# Risk assessment system for pesticides used by Department of Conservation

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## ABSTRACT

Effective, environmentally safe, humane, and legally sound use of pest control tools is a critical factor in sustaining New Zealand's biodiversity. Standards from national legislation and local authorities provide the basis for managing risks when using vertebrate pesticides in New Zealand. Department of Conservation (DOC) builds on these external standards with internal consent procedures to manage pesticide and project risks at sites. We have strengthened this local management of risk by developing a system of baseline risk assessments and performance standards. This system caters for the multitude of ways DOC uses pesticides and copes with the disparity of information available about key risks. Using this system we: (1) evaluate technical risks together with associated uncertainty; (2) assess risk using a framework of hazard and exposure; (3) rely on a specialist group who judge available information and recommend performance standards; (4) make external and DOC standards more accessible to pest managers. Community views, site factors, and cost benefit analyses are excluded and dealt with locally. Having this system in place benefits pest managers, researchers, and manufacturers, supporting them to play their respective roles in pesticide risk management. Set-up and maintenance costs are high. Gaining understanding and acceptance among pest managers requires significant communication planning. Using this system to link performance standards to risks we can demonstrate why standards are there. Public awareness material could be developed from the same information base. We see scope for this system to simplify internal consent procedures.

Keywords: risk assessment, pesticides, standards, risk management, animal pests, invasive alien species, Department of Conservation, New Zealand



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# 1. Introduction

Pest control is a critical factor in sustaining New Zealand's native biodiversity (N.Z. Biodiversity Strategy 2000). To ensure sustained pest control we need effective, environmentally safe, humane and legally sound tools, many of which involve pesticides.

Performance standards[1] from legislation and local authorities provide the basis for managing risks when using pesticides in New Zealand. The Environmental Risk Management Authority (ERMA) controls environmental risks from hazardous substances through the Hazardous Substances and New Organisms Act (HSNO). The New Zealand Food Safety Authority controls pesticide residues (in food) and animal welfare risks through the Agricultural Compounds and Veterinary Medicines Act (ACVM). Regional Councils address environmental risks at sites by administering the Resource Management Act (RMA), either through regional plan provisions, or on a case by case basis through conditions on resource consents. Department of Conservation (DOC) builds on these external standards with internal consent procedures to manage pesticide and project risks at sites.

The system of consistent baseline risk assessments outlined in this paper strengthens the risk management framework described above by addressing DOC's need for:

- Consistency in the technical evaluation supporting decision making
- Better controls on new products used in sensitive environments
- Straightforward rules for managing risks which interpret and complement legal standards
- A means for capturing new information into consents and plans

A literature search and external review did not reveal an existing risk assessment system which we could adapt to meet our needs. Engineering-based approaches required well-researched models and complete data inputs, both unavailable in the context of pesticides for biodiversity management in New Zealand.

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[1] Performance standards control the way pesticides are handled, used, stored, transported, and disposed of. Standards include regulations, label instructions, policy, conditions of use, and other applicable rules.

# 2. The risk assessment system

The system we developed deals with technical risks not related to specific sites. Community views, site factors, and cost benefit analyses are excluded and managed locally.

The basic approach of this risk assessment analyses risk as a combination of hazard and exposure. These two components can expand to cover all the factors determining the risks of using pesticides in conservation management: pesticide, toxic loading, bait type, method, use pattern, site factors (Fig. 1). For a generically applicable risk assessment, we focus on the first four components which we term a **pesticide use**. Each pesticide use is assessed individually as it may have different risks.

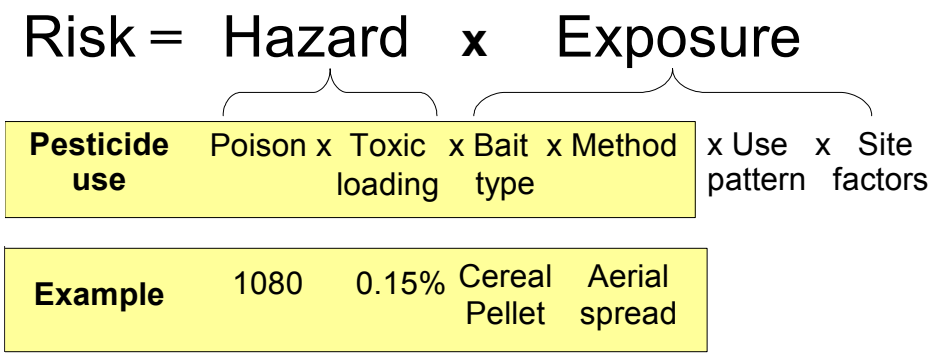


Figure 1. Framework for a risk assessment system, defining pesticide use.

DOC has established a Pesticides Advisory Group to complete these assessments. Each risk assessment represents the collective judgement call of the advisory group based on the best information available and their experience in using or researching the use of pesticides.

The base information is held in online pesticide information reviews, allowing updates as new information comes to hand. The Pesticides Advisory Group uses the pesticide information reviews to assess the risks for each pesticide use.

Broad risk categories in each risk assessment cover non-target species, human health risks, and operational issues such as efficacy and animal welfare. Figure 2 illustrates the worksheet for one risk category. We assess toxicity and exposure risks separately for non-target species and human health. For each component the Pesticides Advisory Group scores the risk and qualifies this with an uncertainty score which indicates how robust the supporting information is. This separation of risk and uncertainty is critical to coping with the disparity of information for key risks. It also serves to prevent the group from confounding high risk with poor information (high uncertainty).

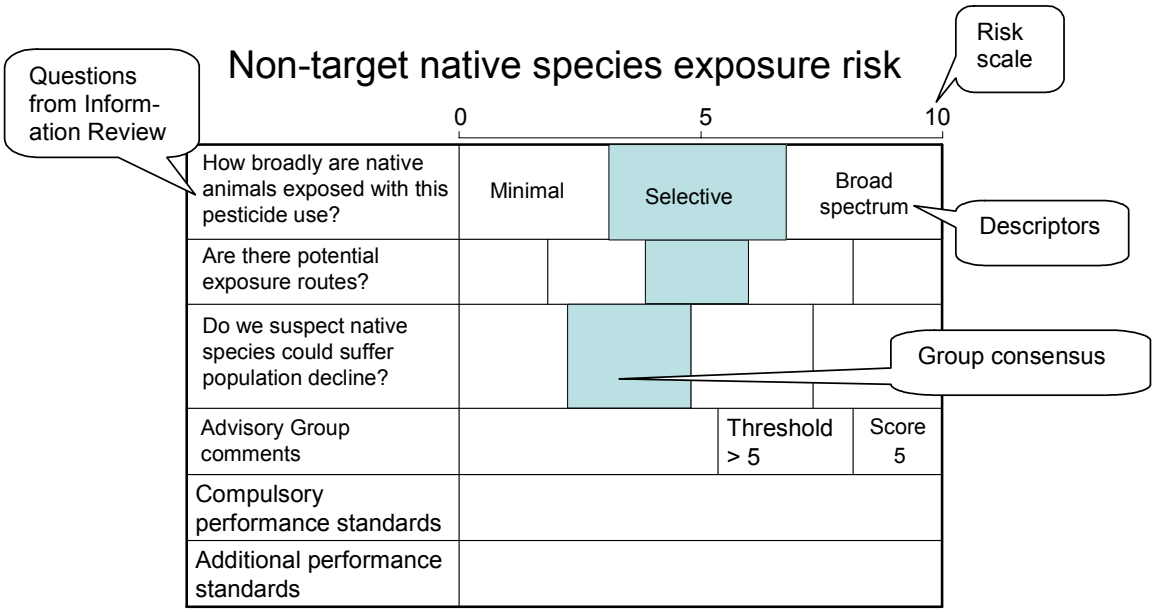


Figure 2. Example worksheet from a Pesticide Advisory Group risk assessment.

To assess fate in the environment, we use a diagram of potential pathways for the pesticide in the ecosystem. Where pesticides go in the environment is not a risk in itself, instead this diagram sets the scene for assessing potential exposure in the other broad risk categories. The fate in environment diagram has no risk score, but it is qualified by an uncertainty score.

We test risk scores against a set of threshold values established to quantify maximum acceptable levels of risk DOC will tolerate. Scores exceeding thresholds either generate risk management performance standards, or if this is not possible, cause the pesticide use to become listed as prohibited on public conservation land. Similarly, uncertainty exceeding the thresholds generates questions which help to lower the uncertainty, once answered. Sometimes a risk or uncertainty threshold is not exceeded, but opportunities arise to further manage risk or reduce uncertainty. We provide these ideas to managers as options to suit their local needs which may drive some consistency in local conditions and act as a catalyst for information.

Staff access the outputs of the risk assessment on a **status list,** or spreadsheet of pesticide uses, which allows them to easily find:

- Permissible target species
- Summary of the risk assessment
- The status (acceptable or prohibited by DOC)
- Compulsory performance standards, both internal and external including those recommended by the Pesticides Advisory Group
- Compulsory information needs, arising from uncertainty scores that exceeded thresholds
- Additional performance standards and information needs, provided as opportunities to further manage risk or fill information gaps

- The relevant DOC Pesticides Information Review
- Product label and Material Data Safety Sheet (MSDS)

Uncertainty scores follow the same process and format and are done concurrently with each risk question.

# 3. Key benefits

## 3.1 BENEFITS FOR PEST MANAGERS

**Targeting risk management**—The risk categories describe the nature of the risks and benchmarking against thresholds indicates their magnitude. Together this means performance standards can be more effectively targeted to manage the risks. Using the Pesticides Advisory Group to judge risks allows their knowledge and experience to improve planning for all pesticide operations on public conservation land.

**Keeping performance standards current**—Using an operational reporting system, results and observations from the field can transfer into the pesticides manual and flow through to influence the risk assessments.

**Efficient legal compliance**—The compulsory performance standards accessed through the status list and DOC's standard operating procedures interpret all pesticide regulations into practical rules to follow.

## 3.2 BENEFITS FOR RESEARCHERS

**Science transfer**—The system helps DOC to capture new information and translate these into operations. The advisory group can re-assess the risks as research changes our understanding. Scoring uncertainty qualifies our risk judgements and clarifies what we need to know. This enables us to cope with data-poor pesticide uses by targeting research and/or mandatory data collection in operations.

## 3.3 BENEFITS FOR PESTICIDE MANUFACTURERS

**Meeting customer needs**—With a transparent risk assessment system, anyone can identify the properties DOC looks for in a pest control product, and identify opportunities for improvements.

# 4. Costs

Before DOC can realise these benefits, we need a critical mass of pesticide uses assessed. It has taken almost two years to refine the system and assess 75% of pesticide uses registered in New Zealand for conservation pests. Having risk assessments based around pesticide uses means any one new piece of information potentially affects several risk assessments.

Hundreds of pest management staff in DOC will use the outputs of the risk assessment, putting the risk management into practice. The challenge is to provide staff with easy access to the most up-to-date version of the information they need.

# 5. Where to from here?

We could develop public awareness material from the same information base. This would provide public information underpinned by the same currency and consistency of technical information as our consents. We see scope for this system to simplify internal consent procedures, improving the efficiency without compromising public and environmental safety. Elements of this system may have wider application, for example to traps or herbicides. Our approach may help in other situations where components of the risk are poorly understood, or where the level of information varies.

# 6. Reference

N.Z. Biodiversity Strategy 2000: The New Zealand Biodiversity Strategy, February 2000. Our chance to turn the tide. Department of Conservation, and Ministry for the Environment, Wellington. ISBN 0-478-21919-9. 146 p.