment of invasive species, it is one of the least understood facets of biological invasions (Mikheyev *et al* 2008, pg.301).

In Australia, studies on the relationship between propagule pressure and plant invasion success are rare. However, one salient historical study of south-eastern Australia plantings of exotic woody plants demonstrated a highly significant relationship between the number of times a species had been planted and naturalisation (Mulvaney 2001).

> Introduction pressure may be expected to affect naturalisation, because the more often an introduction is repeated in time or space, the greater will be the variety of release sites and the greater the chance of release into environmental conditions suitable for establishment (Mulvaney 2001).

At a country level, a New Zealand study found a strong correlation at regional, suburban and neighbourhood scales between human factors and the composition and distribution of naturalised introduced plant species. It determined that that of the introduced plant species found naturalised between 1991-2000, 97% were purposefully introduced for urban horticulture (Sullivan et al 2004). Additionally:

> [o]f all first collections of plant collections of plant species that naturalised in New Zealand between 1985-2000, 91.5% were found within 1 km of the nearest building, and <1% were found > 10km from the nearest building. In comparison, 67% of collections were within 2km of a town. While based on herbarium collections, it is unlikely that this pattern represents a bias in collecting effort, as NZ botanists frequently collect native plants from remote areas of the country (Sullivan *et* al 2004).

The corollary of evidence highlighting the importance of propagule pressure as a major determinant in invasion success, is the need for policy instruments to specifically target weed spread pathways that enable the movement of high volumes of high risk plant species into regions that contain ecosystems vulnerable to invasion.

2 Scale and Nature of the Weed Risk Problem

2.1 Large pool of naturalised and potential weeds already in Australia

Australia has a large pool of weedy introduced and cultivated native plant species that expose our natural environment and agriculture to a major strategic weed risk.

A land mark study by the Weeds CRC and the WA Department of Agriculture and Food (Randall 2007) found that:

- Of the 26,242 introduced plant species in Australia 2,739 have naturalised, leaving 23,503 species grown and cultivated now or earlier.
- Unfortunately, not all of these 23,503 plant species are without risk as many are well known weeds in other countries. There are 5,907 species present in Australia which have weed histories elsewhere in the world but no current history as a weed in Australia. It is these plants that are most likely to become weeds in Australia, given the right opportunities.
- Even without these weedy species there is still a species pallet of just over 20,000 taxa to utilise for all horticultural purposes. This is in addition to the 11,000 cultivated Australian natives, introductions of additional new Australian natives to horticulture and new species introductions from outside Australia, screened for their weed potential by Biosecurity Australia before entry.

The key strategic is associated with the over 5,900 known weedy plant species that have a good probability to naturalise in Australia. Tomorrows weeds are already here.

Based on historical patterns, 10 new plant species naturalise each year (Groves *et al*. 1997) and invasive garden plants are set to dominate future naturalisations and new weed invasions (Groves *et al.* 2005). An indication to the total proportion of the about 5,900 referenced potential weed species that will naturalise in Australia without pre-emptive action has been provided by a recent study (Caley *et al* 2008).

The study used the introduction and time to recorded naturalisation of woody perennials introduced to South Australia to suggest the scale of future naturalisations. Up until 2007, 188 of 2,230 (8.4%) woody perennials listed in nursery catalogues between 1843 and 1985 were recorded as having naturalised. The study calculated that the most likely probability of naturalisation was about double that of the prior belief, and more than double the observed proportion of plants naturalising in South Australia by 2006. As such, the study concluded that:

> in South Australia, we estimate that less than one-half of the potential naturalisations from the extant introduced woody ornamental plants to Australia have occurred. The management consequences of this inertia are that even if border screening completely stopped the importation of new plants into Australia, the number of naturalised alien woody perennial species will continue to increase (Caley *et al* 2008, pg.201).

The available evidence suggests that it will take up to several centuries for the full number of ornamental woody perennials to naturalise.

Despite this evidence, recent papers and studies (Barker *et al.,* 2006, Coutts-Smith and Downey 2006 and Groves *et al*., 2005) show that the weed spread pathway of intentional movement of garden plants remains relatively open.

2.2 Major weed spread pathways remain wide open

The 10 major weed spread pathways identified in the draft *National Weed Spread Prevention Action Plan* (NWSPAP) were outlined in Section 1.2 above. A national pathway risk assessment project is being finalised by the University of New England to ascertain the ways in which weeds spread once in Australia and to assess the relative risks or threats from different pathways of weed spread. It found that 24 sources (sites or areas of land where weeds are actively growing and from which new invasions may emerge) and 17 weed spread pathways pose the most weed risk (Sindel 2009). The key weed spread pathways were:

- **Deliberate spread by humans**. Ornamental plant trade, mail order, plant trade, aquarium plant trade, medicinal plant trade, food plant trade, fodder trade, revegetation and forestry
- **Accidental spread by humans**. Human apparel and equipment, machinery and vehicles, construction and landscaping materials, agricultural produce, research sites, livestock movement, waste disposal
- **Natural spread**. Birds, other animals, wind, water.

It is instructive to note that the study found that:

> Pathways involving human activity that appear likely to increase in importance include fodder trade, ornamental and aquarium plant trade, agricultural produce, and machinery and vehicles (Sindel 2009, pg.39).

The most comprehensive weed spread pathway assessment published to February 2009 has been undertaken by the Victorian Government. Published as *Tackling Weeds on Private Land Initiative – Weed Spread Pathway Assessment Stage 2*, the assessment focussed on weed introduction and spread pathways into and around Victoria, rather than the further spread of weeds already in the State. The assessment determined that the highest risk pathway for spread of priority species was 'Deliberate introduction via business' which characterised four of the five highest pathway risk rankings (Thomas *et al* 2007). The ranking for the top 10 pathways are below.

Table 2: Top 10 Industries and pathways (Rank 1 is highest risk)

Industry	Pathway	Risk 2007	Rank 2006	Rank 2007	Confidence 2007
Seed	Deliberate Introduction via Business	0.894	1	1	0.601 (H)
Aquarium/Pet shop	Deliberate Introduction via Business	0.893	3	2	0.591 (H)
Landscaping	Deliberate Introduction via Business	0.827	4	3	0.622 (H)
Public	Deliberate Introduction via Community	0.819	6	4	0.020 (L)
Nursery	Deliberate Introduction via Business	0.808	5	5	0.479 (M)
Landscaping	Contaminated Vehicles	0.801	9	6	0.480 (M)
Aquarium/Pet shop	Contaminated goods/produce	0.788	new	7	0.630 (H)
Earth moving	Contaminated Equipment	0.787	7	8	0.038 (L)
Earth moving	Contaminated Vehicles	0.770	10	9	0.038 (L)
Forestry	Contaminated Vehicles	0.766	12	10	0.405 (M)

** Aquarium/pet shop – contaminated goods/produce was not identified as a pathway in the initial study.*

The lower the confidence score the greater the uncertainty and amount of missing data for that criterion. Confidence scores refer to the level of uncertainty in the risk score related to the availability of information.

Source: Thomas et al (2007, pg.ii)

A strategic weed spread pathway assessment has also been undertaken by the Queensland Government (Barker 2005).

An indication of how business contributes to increasing the propagule pressure and spread of weedy seeds and plants has been outlined in several studies that examined the trade of weedy plants through the garden industry:

- 56 of the 127 weed species (40%) that impact on threatened native species and ecological communities in NSW are still available for sale as garden plants, according to a NSW Government/Weeds CRC study titled, *Impacts of weeds on threatened biodiversity in New South Wales* (Coutts-Smith and Downey 2006).
- Over two-thirds (70%) of the 281 garden plants that present a significant risk to Australian grazing industries are still available for sale as garden plants, according to a Weeds CRC study prepared for Meat and Livestock Australia (Barker *et al* 2006).
- 6 national Alert list weeds were still available for sale in one or more jurisdictions as garden plants in 2004 (Groves *et al* 2005).

3 Weed Legislation Deficiencies

The effectiveness of noxious plant legislation has been critiqued since the 1970s (Moore 1971, Amor and Twentyman 1974, Moore 1975). This was followed more recently by an insightful critique by two Queensland government scientists, which found that humans contributed to the spread of nearly 90% of Australia's noxious weeds, including 21% that were spread only by humans (Panetta and Scanlan 1995). The focus of analysis was existing declared noxious weeds, most of which were agricultural weeds, and agriculture-related weeds spread pathways such as movement of contaminated fodder and machinery. One of their key conclusions was the need to rationalise existing noxious weed lists to place more focus on those that are at an early invasion stage.

A more recent analysis by WWF-Australia, *Making State Weed Laws Work* (Glanznig 2005) focussed instead on Australia's major weed spread pathway – the propagation, trade and movement of high to medium risk invasive garden plants. It found that State and Territory legislation is:

- generally ineffective in mitigating strategic risks posed by major weed spread pathways,
- generally reactive in design (apart from WA and NT in relation to aquatic plants) and as such results in a high risk of new invasive plants being legally imported into a given jurisdiction
- comprises overly narrow lists of declared weed, and weed categories are not tightly tailored to weed spread pathways
- poorly harmonised resulting in a disjointed national regulatory framework, poor alignment of weed categories and lists.

This policy failure results from taking a narrow approach to a small set of priority weeds, rather than seeking to reduce the propagule pressure associated with *all* high risk invasive garden plant species by restricting their sale. As such, the key policy shift required by governments is to move from a narrow species-based approach to a comprehensive pathway-based approach (which would subsume site-based and species-based approaches).

These deficiencies have been again highlighted in a study to be published as, *Pathway risk analysis for weed spread within Australia*, which found that:

> [a]t least 50 per cent of weeds experts surveyed considered that the current regulatory and management arrangements are inadequate for each weed spread pathway. This was particularly apparent in relation to the plant trade pathways (ornamental, aquarium, medicinal and food plants), fodder trade, and revegetation and forestry (Sindel 2009, pg.39).

In addition to these identified limitations, a further issue needs to noted, namely the risk of people intentionally illegally smuggling invasive ornamental plant species past the Commonwealth border, and due to the absence of a post-border permitted plants list then legally propagating and trading/moving these plants around the country.

3.1 Evidence of smuggling plants past Commonwealth border control

Smuggling exotic species past the Commonwealth quarantine border is not uncommon. While the extent of exotic plant smuggling into Australia has to date not yet been estimated, it is instructive to note that for the ornamental fish trade, between 5% and 10% of fish imported into Australia are smuggled (~300,000-600,000 fish per year), according to the Pet Industry Joint Advisory Council (PIJAC) (AQIS 1999 cited in McNee 2002, pg. 1) .

The smuggling of *Oxalis* into and out of Australia is an example of the illegal trade in a high risk invasive plant. An examination to trace the sources of known and potential *Oxalis* weed species found that:

> [n]inety-nine percent of introduced *Oxalis* taxa could be traced to a specific address in Australia and several traceable to their country of origin. Ongoing commercial and non-commercial domestic and international exchange of *Oxalis* species was found to be carried out despite Federal quarantine regulations, state and local laws (Robinson, R.W. 2003, p.22).

There was also evidence of smuggling out of Australia to other countries:

> Messages contained on the web site of the Oxalis-growers group clearly tell of illegal transportation of Oxalis corms between a grower in the ACT (Australia) and Palmerston North (NZ). Travel logs showing the route taken by one grower on his travels around south-eastern Australia include visits to other collectors (Robinson, R.W. 2003, p.22).

This risk can be effectively mitigated through a national post-border permitted plant list that permits plants on the list to be legally traded and moved.

3.2 Inadequate response to invasive plants not yet naturalised in states and territories

All states, except Western Australia and to a limited extent the Northern Territory, have reactive weed legislation in place. In other words, the general current legislative architecture is built on a prohibited or noxious weed list, compared with the dual permitted/prohibited list system in place in Western Australia. At present, the Northern Territory has a partial permitted list system in place for the proposed import of new aquatic plants under its *Fisheries Act, 1998*.

Furthermore, with the notable exception of Western Australia's *Biosecurity and Agricultural Management Act, 2007*, no other jurisdiction has its weed legislation embedded within broader proactive biosecurity legislation.

3.3 Inadequate response to invasive plants already in states and territories

All State and Territory weed legislation have overly narrow lists of declared plant species prohibited for sale. This results in an ineffective response to reducing the major pathway for the spread of invasive plants within a jurisdiction, namely the continued sale and thus wide distribution of invasive garden plants. The CSIRO report, *Jumping the Garden*

Fence, found that most jurisdictions prohibited the sale of only a small fraction of the invasive or potentially invasive garden plants that had naturalised in their jurisdictions (Groves *et al* 2005).

The major gap between the current and required response is evident when the total number of noxious weeds is compared to the number of reported weeds for sale through the garden sector. In the order of 350 plant species are declared noxious in one or more States and Territories, while of the some 8,700 garden plant species listed for sale, 1,076 (12.3%) are reported as weeds in Australia (Groves *et al* 2005).

3.4 Poor alignment between state and territory declared weed lists

Over 40% of the naturalised invasive garden plants declared noxious in one or more jurisdictions are still for sale in another.

A good illustration of the current disparity between jurisdictions is provided in the following table (Groves *et al* 2005).

Table 3: Naturalised invasive and potentially invasive garden plants and their noxious status and availability or prohibition from sale, both nationally and by jurisdiction

Jurisdiction	Naturalised		Declared Noxious		Available for Sale		Declared Noxious and Available for Sale		Naturalised and Prohibited for Sale in Jurisdiction	
	No.	%	No.	%	No.	%	No.	%	No.	%
Australia	720	100.0	178	24.7	393	54.6	72	40.4	153	21.3
NSW	205	28.5	99	13.8	279	38.8	36	36.7	37	18.0
QLD	158	22.0	57	7.9	146	20.3	20	35.1	35	22.2
SA	161	22.5	66	9.7	79	11.0	19	28.8	31	19.3
TAS	152	21.0	51	7.1	126	17.5	16	31.4	22	14.5
VIC	409	57.0	60	8.3	236	32.8	18	30.0	46	11.2
WA	314	44.0	171[6]	23.8	119	16.5	69	40.4	31	9.9
ACT	104	14.5	23	3.2	33	4.6	6	26.1	0	0.0
NT	63	9.0	42	5.8	75	10.4	13	31.0	26	41.3

Notes

1 Number naturalised includes all listed taxa (genera, species, and sub-species) that are recorded as naturalised in jurisdiction. Percentage is portion of Australian total, and is rounded to nearest 0.5% (Randall and Kessal 2004).

2 Declared noxious refers to taxa that are declared noxious under relevant State/Territory government legislation in respective jurisdiction. The Australian total refers to the number of taxa that are declared noxious in at least one State or Territory jurisdiction. Percentage is portion of total naturalised invasive plants that are declared noxious in respective jurisdiction (AWC January, 2004). The NSW figure includes regional declarations, and these listed species may be available for sale in non-control regions.

3 Available for Sale refers to the number of plant species and taxa that are recorded for sale in Hibbert (2002). It includes number of species recorded as available for sale in the respective jurisdiction plus the 33 species and taxa recorded as 'widely available' (it is assumed that 'widely available' plants are available in all States and Territories). For example, in South Australia 46 species and taxa are recorded as available, which when added to the 33 widely available species and taxa results in a total of 79. Percentage is portion of total naturalised invasive plants in Australia that are recorded as available for sale in respective jurisdiction. No nurseries from the ACT are included in Hibbert (2002) and as such the ACT figure only includes the 33 species and taxa recorded as 'widely available'.

4 Declared noxious and available for sale refers to species and taxa that are declared noxious in one jurisdiction while being available for sale in another jurisdiction. Percentage is portion of declared plants in jurisdiction that are also available for sale in at least one Australian State or Territory.

5 Naturalised and Prohibited for Sale in Jurisdiction refers to species and taxa that are both naturalised and prohibited in the respective jurisdiction. Percentage is portion of invasive garden plant species that are naturalised in jurisdiction that are prohibited for sale.

6 This includes those species that are both declared noxious or unassigned. Unassigned species are subject to a weed risk assessment if importation into the State is sought.

Source: Groves, Boden and Lonsdale (2005)

The deficiencies of the current State and Territory regimes are compounded by the lack of a consistent and uniform national framework. While there have been some recent reforms in relation to commitments to close Commonwealth quarantine loopholes, there is a need for further reform at a national level.

4 The Way Forward: A National Regulatory Framework for Weeds

The role of statute law (legislation) is often seen as being purely to regulate, ignoring its crucial role in establishing policy processes, fashioning institutions, defining public participation and setting agency objectives. Statute law is the wiring of the institutional system.

Stephen Dovers, Ten Commitments: Reshaping the Lucky Country's Environment*, (2008:220)*

In July 2008, the national NRM and primary industries institutional system was strengthened through the establishment of the National Biosecurity Committee, under which the Australian Weeds Committee sits. The National Biosecurity Committee (NBC) is a new advisory committee to the Primary Industries Standing Committee (PISC) and the Primary Industries Ministerial Council (PIMC) and the Natural Resource Management Standing Committee (NRMSC) and Natural Resource Management Ministerial Council (NRMMC). It will consider all biosecurity issues.

Similarly, the up-dated *Australian Weeds Strategy* provides a more robust policy framework, particularly its increased emphasis on weed spread pathways. A major area of unfinished business under the *Australian weeds Strategy,* however, is putting in place a coherent and consistent national regulatory framework that provides effective 'wiring' for Australia's biosecurity system.

Since 2004, WWF-Australia has presented a range of evidence that demonstrates that from a national viewpoint, the current regime of Commonwealth, State and Territory legislation forms an inefficient, inconsistent, *ad hoc*, and only partially effective national regulatory framework for weed prevention and control (Glanznig 2005b, Glanznig 2005c, Glanznig *et al* 2004, Groves *et al* 2005).

This section outlines the strategic approach, key design factors and key objectives and elements that need to underpin a strong national regulatory framework.

4.1 National framework strategic approach

An effective national framework needs to be built around three strategic approaches to weed prevention and control: pathway-based, species-based and place or asset-based interventions. Their respective foci are outlined in the table below. For the purpose of the national statutory framework, the prime approaches that need to be built into legislation are pathway-based and species-based.

Table 4: Three strategic interventions to prevent and control weeds

Weed	Focus	Examples of national policy response
Pathway-based	Strategic control of high risk weed spread pathways caused by human drivers	National Weed Spread Plan
Species-based	New and emerging invasive weeds that are targets for early warning detection, eradication or containment Widespread invasive weeds that are targets for containment	National Alert List National cost-share eradication list Weeds of National Significance
Site-based	Impact mitigation on significant environmental assets	World Heritage site management plans

4.2 National framework design factors

An effective and efficient weed prevention regime needs to manage four major inherent attributes to the weed problem:

1. the large pool of invasive plants already in Australia, their uneven distribution within Australia, and the large number currently traded requires an iterative and reliable assessment regime
2. decisions to introduce new high risk weeds are essentially irreversible once the weed has naturalised and eradication is no longer feasible which requires a pro-active response
3. the uncertainty of predicting which plant species will become serious weeds in Australia, including the lag time between wide distribution of many invasive plants and their subsequent establishment and invasion
4. the role that propagule pressure has in increasing the probability of an invasive plant naturalising that requires a comprehensive pathway-based response.

Large pool of invasive plants: need for an iterative and reliable assessment regime

According to Weeds CRC analysis (Randall 2007), there are 26,242 introduced plant species in Australia. Of these, 2,739 have already naturalised, and 5,907 have known weed histories elsewhere in the world but have no current history of a weed in Australia. The size and strategic risk posed by these over 8,600 weedy plant species has challenged the current narrow prohibited list approach that underpins current State and Territory weeds legislation, with the exception of WA's comprehensive precautionary biosecurity legislation.

As Hanson and Bishop (2005) state in relation to the standard prohibited list approach:

> Weed risk mitigation relies solely on the prior identification of likely threats. These threats are addressed by preventing entry using a prohibited list. This approach may be effective when the pool of threats is small and the task of identifying most of them can be undertaken comprehensively and within reasonable resource constraints. However, when the pool of threats is large or expands, the system becomes far less reliable because the task of identifying the majority of threats becomes prohibitive. In these circumstances this system creates a legal framework within which a large proportion of potential weed threats are not addressed in any way.

The most efficient policy response is implementation of an **iterative and reliable** instrument that is triggered by the proposed import of a new plant species. This approach enables risk assessments to be mostly demand driven, which results in a far more efficient allocation of staff resources spread over many years.

Irreversibility: need to prevent legal trade of invasive plant species

The most effective and efficient policy response to manage the inherent irreversibility of invasive plants increasing their range and impacts, once eradication is no longer feasible, is implementation of a **comprehensive** instrument that subjects all proposed imports of new plant species to a Weed Risk Assessment, such as a permitted list-WRA system.

This also requires that all the elements of the national weed framework are mutually reinforcing. A key design factor is to ensure that there is no incentive to illegally smuggle new plant species past the Commonwealth quarantine border in order to make them available for supply domestically. This risk necessitates the implementation of a national post-border permitted list system to mitigate this risk.

Uncertainty: need to capture the unknown 410 invasive plant species and account for lag time

There is currently imperfect knowledge about the invasive characteristics of the over 26,000 introduced plant species in Australia, since Weed Risk Assessments have been done for only a modest number. The above discussion highlighted that there is also inherent uncertainty in which of the 26,000 have the potential to become serious weeds, since the major determinant for invasiveness used (overseas weed history) (Rejmanek 2000) does not capture between 2-17% of plant species, which become invasive in Australia but are not invasive overseas.[1] It has been estimated that the base-rate probability of a plant becoming a weed in Australia is about 2% for most types of plant introduction, but can be as high as 17% for certain groups (Smith *et al* 1999). This is further complicated by the significant lag phases for the establishment of many plant species. A permitted list/WRA system would capture the estimated more than 410 introduced

[1] Randall (unpublished data cited in Panetta 2005) has calculated that 18% of the species considered to be weeds in Australia are not considered to be weedy anywhere else in the world. This figure is conservative, since a number of species (eg. rubbervine and praxelis), which are now weeds elsewhere in the world, were not known as weeds when they were first introduced to Australia. For example, of the 20 Weeds of National Significance (WoNS), 13 or 65% were not known to be weeds anywhere in the world at the time they were brought into Australia. The WoNS are rubber vine, pond apple, bitou bush/boneseed, bridal creeper, cabomba, Chilean needle grass, serrated tussock, hymenachne, mesquite, parkinsonia, mimosa and willows (McFadyen 2005, pers. comm.).

plant species where base-probability shows that while they are not known weeds overseas they can be expected to become serious weeds in Australia.

The most effective policy response to manage this inherent uncertainty is implementation of a **conservative** and **precautionary** instrument such as a permitted list-Weed Risk Assessment system.

Propagule pressure: need to reduce volume of high risk invasive plants in trade

As discussed in section 1.3, propagule pressure has been found to have strong explanatory power in explaining successful invasion of novel exotic invasive species. The key policy design feature to mitigate this strategic risk is to control and stop the intentional human movement of high risk plant species that results in high propagule pressure and therefore increased risk of these species naturalising and becoming invasive.

A key policy objective should be to control and mitigate the risk associated with the propagation, sale and movement of high risk invasive ornamental plants species. This reinforces the need for a **comprehensive pathway-based response** that targets all high risk invasive plant species, rather the current narrowly defined response.

4.3 National framework policy objectives and instruments

This section sets out the key policy objectives that need to drive the legislative features or elements of an effective national regulatory framework for weeds. This challenge is not restricted to weeds, as law makers are also grappling with invasive animals. There are strong parallels between the approaches introduced below, and those that are under deliberation to put a more robust biosecurity system for invasive animals.

For example, there are similar legal issues and national legislative responses emerging to deal with the problems posed by ornamental fish in Australia, as the NRMMC outlined in their recently released, *A Strategic Approach to the Management of Ornamental fish in Australia*:

> The state and territories generally rely on one or both of two mechanisms to regulate the aquarium fish trade – a prohibited species list and a permitted species list. Under the former approach, authorities target fish species that are recognised as pests (in the broadest sense) and include them on a prohibited (or noxious) species list, usually making the possession of such fish illegal.
>
> Prohibited species lists are generally relatively short and easy to enforce, however, they do not provide a mechanism to prevent trade in species whose pest risk status is unknown and which therefore do not appear on the list. Under this arrangement, fish that are not on the EPBC Act permitted import list and are not on a state or territory prohibited list can be owned and traded easily once they are in the country, as their legal status is not specified in any legislation. Most of the fish that are smuggled into Australia belong to this group, along with species that may have been imported into the country before the advent of existing legislation.
>
> Inconsistency between jurisdictions also compromises the efforts of individual jurisdictions to manage risks through restricting trade in potentially noxious species. In many cases, a fish that is prohibited in one jurisdiction is freely available in neighbouring jurisdictions and may be moved across borders relatively freely by the public... (NRMMC 2006, pg.8).

The major policy objectives of a robust national framework and the desired outcome and proposed legislative instrument is outlined in the table below.

Table 5: National framework policy objectives

Policy Objective	Desired Outcome/s	Required instrument	Legislative instrument/approach	Responsible institution or agency
A. National border				
To stop the legal import of new weeds into Australia	Only new low risk plant species are legally imported into Australia	**Commonwealth permitted seeds list – Weed Risk Assessment system**	**Existing** Schedule 5, Permitted Seeds List, *Quarantine Proclamation, 1998*	Australian Government, Biosecurity Australia
To stop the legal import of previously assessed high risk invasive plants into Australia	Transparently and efficiently inform proposed importers which plant species have previously failed a Weed Risk Assessment and have been designated a prohibited import	**Commonwealth prohibited seeds list**	**Existing** Schedule 4, Part 2, *Quarantine Proclamation, 1998*	Australian Government, Biosecurity Australia
B. National post-border				
To enable the efficient national trade in low risk plant species and halt the legal importation of new non-low risk plant species that are not on the proposed National Noxious Weed List or respective State noxious weed list	Reduced incentive to smuggle high risk plant species into Australia for subsequent propagation and trade	**National permitted plants list**	**New**	NRMMC and PIMC through the Australian Weeds Committee
To prevent the legal inter-state movement of high risk plant species	Reduced propagule pressure and associated risk of high risk plant species naturalising in new States or regions	**National noxious plants list**	**New**, though AWS policy has been implemented that requires States to ban all WONS and some aquatic weeds from sale	NRMMC and PIMC through the Australian Weeds Committee
C. State border				
To prevent the illegal importation of prohibited plant species through interstate mail by enabling	Reduced propagule pressure and associated risk of high risk plant species naturalising in new States	**Commonwealth postal legislation that authorises State quarantine personnel to inspect inter-state mail for quarantine material**	**Existing** *Australian Postal Corporation Act 1989* *Australian Postal Corporation (Quarantine Inspection and Other Measures) Act 2007*	Department of Broadband, Communications and the Digital Economy
To prevent the legal introduction of new invasive plant species from jurisdictions where they are present to jurisdictions where they are absent and/or naturalised	No new invasive plant species legally imported into any State or Territory Recognises that high risk invasive plants are not uniformly spread throughout Australia	**State permitted plants list**	**New for all except WA** State biosecurity legislation that includes comprehensive statutory permitted plant lists. Currently only WA *Biosecurity and Agriculture Management Act, 2007*	State biosecurity, agriculture, environment, or natural resource agencies

To control the import, spread and sale of high risk invasive weeds	No high risk controlled plant species able to be legally traded Controls on high risk human weed spread pathways Reduced propagule pressure and associated risk of high risk plant species already in jurisdiction naturalising or spreading further	**State prohibited plants list**	**Existing** All states have statutory controlled plant lists	State biosecurity, agriculture, environment, or natural resource agencies

The above table can be elaborated to define the key instruments or elements in a national weed legislative framework at three levels: national border, national post-border and State border.

A. National Border: Prevent the legal import into Australia of new weeds and controlled high risk weeds

A.1. Commonwealth quarantine legislation

a. Commonwealth border weed risk assessment system
b. Commonwealth border permitted plant list
c. Commonwealth border prohibited plant list

B. National Post-border: Enable the efficient legal movement of specified low risk plants and prevent the legal movement of controlled high risk weeds throughout Australia

B.1. National post-border weed risk assessment system

B.2 National post-border permitted plant list

B.3 National noxious weed list

B.4 Fully harmonised State and Territory biosecurity laws and weed control classes

C. State Border: Enable the legal import of additional specified plant species and prevent the movement of State specific high risk weeds into States and Territories

C.1 State and Territory biosecurity laws

a. State and Territory permitted plant lists
b. State and Territory noxious weed lists

C.2 Commonwealth *Australian Postal Corporation Act 1989*

The relationship between the different instruments in the national post-border framework is set out in the figure below.

Figure 1: Relationship of proposed key national elements in an effective national regulatory framework

<table>
<tr><td rowspan="4">National List of Invasive Plant Species</td><td rowspan="3">High Risk Plant Species</td><td rowspan="3">National Noxious Weed List
(prohibited for sale (accredited sterile cultivars / varieties excepted))</td><td colspan="2">Quarantine List</td></tr>
<tr><td>Alert List</td><td>Type 1: Species/Taxa Action Plan
Type 2: No specific plan needed</td></tr>
<tr><td>Control List</td><td>Type 1: Species/Taxa Action Plan
Type 2: No specific plan needed</td></tr>
<tr><td>Medium Risk Plant Species</td><td>National Permitted Plant List
(medium risk plant species in current trade would continue to be permitted for sale to mandatory labelling requirements. For new proposed plant species for trade, only those that are low risk plant would be permitted.)

National Mandatory Invasive Species Labelling Scheme</td><td colspan="2"></td></tr>
<tr><td></td><td>Low Risk Plant Species</td><td>National Permitted Plant List
(permitted for trade and movement)</td><td colspan="2"></td></tr>
</table>

Definitions

High Risk Invasive Plant Species refers to those introduced, and native plant species under cultivation that known or predicted to be invasive[1] and a major problem in Australia. This would include plant species that are 'transformers'[1], and/or have a direct impact on rare and threatened native species. A specific Weed Risk Assessment Score range should be determined to provide the metric for high risk.

Medium Risk Invasive Plant Species refers to those introduced, and native plant species under cultivation, that are known or predicted to be able to naturalise and become a minor problem in Australia. A specific Weed Risk Assessment Score range should be determined to provide the metric for medium risk.

Low Risk Plant Species refers to those introduced and native plants plant species that have been assessed as low risk to the environment and agriculture at present. A specific Weed Risk Assessment Score range should be determined to provide the metric for low risk.

The above system is reliant on a *National List of Invasive Plant Species,* which should be a comprehensive list of all invasive plant species that are in Australia, and invasive plant species that present a high risk of invading Australia in the foreseeable future. To be placed on the list, a species would need to satisfy specific tests of 'invasiveness'. Its scope should include both native and non-native species.

The *National List of Invasive Plant Species* would be a component of the proposed *National List of Invasive Species* that would list all invasive species in Australia or that present a high risk of invasion, and be developed under the auspices of the national invasive species framework (see schema in Australian Biosecurity Group (2005) report).

It would include provisions for regular review and emergency listing.

The major political challenge with the proposed national regulatory framework relates to the development of a harmonised national post-border system that covers weed assessment and listing on a national permitted plant list or national prohibited plant list. To highlight how the national permitted list and prohibited list systems harmonise across jurisdictions, the discussion below has been structured by system rather than by jurisdiction under the following headings:

A. National Permitted Plant System

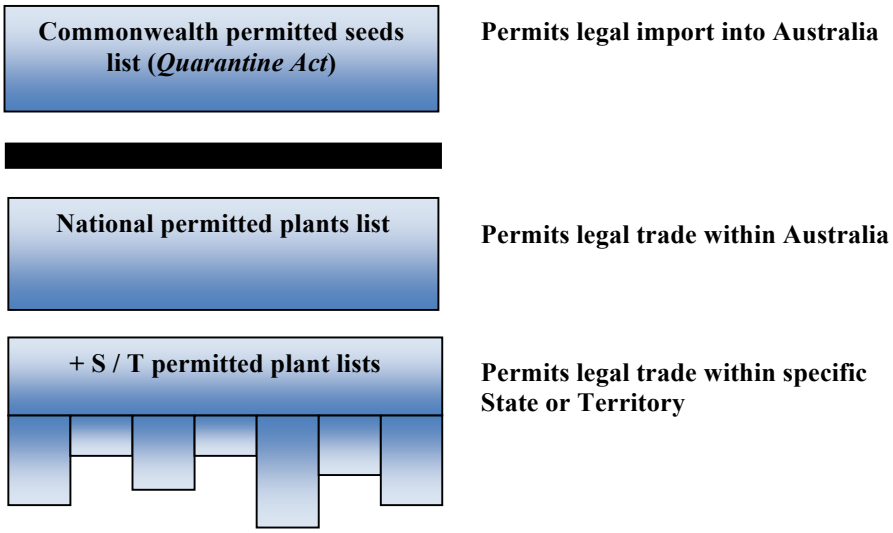
B. National Prohibited Plant System

A. National Permitted Plant List System

The national plant list permitted list assessment system should comprise one weed risk assessment system and two nation-wide permitted plant lists.

- **Commonwealth border permitted plant list**. This is the existing statutory list under Schedule 5 (Permitted Seeds List), *Quarantine Proclamation, 1998*.
- **National post-border permitted plant list**. This is a proposed new national statutory list that legally permits trade of plant species in all Australian jurisdictions (excluding external territories).
- **State and Territory permitted plant lists**. These permit the legal trade of listed plant species within a specific jurisdiction and includes those plant species listed on the national post-border permitted plant list.

Figure 2: A schema of the border and post-border permitted list system



The table below provides an elaboration of the permitted plant list system and identifies the responsible agency, the policy objective for each level of the system and potential issues.

Table 6: National permitted list elements, instruments, responsible agency, policy objective and relevant issues

	Existing legislative instrument	Responsible Agency	Policy objective	Issues
Border Commonwealth permitted list	Schedule 5, *Quarantine Proclamation 1998*	Biosecurity Australia Australian Quarantine Inspection Service	To permit legal import of only new low-risk plant species and plant species on the permitted list	List contains many invasive exotic plant species that are already in Australia but not under 'official control'. This is a legacy effect resulting from 200 years of essentially no legal controls on plant imports
National post-border permitted list		Australian Weeds Committee, NRMMC		The national permitted plants list is the list of plants agreed that can be traded and moved nationally
State and Territory permitted lists	WA *Biosecurity and Agriculture Management Act, 2007* *NT Fisheries Act, 1998* (re: aquatic plants)	Relevant state agencies	To prohibit legal inter-State import of invasive plant species that are present in some jurisdictions but not others. At a national scale the aim is to enable regional containment of invasive species that may be in trade in eastern States but not yet present in Western Australia and the Northern Territory due to their existing permitted list systems	Western Australia has had a comprehensive permitted list system since late 1997 that to March 2005 has prohibited the import of 434 invasive plant species. It cannot be disadvantaged by the proposed new national permitted list system.

Rationale for a three-tiered permitted list system is needed

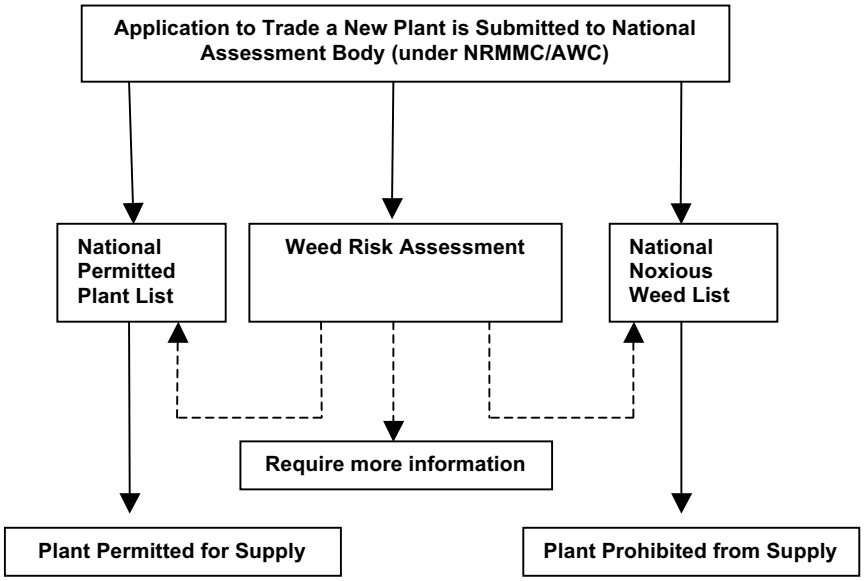
The major rationale for a three-tiered permitted list system is to:

- Differentiate between the Commonwealth and national post-border permitted lists since the Commonwealth permitted list contains many invasive plant species – an artefact of the Commonwealth's narrow quarantine approach until the 1990s. As most of these invasive plants are no longer in trade and there is no interest in other countries wanting to import them, there is an opportunity to construct a post-border permitted list that comprises exclusively or almost exclusively of low risk plant species permitted for trade
- Differentiate between the national post-border permitted list and State permitted lists since invasive plants are not evenly distributed in Australia and enables some flexibility in the national system. An example is that one jurisdiction may want to list a medium risk ornamental plant already in existing trade that is already naturalised in that jurisdiction, but not in other jurisdictions, such as Western Australia that has prevented the legal import of high risk plant species through its permitted list system since the late 1990s.

Permitted/prohibited list assessment system

The national post-border permitted and prohibited lists need to be based on a science based weed risk assessments. To ensure that a consistent approach, each new plant will need to be assessed by a national body proposed to be established under the auspices of the Australian Weeds Committee. Several models exist, such as undertaking an assessment using State government weed risk assessment experts that applies an agreed national risk assessment protocol. This could further institutionalise the Standards Australia post-border weed risk assessment protocol. Another model would be to establish a specific Commonwealth body for this purpose that could also draw on the expertise of Biosecurity Australia.

Figure 3: Procedure to Enable National Trade in Plant Species



Appendix 1 discusses several national permitted list systems that have been developed for chemicals, and their relevance as potential models for a national post-border weed permitted list system.

Mandatory plant labelling scheme for medium risk plant species already in trade

The Australian public needs to know what they are buying and what environmental and agricultural problems their purchased invasive garden plants can cause.

The Australian, State and Territory Governments have already recognised the importance of mandatory labelling schemes to enable informed consumer choice and purchasing of ecologically sustainable goods in other sectors. A *Mandatory Energy Efficiency Labelling Scheme for Australia* is already in place, and governments are in the final stages of developing a *Mandatory Water Efficiency Labelling Scheme for Australia*. The final report for a Mandatory Water Efficiency Labelling Scheme for Australia highlighted the major limitations of national voluntary schemes (George Wilkenfeld and Associates Pty Ltd *et al* 2003).[2]

The report noted that the:

> coverage of the existing voluntary water efficiency scheme is limited and because the scheme is voluntary, few suppliers have chosen to label, and those that have tend to label only their better performing products – for obvious reasons…Consequently, despite being a comparative labelling program, it has developed some attributes of an endorsement label, which assists water utilities and their customers to identify models for rebate purposes, rather than as a purely comparative label, which encourages and enables buyers to compare the water efficiency of different models.

A similar national mandatory invasive species labelling scheme is also required to reduce the purchase and wide distribution of invasive species, particularly invasive garden and aquarium plants. This would enable informed consumer choice and result in reduced demand and trade in invasive species. A key element should be the mandatory inclusion of scientific names on labels to enable ready plant identification by informed consumers and public officials.

The costs and benefits of a mandatory invasive species labelling scheme has been previously examined (Martin *et al* 2005).

B. National Prohibited Plant System

The key elements in the national prohibited plant system are:

- National noxious weed list based on uniform national weed control classes
- Fully harmonised State and Territory weed legislation, including weed control classes
- Commonwealth *Australian Postal Corporation Act, 1989* enables State quarantine inspections of inter-state mail.

[2] The report noted that the "coverage of the existing voluntary water efficiency scheme is limited and because the scheme is voluntary, few suppliers have chosen to label, and those that have tend to label only their better performing products – for obvious reasons…Consequently, despite being a comparative labelling program, it has developed some attributes of an endorsement label, which assists water utilities and their customers to identify models for rebate purposes, rather than as a purely comparative label, which encourages and enables buyers to compare the water efficiency of different models."

National noxious weed list

A major deficiency in implementing a national approach to harmful invasive plant species is the lack of **one** coherent National Noxious Weed List. The United States, which has an analogous Federal system of government to Australia has overarching Federal legislation, namely the Federal *Noxious Weed Act, 1974* and a Federal noxious weed list. Other world leaders, such as New Zealand and South Africa also have statutory national weed lists. Australia's lack of a national noxious weed list is a major omission in an effective national policy response to the weed problem.

The intergovernmental Australian Weeds Committee has long recognised the need to implement uniform national restrictions on the trade of high risk invasive plants:

> Given the realities of today's trade in ornamental plants, where plants are grown in large wholesale nurseries and distributed and promoted nationally, the *ad hoc* declaration of plants on a State-by-State basis is ineffective and needs to be coordinated. By listing high-priority established weeds as prohibited plants throughout Australia, we can avoid the situation where a plant that has been banned in one State can be promoted in national gardening magazines/books and on popular national gardening television programs. By restricting trade (and hence transportation and cultivation), national restrictions will help reduce the rate at which these plant species spread into new areas (AWC Working Group 2001).

Uniform national weed classes

There is a pressing need to develop a comprehensive set of uniform national invasive species control classes covering all major phases of the invasion process. The Federal Senate Inquiry on Invasive Species report, published as *Turning back the tide – the invasive species challenge*, recommended that three national invasive species control classes be developed and official lists under each be developed and agreed by the Australian and all State and Territory governments:

- *National Quarantine List:* Comprised of invasive species of national importance that are a high invasion risk for Australia, may or may not have already invaded Australia, and whose early detection will enable cost-effective eradication. A starting point should be the Northern Australia Quarantine Strategy target list.
- *National Alert List:* Comprised of invasive species of national importance that are naturalised, have a restricted range, are predicted to have a major impact on the environment or industries, and whose eradication is feasible and cost-effective. It should also include introduced invasive plant species of national importance, which are garden plants that are yet to escape and are subject to national early warning surveillance action.
- *National Control List:* Comprised of invasive species of national importance that are naturalised and generally widespread, are having a major impact on the environment or industry, and whose containment or control will assist protect the values of areas of national environmental significance. A starting point is the Weeds of National Significance list…

(SCECITARC 2004, pg.214).

Table 7: Proposed Uniform National Invasive Species Control Classes

National Noxious Weed List Classes	Description	Statutory Requirement	Responsibility
National Quarantine List	Invasive species of national importance that are a high invasion risk for Australia and not known to be present in Australia, and whose early detection will enable cost-effective eradication. A starting point should be the Northern Australia Quarantine Strategy target weed list.	Prohibited import into Australia	Australian Government
		Listed for eradication under State/Territory laws	State and Territory governments
		Prohibited for trade nationally	Australian, State and Territory governments
		Early warning surveillance programs	Australian, State and Territory governments
		Eradication program (where detected and feasible)	Australian and appropriate State and Territory governments
National Alert List	Invasive species of national importance that are naturalised, have a restricted range, are predicted to have a major impact on the environment, human welfare or industries, and which may be, is currently, or was, subject to a State or national eradication effort. It should also include introduced invasive plant species of national importance, which are garden plants that are yet to escape and are subject to national early warning surveillance and eradication/containment action.	Prohibited import into Australia	Australian Government
		Listed for eradication species under State/Territory laws	State and Territory governments
		Prohibited for trade nationally	Australian, State and Territory governments
		Early warning surveillance programs	Australian, State and Territory governments
		Eradication programs (where appropriate)	Australian and appropriate State and Territory governments
National Control List	Invasive plant species of national importance that are naturalised and generally widespread, are having a major impact on the environment or industry, and whose containment or control will assist protect the values of areas of national environmental significance. A starting point is the Weeds of National Significance list	Prohibited import into Australia	Australian Government
		Listed for containment (if appropriate) under State/Territory laws	State and Territory governments
		Prohibited for trade nationally	Australian, State and Territory governments
		National Control Action Plan	Australian, and appropriate State and Territory governments
		Containment programs (where appropriate)	Australian, State, Territory and local governments
National Restricted List	High risk invasive plant species where a national ban in trade would reduce propagule pressure and naturalisation and/or weed spread risk	Prohibited import into Australia	Australian Government
		Prohibited for trade nationally	State and Territory governments

Source: Adapted from Australian Biosecurity Group (2005)

A *National Noxious Weed List* needs to build on existing and emerging State noxious weed lists. As such, States and Territories should apply the mutual recognition principle which recognises that a weed declared as a statutory noxious weed in one jurisdiction should be declared by all jurisdictions to ensure a water-tight policy response to the given noxious weed that prevents the actions of one jurisdiction undermining the efforts of another and controls invasion pathways that operate nationally, such as the promotion, trade and movement of invasive garden plants. This approach would result in a *National Noxious Weed List* of in the order of 500-700 plant species, if quarantine weed species are included.

National action plans or strategies would only be developed for Type 1 Alert and Control species, where nationally coordinated interventions are deemed necessary. For Alert List Type 1 species, for example, this would include those species that are subject to national eradication efforts, while for Control List Type 1 species, this would include the WONS.

Fully harmonised State and Territory weed control classes

The Australian Biosecurity Group report, *Invasive Weeds, Pests and Diseases*, noted that there are about 25 major weed control classes used by the States and Territories. These inconsistent categories need to be harmonised into a uniform set of State and Territory invasive species categories. Governments have done this for protected areas: 47 different categories of protected areas on land and 11 marine classes were rationalised into six uniform protected area classes. The benefits have been enormous for planning, evaluation and reporting (Australian Biosecurity Group 2005, pg. 22).

Table 8: Proposed Uniform State and Territory Invasive Species Control Classes

Uniform State and Territory Invasive Species Control Classes	Description	Statutory Requirement	Responsibility
Class 1: Quarantine and Eradication List	Comprised of invasive species in other jurisdictions but not commonly present in own jurisdiction, and if introduced would cause an adverse economic, environmental or social impact	Prohibited from import and trade in jurisdiction	State/Territory government
		Subject to early warning surveillance	State/Territory government
		Subject to eradication if found	State/Territory government, Land manager
		Notifiable	Land manager
Class 2: Containment List	Comprised of invasive species not commonly present in own jurisdiction or regionally contained, which have, or could have adverse economic, environmental or social impact	Prohibited from import and trade in jurisdiction	State/Territory government
		Subject to early warning surveillance on edge and outside of containment area	State/Territory/local government
		May be subject to eradication or	State/Territory government

		continual suppression Notifiable	 Land manager
Class 3: Control List	Comprised of invasive species that are established in jurisdiction and have, or could have an adverse economic, environmental or social impact.	Prohibited from import and trade Conditions may apply to movement of contaminated materials Landowners must take reasonable steps to keep land free of Class 3 pests Government agencies must take reasonable steps to keep land free of Class 3 pests	State/Territory governments Merchants, land managers Land managers State agencies, local governments
Class 4: Restricted List	Comprised of invasive species whose trade would result in spread in extent and/or abundance, and increase the probability of an adverse economic, environmental or social impact either within or without the jurisdiction	Prohibited from import or trade. Divided into classes that differentiate between direct trade (eg. through garden industry) and indirect trade (eg. As contaminant in fodder)	State/Territory governments
Class 5: Regional Declaration List	Comprised of invasive species of regional importance	Regionally specific actions	Local governments or regional bodies

Source: Australian Biosecurity Group (2005)

Table 9: Current Harmonisation Between State and Territory Weed Control Classes and Proposed Uniform State and Territory Control Classes

	NSW	**Qld**	**SA**	**Tas**	**Vic**	**WA**	**ACT**	**NT**
Class 1: Quarantine and Eradication List	C1	C1	Alert List, others	D	SP	Quarantine or P1 / P2	D	A
Class 2: Containment List	C2, C3	C2	NA	D	RP	P1, P2 or P1, P3	D	B
Class 3: Control List	C4	C2	NA	D	RC	P1, P3 or P1, P4	D	B
Class 4: Restricted List	C5	C3	NA	D	R	P1	D	C
Class 5: Regional Declaration List	C2	NA	NA	NA	RP, RC	Pest Plants	D	NA

Commonwealth *Australian Postal Corporation Act 1989*

An effective national regulatory framework needs to ensure that Commonwealth legislation does not impede State and Territory biosecurity regimes. An example is the Commonwealth *Australian Postal Corporation Act 1989*, which until recently impeded State quarantine efforts in Western Australia.

In its 2003 submission to the Federal Senate Inquiry on invasive species, the WA Government highlighted the significant problems involving the movement of invasive species between States and Territories within Australia, and the fact that a shortcoming in the Commonwealth *Australian Postal Corporation Act 1989* technically prohibited the WA Quarantine Inspection Service from inspecting inter-State mail coming into the State (Government of Western Australia 2003).

To rectify this situation, the former Coalition Australian Government introduced the *Australian Postal Corporation Amendment (Quarantine and Other Measures) Bill 2007* into the Federal Parliament on 20 June 2007 where it received bi-partisan support. As part of the Second Reading Speech, the now Federal Minister for Broadband, Communications and the Digital Economy, Senator Stephen Conroy stated that:

> Labor regards this bill as a sensible approach to address legislative anomalies and introduce amendments to the *Australian Postal Corporation Act 1989* for the benefit of the wider community. This bill has been developed in consultation with state and territory governments and Australia Post.
>
> One of the key aims of this legislation is to prevent the spread of pest species between states and territories. The bill will implement recommendations from the 2004 Senate Environment, Communications, Information Technology and the Arts References Committee report *Turning back the tide: the invasive species challenge* and the 2005 House of Representatives Standing Committee on Agriculture, Fisheries and Forestry report *Taking control: a national approach to pest animals* (Conroy 2007, pg.59).

Analysis by the Parliamentary Library noted that "the Bill appears to be uncontroversial" (Pyburne 2007, pg.9); it was passed by the Parliament on 9 August 2007 and received Royal Assent on 24 September 2007.

The amended Act enables State and Territory jurisdictions the opportunity to scan incoming inter-State mail for quarantine weeds and pests at their cost, and is most relevant to those States that have natural and transport barriers, such as Western Australia and Tasmania.

5 Conclusion

This paper makes the case to reform Australia's national weed regulatory framework, and the benefits this would deliver for the emerging Australian biosecurity system (AusBIOSEC). The framework comprises a national permitted plant system and a national prohibited plant system. There are solid precedents for this type of system already in place for chemicals (as outlined in Appendix 1). Financing for aspects of this system may need to be shared by both impactors and beneficiaries and this is discussed further in Appendix 2.

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Appendix 1: Australia's national hazardous chemicals legislative framework: insights for an effective national weeds legislative framework

by Rachel Walmsley, NSW Environmental Defenders Office

It is interesting to compare the above weeds regimes with the national legislative regime in place for chemical substances. Certain parallels can be drawn between the two policy areas, for example regarding national and State prohibition of hazardous chemicals, controls on classes of chemicals, warning labelling, and best practice regulatory principles. For example, the National Authority for Agricultural and Veterinary Chemicals maintains a national register, with specific assessment criteria for listing. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) regime is assessment only, not registration, and therefore not an ideal white list. However, it is useful to look at different policy approaches.

Importers and/or manufacturers of chemicals or chemical products, need to comply with Federal legislation governing chemicals assessment and registration. The four national chemicals assessment and registration schemes cover food, industrial chemicals, pharmaceuticals and agricultural and veterinary chemicals. The schemes are designed to operate in a complementary manner to ensure there is no duplication or any unnecessary regulatory burden on industry. The scope of each of the four chemicals assessment and/or registration schemes is defined by legislation. The legislation for each scheme specifies relevant chemicals and outlines the requirements for anyone involved in chemicals manufacture and/or importation.[i]

In addition to the four national schemes, Australia has national frameworks for managing chemical risks in transport and workplaces; setting residue standards in food and produce; limiting access to certain poisons; and managing aspects of environmental quality and monitoring. The degree of complexity is necessary (perhaps even more so than for a weeds regulatory regime) because of the prevalence of chemicals use, the variety of uses to which chemicals are put, and the broad range of human and environmental exposures. However, the challenge is the same as for weeds - to ensure that these systems are linked by common principles and coordination mechanisms that reduce the complexity where possible, avoid duplication of effort, provide mutually reinforcing feedback, and deliver consistent outcomes for human health, the environment and trade. [ii]

The following table summarises the four main national schemes for chemicals and how they are dealt with.[iii]

	Industrial Chemicals	Agricultural and Veterinary Chemicals	Medicines and Medicinal Products	Food additives, contaminants and natural toxicants
AGENCY RESPONSIBLE	National Industrial Chemicals Notification & Assessment Scheme (NICNAS)	National Registration Authority (NRA) for Agricultural and Veterinary Chemicals	Therapeutic Goods Administration (TGA)	Food Standards Australia New Zealand (FSANZ) (formerly ANZFA)
MINISTRY	Health & Ageing	Agriculture, Fisheries and Forestry	Health & Ageing	Health & Ageing
SCOPE	Assessment only, not registration based	Assessment & Product Registration	Assessment & Product Registration	Assessment & Product Registration
RELEVANT LEGISLATION	*Industrial Chemicals (Notification & Assessment) Act 1989*, as amended.	*Agricultural & Veterinary Chemicals (Code) Act 1994* *Agricultural & Veterinary Chemicals Administration Act 1994*	*Therapeutic Goods Act 1989*	*Food Standards Australia New Zealand Act 1991* Australia New Zealand Food Standards Code

It is useful to examine NICNAS which is an assessment only scheme, and NRA for Agvet chemicals which involves assessment and registration.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS)[iv]

NICNAS undertakes scientific assessment of industrial chemical entities only. It is not a registration program, nor does it register or assess products. The States and Territories are responsible for the control and sale of industrial chemical and chemical products under separate legislative arrangements. NICNAS undertakes assessments cooperatively with Department of Environment and Heritage and the Department of Health & Aged Care who prepare environmental and public health risk assessments, respectively. NICNAS applies the National Occupational Health and Safety Commission (NOHSC) classification and labelling codes to assessments.[v] Cooperative assessments and the application of national codes and standards would benefit a preventative regime for invasive species.

The notification system under NICNAS could also be adapted for importation of exotic ornamental plants. NICNAS must be notified of all new industrial chemicals prior to their importation and/or manufacture into Australia. A new chemical is defined as one that is not listed in the Australian Inventory of Chemical Substances (AICS). The AICS is a list of some 40,000 industrial chemicals in use in Australia (these are known as existing chemicals). Exceptions and exemptions do apply for some categories of industrial chemicals. Anyone introducing a new chemical must notify NICNAS through the preparation of a notification statement containing: an application for a permit, assessment certificate or an exemption, and a technical dossier containing all the information required for the assessment.[vi]

National Registration Authority for Agricultural and Veterinary Chemicals

The National Registration Authority (NRA)[vii] assesses and registers agricultural and veterinary chemical products. The aim is to 'protect the health and safety of people, animals and the

environment and enhance the domestic and export market potential of Australia's agricultural and animal industries'. The registration system ensures that users have access to approved products that are correctly packaged and labelled with all necessary limitations, precautions and directions for use. It provides the public with assurance that products on the market are safe and effective when used as directed and do not have adverse effects on people, the environment or trade. The NRA receives assessment advice from different departments and agencies.[viii]

In order to register a new product a comprehensive data package must be submitted to the NRA. The information submitted must establish that a chemical product is safe (that is, it can be used according to the instructions without causing harmful effects) and effective. Products cannot be sold until registered by the NRA.

In relation to weeds, it may not be necessary to create an additional bureaucratic burden of a new Authority, but a National Register for Ornamental Plants (maintained by an existing agency) would be beneficial. An ornamental species must not be able to be sold unless on the new register. Registration would ensure that customers could be assured that a plant species is safe to buy without any adverse effects on health or the environment.

Australian Inventory of Chemical Substances (AICS)

The Australian Inventory of Chemical Substances (AICS) is instructive regarding the establishment of a Proposed Australian Inventory of Non-native Species. As noted above, the definition of a new chemical is contingent on the inventory ie, is unlisted as one of the 40,000 existing chemicals. Exceptions and exemptions do apply for some categories of industrial chemicals. AICS makes a distinction between new and existing chemicals, and includes new assessments and corrections where necessary. The list does not contain information on toxicity, use, manufacturers or importers; rather it focuses on chemical identity. The inventory does have certain privacy issues and is divided into confidential and publicly available sections.

The Invasive species inventory would be a list of new exotic species with high invasive potential that are not yet listed. Appropriate exemptions could address any issues of equity that may arise; and similar privacy implications would need to be addressed. It may be beneficial to include more information on the inventory, rather than just species identity (for example, regarding potential invasiveness).

Chemicals divided into end uses (industrial / agricultural/veterinary)

As noted, the chemicals regime separates chemicals according to their application (for example industrial or agricultural/veterinary). This would be more difficult to do in relation to weeds, beyond the environmental versus agricultural classification. However, there are merits to examining the potential for ornamental escapees to be a distinct category attracting specific control and prevention measures ie, legislative bans and labelling requirements. This could involve a categorisation based on the *pathway* (ie, trade and retail of exotic ornamental species); a register of exotic species (like NRA); assessment system (like NICNAS); and a notification and permit system (like under NICNAS).

Harmonisation with state laws

Many of the restrictions on chemicals in Australia are contained in state and territory legislation (for example the *Environmentally Hazardous Chemicals Act 1985* in NSW), but reflect codes of

practice developed at a national level. The influence of the national codes helps to make controls more uniform across Australia.

Policy coordination and NICNAS[ix]

Policy is coordinated at the intra and inter-governmental level through a range of mechanisms including:

- Whole-of-government policy for chemicals and chemical treaties negotiations within the government is undertaken through the Chemicals Clearing House and Inter-departmental Committee on Chemical Treaties respectively.
- NICNAS has two main policy coordination mechanisms: the NICNAS Industry Government Consultative Committee (IGCC) and informal memoranda of understanding (MoU) arrangements with the States.
- The MoU arrangements are designed to allow for exchange of chemical safety information and discussion of chemical management issues between NICNAS and the States
- In January 2003 the Office of Chemical Safety was added to the TGA Group of Regulators (with TGA and OGTR) in the Department of Health and Ageing.
- Environment Australia (EA) provides advice to NICNAS on the environmental implications of the importation/manufacture and use of new and existing industrial chemicals.
- NICNAS applies the NOHSC classification, labelling and MSDS codes to its assessments and recommendations to facilitate a consistent national approach to achieving safe chemical use. Linkages with NOHSC have been strengthened through a MoU arrangement.

Strengths/lessons for invasive species framework for Australia

The National Chemicals Taskforce reviewed the current regulatory regime in March 2003.[x] The Taskforce concluded that the current frameworks have fostered action to reduce chemical risks to the environment by banning or restricting the supply and use of chemicals, and by providing rules and guidance on managing exposures. However, they identified a need for better feedback loops and understanding of chemical impacts in the Australian environment.

While NICNAS is assessment only and therefore not an ideal white list; AICS is a good example of an effective white list – chemicals cannot be approved for use until assessed and listed. There is no single list of banned chemicals, but several useful sources of information about restrictions on chemicals.[xi] Furthermore the chemical regulatory regime has involved examples of chemicals which have been determined to constitute too great a hazard, being successfully phased out of use (for example, polychlorinated biphenyls – PCBs).

It must be noted that some policy mechanisms and principles cannot be translated directly into the invasive species law context. For example, there is no uniform environmental response to each species – what may be a weed in one region may respond differently in another environment and no pose an invasive threat. Hazardous chemicals have relatively consistent consequences if they 'escape' into environments. Considerations of interstate movement and restriction of supply are similar.

Appendix 2: Opportunities to Finance Invasive Ornamental Plant Surveillance and Eradication

by Warwick Moss

Key findings and Recommendations

Two issues are considered:

a. economic arguments in support of banning import of species of greater than low risk
b. the need for financing and/or incentive mechanisms for managing new low risk imports (and illegal imports of greater than low risk species)

In relation to a. economic support exists for a ban where the marginal damage (risk-adjusted) is higher than the marginal benefit for the first plant. Consistent with this, a safe minimum standard approach suggests that the social consequences of a precautionary standard do not outweigh the need for a SMS.

In relation to b. to determine the most appropriate instruments requires a discussion of different cost-sharing principles. This paper supports a move towards greater "impacter pays" pricing which may be achieved through performance bonds on importers, and levies charged on trades. Fines on illegal importation and trade of species would need to incur higher penalties.

Transitional arrangements from the current beneficiary pays system to impacter pays needs to be carefully managed, and measures to encourage industry support and involvement identified.

Introduction

The preceding issues paper provided recommendations for the components of an overall management framework for invasive ornamental plants. The approach to management is essentially based on risk and the Weed Risk Assessment (WRA). The highest risk species are to be prevented from entering the country, and are subject to import bans. Under the policy, only low risk species can be imported however there need to be effective controls placed on the plant industry to ensure that even lower risk species do not become escapees. The banning of higher risk species has an economic dimension, however, this will only be discussed briefly in this chapter, given existing bans on imported species. The main focus here is on the category of low risk imported species, and the application of incentive and/or financing mechanisms to monitor, prevent and, where necessary, eradicate invasive ornamental plants.

Economic theory provides some assistance in understanding the issues, but the appropriate mechanism selection is much broader than just economics. The political and institutional frameworks will determine which of a series of potential options appears to be the most promising.

The bulk of this report is focussed on the legislative framework required to ensure that white and black lists and a nationally consistent approach work to reduce the risk of ornamental plants escaping and becoming weeds. However, given this is a risk-based approach, there is still a

possibility that imported plants, even after risk assessment, become escapees (a notion of "false negatives"). Further, illegal activity and/or uncontrolled internet based trading activity may lead to much more dispersed entry system for potential invasive plants. This chapter focusses on the issue of how financing may be raised to deal with additional costs required and ideally to provide an incentive for responsible control and management of imported plants.

Increasing surveillance, control and eradication requires additional costs. Who bears these costs under current arrangements? How should costs be shared among various parties involved in the operation and regulation of the industry as well as third parties to the industry? How is a transition to be made if the current situation does not fit with the preferred state? There are a number of charging or pricing principles that have been developed to assist in the cost-sharing decision, but there are no hard and fast rules as to how they are to be applied to particular situations. Invariably there is a choice as to which principles to apply. However, this chapter suggests that a change in the way costs are shared is required. Currently costs are shared on a beneficiary pays basis, and there is a need to move to an impacter pays basis.

Following a discussion of the cost-sharing principles, there are particular examples of instruments that could be applied. There is increasing experience in Australia and around the world that can shed light on the process of selecting and implementing economic instruments in line with the appropriate cost-sharing principles. In essence, there are examples of where performance bond or insurance type schemes apply (for example in mining and sea transport) and where levies are applied on products (energy, waste and water). These and other alternatives will be discussed. Finally, given an adjustment to the industry is required, there is a need to discuss potential transitional arrangements.

Economic arguments in support of banning new imports of "greater than low risk" species

The notion of banning high and medium risk plants from entering the country is already well accepted. The success of the bans, and the White List supplemented by a Black List approach advocated in this report, is fundamentally reliant on the effectiveness of precautionary Weed Risk Assessments. It has been argued that a weed risk assessment should include an economic assessment. A weed risk assessment should first and foremost focus on the scientific evidence in relation to the severity and likelihood of an import becoming an invasive weed. Except in extreme cases, there should be no socio-economic reasons why a greater than low risk plant should be accepted into the country. This assertion will be explained below.

In general, economists are not supportive of bans on products. This section argues however that there are sound economic arguments that do support bans in specific situations, and that the case of weed invasions is one of these.

Firstly, economists' general reluctance to support bans is due to the nature of the relationship between marginal costs and marginal benefits. To understand this, the generalised economic model sees the optimal quantity produced of a product being where the marginal net private benefit equals the marginal damage costs[3]. That is, if the benefit from someone purchasing an

[3] These technical terms are simply one way of dealing with external costs based on the usual supply and demand relationships. The marginal net private benefits is the private benefits less the private costs. The fully private outcome with no external costs is where at the quantity where MNPB=0. However, in the case of external costs, the quantity falls to some point where MNPB=MEC. However, in the case of pollution, a usual way of showing this is by comparing Marginal Abatement Costs or Marginal Control Costs. This

additional plant is less than the additional damage that plant causes then the plant should not be sold. The way economists construct the marginal net private benefit curves and the marginal damage cost curves would generally be in favour of some quantity of a good to be sold (that is at least ONE plant). Consider the first plant sold. The general economic assumptions would be that the benefit to someone would be very high given that at least one person in the community would probably be willing to pay a high price for a plant. Given there may be a large number of buyers, that one puts a very high value on one plant is likely. Secondly, the assumption is that the marginal damage cost of one plant is low. Hence, the marginal net private benefit for one plant is likely to exceed its marginal damage, and therefore economic models would suggest more and more plants are sold until the marginal net private benefits and marginal damage costs are equated.

This is of course generalised, and simplified. However, there are several opportunities to mount an economic argument in support of bans. The argument relies on considering when it may be "economically optimal" for a zero level of plant importation. This brief discussion argues that there is a strong likelihood these can be met in the case of ornamental plants.[4]

Kahn suggests that a ban, in particular a command-and-control approach, can be economically optimal even when it cannot equate the marginal control costs among industry players. Although his discussion is focussed on pollution, the argument is applicable to non-pollution contexts. These are:

1. when monitoring costs are high;
2. when the optimal level of [activity] is at or near zero;
3. during random events or emergencies that change the relationship between [activity] and damages.[xii]

All three of these are likely to apply to the invasive ornamental plant context for at least some plants. Monitoring costs will be high for all plants, however are likely to be high regardless of a ban or not. A ban may in fact increase the need for monitoring costs as illegal activity can be expected to increase. The focus here is mostly on the second of these. The optimal level of activity is consistent with the above argument, and suggests that the marginal damage for the first plant is above or near the marginal net private benefit for the first plant. Where it is above, then the optimal is zero. Where the optimal is near zero, some excess social cost may be generated, but this needs to be compared to the costs of other mechanisms to control the plant.

The third is also a distinct possibility in relation to plants which may be sleeper weeds, or where an extreme of drought or flood may lead to unusually favourable circumstances for a weed invasion.

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chapter has chosen to emphasis MNPB as this represents a choice not to import a plant, rather than deal with the problems of controlling or eradicating a plant once it is introduced. For full introductory account of this type of economic representation, refer to Kahn or Hussein).

[4] Another potential argument is that of the Safe Minimum Standard. Where an efficiency criterion is considered to be inappropriate to safeguard a highly valuable resource, here biodiversity, the SMS approach suggests that under reasonable assumptions of uncertainty, threats to the survival of valuable resource systems are eliminated, providing this does not entail excessive social cost (adapted from Perman et al). However, Wills suggests this is a weaker from of the precautionary principle, and this paper is certainly advocating and consistent with that. Wills quotes Rolfe however as saying that the SMS and cost-benefit analysis should reveal similar results).

Both the second and third characteristics need to be applied on a case by case basis. In that sense, the WRA approach is very important in determining where the MDC is likely to exceed the MNPB for all plants of that type. Economically, then, rejecting import of such plants makes sense. This policy is based on the notion that high to medium risk plants fall into this category.

It is when plants are considered to be low risk and allowed for import that the second category of economic discussion applies. Incentive and/or financing mechanisms in relation to low risk ornamental imports

Prior to determining the highest potential incentive and/or financing instruments for managing ornamental imports, it is necessary to consider the nature of market failure, and determining the extent to which the private outcome differs from the socially optimal outcome. Once the private and social divergence is clear, then the nature of instrument required will be easier to determine. (footnote: there is also an emphasis on government failure. Just because there is a market failure does not mean government intervention will lead to the least cost outcome for society. In effect the optimal decision is focussed on the least costly failure, in the event that the socially best outcome cannot be achieved)

Market Failure issues

As mentioned in earlier chapters, there are costs and benefits associated with the operating and regulating the ornamental plant industry. In strict economic terms there are private and public benefits associated with such plants, but there are also private and public costs. The private and public distinction helps determine the divergence between the actual outcome produced by the market (that is the type, quantity and price of plants bought and sold in markets) and the socially optimal outcome from an economic standpoint (that is, what type and quantity and price should be on the market).

It is beyond the scope of this chapter to undertake the full analysis of such markets. However there are several principles and general directions worth highlighting.

Products having an aesthetic appeal tend to have public benefits as well as private, ie. the benefits of them are greater than just the benefits to the people who purchase them. Generally, no one pays for this additional benefit. On the other hand, there are some who may actually not like introduced ornamental plants, and in fact their benefit is lowered by having particular plants. For example, those with a strict preference for indigenous plants may suffer welfare loss from the presence of ornamental plants. It is very hard to estimate. In general, where there are external benefits a market will "under-provide" them.

In terms of costs, however, there are also private and public costs. The private cost is that of acquiring and maintaining a plant, and involves growing, transporting plants as well as the ongoing costs to the end purchaser. The public costs would be any additional costs that should be borne such as monitoring, surveillance, preventative expenditures and eradication where necessary. Often these are borne by others, particularly if a plant becomes a weed, and those who suffer the costs are not those who originally brought in the plant. The costs may be estimated in a wide variety of ways. One way may be the loss of productivity associated with having weeds on a property competing with other plants. The cost of clean-up may be an alternative measure.

In general, it is likely that the external benefits can be feasibly ignored. Many things can provide public aesthetic qualities, and many substitutes to ornamental plants are available. The private

benefits are likely to be a pretty good estimation of the overall benefits to society from ornamental plants.

As earlier sections of this report show, there is likely to be a significant difference between the costs borne by the industry in relation to these plants and the actual and potential costs borne by society. In this case, there are likely to be more plants on the market, at lower cost, than the social optimum (in economic terms). A common alternative discussion on this topic considers the characteristics of biodiversity, and why as common resources or public goods they tend to be underprovided by the market. These are totally consistent in that the overprovision of ornamental plants in the plant market relates (partly) to the under provision of biodiversity in the (largely absent) biodiversity market.

Economic theory suggests that clear, well-specified property rights provide incentives for resource users to manage resources in society's interest, as one potential option for correcting market failure. It is widely recognised in the literature and practice that rights and responsibilities are linked, and that part of specifying rights is specifying responsibilities. Generally, where problems are not recognised or risks not identified, responsibilities for appropriate management are unlikely to have been specified. In some cases, far-sighted and precautionary policies could protect against anticipated problems. However, once problems emerge, it has been traditional to develop policy (usually enacted through legislation) to specify rights. Chapters 3 and 7 show that there such policy approaches have developed over time which imply certain rights and responsibilities in Australia and elsewhere.

The industry is partially regulated at the moment, and as chapter 7 shows, there are reasons to consider that the regulation on the industry should be tighter. The question is, would tightening regulations represent a shift in rights, and therefore require public cost to be incurred, or is it reasonable for these costs to be borne by the industry. This gets to the heart of cost-sharing principles. The key points of these principles are discussed below. Economic instruments to "correct" market failure will need to be consistent with the principle chosen.

Cost sharing issues

The two main principles used are the beneficiary pays and polluter pays principles. These principles can be extremely difficult to apply in practice.

Beneficiary Pays Principle

The 'beneficiary pays' principle requires anyone who benefits from an activity to contribute to the costs of undertaking it (PC). That is, if expenditure is undertaken to remove weeds from a property than this benefits the property owner and, to some extent, neighbouring property owners. This is alternatively known as the "victim pays" principle (Siebert 1992 cited in PC), as those who pay are often not responsible for the problem. That is, if a property owner has a weed infestation due to weeds migrating onto his or her property, then they are required to pay under this principle for the clean up. Note, neighbouring properties could be expected to pay under this principle. In general, the government may bear the cost, or a portion of the cost, partly to reflect the inequity of the "victim" being required to pay, and partly to reflect the difficulty of actually identifying the beneficiaries, let alone developing a mechanism to extract payment from them.

An important feature of the 'beneficiary pays' principle is the recognition that conservation activities may generate private benefits to specific individuals or groups of individuals, as well as public benefits to the community in general. Therefore, it may be appropriate under this principle

for individuals or groups to contribute to the costs of undertaking activities that benefit them. It may also be appropriate for governments to contribute to the costs of conservation, on behalf of the general community, if the conservation generates public benefits. Adoption of this principle is relevant to encourage voluntary conservation when resource users do not have an obligation under existing property rights, or when there is no financial incentive to undertake it. (Productivity Commission)

The Productivity Commission further divides the principle into two components: "User Pays" and "Beneficiary Compensates"

User Pays:

The 'user pays' principle requires anyone who derives a direct private benefit from a an activity to contribute to the costs of undertaking that activity (PC). In this case, direct control of weeds on-site.

Beneficiary Compensates:

The 'beneficiary compensates' principle requires anyone (including government, on behalf of the general community) who derives an indirect benefit from an activity to contribute to the cost of undertaking it (PC).

Impacter/polluter pays

Under this principle, impacters are required to contribute to the costs of activities that ameliorate or prevent damage in proportion to the impact they have (PC). In this case, it is those who "allow" a plant to escape and become invasive having the responsibility for clean up and management. In economic discussions, there is a distinction made between the "statutory incidence" of such a responsibility and the "economic incidence". Statutory incidence refers to the party legally required to pay, such as an employer required to take tax from an employees' wage. The employee is the one "paying the tax" but the employer is the one legally required to collect it and transfer it to the government. In this case, if the importer, trader and purchaser of plants are all required to pay prevention and clean up costs, the economic incidence falls in part on all three industry participants.

As a general rule under the impacter pays principle, governments should not subsidise individuals to undertake the management of their impacts and therefore the government share is low (or zero). In contrast, under the beneficiary pays principle the government's cost-share "could be as high as 100 per cent, depending on the public benefits of conservation and other factors" (PC).

Ability to Pay versus the Benefit Principle

These are principles of taxation, which are based on searching for a definition of fairness. These are based on ideas of horizontal and vertical equity. Horizontal equity is the idea that those who are in equivalent circumstances should be treated equally. Fairness means, say, that those people with the same income and/or wealth should be treated fairly (not exactly the same, if for example we want to tax cigarette smoking). Vertical equity is aimed at seeking fairness between people of different circumstances. Those with larger income and/or wealth should be more heavily taxed. It is important to consider how this notion may apply in the current context of ornamental invasive plants. Both theories have difficulties and it is important not to apply them dogmatically. (Brown and Jackson)

Application of the principles

The Productivity Commission, as well as providing excellent workable definitions of cost-sharing principles, has also provided valuable discussion on applying the principles. Of most relevant to the ornamental plant discussion is how property rights have been allocated or what they are assumed to be, and how they could ideally be defined.

"By determining individuals' responsibilities, well-defined property rights implicitly reflect the extent to which the community has a right to be free of the unwanted consequences of individuals' resource use decisions… If property rights are well-defined — such that individuals have a responsibility to ensure a certain environmental standard — failure to meet that standard breaches this responsibility and may be considered to impose external costs on the community". In the case of the ornamental plants, this implies that "if" the property rights are such that a person who either imports, grows, trades and/or owns an ornamental plant is fully responsible for them, then they should incur the costs of monitoring and managing the ornamental plant stock, and the costs of dealing with problems occurring from the release of such plants to the environment. Given the policy recommendations in chapter 8, this requires industry parties to be responsible for the costs of establishing the various registers of plants and trades, undertaking weed risk assessments, education of market participants, preventing weed escapes and controlling outbreaks.

As will be discussed below, given such an approach, various options exist, including insurance, performance bonds, levies, and direct charges to individuals.

In order to determine how to share costs it is advisable to consider:

- Current property rights: who is allowed or required to do what in relation to the benefits and costs.
- Desired property rights: how do the various parties want rights and responsibilities to be determined and allocated
- Costs of change to the desired state: what changes are required, and how much does it cost to make the transition from current to desired rights, and from current to desired outcomes.

Current property rights

Under current weed legislative arrangements, inconsistent and fragmentary as they are, the main payment principle used is beneficiary pays. Both the user pays and the beneficiary compensates components are applied. Firstly, the onus is on those benefiting from weed management to pay. Secondly, given the public good benefit nature of managing weeds, there is a significant beneficiary compensates aspect, as the government (local, state and national) contributes to the weed management effort[5].

[5] It should be noted that this is a specific application of the beneficiary pays principle which in some way differs from intuition, and demonstrates that the principles can be very difficult to define in practice. One may consider that the ornamental plant industry is the "beneficiary", but this is only in relation to the "benefits" of the plants themselves. Under the user pays aspect of the beneficiary pays argument, the basic costs of production and consumption of ornamental plants does not change from the impacter pays principle. The issue is the additional costs of contributing to a national scheme, of monitoring and

Desired property rights

This appendix is suggesting that the desired property rights need to be changed to a predominantly impacter pays basis, as described above. It is important to consider that there is likely to be a mix of impacter and beneficiary pays principles. This is the importance of the word "predominantly". There are significant difficulties in identifying exactly who the impacters are, and the contribution the industry as a whole should make given uncertainty.

The PC notes that where an impact is non-point source or diffuse, applying the impacter pays principle can be more problematic. This is likely to apply in case of plants becoming invasive if the policy is focussed on identifying particular individuals responsible. If the industry as a whole is considered responsible, this problem may be resolved, however this has problems and difficulties of its own.

A further objection to impacter pays presented by the Productivity Commission relates to treatment of costs incurred from past activity as opposed to current activity (Footnote: this question has been the subject of a report by ACIL commissioned by IPART in relation to water pricing, and although IPART had concerns in accepting the recommendations, there is significant merit in debating these issues, and there is relevance to the current policy discussion). This issue will be further addressed in the section on transitional arrangements below.

Finally, it is important to consider the impact of the "ability to pay" argument. In agriculture in Australia, profit margins are low, and variable (NLWRA report). However, an industry analysis of the ornamental plant industry might show that it has ability to pay. This paper argues that the current beneficiary pays situation is likely to be vertically inequitable. The relative inelasticity of plant markets could mean the more robust ability of the plant industry to cope with the required reforms than the agricultural industry.

Costs of change

The policy changes advocated in this paper essentially suggest that the industry will need to bear a large proportion of the costs involved. This will therefore be likely to impose difficulties on more marginal industry participants, and will also potentially generate increases in illegal activity. The ideal situation is that the industry is a willing participant in the changes. It is unfortunate that in chapter 5, the overwhelming outcome of the analysis is that the industry is less than enthusiastic about developing an industry scheme and is not recognising the importance of participating in the changes being made. This implies that the mechanisms will need to be "top-down" to some extent, and involve significant government assistance to industry in making the required changes over a transitional period. However, it is also important to ensure that greater than low risk plants are not "rushed in" to the country during a transitional period. This suggests that the type of transition involved is very important.

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surveillance and prevention and clean-up of problems. At present, the ornamental plant industry does not pay these additional costs as the beneficiary of these services.

Cost-sharing recommendation

- It is recommended that property rights in relation to the need for precautionary approach and management are developed, and that responsibility for ongoing management of the industry is undertaken on an "impacter pays" basis.
- Problems experienced by past practice should be funded by a cost-share relationship on beneficiary pays principles over a transitional period.
- The government needs to continue to participate in funding and regulating the management of industry generated funds.

Funding and incentive mechanisms

Given the above, it is important to consider how an impacter pays approach to the industry would operate. This leads to a question of the appropriate financing and incentive mechanisms required. The transitional arrangements required to move from the current situation to this desired state will be considered in the following section.

In the case of the ornamental invasive plant industry, there is a need to ensure that particular activities, as recommended in chapter 8, are undertaken in relation to monitoring, surveillance and problem management of species. Funds are required to pay for these activities, and/or incentives need to be provided to change behaviour in relation to uncontrolled movement of potential invasive plants. If the change in behaviour required is a reduction in the number of plants imported and traded, then, depending on the elasticity of demand for a plant, this may be signalled by and increase in price through an economic instrument. As noted however, other behavioural change may need to be funded, such as increasing efforts by industry to prevent the import of risky plants (even considered low risk), improved information in relation to invasiveness risk, improved management practice of traders and nurseries, and more rapid response to potential escapes.

The aim of this section is to discuss what economic instruments are, and how they may be able to contribute to either or both of these needs (raise funds, change behaviour). Particularly promising options in the case of these plants will be considered, and preferred options among these will be recommended.

Definition of economic instruments

As noted above, economic instruments can provide an incentive to change behaviour, raise finance or both. Natural resource management incentives and economic incentives may be defined as follows:

"Instruments for environmental and natural resource management can be defined as administrative mechanisms adopted by government agencies to influence the behaviour of those who value the natural environment, make use of it, or cause adverse impacts as a side-effect of their activities (James).

> [I]nstruments…can be usefully classified under five major headings: motivational, educational and information instruments; voluntary instruments; property-right instruments; financial mechanisms and regulation" (Young *et al*.) A broad distinction can be drawn between direct regulations (commonly described as command-and-control mechanisms) and economic instruments. Command-and-control mechanisms are based primarily on legislative and regulatory provisions and are

> implemented through directives from regulatory authorities. Regulations alone may be used for environmental protection purposes. Indeed, until recently, they were almost the only instrument used (James).
>
> Economic instruments operate through market processes or other financial incentives. Although they take effect through various price and/or quantity controls, they usually allow for adaptive choice and decentralised decision-making by those whose behaviour is to be modified (James).
>
> In reality, the distinction between direct regulations and economic instruments is often blurred, as any system of economic instruments usually requires appropriate legislative or regulatory backing. Wherever economic instruments have been used, in Australia and overseas, supporting regulations have been applied (James, p11).

In determining the most appropriate opportunities to utilise economic instruments in the case of ornamental plants, the following could be considered as having the most potential:

- Levies (local and catchment)
- product charges
- performance bonds (insurance premium taxes also)
- Information disclosure
- Voluntary action
- Management agreements (and also something like the accredited licensee scheme in Vic)
- Management advice and assistance
- Direct and devolved grants
- Ongoing management payments
- Zoning regulations

It is considered that while nearly all of the above options could have some role to play, the most important and potentially useful instruments are product charges and performance bonds. The discussion will be limited to these, and considers what the instrument is, where (and for what) it has been used, and some issues for design consideration.

Product charges[6]

Product charges may be imposed on inputs to economic activities as a means of indirectly controlling adverse environmental impacts. In some European countries, for example, charges are levied on fuels according to their sulphur content, as an incentive to reduce emissions of sulphur oxides. Concessional taxes are also imposed on recycled lubricating oils to promote resource conservation and reduce adverse environmental impacts. Differential taxes have been applied in Australia on recycled paper, to encourage reuse of paper, conserve timber supplies and reduce waste disposal and litter. (James) A levy on plastic bags has recently been debated in Australia, and evidence has been provided from the widely recognised levy in Ireland. (check reference to inquiry).

[6] Note that the terms taxes, charges, fees and levies are often used interchangeably. The distinction made here is that some of these are focused mostly on revenue raising whereas others are corrective taxes, in the Pigovian sense, aimed at correcting some negative activity. These two purposes can be difficult to separate, however

A levy could be applied to all trades of ornamental plants which is collected to fund activities required under the policy requirements of chapter 8. How these funds are distributed would need to be further considered given there are multiple potential uses of the funds. These may be channelled back into the industry to improve education, monitoring and management practices, or they may need to be channelled into managing weed outbreaks resulting from imported species.

Performance Bonds[7]

Performance bonds are being used as an economic instrument in a number of applications for environmental protection in Australia. They have been chiefly used in the mining industry to encourage land rehabilitation, but other applications include pollution reduction programs in New South Wales and effluent control programs in South Australia. (James)

The general principle of performance bonds is that the supervising government agency is guaranteed sufficient funds, in the form of a bond or security, to cover the cost of rehabilitation in the event of failure by the enterprise concerned. One potential disadvantage of performance bonds is that they may not be able to compensate for irreversible environmental damage. Thus where large-scale irreversible damage is possible, it may be more effective to rely on direct regulations. (James)

In relation to the policy recommendations in this paper, the ultimate reliance on direct regulation seeks to reduce the risk of the irreversible environmental damage. Given that even low risk plants have the potential to become invasive due to many reasons, the direct regulation could be enhanced through efforts to raise funds in this way. The difficulty is determining when a bond should be released and the means by which it is collected.

As James notes, there are "various ways in which such finance may be provided. One is the provision of upfront capital funding. This, however, may place severe constraints on the cash flow position of enterprises. A company may reduce strains on working capital by taking out a loan with a financing body, in which case the annual cost would be the interest on the loan. The main requirement of a performance bond, however, is that government has a guarantee against the risk of default of conditions prescribed for environmental safeguards. Arrangements have thus evolved similar to risk insurance, whereby guarantees of rehabilitation or restoration are obtained by payment of a risk premium to a bank, insurance company or other financial institution. (James p59)[8]

There are obvious parallels with insurance, and some authors see insurance premium taxes as being a subset of the general category of performance bonds. Hence, these are discussed now.

Insurance Premium Taxes

Stavins discusses insurance premium taxes as follows:

"In a relatively small number of countries, taxes are levied on industries or groups to fund insurance pools against potential environmental risks associated with the production or use of

[7] Some authors see this as a subset of deposit-refund systems as there is an initial deposit and later on it may be refunded, eg Stavins.

[8] See also Whitten: A bond is deposited (or an insurance policy taken out) as part of the permit process to engage in an activity that may damage the environment (including wetland areas). If the activity is successfully completed without damage to the environment the bond is returned. If the environment is damaged the bond is used to remedy the damage.

taxed products…Such taxes can have the effect of encouraging firms to internalize environmental risks in their decision making, but, in practice, these taxes have frequently not been targeted at respective risk-creating activities.

In the United States, for example, to support the Oil Spill Liability Trust Fund, all petroleum products are taxed, regardless of how they are transported, possibly creating small incentives to use less petroleum, but not to use safer ships or other means of transport. The fund can be used to meet unrecovered claims from oil spills.

An excise tax on specified hazardous chemicals is used to fund (partially) the clean-up of hazardous waste sites through the Superfund program in the United States. The tax functions as an insurance premium to the extent that funds are used for future clean-ups …Since 1989, Sweden has had a compulsory insurance system to compensate for damages when polluters cannot be identified (OECD 1996), managed by private insurance companies and financed by 10,000 "operators of dangerous facilities." … Spain requires pollution liability insurance of companies handling hazardous waste in the chemical industry (OECD 1997d), and operators of waste and tire disposal sites in the Canadian province of Quebec deposit a required financial guarantee and take out mandatory environmental liability insurance to cover disposal costs and potential damage costs (OECD 1995b).

In deciding between bonds and insurances, it is likely that an insurance system offers the greater ease and applicability, in that the pool of funds will be available in the future as problems occur. With a bond system, some agreement needs to be reached as to when funds should be repaid, otherwise they are purely a tax or levy. However, it may be more difficult to gain the support of insurance companies and industry players themselves in an insurance scheme.

A note on fines

Fines or liability systems are what is generally considered to be part of a regulatory approach, but of course these have economic dimensions. An operator undertaking an illegal activity needs to weigh up the costs and benefits of the activity. However, in the case of fines the cost is adjusted by the chance an operator believes they have of not being caught and having to pay the fine. Hence the appropriate level of incentive to comply with policy requirements depends both on the level of the fine and the ability of the policy to be enforced. With the widely dispersed industry and the advent of internet communication, it can only be expected that compliance will be very difficult to enforce and maintain. However, the policy recommendations in chapter 8 have been made with the view to gaining national consistency, minimising loopholes and improving the ease of enforcement. It is recommended also that fines be set (or where currently set, increased) for illegal activity to support the rest of the policy agenda.

Recommendations on instruments

Further work would need to be required to firmly establish a sound potential suite of instruments to be established. It is vital that such criteria are fully explored by government, industry and NGOs to determine the most practical way to choose and implement instruments.

This appendix, however, considers the best options to be:

a) A product charge on the import and trade of all authorised imports and trades of ornamental plants.

b) An insurance premium tax scheme is investigated, and rules established for the pay-out of pooled funds, in the event of escaped plants

c) A performance bond system is investigated as a potential alternative to an insurance premium tax.

d) A fine system be investigated, in conjunction with the ability to enforce the recommended policy, in order to minimise illegal activity and contribute to the raised funds

Discussion

In essence there are three main situations or scenarios which require different treatment. This is because the nature of applying cost-shares and the ability to apply economic instruments in the circumstances changes. Hence a suite of approaches is best to deal with the combination of scenarios.

The scenarios are:

1) New legal imports that subsequently become invasive weeds
2) New illegal imports which become invasive weeds.
3) Existing garden plants which become weeds.

Each will be discussed in turn:

1. New legal imports that subsequently become invasive weeds

A legal import will not be allowed under the proposed system unless the WRA identifies the import as having sufficiently low risk to overcome the threat of invasiveness. However, the WRA is not necessarily going to be foolproof. There is a possibility that a weed is categorised as low risk, however this could be a "false negative". A date needs to be determined which officially recognises the change from the current or past arrangements to the new (see the discussion of transitional issues below). Plants legally imported after this date will predominantly be the responsibility of the industry to pay for monitoring, management and, if necessary, eradication.

In the case of monitoring it is suggested that a product charge be applied to ensure that an industry funds, or provides a substantial contribution, to the monitoring effort.

In terms of management, where the importer, owner or manager of a plant needs to undertake management costs on-site, these would be or should be borne privately, as part of doing business (subject to recognising transitional arrangements where management standards change in line with policy changes). There may be an argument that where an industry participant cannot bear these costs, they have access to industry funds, however this may lead to a moral hazard situation. Where other parties need to bear control costs, they would need to access industry funds to manage this. It is suggested that a product charge and/or a performance bond could be used to generate the required industry funds. There may be already a lot of demands on the funds raised by a product charge, given as well as monitoring it will be necessary to fund education programs and coordinating mechanisms. A performance bond could be used whereby if a plant owner or manager undertakes appropriate control measures, after a period of time of demonstrated control or good management, the bond is returned.

It is the case of eradication that is the most difficult, as a plant may remain "a sleeper" for many decades before the conditions allow it to become a weed. The above discussion of instruments

suggests that under an impacter pays approach, the eradication will need to be paid for by those allowing the weed to escape. Given it is difficult to identify exactly how this may have occurred, and the costs to an individual for the entire eradication are likely to be too high, there needs to be a shared industry responsibility. Reliance on one individual or company to bear the cost may mean they go bankrupt and the funds are never made available. Funds will need to be raised over time to safeguard against the possibility of the need to eradicate. It is recommended that an insurance approach should be considered.

Consideration needs to be given to the different parts of the industry where the instruments can be applied. Importers may be required to pay a performance bond on the importation of a product, or alternatively have the requisite insurance. Product charges would be applied on all trades of plants. A performance bond may also be required on a purchaser of a plant of a particular type, in relation to management. Although this may appear as "double taxing", there are different objectives for the different instruments. As noted, the statutory and economic incidence is different. It is important that the various instruments are transparent, and industry players are aware of the component of a product's price that is being applied to a particular instrument. This is particularly important where a performance bond is refundable at a point in time on the basis of actions taken.

Of course, even with a predominantly impacter pays principle operating, there will need to be government contribution. This will partly be justified on the grounds that the funds required may be too difficult for the industry as a whole to bear, and further that there are strong public good outcomes, especially from the early identification and eradication of weeds.

2. New illegal imports which become invasive weeds

The extent of illegal importation of potentially invasive plants may currently be low given the current loopholes allowing legal importation of high-risk species. Making the policy changes recommended in this report, and moving to impacter pays cost-sharing principles will almost certainly provide an increased illegal trade. To counter this, it will be necessary to improve the surveillance and monitoring capabilities of Government and industry. Fines will need to be set at sufficiently high levels to be a genuine deterrent, and they must be actively enforced. Fines should contribute to the product charge/levy funds and be channelled into the monitoring, surveillance and education programs. On the one hand, it may be considered that the industry as a whole cannot be made responsible for the activities of a few. However, there is a need to be an incentive for industry to actively engage in the attempt to prevent illegal importation. This will occur in two ways. The first is that fines will contribute to activities such as monitoring, surveillance and education. This may provide only a small incentive as it is unlikely to lower industry contributions. Secondly, the industry may need to be even further regulated if the rise in illegal activity is too extensive. This will affect all the industry, and could perhaps be prevented by an industry-wide contribution to managing illegal importation.

3. Existing garden plants which become weeds

The debates regarding cost-sharing principles tend to suggest that the beneficiary pays principle will be predominant in the case where plants are already invasive, or are currently sleeper weeds which may become a weed in some future time. Records will need to determine whether the weed was introduced before or after the change to impacter pays principles are introduced.

In this case, there needs to be an increase in funds for eradication and control which will generally have to be provided through government budgets. Allocating these funds could be more palatable to government given the shift to impacter pays over time for new plant imports.

Industry contribution should also be required under existing user pays arrangements, and for particular outbreaks in the future, the product charge could provide a contribution.

The three main scenarios faced in the above discussion are summarised in the following table.

Scenario	Cost-sharing principle	Nature of cost and potentially applicable instrument
1. New legal imports that subsequently become invasive	Predominantly impacter Pays with some Government contribution for public good outcomes.	Monitoring/surveillance: levy/product charge Management: performance bond Eradication: insurance
2. New illegal imports	User Pays (if caught), Impacter Pays and Government contribution	Monitoring/surveillance: product charge Fine as deterrent and to add to required funds.
3. Existing invasive plants	Beneficiary pays (predominantly government) with some industry contribution.	Industry contribution: product charge, eg. pot levy

Transitional arrangements

As discussed briefly above, and as the Productivity Commission notes, "[I]f property rights were poorly specified in the past, on the basis that the actual, or potential, problems of the industry were unknown or of a minor scale, then the current need to control the industry could reflect a change in community standards. In that case, the PC in particular argues that the impacter pays principle may not be warranted. In particular, where problems of ornamental plant invasion have occurred in the past, it may be difficult, unfair or ineffective to use the impacter pays principle, whereas current and future requirements could be on such a principle.

This chapter argues that the aim should be to move rapidly towards an impacter pays based system, on the basis of product charges, insurance or performance bonds and fines for illegal activity. However, as this represents a change from the current system with an emphasis on government and third party funds, the industry will initially have difficulty adjusting. However, this is a temporary issue as expectations will change within the market to adjust to the new expectations.

Funds must continue to be made available to deal with invasive plants within the landscape, however additional funds will be needed to assist the industry to inform market participants on the required changes. Further, WRAs must be conducted quickly on potential imports, and a White List developed as soon as possible. This will have an almost immediate impact on some participants in the industry. A means of assisting those participants to deal with that change should be established over a period, after which all parties should be expected to have adjusted. A tribunal could be established, or it could be charged to an existing tribunal, to investigate genuine cases of hardship which need to be supported.

Most importantly, a line must be set in the sand, where if a plant imported before a certain date will have a cost-share calculated given this will have a legacy dimension. After that date, the expectation will be that funds collected by industry and/or from insurance should predominantly fund clean-up activities.

In order to establish the recommended instruments, industry, government, non-government organisations and others in the community will need to be involved. The detailed arrangements of instruments will need to be worked out, for instance the establishment of the administrative arrangements for a performance bond and whether the conditions for the return of a bond have been met. In that case, the particular characteristics of instruments, as identified in chapter 8, need to be considered also.

Moss and Walmsley (2005)[xiii] concluded that voluntary approaches to the ornamental invasive plant problem would be unable to successful provide a solution. However, it also concluded that voluntary action will still be an important part of the overall framework. Economic instruments will benefit from the "soft" benefits provided by voluntary action, however the combination of costs to industry for product charges and insurances or bonds will have an impact on the ability of the industry to undertake a fully-fledged voluntary scheme. Where the voluntary scheme proves effective in contributing to awareness raising, education, monitoring, surveillance and identification of illegal activity, the funds raised by economic instruments could be channelled to the scheme. This appendix argues then that the collection of the funds should be mandatory, and the funds will need to be allocated to these activities, whether provided by the industry or government. A voluntary scheme may prove effective in delivering at least part of the requirements.

Conclusion

Cost sharing recommendations:

- It is recommended that property rights in relation to the need for precautionary approach and management are developed, and that responsibility for ongoing management of the industry is undertaken on an "impacter pays" basis.
- Problems experienced by past practice should be funded by a cost-share relationship on beneficiary pays principles over a transitional period.
- The government needs to continue to participate in funding and regulating the management of industry generated funds.

Instrument selection recommendations:

- a product charge on the import and trade of all authorised imports and trades of ornamental plants.
- An insurance premium tax scheme is investigated, and rules established for the payout of pooled funds, in the event of escaped plants
- A performance bond system is investigated as a potential alternative to an insurance premium tax.
- A fine system be investigated, in conjunction with the ability to enforce the recommended policy, in order to minimise illegal activity and contribute to the raised funds

Transition arrangements need to be established to deal with the transition to new cost-sharing instruments, and the rapid transition to a different system of regulation, perhaps supported by a tribunal to determine genuine cases of hardship.

Appendices end notes

[i] http://www.nicnas.gov.au/australia/ARCA.htm.

[ii] Towards Ecologically Sustainable Management of Chemicals in Australia – Scoping Paper – report of the EPHC National Chemicals Taskforce March 2003
http://www.ephc.gov.au/pdf/EPHC/chemicalsmgt_scoping.pdf.

[iii] http://nicnas.gov.au/australia/ARCA.htm.

[iv] About NICNAS http://www.nicnas.gov.au/australia/nicnas.htm.

[v] Consistent with the NOHSC National Model Regulations for the Control of Workplace Hazardous Substances.

[vi] The data requirements for notifications are set out in the Schedules to the *Industrial Chemicals (Notifications and Assessment Act) 1989* and are detailed in the NICNAS *Handbook for Notifiers*.

[vii] http://www.nicnas.gov.au/australia/NRA.htm.

[viii] NRA seeks assessment advice on a cooperative basis from the Department of Environment and Heritage, the Department of Health and Aged Care and the National Occupational Health and Safety Commission, who prepare environmental, public health, and occupational health and safety risk assessments, respectively, for the consideration of NRA.

[ix] http://www.ephc.gov.au/pdf/EPHC/chemicalsmgt_supdoc.pdf.

[x] Ibid.

[xi] For example, see sources listed at http://www.nicnas.gov.au/publications/infosheets.asp.

[xii] Kahn, J. 1998. *The Economic Approach to Environmental and Natural Resources*, Second Edition, Dryden Press. Pg. 68.

[xiii] Moss, W. and Walmsley, R. 2005. *Controlling the Sale of Invasive Garden Plants: Why Voluntary Measures Alone Fail,* WWF-Australia Discussion Paper. WWF-Australia, Sydney.