



SAVING OUR SPECIES

# Science and research strategy

2021 to 2026



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## Our strategy

This strategy applies to all science and research initiated under the Saving our Species (SoS) program for 2021 to 2026. It recognises that science is integral to all aspects of SoS in the Department of Planning and Environment (the department). The strategy guides the effective and strategic investment of SoS funding towards priority science and research.

Our strategy will:

- deliver science and research outcomes that align with the SoS Monitoring evaluation and learning framework 2021–26 (DPE 2022a) and the SoS program logic which sits within the framework
- contribute to the SoS program's principle of **on-ground interventions underpinned by science**
- contribute to the program's outcome of **integrating Aboriginal ecological knowledge**
- align with the SoS program's directions and targets to **use scientific knowledge and innovation** to improve threatened species management actions
- provide a framework to achieve objectives of the SoS Implementation plan 2021–26 (DPE 2023a), to **deliver new and innovative research to fill priority knowledge gaps and meet end-user needs**, leading to improved outcomes for conserving threatened species and mitigating threats.

Our strategy will meet these objectives by delivering outcomes that:

- increase **knowledge** about threatened species, threatened ecological communities and their threats
- deliver science with **rigour** and transparency
- **integrate** science and research into program planning and on-ground actions to leave a legacy of evidence and enduring partnerships.

Outcomes of this strategy will contribute to informing program development, implementation and decision-making which improves on-ground management of threatened species and ecosystems in New South Wales (NSW).

Our strategy is guided by the priority **research themes** for 2021 to 2026 described in Appendix A; namely, species and ecosystem ecology, key threatening processes, and threat mitigation and management. The strategy will be delivered across the SoS program in accordance with the SoS Implementation plan 2021–26.



SoS artificial intelligence for bat calls research: field work with partners.  
Photo: Shannon Greenfields/DPE

## Our goals

Our 3 goals of knowledge, rigour and integration align with the Science Economics and Insights (SEI) Division's:

- vision – a living, thriving environment and future for New South Wales
- mission – we provide science, solutions and thought leadership to protect and build the natural capital and resilience of New South Wales.

The goals also align with the scientific principles and knowledge pillars of the SEI Division *Strategic plan 2023–26* (DPE 2023b). They will result in robust scientific evidence, knowledge and decision tools to support the continued success of the SoS program and increase the likelihood of securing threatened species in the wild in New South Wales.

Our goals are underpinned by the department's *Scientific rigour position statement* (DPIE n.d.) and will ensure science and research delivered under the SoS program is credible, accessible and impactful. They align with broader departmental strategic planning, including the *SEI Knowledge statement* (DPE 2022b) which strives to:

- deliver the research, data and insights needed for evidence-informed decision-making across the department and government
- form partnerships to expand and deepen our expertise and meet prioritised knowledge needs
- use and share knowledge for impact.

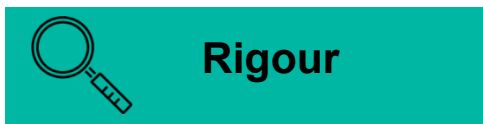
They also align with the department's *Adaptive management position statement* (see link in 'More information' section) and the NSW *Aboriginal cultural and intellectual property protocol* (AANSW 2019).

**Communication is a critical element of all 3 goals and is embedded throughout the priority activities.**



**Critical knowledge gaps are filled and contribute to the conservation of threatened entities in New South Wales**

Our knowledge goal will help to fill key knowledge gaps which limit the effective on-ground delivery of threatened species programs, and will provide an evidence-base for improved decision-making and on-ground management of threatened species and ecosystems in New South Wales.



**Rigour and transparency of science and research is improved across SoS**

Our rigour goal will ensure scientific rigour is applied across SoS program development and implementation to achieve best practice and scientific excellence.



**Science is integrated into program planning and on-ground actions and leads to enduring knowledge and partnerships**

Our integration goal will deliver inclusive and coordinated research outcomes that maximise opportunities for knowledge and resource sharing, and are integrated into program and on-ground decision-making and actions.

## Our drivers

Four **drivers** for SoS science and research were identified through consultation processes and strategic reviews. These drivers reflect the needs of SoS practitioners, recommendations from strategic reviews of the SoS program for 2016 to 2021 (including an independent scientific review), and the need for collaboration and partnerships. They also incorporate emerging technology and innovation, and guide the **priority activities** required to achieve our **goals**.

Our 4 drivers highlight the key issues, challenges and opportunities for SoS science and research in 2021 to 2026, and address our 3 goals to guide our **priority activities**. Each driver has a statement of intent that defines how we propose to address the issue, challenge or opportunity and associated priority activities.

### 1. End-user-guided research

SoS practitioners have indicated a desire for consultation on research direction and a need for applied, co-designed research that provides trusted evidence and proven tools to directly help them manage threatened entities and key threatening processes.

**Statement of intent:** We will ensure science-driven program development and collaborate with end users to identify research needs and to develop co-designed projects that are scientifically rigorous, innovative, and aligned with the SoS program.

### 2. Aboriginal outcomes

*Cultural science research* (see link in 'More information' section) provides an opportunity to support the application of long-term or detailed traditional ecological knowledge, Aboriginal wisdom and practices into SoS science and research activities. It also presents an opportunity to work with Aboriginal communities and share ideas, knowledge, methods and experiences for the benefit of communities and the environment.

**Statement of intent:** We will facilitate cultural connections to threatened species research and broaden our understanding of, and support incorporation of, traditional ecological knowledge, Aboriginal wisdom and science for cultural outcomes.

### 3. Coordinated delivery of science and research

SoS science and research activities are integrated across the department and often involve external partners. There is a need for a collaborative and coordinated approach to engage partners, deliver research and provide scientific support.

**Statement of intent:** We will deliver a coordinated science and research program to produce scientifically rigorous products that inform decision-making, meet end-user needs, leverage resources and facilitate knowledge sharing.

## 4. Translating research into on-ground action

Converting research outcomes into conservation decisions and on-ground actions requires:

- a credible body of evidence to inform decision-making and respond to emerging issues
- effective communication to ensure findings reach and are understood by end users
- end-user knowledge and skills to confidently apply research findings
- management and corporate support to invest in research-led conservation actions.


**Statement of intent:** We will effectively communicate and support the uptake of research findings across the SoS program and the wider scientific community to inform SoS actions to achieve conservation objectives, contribute to the broader scientific knowledge and maintain an enduring source of evidence.




**SoS eDNA research: Collecting water samples for eDNA analysis. Photo: Luke Foster/DPE**

## Our priority activities


Our **priority activities** for science and research flow from the **drivers** (1–4 above) and are the pathway to achieve our 3 goals to build **knowledge**, ensure scientific **rigour** and **integrate** outcomes.

 <p><b>Activities to build knowledge</b></p>	<ol style="list-style-type: none"><li>1.1. Identify knowledge gaps, end-user research needs and opportunities for innovation</li><li>2.1. Enable the application of Aboriginal knowledge and cultural science into threatened species research</li><li>3.1. Coordinate the delivery of applied and cost-effective research that fills identified knowledge needs for SoS</li><li>4.1. Develop skills and capacity in threatened species research</li></ol>
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Activities to build knowledge create a knowledge pathway for impact, from identifying knowledge needs, to filling knowledge gaps, to enhancing our ability to apply knowledge. These activities will result in actions and deliverables that fulfill the needs, opportunities and challenges of our **drivers**.

 <p><b>Activities to ensure scientific rigour</b></p>	<ol style="list-style-type: none"><li>1.2. Provide scientific and evidence-informed advice and expertise</li><li>2.2. Respect the wisdom of Aboriginal knowledge, and ensure meaningful, appropriate and effective application</li><li>3.2. Implement transparent and accountable processes and scientific rigour</li><li>4.2. Support an enduring and scientifically rigorous program through responsive improvement</li></ol>
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Activities to ensure scientific rigour focus on ensuring robust and rigorous science, from program development through to the final analysis, reporting and application of outcomes. These activities will result in transparent and accountable processes.

 <p><b>Activities to integrate outcomes</b></p>	<ol style="list-style-type: none"><li>1.3. Align with relevant strategic planning and policy</li><li>2.3. Build trusted relationships with Aboriginal partners and communities to enable cultural outcomes</li><li>3.3. Foster enduring research partnerships</li><li>4.3. Facilitate rapid integration of research findings into policy, management decisions and on-ground actions</li></ol>
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Activities to integrate outcomes will engage stakeholders and partners to collaborate, share knowledge and resources, and deliver science and research outcomes that are useful and applied.



## Appendix 1: Our research themes

Theme and description	Sub-themes	Identified knowledge gaps
<b>Species and ecosystem ecology</b>		
<p>Understanding the requirements for species and ecosystem survival and long-term persistence in the wild</p>	<ol style="list-style-type: none"> <li>1. <b>Threatened ecological communities (TECs) and ecosystem functions:</b> ecological requirements of TECs, including ecosystem function, state/transition modelling, vegetation classification and ‘tipping points’</li> <li>2. <b>Single-species ecology and reproductive biology:</b> fundamental ecological requirements (e.g. diet, temperature, survival) and life history traits (e.g. reproduction, growth patterns, longevity, foraging strategies)</li> <li>3. <b>Population genetics and taxonomy:</b> using genetics to understand population dynamics, resolve taxonomy, investigate genetic traits, diversity, drift and gene flow</li> <li>4. <b>Habitat suitability:</b> understanding habitat requirements (including habitat quality and connectivity), ecosystem resilience and movement ecology</li> <li>5. <b>Ecological processes:</b> understanding processes between species and or ecosystems, including:                             <ul style="list-style-type: none"> <li>• the role of keystone species (pollinators, top-order predators, ecosystem engineers)</li> <li>• plant–herbivore interactions</li> <li>• predator–prey dynamics</li> <li>• the abiotic environment (hydrology, nutrient flows, decomposition)</li> <li>• biotic processes (pollination, predation, role of detritivores / scavengers / digging animals / herbivores)</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Habitat requirements (type of habitat)</li> <li>• Habitat requirements (sufficiency)</li> <li>• Habitat requirements (connectivity)</li> <li>• Population genetics</li> <li>• Reproductive traits</li> <li>• Dispersal traits</li> <li>• TEC resilience and tipping points</li> <li>• Identification of wild populations (individuals) resistant to threats</li> </ul>
<b>Key threatening processes</b>		
<p>Understanding the mechanisms underpinning interactions between threatening processes and the survival and reproduction of threatened species and TECs</p>	<ol style="list-style-type: none"> <li>1. <b>Habitat loss or change, including anthropogenic climate change:</b> defining what is habitat, habitat resilience, value of novel habitat and or alternate habitat, and flow-on effects of habitat loss</li> <li>2. <b>Extreme natural events:</b> understanding how extreme events (i.e. outside of natural regimes) affect threatened species and TECs, what is the role of refugia in mitigating extreme events</li> </ol>	<ul style="list-style-type: none"> <li>• <b>Climate change:</b> interplay between heat and/or drought and/or fire and persistence (impacts of such variables on direct and indirect survival, breeding or habitat)</li> </ul>

Theme and description	Sub-themes	Identified knowledge gaps
	<ol style="list-style-type: none"> <li>3. <b>Disease and pathogens:</b> understanding disease and pathogens (transmission, distribution, vectors) and susceptibility of different taxa and systems</li> <li>4. <b>Pests and weeds:</b> understanding dynamics of pests and weeds (including over-abundant or displaced natives), what aids/restricts their movement and spread, what are their ecological requirements</li> <li>5. <b>Emerging threats and or other non-specified threats:</b> understanding new or novel threats, or other threats requiring further research (chemicals, pollution, pesticides, changing abiotic/biotic conditions)</li> </ol>	<ul style="list-style-type: none"> <li>• <b>Disease susceptibility:</b> how disease impacts species and whether such impacts are fixed or variable with a range of conditions</li> <li>• <b>Fire:</b> understanding the impacts of various fire frequency and intensity thresholds on long-term species persistence or ecosystem condition (including TECs)</li> <li>• <b>Pests and weeds:</b> population modelling to understand harvest rates for effective control, allelopathic interactions and threshold densities</li> </ul>
<b>Threat mitigation and management</b>		
<p>Understand the efficacy of management interventions on the target threatened species or TEC. This includes understanding the effectiveness and cost-benefit of actions, any unintended consequences and the application of novel technologies/techniques</p>	<ol style="list-style-type: none"> <li>1. <b>Prescribed fire:</b> understanding fire regime requirements of threatened species and TECs, use of fire to restore ecosystems, managing fire in novel systems (e.g. systems that are stressed or degraded, different species composition), fire exclusion</li> <li>2. <b>Translocations/Reintroductions:</b> knowledge to support translocations (including assisted migration, reintroductions, supplementation), risks and benefits to translocated individuals and host environments</li> <li>3. <b>Pests and weeds:</b> understanding different management techniques for controlling feral and native species, including fencing, baiting, trapping, mustering, contraception, herbicide, fire, mowing and new or novel techniques (e.g. gene editing)</li> <li>4. <b>Restoration/habitat enhancement:</b> knowledge to support habitat restoration, barriers and enablers to successful restoration, alternative habitat or artificial habitat supplementation (e.g. nest boxes), and future-proofing habitat against climate change</li> <li>5. <b>Other, including emergency interventions:</b> investigating when these are necessary and evaluating their success (e.g. fauna rescue during fire, supplementary feeding, watering during drought, cooling during heat waves)</li> </ol>	<ul style="list-style-type: none"> <li>• <b>Fire management:</b> trial various fire management approaches (frequency, area, methods)</li> <li>• <b>Pests and weeds:</b> gene drive technology and new (humane) eradication procedures</li> <li>• <b>Climate change:</b> identification of sites for future translocations and/or refugia, and breeding plants with climate-resistant traits (heat and drought tolerance)</li> <li>• <b>Control of exotic diseases/pathogens:</b> breeding populations with resistant traits and inventing new treatments for disease</li> </ul>

## References

AANSW (Aboriginal Affairs, NSW) (2019) '[Aboriginal cultural and intellectual property protocol](#)', AANSW, NSW Government Premier's Department, Sydney.

DPE (Department of Planning and Environment, NSW) (2022a) Saving our Species monitoring, evaluation and learning framework 2021–26 [unpublished planning document], DPE, Parramatta.

DPE (2022b) '[Science and Economic Insights Knowledge statement](#)', DPE, Parramatta.

DPE (2023a) Saving our Species implementation plan 2021–26 [unpublished planning document], DPE, Parramatta.

DPE (2023b) '[Strategic plan 2023–26: Science, Economics and Insights \(SEI\) Division](#)', DPE, Parramatta.

DPIE (Department of Planning, Industry and Environment, NSW) (no date) '[Scientific rigour position statement](#) [PDF 208KB]', DPIE, Parramatta.

## More information

- [Adaptive management position statement](#) – DPE webpage
- [Cultural science research](#) – DPE webpage
- '[SEI Strategic plan on a page](#)'



Checking traps for the Greenspots research project. Photo: Rebecca Montague-Drake/DPE