

Applied science strategy

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Front cover image: Microplastics under UV light

Foreword

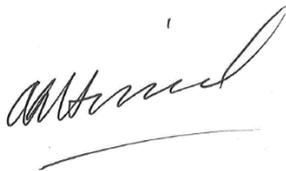
As Victoria's Chief Environmental Scientist, I have joined EPA at a very exciting time. EPA has embarked on the biggest reform program in its 46-year history with an enhanced applied science capability being a critical component to success.

Applied science at EPA is an essential underpinning to the protection of the environment and human health. It enables us to understand the impacts of our activities on the environment as well as identify innovative and effective advancements in technologies to improve our performance.

Our strategy will strengthen EPA's applied science capability. An EPA with applied science at its core will confidently and robustly assess risks to the environment and human health from pollution and waste. It will bolster EPA's ability to work together with Victorians to target and change behaviours to achieve outstanding environmental and public health outcomes.

With enhanced data, information and knowledge, we will develop new and innovative ways for community, industry and government to engage in protecting the environment. From virtual reality environmental problem-solving experiences to codesigning environmental monitoring programs, we will be working to ensure Victorians have access to comprehensive and transparent information and advice on our environment.

EPA has a proud history of using science to tackle environmental issues and I look forward to working with you to protect the environment and human health and ensure we achieve our vision for a liveable and prosperous Victoria now and always.



Andrea Hinwood

Chief Environmental Scientist

Our role



What is Applied Science?

Applied Science at EPA includes the natural, physical and life sciences, environmental health, social sciences, engineering and technology. It is science aimed at answering questions about the risks and impacts of pollution and waste on the environment (ecosystems and built environment) and human health, as well as the appropriateness and effectiveness of prevention, mitigation, treatment and disposal methods. It draws on research, knowledge and capability from across the organisation and from industry and government partners, academia and community.

Who we are

As Victoria's environmental regulator, applied science is at the core of our knowledge and skills. EPA has a diverse and highly qualified workforce, which:

- works with, and provides advice to, community and businesses to prevent pollution,
- provides applied science advice to inform policy and regulatory decisions: assessments, compliance and enforcement actions,
- provides advice on activities which might have pollution and waste impacts,
- responds to pollution incidents and community concerns,
- routinely collects data on the state of the environment, and
- partners with others on projects including research and development.

Our environment

As a regulator of pollution and waste, EPA aims to protect ecosystems and human health. EPA works with community, industries and government to prevent pollution and waste in air, water, land and groundwater. Our environment and the challenges and opportunities we face are diverse and multifaceted.

Climate change is resulting in an increase in extreme weather events and more frequent natural disasters such as bushfires, floods and days of extreme heat which will impact on existing environmental pressures.

Air quality at a regional scale is good but there are localised areas with elevated pollutant concentrations, and social and industrial changes may decrease environmental air quality.

Noise and odour, once considered amenity issues, are ongoing challenges for the protection of both amenity and health in the population.

Victoria's **waterways and coasts** are home to millions of creatures and are highly valued by Victorians. Stormwater and discharges to waterways are a constant challenge that require focused actions.

New industries are emerging that may impact on the nature of pollution and waste generation and treatment in Victoria. **Waste** streams are increasing and some carry uncertain environmental impacts.

There are thousands of existing and new **chemicals** in common use that are finding their way into the environment and must be dealt with to prevent adverse impacts.

There are thousands of **contaminated environments** in Victoria, which are a legacy of past industrial and manufacturing practices. The growing need for land and housing places additional pressure on remediating legacy environmental contamination.

Melbourne is one of the world's most liveable cities, with an enviable natural environment, yet there are many challenges to environmental quality. A growing population will lead to increases in traffic, noise and waste, as well as more diffuse sources of pollution.



Challenges and Opportunities

Social change

The **population** of Victoria is expected to grow to 7.7 million by 2031 and 10.1 million people by 2051, according to the latest Australian Bureau of Statistics information. Greater Melbourne is expected to grow to 8 million people by 2051, bringing with it changes to the economy and increased challenges for environmental quality. Community expectations for real time information are increasing. A more engaged community also aids environmental protection.

Technology

An **increased use of technology** will present challenges and opportunities. The potential to harness large data sets will reveal new understandings of the environment and inform more effective management responses and information for communities. New manufacturing processes will transform products and their uses, presenting new opportunities for improved environmental performance as well as potential sources of harm from pollution and waste.

Industrial change

A **changing economy** will impact on the way we work and travel. New industries are emerging that may impact on the generation and treatment of pollution and waste in Victoria. Changes in business demographics, such as an increase in small to medium businesses, will challenge EPA's regulatory framework. Waste streams in general are increasing and some carry uncertain environmental impacts: there is growing evidence about the impact of industrial chemicals found in common products and plastics. The nature of such contaminants makes them challenging to clean up and remediate once they have entered the environment.



Purpose

Provide quality applied science supporting prevention, response and regulatory decision making.

The Victorian Government initiated the transformation of EPA in 2016 - the biggest reform program in EPA's 46-year history. It will shift our regulatory compliance focus to increased prevention with a strengthened scientific base, more effective planning decisions, with a new environmental public health capability.

EPA's vision is for a healthy environment that supports a liveable and prosperous Victoria now and always. EPA will do its part to achieve this vision by focusing on 5 goals: Prevent Harm, Equip Community and Business, Be an Influential Authority, Respond to Harm and Organisational Excellence.

To be best placed to achieve our vision and to address the scale, complexity and dynamic of environment and environmental health issues, EPA will need a step change in its applied science capacity and capability.

It needs a robust and multidisciplinary applied science capability with enhanced expertise in data analytics to identify and escalate significant risks in a timely fashion.

Using an evidence-based approach, EPA will enhance its influence and regulatory actions by prioritising its efforts and setting higher standards for the delivery of regulatory programs. Working with Victorians, EPA will effectively target and work to change behaviours to help maintain and improve environmental quality.

We are passionate about Victoria staying one of the most liveable places on the planet – a place where community and industry continue to thrive.

How we will work



Enhance and develop internal and external capability and capacity. EPA will apply rigour and best practice to all its applied science activities. EPA will enhance its culture of excellence, grow capability across the whole organisation and externally, and set and meet clear standards for applied science delivery.



Gather data, research, information, and knowledge to understand risks to the environment and human health, and effectively implement proportional regulatory programs. EPA will enhance its capacity to design and implement applied science programs and systems: this will help us to generate, capture and interpret data, partnering with others to achieve this.



Translate and transform technical data, research, information, and knowledge to equip business and the community. EPA will create products that inform actions by community, industry and government, and inform future research by research organisations.

Our strategy will deliver EPA's goals by undertaking a range of strategic actions to achieve applied science outcomes.

Key actions



Organisational goal	Applied science outcomes	How we will deliver	Enhance	Gather	Translate
<p>Prevent harm</p>  <p>We prevent harm from pollution and waste by leveraging good environmental performance across community, business and government.</p>	<p>Data is captured and managed with appropriate quality management systems and analytics.</p> <p>Systems and processes are embedded that support delivery and continuous improvement.</p>	<p>Embed the Environmental Data Management System and Data Quality Reforms across EPA.</p> <p>Train staff in quality data capture, storage and management systems.</p>	✓	✓	
	<p>Indicators are used to assess the condition of, and risks, to the environment and human health.</p>	<p>Develop environmental and human health indicators for evaluation of environmental and human health quality and changes over time.</p>		✓	
	<p>A transparent and risk-based organisational prioritisation process is used to assist resource allocation.</p> <p>An annual horizon scanning process is used to support decision-making and investment.</p>	<p>Develop and implement a robust horizon scanning and risk-based prioritisation process for setting organisational priorities.</p>		✓	✓
	<p>Evaluations of best practice interventions, such as engineering controls and behavior approaches, to prevent environmental pollution and waste are documented and publicly available.</p>	<p>Publish evaluations of the effectiveness of interventions and actions in preventing impacts from pollution and waste.</p> <p>Develop partnerships with academic institutions, business and community to deliver new knowledge, technology and data on environmental and human health condition, interventions and treatments.</p> <p>Provide information to community and businesses on measures to reduce exposure and harm.</p>		✓	✓
	<p>EPA has a suite of environmental reference standards, guidance and best practice codes to inform licensing and works approvals, land-use planning and investigations.</p>	<p>Produce new reference standards and guidance, criteria and codes to support policy and regulatory services.</p>			✓
	<p>EPA staff design, manage and report on quality scientific projects and use applied science in regulatory decision making.</p>	<p>Train staff in the scientific method, environmental investigation and monitoring, and risk assessment to help resolve problems and enhance decision-making.</p>	✓		
	<p>EPA has the right mix of applied science expertise and supporting systems and processes to address the expected shift to focus on prevention of pollution and waste.</p>	<p>Undertake a skills assessment and implement findings to meet current and future needs.</p>	✓		

Organisational goal	Applied science outcomes	How we will deliver	Enhance	Gather	Translate
<p>Equip community and business</p>  <p>We support Victorians to understand the condition of their environment and we work to ensure shared responsibility is accepted and understood by community and business.</p>	<p>Community and business are informed and engaged in environmental science, environmental health, management and decision-making.</p>	<p>Enhance EPA's Citizen Science Program to create empowering opportunities for the community to engage in the applied science behind EPA's decision-making.</p>	✓	✓	✓
	<p>Community and business have the necessary tools and information to comply through the provision of data, access to clear advice and guidance and understand the scientific basis for that advice.</p>	<p>Implement systems and processes to enable data and science-based advice to be easily available on a range of technology platforms.</p> <p>Deliver effective messaging and communication products that build community literacy, engagement and confidence in EPA's applied science advice.</p> <p>Enhance the science communication skills of our applied scientists and improve the quality, types and number of communication products for technical and non-technical audiences.</p>	✓	✓	✓
	<p>Stakeholders understand the condition of the environment and environmental impacts of certain activities, and take ownership of and share environmental stewardship.</p>	<p>Produce fit-for-purpose information on the state of the environment, and activities that pose a risk to the environment and human health from pollution and waste.</p>	✓		✓
	<p>Staff contribute to research and actions that change behaviours, mitigate risks and inform the development of plans that address environmental issues.</p>	<p>Identify, develop and encourage adoption of practical interventions to reduce risks and prevent harm to the environment and human health.</p> <p>Enhance EPA's social science capability for generating new approaches to behaviour change.</p>	✓	✓	✓

Organisational goal	Applied science outcomes	How we will deliver	Enhance	Generate	Translate
<p>Be an influential authority</p>  <p>We are a trusted source of advice on Victoria's environment and influential in working with others to address complex problems resulting from pollution and waste.</p>	<p>EPA is recognised and respected for its applied science expertise and its influence improves environmental and human health outcomes.</p>	<p>Publish and present EPA's science to a broad range of stakeholders, and represent EPA at scientific forums with incentives for staff undertaking this work.</p> <p>Develop a culture of academic rigour amongst applied science staff, ensuring timely and quality publication and reporting of research and knowledge gathering efforts.</p>	✓	✓	✓
	<p>EPA collaborates with state, national and international partners in academia, and with community and business to progress knowledge and deliver applied science outcomes.</p> <p>EPA influences the generation of new knowledge and draws on the knowledge, expertise and capabilities of others.</p> <p>EPA has contributed to environmental science literacy within the education system.</p>	<p>Develop and implement a Research & Development Plan to inform investment in partnerships to gather and deliver new knowledge in line with organisational priorities.</p> <p>Develop accessible bodies of evidence to support strategy and policy development by government.</p> <p>Partner with organisations to deliver science, technology and engineering outcomes.</p>		✓	✓
	<p>Scientific evidence and expertise is used to inform decision-making both inside and external to EPA, and builds stakeholder confidence in EPA.</p>	<p>Ensure all applied science products - including reports, data, presentations are fit-for-purpose and publicly available.</p>			✓
	<p>EPA participates in and contributes its expertise to government, business and community groups.</p>	<p>Actively participate in stakeholder forums across sectors to contribute applied science expertise and knowledge.</p>			✓
	<p>EPA's environmental science series and other events are well attended by academics, community and business.</p>	<p>Introduce opportunities for community, business and academia to learn about environmental science topics through presentations and events. These opportunities will be informed by target audience research.</p>			✓
	<p>EPA partners with internationally renowned organisations and individuals to jointly investigate and report on environmental and human health issues.</p>	<p>EPA applied science is published with others in peer reviewed journals.</p> <p>Host an international exchange and visiting fellow program for eminent scientists to work with EPA on key topics.</p>	✓		✓
	<p>EPA's enhanced environmental public health capability is accessible and valued by the community.</p>	<p>Further embed our environmental public health capability and deliver sound advice to community on risks to human health from pollution and waste.</p>	✓		✓

Organisational goal	Applied science outcomes	How we will deliver	Enhance	Generate	Translate
<p>Respond to harm</p>  <p>We hold polluters to account and work with our partners to respond to pollution and emergency incidents and legacy contamination to minimise harm to Victoria's environment and people.</p>	<p>New technology, modelling and forecasting methods are applied in responding to pollution incidents to improve EPA's ability and timeliness to predict, identify and respond to potential and legacy harm.</p>	<p>Develop technologies and approaches for monitoring and forecasting environmental conditions to assess harm, and potential harm, in real time.</p> <p>Enhance monitoring capability for air, water, soil and groundwater using new technologies in partnership with, academic institutions, community and business.</p> <p>Introduce new measures of environmental performance aimed at business operational capability.</p>	✓	✓	✓
	<p>Technical advice on pollution and waste makes a significant contribution to Victoria's emergency management system in which the community can have confidence.</p>	<p>Improve EPA's capability to enable rapid response monitoring of environmental incidents.</p> <p>Provide rapid scientific advice and communication to emergency services, communities and businesses on environmental and human health issues.</p>			✓
	<p>EPA's applied scientists actively participate in EPA's emergency response role.</p> <p>Staff capability in the application of new technology and systems and data interpretation is enhanced.</p>	<p>Develop EPA scientists capable of providing timely advice during emergency and pollution incident response.</p> <p>Develop staff capability to apply new technology and modelling to respond to pollution and emergency incidences.</p>	✓		
	<p>Comprehensive information on the presence, magnitude and scale of legacy contamination is available to community and decision-makers.</p>	<p>Approaches to identification, assessment and management of legacy contamination are effectively implemented across EPA.</p>	✓	✓	✓

Organisational goal	Applied science outcomes	How we will deliver	Enhance	Generate	Translate
<p>Organisational excellence</p>  <p>As an organisation, EPA commits to delivering on its goals by enabling a high-performance culture that values our people and supports them with fit-for-purpose systems and expertise.</p>	<p>EPA has fit-for-purpose systems, technology, people and processes for analysing environmental and human health issues and their application to EPA's regulatory models and tools.</p>	<p>Improve our analytical capability to link data across segments to develop holistic knowledge of the State of Environment, impacts and regulatory options for preventing and responding to impacts from pollution and waste.</p> <p>Ensure scientific facilities and systems are fit-for-purpose.</p>	✓	✓	✓
	<p>EPA has the breadth and depth of applied science skills and capabilities and expertise across the organisation it needs to become a world class regulator.</p> <p>EPA staff have the development opportunities they need to build capability and performance, and progress in their careers.</p>	<p>Attract, build and retain specialists in the applied sciences including data analytics, environmental and health sciences, engineering, social sciences, intelligence gathering and communication.</p> <p>Identify, enhance and create internal applied science capability, capacity and communities of practice across EPA, including through the introduction of a technical mentoring program.</p> <p>Develop an EPA publications and information database with easy access (e.g. an online chat service) to ensure EPA staff have access to current applied science knowledge.</p>	✓		✓
	<p>Internal science delivery standards are set and met for applied science services to support:</p> <ul style="list-style-type: none"> • Pollution response • Emergency management • Delivery of environmental assessment programs • Professional publication/reporting • Compliance and enforcement • Officers for the Protection of the Local Environment • Standard Operating Procedures • Provision of internal and external advice. 	<p>Set and monitor internal performance indicators.</p>	✓		