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## POLICY BRIEF

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No. 1, 2019

### Taking Our Environmental Pulse: the Need For Ecosystem Surveillance

#### Purpose

The Ecosystem Science Council proposes a critical boost to our fragmented ecosystem monitoring efforts to implement a national system that tracks the health of our ecosystems and trends in biodiversity.

#### Summary

Australia's future depends on healthy ecosystems. They are vital for supporting our plant and animal species, and provide fundamental ecosystem services, such as clean air and water, rich soil and natural resources, to all Australians. Healthy ecosystems are required for meeting Australia's national and international commitments to biodiversity conservation.

Ecosystem surveillance monitoring keeps check on the health of ecosystems and is essential for ecosystem management. Across most of Australia, the existing monitoring efforts do not provide sufficient information on which to base informed management decisions.

An ecosystem surveillance system is required to guide monitoring in Australia. The system would represent a strategic approach to achieve a robust, comprehensive and efficient national monitoring program. This would include a better-resourced environmental monitoring system integrating programs, sites, data centres, administrators and technology, to provide real-time information nationally in standard accessible and consistent formats. It would be used by environmental managers and decision makers at regional, state and national levels.

The system should be coordinated through an independent national environmental authority, in cooperation with State and Territory environmental management agencies. The Ecosystem Science Council has proposed a new Environmental Monitoring Management Agency<sup>1</sup> for this purpose.

#### Recommendations

1. Develop a national ecosystem surveillance system that:

- lists and prioritises Australia's ecosystems according to threats
- detects changes to ecosystems and biodiversity
- informs science, technology, policy and legislation
- identifies appropriate risk management
- is open and accessible to stakeholders

2. Coordinate the system through an independent and cooperative national environmental authority

## Critical Analysis

### Why monitor ecosystem health

Rapid ecosystem changes and species extinctions are occurring in Australia. Urgent action is needed to recognise and conserve our national heritage for future generations. Moreover, as signatories to the International Convention on Biodiversity, we need to improve our performance, and our leaders need to establish targets for biodiversity at Beijing 2020. Monitoring is not just about tracking decline, rather it is also about monitoring the effects of management interventions such as ecological restoration, so that we can learn what approaches are most effective for protecting species and ecosystems.

### Monitoring to enable ecosystem surveillance

Monitoring allows us to detect change, identify the causes of change, introduce appropriate management and track the outcomes of these interventions. In this sense, it encompasses the entire cycle from science discovery of meaningful changes in ecosystems, through the steps of planning, decision-making and management interventions, and the crucial evaluation of effective outcomes from the interventions. Effective ecosystem surveillance therefore needs to be appropriately resourced, scientifically rigorous, use state-of-the art technology, and meet stakeholders' needs, including policy makers, land managers, and ecosystem scientists. The approach must be consistent and comparable across jurisdictional boundaries, across disciplines and institutions, and across space and time and encourage national and regional information exchange to benefit Australia's future.

### The need for national ecosystem surveillance

"If it matters, measure it" is a truism in business, yet we currently lack adequate, comprehensive ecosystem surveillance to be able to monitor changes in our ecosystems.

Australia undertakes ecosystem surveillance data collection through national programs such as the National Collaborative Research Infrastructure Scheme and the associated Terrestrial Ecosystem Research Network, and Integrated Marine Observing System, the Regional Land Partnerships Program and Australia's State of the Environment program. Other programs that enable this effort include, the developing National Environmental Prediction System, the Australian Dynamic Ecosystem Models Project of the Department of the Environment and Energy and CSIRO's development of approaches to surveillance monitoring.

Australia has an opportunity to be a world leader, setting the international agenda on ecosystem surveillance. However, while current efforts address some important elements of an ecosystem surveillance system, they are fragmented because of an inability to share information efficiently, are inadequately resourced or of limited duration, have limited geographic coverage, and most importantly lack national coordination. They are also not taking full advantage of new high-tech monitoring tools such as drones and remote sensors. Furthermore, monitoring is lacking for some ecosystem types such as coasts and wetlands, and components of biodiversity such as fauna. Surveillance should also be implemented across the landscape at a much finer scale to be informative for different purposes and stakeholders.

## **Enabling ecosystem surveillance through a national system**

Ecosystem surveillance needs to be harmonised and coordinated to achieve agreement on methods, reporting and data networks across jurisdictional boundaries. A national ecosystem surveillance system is at the forefront of meeting these needs. The system would take a strategic approach to guide data needs (i.e. the surveillance network) and outline the approach to achieve a robust, comprehensive and efficient national monitoring program. It would leverage existing programs to capitalise on previous investments and use cutting-edge science to design a cost-effective national ecosystem surveillance. The timing of this system would work well given the scoping study underway for the National Environment Prediction System and the review of the *Environment Protection and Biodiversity Conservation Act 1999*.

The system would harness the innovations and opportunities afforded by advances in big data, technology and expertise in the science of ecosystems, and identify where to invest in research to implement new technologies in the field. It would provide long-term support for scientists implementing monitoring and maintaining databases and network infrastructure. It would improve cross-border collaboration and synthesis of monitoring activities.

Reporting ecosystem data and information is needed to demonstrate the value of expenditure on ecosystem monitoring in terms of real, positive and clear outcomes, and this would be outlined within the system. It would provide more effective responses for land and ecosystem managers, policy-makers, politicians and the public.

The system would also identify communication and engagement pathways to ensure scientific findings are available and relevant to urban and regional Australians. Engagement and information transfer are top priorities in Australia's Biodiversity Strategy.

### **The Ecosystem Monitoring and Management Agency**

The system would be delivered by an independent governing body such as the Ecosystem Monitoring and Management Agency (EMMA). Its purpose would be to

- establish national ecosystem monitoring and forecasting systems;
- measure progress towards environmental goals and objectives;
- administer environmental legislation more effectively;
- improve the effectiveness of natural resource management and social health initiatives

It would be accountable for reporting on ecosystem monitoring and communicating the results to the ecosystem community including government, land managers and the public.

### **Financial and legislative implications**

At present, we are well short of adequate funding to provide information on biodiversity and ecosystem health. Investment into ecosystem surveillance monitoring should be strategic to ensure the highest possible return on investment. Current programs, such as the National Environmental Science Program (which is due to finish in 2021), provide some scientific evidence to inform this investment, but need more resources to provide comprehensive information. The ecosystem surveillance system should be funded through legislation, policies and long-term binding plans with investment from Federal, State and Territory environmental agencies.

There are also existing resources that can be tapped into growing the ecosystem surveillance network as part of the national system. For example, Rangers on national parks and reserves protected area network, and Indigenous Rangers on Indigenous Protected Areas could provide a substantial workforce for ecosystem monitoring.

Binding agreements and legislation are needed to provide resources for continuous ecosystem surveillance and to provide coordination and governance to oversee a robust and ongoing program. An independent authority should be commissioned through purposed legislative instruments. This authority would be funded federally to oversee the implementation of the ecosystem surveillance system and meet the reporting needs of Australia both nationally and internationally.

The Ecosystem Science Council and the Working Group on Enabling Ecosystem Science has produced a Technical Report: **Taking our Environmental Pulse: A strategy for monitoring ecosystems in Australia**<sup>2</sup> that outlines the needs and an approach to enable a system of Ecosystem Surveillance Monitoring.

## References

Reference 1. EMMA <http://ecosystemscienceplan.org.au/Submissions-pg32793.html#EMMA>

Reference 2. *Technical report: Taking our Environmental Pulse: A strategy for monitoring ecosystems in Australia*, Ecosystem Science Council 2019. A copy can be sent to you by contacting any of [the Council members](#) or [noel@biome5.com.au](mailto:noel@biome5.com.au).

## Ecosystem Science Council

*The Ecosystem Science Council works with all individuals, groups and organisations within the ecosystem science and management communities providing scientific advice and advancing the goals of the long-term plan for Australian ecosystem science, Foundations for the Future.*

### For further information

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