Ministry for the Environment
Manatū Mō Te Taiao

Environmental Performance Indicators:
Confirmed indicators for waste, hazardous waste and contaminated sites

September 2000

Signposts for sustainability

You can forward any comments, or a request for further information on the EPI Programme, to:

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Environmental Performance Indicators

Confirmed indicators for waste, hazardous waste and contaminated sites

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Executive Summary

Purpose

This report confirms indicators for waste, hazardous waste and contaminated sites. It explains how these confirmed indicators fit into the wider Environmental Performance Indicators (EPI) Programme, why they were chosen and how the indicators will be implemented and reported in the future. The key audience for this report is those who will be implementing and reporting on these indicators, including regional councils, territorial local authorities, industry/commercial operators, and some central government departments.

Issues for waste, hazardous waste and contaminated sites

As a society with a relatively high standard of living we produce high quantities of waste. Our waste is expensive to dispose of and can have adverse environmental effects. The quantity of our waste has been increasing in the past ten years. We all contribute to the waste generated in New Zealand.

There are limited facilities to deal with hazardous waste and lack of agreed definitions of what is hazardous makes the management of hazardous waste a challenge.

In New Zealand there are many contaminated sites with concentrations of hazardous substances above background levels. These pose or are likely to pose an immediate or long-term hazard to human health or to the environment.

Monitoring and reporting on these pressures on the condition or state of our environment is vital. Waste is a pressure on our environment. The Environmental Performance Indicators (EPI) Programme being co-ordinated by the Ministry for the Environment (MfE) aims to develop and use these waste indicators and a broader set of indicators to measure and report on how well we are looking after the environment.

Process leading to the confirmed indicators

The Ministry for the Environment has been through a consultative and iterative process to develop and confirm these waste, hazardous waste and contaminated sites indicators. The proposed indicators were published in October 1998 and presented at the Waste MINZ Conferences in 1998/9. There have been a number of focus group workshops, hui and meetings to discuss the proposed indicators prior to their confirmation in June 1999. There have also been focus group workshops with people respected for their knowledge in the area of these indicators just prior to the release of this report in order to gain agreement and workability of the confirmed indicators. The indicators were amended due to this part of the process.

The confirmed indicators

The confirmed indicators for waste, hazardous waste and contaminated sites are summarised in the table below.

There are four confirmed indicators for solid waste, relating to quantity and composition of waste to landfills, and recycling. There are three Stage 1 indicators and one Stage 2 indicator.

There are three confirmed liquid waste indicators. Stock density and the intensity of land use is a Stage 1 indicator and biological oxygen demand loadings to land and water and nutrient loadings to land and water are both Stage 2 indicators. These indicators tell us about pressures on our land and water resources from liquid waste.

We have confirmed two indicators for hazardous waste, relating to:

- the quantity of hazardous waste accepted at landfills, waste water treatment facilities and hazardous waste treatment facilities and that exported and
- the quantity of priority hazardous waste generated and stored.

The Stage 1 indicators will be based on current monitoring at selected locations around the country. The Stage 2 indicators will be collected under the national hazardous waste definition and national hazardous waste monitoring and information systems – currently being developed as national environment standards under the Hazardous Waste Management Programme. These Stage 2 indicators will eventually replace the Stage 1 indicators.

There are two contaminated sites indicators relating to the management status of confirmed contaminated sites. These indicators tell us about responses to management practices and the Stage 2 indicator also tells us about risks to the environment and human health.

You can view these indicators through the Ministry web page www.mfe.govt.nz or www.environment.govt.nz

Confirmed indicators for waste, hazardous waste and contaminated sites

Indicator Type	Stage 1 Indicators (2000–2002)	Stage 2 Indicators (2002–2005)
Solid waste	SW1 Quantity of waste disposed to landfill and cleanfill by region. SW2 Quantity of waste recycled: • Paper • Plastic • Glass • Metal (including steel and aluminium) • Organic SW3 Access to solid waste resource recovery/recycling facilities: • Number of houses with kerbside collections • Facilities available to households (drop off points, eg, for aluminium cans) • Supervised and unsupervised resource recovery centres (eg, those at landfills or waste exchanges).	SW4 Composition and source of waste to landfill in the following WAP categories: • Paper • Plastic • Glass • Metal • Organic • Rubble, concrete, etc • Timber • Rubber and textiles • Potentially hazardous • Other Source categories are residential or business.

Indicator Type	Stage 1 Indicators (2000–2002)	Stage 2 Indicators (2002–2005)
Liquid waste	LW1 Stock density	LW2 BOD loadings to land and water LW3 Nutrient loadings to land and water
Hazardous waste[1]	HW1 Quantity of hazardous waste: • Accepted at landfills (direct from larger landfills) • Exported (Ministry of Commerce, Basel Convention) • Accepted at hazardous waste treatment facilities – including incinerators (direct from facilities on a voluntary basis) • Accepted at wastewater treatment facilities (calculated estimate of quantities). HW2 Quantity of priority hazardous waste generated and stored: • Imported • Physically hauled away from site (ie, trucked away) – solid or contained (either from transporters or direct from industries) • Discharged to sewer – liquid (direct from industries or upper limit on resource consents) • Discharged to: – land – air – water. On site as defined from the list.	HW1 Quantity of hazardous waste discharged to land, air and water. Includes hazardous waste accepted at: • Landfills • Exported • Hazardous waste treatment facilities – including incinerators • Wastewater treatment facilities (municipal). Collected under national hazardous waste definition and national hazardous waste monitoring and information systems. HW2 Quantity of priority hazardous waste generated and stored: • Required by regulation via National Environmental Standard (manifest or other system) • Storage (possibly minimum threshold or type of facility) • Diffuse sources or WAP methodology. Collected under national hazardous waste definition and national hazardous waste monitoring and information systems.
Contaminated sites	CS1 The total number of sites that fall into the following categories: • Confirmed contaminated site • Remediated site.	CS2 The total number of sites that fall into the following categories: • Under investigation *moderate to low risk* sites • Under investigation *high-risk* sites • Confirmed contaminated *moderate to low-risk* sites (pre and post RMA) • Confirmed contaminated *high risk* sites (pre- and post-RMA) • Remediated sites.

*The categories given for the Stage 2 indicators will be revised following completion of an SMF project currently being undertaken on contaminated classifications criteria.

[1] The Stage 2 indicators for hazardous waste will eventually replace the Stage 1 indicators. The Stage 2 indicators will be collected under a national definition of hazardous waste and reporting systems currently being developed under the Hazardous Waste Management Programme.

Toxic contaminants and hazardous substances indicators still to be confirmed

Work on indicators for toxic contaminants and hazardous substances indicator is progressing more slowly. Indicators were proposed in the October 1998 discussion document, but we are still considering options. We hope to be in a position to recommend indicators for these areas in 2000.

Next steps

Now that we have a confirmed set of indicators we can initiate their implementation. We propose that the Stage 1 indicators for waste, hazardous waste and contaminated sites be implemented by:

Responsible agency	**To implement these indicators and provide information on:**
TLAs	Disposal to landfills, recycling schemes and wastewater treatment.
Commercial waste operators	Disposal to landfills and hazardous waste treatment facilities.
Packaging Council and Plastics Institute	Quantity of waste recycled.
Ministry of Economic Development	Exports of hazardous waste.
Regional councils	Stock density, acceptance of hazardous waste at landfills (where this is required by resource consent) and contaminated sites.

To implement these indicators we need to understand measures of change from a baseline. We also need agreement on how and by whom the indicators will be monitored and reported at different times. The sampling will be unique to each indicator. We specify in this report the monitoring units and the expected frequency of monitoring required to identify trends or changes in waste management in New Zealand.

Before the indicators can be implemented we need to understand the minimum data requirements for each indicator. In the EPI Programme we refer to this process as the MMRR – the minimum monitoring and reporting requirements. MMRR is the transition step between identifying appropriate indicators (what indicators to use) and to implementing them (how the indicators will work). Before we start collecting information we need to know what to collect, how much to collect and where it should be collected. We have developed a template to assist in the process of working through the details of how each indicator will work and will be implemented and reported.

The confirmed indicators outlined in this document will be used to report key waste pressures on the state or condition of our environment in New Zealand. This process of determining how the indicators will be reported is also included in the process of MMRR we have developed.

Glossary

Biological oxygen demand (BOD)	The amount of oxygen required to degrade the organic material and oxidize reduced substances in a water sample; used as a measure of the oxygen requirement of bacterial populations and serving as an index of water pollution; biochemical oxygen demand (Lincoln 1982).
Cleanfill	Material that has no potential to produce harmful effects on humans and the environment (inert waste). Generally natural material such as clay, soil, rock.
Contaminated site	A site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses or is likely to pose and immediate or long term hazard to human health or the environment.
EPI Programme	The Environmental Performance Indicators Programme – being co-ordinated by the Ministry for the Environment.
Hazardous Waste Management Programme	This is being led by the Ministry for the Environment to develop a definition of hazardous waste and a means of managing hazardous waste in New Zealand.
Indicator	An indicator is a measure (eg, a distance from a goal, target, threshold, benchmark) against which some aspects of policy performance can be assessed. Indicators are information tools. Environmental indicators simplify, quantify and communicate trends in and impacts on the environment. They also tell us the extent to which our policies are working.
Investigated contaminated site	A site in this category is not necessarily contaminated but is investigated because it is current or past land use suggests that the site could be contaminated and this risk may harm humans and the environment.
Landfill	A waste disposal site used for the controlled deposit of solid waste onto or into land.
Landfill Census	This is a survey carried out in 1998/99 and 1995 by the Ministry for the Environment to assess current New Zealand landfill practice.
Macroinvertebrates	Animals without backbones – insects, arachnids, molluscs, crustaceans, worms etc.
Non-point source discharge	Diffuse sources of waste discharge
Nutrient loading	Nitrates, phosphorous, and silica in fresh and marine waters
Organic waste	Waste that includes garden, fruit and vegetable waste.
Periphyton	Predominantly attached algae – usually green slime.

PSR Framework	The Pressure-State-Response Framework developed by the OECD
Recycling	The process of retrieving used material from the waste stream and remaking it into new and sometimes different products.
Remediated sites	Sites where remedial action or a management strategy implemented is such that the site contamination hazard no longer poses a risk to human health and the environment whilst the current land use continues. This decision will be based on current information, including Ministry for the Environment guidelines for Gasworks Contaminated Sites, Timber Treatment Sites and Petroleum Hydrocarbon contaminated sites.
Resource recovery facilities	Facilities to divert waste from the waste stream and into useful products.
RHA	Rapid Hazard Assessment – a methodology developed in 1993 by Ministry for the Environment
Stage 1 and Stage 2 indicators	Stage 1 indicators are those that can be implemented now or in the next two years. Stage 2 indicators are those that need further work.
Toxic contaminants	In this report toxic contaminants includes toxics as defined by the HSNO Act – toxic to humans, and ecotoxic that refers to ecosystems.
Waste	Materials and energy, which have no further, use and are released to the environment as a means of disposal, ie, solid waste is generated in a solid form for disposal and liquid waste is generated or converted into a liquid form for disposal.

Abbreviations

MfE	Ministry for the Environment
NES	National Environmental Standard
OECD	Organisation for Economic Co-operation and Development
PC	Packaging Council
PINZ	Plastics Institute of New Zealand
RMA	Resource Management Act 1991
SMF	Sustainable Management Fund
TLAs	Territorial Local Authorities – this includes city and district councils
WAP	Waste Analysis Protocol

Contents

Introduction – Signposts for Sustainability

The purpose and audience of this document

This document reports on the confirmed indicators for waste, hazardous waste and contaminated sites. It explains how these confirmed indicators fit into the wider Environmental Performance Indicators (EPI) Programme and how these indicators will be implemented and reported in the future. The key audience for this report is those who will be implementing and reporting on these indicators. This includes regional councils, territorial local authorities (TLAs), industry/ commercial operators, Statistics New Zealand (StatsNZ), Ministry of Agriculture and Forestry (MAF) and the Ministry of Economic Development (MoD).

The EPI Programme and state of the environment reporting

The State of New Zealand's Environment, the first report of this type, was published in 1997. It told us that New Zealand lacks long-term, consistent integrated information on which to make sound environmental decisions. The indicators developed under the EPI Programme will be used to report on the state of New Zealand's environment in the future.

The purpose of the EPI Programme is to develop and use indicators to measure and report how well we are looking after our environment. The Government's objectives are to:

- systematically measure the performance of environmental policy and legislation
- better prioritise policy and improve decision making
- systematically report on the state of New Zealand's environment.

Benefits of indicators include:

- improved environmental policy, scientifically informed policy and decision-making
- support and commitment from the Government
- easier access to information
- increased ability to share information and compare performance (areas and agencies)
- the development of new monitoring, information management and reporting tools
- better coordination and targeting of monitoring
- identification and prioritisation of national or multi-regional issues, which require research or are addressed at a national level
- benchmarking of "clean-green New Zealand".

There has been excellent progress with the development of environmental performance indicators. The EPI Programme is being led by the Ministry for the Environment with input from other government departments, local government, iwi, Crown Research Institutes, consultants, non-government organisations such as environmental groups, and industry. The indicators developed and confirmed to date include those for:

- land, air, water
- ozone

- climate change
- waste, hazardous waste, contaminated sites
- the marine environment
- transport
- biodiversity.

The Ministry is currently preparing reports to communicate the confirmed indicators for waste, hazardous waste, contaminated sites; the marine environment; transport and biodiversity.

We have developed proposed indicators for energy and toxic contaminants. Indicators are currently being developed for pests, weeds and diseases and urban amenity. We are also working with Maori on the development of environmental performance indicators from a Maori perspective.

What is an indicator?

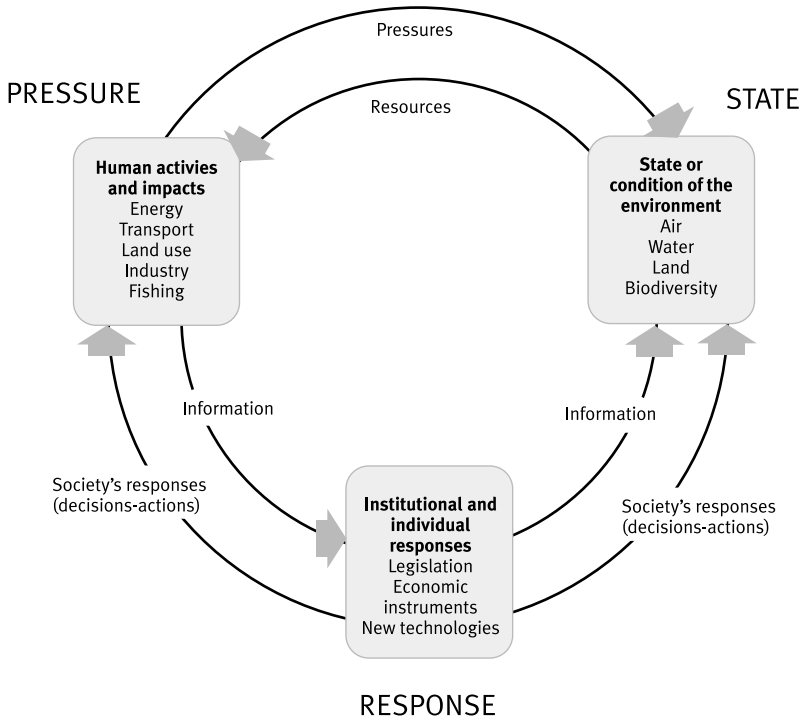
An indicator is a measure (eg, a distance from a goal, target, threshold, benchmark) against which some aspects of policy performance can be assessed. Indicators are information tools. Environmental indicators simplify, quantify and communicate trends in and impacts on the environment. For example, nitrates in groundwater, bathing water quality, and the extent of indigenous forest and other land cover are all indicators developed under the EPI Programme.

Indicators enable the Ministry to ensure that our environmental policies are working and that they are informed by good science. They also highlight the key issues and make it easier to access information and to benchmark clean green New Zealand, therefore our trade advantages.

Pressure-State-Response framework

The EPI Programme uses the Pressure-State-Response framework (the PSR Framework), developed by the OECD for indicator development. The PSR Framework, or modified versions of it, is being used worldwide as a reporting tool. Human activities exert pressures on the environment, changing the quality and quantity of natural resources. These changes alter the state, or condition, of the environment. The human responses to these changes include any organised behaviour which aims to reduce, prevent or mitigate undesirable changes.

Figure 1. **The Pressure-State-Response Framework**



Source: Australian SOE Advisory Council 1996

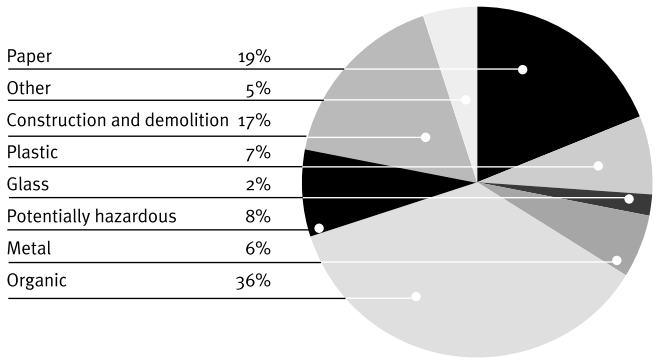
Issues for waste, hazardous waste and contaminated sites

Solid waste

Solid waste is defined as "waste that is generated in a solid form or converted to a solid form for disposal" (MfE, 1998a). There has been an increase in the waste accepted at landfills since 1983, and the trend is for further increases in waste disposed of to landfill. It is widely agreed that population numbers and the level of economic activity in a society has a direct influence on the quantity of waste disposed of and recycled. More people and affluent communities produce more waste.

The composition of waste is also a concern. A large percentage (38 percent) of our waste is organic material, which could be utilised as a resource rather than processed as a waste. Paper and construction – demolition are other major contributors (19 percent and 17 percent respectively) to our waste stream (see Figure 2).

Figure 2. **Composition of waste in 1995**



Source: The National Waste Data Report, Ministry for the Environment, May 1997

Liquid waste

Liquid waste is waste that is generated or converted into a liquid form for disposal (MfE, 1998a). It includes:

- *wastewater or sewage:* collected in the sewage system and transported to water treatment plants before being discharged to rivers, coastal water and land
- *point source discharges:* which includes untreated waste from farms, factories and mines discharged into rivers, coastal waters and land
- *stormwater:* rainwater and runoff channelled from roads and urban properties into rivers and coastal waters
- *non-point source discharges:* such as livestock excrement and agrichemicals that are washed away from paddocks into streams by rainwater.

An example of liquid waste is effluent from stock. Stock density is increasing in some areas of New Zealand and this impacts on biological oxygen demand (BOD) and nutrient loadings to land and water. Liquid wastes can lead to high nutrient loadings in land and this effects water quality (such as the trophic status of lakes, nitrates in groundwater, slimy growths in rivers (periphyton), and a decline in macroinvertebrates) and can eventually contribute to beach closures due to poor estuarine and coastal water quality.

Because of the close links with the existing core freshwater indicators, the liquid waste indicators reported in this document will be integrated into the freshwater indicators from this point on (as key pressures on the freshwater resource).

Hazardous waste

A key issue for the management of hazardous waste in New Zealand and the confirmation of waste indicators is the lack of a consistently agreed and applied definition of hazardous waste. The Ministry for the Environment's Hazardous Waste Management Programme has recommended a definition for hazardous waste, which was out for public comment. Submissions closed recently and are being considered by the Ministry for the Environment.

The proposed draft definition of hazardous waste is based on three key elements:

- an overriding definition of the term waste

- a series of hazardous characteristics and associated minimum thresholds above which waste is designated as hazardous
- a generic hazardous waste list.

Once submissions are received the list of thresholds will be piloted in 2000, and it is hoped that by the end of 2000 there will be an agreed final definition of hazardous waste.

New Zealand often does not know what to do with its hazardous waste and there are a limited number of facilities that can deal with hazardous waste. A recent Centre for Advanced Engineering survey found that there are nine hazardous waste treatment facilities in New Zealand, in Auckland, Wellington and Christchurch, and a small facility for photographic hazardous waste in Dunedin. In addition many waste generators have developed in-house treatment facilities.

Another issue relating to hazardous waste is cross-regional movements of this waste, enforcement and dumping of this waste.

Contaminated sites

A contaminated site is "a site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses or is likely to pose an immediate or long-term hazard to human health or the environment" (ANZECC, 1992; MfE, 1998a).

Many contaminated sites have arisen as a result of the inappropriate handling and management of hazardous chemicals and past disposal practices (considered safe and acceptable at the time), but now known to have long-term toxicity and adverse effects on the environment and human health. Contaminated sites put pressure on the environment through contamination of New Zealand's water and land resources. They create a direct pressure on our environment – our land, water and marine resources. This affects our land use, productivity/economy, ecosystem health and human health (even years later). This is especially so where contaminated sites contaminate our groundwater and surface water. An example of a contaminated site is an old timber treatment site that is not a suitable site for certain types of human activity (due to a residue of toxic contaminants), and is a depleted ecosystem in terms of the plants and animals that site can sustain.

There may be significant clean-up costs involved in remedying contaminated sites. Therefore, it is important to avoid the generation of new contaminated sites.

Waste policy – what we are aiming for

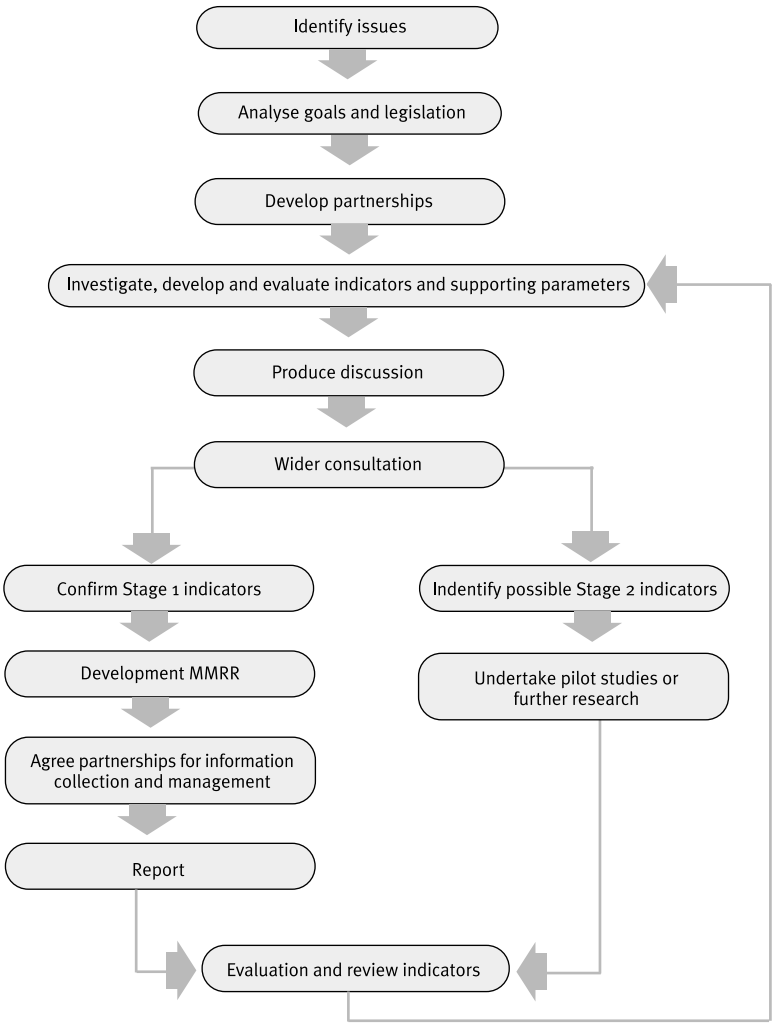
A statement on waste policy was included in the Speech from the Throne when the current Parliament was opened (12 December 1999), and signals the Government's broad intentions in relation to waste policy:

> *Waste management is an environmental matter which needs stronger action. It will be a requirement that by the year 2010 all waste management shall be on a full cost recovery basis and all existing landfills are upgraded or closed. It is my government's objective to reduce significantly the waste stream.*

The process of developing indicators

The process of developing and confirming these waste, hazardous waste, and contaminated sites indicators is outlined in Figure 3.

***Figure 3*. Indicator development process**



The Ministry for the Environment presented the proposed waste and hazardous waste indicators at the 1998 WasteMINZ Conference (MfE, 1998a). Comments were widely sought and a series of meetings held with local authorities and other interested parties in November and December 1998. Altogether there was a lot of informal feedback, and 50 formal submissions were received.

There was general support for the proposed indicators but some lack of understanding from submitters about the concept of pressure indicators (ie, the PSR Framework). The idea of pressure indicators is that they show broad trends and foreshadow potential problems or improvements in the environment. They signal environmental risk. They are not designed to always measure cause and effect, but to complement the state indicators for air, land, freshwater, biodiversity and marine resources. Together they provide an integrated package.

Following the release of the proposed indicators discussion document, the indicators were refined, and the Ministry for the Environment assessed how these indicators could be implemented and gained broad endorsement of a core set of proposed indicators. As a result of a series of focus group workshops, the indicators were further refined and there was a more extensive external peer review. Reviewers included people from government departments, local government, industry, technical experts and environmental groups.

The Ministry for the Environment involved Maori in the development and confirmation of waste, hazardous substances, hazardous waste, contaminated sites and toxic contaminants indicators. Maori consultant, John Hohapata, worked with MfE on the development of these indicators from a Maori perspective. The Ministry also released an indicators document in late May proposing a more comprehensive approach for Maori involvement in the EPI Programme (MfE, 1999b).

There was also a group of officials from other government departments working on environmental performance indicators and related work throughout this process.

The Summary of Submissions document provided an overview of comments received on the proposed indicators. These comments have helped guide the Ministry with the process of confirming the waste, contaminated sites and hazardous waste indicators. This confirming indicators report provides a general overview of how the submissions have been taken into account.

This report confirms which indicators have not been included as confirmed indicators and why. It also outlines how the indicators that have been confirmed will be implemented and reported and any areas for further development.

To assist with this process the Ministry ran workshops on 1 and 29 February 2000 (on the solid and hazardous waste indicators) and on 13 March (on the contaminated sites indicators) to discuss the minimum monitoring and reporting requirements for these confirmed waste, hazardous waste and contaminated sites indicators. The templates used to assist with this process are in Appendix 1. The actual worked and filled in templates are shown in Appendix 2 and outline the thinking that went into confirming these indicators. The following people were involved in the workshops:

1 and 29 February: Solid and Hazardous Waste	**Organisation**
Brian Gallagher	Timaru District Council
John Palmer	Tauranga District Council
Simon Casford	Auckland Regional Council
Gary Bedford	Taranaki Regional Council
Jan Burbery	Auckland City Council
John Webber	Packaging Council
Norm Thom	Auckland University
Dedric Smith (1 February only)	Environment Waikato
Jenny Easton (1 February only)	Tasman District Council
Ian Kennedy (1 February only)	Waste Management New Zealand Ltd
Robert Brodnax (29 February only)	Environment Waikato

The following MfE people also attended these workshops: Dave Brash, Carla Thorn, Maurice Hoban, Ket Bradshaw (1 February only) and Lisa Sheppard (1 February only).

On 13 March an initial meeting was held on the contaminated sites indicators, which was attended by Robert Brodnax (Environment Waikato), Raymond Scoble (Auckland Regional Council), David Clancey (Canterbury Regional Council). Simon Buckland and Maurice Hoban of the Ministry for the Environment were present. Following this meeting the Regional Waste Officer's Forum met on 24 March and discussed the contaminated sites indicators. Staff from most regional councils were present. Simon Buckland and Maurice Hoban (from the Ministry) attended this forum.

Karen Bell of Karen Bell and Associates attended the solid and hazardous waste indicators workshops and the Regional Waste Officer's Forum and prepared this report for the Ministry for the Environment.

The implementation of some of the Stage 1 indicators has begun. So too has developing methodologies for Stage 2 indicators. Stage 1 indicators are those which can be implemented in the next two years, because they are widely monitored now or are simple to set up, and Stage 2 indicators are those that require further development over the next 2–5 years (new methodologies or monitoring networks).

MMRR – the minimum monitoring and reporting requirements

In order to effectively implement these confirmed indicators and report them, the Ministry needs to work through the practicalities of their implementation and discuss the details with the key administering agencies. The Ministry has been working to reach agreement with interested parties on the methods, protocols and systems for data collection, storage and access in order to implement the waste indicators. This process will need to be followed with all agencies implementing and reporting on these indicators.

The Ministry for the Environment has developed processes for progressively implementing all the indicators. In 1999/2000 implementation is focused on the Stage 1 indicators. The Stage 2 indicators have been prioritised and will be further developed and progressively implementing over the next five years.

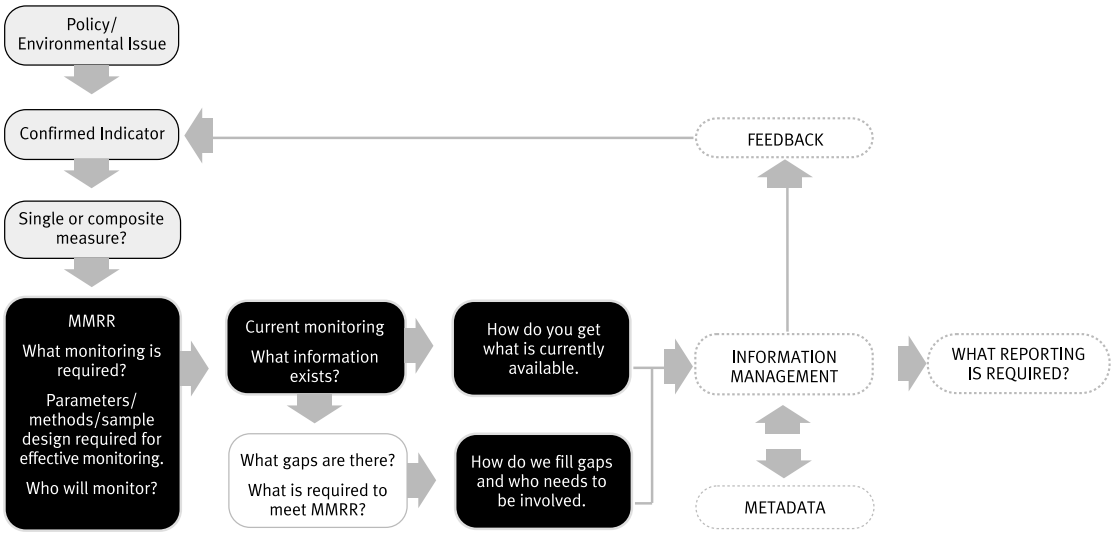
As part of establishing the minimum monitoring and reporting protocols for the Stage 1 indicators the Ministry have to answer the following questions, which we have developed into a template – see Appendix 1:

- What to monitor? (which has already been determined by the confirmed indicators)
- How to monitor? Where to monitor? When to monitor?
- Who will be responsible for monitoring?
- How much information do we need for reporting?
- What is our sampling strategy?
- How to store indicators information?
- How to transfer indicators information?
- How will monitoring results be used?
- Who owns the information?
- Who pays for monitoring, information management and reporting?

The Ministry's experience to date is that some of these questions can be addressed through technical working groups (eg, how to monitor), but many issues need to be addressed at a management level with the monitoring agencies. We intend to use consultative groups (eg, the Regional Councils Resource Managers Group) to work through the generic policy issues, but ultimately we expect to enter specific arrangements with each monitoring agency (eg, memorandum of agreements with each agency). We do not intend to use the regulatory powers of the RMA (section 43), but it remains an option of the last resort (although it has its limitations too).

This process of establishing the minimum monitoring and reporting requirements will involve developing partnerships with these key agencies. It is important to identify what data is readily available due to current or previous monitoring, where the gaps are, how these gaps might be filled, what the broader information management requirements are, and how the Ministry will report the indicators. This process is outlined in Figure 4.

***Figure 4*. MMRR Minimum monitoring and reporting requirements**



The structure of this report

The first four sections of this report discuss the confirmed indicators for solid waste, liquid waste, hazardous waste and contaminated sites. Each chapter covers:

- what the confirmed indicators are (in table form)
- why they were chosen
- which indicators were not included and why including a discussion of key issues raised from the submissions process and the Ministry's decisions
- how the indicator will work
  - the key agencies responsible for their implementation
  - the units/measures that will be used to implement them and anticipated frequency of reporting

- the minimum monitoring and reporting requirements
- examples of how they might be reported.

The fifth section covers waste indicators relevant to Maori.

Following these sections is a discussion on integration (how these confirmed indicators fit into the broader framework of other indicators already developed) and the next steps – for implementation and reporting of these indicators.

Confirmed Solid Waste Indicators

There are four confirmed indicators for solid waste relating to the quantity, source and composition of waste to landfills/cleanfills and recycling. There are three Stage 1 indicators and one Stage 2 indicator. The two indicators relating to landfills are an indication of the potential/ pressures on our land, air, water and marine environments and resources from solid waste disposal. The two recycling/resource recovery indicators are response indicators and tell us what's being done to respond to these pressures waste is exerting on our environment. These response indicators support waste minimisation policies.

Table 1: Confirmed solid waste indicators

Stg	Indicator	P-S-R	Unit and frequency	Agency
1	SW1 Quantity of waste to landfill and cleanfill by region	Pressure	Tonnes/per annum/ per consented landfill	TLAs and operators (some RCs)
1	SW2 Quantity of waste recycled • Paper • Plastic • Glass • Metal (including steel and aluminium) • Organic	Response	Tonnes/per annum	Packaging Industry Advisory Council and Plastics Institute
1	SW3 Access to solid waste resource recovery/recycling facilities • Kerbside recycling collections • Drop-off centres • Recycling/recovery centres	Response	Number of: • households/per scheme • centres/per capita • centres/per capita per annum	TLAs and commercial operators
2	SW4 Composition and source of waste to landfill in the following categories • Paper • Plastic • Glass • Metal • Organic • Rubble, concrete etc • Timber • Rubber and textiles • Potentially hazardous • Other Source categories: residential or business	Pressure	percent material/total waste disposed (based on WAP methodology) every five years. Source data annually where available	TLAs and commercial operators

Why these indicators were chosen

SW1 – Quantity of waste to landfill and cleanfill by region

- There was strong support from submitters for this indicator.
- Information is currently available in many locations so it will be relatively easy to obtain this information.
- Population numbers and economic activity have a direct influence on the quantity of waste produced.
- Provides useful pressure information on changes in risk posed by waste disposal.
- Assists landfill operators determine the capacity of their landfill.
- Helps councils and industry determine waste reduction initiatives.

The next two indicators SW2 and SW3 recycling/resource recovery indicators only tell us about some parts of the waste management hierarchy (and omit important elements such as reuse, recovery, and waste reduction). This was an issue raised through submissions and acknowledged by the Ministry. The Ministry decided to confirm these indicators because while they are not fully comprehensive, they do tell us useful information and it is relatively simple to obtain this information.

SW2 – Quantity of waste recycled

- Recycling enables a quantity of the waste stream to be diverted from disposal and allows for the reuse of materials.
- This indicator can give valuable information on the effectiveness and efficiency of recycling.
- This indicator measures post-consumer waste only.

SW3 – Access to solid waste resource recovery/recycling facilities

- This indicator has been enhanced following the workshops held on 1 and 29 February 2000. The indicator now includes information on resource recovery facilities as well as kerbside recycling facilities available to households.
- Provides valuable information on the number and uptake of kerbside recycling collections, drop-off centres and recycling/recovery centres.
- Supports waste minimisation policy.

SW4 – Composition and source of waste to landfill

- There was strong support for this indicator by most submitters.
- Many waste contractors and councils already collect it so it should be relatively easy to gather this information.

- There were concerns raised by some submitters about the cost of carrying out a Waste Analysis Protocol (or WAP), and some submitters thought this indicator should be measured every 3–5 years. The Ministry appreciates these concerns about cost. It is proposed to report on composition of waste every five years, and, where available, to report on the source (residential and business) of waste to landfill annually.
- Will enable quantities of these materials to be determined and trends in composition and diversion from landfill to be measured over time.
- Assists in determining the degree of risk that these different waste types pose on the environment.
- Waste is produced from a variety of sources – residential, commercial and industrial.
- Understanding the source of waste is critical to achieving waste reduction.
- Residential waste is defined as all waste generated by households (MfE, May 1997b).
- If we can quantify the source, quantity and composition of residential waste to landfill then we have good information as the basis for waste minimisation efforts.

Which indicators have not been included and why?

There are a number of solid waste indicators that were initially proposed that have now been removed from the core set. Submitters were particularly concerned about the lack of a *waste generation* indicator – this is a concern shared by the Ministry. Such an indicator has been considered, discussed and debated throughout the process but could not be included because of:

- concerns over validity or relevance of the options proposed
- the difficulty of definition
- the high costs of monitoring
- the difficulty in obtaining information on waste generation nationally.

Some interesting indicators may emerge from OECD work on indicators, targets and waste prevention (Stutz, 1999). Stutz work shows that as consumer spending increases so too does municipal waste generation. Waste generation is in direct proportion to economic growth. A 40 percent increase in OECD GDP since 1980 has been accompanied by a 40 percent increase in waste in the same period. Stutz emphasises the need for waste prevention not just recycling and the need to decouple waste from wealth.

The OECD's waste minimisation programme includes:

- preparation of a Government Policy Options and Self Assessment Guide on Strategic Waste Prevention (1999–2000)
- development of the first official international waste prevention performance evaluation tools, especially quantitative indicators (2000-2001). This work includes consumption and production indicators.

The Ministry will keep involved and up to date on this waste prevention/minimisation work and it is possible that over time an indicator for waste generated may be developed and implemented.

The following other proposed indicators were not included in the core set:

- *Quantity of litter:* There were mixed comments on this indicator. Some submitters questioned its usefulness. The Ministry shared some of these concerns (about what the indicator actually tells us) and thought that this indicator may be included as an indicator of amenity, and it is included as an indicator for the marine environment (the effect of marine debris on wildlife); so has not included it as a waste indicator.
- *Quantity of waste incinerated:* incineration was not included because it is a minor component of the waste disposed of in New Zealand.
- *Number of complaints in relation to landfills (noise, odour, pollution):* this was not included because of concerns raised by submitters over its relevance. This may be considered as an indicator of amenity.
- *Effects of landfills on surface water, land and air:* These pressures are already identified in the land, air, water strands of the EPI Programme – as state indicators, so have not been included as waste indicators.
- *Number of landfills that exceed consent conditions:* not included because of variations in consent conditions throughout the country.
- *Number of landfills in each category of a landfill grading system:* not included at this stage. At present no such national system exists and there are difficulties in determining how this indicator will work. The Hazardous Waste Management Programme is presently undertaking a pilot programme to develop waste acceptance criteria and a landfill classification system for hydrocarbon and contaminated soil.
- *Cleaner production programmes:* Hard to assess what the information tells us.
- *Quantity of waste to landfill from residential sources:* not included because it has been incorporated into SW1 and SW4 to make them more comprehensive (refer to comments on SW4).

Issues raised in the submissions received on the proposed indicators included:

- the need for a cleanfill indicator – which has now been incorporated into SW1
- the potential problem of accounting for illegally dumped waste and the solid waste not disposed of to landfill (eg, agricultural and mining wastes).

While the Ministry acknowledges the concerns about illegal dumping, it is difficult to account for illegal dumping of wastes, except through compliance monitoring data from councils. The Ministry thinks that the four confirmed solid waste indicators will go a long way to telling us about the pressures and responses to solid waste disposal.

MMRR – how the indicators will work

The Stage 1 indicators are pragmatically based on what is currently monitored by territorial local authorities and commercial operators/industry. The Ministry will be approaching various monitoring agencies over the next six months to work through the minimum monitoring and reporting protocols.

SW1 Quantity of waste disposed to landfill and cleanfill by region

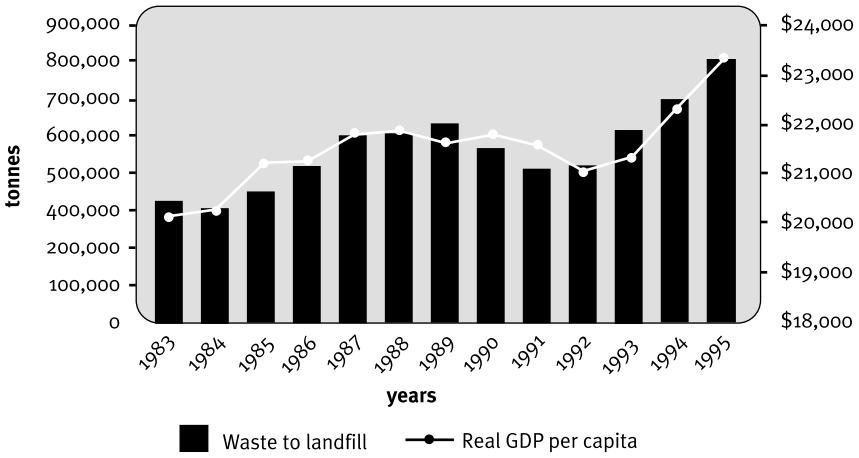
Existing information will be collated for those landfills/cleanfills that have weigh bridges. Approximately 20 percent of all landfills have weigh bridges and these landfills accept around 80 percent of New Zealand's waste. Because 80 percent of landfills do not have weigh bridges

(and produce 20 percent of our waste) information will also be collected from the Landfill Census (MfE, 1999c) and waste analysis protocol (WAP) audits (for volume estimates). This will provide a national figure of the quantity of waste to landfill and cleanfill. It should be noted that the Landfill Census questionnaire and the waste analysis protocol are currently being reviewed. WAP information is a consent requirement in some areas and in some regions such as Auckland we will attempt to generate historical data. The preferred method is to measure weight by weigh bridges, in the future it is anticipated that more landfills will have weigh bridges.

This indicator will cover cleanfills as well as landfills; (cleanfills were not previously included). The Ministry is currently preparing guidelines for the development, modification and enforcement of resource consent conditions for landfills and is also developing a guideline on cleanfill management.

Data on quantity of waste to landfill/cleanfill will be aggregated nationally and by region. One option is to report waste data per capita and per GDP as a national figure and possibly as regional figures (see Figure 5).

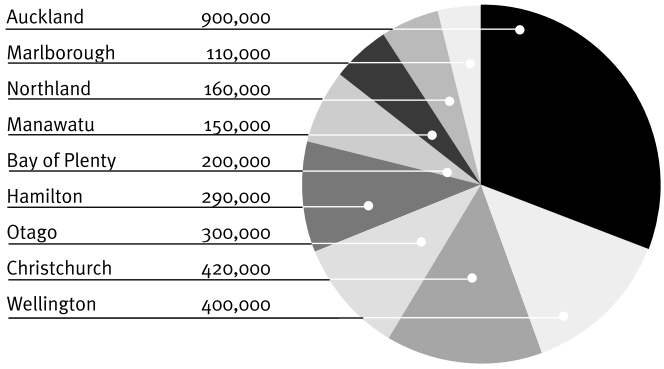
***Figure 5*. Example of reporting SW1, tonnes of waste to landfill (Auckland Region 1988- 1995)**



Source: Auckland Regional Council

The recommended format of reporting this indicator is shown in Figure 5, a simple bar graph of quantities of waste to landfill per region and nationally aggregated each year. A national figure could be reported in a bar graph as in Figure 5 or as a pie as in Figure 6 to demonstrate regional comparisons.

Figure 6. **Example of reporting SW1, tonnes of waste to landfills by region in New Zealand**



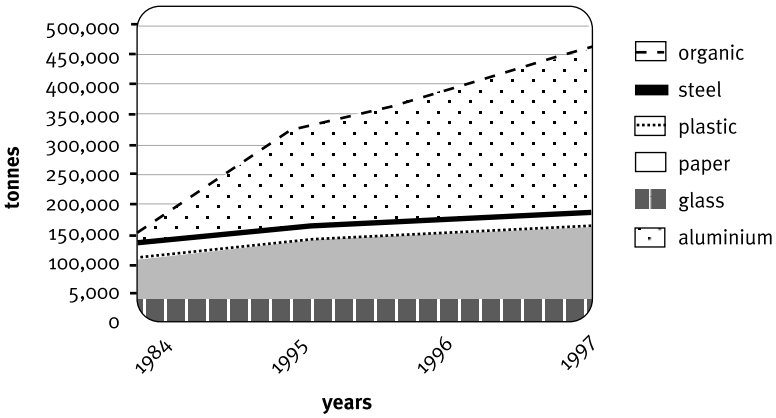
NOTE: Data in this figure has been fabricated and should only be used for demonstration.

SW2 Quantity of waste recycled

Some information for this indicator is available from the Packaging Council (under the Packaging Accord) and the Plastics Institute of New Zealand. PC and PINZ collect annual mass balance figures from industry for paper, plastics, glass and metal. This data will be aggregated nationally. There may be some sector type reporting, eg, by aluminium cans and glass bottles, etc.

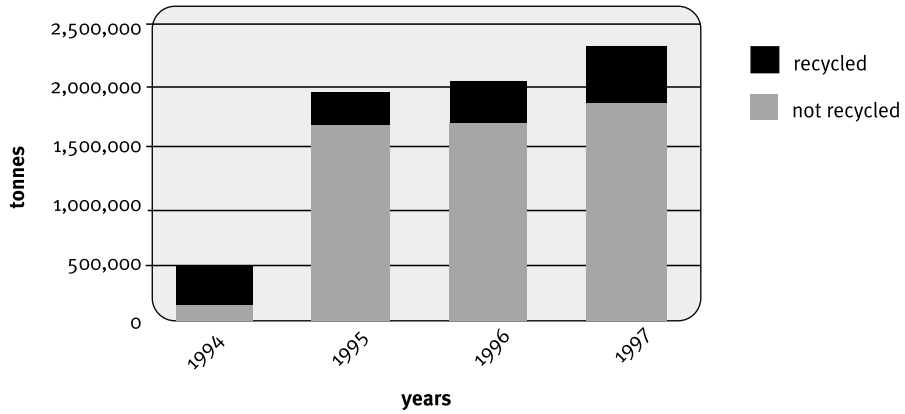
It is recommended that the format of reporting this indicator be simple bar and area graphs of quantities of waste recycled and nationally aggregated each year (Figures 7 and 8). This information could be superimposed onto a map of New Zealand to show which regions have the highest/lowest recycling figures.

Figure 7. **Example of reporting SW2, quantity of waste recycled by recyclable material**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

***Figure 8*. Example of reporting SW2, quantity of waste recycled (and not recycled)**



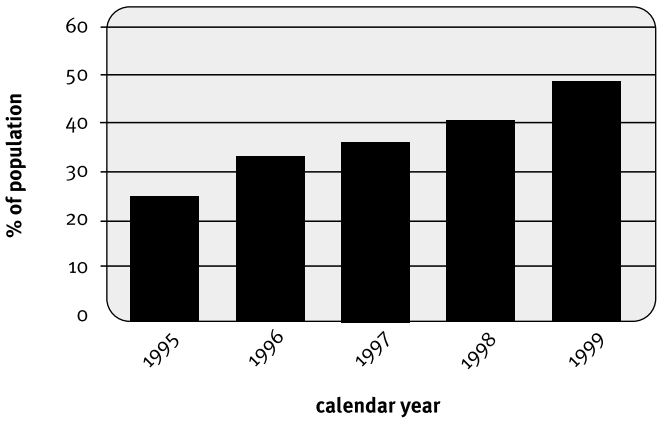
NOTE: Data in this figure has been fabricated and should only be used for demonstration.

SW3 Access to solid waste resource recovery/recycling facilities

This information will be sought from TLAs and industry. Although this indicator is a relatively simple response indicator, work is required on definitions and establishing a regular basis for reporting from TLAs and industry (kerbside recycling contractors). This data will again be aggregated nationally and by TLA.

It is recommended that the format of reporting this indicator be a simple bar graph of the number of people serviced by recycling facilities per district and nationally aggregated each year (Figure 9). This information could be superimposed onto a map of New Zealand to show which areas of New Zealand have the greatest/least access to resource recovery facilities (including kerbside collections).

***Figure 9*. Example of reporting SW3, % of population that has access to solid waste resource recovery (recycling) facilities.**



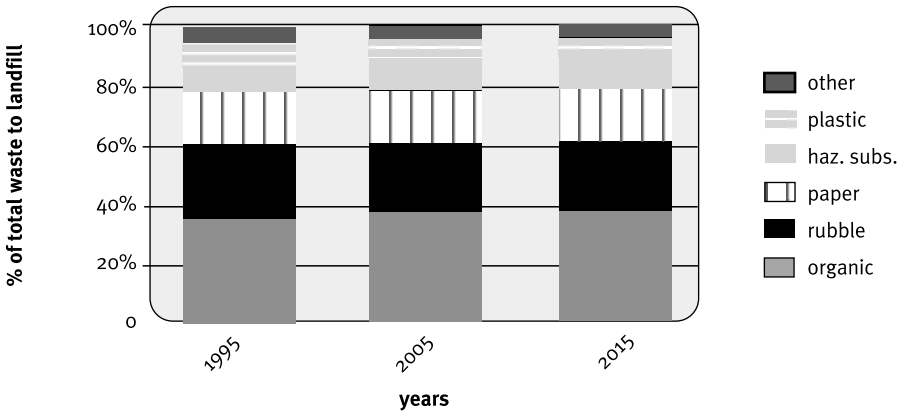
NOTE: Data in this figure has been fabricated and should only be used for demonstration.

SW4 Composition and source of waste to landfill

SW4 is a Stage 2 indicator and requires a more comprehensive effort than the current levels of monitoring. For example, WAP surveys are not widely carried out by TLAs. The Ministry is currently reviewing the WAP to make it easier to use, to look at the minimum level of national coverage, to encourage more territorial local authorities to undertake WAP surveys on a regular basis and to facilitate the collection of robust volume/weight waste data. An ideal would be to have WAP audits every six months on the quantity of waste to landfill (by volume and weight) and to assess the composition of waste to landfill every two years but the reporting recommended in this report is every five years (due to constraints on resources). A key issue for implementation of this Stage 2 indicator will be to ensure there is commitment and buy-in from councils.

Figure 10 gives an example of how the composition of waste to landfill could be reported as a bar chart using the WAP categories. It would be useful to separate out some of the data for closer analysis, such as analysing the trends with the proportion of organic material as part of the total waste disposed to landfill over time.

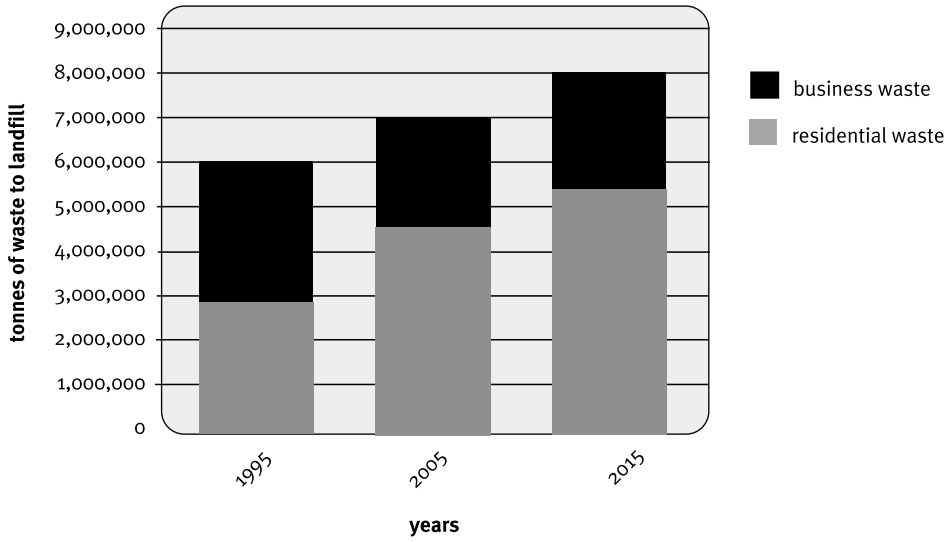
Figure 10. **Example of reporting SW4, composition of waste to landfill**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

The quantity of waste disposed to landfill from residential/business sources, could also be reported as a simple graph with shading to show the contribution of waste to landfill from residential sources relative to other sources (Figure 11).

Figure 11. **Example of reporting SW4, quantity of waste to landfill by source**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

Confirmed Liquid Waste Indicators

There are three confirmed liquid waste indicators. One is a Stage 1 indicator – stock density and the intensity of land use – and two are Stage 2 indicators – biological oxygen demand (BOD) and nutrient loadings to land and water. These indicators tell us about pressures on our land and water resources from liquid waste and complement the indicators already proposed for land and water.

Table 2: Confirmed liquid waste indicators

Stg	Indicator	P-S-R	Unit and frequency	Agency
1	LW1 Stock density	Pressure	Stock units per hectares, every five years	MAF, Statistics NZ and regional councils
2	LW2 BOD loadings to land and water	Pressure	Tonnes per year	Regional councils
2	LW3 Nutrient loadings to land and water	Pressure	Tonnes per year	Regional councils

Why these indicators were chosen

LW1 – Stock density

- Stock are one of the main pressures on our land and water resources. We need to keep track of stocking rates so that we can develop appropriate policy responses to changes, particularly increases, in stocking rate and intensity.
- Intensive farming can have significant impacts on water through faecal contamination and increased risk of eutrophication of streams/lakes.
- Increases in stocking rates can indicate increased pressure on the environment.
- Information on changes to stock density will assist councils and central government respond to the pressures before they adversely affect the state of the environment.

LW2 – BOD loadings to land and water

- Historically, discharges from industry and sewerage systems caused elevated levels of BOD in water. Discharges from these point sources have been significantly cleaned up.
- While BOD is generally not a widespread problem in New Zealand waterways today, it does make a useful indicator of the general pressure on our water resources from sources such as stock effluent and sewage.
- BOD is proposed because it provides a good estimation of the pressure from discharges on the environment.

LW3 – Nutrient loadings to land and water

- Nutrients in water are a problem in some parts of the country and we have developed state indicators for these. For example, nitrate levels in ground water, periphyton (green slime) in rivers and the trophic status of lakes.
- We need a nutrient pressure indicator to help understand the sources and flows of nutrients in the environment.
- The nutrients of interest are nitrogen and phosphorus.

The way we propose to present these indicators is set out in Figures 10 and 11 – in the discussion of implementation.

Which indicators have not been included and why?

There were initially five proposed liquid waste indicators – now rationalised into three indicators. There was a lower level of acceptance of the originally proposed liquid waste indicators (than the solid waste indicators) so these have been modified substantially. Submitters' concerns related to:

- the technical feasibility of the indicators
- a lack of understanding of pressure indicators.

The main change we made from the proposed indicators to the recommended indicators was to drop faecal coliforms and suspended solids. These parameters do not adequately capture the most important pressures on land and water resources because the main pressures are from non-point sources. The stock intensity indicator will capture this pressure.

The following proposed indicators were not included in the core set:

- *Quantity of major discharges to water – BOD:* We have repackaged this indicator as BOD loadings to land and water, following comments from submitters. Concerns about the indicator originally proposed were: that it is difficult to measure BOD; the need to measure background levels; the need to consider the assimilative capacity of the receiving environment; and that focusing on only major discharges ignores the cumulative effects of smaller discharges.
- *Stock effluent of total nitrogen:* We have integrated this into a nutrient loadings indicator. Many submitters wanted modification to the originally proposed indicator because of the problems of measuring and isolating out nitrogen in discharges. The Ministry agrees that a more general nutrient loading measure would be more useful and easier to measure.
- *Quantity of major discharges to water – faecal coliforms and suspended solids:* The majority of submitters suggested that this originally proposed indicator be modified. Non-point source discharges are a much more significant issues in New Zealand that point source discharges so the Ministry agreed and we have dropped this indicator.
- *Quantity of contamination (nitrogen) in waste water discharged to land:* This has been incorporated into a nutrient loadings indicator.

- *Percentage of municipal waste water discharges to land, fresh water, coastal water with:*
  - *no treatment*
  - *primary treatment*
  - *secondary treatment*
  - *tertiary treatment.*

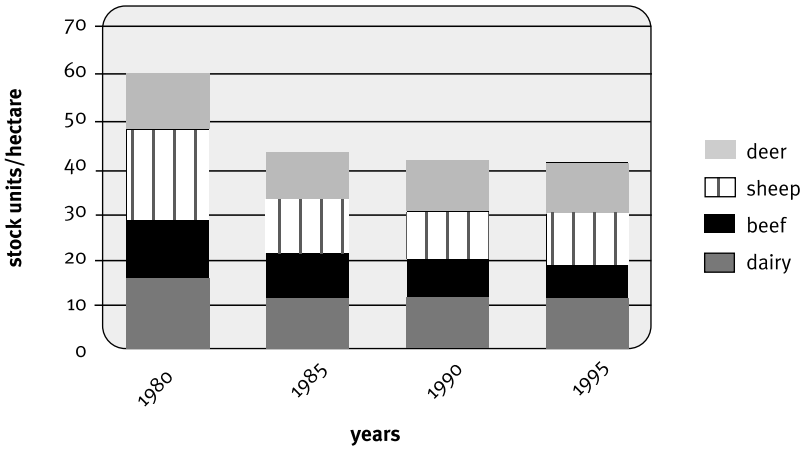
  Although submitters generally accepted this indicator, it has not been included in this form in the confirmed set. It has been incorporated into a nutrient loadings indicator. One of the reasons for this was an issue raised by submitters, which is that it did not take into account septic tanks. The Ministry's analysis was that the nutrient loadings indicator would provide useful information on waste water discharges.

MMRR – how the indicators will work

LW1 - stock density

MAF and Statistics New Zealand will collect the information required for the Stage 1 waste indicator, stock density, (supplemented by data on herd sizes from regional council consent databases – as Environment Waikato have done). Data on stock densities will be aggregated nationally and regionally. It would be ideal to have this information on a land coverage basis too, but this is probably not possible at this stage. It is recommended that stock density data be presented as simple bar graphs, with comparisons over time as more information becomes available and that the frequency of reporting be every five years.

Figure 12. **Example of reporting LW1, Stock Densitities in NZ, dairy, beef, sheep and deer stock units per hectare**



Source: Statistics New Zealand and Ministry of Agriculture and Forestry.

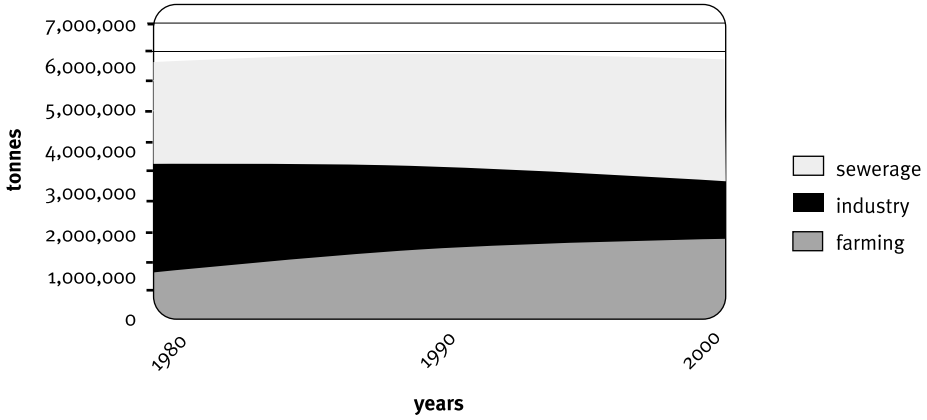
One breeding ewe represents one stock unit, dairy cow: 7 stock units, beef cow: 6 stock units, breeding hind: 1.9 stock units.

LW2 - BOD and nutrient loadings

Regional council consents should provide information required for this Stage 2 indicator. Information from consents could be supplemented by some farm statistics collected by MAF and regional councils land use data. There is still much work to do to ensure the information is recorded in a consistent way. We propose to trial and refine this approach over the next two

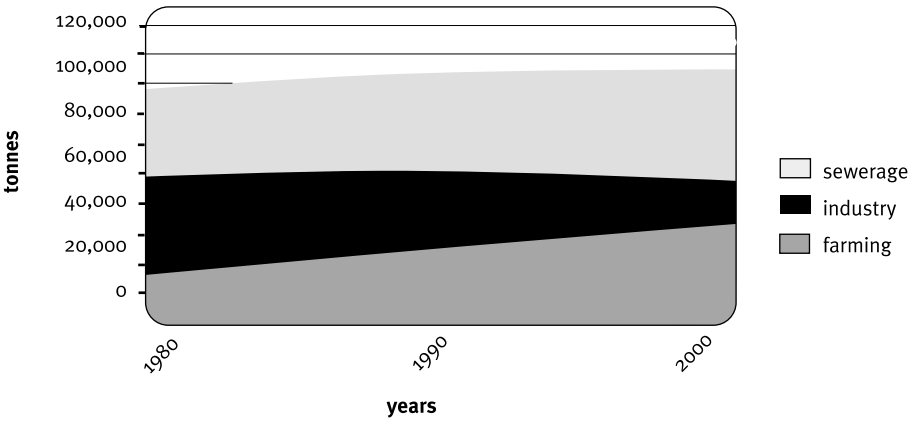
years. In the interim we will aggregate what data we can regionally and nationally. An example of how this information could be reported is provided in Figure 13 and 14.

***Figure 13*. Example of reporting LW2, loading to land and water from farming, industry and sewerage systems**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

***Figure 14*. Example of reporting LW2, nitrogen loading to land and water from farming, industry and sewerage systems**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

Confirmed Hazardous Waste Indicators

There are two confirmed hazardous waste indicators:

- HW1 – the quantity of hazardous waste accepted at landfills, hazardous waste treatment facilities, waste water treatment facilities and exported
- HW2 – the quantity of priority hazardous waste generated and stored.

The Stage 1 hazardous waste indicators will be based on current monitoring at selected locations around the country (ie, we will collect and collate the information currently monitored by a range of agencies – this will mean that we will only have partial information initially).

As New Zealand does not yet have a national hazardous waste definition, it is recognised that the information gathered during Stage 1 may not be complete. The Stage 2 indicators will be collected under the national hazardous waste definition and reporting systems currently being developed under the Hazardous Waste Management Programme. These Stage 2 indicators will eventually replace the Stage 1 indicators.

Table 3: Confirmed hazardous waste indicators

Stg	Indicator	P-S-R	Unit and Frequency	Agency
1	HW1 Quantity of hazardous waste: • Accepted at landfills (direct from larger landfills) • Exported (Ministry of Economic Development, Basel Convention) • Accepted at hazardous waste treatment facilities – including incinerators (direct from facilities on a voluntary basis) • Accepted at wastewater treatment facilities (calculated estimate of quantities).	Pressure	percent that accept HW kg/ annum by list kg or litres/annum by list kg or litres/annum by list kg/contaminant/annum	TLAs, commercial operators and Ministry of Economic Development, possibly hospitals
2	HW1 Quantity of hazardous waste discharged to land, air and water. Includes hazardous waste accepted at • landfills • exported • hazardous waste treatment facilities – including incinerators • wastewater treatment facilities (municipal) collected under national hazardous waste definition and national hazardous waste monitoring and information systems.	Pressure	kg/annum kg or litres/annum kg or litres/annum mass loading kg/ contaminant/annum	As above but possibly with regional councils under the hazardous waste regulations

Stg	Indicator	P-S-R	Unit and Frequency	Agency
1	HW2 Quantity of priority hazardous waste generated and stored: • imported • physically hauled away from site (ie, trucked away) – solid or contained (either from transporters or direct from industries) • discharged to sewer – liquid (direct from industries or upper limit on resource consents) • discharged to: – land – air – water on site as defined from the list.	Pressure	kg or litres/annum litres/annum litres/annum	TLAs, commercial operators and regional council resource consents. Basel Convention reports for imported waste.
2	HW2 Quantity of priority hazardous waste generated and stored: • required by regulation via National Environmental Standard (manifest or other system) • storage (possibly minimum threshold or type of facility) • diffuse sources or WAP methodology collected under national hazardous waste definition and national hazardous waste monitoring and information systems.	Pressure	kg or litres/annum of types of priority hazardous wastes generated and treated per sector	As above, but possibly with regional councils under the hazardous waste regulations

Why these indicators were chosen

HW1 – Quantity of hazardous waste disposed of, treated or exported

- There is limited information available in New Zealand on the quantities of hazardous waste being treated and disposed of.
- It is possible to obtain some information on hazardous waste accepted at the larger landfills and waste treatment facilities, export figures and hazardous waste into water treatment facilities.
- Hazardous waste poses risks on human health and the environment, so it is important that available information is collected during the development of information keeping requirements under the proposed national environmental standard for hazardous waste.
- This indicator provides useful pressure information on changes in risk to the environment by hazardous waste disposal/treatment.
- This indicator also assists those at the council and industry level in determining hazardous waste reduction initiatives.

HW2 – Quantity of priority hazardous waste generated and stored

- It is important to know the quantities of hazardous waste being generated and stored so we can track whether we are reducing the quantities being generated – the policy goal for hazardous waste.
- We also need to focus on the priority hazardous wastes. The Ministry acknowledges that there will be some work required to determine what priority hazardous waste is but have amended this indicator to ensure the most important hazardous waste are dealt with first.
- Given the complexities and costs of tracking hazardous waste it is important to focus on priority hazardous wastes. Work will be required to determine the priority hazardous waste in New Zealand.
- There is currently a problem in New Zealand with "intractable" hazardous waste which cannot be disposed of or treated in an environmentally sound and efficient manner. This indicator provides information about the generation and storage of this type of waste.

Which indicators have not been included and why?

There have been changes to the proposed hazardous waste indicators as a result of the consultation process. In particular, indicators have been combined where measures are similar. A key issue raised in the submissions process was that of the need for definitions – particularly for "hazardous waste". The Ministry shares this concern and is working hard to develop a definition for hazardous waste in New Zealand under the Hazardous Waste Management Programme.

The significant changes to the hazardous waste indicators as a result of comments received are:

- indicators now clearly reflect:
  - waste disposal (including treatment)
  - waste generation
  - waste in storage.

HW1 – Hazardous waste disposed of, treated or exported

- In light of work progressed through the Hazardous Waste Management Programme, and the further consultation undertaken, the quantity of hazardous waste indicator has been refined so that we can measure the quantity of hazardous waste being disposed of in New Zealand more comprehensively, and with a higher degree of accuracy. We will now assess hazardous waste discharges to land, air and water and treatment facilities (including wastewater treatment and incineration).
- Imported waste was moved to HW2 because imported hazardous waste can be considered newly generated in New Zealand and will either be:
  - disposed of via one of the routes listed in the HW1 indicator or
  - recycled, in which case it is no longer hazardous waste.
- The previously proposed HW3 indicator relating to the quantity of hazardous waste effectively treated in New Zealand has now been added to the HW1 indicator. This is because submitters and workshop members think that treatment is one of the routes for the disposal of hazardous waste, even though in some cases, treatment does not

necessarily remove all of the hazardous characteristics of the waste. Where treatment is not fully effective, the other methods listed in HW1 capture the fate of the waste that is generated from the treatment process.

- There is no indicator for hazardous waste that is disposed of illegally, for the simple reason that it would be very hard to obtain data in this area.

HW2 – Quantity of priority hazardous waste generated and stored

- The previously proposed HW2 indicator relating to generation of hazardous waste from industrial sources has been refined so that we can measure the quantity of high priority hazardous waste being generated with better accuracy. These priority high priority wastes are likely to include intractable wastes.
- Hazardous waste storage is now covered in HW2. This provides an indicator for priority waste that has been generated, but has not yet reached its final disposal point. This indicator is necessary to assess the potential risks from hazardous waste storage in New Zealand.

Links with the development of a hazardous waste national definition and strategy

Work on development of a framework for managing hazardous waste (under the Hazardous Waste Management Programme) has progressed since October 1998, when the proposals for hazardous waste indicators were published. A strategy for managing hazardous waste is now in development following wide consultation. We anticipate that this strategy will involve a number of measures, both voluntary and regulatory to improve the management of hazardous waste in New Zealand across the whole life-cycle of the waste. The strategy will include options for monitoring hazardous waste and collection of information on hazardous waste. A national definition is being finalised, which will define the boundaries of the programme and assist disposers of hazardous waste to identify the risks associated with these wastes and select appropriate methods of disposal. The draft national hazardous waste definition is now available for use in the interim period.

MMRR – how the indicators will work

Stage 1 hazardous waste indicators

Until the national environmental standard is developed for hazardous waste, it is recognised that the Stage 1 information may contain some inconsistencies, and may only be collected in some regions and from agencies and businesses who are willing and able to supply it. The patchiness of available data on hazardous waste was an issue raised by most people who submitted on the hazardous waste indicators. There is, however, comprehensive information on hazardous waste export from the Ministry of Economic Development, and on disposal into modern engineered landfills (particularly in some of the larger cities in New Zealand). This is a significant information resource despite there being some issues relating to trans-boundary movements.

The aim is to report on these indicators regionally and nationally, but there will be progressive development of comparable data over time as any substandard landfills close and are replaced by larger sub-regional landfills with more efficient monitoring systems.

HW1 – Quantity of hazardous waste disposed of, treated or exported

Hazardous waste accepted at landfill – this would be collected through the WAP where possible. Resourcing may limit the widespread uptake of this indicator.

The Ministry of Economic Development, under the Basel Convention (on the Trans-boundary Movement of Hazardous Wastes and their Disposal), will collect data on hazardous waste exported.

Amounts of hazardous waste treated will be sought directly from the treatment facility operators. This will be collected by regional councils and aggregated nationally.

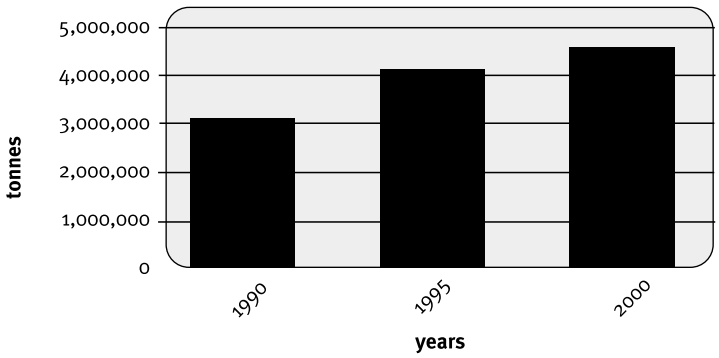
Hazardous waste discharged into wastewater treatment plants will be calculated using the following formula:

> [Average contaminated concentration X average annual discharge rate] = [total contaminant load], then [total contaminant load] – [average annual discharge rate X average domestic contaminant concentration] = [average contaminant load discharged to the environment from each plant].

The load could then be compared load to catchment population to ensure there is a correlation.

The quantity of hazardous waste will be collected annually and a recommended format is to provide a series of bar graphs for easy comparison (Figure 15). Information may also be compared against the total amounts of waste going to landfill (SW1).

Figure 15. **Example of reporting HW1, quantity of hazardous waste accepted at landfills**



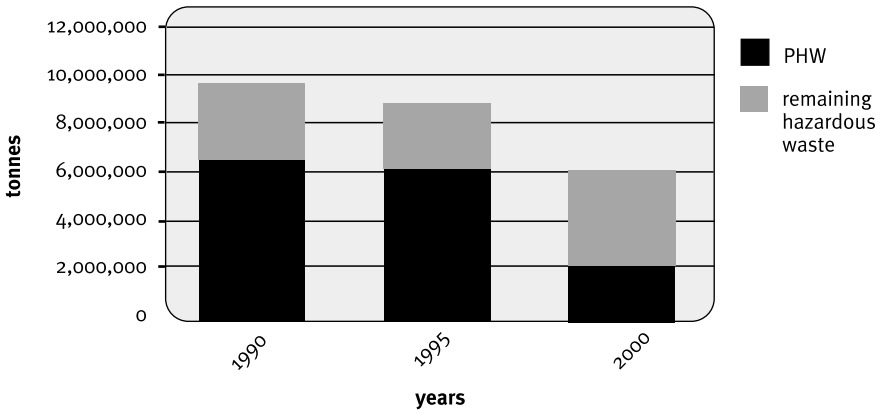
NOTE: Data in this figure has been fabricated and should only be used for demonstration.

HW2 – Quantity of priority hazardous waste generated and stored

Some larger industries and hospitals collect data on the hazardous waste they generate and store. It is anticipated that regional councils will work alongside industry to gain what data is available, and that this will be aggregated nationally.

Data on the quantity of priority hazardous waste generated and stored will be reported annually. It is recommended that the data be reported as a bar graph with shading to represent the proportion that is priority hazardous waste (Figure 16).

Figure 16. **Example of reporting HW2, quantity of priority hazardous waste (PHW) generated and stored**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

PHW: Priority Hazardous Waste. This has been defined as organochlorines and radioactive waste for trial purposes only. Data in this figure has been fabricated and should only be used for demonstration.

Overall the information currently available on hazardous waste in New Zealand is patchy, but we think this limited information will be very valuable in the short term.

Stage 2 hazardous waste indicators

To implement the Stage 2 indicators we will need agreement on agency roles for monitoring and reporting. Clarification of the monitoring and management roles for hazardous waste will be a critical part of the Hazardous Waste Management Programme. Another critical step will be agreement on definitions, particularly a national definition for hazardous waste.

Good progress has been made on the hazardous waste indicators, but there are still a number of risks, gaps, outstanding issues, and work remaining to be completed. These include:

- ensuring alignment between the hazardous waste indicators and the development of a national environmental standard for hazardous waste which is occurring in parallel but as part of a separate process under the Hazardous Waste Management Programme
- ensuring there are strong links/integration between the hazardous waste indicators and the wider set of indicators developed and being developed
- clarifying agency responsibilities.

Confirmed Contaminated Sites Indicators

There are two indicators relating to the management status of contaminated sites. These indicators tell us about risks to the environment and human health and also about responses to management practices. The contaminated sites indicators are listed in Table 4 below.

Table 4: Confirmed contaminated sites indicators*

Stg	Indicator	P-S-R	Unit and Frequency	Agency
1	CS1 The total number of sites that fall into the following categories: • confirmed contaminated site • remediated site	Pressure and response	Numerical value per annum	Regional councils
2	CS2 The total number of sites that fall into the following categories: • under investigation *moderate to low risk* sites • under investigation *high risk* sites • confirmed contaminated *moderate to low risk* sites (pre and post RMA) • confirmed contaminated *high risk* sites (pre and post RMA) • remediated sites	Pressure and response	Numerical value per annum	Regional councils

* The categories given for the Stage 2 indicator will be revised following completion of a SMF project currently being undertaken on contaminated classifications criteria.

Why these indicators were chosen

- Many contaminated sites have arisen as a result of an insufficient standard of care in the handling and management of hazardous chemicals and past disposal practices, including those considered safe and acceptable at the time.
- Unless adequately managed, these sites may pose a risk to the environment and human health, either via exposures on-site, or from exposures following off-site migration of the hazardous chemicals.

CS1 – Total number of contaminated sites – confirmed and remediated

The first indicator reports the number of confirmed contaminated sites and the number of remediated sites. It is recommended as a Stage 1 indicator for use until the second contaminated site indicator is developed and implemented.

CS2 – Total number of contaminated sites in certain management categories

The second indicator reports the number of sites in a range of categories that are delineated on the basis of the risk they post to the environment and human health. The indicator also

distinguishes between sites that were contaminated pre-RMA and post-RMA. A schematic of this indicator showing how the categories interrelate is shown in Figure 17.

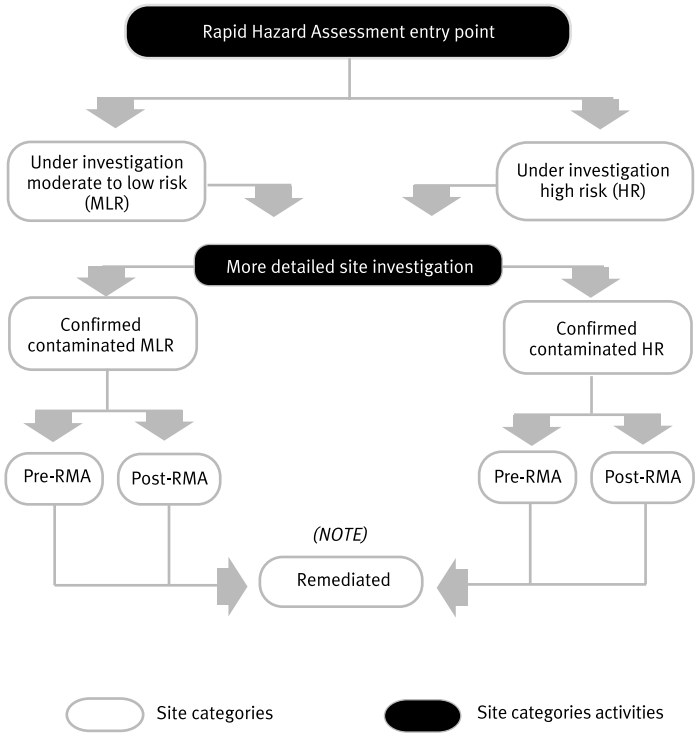
To aid the development of effective policies on contaminated sites management, and to facilitate state of the environment reporting, it is important to know how many sites exist and the severity of the hazard that these sites pose. In addition, the second indicator will:

- report the number of *high-risk* sites that pose the greatest risk to the environment or human health, and for which remediation (including implementation of a management plan) is justified
- report the number of *moderate to low-risk* sites which pose a lesser risk to the environment and human health (it is no additional effort to report on these sites)
- provide information on pressures on the environment from the past use of hazardous chemicals and the effectiveness of policies and management procedures to minimise any adverse effects to the environment or human health from the current use of hazardous chemicals. This will be achieved by distinguishing between pre- and post-RMA sites
- show changes in the risk posed by contaminated sites over time
- indicate the level of activity that is occurring to reduce risk through site remediation or the implementation of management plans (in this sense, CSI and CS2 are response indicators).

Sites may be added to a register on the basis of a rapid hazard assessment or a detailed site investigation. Sites move between categories depending upon the outcome of site investigations, any site remediation or management plans implemented.

The categories used in these indicators are consistent with those recommended for a contaminated sites database outlined in the Ministry publication *Collecting and Managing Contaminated Sites Information* (MfE, 1996). A Sustainable Management Fund (SMF) project is currently under way to develop a standard information collection system for contaminated sites in partnership with all regional councils. The categories used in the indicators will be consistent with the outcomes of this SMF project.

Figure 17. **Contaminated sites categories for indicator CS2**



NOTE: Sites may be included in the remediated category on the basis of site remediation work undertaken or the implementation of an appropriate plan such that the site no longer poses a threat to human health or the environment whilst the current land use continues

Which indicators have not been included and why?

There was mixed buy-in from councils on the indicators proposed in late 1998 and their roles and responsibilities. The key issues relating to buy-in for these indicators include:

- mandate – councils question who is responsible for contaminated sites
- lack of clarity around liability for orphan sites
- prioritisation of resources to monitor contaminated sites.

The consultation process on the initially proposed indicators showed general agreement to the concept behind the contaminated sites indicators, but some modifications were suggested. Several submitters suggested that it might be useful to monitor the age, status, type and history of contaminated sites. Other submitters suggested that the number of sites removed from contaminated sites registers should be monitored.

As a result of the consultation process the Ministry made the following changes to the contaminated sites indicators:

- the two contaminated sites indicators proposed in the October 1998 document have been combined into a single indicator

- sites are identified on the basis of a hazard assessment methodology (RHA) rather than land use
- "not investigated" and "not contaminated" categories are no longer included
- as this revised indicator is a Stage 2 indicator, an interim Stage 1 indicator has been developed.

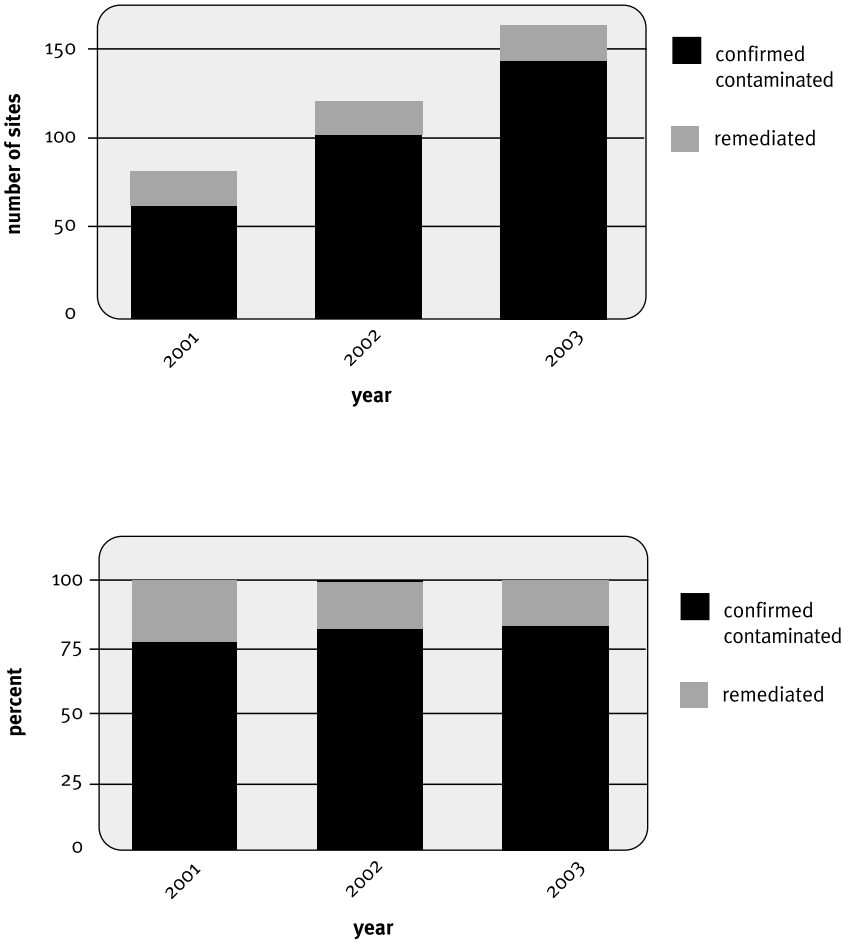
MMRR – how the indicators will work

CS1 – Total number of contaminated sites – confirmed and remediated

The Stage 1 indicator – total number of confirmed contaminated sites and remediated sites – should be comparatively simple to compile from existing information held by regional councils. It will be possible to aggregate this data at a regional and national level. It should be noted, however, that not all regional councils have precise data on site numbers.

It is recommended that this data be reported graphically, for ease of comparison (for example, as a series of bar graphs, as illustrated in Figure 18 following). Actual site numbers will also be reported in tabular format.

***Figure 18*. Example of reporting CS1, percentage and total number of contaiminated site: confirmed and remediated.**



CS2 – Total number of contaminated sites in certain management categories

Sites will be identified under investigation on the basis of a rapid hazard assessment (RHA) and a site will be confirmed contaminated on the basis of a more detailed site investigation. This provides two points of entry for adding a site to the register (as illustrated in Figure 14).

- The first entry level is where councils or other agencies undertake to systematically identify contaminated sites in their region using a risk based methodology. A SMF funded project is currently under way to reuse the draft Rapid Hazard Assessment published by the Ministry for the Environment in 1993. This revised methodology will be applicable for use with the contaminated sites indicators.
- The SMF project is also harmonising site classification criteria that are currently being used by Regional and District Councils. The classification criteria that are applied to this indicator will be those that are finalised from this SMF project.
- The second entry level is where a site investigation is carried out without any initial appraisal (ie, without a RHA). This may occur because of the nature of the past use of the site or because maintenance/earthworks at a site show visual indications of contamination.

In the initial years of the second indicator being implemented, it is likely to show a steady increase in the number of sites in the "under investigation" and "confirmed" contamination categories, and comparatively little change in the number of sites in the remediated category. This will primarily reflect regional council and local authority programmes to systematically identify contaminated sites in their area. As contaminated sites management develops, this indicator will be particularly relevant in indicating the reduction in risk to the environment and human health as sites move from the confirmed contaminated category to the remediated category.

We propose that regional councils monitor the contaminated sites indicators with some input from territorial local authorities.

Indicators Relevant to Maori

Recognising the value of indigenous knowledge, the Ministry for the Environment seeks to incorporate Maori concepts to ensure these waste, hazardous waste and contaminated sites indicators are relevant to Maori. Maori have developed a complex set of customs and lore to conserve, manage and protect their environment. Maori consider all things have a life force or mauri. The concepts and practices, derived from and associated with kaitiakitanga, were used to ensure that resources were sustainably managed and their mauri (life force) protected. The Maori approach to environmental management discussed through the indicator development process incorporates the needs and values of people and recognises the interrelated nature of the natural world.

What we did and what we found

The Ministry involved Maori in the development and confirmation of waste, hazardous substances, hazardous waste, contaminated sites and toxic contaminants indicators. Four hui were held throughout New Zealand in 1998 and attended by approximately 100 people representing various iwi, hapu and Maori interests. We had a Maori consultant, John Hohapata, of Oke Promotions and Consultants working with us on the development of these indicators from a Maori perspective. Wira Gardiner of Gardiner and Parata organised the hui for us, which discussed issues broader than the waste indicators.

Most of the comments received from the hui related to process issues. Therefore Oke Promotions and Consultants developed mainly process indicators. Many of these indicators did not meet the selection criteria of the Ministry for indicator development and have not been included in the confirmed set.

Waste indicators specific to Maori

Some indicators specific to Maori were recommended for inclusion as Stage 1 indicators. For example, “The number of waste discharges around areas of spiritual significance”. The major difficulty in including this proposed indicator was the issue of defining spiritual sites. A further problem surrounded the issue of confidentiality. It was suggested that hapu and iwi might not want the location of these sites published. Notwithstanding these difficulties it might be possible to include potential indicators similar to this one as Stage 2 indicators, requiring further work and inquiry.

The only Maori-specific indicator that was developed which also met the MfE selection criteria for indicator development, relates to rahui. This indicator is a Stage 2 indicator: “Days per year and extent over which rahui is applied to address the adverse effects of waste”. This indicator could be included as an indicator in other parts of the EPI Programme ie, the marine environment indicators set, etc.

The Ministry released an indicators document in late May 1999 proposing a more comprehensive approach for Maori involvement in the EPI Programme (MfE, 1999b). The Ministry has decided (based on feedback on this document that all of the Maori specific indicators developed under the EPI Programme will be dealt with as part of a separate and parallel Maori indicators process. This includes Maori relevant indicators from other strands of

the EPI Programme (such as marine environment and biodiversity indicators). The Ministry has sought comments from Maori on the indicators developed to date under the EPI Programme. In November/December 1999 the Ministry held a series of hui around the country to gain this feedback. These comments will guide us on which if any of the Maori-specific waste indicators to confirm and we will then begin a process of clarifying the minimum monitoring and reporting requirements.

Integration – How the Indicators Work Together

Information about our environment is being collected throughout New Zealand by regional, city and district councils, government departments, and other agencies. Our challenge is to implement a core set of environmental performance indicators to give a reliable picture of what is happening in the environment. One part of this challenge is the need to meaningfully report on waste management, hazardous waste and contaminated sites, as pressures and responses, to our environment.

As noted earlier, there is some misunderstanding about how this set of indicators fits with the broader set of indicators. The aim has always been, not only to make this set internally coherent, but also to integrate them into the wider EPI Programme set of indicators.

The overall progress with the EPI Programme was summarised in the Introduction. We have confirmed most of the indicators for the various strands and are very much moving into the implementation phase. In the early phases of the Programme we focused on land, water and air issues and confined ourselves largely (but not totally) to state indicators (ie, indicators of the condition of the environment). More recently the indicators we have been developing are more pressure indicators such as waste, energy and transport. Waste, energy and transport can exert pressures on the environment, changing the quality and quantity of natural resources. These changes alter the state or condition of our environment. In order to effectively report on the state of our environment, we need to also consider these pressures and human responses to the state and pressures on that environment.

Figures 19 and 20 illustrate the example issue of non-point source nutrient runoff and bathing beaches, how the waste indicators (pressure indicators) link with the land, water and marine indicators (state indicators). It is only as a whole that the indicators can give us a picture of the environment. In some cases they will indicate causes of problems, but mostly they are designed to be flags which will trigger further investigation.

Figure 19. **Indicators of pathogens at bathing beaches**

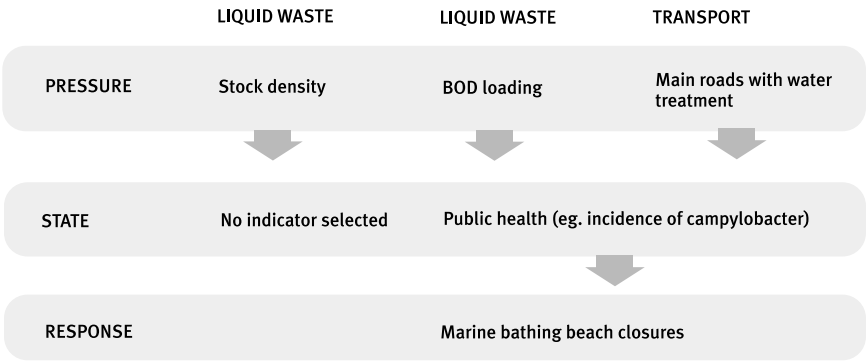
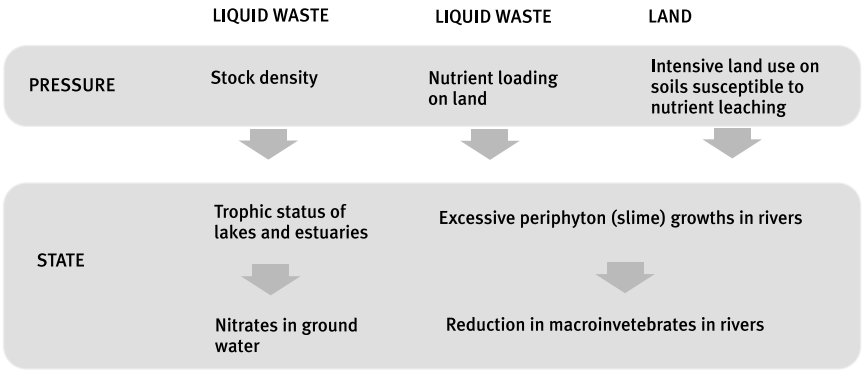


Figure 20. **Indicators of non-point source nutrient runoff**



Next Steps – Implementation and Reporting

We propose that the Stage 1 indicators for waste, hazardous waste and contaminated sites be implemented by the agencies listed below.

Table 6: Providing information

Responsible agency	To implement these indicators and provide information on:
TLAs	Disposal to landfills, recycling schemes and wastewater treatment.
Commercial waste operators	Disposal to landfills and hazardous waste treatment facilities.
Packaging Council and Plastics Institute	Quantity of waste recycled.
Ministry of Economic Development	Exports of hazardous waste.
Regional councils	Stock density, acceptance of hazardous waste at landfills (where this is required by resource consent) and contaminated sites

The priority development work for Stage 2 indicators is to:

- review the WAP and develop the basis for a minimum representative coverage of New Zealand
- complete the Hazardous Waste Management Programme, including the definitions, landfill acceptance criteria, wastewater acceptance criteria and some form of record keeping by operators
- develop and trail methods for monitoring BOD and nutrient loadings to water and land. We propose this be based on regional councils consents monitoring data, but these are not always reported in a consistent way. We propose to trial this approach with a regional council first
- review and refine the rapid hazard assessment protocol for contaminated sites. We hope to trial this with regional councils.

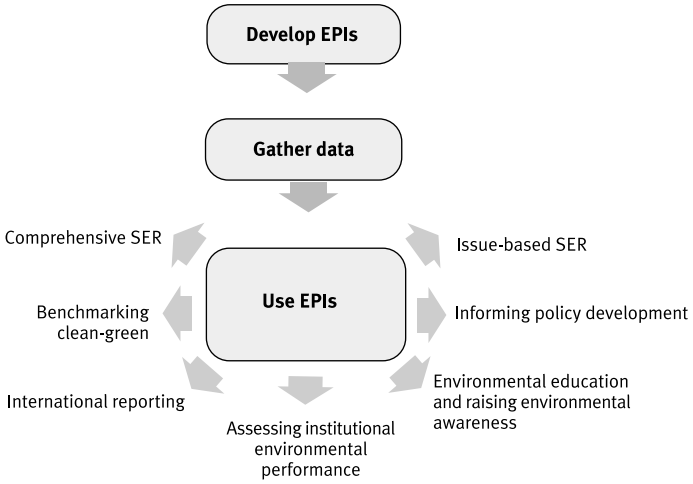
The Stage 1 and Stage 2 indicators for all the strands will be progressively implemented over the next five years. We expect a patchwork of indicators, and coverage of New Zealand, to evolve over time. As indicators become available we will use them for reporting.

State of the Environment Reporting (SER)

The Ministry's web site will be the hub for access by the Ministry and the public to the indicators. Data on only a few of the indicators will be held by the Ministry.
Most data management will be outsourced to a variety of agencies – as the indicators for ozone climate change, and air quality are now. So, for example, data on the landfill indicators will be managed by regional council, territorial local authority and commercial waste operators, but will be accessible as worked data through the Ministry's web page. The Ministry's web page will provide access to all data for all indicators. The system is still being developed and indicators will be reported on as information becomes available.

The Ministry proposes to use indicators to report on the environment as summarised in Figure 21.

Figure 21. **Using indicators for State of the Environment Reporting**



The Ministry is currently working on the first two issue-based SERs, namely:

- transport and air quality in our cities
- sustainability of our commercial fish stocks (with the Ministry of Fisheries).

In 2001 the Ministry will begin work on a SER on the issue of bathing water quality.

Key elements of what will be reported include:

- What's happening in and to the environment (state and pressures)?
- Why is this happening? What are the key pressures?
- What are we doing about it (responses)?
- How do we compare (trends over time and space)?

The information will be presented in simple formats so that it is easily understood. It is important to have credible information and a flexible approach. This is why the Ministry web page is being used as a hub for this indicator information, which can be accessed by a wide range of people as soon as it is available and the agencies responsible for the data can maintain some control over the integrity of the data.

Ministry web site and key contacts

You may wish to look at the Ministry home page in the monitoring section (www.environment.govt.nz or www.mfe.govt.nz) for more information on the EPI Programme. This web page lists the key Ministry contact people for various aspects of the EPI Programme and shows how we are starting to manage and present information. It also gives an indication of how other indicators are being reported. We recommend that you look, for example, at the marine indicators on the web page.

The following Ministry for the Environment staff are also happy to discuss these confirmed waste, hazardous waste and contaminated sites indicators further and may be contacted at the Ministry for the Environment's head office in Wellington:

EPI Programme – Kirsty Johnston, Maurice Hoban, Ruth Berry
EPI waste indicators generally – Maurice Hoban
Solid waste indicators – Carla Thorn
Liquid waste indicators – Dave Brash
Hazardous waste indicators – Ket Bradshaw/Glenn Wigley
Contaminated sites indicators – Simon Buckland

References

Australia New Zealand Environment Conservation Council (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, ANZECC, National Health and Medical Research Council.

Hohapata, John (1999) *Report on Proposed Maori Oriented Environmental Performance Indicators*, Unpublished report prepared for the Ministry for the Environment.

Lincoln, R J, Boxshall, G A, Clark, P F (1982) *A dictionary of ecology, evolution and systematics*, Cambridge University Press.

Ministry for the Environment (1996) Collec*ting and Managing Contaminated Sites Information: A Guide for Local Government*, Wellington.

Ministry for the Environment (1997a) *The State of New Zealand Environment*, Wellington.

Ministry for the Environment (1997b) *National Waste Data Report*, Wellington.

Ministry for the Environment (1998a) *Environmental Performance Indicators: Proposals for waste and hazardous substances*, Wellington.

Ministry for the Environment (1998b) *Environmental Performance Indicators: Summary of proposals for waste, hazardous substance and toxic contaminants*, Wellington.

Ministry for the Environment (1999a) *Environmental Performance Indicators – Proposals for waste, hazardous substances and toxic contaminants, summary of submissions*, prepared for the Ministry for the Environment by Gus Roxburgh.

Ministry for the Environment (1999b) *Maori Input into the Environmental Performance Indicators Programme*, Wellington.

Ministry for the Environment (1999c) *Landfill Census*, Wellington.

Ministry for the Environment (1999d) *Environmental Performance Indicators: Waste, Hazardous Waste and Contaminated Sites* Unpublished paper prepared for the 1999 WasteMINZ Conference, Wellington.

Stutz JK (1999) *Towards a Strategic Framework for Setting National-Level Waste Prevention Targets*, in *OECD Joint Workshops on Extended Producer Responsibility and Waste Minimisation Policy in Support of Environmental Sustainability*: OECD Paris, May 1999.

Appendix 1 – MMRR (Minimum Monitoring and Reporting Requirements) Template

Minimum Monitoring and Reporting Requirements (MMRR)

1 EPI Strand: eg, Land, Freshwater, Terrestrial and Freshwater Biodiversity

2 Indicator: indicator name in full, eg, 'extent of each land cover class'; 'freshwater clarity'; 'biodiversity condition of selected ecosystems and habitats'.

3 Parameter(s): ie, what is actually (physically) measured (and/or calculated) to make up/report the indicator, eg, land cover class, water clarity, species counts. There may be more than one parameter.

4 Method(s): ie, how is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above, eg, for land cover, satellite imagery, aerial photography; for water clarity, Secci disc; for biodiversity condition, Recce plot.

Include a reference for the method if available, eg, for Recce plot: Allen RB, 1993. 'A permanent plot method for monitoring changes in indigenous forests'). Include details of method(s) development, quality assurance and agreement for use by monitoring agencies.

Tick boxes below. More than one tick box may apply.

4a ☐ Standard method(s) available ☐ Method(s) need development ☐ Standard method(s) agreed

5 Recommended sample design:

Where to measure: Looking at the map of New Zealand, think about the geographical coverage required to meet the reporting needs for this indicator. What kind of monitoring network is required? Tick boxes below, fill in percent.

☐ fully representative (total picture for whole country)

☐ random stratified (random sites within areas defined by particular features, eg, land use, boundaries, environments)

☐ random (completely random)

☐ totally subjective (non statistical)

☐ risk-based (selected 'at risk' sites within defined areas)

☐ selective (sites selected on biophysical basis or risk based)

☐ other (specify) _____

5a Statistical relevance: How certain do you need to be that the monitoring is nationally representative (eg, 95 percent certainty)?

___ percent certainty

5b At what scale do you want to collect data (could be more than one scale)?

☐ national ☐ regional ☐ local (catchment/ecosystem, city/district)

☐ sector based ☐ other (specify) _____

6 'When' to measure and report: How often does this indicator need to be measured:

(a) to monitor the indicator parameter(s) = 'frequency of monitoring'?

(b) to enable the transfer of indicator data = 'frequency of data transfer'?

(c) to monitor change and report indicator trends = 'frequency of reporting'?

Tick boxes below.

6a Frequency of monitoring (for EPI):

- ☐ hourly
- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ quarterly
- ☐ six-monthly
- ☐ yearly
- ☐ other (specify) _____

6b Frequency of data transfer (to EPI):

- ☐ hourly
- ☐ daily
- ☐ weekly
- ☐ monthly
- ☐ quarterly
- ☐ yearly
- ☐ other (specify) _____

6c Frequency of reporting: (for SOE)

- ☐ monthly
- ☐ quarterly
- ☐ yearly
- ☐ five-yearly
- ☐ 10-yearly
- ☐ 20-yearly
- ☐ 50-yearly
- ☐ other (specify) _____
- ☐ for WWW updates (specify if not the same as above) _____

7 'How' to report: How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator, eg, extent and area of each land cover class; percent time water clarity varies from standard value; biodiversity condition by environmental domain, and illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables, etc.

7a Reporting unit:

_____

_____

_____

7b Reporting format:

_____

_____

_____

7c Reporting scale: At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)

- ☐ national
- ☐ regional
- ☐ local (catchment/ecosystem, city/district)
- ☐ sector-based
- ☐ other (specify) _____

8 'Who' is responsible for measuring the indicator (please specify under tick boxes. Can be a combination of agencies depending on number of parameters or scale(s) of monitoring and reporting – refer to questions 5, 5b, 7c):

resource monitoring agencies:

central government:
_____

regional councils/ unitary authorities:
_____

district/city councils:
_____

iwi:
_____

sector group (industry):
_____

contracted activity:

Crown Research Agency:
_____

consultancy:
_____

sector group (industry):
_____

other (specify):
_____

volunteer activity:

sector group (industry):
_____

NGO:
_____

community group:
_____

other (specify):
_____

Appendix 2 – Completed MMRR templates for solid and hazardous waste and contaminated sites

Minimum Monitoring and Reporting Requirements (MMRR) for SW1

1 EPI Strand: Waste indicators

2 Indicator

SW1 Quantity of waste disposed of to landfill and cleanfill by region

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator, eg, land cover class, water clarity, species counts. There may be more than one parameter.*

Quantity of landfill waste (per capita for reporting purposes – regarding income)
Source of waste – ie, amount of waste from each region

4 Method(s): *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above*

Weight – Actual tonnes to capture 20 percent of the landfills but 80 percent of the waste.

Volume and weight surveys would be carried out for the other 80 percent of landfills to provide a national figure.

These figures of waste to landfill can be collected from the operator. At the landfills where there is an operator, staff will assess/ask the source of the waste, ie, which region; and assume that small-unstaffed landfill will primarily accept local waste.

It is also recommended that guidelines be provided for resource consent conditions.

The method is available but needs further development.

4a ✓ standard method(s) available ✓ method(s) need development ☐ standard method(s) agreed

5 Recommended sample design: 'Where' to measure: *What kind of monitoring network is required?*

✓ fully representative (total picture for whole country)

5a *At what scale do you want to collect data (could be more than one scale)?*

✓ local (catchment/ecosystem, city/district)
✓ the operator

6 'When' to measure and report:

6a Frequency of monitoring (for EPI):	6b Frequency of data transfer (to EPI):	6c Frequency of reporting (for SER):
✓ yearly	✓ six-monthly ✓ yearly	✓ yearly – calendar year

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like?*

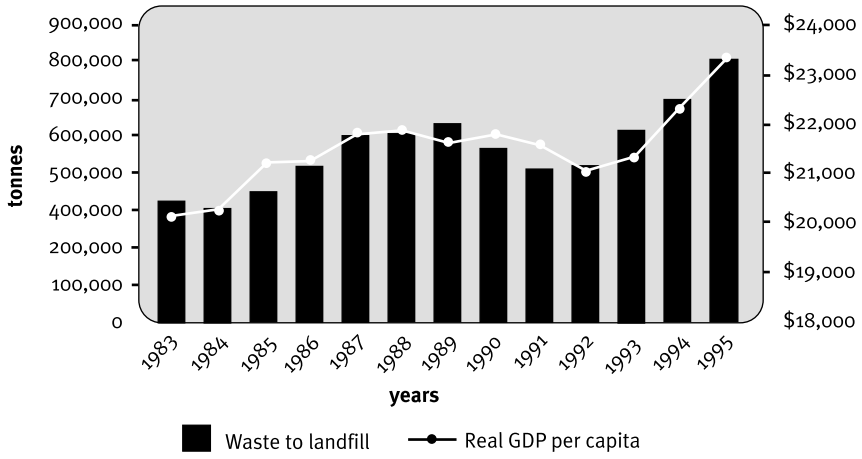
7a Reporting unit:

Volume and weight (in tonnes) – need both where possible.
National and possibly regional.

7b Reporting format:

Maps, tables and graphs will be used.
This will provide a national 'on line' system, which will be trailed by councils and landfill operators before going live.

Figure 5. **Example of reporting SW1, tonnes of waste to landfill (Auckland Region 1988- 1995)**



Source: Auckland Regional Council

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national ✓ regional?

8 'Who' is responsible for measuring the indicator?

resource monitoring agencies:	**contracted activity:**	**volunteer activity:**
✓ regional councils and unitary authorities:	✓ landfill operators	
✓ district/city councils:		

Minimum Monitoring and Reporting Requirements (MMRR) for SW2

1	**EPI Strand:** Waste indicators
2	**Indicator:** SW2 Quantity of waste recycled
3	**Parameter(s):** *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.* Total quantity of waste and by category.
4	**Method(s):** *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.* Quantities of packaged waste/organic Recycling/recovery/redirection and reuse Landfills/cleanfills/transfer stations Green waste can be drawn from WAP survey Start with what we have but some development work will be needed. *Tick boxes below. More than one tick box may apply.*
4a	✓ standard method(s) available ✓ method(s) need development
5	**Recommended sample design: 'where' to measure:** ✓ fully representative (total picture for whole country)
5a	*At what scale do you want to collect data (could be more than one scale)?* ✓ national ✓ cleanfill per site
6	**'When' to measure and report:** *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	**6b Frequency of data transfer (to EPI):**	**6c Frequency of reporting: (for SOE)**
		✓ yearly

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like?*

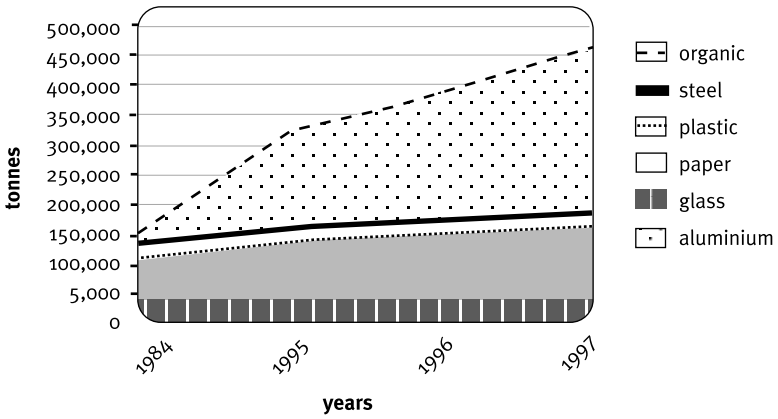
7a Reporting unit:

Unit in tonnes

7b Reporting format:

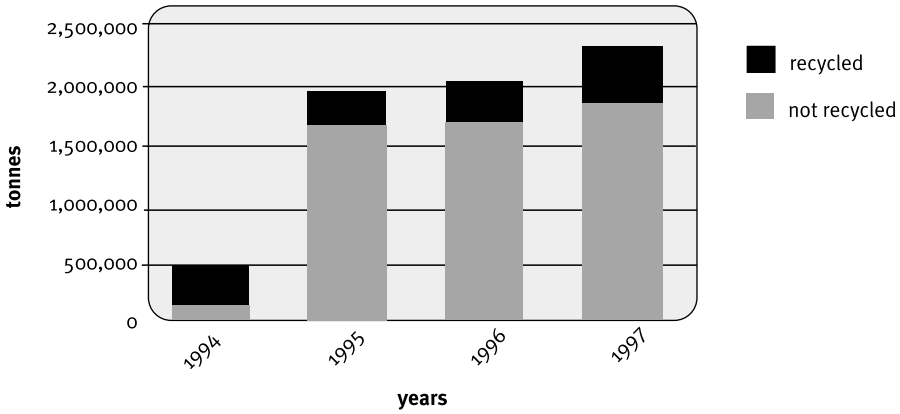
By categories – bar/pie charts/area charts

Figure 7. **Example of reporting SW2, quantity of waste recycled by recyclable material**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

Figure 8. **Example of reporting SW2, quantity of waste recycled (and not recycled)**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national

8	**'Who' is responsible for measuring the indicator?**		
	resource monitoring agencies:	**contracted activity:**	**volunteer activity:**
	✓ regional councils/unitary authorities ✓ district/city councils ✓ sector group (industry): Packaging Council		

Minimum Monitoring and Reporting Requirements (MMRR) for SW3

1	**EPI Strand:** Waste indicators		
2	**Indicator:** SW3 Access to solid waste resource recovery/recycling facilities		
3	**Parameter(s):** *ie, 'what' is actually (physically) measured (and / or calculated) to make up/report the indicator, eg, land cover class, water clarity, species counts. There may be more than one parameter.* Total number of facilities. Access to facilities, drop off points, resource recovery points.		
4	**Method(s):** *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.* Number of houses served by kerbside collections Facilities available – and household access to Supervised and unsupervised resource recovery centres *Tick boxes below. More than one tick box may apply.*		
4a	✓ method(s) need development		
5	**Recommended sample design: 'where' to measure:** ✓ fully representative *(total picture for whole country)*		
5a	*At what scale do you want to collect data (could be more than one scale)?* ✓ local (catchment/ecosystem, city/district) ✓ commercial operators		
6	**'When' to measure and report:** *How often does this indicator need to be measured?*		
6a	**Frequency of monitoring (for EPI):**	**6b Frequency of data transfer (to EPI):**	**6c Frequency of reporting: (for SOE)** ✓ yearly

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like?*

7a Reporting unit:

Nationally – percent of population serviced by kerb-side recycling and resource recovery centres.

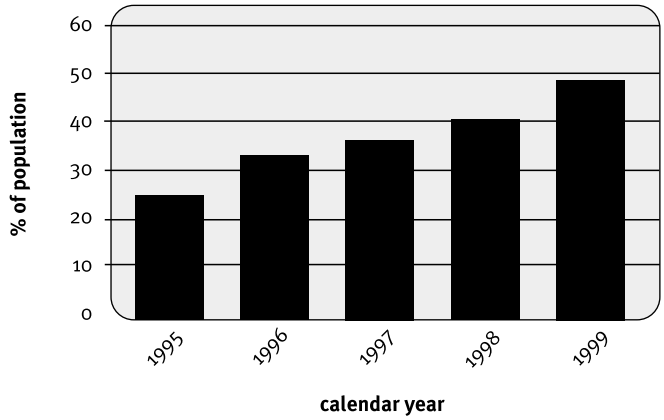
Locally – district by district – recovery centres

Materials collected eg, glass, paper, etc.

7b Reporting format:

Report on the services provided to the household

***Figure 9*. Example of reporting SW3, % of population that has access to solid waste resource recovery (recycling) facilities.**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is are the scale(s) different?)*

✓ national ✓ local (catchment/ecosystem, city/district)

8 'Who' is responsible for measuring the indicator?

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ district/city councils		
✓ sector group (industry)		

Minimum Monitoring and Reporting Requirements (MMRR) for SW4

1 EPI Strand: Waste indicators

2 Indicator: SW4 Composition and source of waste disposed to landfill by WAP categories

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.*

Paper, glass, plastic, metal, organic, rubble/concrete etc, timber, rubber and textiles, potentially hazardous, other.

Assessed as to whether it from residential or industrial/commercial sources (ie, business). This will be assessed crudely over the weighbridge by the landfill operator counting all cars and small trailers as having household/residential waste and all trucks/skips etc as having business waste. Could define by vehicle categories.

4 Method(s): *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.*

WAP Survey (which is currently under review)

This now includes assessing whether the waste is from residential or commercial/industrial sources (the previous SW5).

Tick boxes below. More than one tick box may apply.

4a ✓ method(s) need development

5 Recommended sample design: 'where' to measure:

✓ totally subjective *(non statistical)*

✓ risk based *(selected 'at risk' sites within defined areas)*

✓ selective *(sites selected on biophysical basis or risk based)*

We do not need a fully representative picture (and won't get that anyway!)

Need to analyse previous data to see if there is any difference in composition between landfills/city vs country/big vs small /North Island vs South Island then decide if it should be random, risk based or subjective.

This indicator will focus on the composition of waste to landfill and transfer station (if there is a public one/s) ie, on trailer or truck.

It will be assessed by staffed landfill – the weighbridge.

5a *At what scale do you want to collect data (could be more than one scale)?*

✓ transfer stations (if public access)

Collect at both landfills and transfer stations

6 'When' to measure and report: *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	**6b Frequency of data transfer (to EPI):**	**6c Frequency of reporting: (for SOE)**
✓ daily It is recommended that current information is reviewed to assess how often it should be done – say five-yearly subject to review.	As the surveys are done.	✓ five-yearly Report yearly on the residential/business waste

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator, illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables etc.*

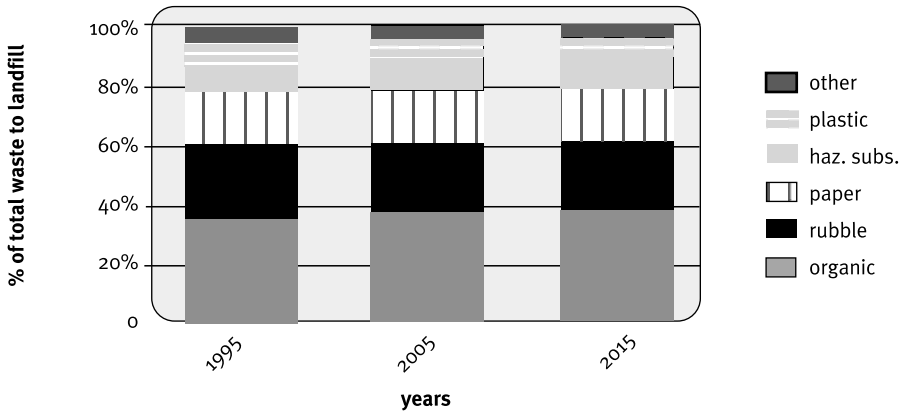
7a Reporting unit:

percent of total

7b Reporting format:

Compare internationally/nationally. Have bar graphs and tables showing the component of the total waste per year in each of the WAP categories and then a bar graph of each of these over time to show trends.

Figure 10. **Example of reporting SW4, composition of waste to landfill**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national

8 'Who' is responsible for measuring the indicator? *(Please specify under tick boxes. Can be a combination of agencies depending on number of parameters or scale(s) of monitoring and reporting.)*

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ central government: for funding		
✓ regional councils/unitary authorities: for funding and organising		
✓ district/city councils: for funding and collecting data		

Minimum Monitoring and Reporting Requirements (MMRR) for SW5

1 EPI Strand: Waste indicators

2 Indicator: SW5 Quantity of waste disposed of to landfill from residential sources.

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.*

Residential waste – which is a subset of indicator SW1 and SW4
SW5 will be deleted and residential waste will be incorporated as part of SW1 and SW4.

Minimum Monitoring and Reporting Requirements (MMRR) for HW1

1 **EPI Strand:** Waste indicators

2 **Indicator:** HW 1 Quantity of hazardous waste disposed of, treated or exported – interim (stage 1)

3 **Parameter(s):** *ie, 'what' is actually (physically) measured (and / or calculated) to make up/report the indicator. There may be more than one parameter.*

Hazardous waste accepted to
- landfill
- exported
- waste water treatment facility
- hazardous waste treatment facility

using the new national hazardous waste definition. * *The national definition is essential.*

4 **Method(s):** *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.*

Landfill – nine landfills will be surveyed/piloted:
- Redvale
- Greenmount
- Whitford
- Horitu
- Silverstream
- Grenada (North)
- Burwood
- Green Island
- Rosebank

The national hazardous waste definition will be used.

Landfill operators will be asked:
- Are you consented to accept hazardous waste? Y/N
- Which of the following hazardous wastes do you accept (from the HW list)? Tick.
- Any additional information if available on the quantities of waste from the list?

Exported:
- Under Basel Convention – dealt with by Ministry of Commerce

Waste water treatment facility:
- A mass balance approach will be taken using the formula in the confirming indicators report (an annual estimate of quantities).
- A small set of waste water treatment plants will be sampled and the load calculated – this will be extrapolated.
- Ask what is being accepted against the hazardous waste definitions.

Hazardous waste treatment facility:
- Quantities of hazardous waste using the definition on a voluntary basis.
- Can also gain information from UEL and companies on their waste discharges.

Tick boxes below. More than one tick box may apply.

4a ✓ *some* method(s) need development ✓ standard method(s) agreed

5 **Recommended sample design: 'where' to measure:** *Looking at the map of New Zealand, think about the geographical coverage required to meet the reporting needs for this indicator. What kind of monitoring network is required?*

✓ fully representative (total picture for whole country)

Consented and unconsented landfills

5a *At what scale do you want to collect data (could be more than one scale)?*

✓ local (catchment/ecosystem, city/district)

6 **'When' to measure and report:** *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SOE)
		✓ yearly – *one-off baseline/review*

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator, illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables, etc.*

7a Reporting unit:

percent that accept hazardous waste: landfill/waste water treatment plant/hazardous waste treatment facility

Landfill – nine selected landfills, quantity (kg) by list

Waste water treatment facility – all identified facilities, quantity by list

Hazardous waste treatment facility – loading (kg) by year

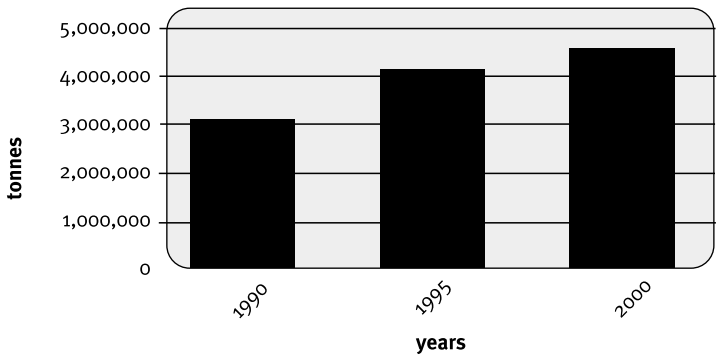
7b Reporting format:

As a pie chart (landfills)

Table of kg of hazardous waste (for exported, waste water, hazardous waste treatment facility)

Bar chart by contaminant (for hazardous waste to a waste treatment facility)

Figure 15. **Example of reporting HW1, quantity of hazardous waste accepted at landfills**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national

8 'Who' is responsible for measuring the indicator

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ district/city councils:	✓ industry	
✓ sector group – industry, operators		

Minimum Monitoring and Reporting Requirements (MMRR) HWI

1 **EPI Strand:** Waste indicators

2 **Indicator:** HW1 Quantity of hazardous waste disposed of, treated or exported – (Stage 2)

3 **Parameter(s):** *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.*

This now incorporates HW2 (quantity of hazardous waste discharged to land, air and water).
Hazardous waste accepted to:

- landfill
- exported
- waste water treatment facilities – including incinerators
- hazardous waste treatment facilities

using the new national hazardous waste definition. * *The national definition is essential.*

4 **Method(s):** *ie, 'how' is it measured - data collection (and or analysis) method(s) to measure/ derive the parameter(s) above.*

Landfill:

- It will be mandatory for the quantity of all priority hazardous wastes to landfill to be reported – kg/year, using the list (national definition).
- This will be based on the manifest declaration of hazardous waste based on the HW list.
- Priority hazardous wastes will be identified nationally and there will be a five yearly survey of industry to ensure that the priority list is still valid.

Waste water treatment facility:

- An annual estimate of mass loading will be calculated using the formula.
- The constituents will be sampled hourly every six months – this will be extrapolated.
- Hazardous waste will be measured in kg/year based on the definition and the list.

Hazardous waste treatment facility:

- Same as landfill with a mandatory manifest declaration and mass balance to determine the hazardous waste treated to become not hazardous (eg, landfill, trade waste, non hazardous).
- We will need some information about treatment to understand how hazardous waste is diverted from direct disposal. In the absence of full information – information on treatment and disposal provides a surrogate with some useful information broadly about whether the amount of hazardous waste generated is decreasing. This in turn gives an indication of the improving management of the total hazardous waste stream.

Tick boxes below. More than one tick box may apply.

4a ✓ *some* method(s) need development ✓ standard method(s) agreed

5 **Recommended sample design: 'where' to measure:** *Looking at the map of New Zealand, think about the geographical coverage required to meet the reporting needs for this indicator. What kind of monitoring network is required?*

Tick boxes below, fill in percent.

✓ fully representative *(total picture for whole country)*

Consented landfill

5a *At what scale do you want to collect data (could be more than one scale)?*

✓ ? regional ✓ local (catchment/ecosystem, city/district)

6 **'When' to measure and report:** *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SOE)
✓ hourly – landfills and treatment facilities ✓ yearly – waste water		✓ yearly – ***one off baseline/review***

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator, illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables, etc.*

7a Reporting unit:

- percent that accept hazardous waste: landfill/waste water treatment plant/hazardous waste treatment facility
- Landfill –quantity (kg) by list
- Waste water treatment facility –quantity by list
- Hazardous waste treatment facility – loading (kg) by year.

7b Reporting format:

As a pie chart

Table of kg of hazardous waste

Bar chart by contaminant

We will now be in a position to report trends in addition to the above information. This will be as one line graph showing the trends for hazardous waste disposed of and treated to landfill, waste water treatment facilities and hazardous waste treatment facilities.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national ✓ ? regional

8 'Who' is responsible for measuring the indicator?

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ district/city councils	✓ industry	
✓ sector group – industry, operators		

Minimum Monitoring and Reporting Requirements (MMRR) for HW2

1	**EPI Strand:** Waste indicators
2	**Indicator:** HW2 Quantity of priority hazardous waste generated and stored – interim (Stage 1)
3	**Parameter(s):** *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.* When we add this indicator (which was previously about hazardous waste from industrial sources), to HW1 we have a complete picture. We will focus on the following: • Physically hauled away from site: – An estimate of the total for liquid and solid hazardous waste • Quantity of hazardous waste (max) discharged to sewer: – This will be the total (maximum only) permitted discharges of trade waste (by license) to the sewer ie, not related to *all* waste water discharges • Number of consents which permit hazardous waste discharges to: – Land – Air – Water On site, as defined by the list. (Which is a change to this indicator.) • This indicator will provide a snapshot of what is happening at the time of the survey.
4	**Method(s):** *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.* Physically hauled away from site • Survey/request information from the contractor. • This will be based on the hazardous waste definition. • This will relate to solid and liquid waste. • An estimate of the total will be made. Quantity of hazardous waste (max) discharged to sewer. • This will be the total (max only) permitted discharges of trade waste (by license) to the sewer ie, not related to *all* waste water discharges. • There will be a survey of TLAs and water companies. Number of consents which permit hazardous waste discharges to: • Land • Air • Water On site, as defined by the list. This will be a survey of all regional councils. *Tick boxes below. More than one tick box may apply.* **4a** ✓ method(s) need development
5	**Recommended sample design: 'where' to measure:** *Looking at the map of New Zealand, think about the geographical coverage required to meet the reporting needs for this indicator. What kind of monitoring network is required?* ✓ fully representative *(total picture for whole country)* based on the above surveys **5b** *At what scale do you want to collect data (could be more than one scale)?* ✓ local (catchment/ecosystem, city/district)
6	**'When' to measure and report:** *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SOE)
		✓ yearly – one-off snapshot

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator, illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables, etc.*

7a Reporting unit:

Haulage and waste water in kg/year

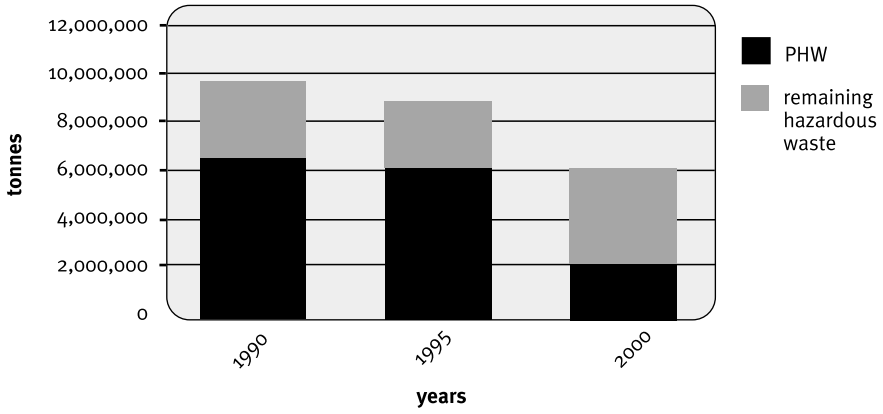
Number of discharge consents per constituent

7b Reporting format:

New Zealand total/year

This will initially be shown as bar graphs.

***Figure 16*. Example of reporting HW2, quantity of priority hazardous waste (PHW) generated and stored**



NOTE: Data in this figure has been fabricated and should only be used for demonstration.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national ✓ regional

8 'Who' is responsible for measuring the indicator?

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ regional councils/ unitary authorities: (c)		
✓ district/city councils: (b)		
✓ sector group (industry): waste transport operators (a)		

Minimum Monitoring and Reporting Requirements (MMRR) for HW2

1 EPI Strand: Waste Indicators
2 Indicator: HW2 Quantity of priority hazardous waste generated and stored (Stage 2)

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.*

All priority hazardous waste generated and stored by industry (per sector)

4 Method(s): *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above.*

Required by regulation/National Environmental Standard – constituents to provide information (manifest or other system).

Storage possibly minimum threshold/or type of facility.

Diffuse sources or WAP methodology.

5 Recommended sample design: 'where' to measure: *Looking at the map of New Zealand, think about the geographical coverage required to meet the reporting needs for this indicator. What kind of monitoring network is required?*

✓ fully representative *(total picture for whole country)*

5b *At what scale do you want to collect data (could be more than one scale)?*

✓ local (catchment/ecosystem, city/district)

✓ this will be business and site specific. There will also be surveys of diffuse sources.

6 'When' to measure and report: *How often does this indicator need to be measured?*

6a Frequency of monitoring (for EPI):	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SOE)
✓ hourly ✓ daily ✓ weekly	✓ yearly	✓ yearly

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like?*

7a Reporting unit:

Kilograms of types of priority hazardous wastes generated and treated per year by sector.

7b Reporting format:

A line graph

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)? (Refer to question 5b. Is/are the scale(s) different?)*

✓ national ✓ regional

8 'Who' is responsible for measuring the indicator?

resource monitoring agencies:	contracted activity:	volunteer activity:
✓ sector group (industry): waste generator		

Minimum Monitoring and Reporting Requirements (MMRR) for HW3

1 EPI Strand: Waste indicators

2 Indicator: HW 3 type and quantity of hazardous waste at major facilities that cannot be dealt with in and environmentally sound and efficient manner – interim (Stage 1)

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator. There may be more than one parameter.*

This indicator has been deleted as it has been incorporated into the new HW 2 – quantity of priority hazardous wastes generated and stored.

Minimum Monitoring and Reporting Requirements (MMRR) for CS1

1 EPI Strand: Contaminated sites

2 Indicator: The total number of sites that fall into the following categories:

- confirmed contaminated site
- remediated site.

A Stage 1 indicator. This is an interim indicator that will be replaced by implementation of the Stage 2 indicator, the methods for which are currently under development.

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator , eg, land cover class, water clarity, species counts.*

Confirmed contaminated sites

Remediated sites

4 Method(s): *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above, eg, for land cover, satellite imagery, aerial photography; for water clarity, Secci disc; for biodiversity condition, Recce plot.*

This indicator collates data already collected by regional councils and held on their contaminated sites databases. This data will need to be collected from each regional council. It is likely that the council databases will have been initially identified on the basis of land use, followed by subsequent site investigation (if necessary). The indicator provides no differentiation on the degree of risk posed by a site.

Tick boxes below. More than one tick box may apply.

4a ✓ standard method(s) available

5 Recommended sample design: 'Where' to measure: *what geographical coverage is required to meet the reporting needs for this indicator?*

✓ fully representative (ie, total picture for whole country)

5a A*t what scale do you want to collect data (could be more than one scale)?*

✓ regional

6 'When' to measure and report: *How often does this indicator need to be measured?*

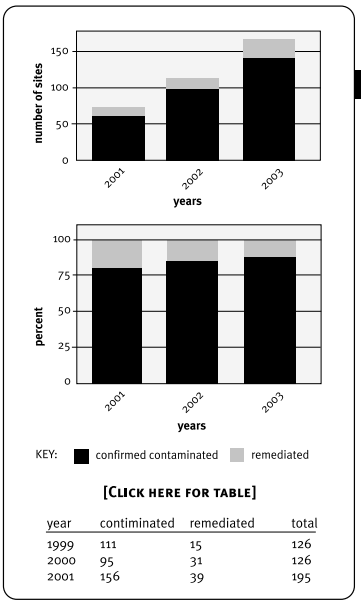
6a Frequency of monitoring	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SER)
✓ six-monthly	✓ six-monthly	✓ financial year

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe how this information might be presented, eg, graphs, charts, maps, tables, etc.*

7a Reporting unit: Total number and percent

7b Reporting format: An example of web based reporting is provided below. Other reporting media (eg, printed text) will also be used.

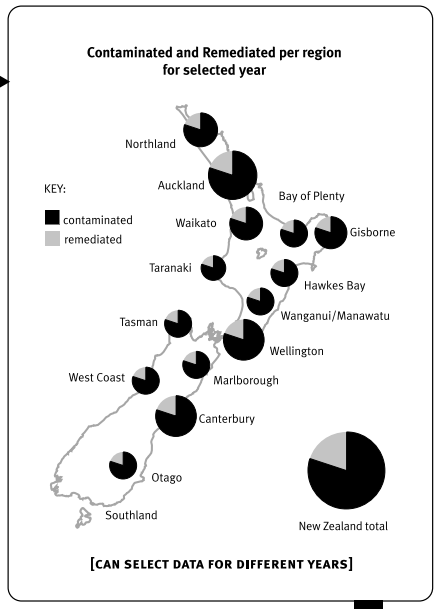
Screen 1: National Data



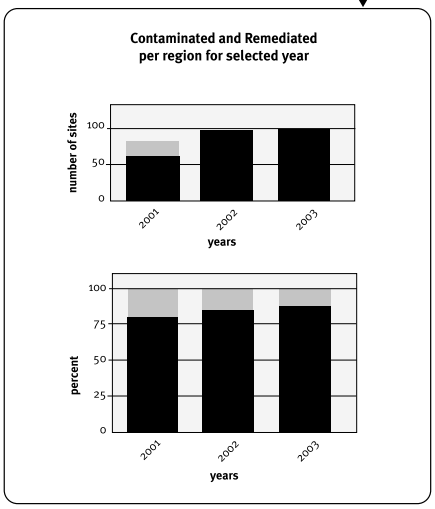
year	contiminated	remediated	total
1999	111	15	126
2000	95	31	126
2001	156	39	195

NOTE: data in this figure has been fabricated and should only be used for demonstration.

Screen 2: Index for Regional Data



Screen 3: Regional Data



7c Reporting scale: At what scale do you want to detect change/report trends in this indicator (could be more than one scale)?

✓ national and regional

8 'Who' will be responsible for measuring the indicator? *Can be a combination of agencies.*

✓ regional councils and unitary authorities

Minimum Monitoring and Reporting Requirements (MMRR) for CS2

1 EPI Strand: Contaminated Sites

2 Indicator:

The number of contaminated sites that fall into the following categories:

- Under investigation moderate to low risk sites.
- Under investigation high risk sites.
- Confirmed contaminated moderate to low risk sites (pre and post RMA).
- Confirmed contaminated high risk sites (pre and post RMA).
- Remediated sites.

This is the Stage 2 indicator that will replace the interim Stage 1 indicator. The site classification will be reviewed, if necessary, to harmonise with the classification system developed in the SMF Project "Development of a Standard Information Collection System and Improved Rapid Hazard Assessment for Contaminated Sites".

3 Parameter(s): *ie, 'what' is actually (physically) measured (and/or calculated) to make up/report the indicator , eg, land cover class, water clarity, species counts.*

Under investigation moderate to low risk sites.

Under investigation high risk sites.

Confirmed contaminated moderate to low risk sites (pre and post RMA).

Confirmed contaminated high risk sites (pre and post RMA).

Remediated sites.

4 Method(s): *ie, 'how' is it measured – data collection (and or analysis) method(s) to measure/derive the parameter(s) above, eg, for land cover, satellite imagery, aerial photography.*

The risk methodology (to distinguish "moderate to low" and "high" risk sites will be based on a revised rapid hazard assessment (RHA). The revised RHA is to be undertaken as a component of the SMF Project "Development of a Standard Information Collection System and Improved Rapid Hazard Assessment for Contaminated Sites".

Tick boxes below. More than one tick box may apply.

4a ✓ method needs development

5 Recommended sample design: 'Where' to measure: *Think about the geographical coverage required to meet the reporting needs for this indicator.*

✓ fully representative (ie, total picture for whole country)

5a *At what scale do you want to collect data (could be more than one scale)?*

✓ regional

6 'When' to measure and report: *How often does this indicator need to be measured?*

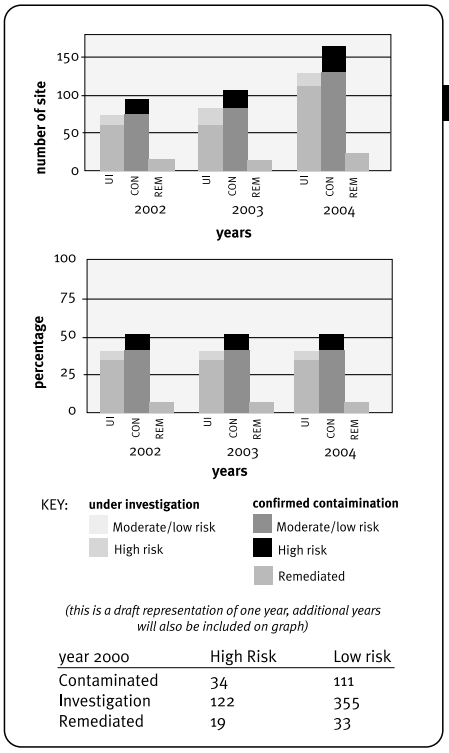
6a Frequency of monitoring:	6b Frequency of data transfer (to EPI):	6c Frequency of reporting: (for SER)
✓ six-monthly	✓ six-monthly	✓ financial year

7 'How' to report: *How will the indicator be reported? What will the reported indicator look like? Please describe the unit of reporting (reporting unit) for the indicator and illustrate how this information might be presented (ie, reporting format), eg, graphs, charts, maps, tables, etc.*

7a Reporting unit: Total number and percent.

7b Reporting format: An example of web based reporting is provided overleaf. Other reporting media (eg, printed text) will also be used.

Screen 1: National Data

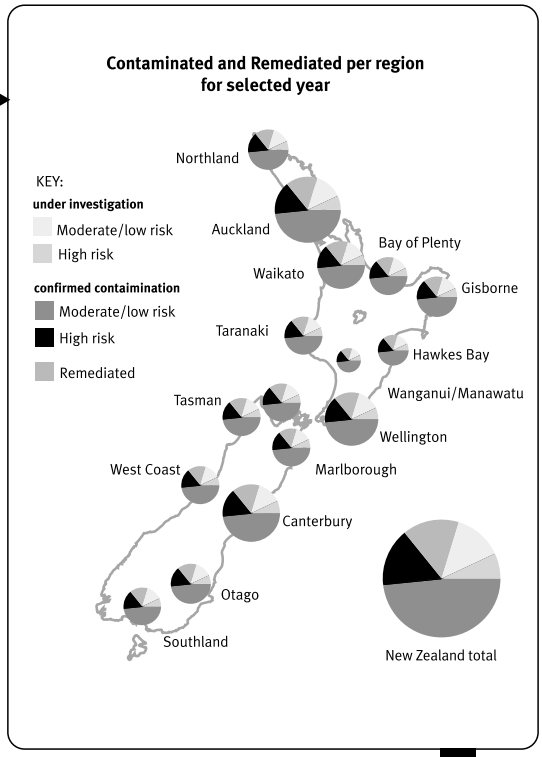


(this is a draft representation of one year, additional years will also be included on graph)

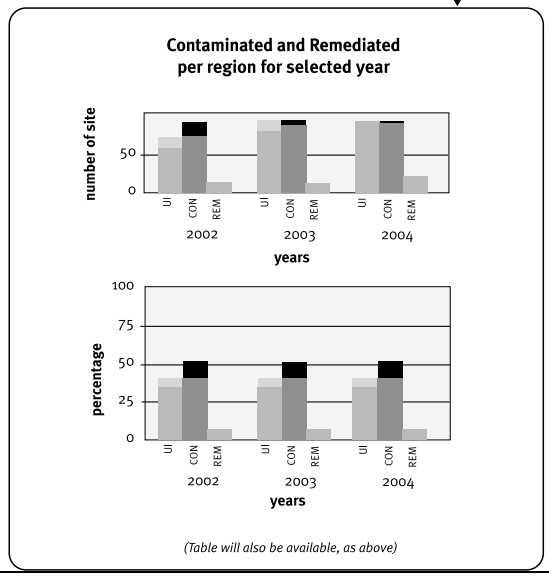
year 2000	High Risk	Low risk
Contaminated	34	111
Investigation	122	355
Remediated	19	33

NOTE: data in this figure has been fabricated and should only be used for demonstration.

Screen 2: Index for Regional Data



Screen 3: Regional Data



(Table will also be available, as above)

Note: This example of the indicator does not yet incorporate the "pre-RMA/post-RMA" delineation.

7c Reporting scale: *At what scale do you want to detect change/report trends in this indicator (could be more than one scale)?*

✓ national and regional

8 'Who' will be responsible for measuring the indicator? *Can be a combination of agencies.*

✓ regional councils and unitary authorities

About the Ministry for the Environment

"Making a difference through environmental leadership"

The Ministry for the Environment advises the Government on policies, laws, regulations, and other means of improving environmental management in New Zealand. The significant areas of policy for which the Ministry is responsible are management of natural resources; sustainable land management; air and water quality; management of hazardous substances, waste and contaminated sites; protection of the ozone layer; and responding to the threat of climate change. Advice is also provided on the environmental implications of other government policies.

The Ministry monitors the state of the New Zealand's environment and the operation of environmental legislation so that it can advise the Government on action necessary to protect the environment or improve environmental management.

The Ministry for the Environment carries out many of the statutory functions of the Minister for the Environment under the Resource Management Act 1991. It also monitors the work of the Environmental Risk Management Authority on behalf of the Minister.

Besides the Environment Act 1986 under which it was set up, the Ministry is responsible for the Soil Conservation and Rivers Control Act 1941, the Resource Management Act 1991, the Ozone Layer Protection Act 1996, and the Hazardous Substances and New Organisms Act 1996.

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