AGRICULTURAL and RURAL AVIATION GUIDANCE NOTE

Introduction

The agricultural and rural aviation industry (the "industry") provides services to primary production activities and associated rural activities through applying agrichemicals, fertilisers and Vertebrate Toxic Agents (VTAs)[1] from the air from both fixed wing aircraft (aeroplanes) and helicopters. The aerial application of these substances has the potential to cause adverse environmental effects if not adequately managed. The potential adverse effects primarily relate to the discharge of these substances but can also relate to land-based issues such as storage, reverse sensitivity and the generation of noise.

The industry is subject to a number of legislative requirements. The focus of this guidance note is to highlight the key resource management issues under the Resource Management Act 1991 (RMA) associated with the industry and how these must be considered by councils in relation to other relevant legislation, particularly the Hazardous Substances and New Organisms Act (HSNO Act).

Under the RMA, regional councils and territorial authorities both have roles and responsibilities for managing the effects of the industry. Regional councils are primarily responsible for managing the discharges associated with the industry, whereas territorial authorities are primarily responsible for the management of land-based amenity issues such as noise. Most industry operators work in a number of different regions so have to comply with a range of plan provisions and controls which can increase the complexity of their operations if plans are not well aligned and managed.

This guidance note provides a background to the industry, outlines relevant industry best practice standards, and provides guidance on how industry operations can be managed through regional or district plans to address actual and potential adverse effects. This note outlines the nature and type of discharges associated with the industry and recommends a risk assessment/management approach to manage the actual and potential effects of these discharges based on appropriate performance standards. It also provides guidance on managing adverse effects and amenity issues associated with the land-based components of the industry's operations.

Purpose of the guidance note

This guidance note sets out the key resource management issues associated with the industry and methods to manage the associated potential adverse effects. The purpose of this guidance note is to:

- Raise the knowledge and understanding of the industry and the nature of its operations among RMA practitioners.
- Outline relevant legislation that applies to the industry in order to raise awareness amongst RMA practitioners as to the scope of controls in regional and district plans.
- Outline relevant industry best practice and Codes of Practice and how these can be used to help manage adverse effects.

[1] VTAs are commonly referred to as bait. This guidance note provides information on the management of the VTA that is applied aerially most often - 1080 applied as cereal bait or carrot bait. This guidance note does not address applications of other VTAs (including pindone pellets) or non-aerial applications of VTAs.

- Provide an overview of the matters that councils could consider when developing plan provisions to manage adverse effects and enable the industry to operate in a sustainable manner.

The guidance note is intended to help councils develop plan provisions and resource consent conditions that will manage potential adverse effects on the environment and deliver positive outcomes from both a council and industry perspective. It promotes a risk based approach to manage discharges associated with the industry's operations, coupled with the ability to demonstrate (verify) if required, how any environmental risks will be, or were, managed. Additional Technical Information relating to the Agricultural Aviation Industry is provided on the New Zealand Agricultural Aviation Association (NZAAA) website to support this risk management approach and to provide further information on industry best practice.

Scope and structure of the guidance note

The guidance note focusses on managing the environmental effects associated with the aerial application of the three main products associated with the industry: fertiliser, agrichemicals and VTAs. It outlines the nature of these discharges, relevant risk factors and exposure pathways that may lead to adverse effects. It then sets out options to manage the effects of these discharges. Related land use matters that are generic to the application of all three groups of substances and aircraft are also addressed in this guidance note, including aircraft noise, storage and reverse sensitivity. Fertilisers, agrichemicals and VTAs may also be applied by ground based methods but these methods are not addressed in this guidance note as the potential effects of ground application and associated management tools are different to aerial applications.

The guidance note is structured as follows:

- **The agricultural aviation industry** – an overview of the industry within New Zealand.

- **The environmental legislative context for the agricultural aviation industry**– focusing on roles and responsibilities under the RMA and how these relate to other relevant legislation, particularly the HSNO Act.

- **The key resource management issues associated with the agricultural aviation industry** - including the actual and potential adverse effects associated with these issues.

- **A risk management approach to address resource management issues associated with the agricultural aviation industry** – a description of a risk management approach and how it could be applied to address the key resource management issues associated with the industry.

- **Managing discharges from the industry operations -** three specific discharges are addressed:
    - Fertilisers;
    - Agrichemicals; and
    - VTAs – note that this guidance note ***does not promote or provide options for managing VTAs in district and regional plans.*** Rather, councils are encouraged to pursue this matter under the HSNO Act pursuant to the findings of the Parliamentary Commissioner for the Environment.

These sections outline the nature and potential effects of the aerial application of these substances. They also identify the relevant risk factors and exposure pathways and provide guidance on managing the effects using a risk management approach.

- **Use of land for agricultural aviation activities and managing reverse sensitivity arising these activities** –guidance on how to manage land-based issues associated with the industry's operations, including provision for rural airstrips and helicopter landing areas, aircraft noise, storage, loading and mixing and reverse sensitivity.

There is much technical information and terminology associated with the industry which has the potential to cause confusion. It can also create issues for the industry where inappropriate terminology is used in plan provisions. In this document, preferred definitions have been provided for fertilisers, agrichemicals, VTA, and a glossary is provided to clarify other key terminology used in this guidance note. Links to the NZAAA website are provided to support this guidance note, particularly in terms of relevant legislation and Technical Information relating to the Agricultural Aviation Industry. This technical information also includes a diagram in Appendix 3 which illustrates the relationship between the various terms.

Development of the Guidance Note

This guidance note was initiated in 2011 by NZAAA. NZAAA is an industry body which represents approximately 72% of New Zealand's pilots, operators and aerial organisations that hold Civil Aviation Authority (CAA) agricultural aviation certificates, and is a division within the Aviation Industry of New Zealand (AIA). Funding for a project entitled "Environmental Best Practice in Agricultural and associated Rural Aviation" was obtained from the Sustainable Farming Fund (project # 11/076) and stakeholder organisations to develop this guidance note.

The development process involved regional meetings with councils, operators and stakeholders where key issues and management options were identified. Workshops were also held with pilots and operators at NZAAA conferences. Feedback on draft material was sought from the stakeholder group, which included industry, councils, and related industries such as horticulture, agriculture and environmental organisations. This guidance note has subsequently been considered and peer reviewed by planning practitioners, industry representatives, Ministry for the Environment, the Environmental Protection Authority, Ministry for Primary Industries, the Department of Conservation, regional councils and WorkSafe New Zealand.

The agricultural aviation industry

Industry overview

Aerial agricultural operators apply three main types of substances where ground based application is not possible, or not the most efficient or effective means of application; agrichemicals, fertilisers and VTAs. Aerial application has also been used to apply substances for bio-security purposes, such as the eradication of painted apple moth in Auckland.

Aerial operations can be from either fixed wing aircraft (aeroplanes) or helicopters. The type of aircraft used will depend on the nature of the task to be undertaken and the target area. For instance, helicopters are better suited to follow complex boundaries, such as setbacks from streams or watercourses, whereas fixed wing aircraft are suitable for applications over larger areas.

There are approximately 50 fixed wing aircraft and 250 helicopters (as measured in 2014) that undertake agricultural aviation work in New Zealand. There are no restrictions on what area of the country an operator can work, with many operators working in a number of regions throughout New Zealand. Each year about 129,000 hours of flying time (helicopters and fixed wing) can be attributed to agricultural work, with a trend towards more helicopter hours (approximately 70% of total flying time) and less fixed wing hours. For more information on the industry, refer to Technical Information relating to the Agricultural Aviation Industry.

Industry regulations and best practice

There are a range of relevant industry regulations, codes, and best practice standards that operators comply with.

In terms of **flight safety**, agricultural aviation is regulated by the CAA General Aviation Group. CAA operates a rules based system, and all operators and pilots are required to comply with the standards set by these rules. To operate an aircraft for agricultural aviation purposes a pilot requires a Pilot Agricultural Rating from CAA which permits the pilot to operate at low levels. It is a flight safety requirement.

Environmental management is a key component of industry regulations and best practice. Pilots require a Pilot Chemical Rating issues under Civil Aviation Rule Part 61 to undertake discharges from an aircraft.

Environmental management is addressed by the industry through various programmes, standards and codes of practice. Some are approved by regulatory authorities to meet specific legislative and regulatory requirements, while others have been developed as good practice. The most common programmes and standards are:

Agrichemicals:

- NZS8409: Management of Agrichemicals – an approved code of practice by the EPA (HSNO COP3) and NZFSA.

Fertiliser:

- Farm Airstrips and associated fertiliser cartage, storage and application: safety guidelines, Department of Labour and CAA.
- Code of Practice for Nutrient Management.

- Fertmark Code of Practice.
- The Aerial Spreadmark Code of Practice.

VTAs:
- Safe Handling of Pesticides: Standard Operating Procedures, produced for DOC
- Code of Practice for the Aerial Application of Vertebrate Toxic Agents (part of AIRCARE™ accreditation programme).
- Aerial 1080 Pest Control Industry Guidelines, National Pest Control Agencies.
- Guidelines for the Safe Use of Sodium Fluoroacetate (1080), Department of Labour.

Noise:
- AIRCARE™ Environmental COP for Aircraft Operations - Noise Abatement which is based on Fly Neighbourly guideline (produced by Helicopter Association International).

Quality Assurance Programmes - there are three systems currently in place for general and agricultural aviation (excluding airlines):
- Individual aviation operator-created systems that are audited against AS/NZS 4801:2001 (ACC WSMP) or the International Mining or Oil and Gas Producers. Both are focused on aviation rule compliance, SMS, experience and people.
- AIRCARE™ is an integrated accreditation programme for all of an aviation business, which brings flight safety and environmental management together into one safety assurance programme. There are three parts to the programme: pilot competency, safety management system and third party audit. It is audited by Navigatus against their industry based standard Further information on AIRCARE™ is provided in the Appendix.
- The Aviation Industry Group (AIG) system uses a similar structure as AIRCARE™ with safety manuals and codes of practice. This system is designed to achieve the ACC WSMP requirements.

The environmental legislative context for the agricultural aviation industry

A number of pieces of legislation manage the environmental effects associated with the agricultural aviation industry. The RMA and HSNO Act are most relevant to managing substances that the agricultural aviation industry discharges. The HSNO Act manages specific hazardous substances and new organisms across their life cycle, while the RMA manages environmental effects associated with the industry's activities (a wider range of substances as well as land use matters such as noise). The Agricultural Compounds and Veterinary Medicines (AVCM) Act 1997 and Health and Safety in Employment (HSE) Act 1992 also play a role in managing the substances that the industry uses.

This section outlines the relevance of the legislation to the industry and summarises the interactions between the legislation (focussing on the implications for planning under the RMA).

Resource Management Act 1991 (RMA)

Both regional councils and territorial authorities have responsibilities for managing the effects of agricultural aviation activities under the RMA.

Section 30 of the RMA sets out the functions of regional councils which include the control of discharges of contaminants into or onto land, to air or into water. It includes the control of the use of land for the purpose of maintaining and enhancing the quality of water which may, in the context of

agricultural aviation, include controlling the loading of contaminants and sites where contaminants are mixed.

Regional council responsibilities are further addressed by section 15 of the RMA which sets out requirements for discharges of contaminants to the environment. In this context, discharges include agrichemicals, fertilisers and VTAs discharged to air, onto or into land where it may enter water, or directly into water. These substances fall within the definition of contaminants under the RMA. Resource consent is required for the discharge of contaminants unless it is specifically permitted by a rule in a regional plan. Regional plans often include permitted activity rules to enable discharges of these substances, subject to conditions and/or performance standards.

Under section 31 of the RMA, territorial authorities have primary responsibility for managing the effects of land use activities, including impacts on amenity values arising from those activities. In the context of the agricultural aviation industry, the most common amenity issue or concern relates to noise from aircraft. However, it is important to note that under the RMA, territorial authorities do not control aircraft noise while the aircraft is in flight, as this is managed under the Civil Aviation Act and related rules. Therefore territorial authorities are limited to managing aircraft noise associated with airports, airstrips and landing areas. Some territorial authorities include rules in their district plans to manage the effects of land use associated with rural aviation, including noise associated with airstrips and landing areas.

Regional councils and territorial authorities both have responsibilities for preventing or mitigating the adverse effects of the storage, use, disposal or transportation of hazardous substances, where it is considered that the HSNO Act does not adequately address resource management issues within the region or district. Territorial authorities have the primary responsibility for managing these substances unless the regional policy statement specifies otherwise (s62(1) (i) of the RMA). It is therefore important that controls relating to hazardous substances are aligned across regional and district functions and they do not duplicate controls under the HSNO Act. This matter is elaborated on in the 'implications for planning under the RMA' section below.

Hazardous Substances and New Organisms Act 1996 (HSNO)

The HSNO Act is administered by the Environmental Protection Authority (EPA). The purpose of the HSNO Act is to "*protect the environment, and the health and safety of people and communities by preventing or managing the adverse effects of hazardous substances and new organisms*". It is New Zealand's primary legislation for managing hazardous substances and new organisms across their life cycle (from import/manufacture, transport, storage, use and disposal).

The HSNO Act defines hazardous substance as any substance with one or more of the following intrinsic properties – explosiveness, flammability, capacity to oxidise, corrosiveness, toxicity (including chronic toxicity), and ecotoxicity, which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any one or more of the properties specified above.

All hazardous substances, including fertilisers, pesticides[2] and VTAs, must be approved under the HSNO Act before they can be imported or manufactured in New Zealand. Individual approvals must be sought from the EPA for agrichemicals and VTAs. Under the HSNO regulations there is provision for group standard approvals for hazardous substances of a similar nature, type or use. Group standards

[2] EPA and the HSNO Act refer to "pesticides" which include herbicides, fungicides, insecticides, detergents, sanitisers, VTA's timber treatments, animal remedies and fumigants. "Agrichemicals" is a term used to describe herbicides, fungicides, insecticides, detergents, sanitisers. Refer to the 'definition of agrichemical' section of this guidance note and Appendix 3 in Technical Information relating to the Agricultural Aviation Industry.

set out conditions that enable a group of hazardous substances to be managed safely by applying a nationally consistent set of controls that must be followed. Most domestic and workplace chemicals (except for pesticides, veterinary medicines, timber treatment chemicals and VTAs) are approved under group standards. There are specific group standards for fertilisers which establish nationally consistent controls that must be followed when using these fertilisers. Lists of group standards are available on the EPA website.

The individual approval process is referred to as a HSNO assessment, which has two key steps:

- Hazard classifications are assigned to a hazardous substance which is based on Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001 and Hazardous Substances (Classification) Regulations 2001.
- Controls are placed on the substance according to its hazard classification and any additional risks the substance may pose. These controls may apply to the use, storage, transportation, equipment requirements, labelling, and disposal of the hazardous substance. Any person using a hazardous substance must comply with these controls and to not do so is an offence under the HSNO Act.

For more information on HSNO classes, controls and regulations see Technical Information relating to the Agricultural Aviation Industry on the NZAAA website and the Hazardous Substances section on the EPA website.

Changes to the regulation of hazardous substances

In 2016 there will be a change to how hazardous substances are regulated. The new workplace health and safety regime will come into force during 2015-2016 with the Health and Safety at Work (HSW) Act. As part of these changes, there will be new HSW regulations describing how hazardous substances must be addressed in workplaces (for example how they must be handled and stored).

This change will mean that:

- The EPA will no longer set rules (controls) on the workplace use of hazardous substances, these will be set in regulations under the HSW Act.
- The EPA will still set the controls under the HSNO Act for labelling, packaging, safety data sheets, consumer product content (i.e. allowable levels) and disposal regardless of where the hazardous substance is to be used. The EPA will also set environmental and non-workplace public health controls.
- In the workplace, WorkSafe New Zealand will enforce the controls under the HSW Act and environmental and disposal controls set under the HSNO Act.

The EPA is also proposing to develop a new classification system based on the United Nations Globally Harmonised System of Classification and Labelling of Chemicals. This will replace the regulations referenced above.

More information and updates on the new workplace health and safety regime are available on the Ministry of Business Innovation and Employment and WorkSafe New Zealand websites.

Agricultural Compounds and Veterinary Medicines Act 1997 (ACVM)

The ACVM Act is administered by the Ministry for Primary Industries (MPI). Under the ACVM Act, MPI manages agricultural compounds in relation to risks that these compounds may pose to trade in primary produce, animal welfare, agricultural security and public health. The ACVM Act also ensures

residues comply with domestic residue standards and consumer information is provided on agricultural compounds.

Products are required to be registered under the ACVM Act unless they are exempt from registration under Regulations. Registration requires the manufacturer to provide data on efficacy, residues, product chemistry and safety on their product. This data is assessed in relation to the risks managed under the ACVM Act and appropriate controls or conditions are placed on the registered product. Those products exempt from registration under Regulations have to comply with conditions outlined in the Regulations. Pesticides and VTAs require registration, while fertilisers are exempt from registration.

Product labels are approved as part of the registration process and establish the framework within which a substance can be used. The label contains the critical information for the end-user to use the product effectively and safely. The focus of the label relates mainly to HSNO and ACVM Acts; it does not contain all the legal requirements that are covered under other legislation such as the RMA.

Health and Safety in Employment Act 1992 (HSE)

The purpose of the HSE Act is to promote the prevention of harm to people at work, and others in the vicinity of places of work. The HSE Act manages the exposure of people to identified hazards to reduce risk. In the aviation sector the Civil Aviation Authority administers the HSE Act, as well as the Civil Aviation Act 1990 and related rules. CAA is also a delegated enforcement agency for HSNO.

As noted in the 'changes to the regulation of hazardous substances' section, a new workplace health and safety regime will come into force during 2015-2016 with the HSW Act and associated regulations. The Ministry of Business Innovation and Employment and WorkSafe New Zealand websites should be referred to for up-to-date information on these changes.

Interaction between legislative requirements

It is important to understand both the primary role of, and interaction between, the various pieces of legislation that regulate the agricultural aviation industry to ensure that controls are aligned and duplication is avoided. The areas of commonality in the legislation outlined above relate to the management of substances used by the industry.

The roles of the key legislation in relation to the use of substances can be summarised as:

- **HSNO Act** - addresses risks to the environment, people, and communities by conducting thorough risk, cost and benefit assessment on specific hazardous substances so that the overall benefits are balanced against potential risks. Through this assessment controls are applied to the hazardous substance to prevent or manage adverse effects of it.
- **RMA -** identifies and manages potential adverse effects on the environment associated with the discharge of the substances (contaminants) through the use of plan provisions and resource consent conditions. These controls can be applied at any geographic level.
- **ACVM Act** - manages risks of agricultural compounds on primary produce, animal welfare, agricultural security and public health by establishing controls and conditions on them.
- **HSE Act** - manages the exposure of people to identified hazards in their workplace[3].

[3] The HSW Act will change the way hazardous substances are regulated when it comes into force during 2015-2017. Details are provided on the Ministry of Business Innovation and Employment and WorkSafe New Zealand websites.

Conditions or controls relating to the use of agrichemicals, fertilisers and VTAs can be applied under all of these Acts. Therefore, the potential exists for duplicating requirements for operators under the RMA, HSNO Act and ACVM Act, which can lead to increased complexity and compliance costs if these requirements are not well aligned. Where appropriate controls exist under other legislation such as the HSNO, ACVM and HSE Acts, it is unnecessary for RMA policies and plans, or conditions of consent, to duplicate these requirements. For example:

- In most circumstances HSNO controls should manage the risks from the discharge of substances used by the industry and therefore controls under the RMA are not required (see the 'implications for planning under the RMA' section below).
- HSNO Act controls and classifications can inform the tracking of VTAs and the storage and management of substances, such as group standards for fertiliser, therefore controls under the RMA may not be required.
- Label requirements set by the ACVM and HSNO Acts form the basis for outlining the risk a substance poses and how a substance should be used and managed. However not all controls may be specified on labels (this may not be physically possible) and for this reason safety datasheets and product safety cards (NZS 8409) are designed for users and contain more comprehensive information for HSNO controls to ensure that substances are adequately managed.
- NZS8409:2004 Management of Agrichemicals is an approved Code of Practice under HSNO that is also relevant to the management of agrichemicals under the RMA because it sets out best practise on safe, responsible and effective management as to how these substances can be used, stored, transported and disposed.

Implications for planning under the RMA

The RMA and HSNO Acts are the main legislation relevant to managing substances that the agricultural aviation industry discharges, and must therefore be considered together when examining the risks that the aerial application of agrichemicals, fertiliser and VTAs pose. The potential overlap in controls between the two Acts is explicitly recognised in section 142 of the HSNO Act, and the policy tool for minimising this overlap is provided in section 32 of the RMA which requires an evaluation of the appropriateness, effectiveness and efficiency of plan provisions.

Section 142 of the HSNO Act requires every person exercising a power or function under the RMA relating to the storage, use, disposal or transportation of hazardous substances to comply with any HSNO requirements. However, section 142 also gives councils the ability to impose more stringent requirements in regional or district plans if it is deemed "necessary" for the purposes of the RMA.

More stringent requirements in regional or district plans are likely to relate to area-specific circumstances. This reflects the difference between the HSNO Act which controls specific substances irrespective of where they are used, compared to the RMA which controls the effects of activities on the environment (and hence has a geographic focus). Potential situations where additional controls on substances used in agricultural aviation may be necessary under RMA plans or as consent conditions include:

- Managing potential effects on sensitive activities or sensitive natural environments.
- Managing reverse sensitivity.
- Managing cumulative effects from storage of hazardous substances. Location Test Certificates may be required and will include all hazardous substances stored on a site.
- Managing cumulative effects from repeat or long-term use.

The Quality Planning guidance note on Managing Hazardous Substances – interface between the Hazardous Substances and New Organisms Act and the RMA states that the "***inclusion of hazardous substance controls in plans should be the exception rather than the rule, and only included when a rigorous section 32 analysis shows that these controls are justified***".

Under the RMA any new or amended provisions in a plan must be justified in a section 32 evaluation. A section 32 evaluation requires councils to consider the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the RMA, and whether the proposed policies, rules and other methods are the most appropriate way to achieve the objectives by identifying other reasonably practicable options for achieving the objectives and assessing the efficiency and effectiveness of the provisions in achieving the objectives.

In the context of hazardous substances, one of the most important section 32 considerations is whether controls are required under the RMA or whether HSNO controls on the particular substance will sufficiently manage potential environmental effects. Compliance with HSNO is compulsory if there is a conflict between controls (s142 of HSNO) and HSNO requirements should not be duplicated in regional or district plans. If a council considers that RMA controls are required, these controls should specifically address those matters where HSNO does not address identified resource management issues. The rationale for these more stringent controls should also be specifically assessed and documented through the section 32 evaluation.

More information on the relationship between HSNO and RMA controls is provided on the Quality Planning website (Managing Hazardous Substances – interface between the Hazardous Substances and New Organisms Act and the RMA). Guidance on section 32 evaluations is provided on the Ministry for the Environment's website (A Guide to Section 32 of the RMA).

Key resource management issues associated with the agricultural aviation industry

This section outlines the nature of the agricultural aviation industry operators, the potential environmental effects from these operations, and the challenges this presents for developing appropriate management approaches under the RMA. It also outlines the key resource management issues associated with the agricultural aviation industry and some important considerations when developing methods and provisions to address these issues.

The nature of agricultural aviation activities

In order to develop appropriate management methods and controls under the RMA it is important to understand the outcomes sought from agricultural aviation operations and the numerous parameters affecting these operations. This is because the outcomes councils are seeking to achieve when managing the effects of industry discharges are often similar to the outcomes industry is seeking to achieve through discharging the selected product.

For an aerial agricultural application to be successful it is dependent on accuracy:

- The right product being discharged at the right rate.
- At the right place.
- At the right time.

The challenge is to develop appropriate provisions and conditions that adequately provide for this successful application in a way that achieves councils' outcomes in terms of managing the potential adverse effects from the aerial application of the selected product.

Importantly, no two situations will be the same for the aerial application of fertilisers, agrichemicals and VTAs and an operator must assess a range of variable factors to ensure that an accurate application is achieved.

The key variables affecting aerial applications relate to weather conditions (e.g.: wind speed and direction, and temperature), the target plants or animals, and the nature of the target area and surrounding location. To assist in achieving accuracy and to manage risks, aerial operators use a range of tools and methods such as GPS, calibration, nozzle selection, and pattern testing to certify equipment swath width and spread evenness. Operators also seek to undertake their activities only when the weather conditions suit. The assessment of a specific situation will determine which tools an operator uses to address the risks that the situation presents.

Public perceptions of the industry can be exacerbated by the visibility of an aircraft discharging substances and the height and speed at which a discharge is made. For example, a low-flying aircraft may lead to the perception that the degree of risk and potential adverse effect is significant and therefore the activity should be highly regulated.

Confusion can arise from the variable use of terms to describe or refer to the same substance which can raise concerns and have implications on the management approaches for that substance. For example, is the substance a pesticide, an agricultural compound, an agrichemical or a hazardous substance? Appendix 3 in Technical Information relating to the Agricultural Aviation Industry demonstrates the linkage between the various terms.

The issues above and the fact that there are a range of variables affecting industry operation presents a challenge for councils in developing plan provisions and controls that both provide flexibility for different situations, while providing enough certainty to achieve the outcomes sought. A risk assessment/management approach by the party carrying out the operation – in this case the aerial operator – is an effective approach to manage these issues. This approach also provides flexibility in how desired outcomes are to be achieved which is important given the range of variables involved. This approach has proven to be effective because it deals with specific situations to allow decisions to be made to address the risks and potential adverse effects that situation presents and achieve the outcomes sought by the industry and councils.

Resource management issues and potential adverse effects from agricultural aviation activities

There are a number of key resource management issues and associated effects related to agricultural aviation activities that councils need to consider and manage. This includes:

- Off-target drift and potential adverse effects.
- Discharges into water bodies.
- Advice and information before and after discharges.
- Reverse sensitivity effects.
- Amenity issues such as noise.
- Effects on Māori cultural values.

The focus of the RMA is on managing the risk of environmental effects of an activity, rather than the activity itself, which is consistent with an outcome based approach sought by the industry. In terms of the discharge of agrichemicals, fertilisers or VTAs the potential adverse effects that need to be considered and managed include:

- Health effects.
- Contamination of crops and plants.
- Contamination of domestic or commercial water supplies.
- Contamination of indigenous flora and fauna, habitat areas and reserves.
- Contamination of wetlands, surface water body and coastal and marine environments.
- Contamination of groundwater.
- Contamination of soils/ land.
- Amenity values where the discharge creates an offensive and/or objectionable effect.

It is important to consider the scale and significance of the actual and potential adverse effects when developing plan provisions and imposing resource consent conditions. While agrichemicals, fertilisers and VTAs can all have adverse effects, the nature and degree of the potential adverse effects varies considerably due to the different nature of the substances and the sensitivity of the receiving environment the discharges are occurring within. For example, agrichemicals are designed to control pests whereas fertilisers are designed to assist plant growth. Both products have the potential to cause adverse effects through off-target drift but the consequences of such drift are significantly different. Agrichemicals are likely to damage a non-target crop but fertilisers are unlikely to cause such damage, although off-target drift of fertiliser onto an organic property could affect the organic registration of the property.

It is also important to consider area-specific situations when developing plan provisions and imposing resource consents. For example, the use of agrichemicals and VTAs is necessary to control weeds and animal pests in some areas that contain indigenous flora and fauna (such as in wetlands and on the Conservation estate).

The substance specific sections on fertilisers, agrichemicals and VTAs in this guidance note outline the nature of these substances and their potential adverse effects in more detail.

Potential for adverse effects from off-target drift

The two pathways that adverse effects may occur as a result of aerial application are direct application and indirect application, more commonly known as “off-target drift”. Off-target drift is where the substance being applied ends up in a place other than the target area. It can occur in both fertiliser and agrichemical applications, but the potential for off-target drift is less for VTAs because of the physical properties of the substance (i.e. large particle size and predictable trajectory from the point of release).

An operator seeks to apply the product at the correct rate to the target crop or area, so adverse effects from direct application should generally not arise. However, due to the range of variables affecting these operations off-target drift will inevitably occur in some situations and this is the most likely cause of adverse effects. Off-target drift is a key resource management issue for the industry because of the potential adverse effects that may arise, particularly in sensitive areas where people, water bodies and non-target property are exposed to the discharge. Off-target drift is also a major source of complaints associated with aerial applications.

The approach should focus on ways to minimise the risk of off-target drift and the potential for adverse effects from this drift on surrounding areas. It is appropriate for councils to identify this as an issue and

include supporting methods in plans to manage the potential adverse effects. However, determining how off-target drift occurs and how best to manage and avoid it is not a simple matter as there are a range of variables which all contribute to its occurrence, to a greater or lesser extent, depending on the circumstances. The five groups of important variables that contribute to off-target drift are:

a) Chemical composition (e.g. formulation or product type).
b) Physical characteristics (i.e. product quality - droplet size or particle size).
c) Release position (i.e. height above the ground /target).
d) Interception (by the target).
e) Meteorology (wind speed and direction).

These variables are either:

- **"Pre-determined factors"**– factors that do not change once the application has begun (e.g. spray nozzle type and hence droplet size); or
- **"Real-time factors"**– factors that can change while the application is occurring (e.g. wind speed and direction).

The distinction between pre-determined and real-time factors is important because the most significant factor causing adverse effects from off-target drift is almost always wind direction – a real-time factor. Further information on off-target drift is included in the Technical Information relating to the Agricultural Aviation Industry on the NZAAA website and the substance specific sections for agrichemicals, fertilisers and VTAs in this guidance note.

Potential for adverse effects from discharges into water bodies

Discharges of agrichemicals and fertilisers close to water bodies can be a resource management issue where these may enter water or onto land that enters water. Where this occurs, these discharges have the potential to cause adverse effects on the quality of the water body and its ecosystems, and on uses of the water body (e.g. drinking water supplies, irrigation). These discharges can occur through either direct application or indirectly through off-target drift.

Clear identification of water bodies and the proximity of aerial applications to these water bodies is a critical part of identifying the potential risk of direct application and off-target drift and ensuring that appropriate measures are taken to avoid discharges to water or onto land that may enter water. Some plans include specified setback distances as a means to reduce the risk of discharges entering water bodies. However, there often needs to be flexibility to ensure the setback distance can be varied and targeted to the circumstances of the individual situation based on the actual level of risk of discharges entering into the water body. Other activities associated with aerial applications, such as loading and mixing sites, also need to be located and managed to avoid potential adverse effects on water bodies.

Notwithstanding the above, there may be situations when substances are required to control weeds in wetlands. Aquatic herbicides are an example of one type of substance. The use of aquatic herbicides onto or into water is not a matter for regional and district plans as it is controlled by the EPA pursuant to section 95A of the HSNO Act.

The need for information and advice about discharges (e.g. notification)

People who may be adversely affected by an aerial application of agrichemicals, fertilisers and VTAs often want to be notified before a discharge is to occur and provided information on the nature of the discharge. Notification, or lack of it, is often a source of complaints about discharges from aerial

applications. Providing this notification and information often influences the perception and concerns of people about the aerial application so the provision of timely and appropriate advice can help address this issue and the potential for complaints/concerns. However, providing information and advice raises a range of issues relating to the different methods used, and the various obligations and responsibilities of councils, landowners and aerial operators.

For agricultural aviation operators, providing early notification of their operations can be problematic because operators fly onto a property to complete a task but do not meet directly with the neighbours or surrounding land owners. However, in the event of a complaint it is usually the aviation company that is identified. It is therefore important to obtain clarity and certainty about the obligations and responsibilities for notification of aerial applications. This should clearly identify who is responsible for undertaking the notification, who will be notified, the form of notification and the timeframes for this notice (this may be controlled under HSNO).

Potential for reverse sensitivity effects

Reverse sensitivity is a key resource management issue for a number of rural activities, including the agricultural aviation industry. Reverse sensitivity refers to the situation where new, incompatible activities constrain the operation or expansion of existing lawfully established activities. The new activity is "sensitive" to the effects of the existing activity, which can result in complaints to councils, and the risk of constraints being placed on those lawfully established activities.

In respect of agricultural aviation, reverse sensitivity usually involves complaints about the aerial application of agrichemicals, fertilisers and VTAs even though it is undertaken correctly (e.g. people may be concerned about the idea of it, or concerned by the noise or effect on their amenity in general). It is a particular issue in rural-residential areas or where the urbanisation of fringe areas has occurred. Reverse sensitivity can also occur between primary production activities, where one activity is sensitive to the substances being applied (e.g. vineyards amongst pastoral land uses or organic properties).

To help avoid reverse sensitivity, councils need to consider the compatibility of activities in different areas and their potential sensitivity to one another in order to reduce the potential for reverse sensitivity complaints. For more information see the 'reverse sensitivity' section of this guidance note.

Noise

The main potential adverse effect on amenity is associated with aircraft noise from aerial applications which can lead to concerns and complaints. The RMA limits councils to addressing the effects of aircraft noise at take-off and landing, not while in flight. It is important to acknowledge and communicate this to those who may raise concerns about the noise of aerial applications to help reduce the potential for complaints and concerns from surrounding land-uses. For more information see the 'aircraft noise' section of this guidance note.

Considerations in developing methods and plan provisions to address identified issues

Developing effective and appropriate plan provisions to manage agricultural aviation activities is complex as there are multiple variables that need to be considered for any aerial application. It is important to avoid overly complex and prescriptive plan provisions and consent conditions so there is an inherent tension about how to develop simple plan provisions and controls to manage a complex and variable activity. To ensure appropriate methods and plans provisions are developed there are a number of key considerations:

- Avoid duplication with other legislation, and only impose additional controls in plans where controls under other legislation are considered insufficient (refer to the section 32 evaluation discussion in 'implications for planning under the RMA').
- Ensure provisions recognise the multiple variables involved in aerial applications to ensure there is enough flexibility to accommodate different circumstances.
- Use a risk assessment/management approach expressed through controls and appropriate performance standards aimed at achieving clear outcomes sought.
- Provide alignment and consistency across regions and with adjoining councils where appropriate to avoid complexity for operators who work in a number of regions.
- Ensure there is recognition of the positive effects of agricultural aviation, such as pest control, increased or improved primary production and public health, when managing potential adverse effects from the industry.
- Ensure management controls and conditions are achievable and verifiable and do not impose undue constraints or compliance costs.
- Recognise that fertilisers, agrichemicals and VTAs are different so if they are to be managed in regional plans different provisions may be required for the different types of substances.
- Provide information on industry best practices and standards.
- Develop provisions that provide the flexibility to adapt over time and use best practice according to the circumstances of the situation.

The substance-specific sections in this guidance note provide more guidance on developing plan provisions to manage the adverse effects of discharging agrichemicals and fertilisers from air and background information on VTAs. The 'use of land' section provides more specific guidance on managing amenity and reverse sensitivity issues associated with the industry's land-based activities.

A risk management approach to address resource management issues associated with the agricultural aviation industry

Rationale for a risk management approach

Agricultural aircraft operate in an environment where many of the relevant parameters are variable over time and from place to place (e.g. wind speed, wind direction, temperature, location of the application target, the coverage required, and the surrounding activities and areas). Therefore it can be challenging to manage the effects of these operations through plan provisions and controls that will be appropriate for all situations.

Traditionally the approach has been to prescribe limits or specifications, such as how the operation should be carried out. Such a prescriptive approach assumes that compliance with requirements will achieve the desired outcomes and can often result in a complex suite of requirements to catch all possibilities, which may not actually adequately address the actual situation or achieve the desired outcomes.

This guidance note promotes a risk assessment/management approach to address the ***actual risk*** of the situation and the use of appropriate performance standards to achieve desired outcomes. This approach is intended to provide more flexibility in how outcomes are to be achieved while providing clear performance standards for operators to meet (e.g. "no fertiliser directly into water").

Adopting a risk management approach requires the person responsible for the discharge to assess the situation and circumstances and adopt appropriate procedures to ensure that risks are appropriately managed and the performance standards are achieved. For agricultural aviation activities, a risk management approach requires a pilot to:

- Undertake an assessment of the risk of the application which takes into account the nature of the substance being discharged and the actual (real time) situation.
- Choose appropriate actions to address and minimise the identified risks.
- Follow best practice when undertaking their operations and be able to verify that.

Under this approach a pilot must also accept the responsibility for the outcome and take all practicable steps to minimise the risk. If requested, a pilot should also be able to demonstrate how the activity was carried out and that the performance standard was achieved. For example:

- What discharges occurred?
- Where did the discharge go?
- What were the (weather/real time) conditions at the place and time of application?

The methods adopted and requirements for verification should reflect the level of risk of the application. Technical information relating to the Agricultural Aviation Industry contains relevant technical information for pilots to manage risk, and to satisfy the task verification requirements by any authorised third party. These methods enable operators to demonstrate that aerial application tasks were carried out according to industry best practice.

The risk management approach

Risk assessment management is a well-established approach to manage a range of activities. This approach is based on the relationship between hazard, exposure and risk where:

Hazard x Exposure = Risk (level)

Hazard	=	Something that could present a risk – a potential adverse effect
Exposure	=	The extent to which people and/or the environment are exposed to the hazard
Risk	=	The combination of the nature of the hazard and level of exposure determines the degree/magnitude of risk

The state and nature of the substance influences the degree of hazard from aerial application of fertilisers, agrichemicals and VTAs, the degree of exposure and hence the risk. The following table compares the risk of off-target drift based on the state of the substance and its ballistic properties (the extent to which the trajectory of released particles can be predicted).

Table 1: Comparative risk of off-target drift as a function of the state of the substance (i.e., solid, liquid or vapour) and particle size (ballistic properties)

Potential off-	

Target drift ballistic properties	State		
	Solid	Liquid	Vapour
< 200 µm	High	High	High
0.5 mm	Moderate	Moderate	High
> 1 mm	Low	Low*	High

* = with larger droplet sizes the potential for droplet shatter into smaller droplets increases thereby increasing the risk. The same applies to large solid particles that break up when discharged.

Understanding the comparative risk of off-target risk is important as the state of the substance varies between fertilisers, agrichemicals and VTAs:

- **Fertiliser -** As well as typically being relatively low hazard most fertilisers are in a solid form and particles are larger than 0.5mm (i.e. a low hazard substance can more effectively be contained to the target area).
- **Agrichemicals** - Most agrichemicals are applied in liquid form and although the means to contain them to the target is available, the larger droplet sizes may mean a reduction in efficacy of the agrichemical which is a dis-incentive. Increased spray drift potential is closely linked to small droplets (< 200 µm).
- **VTAs** - VTAs (1080 Bait) are most often applied in a compressed cereal "cylinder" which weigh about 6-12 gm each, and therefore it is entirely a matter of where it is directed that determines where it goes. Local wind and variation in temperature will be the main determining factors of risk.

Once the level of risk from the hazard is identified, steps can then be taken to eliminate the hazard, isolate the hazard, or reduce exposure to it. This approach involves asking relevant questions so that the best option to manage the risk can be identified, as set out in the following table:

Table 2: Managing the risk

Is there a risk?	Contributing factors	Reference in Guidance Note
Is the risk significant?	Combination of likelihood and potential adverse effect	Table 3
What could be the adverse effect from the hazard?	Potential adverse effects	'Resource management issues'
What are the possible reasons for the adverse effect?	Risk factor	Table 4
How could it occur?	Exposure pathway	'Exposure pathways'
How can the potential effect be managed?	Management options	Table 4 Fertiliser – Table 5 Agrichemicals – Table 6 VTAs – Table 7

To assess the significance of the risk, both the likelihood of the adverse event occurring and the potential impact need to be determined. Refer to Technical Information relating to the Agricultural Aviation Industry (Section 2 – Risk Management).

A risk matrix, as set out below, can also be used to assess the level of risk based on the likelihood of an adverse effect together with the potential impact of that adverse effect. The colours indicate the degree of risk. Management options can then be selected that reflect the degree of risk, which may include not undertaking aerial applications at that point in time.

Table 3: Is the risk significant?

Potential impact of an adverse effect	Likelihood of an adverse effect occurring		
	High	Medium	Low
High			
Medium			
Low			

Applying a risk management approach to agricultural aviation discharges

The following sections provide guidance on managing the effects of discharges from the industry, focusing on the three main types of substances that are applied from the air – fertilisers, agrichemicals and VTAs. Understanding the nature of these discharges and associated potential adverse effects is important to ensuring the management approach is focused on the actual risk factors associated with the substance being applied.

Managing the risk

Managing the risk should involve the following steps:

- Assessing the potential adverse effects.
- Considering the relevant risk factors.
- Identifying the exposure pathways.
- Developing and applying appropriate management options.

Risk Factors

The reasons for and magnitude of potential adverse effects from agricultural aviation operations is related to a range of risk factors. The extent to which a risk factor applies varies according to the nature of the receiving environment and on the type and nature of the discharge.

Key risk factors to consider include:

- The chemical being used.
- The exposure pathway.
- The concentration and rate of application of the substance.
- The timing of the application and its proximity to people and sensitive areas (including water bodies).
- The location of the application and use, including mixing sites.
- On site/real time weather conditions and their suitability for the task/application.

- Substance characteristics (e.g. particle size or ballistic properties).
- Accuracy of the target identification.
- Application height.
- Application equipment.
- The permeability of the soil.

A risk based approach enables management controls to be clearly linked to these risk factors in order to manage potential adverse effects. Further information is available in Technical Information relating to the Agricultural Aviation Industry (Section 2 – Risk Management).

Risk assessment factors

Once the relevant risk factors have been identified, these can then be assessed to determine the appropriate information requirements and pilot management options. Distinguishing between pre-determined and real-time risk assessment factors is important because the most significant factor causing adverse effects from off-target spray drift is almost always wind direction – a real-time factor. The real-time factors are those which can vary over the time of the operation, such as the weather conditions. A pre-determined factor is one that is evident and on which decisions are made before the application commences. These real-time and pre-determined risk factors are identified in Table 4 along with corresponding information requirements and pilot management options. This table is based on a risk management approach with requirements and management options based on the level of risk from each factor.

Table 4: Risk assessment requirements and management controls for aerial application of fertiliser, agrichemical* and VTA

	Risk assessment requirements	Information needed	Information able to be used for task verification	Pilot Management
1	Application site (target)	Location and boundaries	• GIS co-ordinates, dated photograph • Hand-written diagram or map, verbal	Application plan with map detailing location and boundaries. Use of GPS system to ensure coverage and avoid drops beyond target area boundaries.
2	Sensitive area	Nature of and location with respect to application area	• GIS co-ordinates, dated photograph • Hand-written diagram or map • Verbal only if task is low risk	Sensitive areas identified and actions taken to avoid adverse effects
3**	Wind direction	Direction (bearing) at the application site at the time	• Digital recording wind vane/sensor with time base • Hand held vane or equivalent • Smoke or other visual indicators	Adjacent to sensitive areas, aerial application only when wind is away from sensitive areas and when wind speed is steady
4**	Wind speed	Wind speed at the application site at the time	• Digital recording wind vane/sensor with time base • Hand held anemometer or equivalent • Smoke or other visual indicators	Adjacent to sensitive areas, no application when wind speed exceeds the limits according to the risk.
5	Particle size	Physical properties of the product being applied	• Documented record of particle size and size range, and stability, i.e. volatility (liquid) or fragmentation (solid)	Adjacent to sensitive areas, physical properties of the product must be such that trajectory after release is predictable
6	Product hazard	HSNO hazard classifications and controls, bio-accumulation, water solubility and attributes relevant to potential adverse effects. High risk situations may require more information, for example there may be specific situations where the product hazards limit the time of day or season when they can be used.	• Product selected according to application task, taking account of HSNO class, efficacy, other attributes that may result in greater risk (e.g., volatility) and the at-risk sensitive locations, all according to written prescriptions and documented	Choose least hazardous product suitable for the task Extra care taken if using Classes 6.1A, 6.1B, 6.1C, 6.7, 6.9, 9.1A, 9.2A, 9.3A and/or 9.4A adjacent to sensitive areas
7	Effective height of release of product	Application method, including lateral spreading vs localised	• Application equipment selected to minimise product losses between the point of release and the target, all fully documented	Product directed to the target at all times

	Risk assessment requirements	Information needed	Information able to be used for task verification	Pilot Management
8**	Buffer zone	Downwind application free zone	• Location of application target and sensitive area known and logged, communication/notification confirmed, product quality, and wind direction known and drift modelling done	Adjacent to sensitive areas, application only when wind is away from sensitive areas and is a steady wind speed
9	Shelter belts	Nature of and location with respect to application area	• Location of application target and sensitive area known and logged, communication/notification confirmed, product quality, and wind direction known and drift modelling done	Adjacent to sensitive areas, application only when wind is away from sensitive areas and is a steady wind speed Also operation must be planned to take account of hazards associated with shelter trees and structures
10**	Humidity	Air temperature	• Humidity measured and recorded on site at the time	Specific controls according to the volatility of the product being applied
11**	Atmospheric stability	Inversion layer	• Wind and temperature data recorded on site such that no inversion layer, and visual clues e.g. smoke to test for inversion according to the risk	If label information indicates volatility an on-site test for inversion layer should be done

***** Refer to NZS 8409 (Appendix G)
** A real time factor i.e., factors that can change while the application is occurring (e.g. wind speed and direction).

Exposure pathways

The indirect exposure pathways for adverse effects are:

- **Off-target drift or dust** – Off-target drift is where the product drifts beyond the target area and this may, or may not, lead to adverse effects, depending on the nature of the non-target area. For example, lime dust on a neighbouring farming property may not be regarded as an adverse effect by the owner whereas lime dust on a roof where water is being collected is likely to be regarded as an adverse effect.
- **Overland flow** - This is where there is runoff from land when product has been applied and the runoff flows overland with product entrained in the flow ending up in a water body. Operators can minimise the risk of this occurring by ensuring the product has time to be absorbed before heavy rainfall events.
- **Leaching through soil** - Leaching is the movement of a substance through the soil into groundwater. Leaching may only remove mobile components of the product while some immobile components remain bound to soil particles and may accumulate to unacceptable levels, such as cadmium build-up from phosphate fertilisers[4]. The potential for leaching depends in part on the chemical and physical properties of a product and the permeability of the soil. To reduce the potential for leaching, regional plans may have controls on the amount of product that can be applied (input control) or have limits on the amount of leaching that can occur (output control). The rate and type of product being applied needs to take into account any such requirements.

The direct exposure pathways for adverse effects are:

- **Applications direct to non-target area** - This is where there is a direct application on a non-target area, such as a non-target crop, water body or sensitive area which may result in adverse effects. Such a situation may arise where insufficient care has been taken accurately direct and apply the substance to the target area. Management controls can be imposed that require applications to avoid non-target areas, water bodies or sensitive areas.
- **Frequency and rate of application** - The frequency and rate of application can determine the potential for adverse effects, particularly soil contamination or leaching to water. It is the role of the land manager/owner (client) and applicator to ensure that relevant RMA, HSNO and ACVM Act requirements regarding the substances being applied are met. All farmers or growers applying products should prepare a management plan to ensure that the amount of product being applied is appropriate. The task of the aerial applicator is to ensure the land manager/ owner (client) has met relevant requirements and to apply the required amount of product to the target area as instructed by the land manager/ owner (client) and ensuring regional plan requirements for the application are met.
- **Exposure of public in public areas at time of application** - Applications can occur in public areas, creating a risk of direct exposure. Care needs to be taken to ensure that public areas are free of people at the time of application.

Indirect and direct exposure pathways include:

[4] The Code of Practice for Nutrient Management (COPNM) sets out good practice for managing potential contaminants as a result of fertiliser applications (including cadmium).

- **Inappropriate disposal of wastes** - Inappropriate disposal of surplus or waste could lead to product ending up in water bodies or sensitive areas. There are general disposal rules under HSNO relating to different classes of substance. Care should be taken to ensure that disposal does not lead to such effects.
- **Spillages/ overflows at loading sites** - For aerial applications the loading site is the area between the storage area and where the aircraft stops for loading. The Safety Guidelines and the appropriate loading practices can be found in the Health and Safety section of the CAA website, and for VATs there are HSNO controls relating to spillages at loading sites. Care should be taken when loading substances, to ensure that the product is loaded into the aircraft to avoid excess product in one area otherwise this can lead to contamination of the specific area or leaching into water. If the loading area is near a waterbody or bore then extra care is required to ensure that no product ends up in the water.

Managing discharges from the industry operations

This section describes the aerial application, risk factors and management options (pilot management options and plan provision options) for the three types of aerial applications. A summary table of management options is provided for each aerial application type (fertilisers, agrichemicals and VTAs), which identifies:

- Potential adverse effects.
- Risk factors.
- Exposure pathway.
- Pilot management options.
- Options for plan provisions and consent conditions (note this is not provided for VTAs).

When identifying the appropriate management option, it is also important to assess the key considerations and section 32 requirements when developing plan provisions and controls to manage the adverse effects of the agricultural aviation industry.

Fertilisers

Fertilisers are substances that are applied to land to improve the productivity of plants for primary production, which includes pastoral farming (sheep, beef, deer and dairy), horticulture, viticulture, and forestry. They are critical to the success of primary production and therefore contribute to GDP and the economic well-being of communities. Fertilisers are also used on sports fields and golf courses. About 600,000 tonnes of fertiliser is applied by air annually in New Zealand, both by fixed wing aircraft and helicopters.

There is a wide range of fertilisers used for different purposes, in both solid and liquid forms. The most common types are superphosphate and nitrogen based fertilisers. Essential nutrients to retain soil balance, such as potassium and sulphur, magnesium and cobalt, are also applied as fertilisers or added to fertiliser mixes.

Fertiliser definitions

The ACVM (Exemptions and Prohibited Substances) (ACVM (E&PS)) Regulations 2011 defines a fertiliser and requirements and conditions for fertilisers. Relevant definitions in these regulations are as follows:

Fertiliser

(a) means a substance or biological compound or mix of substances or biological compounds that is described as, or held out to be for, or suitable for, sustaining or increasing the growth, productivity, or quality of plants or, indirectly, animals through the application to plants or soil of—

(i) nitrogen, phosphorus, potassium, sulphur, magnesium, calcium, chlorine, and sodium as major nutrients; or

(ii) manganese, iron, zinc, copper, boron, cobalt, molybdenum, iodine, and selenium as minor nutrients; or

(iii) fertiliser additives; and

(b) includes non-nutrient attributes of the materials used in fertiliser; but

(c) does not include substances that are plant growth regulators that modify the physiological functions of plants.

Fertiliser additive

(a) a non-nutrient substance added to a fertiliser, or applied to land by itself, that—

(i) improves the supply and uptake of nutrients; or

(ii) increases the biological activity of soil; or

(iii) modifies the physical characteristics of a fertiliser to make it more fit for its purpose; but

(b) does not include substances that are plant growth regulators that modify the physiological functions of plants.

These definitions are considered appropriate for incorporation into plan provisions. Agricultural lime is applied to condition and change the pH of the soil and under these definitions is considered to be a fertiliser additive.

For other definitions of fertiliser see the Technical Information relating to the Agricultural Aviation Industry.

Relevant legislation relating to fertilisers

Fertilisers are managed under both the HSNO and ACVM Acts. While not specifically mentioned or provided for in the RMA, fertilisers can also be managed under the RMA as they fall within the definition of contaminants.

Regional councils are responsible for managing fertiliser discharges to air, onto or into land and/or water. The application of fertiliser, including aerial applications, is generally provided for in regional plans as a permitted activity, subject to conditions.

Territorial authorities are primarily responsible for the management of land use activities which can include the control of hazardous substances. As most fertilisers are classified as hazardous substances they are managed under the HSNO Act. However if councils consider that HSNO controls are not sufficient to meet the purpose of the RMA, then councils can address this through their district plans. District plans should address the storage of fertilisers. HSNO Act regulations are also relevant in this regard and are discussed further in Technical Information relating to the Agricultural Aviation Industry. Under the ACVM Act, the requirements for end users are outlined in the ACVM (E&PS) Regulations.

Aerial Application of fertiliser

Superphosphate is typically applied from the air at rates of between 100 and 300kg/ha over complex topography where no other application methods are viable. Superphosphate fertilisers tend to be of variable quality in terms of particle size and size range. Nitrogen based fertilisers (and other high analysis fertilisers) tend to be applied over more productive, and hence more uniform land for both pasture and cropping. Nitrogen based fertilisers are also usually more uniform and consistent in terms of particle size.

Maximising the productivity gains from fertiliser application requires evenness of application across the target area. Achieving an even application within the target area has an impact on the precision of application (i.e. the requirement to confine the fertiliser to the target area). There are a range of systems, equipment and techniques required to consistently and reliably achieve an even application of fertiliser and this also enables fertiliser applications to be confined to the target area.

There are a number of publications setting out best practice for fertiliser application including:

- Safety Guideline: Farm Airstrips and Associated Fertiliser Cartage, Storage and Application.
- Code of Practice for Nutrient Management (COPNM).
- The Fertmark Code of Practice for the Sale of Fertiliser in New Zealand .
- The Aerial Spreadmark Code of Practice (Part A and Part B).

For more information on these codes and standards see Technical Information relating to the Agricultural Aviation Industry.

Risk factors of aerial application of fertilisers

The key risk factors for aerial application of fertiliser are particle size, wind speed and wind direction. It is important to recognise that not all fertiliser has the same physical characteristics. The particle size of fertilisers varies, which directly affects the ballistic property of the substance and how it falls when discharged. Coarser particle size means that the product trajectory will be more predictable, whereas a smaller particle size presents a greater likelihood of off-target drift and dust.

Wind speed at the time of application influences how far the fertiliser will travel from the point of release. At a given wind speed, small particles will move down wind further than large particles. Wind direction determines the direction in which the fertiliser particles will travel. Both wind speed and wind direction needs to be factored in by the pilot, along with the product quality and particle size to determine flight paths, to avoid sensitive areas, and to ensure the product is applied to the target area. An operator can verify the track flown and where they have discharged fertiliser. However to accurately verify where the product has landed requires information on wind speed (which influences how far the product will go from the track flown) and wind direction which determines the direction the fertiliser particles will travel from the point of release.

Management options for the aerial application of fertilisers

The risk management section sets out the general framework for a risk management approach for aerial applications. This section provides guidance on how to apply this approach specifically to manage the discharge of fertilisers. Table 5 identifies management options for plan provisions and consent conditions to manage the adverse effects from the aerial application of fertilisers based on the type of adverse effect, relevant risk factors and the exposure pathway. It also identifies the measures pilots can take to minimise risks and potential adverse effects from the aerial application of fertilisers.

Table 5: Risk management approach for aerial application of fertiliser

Potential adverse effects	Risk factor	Exposure pathway	Pilot Management Options (see Technical Information relating to the Agricultural Aviation Industry and the Aerial Spreadmark Code)	Options for plan provisions and consent conditions
Health effects which may include: • Allergic reactions • Irritations • Toxic poisoning	• Hazard class of chemical (substance) being used and exposure to it (HSNO Classes[5] 6, 8 and 9)	Indirect: • Off-target drift or dust Direct: • Applications to non-target area through handling and loading	Indirect: • Minimise potential for drift – technical options Direct: • Personal Protective Equipment - management of loading and handling operations	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify dwellings, educational facilities and public places as sensitive areas (drift hazard of fines)
Contamination of crops and plants including sensitive crops and organically farmed properties; • Growth and quality of the crop; or • Threatens organic registration	Fertiliser type: • Excessive residue levels • Timing of application • Crop stage • Application rate – calibration • Drift	Indirect: • Off-target drift	Indirect: • Minimise potential for drift – technical options	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify crops and non-target plants as sensitive areas
Contamination of domestic or commercial water supplies where it renders the drinking water non-potable	Fertiliser hazard and type: • HSNO Classes 6 and 8	Indirect: • Off-target drift Direct: • Applications to non-target area	Indirect: • Minimise potential for drift – technical options	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify water bodies/ drinking water supplies as sensitive areas • It may be appropriate to include

[5] These refer to the HSNO Classification Codes. A full list is available on the EPA website.

Potential adverse effects	Risk factor	Exposure pathway	Pilot Management Options (see Technical Information relating to the Agricultural Aviation Industry and the Aerial Spreadmark Code)	Options for plan provisions and consent conditions
				conditions or other restrictions for some applications over or near water bodies
Contamination of indigenous flora, fauna, habitat areas and reserves where the inherent values of these areas are damaged or lost	Ecotoxicity of fertiliser: • HSNO Classes 9.2, 9.3A and 9.4A • Poor/no target identification • Fertiliser quality (particle size and stability)	Indirect: • Off-target drift Direct: • Applications to non-target area	Indirect: • Minimise potential for drift – technical options* • Target site identification (GPS) • Ensure that fertiliser quality is appropriate to minimise potential for drift	• Require site identification as part of risk assessment • Classify as sensitive areas
Contamination of wetlands, surface water bodies, and coastal and marine environments where it causes: • Death of flora and fauna • Water takes affected leading to un-potable water or damage to crops and animals	Fertiliser type and hazard: • HSNO Classes 6, 8 and 9 • Application rates • Location of application and proximity to water take points • Inappropriate disposal • Poor/no target identification • No identification of at-risk water bodies • Non-point fertiliser – dust	Indirect: • Applications adjacent to water bodies – off-target drift or overland flow • Disposal adjacent to water Direct: • Applications into water • Spillages/ overflows at mixing sites • Disposal to water	• Management measures for loading sites • Follow label requirements • All reasonable measures must be taken to avoid discharges to surface water bodies – risk assessment to establish appropriate measures • Use of fertiliser with good ballistic properties (particle size)	• Require that loading sites in proximity to water bodies be managed to contain spillages • Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required, including identification of sensitive areas • Require that all reasonable measures are taken to avoid discharges to surface water bodies • Classify water bodies as sensitive areas • Require label requirements to be followed
Contamination of groundwater	• Concentration of	Indirect:	• Management of loading	• Require that loading sites in

Potential adverse effects	Risk factor	Exposure pathway	Pilot Management Options (see Technical Information relating to the Agricultural Aviation Industry and the Aerial Spreadmark Code)	Options for plan provisions and consent conditions
	fertiliser and application rates • Soil type – highly permeable and fertilisers that are mobile	• Leaching through soil Direct: • Spillages/ overflows at loading sites • Inappropriate disposal Direct and indirect: • Inappropriate disposal of wastes	sites • Ensure that client has established appropriate rate, concentration gradient for the soil profile • Methods of disposal	proximity to wellheads be managed to ensure that spillages are contained
Contamination of soils/ land which may cause death of flora and fauna	• Fertilisers that are, or contain substances not mobile in soil • Inappropriate application rates • Inadequate containment at loading sites	Indirect: • Permeability – water moves nutrients through soil profile but contaminants e.g.: Cd and F remain bound to soil particles Direct: • Frequency and rate of application of fertiliser	• Follow use requirements • Ensure that client has established appropriate rate, for the soil profile • Loading sites, and storage	• Label requirements to be followed • Ensure management of loading sites to contain spillages
Amenity values	• Proximity of people – timing and location • Fertiliser volatility and toxicity class • Aircraft operating	Indirect: • Off-target drift Direct: • Exposure if public in public areas at time of application	• Minimise potential for drift – technical options	• Classify high amenity areas as *sensitive areas* • Plan provisions relating to reverse sensitivity in rural areas (including noise and drift) to identify what is reasonably expected in the rural area

Potential adverse effects	Risk factor	Exposure pathway	Pilot Management Options (see Technical Information relating to the Agricultural Aviation Industry and the Aerial Spreadmark Code)	Options for plan provisions and consent conditions
		Noise: • Aircraft and machinery		
All potential adverse effects			• Competent to carry out risk assessment for operation	

Agrichemicals

The term 'agrichemical' is commonly used to describe a range of substances that control pests. Agrichemicals are applied to land, water or crops to control pests in primary production activities of pastoral farming (sheep, beef, dairy and deer), horticulture, viticulture and forestry.

Examples of agrichemicals include:

- Herbicides to control unwanted plants, including some that are specific for aquatic use in water;
- Insecticides to control insects such as clover flea or potato psyllid;
- Fungicides to control fungus e.g. rust, mildew, moulds; and
- Plant growth regulators e.g. Hi Cane.

Agrichemicals are usually discharged into air rather than applied directly onto the target species. Under the RMA such applications are classed as a discharge of contaminants to air, land or water.

Agrichemical applications can be by both fixed wing aircraft and helicopters, and vary due to a range of factors so plan provisions need to be appropriate, flexible and applicable across the range of situations. Aerial application of agrichemicals range from total vegetation control (e.g. pre-plant herbicide application in cropping and forestry) where confining the spray to the target area is the first priority, through to application of a biological insecticide as a biosecurity requirement (e.g. Painted Apple Moth eradication in Auckland). In the latter case, large urban areas were sprayed with small spray droplets in specific local wind conditions to achieve the required target penetration and coverage.

Definition of Agrichemical

The terms agricultural chemicals, agricultural compounds and pesticides are often used to describe the same or similar groups of products. The terminology and definition used in a plan is important so it is clear exactly what substances fall within the parameters of any regulation.

The most commonly used definition in RMA plans is the definition from NZS 8409:2004 Management of Agrichemicals (NZS 8409) which defines agrichemicals as:

> *"Any substance, whether inorganic or organic, man-made or naturally occurring, modified or in its original state, that is used in any agriculture, horticulture or related activity, to eradicate, modify or control flora and fauna. For the purposes of this Standard, it includes agricultural compounds but excludes fertilisers, vertebrate pest control products and oral nutritional compounds."*

This definition is considered appropriate to incorporate into plan provisions.

Pesticides are not defined in regulations or the HSNO or ACVM Acts. Pesticides can include a wider range of substances than the definition of agrichemical in NZS8409. Pesticides generally include any chemical mixture of substances intended for preventing, destroying or controlling any pest. For example, VTAs or timber treatment chemicals would be classed as a pesticide, but not as an agrichemical as defined in NZS 8409. For other definitions see the Technical Information relating to the Agricultural Aviation Industry.

Aerial Application of Agrichemicals

Aerial application of agrichemicals normally involves mixing it with water in a spray tank according to the rate and concentration specified on the product label[6]. It is then applied using a boom fitted to the aircraft that has the appropriate number and type of nozzles fitted. The nozzles regulate the flow rate and determine the droplet size produced. Getting an even spray pattern from an aircraft, whether fixed wing or helicopter, depends on the way in which the spray boom and nozzles are mounted on the aircraft.

Most aerial spraying of agrichemicals in New Zealand involves herbicide application where it is important to ensure maximum deposition onto the target, while minimising off-target drift. The application equipment used, the way this equipment is fitted and the type of aircraft can significantly affect the extent to which off-target drift is minimised.

Sometimes a different technique is needed, where lateral movement of small droplets in the spray is used to obtain large swath widths and horizontal droplet deposition. Examples of this technique in New Zealand include fungicide application to broad-acre crops and control of pest incursions such as the Tussock Moth and Painted Apple Moth. This technique can produce very good target coverage but containing such spray in the target area is more difficult.

There are existing industry best practice standards for agrichemical application. The most relevant is NZS 8409.This performance standard applies to any agrichemical application, including aerial methods. NZS 8409 was developed by Standards New Zealand and sets out the requirements for the safe, responsible and effective management of agrichemicals. EPA has approved NZS 8409 as a Code of Practice under the HSNO Act and by complying with the standard you are considered to have met ACVM conditions. NZS8409 is one of the Codes of Practice that form part of the AIRCARE™ Accreditation programme.

Risk factors of aerial application of agrichemicals

There are a number of potential adverse effects that can arise from agrichemical applications and the nature of these effects will vary depending on the combination and level of risk factors for the operation. The relevant risk factors for the discharge of agrichemicals include:

- The chemical being used, hazard class and type, and exposure to it.
- The concentration and rate of application of the chemical.
- The timing of the application.
- Location of sensitive activities.
- The proximity of people – timing and location.
- The location of the application and use, including mixing sites.
- Weather conditions.
- Spray quality.
- Target identification.
- The permeability of the soil.
- Whether non-target animals are present (e.g. when applying to pasture).

In seeking to avoid or minimise adverse effects from the discharge of agrichemicals, these risk factors must be assessed and addressed in the context of the relevant exposure pathways.

[6] Note that Appendix C3.2 of NZS 8409 specifies use outside of conditions (off-label use)

Exposure pathways and management options

The exposure pathways for agrichemicals can be either:

- Indirect – off target drift, leaching, overland flow; or
- Direct – application on subject areas, point source discharges (e.g. spillages).

Off target drift - Spray drift and drift hazard
Drift hazard is defined in NZS 8409 as the hazard associated with drift and consequent trespass which may result in an adverse effect to human health, animal health or the environment.

Every spray application of agrichemicals will result in some degree of spray drift as it is not possible to have zero drift due to the range of variables. However, the most important issue from a risk management perspective is what risk the spray drift poses and how the risk can be avoided or minimised.

Appendix G of NZS 8409 provides a drift hazard guidance chart. Technical Information relating to the Agricultural Aviation Industry includes a potential draft hazard scale from NZS 8409. This table highlights the range of variables that need to be considered such as wind speed and direction, height and application, and sensitive areas. It also identifies ways to address these hazards which requires knowledge of all the variables that are relevant to the agrichemical application at the time. Table 4.1 in the Technical Information distinguishes between pre-determined and real-time factors and identifies that the most significant factor causing adverse effects from off target spray drift is almost always wind direction – a real-time factor.

Plan provisions relating to the discharge of agrichemicals need to ensure they recognise these options so that they are assessed at the time of application.

Management options for the discharge of agrichemicals

The risk management section sets out the general framework for a risk management approach for aerial applications. This section provides guidance on how to apply this approach specifically to manage the discharge of agrichemicals.

For each potential adverse effect, table 6 identifies the relevant risk factor, exposure pathway and management options to manage potential adverse effects for both the pilot and councils. The extent to which a risk factor applies and management options need to be considered varies according to the nature of the receiving environment and the potential adverse effect.

Table 6: Risk management approach for aerial application of agrichemicals

Potential adverse effects	Risk factors	Exposure pathway	Pilot management options (see Technical Information relating to the Agricultural Aviation Industry)	Options for plan provisions and consent conditions
Health effects caused or possible: • Allergic reactions • Irritations • Toxic poisoning • Exposure to carcinogens and teratogens	• Hazard class of chemical being used and exposure (HSNO Classes 6 and 8)	Indirect: • Off target drift Direct: • Applicator	Indirect: • Minimise potential for drift – technical options • Notification (drift hazard) Direct: • Personal Protection Equipment	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify dwellings, educational facilities and public places as sensitive areas • Require notification where application adjacent to sensitive areas
Potential toxicity to bees and other pollinators, including beneficial insects (insects that perform valued services like pollination and pest control)	• Chemical type (herbicide, insecticide, fungicide etc.) • Excessive residue levels	Indirect: • Off target drift	• Minimise potential for drift – technical options	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required, including identification of sensitive crops and methods to avoid drift onto those areas
Contamination of crops and plants including sensitive crops and organically farmed properties. Effects include: • Growth and quality of the crop • Contamination to levels in excess of residue levels • Threatens organic registration • Off target spray drift can lead to	• Chemical type (herbicide, insecticide, fungicide etc.) • Excessive residue levels • Timing of application – crop stage • Application rate	Indirect: • Off target drift	• Minimise potential for drift – technical options	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required, including identification of sensitive crops and methods to avoid drift onto those areas • Classify crops and non-target plants as sensitive areas

Potential adverse effects	Risk factors	Exposure pathway	Pilot management options (see Technical Information relating to the Agricultural Aviation Industry)	Options for plan provisions and consent conditions
residue in food crops which may not be compliant with the NZ (Maximum Residue Limits of Agricultural Compounds) Food Standards 2011	(calibration)			• Require notification to greenhouse operations in the area
Contamination of domestic or commercial water supplies where it renders the drinking water non-potable	Chemical type and hazard class: • HSNO Classes 6 and 8	Indirect: • Off target Direct: • Discharges	• Minimise potential for drift – technical options	• Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify water supplies as sensitive areas • It may be appropriate to include conditions to avoid direct applications over such areas
Contamination of indigenous flora and fauna, habitat areas and reserves where the inherent values of the areas are damaged or lost (Note: in considering effects consideration should be given to whether the application is specifically for the control of	• Ecotoxicity of substance (HSNO Classes 9.2, 9.3A and 9.4A[7] • Poor or no target identification • Spray quality	Indirect: • Off target drift Direct: • Applications	• Minimise potential for drift – technical options • Target site identification (GPS)	• Require site identification as part of risk assessment • Require documentation of operator risk assessment to ensure use of appropriate technical options can be verified if required • Classify as sensitive areas (except in

[7] Note that just because a product does not have a high 9 classification under the HSNO Act it does not mean that it does not pose a risk to the environment. This is because the HSNO Act only considers acute effects for classification which could be problematic when considering other impacts such as reproductive effects.

Potential adverse effects	Risk factors	Exposure pathway	Pilot management options (see Technical Information relating to the Agricultural Aviation Industry)	Options for plan provisions and consent conditions
environmental weeds in areas of native vegetation / reserve land)				relation to environmental weeds in areas of native vegetation / reserve land)
Contamination of wetlands, surface water body and coastal and marine environments where it causes: • Death of flora and fauna • Water takes affected leading to un-potable water or damage to crops and animals (Note: in considering effects consideration should be given to whether the application is specifically for the control of environmental weeds in wetlands and other waterbodies).	• Chemical type and Hazard Classes 6, 8 or 9 • Concentration of chemical and application rates • Location of application in proximity to water take points • Inappropriate disposal • Poor or no target identification • No identification of at-risk water bodies • Non-point spray quality	Indirect: • Applications adjacent to water bodies – off target drift or overland flow • Disposal adjacent to water Direct: • Applications into water is prohibited for the vast majority of pesticides, but could still occur • Spillages/ overflows at mixing sites • Disposal into water is prohibited for the	• Minimise potential for drift – technical options • Target site identification (GPS) • Management measures of mixing sites NZS8409 Section 5.3.2 and Appendix R • Management of disposal NZS8409 Section 6 and Appendix 6	• Require reasonable measures be taken to avoid discharges to surface water bodies *unless for intended aquatic use*[8]. • Operator risk assessment undertaken and documented to establish reasonable measures and ensure use of appropriate technical options • Classify water bodies as sensitive areas (except in relation to aquatic herbicides) • It may be appropriate to include conditions to avoid direct applications over such areas (except in relation to aquatic herbicides and other environmental weeds such as willow, spartina, tradescantia, alligator weed)

[8] Aquatic herbicides are used to control weeds in some wetlands. This activity is typically undertaken by DOC, MPI, regional councils, territorial authorities, farmers and contractors. The use of aquatic herbicides onto or into water is not a matter for regional and district plans, as it is controlled by the EPA pursuant to section 95A of the HSNO Act.

Potential adverse effects	Risk factors	Exposure pathway	Pilot management options (see Technical Information relating to the Agricultural Aviation Industry)	Options for plan provisions and consent conditions
		vast majority of pesticides unless it has been treated first and made non-hazardous		
Contamination of groundwater	• Concentration of chemicals and application rates • Soil type – highly permeable and chemicals that are mobile	Direct: • Spillages/ overflows at mixing sites Indirect: • Leaching through soil Direct and indirect: • Inappropriate disposal of unwanted agrichemicals and surplus spray mix	• Management measures of mixing sites – bunded etc. NZS8409 Section 5.3.2 Appendix R • Appropriate rate, concentration, gradient, soil profile (e.g. GROWSAFE calculator) • Methods of disposal NZS8409 Section 6 and Appendix S	• Require compliance with NZS8409 Section 6 and Appendix S and Section 5.3.2 and Appendix R (must specify the exact date and version of the standard as standards can be subject to change)
Contamination of soils/ land	• Use of substances that persist and accumulate in the soil – e.g. copper • Inappropriate application rates • Inadequate containment at storage and mixing	Direct: • Frequency and rate of application of persistent chemicals Indirect: • Permeability –	• Appropriate tools (e.g. GROWSAFE calculator) • Fate processes NZS8409 Appendix F • Mixing sites and storage NZS8409 Section 4 Appendix L	• Require that NZS8409 Section 4 and Appendix L are met (must specify the exact date and version of the standard as standards can be subject to change)

Potential adverse effects	Risk factors	Exposure pathway	Pilot management options (see Technical Information relating to the Agricultural Aviation Industry)	Options for plan provisions and consent conditions
	sites	includes water source to move through the soil profile	• See label requirements	
Amenity values Offensive and/or objectionable effects such as: • Limiting access to public areas • Off target drift other than health and vegetation damage • Excessive noise	• Proximity of people – timing and location • Chemical – volatility and toxicity class • Air craft and machinery operating	Direct: • Exposure if in public areas at time of application • Off target drift • Noise – aircraft and machinery	• Minimise potential for drift – technical options • Notification (drift hazard)	• Classify amenity areas as *sensitive areas* • Plan provisions relating to reverse sensitivity in rural areas (including noise, odour, spray drift) to identify what is to be reasonably expected in the rural area
All potential adverse effects			• Competent to carry out risk assessment for operation • Recommend pilot competency through Pilots Agrichemical Rating issued by CAA and that the operator is accredited for agrichemicals	

Vertebrate Toxic Agents

This section provides background information on the safe and responsible management of the most common aerial application of VTAs – 1080 applied as cereal bait or carrot bait[9]. VTA (as defined in the ACVM Standard for Vertebrate Toxic Agents) is "*a toxic substance used to kill or reduce the viability of vertebrate animals. It does not include attractant or repellent substances that are not toxic*". VTAs, commonly referred to as baits, are substances, inorganic, human made or naturally occurring, modified or in its original state, that are used to kill, control or limit the viability of vertebrate pests, including possums, rats, rabbits, mice and mustelids. These substances are sometimes known as vertebrate pest control products and include products that have a negative effect on reproduction.

This section *does not provide options for managing VTAs in district and regional plans.* The Parliamentary Commissioner for the Environment (PCE) found that where controls and consent conditions are imposed under the RMA they often create unnecessary inconsistency or duplication with controls under the HSNO Act. Therefore, councils are encouraged to pursue this matter under the HSNO Act and to refer to relevant resources such as:

- ERMA's 2007 Reassessment of 1080.
- ERM/EPA Annual Reports on 1080.
- EPA 5 year review of the aerial use of 1080.
- Managing Hazardous Substances – interface between the Hazardous Substances and New Organisms Act and the RMA.
- Parliamentary Commissioner for the Environment Report on 1080.

Aerial application of VTAs

Aerial application of 1080 usually involves the 1080 substance contained within cereal bait or it is added as a soluble concentrate on site with carrot bait. Bait containing 1080 is principally used to manage possums in the Conservation estate to protect indigenous flora and fauna and on primary production land to control possums as vector carriers of TB to cattle. Rabbits are also controlled by using 1080 and Pindone.

Guidelines and standards for aerial 1080 are available on the EPA's website. In addition, the main users of 1080, such as the Department of Conservation (DOC) and TBfree New Zealand have developed their own Standard Operating Procedures (SOP's), and other bodies have developed best practice measures for the aerial application of VTAs, including:

- Aerial 1080 Pest Control Industry Guidelines, National Pest Control Agencies.
- Guidelines for the Safe Use of Sodium Fluoroacetate (1080), Department of Labour.
- Code of Practice for the Aerial Application of Vertebrate Toxic Agents.

Note that management of VTAs is not included within NZS8409: 2004 Management of Agrichemicals, therefore the standard is not an appropriate management tool for VTAs.

Risk Factor of aerial application of VTA

ERMA's Decision (now EPA) for the reassessment of 1080 (Table C1) has already assessed the level of risk for the application of VTAs and has accordingly set national controls to manage the potential

[9] This guidance note does not address applications of other VTAs, such as pindone pellets, or non-aerial methods of applying VTAs.

risks. Hazard classifications for sodium fluoroacetate (1080) and formulated substances containing 1080 are given in Section 7 of the reassessment.

Overview of management options for the aerial application of VTAs

The application of 1080 is regulated under the HSNO Act by the EPA, with the EPA risk assessment controlling its use. There are also controls on their use under the ACVM Act, which is administered by MPI.

The former Environmental Risk Management Authority (ERMA), now the EPA, undertook a reassessment of 1080 in 2007. This assessment provides full information on the product, risks and controls which must be met by operators. It looked at the broader environmental effects of 1080, and identified that existing hazardous substance controls are adequate to control the adverse effects of 1080 on public health and the environment. This assessment recommended that more effort should be put into ensuring that the existing controls are complied with by all users of 1080 through implementation of best practice guidelines and standards. For more information, see the 1080 webpage on the EPA website.

While the application of VTAs is considered a discharge of contaminants to air, land or water under the RMA, additional controls under the RMA (through consent conditions or district or regional plan provisions) should only be used to address a resource management issue which a council considers is not adequately controlled by the EPA under the HSNO Act.

The following table sets out a risk management approach for use of VTAs. It is based on the ERMA (now EPA) reassessment of 1080 in 2007 and provides examples of how pilot management options give effect to controls under the HSNO Act.

Table 7: Risk management approach for VTA (1080) use

Potential adverse effects	Risk factor*	Exposure pathway (Nature of risk)	Examples of pilot management options addressed under the HSNO Act (see Technical Information relating to the Agricultural Aviation Industry)
Adverse human health effects (both short and long term) (Note: risks to public health from 1080 are covered by the HSNO Act public health permission)	B Minor/ Improbable	Exposure of occupationally exposed persons during the handling of treated carrot and apple baits in the field and from handling cereal pellets if Personal Protection Equipment is not worn correctly. Nature of risk: a) The risk is voluntary; b) The risk will not persist over time (exposure is not on-going and the effect will not persist across generations since 1080 is not mutagenic); c) The risk is controlled in scope and location; d) The potential effects may be irreversible but information was incomplete on this aspect; e) There is good understanding in the occupational setting for managing exposure (e.g. protective equipment) and little risk of public exposure.	• Ensure all personnel involved have and use appropriate Personal Protection Equipment.
Effects following direct exposure to pellets during aerial operations and coated baits on: a) native birds b) native mammals (bats) c) native herpetofauna (frogs and lizards)	A – D D A - C	Nature of risk: a) Exposure of organisms to the substance is involuntary b) The risk will not persist over time as 1080 is biodegradable c) The effects are controllable and would be irreversible only in the event of the loss of a species or a significant population d) Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public	• Ensure accurate GIS mapping of target area • Clearly identify target area boundaries and water bodies • Avoid flight outside target area while undertaking the operation • Don't apply bait outside the target area
Effects following indirect exposure on non-target food producing animals.	**	Nature of risk: a) Exposure of animals to the substance is involuntary b) Potential for residue to occur in food or milk	• Ensure accurate GIS mapping of target area • Clearly identify target area boundaries and water bodies • Avoid flight outside target area while undertaking the operation

		c) The risk will not persist over time as 1080 is biodegradable d) The effects are controllable and would be irreversible only in the event of the loss of a species or a significant population e) Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public	• Don't apply bait outside the target area

* See ERMA Decision - Table 12.2 (Overall evaluation of adverse effects). The 'level of risk' column in the guidance note reflects the information in the last column of Table 12.2 ('level of risk adjusted to take account of approach to risk'). For further information, refer to Appendix C 'Qualitative descriptors for risk/benefit assessment' for additional information, particularly Section C2 'Describing the magnitude of the effect' (pg. 203) and Table C5 (Assignment of level of risk/benefit, pg. 206).

** Not included in ERMA Decision

Use of land for agricultural aviation activities and managing reverse sensitivity arising from aircraft operations

This section outlines matters relating to the use of land for agricultural aviation activities and the interface with the RMA including amenity and reverse sensitivity issues. It is focused on four main issues:

- Providing for the use of land for agricultural aviation activities:
  - Rural airstrips and helicopter landing areas.
  - Aircraft noise.
  - Storage, loading and mixing.
- Reverse sensitivity.

Providing for rural airstrips and helicopter landing areas

Aircraft undertaking agricultural aviation operations need appropriate areas for landing and take-off – both at a base and on-farm. Fixed wing aircraft require an airstrip and helicopters require a flat landing area. Usually an operation will have a specific base for regular on-going use. Often such bases are located at airfields or aerodromes, while helicopter bases can be more flexible in location. On-farm fixed wing aircraft will use established farm airstrips while helicopters will land in an area suitable for the operation being undertaken, often located near roads or tracks for access by ground crew.

The nature and scale of the two different areas is significant given that the use of on-farm facilities is intermittent and directly linked to the rural activity that the aircraft is providing services to, as opposed to the regular use of a base for the aviation activity. Therefore the consideration of the two types of landing areas within a regulatory context needs to be cognisant of the type of activity being undertaken. It is reasonable that a council would want to control the use of land for regular landings and take-offs, such as from a heliport, depot or base. But given the intermittent nature of agricultural aviation on rural properties, there needs to be clarity as to whether a council seeks to control the use of land in such circumstances.

Management options for rural airstrips and helicopter landing areas under the RMA

The use of land is controlled by territorial authorities (city, district and unitary councils) under section 9 of the RMA. Section 9(5) limits council control in respect of overflying aircraft to where noise emission controls have been set for airports. Therefore the extent of the control is limited to the use of the land for the activity, including repairs and maintenance of aircraft and the construction of hangars, fuel storage facilities and other ancillary structures. In respect of overflying aircraft, control is limited to the noise associated with take-off and landing of the aircraft.

The RMA defines airport as:

> *'Any defined area of land or water intended or designed to be used, whether wholly or partly, for the landing, departure, movement or servicing of aircraft'.*

This definition of airport would include rural airstrips and landing areas used by aircraft for agricultural purposes on an intermittent basis.

There are a range of ways that district plans can provide for the use of land for rural airstrips and helicopter landing areas used intermittently. The style adopted in the drafting of rules will influence how that is done, but could include:

- No specific provisions for rural airstrips and helicopter landing areas. The presumption of s9 would apply so such activities are provided for as of right. However care would need to be taken to ensure that other plan provisions do not capture the activity by default, or such activities are not caught by a 'catch all' provision for activities not listed in the plan (e.g. any activities not covered under the plan provisions are discretionary or non-complying).
- Specifying rural airstrips and helicopter landing areas used intermittently as an activity ancillary to farming or rural production activities, and relying on provisions relating to ancillary activities. Any standards applying to the farming or rural production activity would need to be drafted having regard to the use of land for agricultural aviation activities, particularly the use of rural airstrips and helicopter landing areas.
- If the plan rules are activity based, provision could be made for the use of land for agricultural aviation activities as permitted activities or activities requiring consent, by:
  - including rules applying to all types of airports, but applying different standards for rural airstrips and helicopter land areas; or
  - including specific rules for rural airstrips and helicopter landing areas used intermittently.

  For example, a controlled activity status could be applied to rural airstrips and helicopter landing areas where the rural aviation activities are undertaken on the same property as the landing and take-off site. Where a council considers a non-complying status more appropriate for aviation activities, consideration could be given to a discretionary status for rural airstrips and helicopter land areas where landing and take-off occurs on the same site as the rural aviation activities.

Where rules are included in a district plan, standards or conditions applying to rural airstrips and helicopter landing areas could specify the frequency of use or setback distances. For example, the frequency of use (or what constitutes an intermittent use) could be determined by specifying an annual allocation in a standard. Determining appropriate setback distances from neighbouring properties can assist in addressing amenity effects from rural airstrips and helicopter areas, and is an important consideration to ensure that permitted developments on adjoining properties are not subject to reverse sensitivity from newly established rural airstrips and helicopter landing areas.

There may also be the need to allow for the location of helicopter landing areas to move as the target area moves (as is often the case for VTAs). Non-compliance with one or more conditions could be considered as a restricted discretionary activity, with the council only assessing and considering the matter of non-compliance.

Separate definitions are required where rules apply to different types of airports, such as commercial airports, informal airports, rural or on-farm airstrips, or landings for non-commercial purposes.

Changes of land use in proximity to an existing rural airstrip, such as subdivision, can affect the operation of the airstrip. While there is the potential for reverse sensitivity effects (see 'reverse sensitivity'), there is also the potential to affect flight safety where new dwellings are located near the flight path. Airstrips are required to be designed and maintained in a way that makes them 'fit for purpose' for heavily loaded agricultural aircraft. To be 'fit for purpose' CAA Rule 137 requires that the defined area following the departure point must be free from obstacles and third parties. Therefore new activities within the defined area could affect the integrity of a rural airstrip and render it inoperable as the CAA Rule could not be met. Therefore the location of existing rural airstrips should be a matter considered at the point of subdivision.

Aircraft noise

Noise is generated by aircraft taking off and landing – it cannot be avoided. However the potential adverse effects of the noise will vary depending on the location, nature and scale of the airport activity, ranging from international airports through to rarely used rural airstrips. The mechanisms used to manage the effects of noise should relate to the location, nature and scale of the activity.

In terms of agricultural aviation the location, nature and scale are such that the activity is undertaken in rural areas on an intermittent basis, and is essential to rural production systems. The nature of the activity means that the operator may need to fly the aircraft continuously at a low level to achieve predictable positioning of the products being discharged. This requirement creates an issue in that the potential noise nuisance from low flying aircraft is greater than aircraft flying more than 1,000 feet above ground level.

As a result, the activity can give rise to complaints about aircraft noise, particularly when aircraft operate at low levels near sensitive activities.

Management options for aircraft noise under the RMA

Section 16 of the RMA requires an operator to avoid unreasonable noise by adopting best practicable options to ensure that the level of noise does not exceed a reasonable level. However, there are no directly relevant standards[10] or case law[11] that assists councils to establish provisions to manage noise effects from infrequently used airports or landing areas during take-off and landing. Councils' enforcement controls in relation to excessive noise specifically excludes noise from aircraft being operated during or immediately before or after flight (s326).

Territorial authorities can manage the potential adverse effects of aircraft noise by ensuring the district plan recognises the activity as a legitimate part of the farming or rural production activity in the rural area and having an appropriate policy framework to address such effects. However, council control is limited to managing aircraft noise at take-off and landing, not noise that is generated in-flight. In an agricultural aviation context that means controlling the noise levels at take-off and landing from the rural airstrip or helicopter landing area. Setting such provisions can be problematic in that defining take-off and landing is subject to multiple variables, including the point at which an aircraft is in controlled flight as opposed to 'take-off or landing'. Noise contours are often used for commercial airports but such an approach would be costly and difficult to implement for rural airstrips and would not reflect the nature and scale of the activity.

The aviation sector is conscious of the limited cover of legislation and has developed best practice standards and guidelines that seek to reduce adverse effects from aircraft noise. The Fly Neighbourly guideline produced by Helicopter Association International is applied by operators in New Zealand and NZAAA has developed a Code of Practice for Noise Abatement, which forms part of the AIRCARE™

[10] Two standards refer to aircraft noise, however neither is intended to apply to infrequently used airports or landing areas and is therefore not designed to be applied to operations such as agricultural aviation:

- NZS6807:1994 Noise management and land use planning for helicopter landing areas
- NZS6805:1992 Airport noise management and land use planning

[11] In Dome Valley District Residents Society Inc. v Rodney District Council, the Environment Court considered options to manage noise emissions from helicopters taking-off or landing at a base. The Environment Court referred to the CAA requirement that aircraft operate above 500 feet and based the assessment on that requirement. However CAA's Rule Part 137 provides an exemption to the general requirement relating to operational height for agricultural aircraft, so applying the 500 feet as a benchmark to agricultural aviation operations is not relevant or appropriate.

programme. These are used alongside other noise abatement practices as measures for an operator to reduce the effects of noise.

A risk management approach can be applied to the management of noise from agricultural aviation aircraft as set out below.

The potential adverse effects from noise are:

- Noise nuisance or offensive/excessive noise for persons living in the vicinity of aircraft operations (including rural homesteads, rural-residential activities, or urban development).
- Noise nuisance or offensive/excessive noise for persons undertaking recreational activities within riverbeds, adjacent to water bodies, on Crown or other publicly owned land, or in private land (including golf courses, and areas used for hunting).
- Disturbance of stock.

The risks arising from aircraft noise are:

- Depending on the intensity of the noise, people may need to modify the manner in which they undertake activities, or cease altogether while aircraft are operating.
- Stock and domesticated animals may take fright and become injured.
- Complaints from people and subsequent investigation by councils.
- Limits may be placed on the activities of aircraft operators.

Pilot management options to minimise the effects of noise include:

- Identify sensitive areas and avoid these where possible or manage the timing of the operation.
- Advise potentially affected people prior to operations, with details of likely timing and duration.
- Operate quiet aircraft types if available.
- Adopt noise minimisation techniques to operate aircraft as quietly as possible.
- Discuss operations with staff at councils for a mutual understanding of the activity, its effects and rules required to be complied with.

Options for plan provisions to address potential adverse effects of noise:

- Include objectives and policies for "reverse sensitivity" that recognise the importance and effect of agricultural aviation operations.
- Require resource consents (land use and subdivision) to identify activities in the vicinity that could give rise to reverse sensitivity effects, and where these are present the means by which such effects will be avoided.
- Provide for agricultural aviation operations as a permitted activity, either:
  (i) as part of farming or primary production activities; or
  (ii) as a separate activity with appropriate standards or conditions.
- Provide for a list of permitted activities in the vicinity of the site to be included on LIMS and PIMS. If agricultural aviation activities are included as a permitted activity in the district plan (as per above bullet point), information such as rural airstrips would be available to the landowner in their LIM and PIM.

Refer to the Quality Planning guidance note on Noise management in mixed-use urban environments for more information.

Storage, loading and mixing sites

As part of and prior to the aerial application of fertilisers, agrichemicals and VTAs there is generally a need to store these substances, mix them as required and then load them onto the aircraft. These activities have the potential to cause adverse effects if not appropriately managed and contained.

There are a number of HSNO controls that apply to the storage and handling of hazardous substances. These controls are based on the hazard classifications and quantity to be stored, including requirements for approved handlers, location test certificates, fire extinguishers, signage, and emergency response plans and secondary containment.

New Zealand Standard NZS 8409:2004 Management of Agrichemicals includes requirements for agrichemical storage which are best practice and consistent with the HSNO Act. If storage complies with these requirements additional controls should not be necessary through a district plan. This could be reflected through a permitted activity rule.

Management options under the RMA for storage, loading and mixing sites

Storage of hazardous substances is a land use issue that can be managed by regional councils and territorial authorities under the RMA. This creates the potential for duplication with controls under the HSNO Act. As previously noted it is particularly important that regional councils and territorial authorities do not duplicate hazardous substances controls in their regional and district plans. Controls should only be contained in regional or district plans where they add a higher degree of environmental protection that is appropriate to the local context.

The Quality Planning guidance on Managing Hazardous Substances – interface between the HSNO Act and the RMA provides examples of areas where councils may wish to consider RMA controls. These include:

- Storing hazardous substances within or adjacent to sensitive land uses and environments.
- Storing hazardous substances in areas prone to natural hazards.
- For sites or operations that store or use particularly large volumes of hazardous substances.

Some councils have taken a prescriptive approach of specifying thresholds over which storage of a substance would require resource consent. Where storage is temporary this is unnecessary and NZS8409 (Appendix L3.4) should be referred to. Some district plans address temporary storage in their hazardous substances section by providing rules to exempt this situation, subject to standards to avoid areas of potential inundation, to ensure the substances will not be windblown, and it is not located near property boundaries or waterways. Under the HSNO Act users must be given a Safety Data Sheet (SDS) when an agrichemical or VTA is purchased. HSNO controls specify what must be in the SDS. All the information on the hazards of substances and how they should be safely used, stored, transported and disposed of should be contained in the SDS for that substance. The SDS also describes emergency procedures, such as what to do in the event of a spill or fire.

Users can source a Product Safety Card (PSC) at the time of purchase. A PSC is a one-page document designed to collect all the relevant data on the hazard characteristics for specific agrichemicals. A Haznote™ is an example of a Product Safety Card (PSC see NZS 8409:2004). However, it should be noted that the SDS contains more information and detail than a PSC.

Reverse sensitivity

Reverse sensitivity is the term used to describe the sensitivity of some activities to other lawfully established activities in the vicinity. It is relevant to both regional and district plan matters. Regional plan matters may include odour, dust and spray drift, and district plan matters may include noise.

The Environment Court[12] has provided the following interpretation of reverse sensitivity:

> *Some lawfully existing activities may produce adverse effects on their surrounding environments, or at least they are perceived to do so. Reactions to those effects, or perceived effects, by way of complaints or actions in nuisance can stifle their growth or, in extreme cases, drive them elsewhere. That stifling, or that loss, may be locally, regionally or even nationally significant. If an activity likely to emit adverse effects seeks to come into a sensitive environment, the problem should be manageable by designing appropriate standards and conditions, or by refusing consent altogether. It is when sensitive activities (usually, but not always, residential activities) seek to establish within range of a lawfully established but effect-emitting activity that management may become difficult. This is the concept of reverse sensitivity…*
>
> *Reverse sensitivity is the legal vulnerability of an established activity to complaint from a new land use. It arises when an established use is causing adverse environmental impact to nearby land, and a new, benign activity is proposed for the land. The "sensitivity" is this: if the new use is permitted, the established use may be required to restrict its operations or mitigate its effects so as not to adversely affect the new activity.*
>
> *It is well settled law now that reverse sensitivity is an adverse effect, and is therefore to be avoided, remedied or mitigated.*

In terms of agricultural aviation activities people may be sensitive to noise, dust and spray effects that are generated by aerial operations. Such sensitivity can lead to complaints and attempts to restrict or curtail the operation, even in established rural areas. Often complaints are directed at the aerial operator as the name or number of the aircraft can be determined, rather than to the landowner who has engaged the aerial operator.

As noted in the industry regulations and best practice section, there are a range of industry best practice and standards that operators use to ensure that the adverse effects of their application are minimised. However, this may not be sufficient for everyone, particularly those residents new to rural areas who see the operations as an imposition on their lifestyle. In addressing such complaints, it is important to recognise that the aerial operations are generally intermittent and short term in nature and only occurring on a limited number of days in any year.

It is also important for landowners who wish to establish a new rural airstrip or helicopter landing area to consider the potential that this new activity may create reverse sensitivity effects on adjacent properties where permitted activities currently operate from.

[12] *Ngatarawa Development Trust Limited v The Hastings District Council* W017/2008 [2008] NZEnvC 100 (14 April 2008)

Management options under the RMA for reverse sensitivity

Many regional and district plans include provisions relating to reverse sensitivity, especially in the rural area. Noise, including aircraft noise, and the setbacks required for the safe operation of a rural airstrip can be explicitly included in such provisions.

It is important that any definition of reverse sensitivity is clear about where the sensitivity lies and the effect that it can have on lawfully established activities and that the plan adequately provides for agricultural aviation activities.

A policy framework that establishes that rural production activities, including aerial airstrips and operations, are part of normal rural production activities in the area enables the activity and any complaints to be assessed in that context. For example, some plans include a description of rural character to establish what activities and effects can be anticipated in the rural area.

Councils can also use non-regulatory methods such as providing information to landowners and including notices on Land Information Memorandums to draw a landowner's attention to activities that can reasonably be expected in rural areas.

It is also important to consider the potential for reverse sensitivity from the establishment of new rural airstrips and helicopter landing areas. This can be addressed in district plans through the use of appropriate setback distances on the land that the airstrip/landing area is to be located on. It can also be addressed by including an encumbrance on a title for the adjoining land to create a no-build area.

Glossary

Agrichemical	Refer to section on 'definition of agrichemical'
Buffer Zone	The distance between an identified sensitive area and the downwind edge of where an application is occurring
Bunded	An area which has a raised perimeter to prevent the escape of any spills
Controlled swath width	Defined distance across the spray pattern from a single pass
Fertiliser	Refer to section on 'fertiliser definitions'
GROWSAFE®	Registered trade name of the NZ Agrichemicals Education Trust and name of the training course associated with NZS8409:2004 Management of Agrichemicals
Notification	Advising an affected party that an application or operation is to occur
NZS8409	New Zealand Standard 8409:2004 Management of Agrichemicals
Off target drift	The movement of airborne substances as droplets, vapour, solid particles or dust away from the target area
Operator	The organisation undertaking an operation. The operator may be a sole operator/ pilot or a larger organisation with a number of pilots.
PPE	Personal Protective Equipment (e.g. gloves, respirator)
Reverse sensitivity	Reverse sensitivity is when occupants of an activity complain about the effects of an existing lawfully established activity. This can have the effect of imposing economic burdens or operational limitations on the existing activity thereby reducing their viability.
Risk factor	The possible reasons why an adverse effect could occur
Sensitive areas	Sensitive areas (as defined in NZS 8409) are areas that have an identified risk profile near an agrichemical application site. The following are examples of sensitive areas (except where the area involved is the intended spray target). Check with the regional council however as there may be sensitive areas specified in the regional plan. – Residential buildings; – School buildings; – Public places and amenity areas where people congregate; – Public water supply catchments and intakes; – Water bodies and associated riparian vegetation; – Sensitive crops or faming systems (e.g., organic farms, greenhouses); – Wetlands, indigenous vegetation habitat areas and reserves; – Public roads.
Spray quality	The spray droplet size dependent on the nozzle used. Nozzle manufacturers will provide information on spray quality while the technical specifications are set out in Spray Nozzle Classification by Droplet spectra ANSI/ASAE S572.1 March 2009
Spray plan	Spray plan means: a Spray plan prepared consistent with NZS8409: 2004 Management of Agrichemicals Section 5.3 and Appendix M4. A template can be found on the GROWSAFE website www.growsafe.co.nz
Swath	The width of deposition from a single pass of an aircraft
Vertebrate Toxic Agents (VTAs)	ACVM Standard for VTAs definition - a toxic substance used to kill or reduce the viability of vertebrate animals. It does not include attractant or repellent substances that are not toxic.
Water body	RMA definition – means fresh water or geothermal water in a river, lake, stream,

	pond wetland or aquifer or any part thereof that is not located within the coastal marine area

Appendix: Summary of the AIRCARE™ programme

AIRCARE™ is an integrated accreditation programme for all of an aviation business and brings flight safety and environmental management together in one safety assurance programme. There are three parts to the AIRCARE™ programme:

- ***Pilot competency*:** Certification is evidence of competency – in this context pilots must hold a current Agricultural Rating which demonstrates the pilot's competency to manage flight operations associated with applying all agricultural products. Under CAA Rule Part 61, a pilot must also have a Pilot Chemical Rating to apply agrichemicals and VTAs.

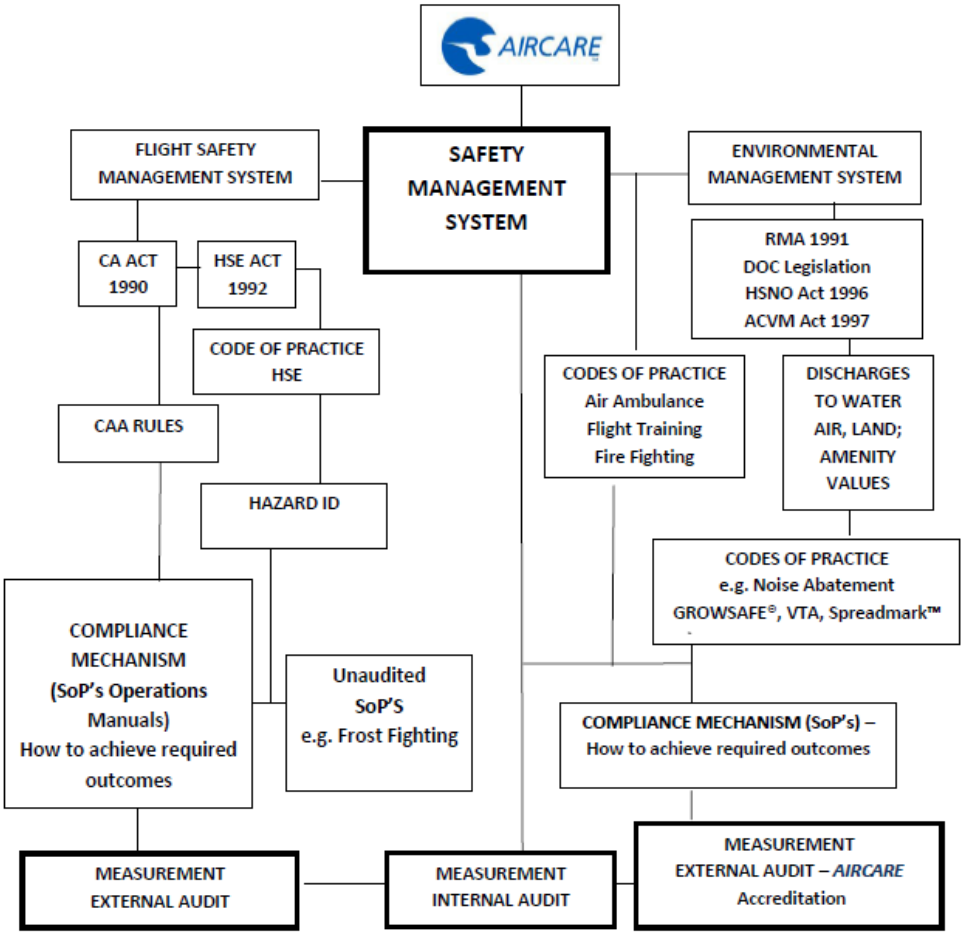
- ***Safety management system (SMS):*** The organisation (business) is required to run a safety management system. Accreditation is given to organisations able to demonstrate that the organisation has competent people – pilots and ground crew, and that they are operating using a robust and active safety management system. It is the organisation that is accredited, not the pilots.

- ***Third Party audit:*** An aerial organisation can attain AIRCARE™ accreditation only by satisfying an independent third party audit of the SMS and compliance with the relevant Codes of Practice for their operation.

Figure 1 represents the key compliance requirements for aerial operators under AIRCARE™. The left hand side sets out aviation flight safety and is mandatory under the Civil Aviation Authority Act 1990 for continued certification and licence to operate. The right hand side sets out the voluntary codes of practice covering environmental management. The four Codes of Practice (COP) that currently make up environmental management are:

- NZS8409:2004 Management of Agrichemicals COP (GROWSAFE®);
- SPREADMARK™ (Aerial) COP for the Placement of Fertiliser in NZ;
- AIRCARE™ Environmental COP for Aircraft Operations - Aerial Application of Vertebrate Toxic Agents; and
- AIRCARE™ Environmental COP for Aircraft Operations - Noise Abatement.

Figure 1: AIRCARE™



The Safety Management System (SMS) is the management system operators utilise to manage their compliance with both the CAA Rules and the AIRCARE™ codes of practice. SMS is the way in which the entire organisation is run but in this context the focus is on those activities that have a direct bearing on environmental effects. The SMS audit has four main requirements:

- A quality assurance process.
- A procedure to identify hazards.
- A procedure to place controls on the hazards.
- A procedure to measure the effectiveness of those controls (i.e. quality assurance and risk management).