



Knowing what's out there

Regulating the environmental fate of chemicals

Frequently asked questions

What is this report about?

This report reviews how well our regulatory system manages chemical contaminants reaching and affecting our environment. It also examines whether the system appropriately takes environmental impacts into account when deciding what conditions to place on a substance's use.

The report recommends that we gather better information about the quantities of chemicals entering the environment and use a common framework to determine whether their use and presence in the environment is problematic.

The recommendations aim to create a system where regulations controlling how a chemical can be used are regularly updated in light of environmental evidence that is relevant to New Zealand.

What are chemical contaminants?

When chemicals enter environments where they are not usually present, or in quantities above naturally occurring levels, they can cause problems for living things. Organisms can be mildly or severely damaged from exposure to certain chemicals, and some can die. The degree of harm depends on a chemical's concentration and toxicity, and how the chemical causes a toxic effect. These contaminants can be natural (such as mineral compounds, or human or animal waste) or humanmade (such as plastics and pharmaceuticals).

This report focuses on the impact of chemicals in receiving environments – where they are most likely to end up – such as freshwater ecosystems, coastal environments and soils. The report does not focus on chemical contaminants that impact on human health, or on nutrients and bacterial contaminants as they have received considerable policy focus over recent decades.

How do chemicals get into our environment in the first place?

Chemicals can enter our environment through direct application onto the soil, such as by spraying pesticides on lawns or crops. They can leach out of landfills, manufactured items or from naturally occurring sources. They can be carried in run-off from roofs and roads into stormwater drains to reach our waterways and coastal environments. Wastewater treatment plants discharge treated wastewater (containing whatever industry and households put down the sink) into our waterways. Biosolids from these treatment plants are sometimes applied to land.

What happens to chemicals in the environment?

Once a chemical is in the environment, its physical and chemical properties will determine where it ends up and whether it will have any toxic effects on organisms and ecosystems exposed to it. Based on these physicochemical properties and observational work, scientists have developed tools to measure how long a chemical remains in the environment (its persistence), how much it can move around (its mobility), and how much is likely to be available to organisms to take up (its bioavailability).

The persistence of a chemical in the environment will depend on how easily it degrades. Key environmental factors affecting the rate of a chemical's degradation include exposure to light (photolysis), water (hydrolysis) or microbial activity (biodegradation).

Do we know what chemicals end up in the environment and where?

Not really, monitoring is very patchy. Fewer than 200 chemicals – of roughly 30,000 approved for use in New Zealand – are routinely monitored as part of state of the environment reporting or through resource consent monitoring. Some others are monitored, but less systematically.

There have been a few studies aimed at establishing baseline levels of emerging contaminants but these haven't been conducted for each ecosystem or with sufficient regularity.

A review of consents covering discharge activities (including landfill leachate, wastewater and stormwater) found there is routine monitoring of some contaminants, like heavy metals, across all discharge activities. But very few organic contaminants, such as pharmaceuticals or personal care products, are subject to an equivalent level of scrutiny.

Why do we use chemicals that have the potential to cause environmental harm?

Chemicals are not inherently bad. Many help society – from the development of medicines to the production of items we use daily. Not all chemicals have the same properties, and not all have the same level of toxicity and persistence. Unless a chemical is so toxic that it is banned, decisions to approve a chemical's use will involve judgements about what level of risk is acceptable after taking into account the advantages it offers and conditions on the way and where it will be used.

Problems arise when chemicals are used at concentrations and frequencies outside of regulations. This review has not set out to question whether chemicals should be used or not, or to evaluate how risky or beneficial they are. It has considered whether the regulatory system has sufficient oversight of the environmental fate of the chemicals it approves for use.

Who decides what chemicals can be used in New Zealand and how they can be used?

Four main national-level regulators play a role in chemical management in New Zealand. The Environmental Protection Authority (EPA) is the key agency responsible for the management of any environmental risks associated with chemicals that are hazardous substances. The Ministry for Primary Industries plays a role in regulating agricultural compounds and veterinary medicines, Medsafe regulates medicines and WorkSafe New Zealand can place controls on substances used in workplaces.

There are roughly 150,000 substances approved for use in New Zealand, made up of an estimated 30,000 chemicals (a single chemical can be an ingredient in multiple products). Globally, over 100,000 chemicals are in use, of the more than 100 million chemicals available.

How does the approval process take environmental impacts into account?

Substances assessed by the EPA must include analysis of their impacts on human health and the environment. Environmental risk assessments collate findings from ecotoxicology and environmental chemistry tests to assist regulators weighing up the risks of chemicals reaching the environment. These assessments analyse how a chemical can get into the environment, in what form and quantity, and how they can cause harm to the things living there. The EPA also engages with Māori to gauge any cultural impacts.

If risks are identified when approving a new chemical for use, the EPA can restrict its use to limit the potential for harm. These environmental controls range from setting application rates to prescribing label statements and restricting specific use patterns.

The approval of medicines by Medsafe does not take into account environmental impacts.

Has every substance in use in New Zealand been assessed for environmental risk?

Not directly. Only about 3,500 substances have ever been the subject of individual approvals requiring specific environmental risk assessments. Most substances are approved as a group. This is the legacy of the system created by the Hazardous Substances and New Organisms Act in 2005. The Act triggered a mass transfer of chemicals to the new system, mostly by assigning chemicals to group standards.

While group standards and transfer notices provided new generic controls, there was no formal risk assessment weighing up the risks, costs, benefits and effectiveness of individual substances because of the sheer size of the task. This is still true for new substances assigned to existing group standards. These assignments are made by private businesses associated with their import and manufacture.

Evidence relating to individual substances will not be evaluated by the EPA unless the chemicals are formally reassessed. That is a costly business and the EPA has never had anywhere near the resources to conduct more than a handful of reassessments per year, with only a few hundred ever having been completed.

Can't we just use what other jurisdictions say?

Yes, to a degree. The Commissioner supports the move towards the proposed "trusted regulator approach" that would enable closer links to international regulator assessments and data. But we still need to take into account the New Zealand context. The particular features of our environment and the particular use we make of certain substances means we cannot simply adopt the judgements of other countries without further question. Input from tangata whenua must also be considered.

What did the report find?

The report found there is a lot we don't know about chemicals reaching our environment, including how much, where and the effects they are having.

Our regulatory system needs to be better informed with data on the quantities of chemicals imported, manufactured, sold and used. For the most risky chemicals, actual levels of environmental contamination must be monitored against appropriate guidelines and limits (including for cultural health), with results reported back so rules for the chemical can be adjusted.

This is no easy task. It is implausible to assess the environmental risk of every single chemical or substance used in New Zealand. Any chemical management system needs to be able to target its regulatory effort to those contaminants and uses that raise the most serious issues.

What does the report recommend?

The Commissioner recommends that all agencies dealing with chemicals adopt a common framework to help them manage the environmental impacts of chemical use. The framework would help prioritise which chemicals to focus on based on their scale of use, potential harm and environmental presence. The design of any framework should involve Māori.

To help gauge the scale of a chemical's use in New Zealand, the Commissioner recommends collecting and reporting data on use patterns for chemicals of concern throughout their lifecycle. This would require importers, manufacturers and sellers of chemicals to report on chemical quantities.

Guideline limit values and monitoring are essential to understanding chemical presence in receiving environments and determining whether the concentration is likely to cause harm to ecosystems and the things living there. The Commissioner wants greater use made of environmental exposure limits and better guidance on regional and national monitoring. Modelling of New Zealand-specific scenarios is also suggested to predict whether a contaminant will reach a receiving environment.

To cover some gaps in the current system, the EPA should develop policies to address specific pathways through which chemicals reach the environment, such as animal wastes, the accumulation of contaminants in agricultural soils and human pharmaceuticals in wastewater, together with some manufactured articles and by-products.

How should Māori engagement underpin chemical approvals?

In the current approval process for chemicals, cultural impacts are only considered at a national level, which dilutes the concerns of tangata whenua, which are more likely to be place-based.

The Commissioner suggests that the EPA's Kaupapa Kura Taiao team should consider focusing some of its resources on providing 'friends of submitters' services to Māori (whānau, hapū, iwi and other Māori entities) to ensure the impacts of contamination on place-based social and cultural dimensions are taken into account.

Who enforces the rules around chemical contaminants? Are they doing it?

Once approved at the national level, responsibility for compliance and enforcement of environmental regulatory requirements for chemicals sits with WorkSafe New Zealand, councils and the EPA – depending on how they are used. However, a recent report on the status of the hazardous substances compliance system identified constraints on the level of priority, capacity and capability that can be devoted to hazardous substances by enforcement agencies.

To prevent duplication, the Commissioner's investigation did not review compliance and enforcement.