



Government of **Western Australia**
Department of **Health**
Public and Aboriginal Health Division

Pesticides Monitoring Exclusion Policy

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Introduction

The National Health and Medical Research Council's *Australian Drinking Water Guidelines* (ADWG)¹ advises that "ensuring drinking water safety and quality requires the application of a considered risk management approach".

The ADWG also includes an expanded list of pesticides that may be relevant to drinking water supplies in Australia, with a total of 155 listed in the 2011 update. For the ADWG, the term 'pesticides' includes agricultural chemicals such as insecticides, herbicides, nematicides, rodenticides and miticides.

Likewise, the document "*Public Sector Circular 88 Use of Herbicides in Water Catchment Areas*", also known as PSC 88² and endorsed by the Department of Health on 29 August 2006, has been established for the purpose of protecting surface and ground water sources that are used as sources of water for human consumption in Western Australia from contamination by herbicides. The document is a best practice policy statement that applies to all Western Australia government departments and their contractors. PSC 88 also sets out a definition for the term "water catchment area" that applies in Western Australia.

In light of the risk management framework set out in both ADWG and PSC 88, the Department of Health Western Australia has developed a risk-based routine monitoring approach for pesticides in drinking water catchment areas in Western Australia which:

- eliminates testing requirements for some pesticides, as their inherent chemical properties mean they are unlikely to be retained in catchments, or they are not registered for use in Western Australia; and
- assigns land use categories, allowing a water supplier to target those pesticides which are more likely to be relevant, based on current and historical land-use activities in and surrounding the catchment area.

Considering both ADWG and PSC 88 together, this **Pesticides Monitoring Exclusion Policy** sets out those pesticides which can be excluded from routine catchment monitoring program of drinking water suppliers in Western Australia and provides a methodology for developing a risk based monitoring approach for the remainder.

This Pesticides Monitoring Exclusion Policy should be read in the context of the overall risk management framework set out in the "*Australian Drinking Water Guidelines*". It may be applied to any drinking water catchment, but is principally focussed on surface water catchments and ground water catchments that may be affected by surface land use activities. It does not apply to responses to spills, incidents, misadventure or similar emergencies.

¹ Details at: www.nhmrc.gov.au/guidelines/publications/eh52

² Details at: http://ww2.health.wa.gov.au/Articles/A_E/Drinking-water-catchment-management

Pesticide exclusion process

A total of 157 pesticides, including the herbicide fluazifop-p-butyl referenced in PSC 88 and the deregistered hexachlorobenzene (in addition to the 155 listed in the ADWG), were reviewed to identify opportunities for exclusion.

The categories for exclusion and corresponding criteria used in the review were as follows:

Instability

- Solubility in water, in milligrams per litre (mg/L) at 20 degrees Celsius (°C).
- Leachability, based on the Groundwater Ubiquity Score (GUS), which was used to rank pesticides for their potential to move toward groundwater. GUS is an experimentally calculated value using solubility in water and half-life in soil, which in reality is affected by temperature, moisture, organic matter, soil type etc. A GUS value of 2.8 was considered high, therefore greater potential for the pesticide to move toward groundwater.
- Those pesticides with solubility less than 500 mg/L at 20°C and a leachability index of less than 2.8 were excluded, as the potential for detection in a drinking water catchment is considered to be unlikely.

Low half-life

- Those pesticides whose half-life in soil, where the time in days required for the pesticide to be detected at half of its original concentration was less than 60 days, were excluded, as the potential for detection in a drinking water catchment is considered to be unlikely.

No registration

- Those pesticides that are not registered for use in Western Australia by the Australian Pesticides and Veterinary Medicines Authority (APVMA)³ have been excluded.
- This list requires annual review and will be amended as appropriate.

³ The APVMA is responsible for assessing all pesticides (including insecticides, herbicides, nematicides, rodenticides and miticides), prior to registration to allow sale and use in Australia.

Details at: <https://apvma.gov.au/>

Table 1 Pesticides which have been excluded from routine monitoring due to instability, low half-life or are currently not registered for use in Western Australia.

Exclusion due to instability	Exclusion due to low half-life	Exclusion due to no registration for use in WA
Benomyl	Acephate	2,4,5-T
Captan	Bentazone	Bromophos ethyl
Carboxin	Chloropicrin	Carbophenothion
Carfentrazone ethyl	Endothal	Chloroxuron
Dicofol	Metham (Na salt)	Difenoquat
Diflubenzuron	Methylbromide	Diphenamid
EPTC	Metiram	EDB
Haloxyfop	Naphthalophos	Ethoprophos
Iprodione	Profenofos	Fenchlorphos
Mancozeb	Trichlorfon	Fenoprop
Metaldehyde		Fensulfothion
Nicarbazin		Formothion
Pebulate		Fosamine
Propanil		Hexaflurate
Quintozene		Methoxychlor
Spirotetramat		Monocrotophos
Terbufos		Molinate
Tetrachlorvinphos		Nitralin
Thiobencarb		Pentachlorophenol
Thiometon		Primiphos-ethyl
Thiram		Promecarb
		Propazine
		Pyrazophos
		Sulprofos

No usage / detection

- The ADWG lists six pesticides which are de-registered, but are considered persistent organic pollutants and of significant concern to human health, with occasional detections occurring in catchment areas.
- Where there is ten years of historical monitoring data (or equivalent period of historical monitoring data having due regard for spatial and seasonal variability) confirming the absence of a pesticide listed in Table 2 from a specific catchment, that pesticide may also be excluded from routine monitoring requirements.
- This needs to be determined on a catchment by catchment basis.

Table 2 Pesticides which may be excluded if there is a record of monitoring with no detections.

Exclusion if there is a record of monitoring with no detections
Aldrin
Chlordane
Dieldrin
DDT
Hexachlorobenzene
Lindane

Developing a monitoring program

Prior to developing a routine monitoring program for any drinking water supply system, the drinking water source and the likelihood of pesticide exposure in the catchment area needs to be considered. Deep, protected aquifers are unlikely to have any exposure to pesticides, whereas surface water catchments or shallow, unconfined aquifers situated in a large basin with intensive anthropogenic activity have a higher likelihood of exposure.

The extent to which existing legislation protects the catchment should also be considered, for example, proclamation of an underground water pollution control area, catchment or water reserve as a Public Drinking Water Source Area⁴ in Western Australia.

Drinking water suppliers in Western Australia **do not need** to routinely monitor catchment areas for those pesticides listed in Table 1.

The remaining pesticides, including those in Table 2, have been assigned to their applicable land use categories, based on the claims made by the manufacturer on the product label (see Tables 3 to 6).

Drinking water suppliers **are required** to develop a pesticides monitoring program which gives due consideration to those pesticides which are not listed in Table 1, and are encouraged to use the land use categories and advice in this Policy document as a guide.

Assessing land uses

The following 11 land use categories have been established to assist during the catchment risk assessment process in identifying pesticides listed in Tables 3 to 6 that may be in use, or have historically been in use, in or surrounding particular drinking water catchments:

- Agriculture (animals including pastures/feedlots)
- Agriculture (cropping)
- Agroforestry
- Water bodies (pontoons, boats and water vessels)
- Commercial/Industrial
- Disease risk areas (quarantined off; Phytophthora)
- Horticulture (orchards, market gardens)
- Crown land (National Park, State Forest, Crown reserves)
- Residential development (urban and rural)
- Viticulture
- Weed management (weed control in turfed areas, parks, recreation areas, road verges and infrastructure).

A drinking water catchment may incorporate several land use categories.

⁴ Details at: www.water.wa.gov.au/urban-water/drinking-water/proclaiming-public-drinking-water-source-areas

Monitoring frequency

The ADWG advises that water quality characteristics deemed unlikely to be present on the basis of a thorough risk assessment require very infrequent monitoring, or no monitoring at all.

If pesticides have previously been detected or investigation into their presence is ongoing, monthly or quarterly sampling may be appropriate. Seasonal fluctuations in temperature, and significant rainfall events, should also inform the timing and frequency of monitoring.

Observational catchment monitoring should supplement the chemical testing program, e.g. checking for spillage, appropriate application usage, and storage of pesticides. Table 9.5 of ADWG provides a generic guide to monitoring frequency for drinking water quality characteristics. Monitoring frequencies and characteristics for individual systems should be adjusted as needed, based on ongoing review of the water supply system and risk assessment. Chapters 9 and 10 of ADWG also provide more detailed advice about monitoring generally.

Persistent detection of pesticides may indicate inappropriate use or accidental spillage, and investigation is required in line with established procedures in the risk management plan for the particular water source. Drinking water suppliers also need to be aware of, and consider monitoring for illegal, deregistered or off-label pesticide use, in water catchment areas.

Where pesticides are intentionally applied to drinking water supplies or catchments areas, or inadvertently as a result of a spill, misadventure or emergency use, concentrations should be checked to ensure they are within safe levels. Deviations from the guideline values over a short period do not necessarily mean that the water is unsuitable for consumption. However, any pesticide detection should trigger an investigation.

Within the context of aiming to minimise pesticide contamination of drinking water, it should be noted that a small number of pesticides have been approved by the APVMA for the management and control of pests including insects and insect larvae in drinking water supplies. An example is s-methoprene, which has been approved for use as a larvacide in rainwater tanks. In circumstances where pesticides (particularly herbicides) are intentionally applied to or near drinking water supplies, drinking water concentrations should be monitored to ensure that concentrations are within safe levels.

For licensed drinking water providers in Western Australia, the monitoring frequency is to be set out in documents prepared by the drinking water provider pursuant to the Memorandum of Understanding for Drinking Water between the provider and the Department of Health. For other drinking water suppliers, it should be recorded in the Drinking Water Quality Management Plan.

In any event, drinking water providers (and Western Australia Government agencies and their contractors) shall not use herbicides in water catchment areas except in accordance with the provisions of PSC 88 “*Use of Herbicides in Water Catchment Areas*”.

Table 3 Land use categories and pesticides recommended for routine monitoring

Agriculture - animals (includes pastures/ feedlots)			Agriculture - cropping			
2,4-D	Fipronil	Toltrazuril	2,4-D	Dichloroprop	Metribuzin	Methidathion
Amitraz	Fluazifop	Triclopyr	Aldicarb	Dichloropropene	Metsulfuronmethyl	Methiocarb
Amitrole	Flupropanate	Lindane*	Amitrole	Diclofopmethyl	Omethoate	Methomyl
Atrazine	Glyphosate		Asulam	Dimethoate	Oryzalin	Triadimefon
Bromoxynil	Hexazinone		Atrazine	Diquat	Paraquat	Trifluralin
Carbaryl	Maldison		Bromoxynil	Disulfoton	Pendimethalin	Vernolate
Chlorfenvinphos	MCPA		Carbendazim	Diuron	Permethrin	Lindane*
Chlorpyrifos	Methidathion		Carbofuran	Endosulfan	Picloram	
Clopyralid	Methiocarb		Chlorantraniliprole	Esfenvalerate	Pirimicarb	
Cyfluthrin	Methomyl		Chlorfenvinphos	Fenamiphos	Propiconazole	
Cypermethrin	Metribuzin		Chlorothalonil	Fenitrothion	Propyzamide	
Deltamethrin	Metsulfuronmethyl		Chlorpyrifos	Fenvalerate	Pyrasulfotole	
Diazinon	Permethrin		Chlorsulfuron	Fipronil	Pyroxsulam	
Dicamba	Picloram		Clopyralid	Flampropmethyl	Simazine	
Dimethoate	Piperonylbutoxide		Cypermethrin	Fluazifop	Terbutylazine	
DPA	Polyhexanide		Deltamethrin	Fluometuron	Terbutryn	
Ethion	Propyzamide		Diazinon	Glyphosate	Triclopyr	
Fenitrothion	Temephos		Dicamba	Hexazinone	Maldison	
Fenvalerate	Terbutryn		Metolachlor	Imazapyr	MCPA	

Table 4 (cont'd) Land use categories and pesticides recommended for routine monitoring

Horticulture				Residential development		
2,4-D	Norflurazon	Dicamba	Triclopyr	2,4-D	Diquat	Permethrin
Aldrin / dieldrin*	Omethoate	Dichlobenil	Trifluralin	Aldrin / Dieldrin*	Diuron	Piperonylbutoxide
Amitrole	Oryzalin	Dimethoate	Vernolate	Amitrole	DPA	Primiphos methyl
Azinphosmethyl	Oxamyl	Diquat	Methidathion	Atrazine	Fenamiphos	Propyzamide
Bromacil	Parathion (ethyl)	Diuron	Methiocarb	Bioresmethrin	Fenthion	Simazine
Carbaryl	Parathion-methyl	DPA	Methomyl	Bromoxynil	Fenvalerate	Temephos
Carbendazim	Pendimethalin	Endosulfan	Metolachlor	Carbaryl	Fipronil	Terbutylazine
Carbofuran	Permethrin	Esfenvalerate	Metribuzin	Chlorpyrifos	Fluazifop	Triclopyr
Chlorantraniliprole	Piperonylbutoxide	Fenamiphos	Chlordane*	Cyfluthrin	Fluazifop-p-butyl	
Chlorfenvinphos	Pirimicarb	Fenarimol	Lindane*	Cypermethrin	Glyphosate	
Chlorothalonil	Propachlor	Fenthion		Deltamethrin	Heptachlor	
Chlorpyrifos	Propargite	Fenvalerate		Diazinon	Hexazinone	
Clopyralid	Propiconazole	Fipronil		Dicamba	Maldison	
Cyfluthrin	Propyzamide	Fluazifop		Dichlobenil	MCPA	
Cypermethrin	Simazine	Glyphosate		Dichloroprop	Methiocarb	
Metsulfuron methyl	Cyprodinil	Hexazinone		Dichloropropene	Metsulfuronmethyl	
Mevinphos	Deltamethrin	Maldison		Dichlorvos	Omethoate	
Napropamide	Diazinon	Triadimefon		Dimethoate	Paraquat	

Table 5 (cont'd) Land use categories and pesticides recommended for routine monitoring

Agroforestry		Commercial / Industrial		National parks		Disease risk area (Phytophthora)
2,4-D	Hexazinone	Ametryn	Flupropanate	2,4-D	Chlordane*	Etridiazole
Amitrole	Imazapyr	Amitrole	Glyphosate	Amitrole	Lindane*	Thiophanate
Atrazine	Maldison	Bioresmethrin	Hexazinone	Chlorsulfuron		
Carbaryl	MCPA	Bromacil	MCPA	Clopyralid		
Carbendazim	Metsulfuron methyl	Chlorpyrifos	Metsulfuron methyl	Dicamba		
Chlorothalonil	Paraquat	Clopyralid	Permethrin	Diclofopmethyl		
Chlorpyrifos	Pendimethalin	Cyfluthrin	Piperonylbutoxide	Diquat		
Chlorsulfuron	Permethrin	Cypermethrin	Pirimiphosmethyl	Fluazifop		
Clopyralid	Simazine	Diazinon	Propargite	Fluazifop-p-butyl		
Cypermethrin	Terbacil	Dicamba	Simazine	Glyphosate		
Diazinon	Terbutylazine	Dichlobenil	Triclopyr	Hexazinone		
Dicamba	Trichlorfon	Diclofopmethyl		Imazapyr		
Diclofopmethyl	Triclopyr	Diquat		MCPA		
Dimethoate		Diuron		Metsulfuron methyl		
Diquat		Esfenvalerate		Paraquat		
Fipronil		Fenthion		Picloram		
Fluazifop		Fenvalerate		Simazine		
Glyphosate		Fipronil		Triclopyr		

Table 6 (cont'd) Land use categories and pesticides recommended for routine monitoring

PSC88	Viticulture	Water bodies	Weed management
2,4-D	Amitrole	Diuron	2,4-D
Amitrole	Carbendazim		Amitrole
Fluazifop-p-butyl	Chlorothalonil		Bromacil
Glyphosate	Chlorpyrifos		Bromoxynil
Hexazinone	Cypermethrin		Chlorothalonil
Triclopyr	Cyprodinil		Chlorpyrifos
Metsulfuron methyl	Dichlobenil		Chlorsulfuron
	Dimethoate		Clopyralid
	Esfenvalerate		Cypermethrin
	Fenarimol		Diazinon
	Fenvalerate		Dicamba
	Fipronil		Diclofopmethyl
	Glyphosate		Fenamiphos
	Napropamide		Fipronil
	Norflurazon		Fluazifop
	Oryzalin		Glyphosate
	Parathion (ethyl)		Hexazinone
	Permethrin		Imazapyr
	Simazine		MCPA
	Triadimefon		Metsulfuron methyl
			Pendimethalin
			Picloram
			Propyzamide
			Simazine
			Triclopyr
			Chlordane*

Analytical laboratories

The following laboratories in Western Australia have National Association of Testing Authorities (NATA)⁵ accreditation for analytical testing of a range of pesticides in drinking water:

Laboratory	Contact details
Australian Laboratory Services Pty Ltd	www.alsglobal.com (08) 9406 1301 26 Rigali Way WANGARA WA
Analytical Reference Laboratory (WA) Pty Ltd	www.arlwa.com.au (08) 6253 4444 46-48 Banksia Road WELSHPOOL WA
Chemistry Centre WA	enquiries@chemcentre.wa.gov.au (08) 9422 9800 Resources and Chemistry Precinct, Manning Road BENTLEY WA
MPL (Envirolab Services)	wwwmpl.com.au (08) 9317 2505 16-18 Hayden Court MYAREE WA
SGS	www.au.sgs.com (08) 9373 3500 28 Reid Road PERTH AIRPORT WA

⁵ Details at: www.nata.com.au/

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