



# EcoHort

## GUIDELINES FOR MANAGING THE ENVIRONMENT



An Environmental  
Management System for the  
Australian Nursery Industry

Intensive plant production, growing  
media manufacturers and greenlife  
markets

4<sup>th</sup> Edition 2018



Nursery & Garden Industry  
Australia

**Horticulture**  
**Innovation**  
Australia



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# 1 Introduction

The Australian nursery industry makes a significant contribution to almost all horticulture and forestry industries across the nation. Production Nursery enterprises provide greenlife to retail, landscape, fruit production, vegetable production, forestry plantations, cut-flower, production, interiorscape and re-vegetation systems.

Furthermore, nurseries are situated in almost all communities and areas of Australia. This presents a wide range of environmental and natural resource issues and constraints that need to be addressed in an industry-wide program and through the utilisation of all available resources.

Having such diverse markets the industry is feeling pressure from many quarters to demonstrate clearly their achievements in the area of natural resource and environmental management. Nursery production covers the intensive plant producers for:

- Container stock
- In-ground stock
- Seedling stock
- Forestry stock
- Fruit tree stock
- Landscape stock
- Plug and tube stock
- Revegetation stock

This program (EcoHort) supports production nurseries, growing media manufacturers and greenlife market businesses to implement good sustainable practice, improve production and help position the industry to proactively demonstrate its role in maintaining and enhancing the broader landscape in which we all live, work and play.

The Australian nursery industry, in partnership with Horticulture Australia Limited (HAL), has developed these environmental guidelines titled EcoHort as a tool to assist production nurseries, growing media manufacturers and greenlife market businesses demonstrate their commitment to sound environmental and natural resource stewardship.


## Benefits of implementing EcoHort

These EcoHort Guidelines provide a risk assessment-based pathway for production nurseries, growing media manufacturing businesses and greenlife market businesses to demonstrate their environmental stewardship and natural resource management to government, markets, industry and the general community. This aspect of business management is becoming more important as evidenced by increased environmental regulation. Restrictions on natural resource access, such as water and land use, continue to threaten business sustainability.

EcoHort provides a guide for assessing and determining environmental impacts, efficient resource use plus sound strategies to meet environmental obligations as expected by the community.

EcoHort distills key information that outlines good environmental as well as good business practice. It encourages production nurseries, growing media manufacturers and greenlife market businesses to investigate cost savings from more efficient use of inputs such as water, electricity, fuel and chemicals and flags useful information sources for the topics discussed in these Guidelines.

EcoHort is an independently audited program underpinned by the Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice program and part of the Australian Plant



Production Standard (APPS). This will provide credible evidence of good environmental performance and will support your efforts to demonstrate sound environmental practice (stewardship) where your markets or local and state authorities require this. EcoHort also has the Potential to allow a certified business to move into the area of ecolabelling if so desired

## Staff training

To ensure results, owners and staff need to be aware of environmental and natural resource issues relevant to their responsibilities. Staff training is ideally a combination of internal and external industry-supported programs and should be recorded in staff training records. This will ensure relevant staff undertakes their duties and activities to meet the business' environmental and natural resource objectives. Industry-supported training is available through the relevant State & Territory Nursery & Garden Industry body or Greenlife Industry Australia (GIA).



*Staff training will support the implementation of EcoHort*

## The EcoHort Certification process under NIASA

The EcoHort Guidelines may be applied to any business for implementation and to demonstrate good environmental stewardship. However, to operate as an EcoHort Certified production nursery, growing media manufacturer or greenlife market with external auditing, the business must first have, or achieve, NIASA Accreditation.

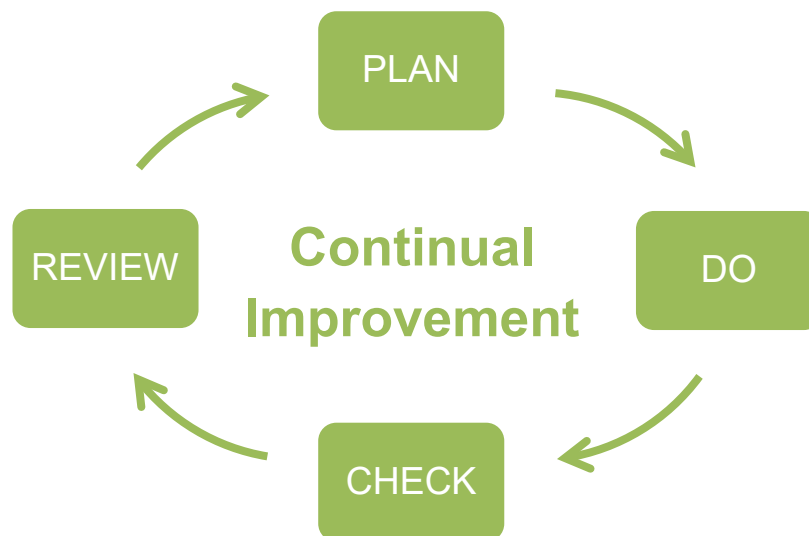
The process to become EcoHort Certified under the NIASA program is as follows:

- Business is/or becomes NIASA-Accredited – via relevant Nursery & Garden Industry body.
- The business must have a copy of the EcoHort Guidelines and risk assessment checklist.
- The business undertakes a self-assessment using the provided risk assessment checklist in the EcoHort Guidelines.
- The business contacts the NIASA Technical Officer.
- A NIASA Technical Officer arranges an audit with the business (as with current NIASA arrangements) once the business has formally applied for EcoHort Certification.
- A confidential NIASA number (supplied with NIASA accreditation) will be used to ensure confidentiality.
- A NIASA Technical Officer conducts a walk-through audit of the enterprise using the EcoHort Risk Assessment Checklist
- The NIASA Technical Officer discusses areas for improvement with the nursery manager/owner and they collaboratively set an action plan for improvement with clear objectives to be completed by next audit.

- Areas shaded in the EcoHort Checklist indicate they are priority items that must be ranked 'high priority' if recorded in the EcoHort Action Plan.
- An audit report (not the Checklist) is completed by the NIASA Technical Officer and is assessed by the NIASA Committee for the granting of EcoHort Certification.
- Audits are conducted at an interval consistent with current NIASA arrangements.
- At each audit the NIASA Technical Officer conducts audits using the risk assessment checklist, the nurseries' action plan is reviewed and a new action plan (with priorities) is developed based on audit results.
- Failure to meet agreed priorities/targets will need to be discussed with the auditing officer. Significant failures are reported to the NIASA Committee to adjudicate on the status of certification.

*NOTE: To gain EcoHort Certification it is not necessary that the business complies 100% with the EcoHort Target Values. The business must commit to and demonstrate continuous improvement based on agreed priorities developed during each property audit. Failure to meet set priorities/targets is the criteria for losing EcoHort Certification at the discretion of the State Accreditation & Certification Committee. EcoHort target values are a guide to the best management practice that a business can aim to achieve.*

### **Continual improvement – a business concept**



The 'plan, do, check, review' process is a basic management tool embedded in any credible environmental management system (EMS). It encourages a continuous cycle of improvement through good planning, implementing actions, effective monitoring and recording plus regular reviewing. It is an essential part of the adaptive management cycle to use monitoring of results to review and update plans.

The EcoHort Certification process applies these principles by ensuring the business undertakes a self-assessment and develops an action plan as part of the audit process. The business is then expected to implement these changes and review and update action plans as part of the next audit. The Guidelines require on-site monitoring to be conducted, where identified in the EcoHort Action Plan, and the auditor will review the progress of the EcoHort Action Plan priorities towards accepted industry targets at each audit

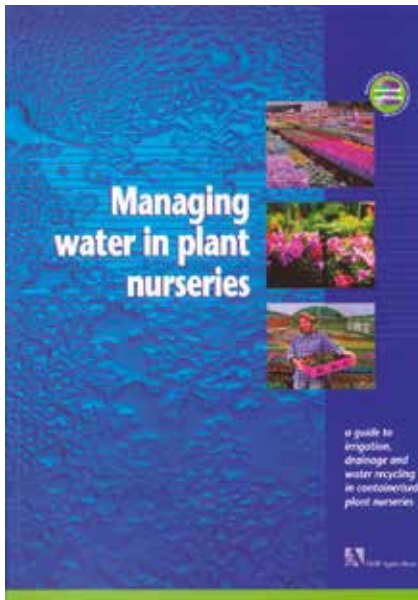


## How to use these Guidelines

A good starting point is to use the risk assessment checklist (refer section 5.8) as a summary to identify what you are doing well and highlight any gaps in your natural resource management and environmental performance. If you are unsure about information provided in the checklist, you can go to the text section for more information.

The decision guides in each section provide a quick environmental risk assessment for your business. Further information on how to address environmental issues can then be gleaned from the text related to each section.

A document of this type addresses a wide range of items and cannot provide comprehensive information on any one issue. Therefore, references are listed throughout the document that will enable you to source more detailed information about any particular section. To get the best out of the EcoHort Guidelines it is essential the business accesses the references mentioned in each section.

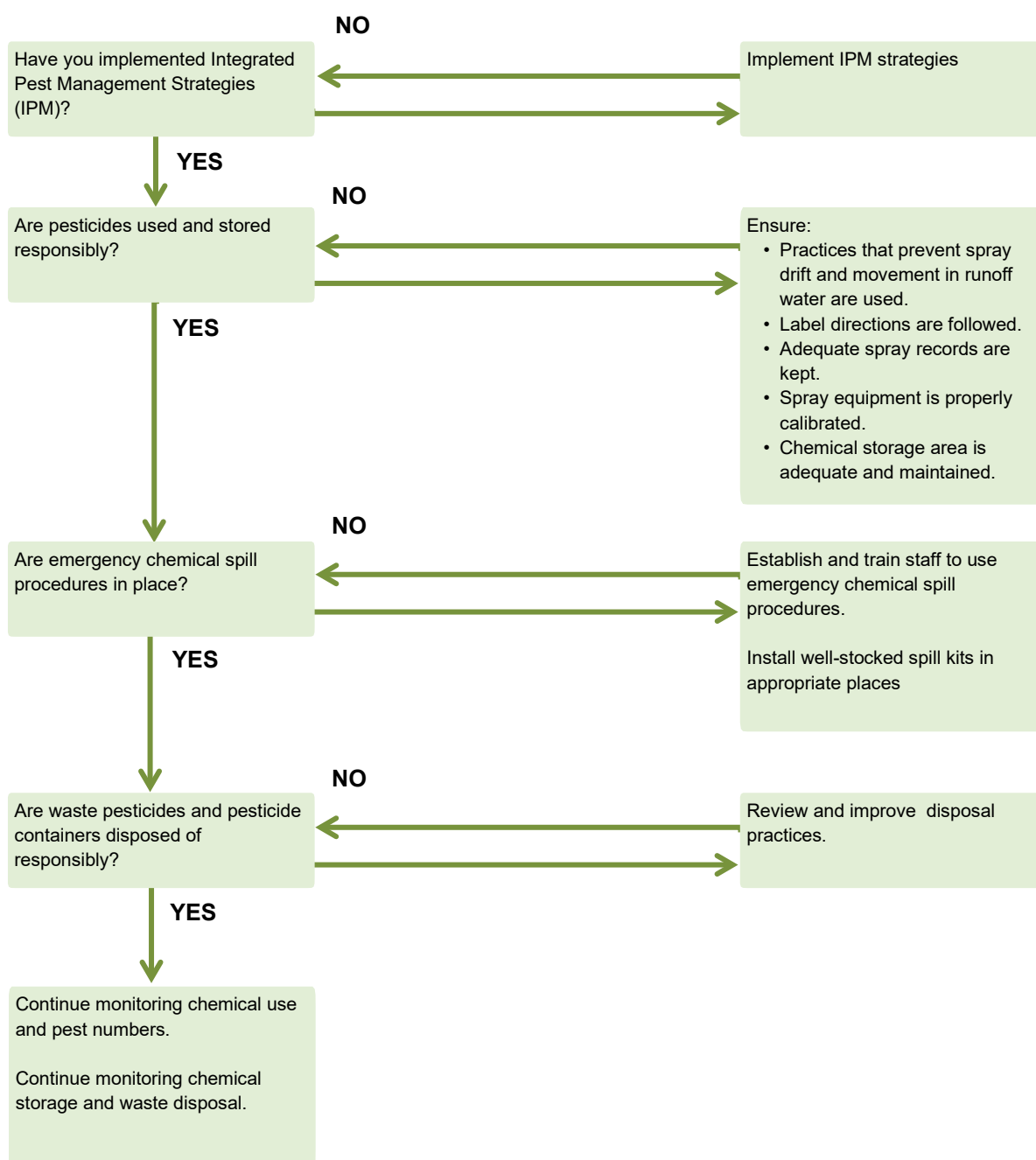



*References are listed throughout the document that will enable you to source more detailed information*

## 5.2 Managing pesticides and chemicals

**Environmental objective: maintain the quality of air, water, soil and biodiversity by minimising the impact of agricultural pesticides and industrial chemicals.**

### Decision guide for managing pesticides and chemicals





Persistent chemicals (including insecticides, miticides, fungicides, herbicides, bactericides, molluscicides, algacides and plant growth regulators) that enter the water, air or soil off site may damage or kill native plant and animal species in natural ecosystems. Of particular concern is the effect of pesticide residues on neighbouring or downstream sensitive ecosystems such as wetlands, fresh water and marine habitats, and national parks and reserves. In heavily populated areas great care is needed to prevent pesticide drift onto neighbouring areas.

Chemicals other than pesticides are widely used for cleaning and sanitising around the nursery, and for treating recycled water. Care needs to be taken to ensure these chemicals do not enter waterways and off-site drains.

## Suggested practices

### 5.2.1 Safe pesticide and chemical use

**Avoid pesticide drift** — Select the right combination of spray unit, nozzle type and size, and pressure. Avoid spraying when wind speed is variable and less than 3 km/hr or exceeds 15km/hr or when wind direction is toward sensitive natural areas or neighbours. Avoid spraying on very hot days.

Erect or plant barriers to catch possible spray drift. Establish buffer zones between production areas and neighbours or sensitive natural areas (such as wetlands, waterways).

## References

- Best Practice Manual for Pesticide Application in the NIASA BMP Guidelines, Section 3.1 'Managing spray drift', available from [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)


**Use pesticides and chemicals responsibly** — always read the label and follow label instructions. Keep good records of application, including date and time applied, location of area treated, pest/disease targeted, pesticide used, rate/ha, amount of product per litre of water, application equipment used, weather conditions, operator signature (see Appendix 2 'Sample documents')

A suitable pesticide application recording system is included in the Nursery Pesticide Application Best Practice Manual and NIASA BMP Guidelines available from Greenlife Industry Australia at [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)

Ensure all people applying chemicals in the business have completed an accredited chemical user's training course and are current within 5 years of completing the course. (for example an AusChem or ChemCert chemical user certificate. Ensure all staff who apply pesticides have adequate in-service training.

Regularly calibrate and maintain pesticide application equipment. Only use pesticides registered for use in your State or Territory or have an Australian Pesticides and Veterinary Medicines Authority permit ([www.apvma.gov.au](http://www.apvma.gov.au)).

Keep an updated list of all pesticides used in your nursery in a Pesticide and Chemical Inventory Record and Safety Data Sheets for all pesticides used. These provide information about health hazards and safe handling, including transport, storage and spill clean-up.



**Use rat and mouse baits responsibly** — If rat and mouse baits are used around the nursery, ensure they are enclosed in bait stations to prevent native birds and animals eating them. Follow label instructions. Native birds or animals may feed on rodents poisoned by baits and suffer secondary poisoning. Some baits have been developed that do not cause secondary poisoning. These are generically called first generation rodenticides and include coumatetralyl and warfarin (active ingredients).

**Minimise pesticide applications** — Pesticides should be thought of as only one strategy for managing pests, diseases and weeds because of Potential impacts on the environment, neighbours, staff and development of resistant pest strains through overuse. By minimising pesticide use, you encourage beneficial insects and micro-organisms to flourish.



*Crop monitoring*

Non-pesticide strategies plus strategic pesticide use comprise an Integrated Pest Management (IPM) strategy. These include:

- Have the resources and undertake suitable training to recognise all the pests and diseases that can attack your particular crops, their symptoms of attack and life cycles.
- Monitor crops for pests, diseases and weeds on a regular schedule and record results. Use monitoring to guide pesticide treatment and to check effectiveness of management measures.
- Use environmentally friendly pesticides where appropriate, such as oils, soaps and Bacillus formulations.
- Use pheromone traps and bug zappers for moths where applicable.
- If a pesticide is needed:
  - Use narrow-spectrum pesticides instead of broad-spectrum pesticides.
  - Use container applications of pesticide rather than blanket sprays if monitoring indicates an infestation is localised.
  - Use pesticides strategically when the pest or disease is most vulnerable.
- Practice good hygiene to limit disease in particular – refer to NIASA Best Management Practice Guidelines.
- Screen ventilation areas of growing structures to keep out thrips, whitefly and aphids.
- Use resistance minimisation strategies such as pesticide rotation based on mode of action groups.
- Use biological control agents (BCA) where available and appropriate. Use of BCAs requires all of the above to be in place and to maintain a suitable environment to encourage their survival and growth.
- Have an all-year-round weed management program in place, in and around the growing area, as weeds can harbour pests and diseases and act as a constant source of re-infestation.



## References

- Best Practice Manual for Pesticide Application in the NIASA BMP Guidelines, Section 3.1 'Managing spray drift', available from [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)
- Goodwin, S et al., 2002, Integrated Pest Management in Ornamentals: Information Guide, NSW Agriculture, Orange, NSW (Also available through NGIA).
- 'A step-wise programme for practicing IPM', The Nursery Papers 1997:5
- The Good Bug Book (2003) Australian Biological Control Inc PO box 436, Bourke St, Richmond NSW 2753.
- 'Pest & Disease – prevention is better than cure'. The Nursery Papers 2004:3

**Protect water supplies from pesticide and chemical contamination** — To avoid back-syphoning into the water supply and contamination of the hose with pesticide, keep the end of a fill hose above the water level when filling a spray tank. Fill spray tanks with water and then move them away from any surface water storages before adding chemicals.

**Minimise movement of pesticides into nursery runoff wastewater** — Avoid application of pesticides immediately before rain or irrigation. However some herbicides need water for incorporation into growing media or soil. Use granular pre-emergent herbicides in preference to sprayed herbicide.

If using granular herbicides in containers, restrict water leaching from containers. Most herbicide is leached via nursery runoff wastewater in the early part of the first irrigation (or rainfall) after the initial application. Gravel under containers retains and retards movement of leached herbicides to some extent (Whitwell et al 1995).

Apply herbicides to small areas at any one time; avoid blanket application to the whole nursery in a single application. Ensure herbicides are applied into containers where the herbicide is bound to growing media, not between containers where it can be picked up by runoff water.

Do not apply herbicide to containers just before sale. This transfers the problem of herbicide leaching and runoff to the retail nursery or customer who may not have runoff wastewater remediation or collection facilities, so the herbicides have a high Potential of entering public drains and waterways.




*Pesticide application training*

## References

- Whitwell, T, Briggs, JA, Riley, MB & Camper, ND 1995, 'Fate of herbicides in container nursery runoff'. Combined Proceedings International Plant Propagators Society. Vol 45 pp 570–573.





**Safely store pesticides, chemicals and other hazardous substances** — Pesticides and chemicals should be stored in a lockable, weatherproof, fireproof, well-ventilated area away from production facilities, waterways, water storages, and flood-prone areas. The floor should be impermeable, and the store area able to contain spilt liquid and be easily cleaned. Spilt liquid can be contained by bunding (an embankment or wall) or other construction to prevent spills leaving the area.

Pesticides and chemicals must be stored in their original, clearly labelled container, separately from fertilisers, chlorine and any oxidising agents. Liquid pesticides and chemicals should be stored below powder pesticides if on shelving.

Maintain an up-to-date inventory of stored pesticides (see Appendix 2 'Sample documents'). Only store sufficient pesticide on site to meet needs and regularly check pesticide and chemical containers for any leakage or damage. Maintain a chemical clean up kit near the area (see 'Emergency response for hazardous chemicals' below).

All States have regulations concerning storage of hazardous substances. Check with your local authority to ensure you conform to these regulations.



*Secure storage of pesticides*

## References

- Best Practice Manual for Pesticide Application in the NIASA BMP Guidelines, available from [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)
- 'ChemClear Handling and Storage' fact sheet in Chemical Disposal, Handling & Storage in the ChemClear® website: [www.chemclear.com.au](http://www.chemclear.com.au)

## 5.2.2 Pesticide and chemical disposal

**Pesticide and chemical mixing, filling and washing down areas** — The mixing and wash down area should be situated away from water sources, drains and streams. The area should have a bunded concrete pad that will collect spills and wash down rinsings and drain them to a containment tank/sump to allow breakdown of pesticides. Never leave a spray unit unattended while it is being filled.

**Dealing with leftover spray and washings from a spray unit** — Prevent leftover pesticide by carefully calculating how much is needed for the area to be sprayed. Do not allow leftover spray or rinsings from a spray tank or from empty pesticide or chemical containers to enter streams or drainage from the property. Spray leftover pesticide and washings from rinsing after spraying onto a mulched or vegetative area away from people and animal access areas and away from drains, low drainage areas, waterways and water storages (follow label guidelines), or spray onto another area of production plants for which the pesticide is registered.

**Emergency response for hazardous chemicals** — It is essential to have an emergency response strategy in place including a list of emergency contacts, and to train staff how to deal with spills. Spill kits should be located conveniently to the storage and mixing areas, outside the chemical storage area and identified on a map in the chemical storage area. Spill kits should include:

- A shovel.
- Absorbent material, such as kitty litter, vermiculite, earth or dry sand (do not use sawdust or other combustible materials).
- Soda-ash (up to 10%) or hydrated lime can be added for organochlorine spills.
- Containers to hold the absorbent material or other leaking containers.
- Protective clothing, including gloves, respirator, boots and eye protection.

Control the spill quickly. Ensure you put on protective equipment first then ensure all effort is applied to stop the leak or spill and contain the spread. For example use a shovel to form an earth wall or barrier, and use the absorbent spill-kit material to soak up or wipe up the spill. The important thing is to prevent the spilled material from getting into any body of water or into drains.

Properly dispose of the chemical-drenched absorbent clean-up material. Use hydrated lime or bleach to decontaminate spill surfaces but never use these two materials together.

Report the spill to authorities if it is large or if it enters waterways.

## References

- Best Practice Manual for Pesticide Application in the NIASA BMP Guidelines, available from [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)
- 'ChemClear Handling and Storage' fact sheet in Chemical Disposal, Handling & Storage in the ChemClear® website: [www.chemclear.com.au](http://www.chemclear.com.au)

### Dispose of waste pesticide containers safely —

Businesses, under various State and Territory regulations, are required to dispose of empty chemical containers safely. When purchasing, ask if used pesticide containers can be re-used, returned, refilled or recycled.



Used containers must be triple rinsed or pressure rinsed immediately after emptying the container and left free of any visible chemical residue. Dispose of rinsate into spray unit. Store rinsed containers in a secure storage area on-site until delivery to an approved waste container, recycling or collection site.

Puncture steel containers so that they cannot be re-used. Pass a steel rod or crowbar through the neck/pouring opening and out the base of the container. Do not puncture plastic containers included in reconditioning/re-use programs.

## References

- Best Practice Manual for Pesticide Application in the NIASA BMP Guidelines, available from [www.greenlifeindustry.com.au](http://www.greenlifeindustry.com.au)
- 'Agsafe Effective Drum Rinsing Standards', available from drumMUSTER [www.drummuster.com.au](http://www.drummuster.com.au)

**Dispose of old, de-registered or unwanted pesticide concentrates safely** — These need to be disposed of so they do not pose a risk to the environment, or to human health. Use registered pesticide collection programs to dispose of these pesticides.

Mark the containers so they are identified for disposal. This may need to be a paint mark or other permanent mark on old, rusting containers. Ensure the containers cannot leak and store in a separate part of your chemical storage facility until they can be removed for disposal. Ensure the pesticide is known by maintaining the product label on the container.



*ChemClear Program*

## References

- Details of pesticide disposal programs are available on the ChemClear® website [www.chemclear.com.au](http://www.chemclear.com.au) or phone 1800 008 182

If a government collection program is not available, then use a certified or approved chemical waste contractor or supply company.

If transporting these pesticides to a collection centre, place them on the back of a utility or truck. It is illegal to transport pesticides in the boot or cabin of a vehicle, or back of a station wagon, where fumes may affect the driver or passengers. Ensure containers cannot leak during transport.

### 5.2.3 Fuel storage and use

**Prevent oil, fuel, and grease pollution** — regular maintenance of on-site vehicles, storage containers and equipment will prevent oil and grease leaks, and burst hydraulic hoses.

Construct a bund (liquid-proof wall) around fuel, oil and grease storage areas sufficient to contain leaks and spills. Check that bunding meets regulatory requirements where applicable.

Locate fuel, oil and grease storage areas away from drains and drainage areas, waterways, water storages and flood-prone areas.

Have an emergency cleanup strategy in the event of fuel, oil or grease spills. Regularly clean up vehicle oil spills and leaks on car park areas.



*Bunded fuel storage*



*Service equipment*

## 6 EcoHort Risk Assessment Checklist

### 6.1 General Site Management

Issue/Activity	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
<b>Identify on a property map (or map overlays):</b>					
•Chemical storage, mixing and wash-down areas					
•Water storage facilities, water courses, bores, pumps, constructed wetlands					
•Property irrigation and drainage lines					
•Vegetation including remnant and riparian vegetation					
•Off-site drainage and discharge points					
•Neighbouring public roads, houses, public places, sensitive natural areas (lakes, wetlands, vegetation)					
•Fertiliser and fuel storages					
•Growing media composting, ageing, storage and mixing areas					
•Raw material storage areas					
State and local government environmental regulations are assessed					
The manager/owner and, where appropriate, relevant staff have undertaken EcoHort training					
<b>The business has the following references:</b>					
Environmental Policy					
EcoHort Guidelines					
NIASA BMP Guidelines					
IPM in Ornamentals Information Guide					
Nursery Industry Pesticide Application BMP					
Managing Water in Plant Nurseries					
Pesticide Management Diary					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## 6.2 Wastewater Management

Issue/Activity	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
Water flowing onto the property from neighbouring areas is deflected from production/growing areas					
<b>Nursery runoff drainage systems are adequate:</b>					
• Production/growing areas have a barrier protecting sub-soil					
• Barrier is sealed (concrete, bitumen, plastic/gravel, hardstand/gravel, etc.) and graded to allow slow drainage without water pooling					
• Drains have sufficient capacity					
• Drains are sealed or erosion managed e.g. grassed/rubble/vegetation					
• Drains allow water movement freely without pooling					
Runoff water from all growing/production areas drains to a storage point					
Raw material storage/aging areas are either sited on impermeable ground, have sub-surface drainage installed and/or are sealed - no supporting reference in guidelines					
Stored water/runoff water monitored and details recorded. Wastewater (Runoff/Stored water)Quality Record completed					
• pH monthly – Target Value between 5.5 & 7					
• Electrical conductivity (EC) monthly – Target Value < 1dS/m					
• Nitrates monthly – Target Value < 100 ppm					
• Phosphates monthly – Target Value < 40 ppm					
<b>Other quality parameters (list):</b>					
Nursery runoff water is recycled/re-used					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## 6.6 Water Use Efficiency

Issue/Activity	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
State or local authority water licensing regulations are adhered to					
Irrigation System operating parameters tested, monitored and recorded with Irrigation System Record completed six monthly					
Irrigation solenoid areas/blocks line pressure individually tested and recorded with Irrigation Line Pressure Record completed monthly					
Annual water use, mean monthly evaporation and rainfall are measured and recorded with Total Irrigation Water Use Record completed monthly					
Efficient irrigation systems are being used					
The irrigation system is in good condition and well maintained					
Irrigation is scheduled according to plant needs, weather conditions and container water volume					
Plants are grouped according to water needs and irrigation is sectioned and applied according to these needs					
A complete elemental water test for irrigation is conducted every six months					
Irrigation water quality meets acceptable industry standards					
Growing media characteristics are suited to optimise irrigation efficiency and minimise leaching					
The business owner/manager and, where appropriate, relevant staff, have attended a WaterWork course					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## 6.7 Managing Pesticides and Chemicals

### 6.7.1 Pesticide Drift

Issue/Activity	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
Spraying is done in suitable weather conditions					
Spraying equipment is selected, maintained and regularly calibrated to minimise drift					
Buffer zones and barriers are established between production areas and neighbours or sensitive environmental areas where needed					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### 6.7.2 Responsible pesticide/chemical use

Issue/Activity	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
Records of pesticide applications are kept and are adequate (includes weather conditions)					
Copies of pesticide Safety Data Sheets (SDS) are kept on-site					
Pesticides are mixed and applied according to label/permit directions					
All staff handling or applying pesticides/chemicals have completed an accredited pesticide user's course (e.g. ChemCert or AusChem Course)					
Only registered or approved pesticides/chemicals are used					
Pesticide and Chemical Inventory Record completed					

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_