

# Australian Regulations Limiting $D_{v0.1}$ for Aerial Applications

Andrew Hewitt

The University of Queensland, Gatton,  
Australia and Lincoln Ventures, Lincoln  
University, New Zealand

# Summary

- Overview of Australian pesticide regulations for aerial and ground applications
- Clarification by APVMA that the ASABE S-572 standard applies to droplet size classification for labeling but that the key parameter is the  $D_{v0.1}$

# Australian Pesticide Regulations for Spray Drift Management

- The regulatory government bodies have introduced a fairly aggressive set of regulations and proposed regulations including buffers of several hundred meters
- A National Working Party for Pesticide Application has been formed in response to the regulations whereby all stakeholders are working together toward more flexible regulations including new research and modeling (led mainly by the grains industry)
- The Australian regulations are based on AgDRIFT and AGDISP assessments but there is keenness to introduce choice through a new DRT scheme

## Aerial Agricultural Application

[Top](#)

These aerial application scenarios rely on modeling software called AGDISP developed by the US Government. AGDISP is a 'true model' that allows the use of different parameters to examine spray release height, wind speed, temperature, humidity and many others parameters including relevant features of different aircraft. Summaries of the input parameters are included with each scenario. The scenarios use the AT502 as the representative fixed wing aircraft and the Bell 206BIII as the representative helicopter. Each scenario displays downwind deposition data for appropriate droplet size spectra modeled for three different wind speeds.

- [Aerial Agricultural Fixed Wing - Average Applications \(XLS, 272kb\)](#)
- [Aerial Agricultural Fixed Wing - Large Applications \(XLS, 274kb\)](#)
- [Aerial Agricultural Helicopter \(XLS, 2.6Mb\)](#)

## Aerial Forestry Application

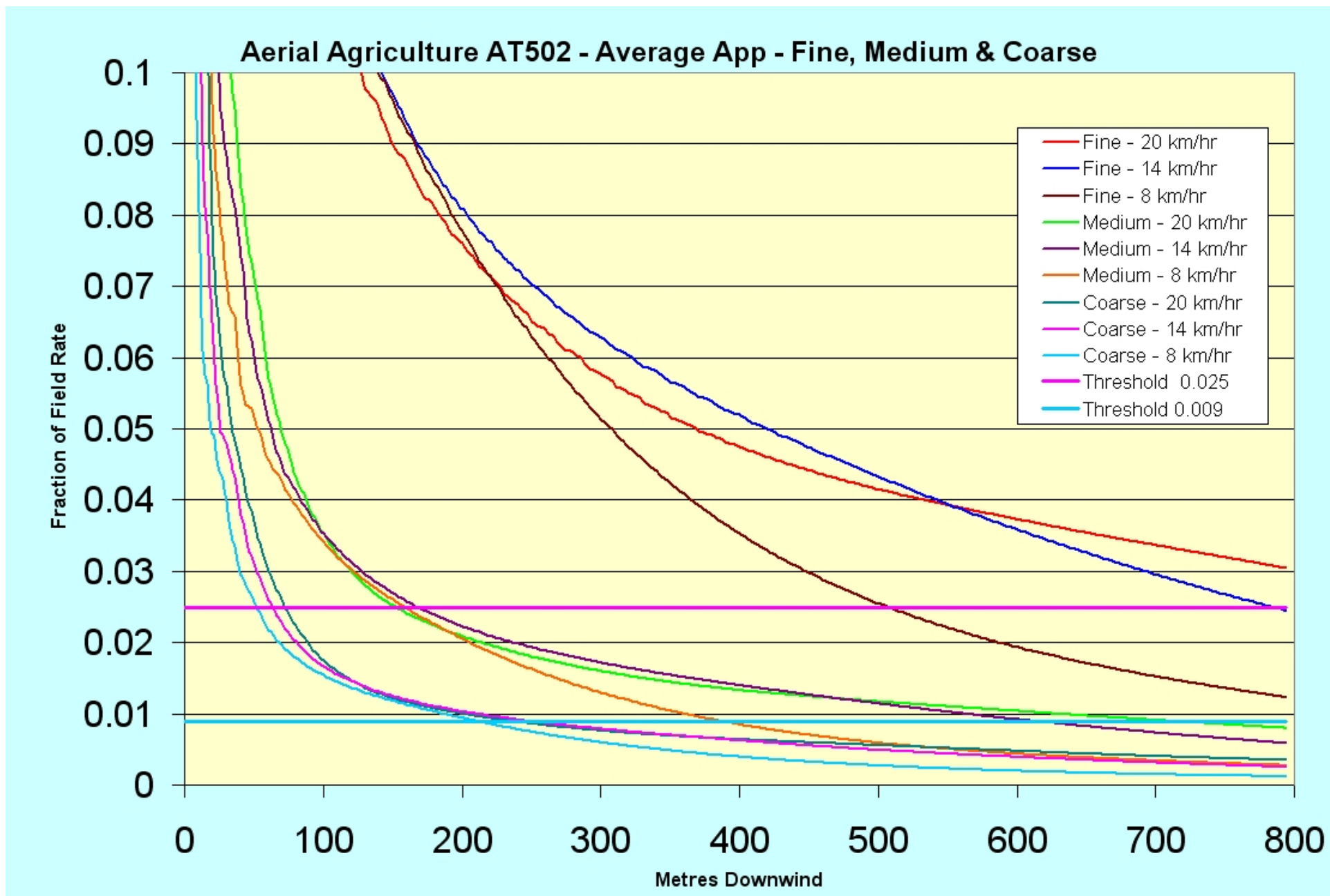
[Top](#)

The great majority of forestry applications are herbicides applied pre-planting and during establishment, up to a time when the trees are about two metres high. There are many fewer insecticide applications.

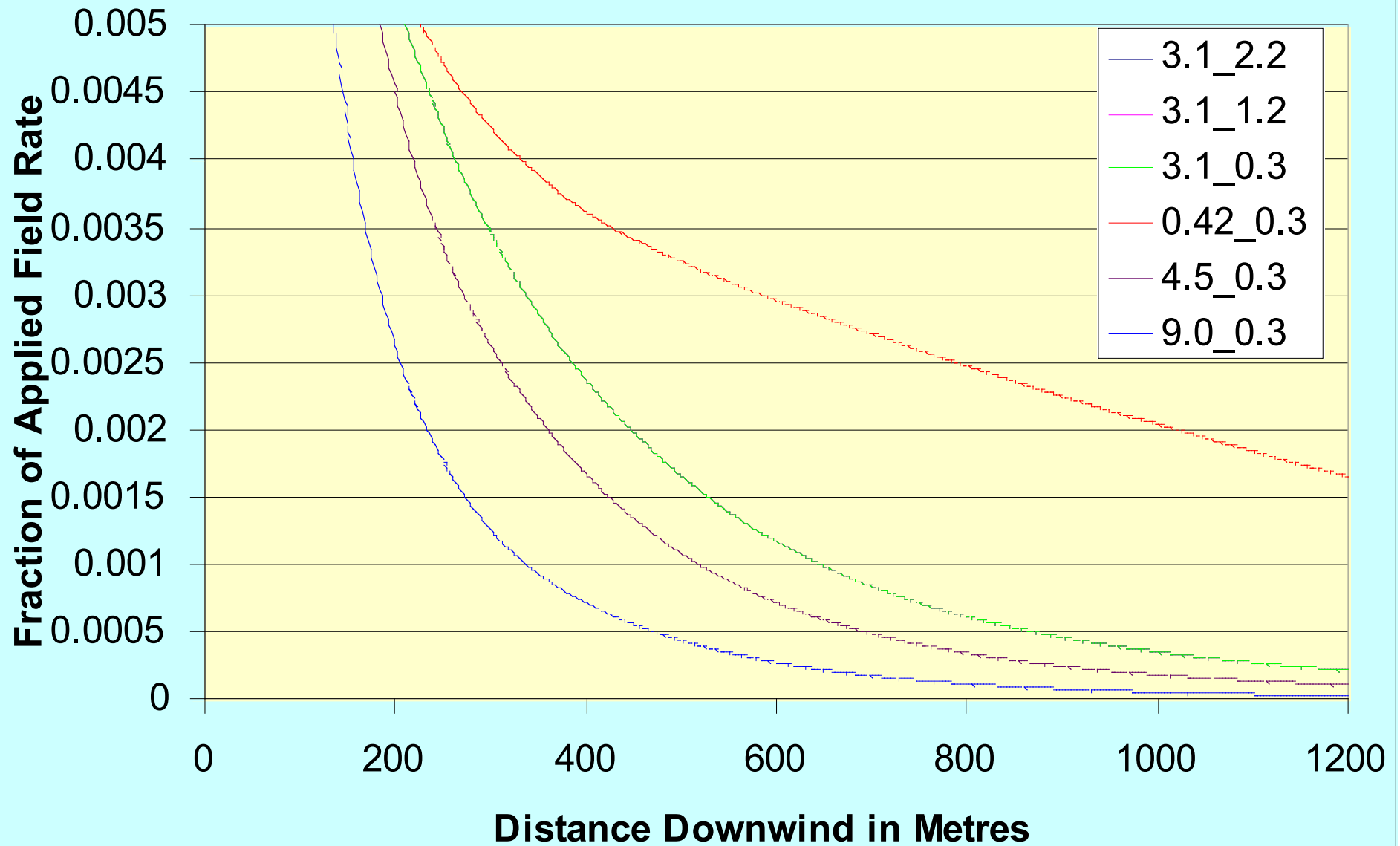
There are five aerial forestry application scenarios in this section; three for level ground and two for sloping ground. The two for sloping ground will be the ones the APVMA uses most often to assess and manage risk. The level ground versions will mainly be used for permit assessments when the APVMA can be assured that a use would be limited to level forestry plantings.

Summaries of the input parameters are included with each scenario.

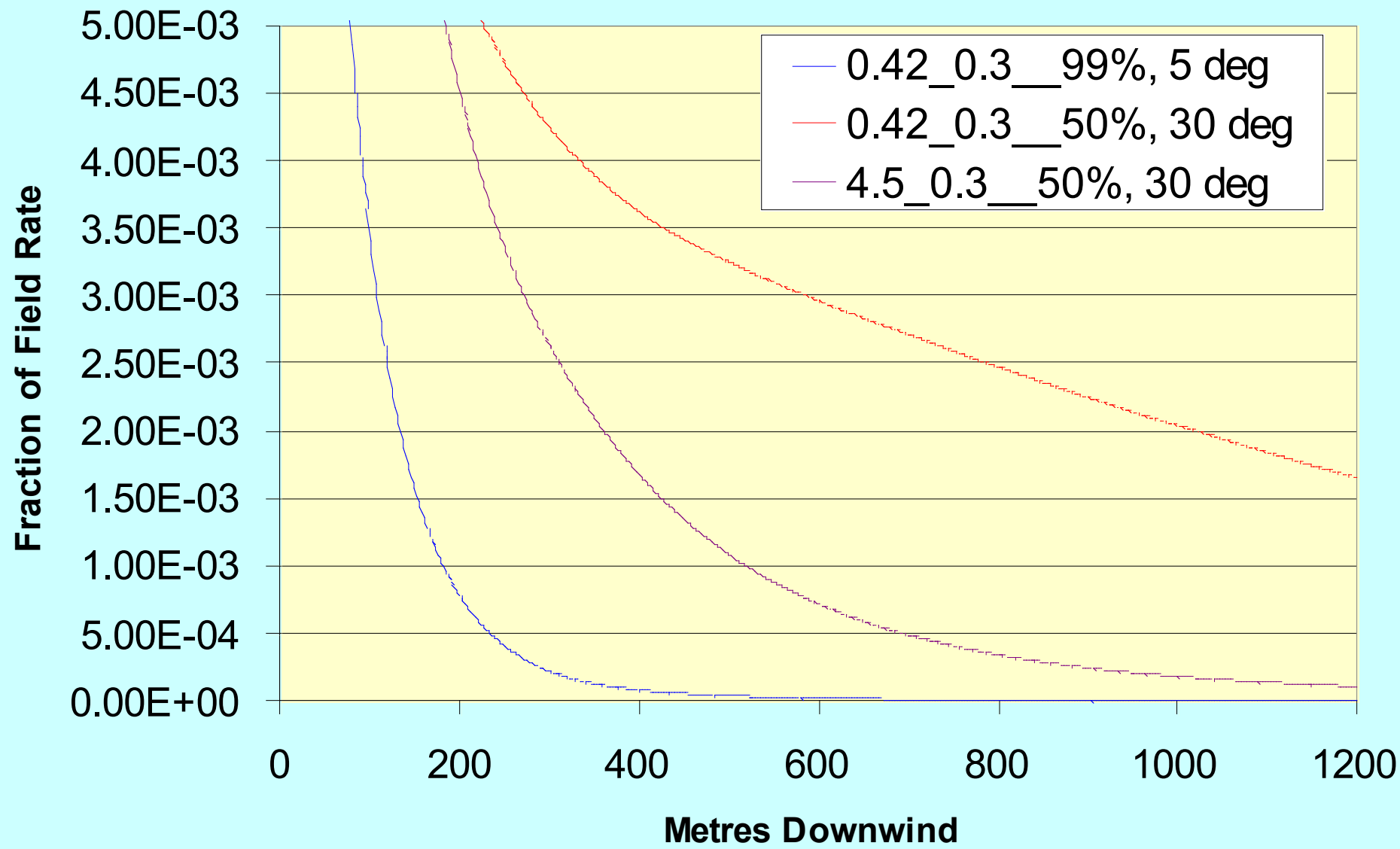
- [Forestry Helicopter Herbicide - level - 5m height \(XLS, 203kb\)](#)
- [Forestry Helicopter Herbicide - level - 15m height \(XLS, 202kb\)](#)
- [Forestry Helicopter Herbicide - slope - 15m height \(XLS, 203kb\)](#)
- [Forestry Helicopter Insecticide - level - high canopy \(XLS, 271kb\)](#)
- [Forestry Helicopter Insecticide - slope - high canopy \(XLS, 271kb\)](#)



## NonVolatile Rates at 50% Humidity & 30 Deg



## Compare Evaporation Potential



## Scenarios in Each Group

### Ground Application

The ground deposition data provided in this section is based on a large reference data set from studies conducted in the USA in conjunction with the US Environmental Protection Agency.

The studies were grouped into the 11 categories shown in these scenarios and a 'best fit' curve was applied for each group. These reference curves were built into a spray drift assessment software program called AgDRIFT which was used to produce the deposition data.

#### *Airblast*

- [Airblast - composite orchard \(XLS, 37kb\)](#)
- [Airblast - dense orchard \(XLS, 37kb\)](#)
- [Airblast - normal orchard \(XLS, 37kb\)](#)
- [Airblast - sparse orchard \(XLS, 37kb\)](#)
- [Airblast - vineyard \(XLS, 38kb\)](#)

#### *High Ground Boom*

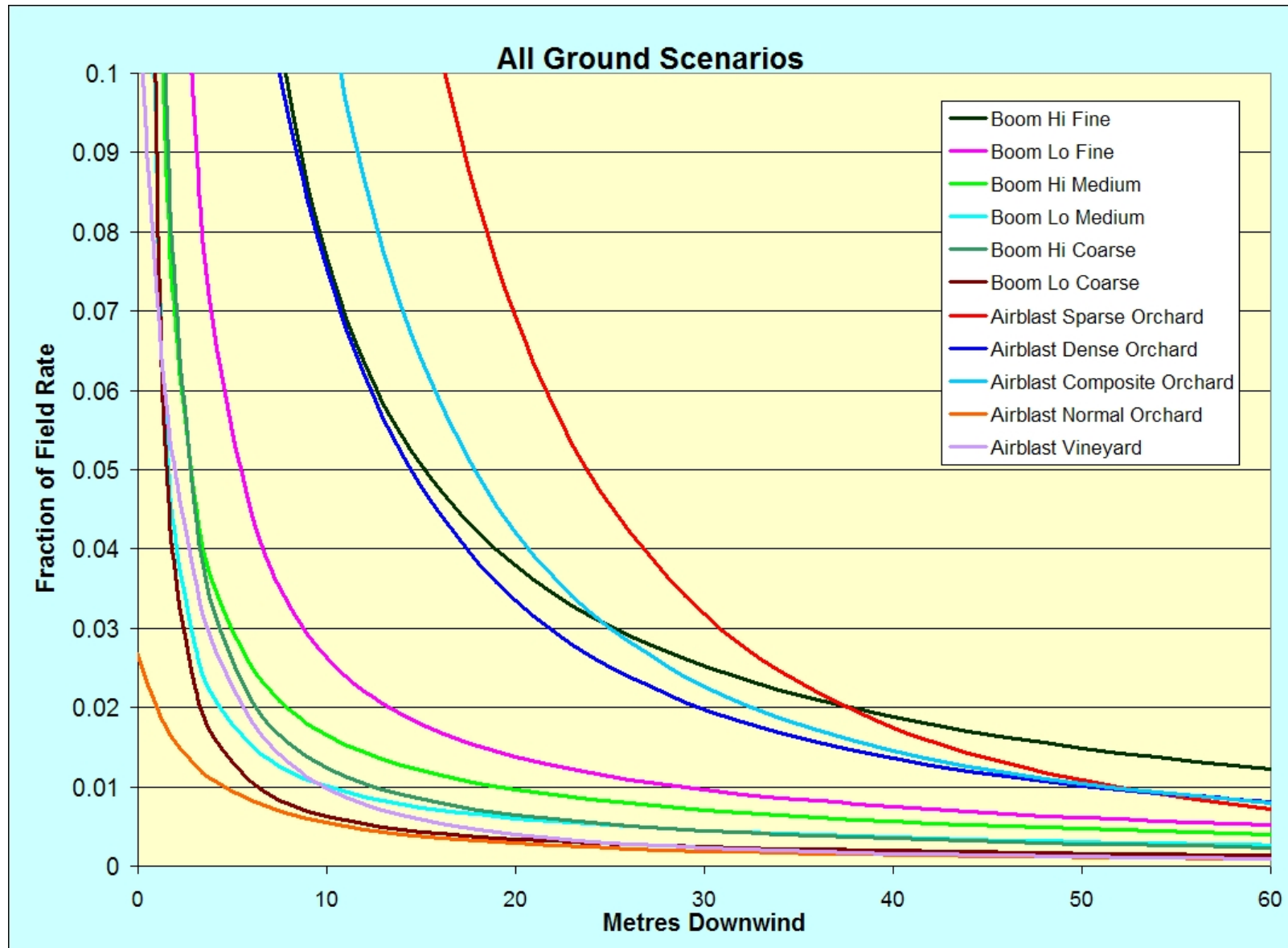
- [High ground boom - Coarse \(XLS, 37kb\)](#)
- [High ground boom - Medium \(XLS, 37kb\)](#)
- [High ground boom - Fine \(XLS, 37kb\)](#)

#### *Low Ground Boom*

- [Low ground boom - Coarse \(XLS, 37kb\)](#)
- [Low ground boom - Medium \(XLS, 37kb\)](#)
- [Low ground boom - Fine \(XLS, 37kb\)](#)



# Examples of typical drift deposition profiles



# Principal Label Restrictions

---

Mandatory label statements include:

- Required use of largest spray droplet size compatible with efficacy – specified as a standard spectrum – currently within ASABE S572 (more on this later....)
- Limits on wind speed or other weather conditions during spraying
- Imposition of protective downwind no-spray zones (buffer zones) when necessary

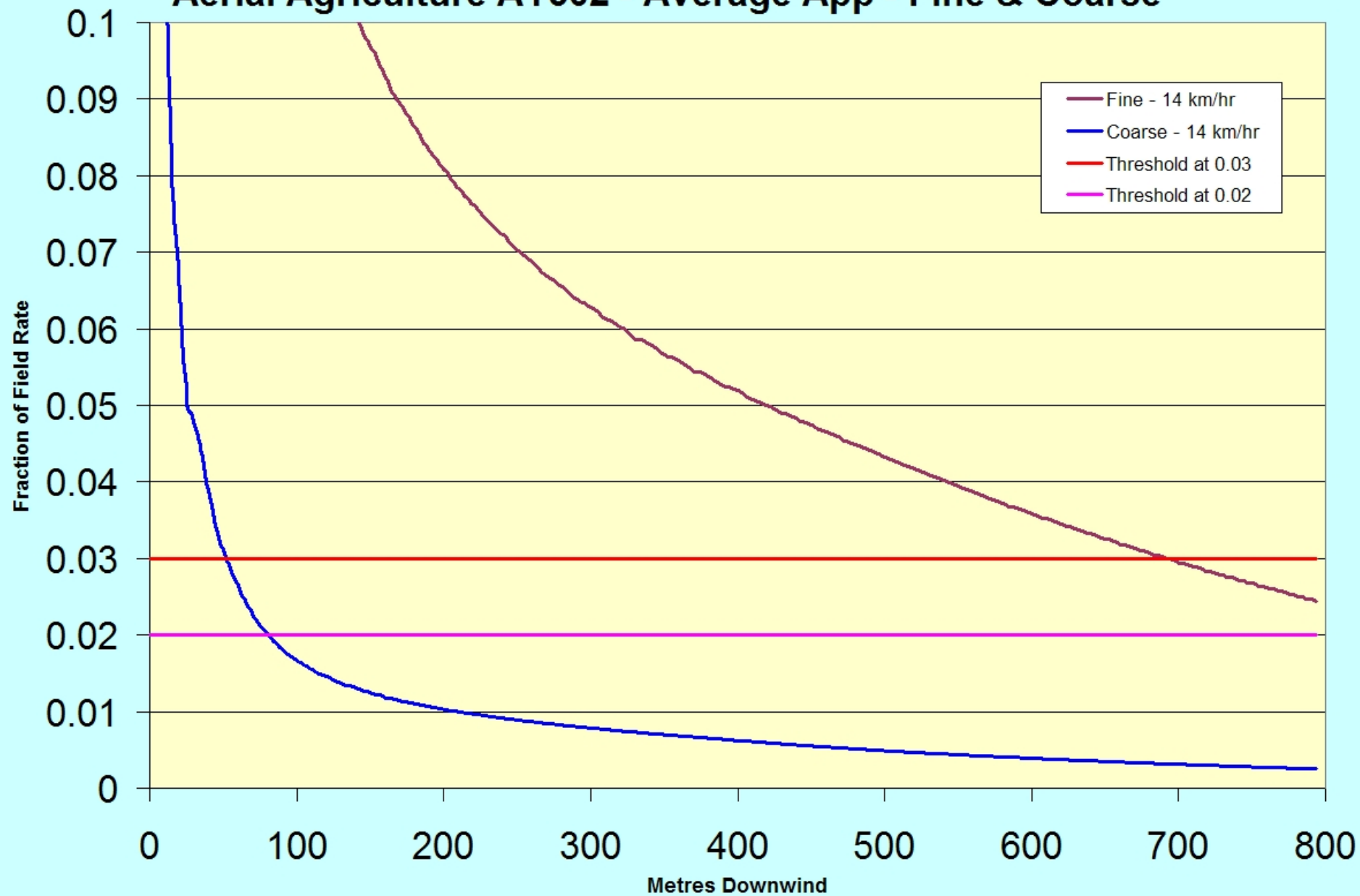
# Mandatory No-Spray Zones

---

Mandatory no-spray zones (buffer zones) exist only in the downwind direction at the time of spray application

- Labels might have a different no-spray zone for each of the three major risk categories
- The size of a no-spray zone is based on estimated spray drift deposition linked to an acceptable risk-threshold based on scientific studies

## Aerial Agriculture AT502 - Average App - Fine & Coarse



# **Systematic Label Reviews**

---

Targeted label revisions of older products for spray drift risk have recently begun

- A large number of old products need to be reviewed – perhaps more than 2,000
- This massive task is expected to require four to five years

# Example Wind Speed Restriction Statement

---

**DO NOT** apply when wind speed is less than 3 or more than 20 kilometres per hour at the application site.

# Example Weather Condition Restriction Statement

---

**DO NOT** apply during surface temperature inversion conditions at the application site.


# Example Droplet Size Restriction Statement

---


**DO NOT** apply with spray droplets smaller than a **COARSE** spray droplet category according to “*APVMA Compliance Instructions for Mandatory COARSE Spray Droplet Size*” located under this title in the GENERAL INSTRUCTIONS section of this label.

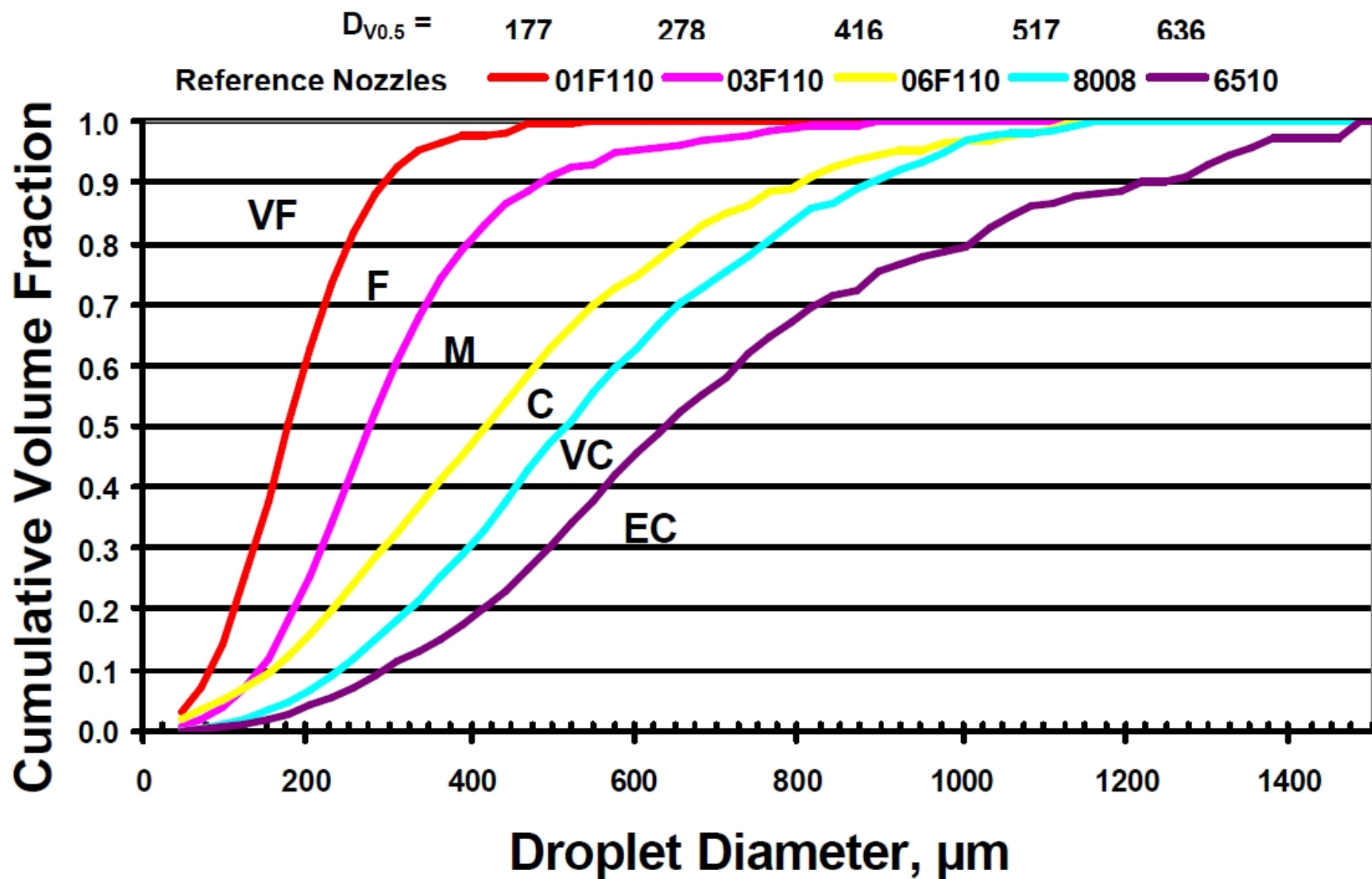


## Turbo TeeJet® (TT)

	bar										
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
TT11001	C	M	M	M	F	F	F	F	F	F	F
TT110015	C	C	M	M	M	M	M	F	F	F	F
TT11002	C	C	C	M	M	M	M	M	M	M	F
TT11003	VC	C	C	C	C	M	M	M	M	M	M
TT11004	XC	VC	C	C	C	C	C	C	M	M	M
TT11005	XC	VC	VC	VC	C	C	C	C	C	M	M
TT11006	XC	VC	VC	VC	C	C	C	C	C	C	M
TT11008	XC	XC	VC	VC	C	C	C	C	C	C	M

## AI TeeJet® (AI) and AIC TeeJet® (AIC)

	bar											
	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5
AI110015	VC	VC	VC	VC	C	C	C	C	C	C	C	C
AI11002	VC	VC	VC	VC	VC	C	C	C	C	C	C	C
AI110025	XC	VC	VC	VC	VC	VC	VC	C	C	C	C	C
AI11003	XC	XC	VC	VC	VC	VC	VC	VC	C	C	C	C
AI11004	XC	XC	VC	VC	VC	VC	VC	VC	VC	C	C	C
AI11005	XC	XC	XC	VC	VC	VC	VC	VC	VC	C	C	C
AI11006	XC	XC	XC	VC	VC	VC	VC	VC	VC	VC	C	C
AI11008	XC	XC	XC	XC	VC	VC	VC	VC	VC	VC	C	C





# $D_{v0.x}$ and Classification

- The previous graph showed that the finest  $D_{v0.9}$  value for any of the ASABE size categories is close to 300  $\mu\text{m}$ . There is general consensus among researchers that the driftable fraction of sprays is close to half this value. Therefore  $D_{v0.9}$  is of no practical use in assessing spray drift risk
- Similarly, the  $D_{v0.5}$  values are all above 250  $\mu\text{m}$  except for the VF/F boundary which is already considered a very fine spray, so even  $D_{v0.5}$  is of little value for assessing spray drift risk in most cases
- APVMA therefore clarified that for aerial applications the parameter of use for classification is the  $D_{v0.1}$

# Example Human Health No-Spray Zone Restriction Statement

---

**DO NOT** apply when there are people, structures that people occupy or parks and recreation areas within **xxx metres** downwind from the application area.

# Example Aquatic Environment No-Spray Zone Restriction Statement

---

**DO NOT** apply if there are aquatic and wetland areas including aquacultural ponds or surface streams and rivers within **xxx metres** downwind from the application area.

# Example Terrestrial Environment No-Spray Zone Restriction Statement

---

**DO NOT** apply if there are sensitive crops, gardens, landscaping vegetation, protected native vegetation or protected animal habitat within **zzz metres** downwind from the application area.

# Example Trade Risk No-Spray Zone Restriction Statement

---

**DO NOT** apply if there are livestock, pasture or any land that is producing feed for livestock within **xxx metres** downwind from the application area.



**Australian Government**  
**Australian Pesticides and  
Veterinary Medicines Authority**

## **Operational Notice**

### **New registration application and label requirements in relation to spray drift management**

#### **Purpose**

This notice is issued to announce changes to previous label conventions for statements related to spray drift management and to explain how those changes should be implemented. These changes are an extension of the APVMA's spray drift policy framework *APVMA Operating Principles In Relation To Spray Drift Risk*<sup>1</sup> published in July 2008, its linked regulatory impact statement<sup>2</sup> and further supporting technical information published in September 2008<sup>3</sup>.

The broad changes explained in this notice came into use by the APVMA with the publication of its spray drift policy framework in July 2008. This notice sets out in greater detail how registrants and applicants should comply with those changes.

Note that the APVMA may require additional changes in future notices as new scientific information becomes available.

**Date of Effect of this Operational Notice: 1 March 2010**

#### **Part A. New spray drift related application requirements**

- 1. New requirement for registration applications to nominate a specific spray droplet size category that must appear on product labels**



## DIRECTIONS FOR USE

### RESTRAINTS

**DO NOT** XX

**DO NOT** XX

**DO NOT** XX

**DO NOT** XX

These represent a range of ordinary Restraint Statements tailored to the particular product to deal with efficacy issues or other global restraints. Spray Drift Restraints immediately follow.

### SPRAY DRIFT RESTRAINTS

**DO NOT** apply with spray droplets smaller than a **COARSE** spray droplet size category according to “*APVMA Compliance Instructions for Mandatory COARSE or Larger Droplet Size Categories*” located under this title in the GENERAL INSTRUCTIONS section of this label.

**DO NOT** apply when wind speed is less than 3 or more than 20 kilometres per hour as measured at the application site.

**DO NOT** apply during surface temperature inversion conditions at the application site.

Users of this product **MUST make an accurate written record** of the details of each spray application within 24 hours following application and **KEEP** this record for a minimum of 2 years. The spray application details that must be recorded are: **1** date with start and finish times of application; **2** location address and paddock/s sprayed; **3** full name of this product; **4** amount of product used per hectare and number of hectares applied to; **5** crop/situation and weed/pest; **6** wind speed and direction during application; **7** air temperature and relative humidity during application; **8** nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application; **9** name and address of person applying this product. (Additional record details may be required by the state or territory where this product is used.)

### MANDATORY NO-SPRAY ZONES

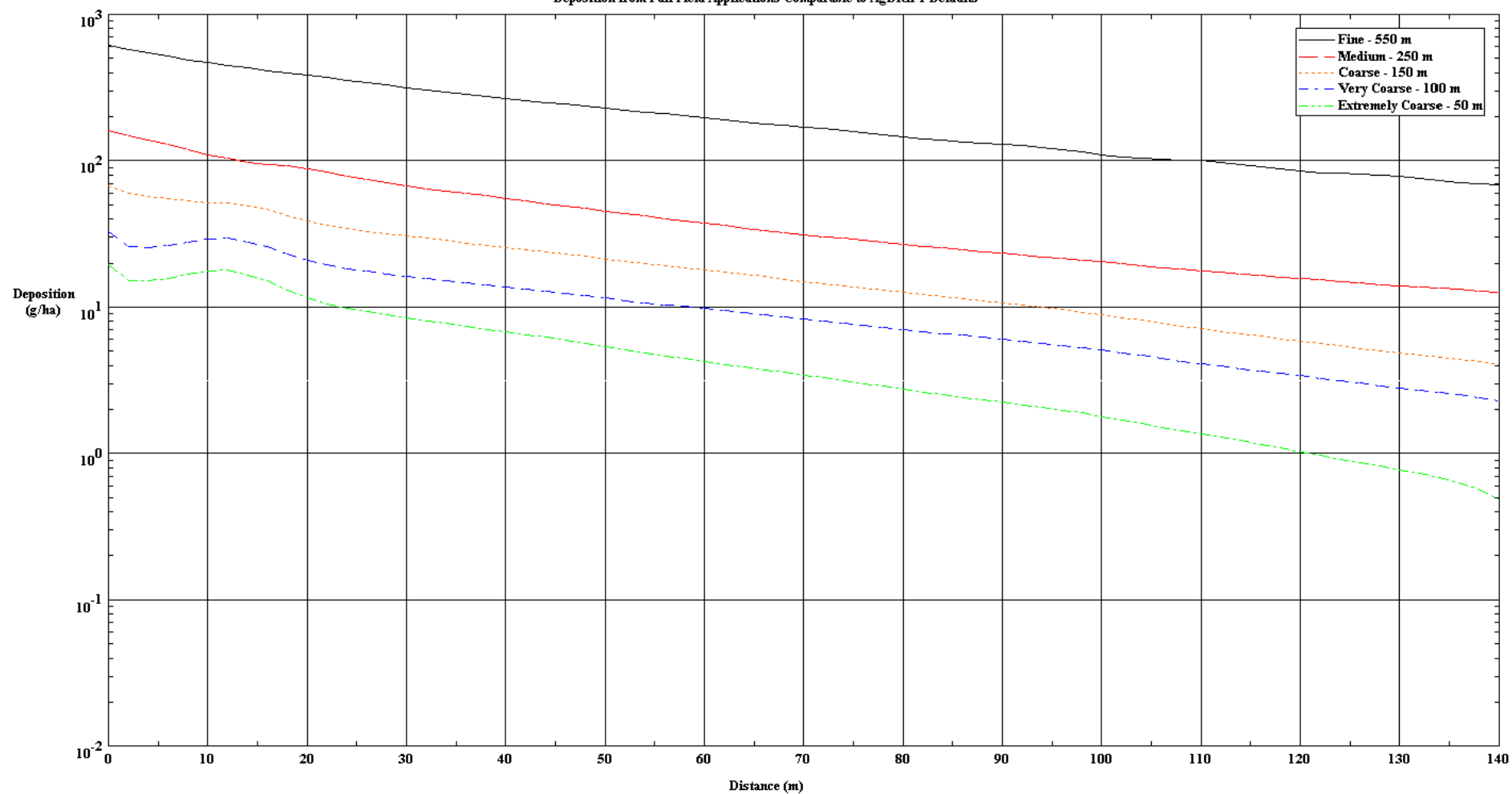
**DO NOT** apply if there are aquatic and wetland areas including aquacultural ponds, surface streams and rivers downwind from the application area and within the **mandatory no-spray zones** shown in Table 2 below.

<b>Table 2 – No-Spray Zones for Protection of the Aquatic Environment</b>		
<b>FOR AERIAL APPLICATION</b>		
<b>Wind Speed Range at Time of Application</b>	<b>Downwind Mandatory No-Spray Zone</b>	
	<b>Fixed-Wing</b>	<b>Helicopter</b>
from 3 to 8 kilometres per hour	XXX metres	MMM metres
from 8 to 14 kilometres per hour	YYY metres	PPP metres
from 14 to 20 kilometres per hour	ZZZ metres	QQQ metres
<b>FOR GROUND APPLICATION</b>		
from 3 to 20 kilometres per hour	WWW metres	

**DO NOT** apply if there are sensitive crops, gardens, landscaping vegetation, protected native vegetation or protected animal habitat downwind from the application area and within the **mandatory no-spray zones** shown in Table 3 below.

<b>Table 3 – No-Spray Zones for Protection of the Terrestrial Environment</b>		
<b>FOR AERIAL APPLICATION</b>		
<b>Wind Speed Range at Time of Application</b>	<b>Downwind Mandatory No-Spray Zone</b>	
	<b>Fixed-Wing</b>	<b>Helicopter</b>
from 3 to 8 kilometres per hour	XXX metres	MMM metres
from 8 to 14 kilometres per hour	YYY metres	PPP metres
from 14 to 20 kilometres per hour	ZZZ metres	QQQ metres
<b>FOR GROUND APPLICATION</b>		
from 3 to 20 kilometres per hour	WWW metres	

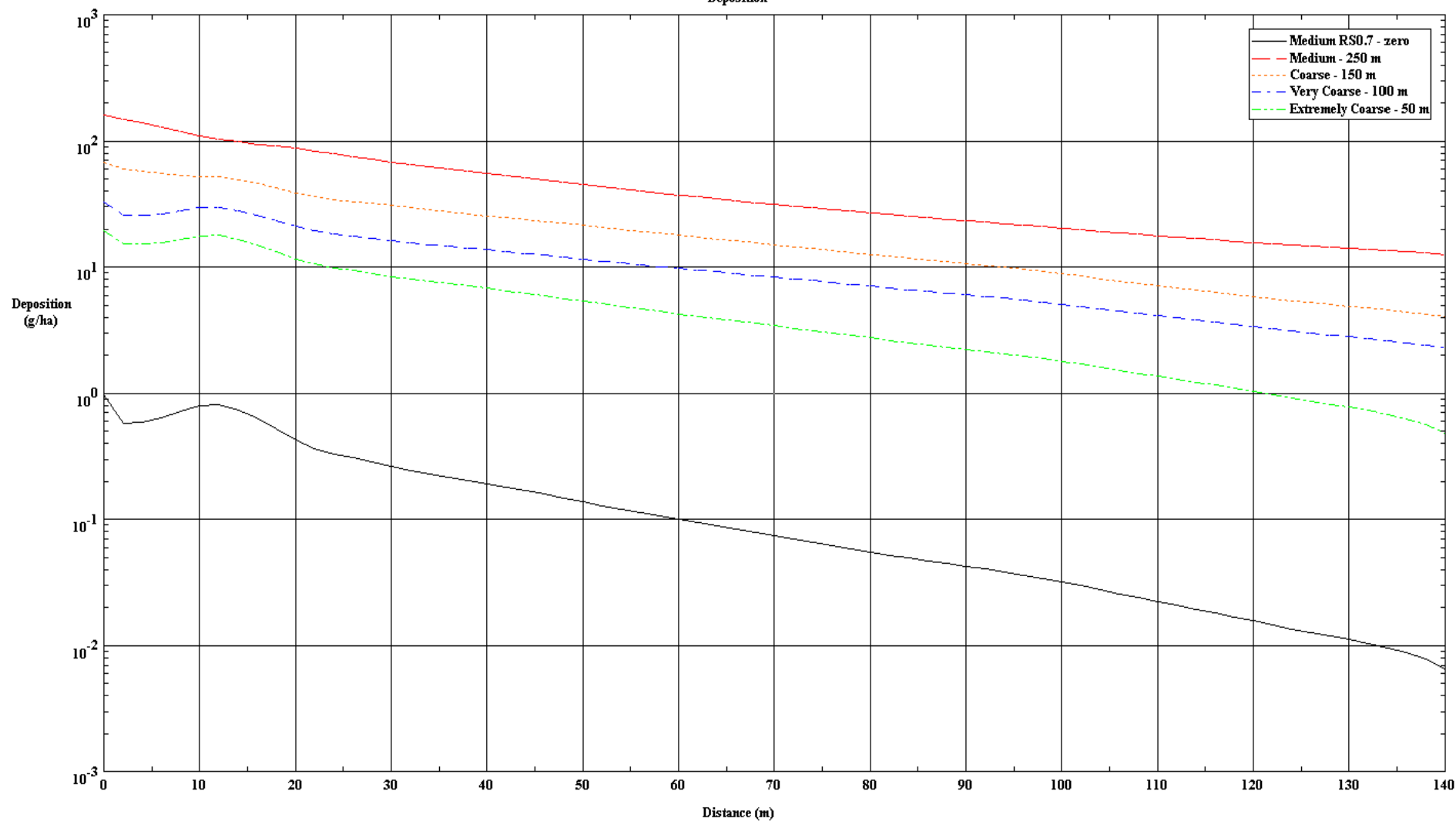
Example of Very Approximate No-Spray Buffer Zones for 2,4-D Applied as Different Droplet Size Categories by Ground Using AGDISP  
Deposition from Full Field Applications Comparable to AgDRIFT Defaults



# Droplet Size ( $D_{v0.1}$ focus) as a DRT

Medium Spray with DRT for  $D_{v0.1}$ / Fines

Deposition



# Conclusions

- Australia is basing the classification of sprays for drift mitigation in its regulations on the ASABE S-572 scheme with clarification that the parameter of importance for aerial spray classifications is the Dv0.1
- A drift reduction technology program is under development for aerial and ground spraying and ongoing work by the grains and horticulture industries as well as the registrants and other groups as part of a National Working Party on Pesticide Application is providing data on spray classification and DRT performance as well as extensions to ground drift modeling
- Australia is keen to collaborate and work with international groups on spray research and modeling, especially in North America as there are so many similarities in spraying there