



25 July 2008

Mr Peter Lee-Archer
Coordinator Spray Information & Referral Unit
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PROSPECT TAS 7250

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Dear Mr Lee-Archer

**Implementation of Regulatory Controls for Aerial Spraying and Ground
Spraying Agricultural Chemical Products - Consultation Paper**

The Institute of Foresters of Australia (IFA) welcomes the opportunity to comment on the abovementioned Consultation Paper.

Attached is the Institute's submission for consideration. Please contact me at andrew.wye@smartfibre.com.au or phone: 0407 105 133 if you have any enquiries or require any further clarification of the submission.

Yours faithfully



Andrew Wye
Chairman
Tasmania Division



Institute of Foresters of Australia
Submission
Department of Primary Industries and Water
Consultation Paper
Implementation of Regulatory Controls for Aerial Spraying and
Ground Spraying Agricultural Chemical Products
2008

Preamble

The Institute of Foresters of Australia (IFA) welcomes the opportunity to comment on the Consultation Paper, *Implementation of Regulatory Controls for Aerial Spraying and Ground Spraying Agricultural Chemical Products*, Released April 2008.

The IFA considers itself uniquely qualified to comment on chemical associated with forest based agricultural activities. The IFA is the only organisation whose members are professionally trained foresters who have direct experience in the use of chemicals and represent broader land managers who support multiple purpose objectives across all tenures in Australia.

The IFA currently has 1320 members, of which 119 are located in Tasmania. IFA members are committed to implementing continued improvements to planning and management systems, which protect current and future values within forests to maximise social and economic benefits whilst protecting natural environments and cultural heritage.

The IFA advocates responsible and judicious use of approved chemicals in forest and non-forest based agricultural enterprises, and other land management, together with thorough planning, application and monitoring procedures and appropriate controls to minimise the risk of off-site contamination.

The IFA considers that:

- the use of chemicals associated with land management should comply with all relevant legislation and Codes of Practice and adopt best practice principles to avoid adverse environmental impacts and impacting on long term sustainable land use;
- chemical application techniques should be appropriate to the circumstances, take account of community views, protect water quality and environmental values and minimize off site movement of chemicals; and
- the use of chemicals in plantation management should be minimised consistent with the need to achieve a balance between economic, environmental and social outcomes.

The IFA supports and encourages:

- an integrated approach to all weed and pest management situations with a view to minimising the use of artificial chemical compounds across and applicable to all land management activities;
- ongoing research and development into the use of chemicals and alternative control measures in the plantation forestry sector.

The IFA encourages the Review Committee to read the Institute's policy statements as part of the review process. The IFA considers that these policy statements identify objectives and concerns which must be incorporated by forest managers, governments and communities, when developing informed responses to forest based issues, including chemical use. Copies of the IFA Policy Statements are available at www.forestry.org.au/ifa/g/g0-ifa.asp and include the following:

- Statement 2.5 Use of Chemicals in Plantation Forestry
- Statement 5.1 Native Forests and Water
- Statement 5.2 Plantation Forests & Water
- Statement 6.1 Environmental Services

Executive summary

The IFA consider the proposed amendments to the *Tasmanian Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008*, represent a significant increase in regulation of spraying of chemicals achieved through the establishment of exclusion zones (resulting in the loss of productive land), lowering the acceptable standards for detection, and increased accountability as defined through improved record keeping and administrative procedures.

The IFA do not support the extent of changes proposed but recognise that such amendments provide a basis under which improved regulations can be developed to protect current and future values within forest-based and non forest agricultural enterprises, and maximise social and economic benefits whilst protecting natural environments and cultural heritage.

The IFA consider the proposed amendments do not reflect appropriate scientific knowledge, will significantly disadvantage the agricultural community and do not reflect a consistent approach to the management of chemicals at the local, regional, State and national level.

The IFA consider that to achieve the objectives of the amendments, Regulations must apply to all users of chemicals, ranging from the industrial to individual scale and including private and State land managers, equally.

Improvements to the proposed amendments must be incorporated to avoid :

- inappropriate and impractical controls on land managers;
- increased production costs, and preventing further loss of asset values;
- decreased competitiveness;
- nationally inconsistent anomalies;
- increased pest and weed infestation of waterways; and
- are not applied discriminately.

Background.

Australia has 453.7 million hectares of agricultural land, which includes low intensity grazing land and high intensity multi-rotational crops. About 10 per cent of Australia's agricultural land is cultivated annually (crops, pasture and grasses), with the balance generally used for

livestock grazing¹. In comparison, Australia has 13 million hectares of native production forest and 1.7 million hectares of plantation forest. All these industries use chemicals to maintain a competitive position in the domestic and international market place. It has been shown that the total use of agricultural chemicals by the forestry sector in Australia amounts to about 0.7% of the total spend on agricultural chemicals in Australia on an annual basis².

In Tasmania, there are 1.6 million hectares of agricultural land: about 1.6 million hectares of native production forest and 0.3 million hectares of plantation forest. The agricultural and plantation forest industries use chemicals including pesticides, growth promoters, flower and seed inhibitors and promoters and fertilisers to maintain a competitive position in the market place..

The IFA note that chemicals are used in and generated from urban and industrial based activities. Such activities are not addressed within the proposed amendments.

The IFA also note that chemical residue in food produced for, and consumed by, humans is not tested at a similar level within Tasmania. Thus, the regulator advises the community when food is not safe to consume, but does not report on chemical levels which are below those deemed acceptable. This is inconsistent with the approach being proposed for drinking water, where the regulator reports on all detected chemical residues, irrespective of whether or not the below acceptable levels.

Statement The IFA consider that a consistent approach to advising the community in regards to the level of chemical contamination, and advice relating to threats as applicable to human consumption.

The IFA consider that chemical use in agricultural industries is a complex issue, with the responsible and professional use of any chemical being essential in order to maintain high environmental and health standards. However, while the use of chemicals in forest based operations is poorly understood and often misrepresented², the use of identical chemicals in other agricultural industries is viewed as necessary and creates little community or legislative concern.

Statement The Review Committee must support non-discriminatory approaches to chemical management controls which ensure off-site contamination at the local, regional and state wide is minimised.

Agricultural chemicals are used in forestry as part of an integrated pest management strategy which includes biological control agents and preventative forest management practices. Chemicals are expensive to purchase and to apply on an industrial scale. Therefore, their use is minimised and applied only where commercial and practical alternatives are not available.

There are currently over 1200 registered agricultural chemical products, of which less than 200 are registered for use in forests (among other industries) with the Australian Pesticides and Veterinary Medicines Authority (APVMA)³. No chemical is registered exclusively for use in forest operations, and many of the chemicals used in forests are also used in horticulture,

¹ Australian Bureau of Statistics; 2001 Year Book Australia.

² Jenkin, B.M. & Tomkins, B, 2006. The use of chemical pesticides by the Australian plantation forestry industry. FWPRDC Report PN06.4016 183pp.

³ APVMA, personal correspondence.

viticulture and other food crops. For example, Atrazine is approved for use on-label (as specified on the label) in 33 agricultural situations, which range from specific crops like Canola to general application weed control in turf. In addition to the broad range of hosts, Atrazine is approved to control 149 pests.

Chemicals are approved for use 'on label' or 'under permit'. 'On label' registration provides for use of the active chemical only on those crops and at the rate specified on the label attached to the storage container. For situations and/or concentrations not specified on the label the APVMA may approve the chemical for use 'under permit'; this is only granted after assessing the potential impact of the chemical on health and environmental systems.

Statement Where chemical specific restrictions are being considered, the Review Committee must ensure such restrictions apply to all land managers.

The IFA note that unlike many agricultural industries, chemical use within the forest industry is highly regulated and carried out in accordance with strict legislative requirements (Attachment C: summary of legislation) applied by professionally trained and accredited personnel. Contractual arrangements between forest managers and service providers, Codes of Practice, Standard Operating Procedures (Attachment D to F) and detailed planning requirements contribute to the high standards in chemical safety.

The IFA note that agricultural chemical herbicides are used to reduce weed competition; insecticides to control insect pests and fungicides to manage disease

The IFA note that the long-term nature of forest management generally restricts the use of chemicals to instances of extreme competition and/or damage. These are usually limited to the establishment phase (the first 2 years over the life of the crop which can be between 12 to 500 years). It is unusual for chemicals to be used after this phase

When discussing chemical use in any forest management situation, it is important to compare 'apples with apples'. In this regard, the chemical use over the life of a crop is as important when assessing environmental and health concerns as the initial application rate used. While the use of chemicals is an issue for concern in rural and urban communities, it is important to recognise that the forest industry is one of the most regulated chemical users within the agricultural sector and, over the life of a crop, may use significantly less chemicals than other agricultural sectors (Attachment A and B).

Statement The Review Committee must consider chemical use in regards to time and space, and ensure application restrictions reflect the whole of life impact such applications pose.

Forest managers also use chemicals to reduce environmental and biodiversity threats caused by pests in native ecosystems. For example, dieback (*Phytophthora cinnamomi* (Pc)) is recognised as a serious threat and a number of species face extinction due to the impact of Pc in Western Australian forests. In Tasmania, the spread of Pc through unregulated activities poses a real threat to a number of species, including Xanthorrhoea. The use of chemical phosphite, a biodegradable chemical, provides protection against Pc for up to five years.

Specific comments.

The IFA accept that the amended regulations, as detailed in the April 2008 Consultation paper, apply limits on the extent of permissible off-site movement of pesticides with a view to detailing:

- the maximum levels of contaminants permitted in drinking water, waterways and water bodies more generally; and
- prescriptions for exclusion zones around a number of designated protected places.

The following comments relate to specific amendments as detailed in the April 2008 Consultation paper.

Amendment 1: Water quality standards have been set to ensure that drinking water does not contain unacceptable levels of pesticide. The standards to be adopted are the 'guideline values' measured in drinking water for human consumption, as specified in the Australian Drinking Water Guidelines.

Refer Subregulations 41 (2)(d)(i) and (ii) of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

The IFA support guidelines which are nationally applied and ensure drinking water does not contain unacceptable levels of human induced chemicals. The IFA consider the Review Committee must apply guidelines which are achievable and appropriate, taking into account all water supply inputs and the natural fluctuations associated with stream flows over time and space.

For example, periods of prolonged drought will result in changes to detection (which may result in seasonally concentrated readings) than those during peak flow periods (where dilution of readings may result).

The Review Committee must develop guidelines which are nationally consistent, scientifically based, commercially achievable and environmentally practical. This approach is consistent with the 2004 *Australian Drinking Water Guidelines* (ADWG) which were developed by the National Health and Medical Research Council (NHMRC) in collaboration with the Natural Resource Management Ministerial Council (NRMMC)⁴.

While the ADWG are not mandatory standards, they are intended for use by the:

“Australian community and all agencies with responsibilities associated with the supply of drinking water, including catchment and water resource managers, drinking water suppliers, water regulators and health authorities.”. In addition, the ADWG take into account “ the diverse array of regional or local factors, and take into account economic, political and cultural issues, ...”.

This approach is further detailed in the *Commonwealth Agricultural and Veterinary Chemicals Act 1994*, which state, “

“that the furthering of trade and commerce between Australia and places outside Australia, and the present and future economic viability and competitiveness of primary

⁴ <http://www.nhmrc.gov.au/publications/synopses/eh19syn.htm>

industry and of a domestic industry for manufacturing and formulating such products, are essential for the well-being of the economy and require a system for regulating such products that is cost-effective, efficient, predictable, adaptive and responsive; and

“that the system should, so far as practicable, be uniform throughout Australia;”

Both national agencies acknowledge that it is impractical to achieve the delivery of chemical free water. The ADWG recognise the need to supply water that is ‘safe to use’ and that “greatest risks to consumers of drinking water are pathogenic microorganisms”. Further, the guidelines recognise that “a robust system must include mechanisms or failsafes to accommodate inevitable human errors without allowing major failures to occur” with such systems requiring “the application of a considered risk management approach”.

The IFA consider that many non-chemical land use activities directly contribute to lowering the health values of drinking water, and such inputs are not being addressed equitably within Tasmanian Government policies. Such inputs include:

- domesticated animal husbandry;
- broader stream side management, particularly within non-forest agriculture; and
- road reserve management (including drainage management to reduce untreated pollutants).

The IFA note that Director of Public Health Dr Roscoe Taylor released on 15 July 2008 the ‘2006-07 Annual Drinking Water Quality report’, which details the performance of the State's local councils and other water suppliers. This Report supports the ADWG statement, and found 51 per cent of local government water systems were insufficiently monitored for bacteriological problems in 2006-07. 23 local government water supply systems in Tasmania operated with a permanent boil water alert during the reporting period.

In line with national approaches, it is impractical to meet community expectations that ‘chemical free’ water will be available. The proposed guidelines must reflect those principles outlined above.

Statement The Review Committee must develop guidelines which are nationally consistent, scientifically based, commercially achievable and environmentally practical.

The Review Committee should fully assess the commercial and practical impacts proposed changes will impart on the agricultural and non-agricultural community within Tasmania, and such an assessment must be conducted before the adoption of changes as detailed.

The proposed guidelines must reflect those principles outlined in the ADWG, detailed within the *Agricultural and Veterinary Chemicals Act 1994*, and reflected within APVMA label specifications.

Chemical contamination of water must be addressed simultaneously as those inputs which lead to a lowering of water standards, which include those identified in the Tasmanian ‘2006-07 Annual Drinking Water Quality report’.

Amendment 2: Enforceable water quality standards have been set to protect aquatic environments.

Refer Subregulation 41 (2)(c) of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

The IFA support enforceable water quality standards which protect aquatic environments. However, the guidelines do not specify what an ‘environment’ is, the level of protection such environmental require, and under what situations protection is required.

The IFA note that the health of Tasmania’s streams and the quality of our water is of a very high standard. The monitoring undertaken by Department of Primary Industries and Water, combined with the findings from the ‘State of River’ reports and a major river health study carried out between 1994 and 2002, indicates that streams within catchments with significant forest-based agricultural operations are as healthy as those without such operations.

The IFA accept that the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC Guidelines)⁵ establish trigger values for some pesticides. These guidelines state that:

“In recent years it has been recognised that pollution-related issues should be addressed by approaching the conservation, management and use of water resources in a holistic manner, according to the principles of integrated catchment management.”

The report also states that:

“Most of the guidelines presented for aquaculture should be used with some caution because few are based on a critical assessment of a wide data set.”

In conclusion, the ANZECC Guidelines are:

“only partially sufficient tool for aquatic ecosystem management or rehabilitation.” with guidelines applying only where water bodies have been defined *“from scientific information and monitoring data.”*

Statement The IFA supports further scientific assessment of aquatic environments to determine the level of threat posed by chemicals, irrespective of origin as chemical contamination of waterways results from a wide range of direct and indirect land use activities.

The proposed amendments do not address broad contamination inputs. Fore example, Urban based activities and inputs are not addressed in regards to chemical contamination. Such contaminations include heavy metal and PM10 pollutants which are recognised as posing the greatest long term threat to the health of consumers.

Broad agricultural chemical contamination is not addressed within the Consultation paper, and it appears to be unduly focused on chemicals used in forestry, while ignoring other common

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http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

non-forest agricultural contaminants, such as MCPA which accounted for 13 instances of detection in the last three years. In addition the detection levels proposed for the four chemicals mentioned do not appear to be based on any scientific research on environmental or health impact, but appear to be arbitrary values associated with current analytical technology.

Statement **The IFA considers that appropriate risk assessment procedures must be developed and adequately incorporated within the proposed amendments to reflect the cautionary basis detailed within the ANZECC Guidelines.**

Enforceable water standards apply to all landmanagers.

Amendment 3: Exclusion zones have been established around protected places to exclude contamination through the direct discharge or spray drift of pesticides.

Refer Subregulations 41 (2)(e), (f), (g), (h), (i), (j), (k) and (l) of the Draft Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008 detailed in the Appendix.

The IFA agree that the establishment of exclusion zones is appropriate to mitigate the potential of off-site contamination.

The IFA once again notes that the principles detailed within the ADWG guidelines have not been taken into consideration when developing this amendment.

There is no doubt that the establishment of exclusion zones will significantly impact on agricultural activities, and it is likely that some operations will no longer remain commercially viable.

The IFA note that there are no mechanisms to provide compensation for loss of commercial assets resulting in the establishment of the proposed exclusion zones. COAG principles apply which address the need to the community to pay for environmental services provided by landowners whose assets and ability to otherwise use their land is withdrawn.

The IFA notes that a protected place includes an “accredited organic enterprise”, and such a place will impose mandatory exclusion zones on neighbouring enterprises. This is a broadening of common law principles established over time and recognised through the legal system. There is no justification to impose a restriction on a land manager because a neighbour chooses to undertake a different land use activity. The IFA supports the common law status that activities on one land must not impact on another. However, placing a restriction is extending the current legal framework and does not:

- provide compensatory provisions;
- provide a ‘grandfather’ clause for traditional land use activities (i.e. when a new organic enterprise is established adjacent to existing chemical dependent enterprises); and
- provides no appeal mechanism.

Statement **The IFA recommend that where a land managers right of use is restricted by the imposition of exclusion zones, compensation is paid either by the Government or by the individual imposing such restrictions..**

There are a number of chemicals available on the market which are approved for use within water ways, and pose no threat to aquatic environments. Proposed amendments 2 and 3 do not appear to reflect this fact, and as such apply provisions which are inappropriate and inconstant with assessments approved by the APVMA.

The IFA do not support the statement that:

“Spray drift into this zone would invariably mean that drift into the water body had also occurred”.

The establishment of exclusion zones is intended to provide buffers, and act as a natural filtration zone to prevent chemicals entering into a stream. It is therefore inconsistent that chemicals within a buffer ‘invariably’ results in stream contamination. Buffers are not exclusion zones and the presence of chemicals within buffers may be consistent with the primary purpose underlying the establishment of such buffers.

If the intention is to have chemical free exclusion zones, then the size of these zones should be reduced from what is proposed. It should be recognised that forestry operators often utilize no-spray buffer zones, where there is no intentional spraying. These buffer zones are designed to capture spray-drift or run-off to ensure that there is no contamination of the area to be protected from chemical application such as streams, neighbouring property etc. Therefore such buffer zones may not be chemical free.

Statement Allegations of contamination must be supported by factual evidence.

The establishment of proposed exclusion zones will require additional buffers to be established, therefore increasing the loss of lands available to agriculture. Consequently, the establishment of exclusion zones is not supported, although the establishment of suitable buffers are.

The IFA is concerned that inappropriate exclusion zones will result, in the long term, to a loss of productive land, increased uncontrolled weed and pest infestation, and potential loss of natural values within and adjoining buffer zones.

Statement Appropriate mechanism be developed to recognise that under certain conditions, chemical use within buffers is allowed to deliver long term environmental benefits.

Exclusion zones should apply to all land managers.

The issue of how to control of unwanted pests, especially noxious weeds and exotic insect, within such mandatory exclusion zones needs to be addressed by government.

Amendment 4: Neighbour notification requirements have been clearly defined and are mandatory for both aerial spraying and ground spraying.

Refer Regulations 23 and 24 of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

The IFA consider that current notification provisions as detailed within the Code of Practices is adequate to meet community expectations and operational efficiencies.

The proposed amendments must reflect the difficulties associated with identifying and notifying neighbours. Such difficulties include:

- incomplete Government based records;
- vacant lands;
- interstate and absent landlords; or
- absent residents.

The IFA consider that where broad scale chemical application is proposed (e.g.: insect control measures, or other program based activities), alternative provisions apply which allow 'community' notifications to occur (such as through newspapers).

Statement: The IFA consider that it is more appropriate that 'a reasonable effort is made' is more appropriate when notifying neighbours or the broader community, and such efforts should be documented.

Notification provisions should apply to all land managers.

The IFA notes that the wording used within the proposed amendments states the neighbour must be informed of the "the amount of each chemical product used in the aerial spraying". The use of past tense is inappropriate as the chemical is yet to be applied, and therefore cannot be detailed. Details of proposed rates of applications may be a detail which could be provided in a notification, but not the amount used.

Amendment 5: Permission from property managers must be obtained prior to aerial spraying within 100 metres of residential premises.

Refer Regulation 18 of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

Statement The IFA strongly support this amendment.

Amendment 6: Instructions for property managers and contracted sprayers have been clarified and amended in light of the proposed changes to neighbour notification requirements and exclusion zones.

Refer Regulations 19 and 20 of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

The IFA support measures which ensures non-forest agricultural and other land managers adopt and employ the professional standards currently associated with broad scale forest-based silvicultural activities.

The IFA consider that all persons directly applying chemicals should be appropriately trained and accredited.

Statement The IFA support measures which clearly identify roles and responsibilities.

Amendment 7: Additional information to be recorded by contracted sprayers and property managers has been introduced as well as time limits on when a record must be made.

Refer Regulations 21 and 22 of the Draft *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2008* detailed in the Appendix.

Statement The IFA support this initiative and note it is a standard practice in broad scale forest-based silvicultural activities.

Attachment A	Herbicides – application rates and comparative use information
Attachment B	Insecticides - application rates and comparative use information
Attachment C	Legislative and Regulatory controls for the application of chemicals in forest management.
Attachment D	Example of Tender document
Attachment E	Example of a Standard Operating Procedure
Attachment F	Example of a Prescription

Herbicides

Table 1 contains six common herbicides used in forestry and other industries. It is important to note that the initial rate of application for forest practices may be higher than other agricultural industries. However, many agricultural practices require annual applications (at least), while most forest chemicals are applied at the establishment phase, with no additional chemicals being applied for the rest of the crop's life. For example:

- Pine forest managers apply Velpar (a.i. hexazinone at 200g/kg) at 5 kilograms per hectare at establishment and sugarcane growers apply 3.5 kilograms per hectare when establishing a crop (30 per cent less than the pine grower). However, the pine grower would not generally apply this chemical again for up to 30 years, while the sugarcane grower may apply this chemical annually. Therefore over the life (rotation) of the pine crop, sugarcane growers could apply up to 105 kilograms per hectare (2,100 per cent more than applied to a pine forest).
- In short rotation Eucalypt crops (12 years), Atrazine (usually products contain 50% active ingredient) may be applied at a rate of up to 8.8 kilograms (= 4.4 kg of a.i.) per hectare over life of the tree crop. Wheat, with an annual application rate of up to 0.87 kilograms per hectare, may have a total chemical rate of 10.5 kilograms per hectare over 12 years.

TABLE 1: Comparative herbicide application rates⁶

	GLYPHOSA TE	ATRAZINE	SIMAZIN E	METOLACHL OR	METSULFUR ON-METHYL	VELPA R
Forests – permit rate	1-4.5l/ha	-	1.5- 4.5L/ha	2-4l/ha	0.06kg/ha	1-2kg/ha
Pine forests – label rate	2-6l/ha	1.6-2.2kg/ha	-	-	0.95kg/ha	5kg/ha
Eucalypt forests – label rate	2-6l/ha	5-8.8kg/ha	-	2-4L/ha	-	-
Land - other ⁷	2-3l/ha	-	-	-	0.01-0.06kg/ha	4-8kg/ha
Citrus	4-4l/ha	-	2.5kg/ha	-	-	-
Grapes	2-6l/ha	-	1.9-4kg/ha	-	-	-
Wheat	4-6l/ha	0.65- 0.87kg/ha	-	0.3-0.5L/ha	0.05-0.07kg/ha	-
Corn	-	2.5-3.3kg/ha	-	2-4L/ha	-	-
Sugarcane	-	2.2-3.3kg/ha	-	-	-	3.5kg/ha

⁶ And ⁴ Infopest. www.dpi.qld.gov.au/aphs/infopest

⁷ Land – other describes land which is not industrial, close to water, grazed or cropped. For example, this category includes right-of-ways and non-agricultural land.

It is important to recognise that many chemicals are registered for a variety of agricultural uses, targeting a wide range of pests (which include weed species). *Table 2* illustrates how the six chemicals in *Table 1* are approved for use in a diverse range of agricultural applications (or hosts).

- Atrazine is approved for use on-label (as specified on the label) in 33 agricultural situations, which range from specific crops like Canola to general application weed control in turf. In addition to the broad range of hosts, Atrazine is approved to control 149 pests.
- Glyphosate is used to protect 38 hosts and control 266 pests.

TABLE 2: Comparative herbicide use information⁸

Listed Herbicide	Number of Hosts ⁹ approved for use with the listed herbicides	Number of Pests ¹⁰ controlled by the listed herbicide	Approved agricultural use	
			specific application crop range	general application range
GLYPHOSATE	38	266	Avocados to wheat	Aquatic areas to citrus to pasture
ATRAZINE	33	149	Canola to peas to wheat	crops to turf
SIMAZINE	35	69	Almonds to strawberries	Citrus to pines
METOLACHLOR	30	57	Barley to tobacco	Forests to pasture
METSULFURO N-METHYL	30	125	Barley to rye	Aquatic areas to dunes to pines
VELPAR	5	123	Pines to sugarcane	Commercial land to pasture

⁹ APVMA use the term **Host** to describe the crop/animal/situation for which the chemical acts to protect from a pest.

¹⁰ **Pest** is used by APVMA to describe the weed/insect/disease/condition which is targeted for control by the chemical.

Insecticides

The long term nature of forests reduces the need to use insecticides on a broad scale. Generally insect damage to forests is limited and localised. Broad scale insecticide application is not cost effective when compared to the damage caused to the forest as a whole. However, the nature of intensive short rotation crops requires a higher degree of protection against insect damage which could result in significant financial loss to the producer. The only insecticide commonly used in forests is Dicamba; a chemical used to control the sirex wasp in pine plantation.

Table 3 compares three insecticides used in agricultural situations. The concentrations used in each situation are relatively similar for Cypermethrin and Permethrin. It is difficult to directly compare Dicamba concentrations as this chemical is injected directly into the stem of trees and applied broadly within maize crops. Permethrin is also used to control ticks in domestic animals.

TABLE 3: Comparative insecticide application rates¹¹

	CYPERMETH RIN	PERMETH RIN	DICAMB A
Timber Products	-	20-40mL/10L	
Pine forests – label rate	0.3-2.5L/ha	-	1mL/10cm tree circumference
Eucalypt forests – label rate	0.3-2.5L/ha	-	
Maize	0.3-0.4L/ha		0.8-1.4L/ha
Grapes	0.1L/ha		-
Wheat	0.1-0.75L/ha		
Domestic animals		10-30mL/L	
Roses		20mL/L	
Herbs		20mL/L	

Table 4 illustrates how each chemical can be used on a number of different hosts to control a wide range of pests. For example, Cypermethrin and Permethrin can be used to control hosts in agricultural crops, forests and on animals. However, Dicamba is a specialised chemical and can only be used ‘under permit’.

¹¹ And ⁴ Infopest. www.dpi.qld.gov.au/aphs/infopest

TABLE 4 : Comparative insecticide use information¹²

	Number of Hosts approved for use with	Number of Pests approved for use on	Approved agricultural use	
			specific application crop range	general application range
CYPERMETHRIN	61	41	Apples to Zoo animals	Domestic herbivores to crops
PERMETHRIN	69	54	Canola to peas to wheat	Domestic Animals to herbs to timber products.
DICAMBA (permit use only)	5	4	Maize, Pine, irrigation channels, pastures and right-of-way.	N/a – all use requires a permit from NRA

Legislative and Regulatory controls for the application of chemicals in forest management.

	Forest specific	Chemical specific (applicable to all agricultural industries)
NATIONAL	<ul style="list-style-type: none"> • Australian Forestry Standard (voluntary) • Code of Practice for Afforestation Managed Investment Schemes (under development) • National Principles (used by CSIRO to review State codes): the Code for Plantations and the Code for Native Forests • The Certification Standard 	<ul style="list-style-type: none"> • <i>Agricultural and Veterinary Chemicals (Administration) Act 1992</i> • <i>Agricultural and Veterinary Chemicals Code Act 1994</i> • Agricultural and Veterinary Chemicals Act 1994
TASMANIA	<ul style="list-style-type: none"> • <i>The Forest Practices Act, 1985</i> • Forest Practices Code • Private Timber Reserve (PTR) 	<p>Agricultural and Veterinary Chemicals (Control of Use) Act 1995</p> <p>Environmental Management and Pollution Control Act 1994</p> <p>Private Forests Act 1994</p> <p>Weed Management Act 1999</p> <p>Workplace health and Safety Act 1995</p>

Example of Tender document

**SPECIFICATIONS FOR AERIAL APPLICATION OF
HERBICIDE BY HELICOPTER**

Set No. - Issue date

The following contract is for the hire of helicopter/s complete with pilot, loader/driver, fuel and ancillary equipment necessary for the application, loading and transport of herbicide.

1. Chemical, Fuel and Ancillary Equipment

- 1.1 The contractor is required to transport the chemical from the chemical shed to each operational site.
- 1.2 The contractor shall be responsible for the supply of water to the site.
- 1.3 The contractor will arrange for the mixing and loading of the chemical at each site. All equipment used for mixing and loading will be used subject to the nominated Foresters approval.
- 1.4 The mixing equipment used must have the ability to decant pure chemical back into the drums if for some reason operations are to be halted for the day.
- 1.5 The contractor is required to return empty drums to the chemical shed.
- 1.6 The contractor shall arrange for the supply of fuel for the helicopter as required.

2. Specifications

- 2.1 The aircraft must be fixed with a system capable of maintaining a specific droplet size, pressure and flow rate dependant on the particular application requirements and chemical mixes.

70% of droplets are to be 250 to 350 microns in diameter at the green canopy level in the plantation. Droplet density approximately 20 droplets/cm². Droplet size may be increased on special sites (ie. boundary runs, sensitive areas).
- 2.2 The systems must also have a positive suckback mechanism, flow computer and turbines to suit up to 30 litres/ha.
- 2.3 The contractor must guarantee all work and any stripping or missed areas as a result of inaccurate flying will be resprayed at the contractors expense.
- 2.4 Spraying runs will be flown at the lowest height above the ground level that safety permits. Generally this will be at about 2 metres and no higher than 5 metres

- 2.5 The pilot(s) shall have a minimum experience level of 1000 hours agricultural experience and hold all the appropriate agricultural and chemical ratings.
- 2.6 Any individual pilot used shall be subject to an agreement between the contractor and [organisation name]. [organisation name] reserves the right to request the replacement of a pilot at any time.
- 2.7 The helicopter shall be fitted with an on-board device to monitor wind direction, inversion layers and turbulence levels. The device should be able to be operated by the pilot and meet the satisfaction of the nominated Forester.
- 2.8 The system must be free of any leaks. All hoses and external connections must be securely fitted and lock-wired where appropriate.
- 2.9 The machine and system must be fully decontaminated before arrival of the helicopter at the site of operations.
- 2.10 The spraying system shall be installed on the helicopter in such a manner as to ensure that spray does not foul the airframe.
- 2.11 The washing down of the helicopter must be undertaken at the helipad or a site approved by the nominated Forester.
- 2.12 The operation will be conducted in accordance with the specifications outlined in the '[relevant State pesticides Act]'
- 2.13 Aerial spraying operations will occur in the following meteorological conditions and the nominated Forester will suspend the operation if these conditions are not met.

Wind: 2 to 7.2km/h (0.5 to 2m/s) blowing away from susceptible non-target areas, with constant speed or direction. Spraying is not to proceed in calm conditions or when wind is variable or gusty. Spraying must be undertaken in a crosswind direction whenever practicable.

Temperature: 0 - 25^o Celsius

Relative Humidity: 40 - 80%

Atmospheric stability: no temperature inversion and preferably overcast

- 2.14 The contract completion date is [date].

3. Guidance System

- 3.1 The pilot(s) shall ensure that helicopters guidance system is capable of accurately obtaining correct placement of swaths.
- 3.2 If in the opinion of [organisation name] Officer the pilot is not flying accurate swath widths, the operation may be suspended and payment withheld.

Example of a Standard Operating Procedure

APPLICATION OF HERBICIDE BY HELICOPTER

Objective

To apply a measured amount of herbicide to a specified area to control pest plants including pine regeneration, to enhance the early growth and survival of planted stock.

Method

Each operation will have a nominated Forester in charge who is responsible for the field implementation of the spray program. The Forester will ensure that:

- the spray operation is undertaken in accordance with the relevant prescriptions, legislation and contract conditions and runs efficiently, including obtaining written permission from the NRA for the operation.
- the relevant adjacent land holders are notified of the spray program.
- a pre-spraying briefing is performed involving all personnel detailing the entire operations and answering queries.
- every person involved with the spray program has a copy of the program, including maps delineating areas to be sprayed, spray rates, pad sites, significant environmental assets, water points and access roads.
- aerial operation warning signs are placed at all entrances to areas being sprayed. The area is to be cleared of people and at least one person is present to stop members of the public from entering the specific area. The additional person/persons will also monitor meteorological conditions and the fall of spray from the helicopter and inform the Forester in charge if drift is detected.
- a weather station is set up and monitored within the spray area where it will record indicative meteorological conditions. This station is to be regularly monitored and readings recorded to ensure conditions are within the parameters specified for aerial spraying. In addition, the Forester in charge will ensure periodic measurements of wind speed and direction are recorded from other areas within the spray zone. Smoke should be used to determine wind speed and direction, and to help identify the presence of an inversion layer. The Forester in charge will determine whether ground- or helicopter-generated smoke is appropriate to be used.

- water sensitive sheets are placed in sample compartments prior to the operation to monitor droplet size and distribution and spray drift. Paper will be placed at 5, 10, 25 and 50 metre intervals from the edge of the swath going down-wind (or in both directions if no wind). These sheets are to be retrieved and examined before the commencement of each area, and the results discussed with the contractor.
- spraying may only commence when the Forester in charge is on the spray area and has given permission for the operation to commence.
- three water samples will be taken from various water courses throughout each compartment. Samples will be taken prior to the commencement of the operation, within 15 minutes of completion, and after a 15mm of rainfall. All samples will be held at ACT Forests for a least 2 years after the contract is complete.
- regular communication is to be maintained between the Forester in charge and the pilot during the operation regarding clearance to spray, weather conditions, spray drift detected and other operational concerns. The Forester will also report a daily summary of events to the Operations Manager.
- compartment history sheets are completed within a week of the completion of the operation and filed for each compartment sprayed.
- the logged flight paths are plotted on a daily basis and discussed with the contractor prior to the next days flying.
- a file report including field notes and weather readings is completed within a week of the completion of the program.

The contract will specify spray equipment requirements and the obligations of the contractor.

Quality Control

Water sensitive sheets will be placed in sample compartments to determine droplet size and distribution and spray drift. The logged flight paths are to be plotted to determine the accuracy of the herbicide application.

Special Considerations

Compartments scheduled for spraying must be inspected to identify weed occurrences. Sample plots should be established before spraying and monitored 12 months post-spray to determine the efficacy of techniques. Prescriptions must be consistently updated as new information becomes available. Water quality monitoring system is to be developed and implemented. At the completion of operations the Forest Officer is to ensure that details of the program are stored in the appropriate areas (ie. Compartment history).

References

Relevant State pesticides Act

Relevant Contract Specifications Aerial Application Tender.

Other reference (eg: Forestry Commission, Tasmania (1994) Pesticide Application Manual)

Example of a Prescription

APPLICATION OF WEEDICIDE BY HELICOPTER

Meteorological parameters

Wind: 2 to 7.2km/h (0.5 to 2m/s) blowing away from susceptible non-target areas, with constant speed or direction. Spraying is not to proceed in calm conditions or when wind is variable or gusty. Spraying must be undertaken in a crosswind direction whenever practicable.

Temperature: 0 - 25° Celsius

Relative Humidity: 40 - 80%

Atmospheric stability: no temperature inversion and preferably overcast

Other: rain is not likely which will limit herbicide uptake, trees are not under stress.

Buffers: Consistent with current legislative requirements.

Herbicides:	Glyphosphate	<i>Roundup CT</i>
	Metsulfuron methyl	<i>Brush Off</i>
	Hexazinone	<i>Velpar</i> liquid or granules

Additives:	Surfactant	<i>Pulse</i>
	Oil	<i>Synnetrol</i> (Canola derived)

Application rate: 40L/ha total rate for liquid mixes, mix varies as follows:

Standard Mix per hectare: *Roundup dry* 2.5kg/*Velpar DF* 2Kg/*Brushoff* 60g/*Pulse* 100mls/*Canola oil* 600mls.

Water coarse mix: *Roundup Biactive* 7L/ha + water

Granules: *Velpar G* 12- 15kg/ha

Droplets: 70% of droplets are to be 250 to 350 microns in diameter at the green canopy level in the plantation. Droplet density approximately 20 droplets/cm². Droplet size may be increased on special sites (*ie* boundary runs, sensitive areas).

Time of year: Within Cotter catchment: November to ensure blackberries are actively growing and allows time for Jan/Feb site preparation.
Outside Cotter catchment: Dependent upon scheduling of site preparation operations.

Scheduling: Areas sprayed must not be disturbed for at least 4 weeks after spraying to ensure efficacy of herbicide uptake. *Velpar* can not be applied closer than 4 weeks before planting.

(End)

