Geoscience Australia
Science Principles
Department of Resources, Energy and Tourism  
Minister for Resources and Energy: The Hon. Gary Gray AO, MP  
Secretary: Mr Blair Comley, PSM

Geoscience Australia  
Chief Executive Officer: Dr Chris Pigram

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Message from Geoscience Australia’s Chief Scientist

Geoscience Australia is custodian of the geographic and geological data and knowledge of the nation. Through our applied research, and enabling access to geoscientific and spatial information, Geoscience Australia informs Government, industry, and community decisions on the economic, social, and environmental management of the nation’s natural resources.

The fundamental tool of the agency is science. Science outputs must be evidence-based, testable and transparent. It is essential that science outputs are peer reviewed, communicated effectively, and the science programs are benchmarked and monitored to ensure sustainable capability. This approach requires collaboration and cooperation within the agency and with external stakeholders.

This document sets out the six Science Principles underpinning Geoscience Australia’s scientific activities, describing how Geoscience Australia conducts its science. In this context, an activity is considered scientific where there is:

• application of existing scientific techniques to create information; and/or
• development of a new scientific technique.

These Principles form part of, and are embedded into, our long-term strategic planning and day-to-day operations (Appendix 1). The Principles reflect the fact that:

• our reputation and effectiveness depend on the timely delivery of outputs that meet client needs; and
• our agency provides leadership in a range of geoscientific domains to ensure such information is trusted, broadly used and valued.

The six Science Principles are:
1. relevance to Government
2. collaborative science
3. quality science
4. transparent science
5. communicated science
6. sustained science capability.

I am confident that these Principles, developed with a cross-agency team, provide a solid foundation for our continued contribution to Australia’s future well-being through the delivery of quality geoscience and spatial data and information.

Dr Clinton Foster
Chief Scientist
Principle 1—Relevance to Government

Context

- The Australian Government is our key client.
- We need to provide quality-assured information to the right people in the right timeframe so they make evidence-based decisions. This ensures that:
  - Government can deliver on its priorities; and
  - Other stakeholders, including industry, take actions that support Government priorities.
- It is essential that our scientific activity is focussed to produce information that directly meets these needs.
- Our scientific activity can produce outputs that position Government to respond to decadal challenges in Earth System Science, including:
  - **Water**: surface, shallow (ground) and deep subsurface resources to ensure fresh water supplies support communities and their activities; and deep surface saline water formations, as possible storage sites for carbon dioxide;
  - **Continuing access to the resources pipeline of export minerals and hydrocarbons**: through the discovery and development of new mineral and hydrocarbon systems; underpinning the economy of Australia; and contributing to energy security of Australia and the region;
  - **Community safety and emergency management**: to improve the understanding of, and support increased protection from, natural hazards and climate change, including flooding, landslides, cyclones, earthquakes, bushfires and tsunami;
  - **Sustainable environmental management**: to meet both international and national obligations, for example under the *Environmental Protection and Biodiversity Conservation Act 1999*, *Water Act 2007* and the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*; and
  - **National positioning**: to improve the productivity and prosperity of Australia's economy, understand the deformation of the Australian continent and enable the consistent use of location-based information.

Strategies

- Understand the science required to address the key questions Government is currently asking and is likely to ask in the future.
- Influence national and international research agendas to promote the development of science that will support current Government priorities and position the Government to respond to the decadal challenges.
- Ensure agency investments in scientific activity are scrutinised to ensure they are both targeted towards current government priorities and build capability to address the decadal challenges.

Key Enablers

- Active engagement with key stakeholders, including policy makers, industry, and general public.
- Strategic and work planning processes that translate current and future Government priorities into detailed actions and relevant outputs.

...improve the understanding of, and support increased protection from, natural hazards and climate change...
Principle 2—Collaborative science

Context

- Emerging challenges require multi-disciplinary approaches, and are more complex than any single individual, team or institution can deal with alone.
- We can only achieve our objectives if we harness the best science, the best data, and the best people available at the time they are needed.
- This requires us to engage with the capability and efforts of the broader research community, including national and international science agencies.
- Non-scientific stakeholders are also more likely to use and value the information we provide if they are engaged during scoping and delivery of science outputs.

Strategies

- Ensure our data, methods, and results, are available for others to use; with a focus on supporting multi-disciplinary approaches.
- Adopt a business model in which we proactively seek to engage with the science community to leverage, and develop, its capability wherever possible.
- Engage stakeholders in scientific activity to ensure it results in them getting, and using, the information they require.

Key Enablers

- Data that are readily accessible and capable of being integrated and amalgamated with other data: this means conforming with international standards where possible, or contributing to developing standards.
- Collaboration agreements with key science agencies that streamline project start-up processes and promote free availability of intellectual property.
- Use of well-understood open access licensing agreements for publication of our data, methods, and results.
Principle 3—Quality science

Context

- Stakeholders must have confidence in the information we provide to reach evidence-based decisions.
- Stakeholders need to be assured that the information is reliable, that results are repeatable and accurate, and that any uncertainties have been specified, quantified and explained.
- **We** must have confidence in the quality of the information we provide, because:
  - Data and information are used to inform current decisions and debate;
  - Information can be re-used and re-purposed long after it is created; and
  - Not all of the users of that information have the required expertise to independently assess its quality.
- Through collaboration agreements, Geoscience Australia will inevitably use information from other sources. Even where we did not create the information we provide, users will associate it with us.
- Moreover, as both a government agency and a member of the Australian research community we have key compliance requirements, including the Australian Code for the Responsible Conduct of Research.¹

Strategies

- Conduct our scientific activity in accordance with the Australian Code for the Responsible Conduct of Research.
- Provide fit-for-purpose information where our conclusions are consistent with the data inputs, and there are appropriate caveats on limitations to ensure the quality is understood by the user.
- Ensure our scientific activity, and the resulting information, takes into account a range of likely scenarios and quantifies the uncertainties.
- Ensure that the quality of datasets used is sufficient for the intended use.

Key Enablers

- Support publication in recognised journals and attendance at key conferences, enabling others to openly test the quality of our science.
- Science benchmarked against world’s-best practice, and ensuring that associated data, methods, and results are peer-reviewed prior to publication.
- Identification and championing of current best practice in relevant fields of science.

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Principle 4—Transparent science

Context

• Geoscience Australia is committed, through the Principles on Open Public Sector Information, and the Declaration of Open Government, to extend the role that science plays in the transparency of government processes²,³.

• Science is contestable. It is critical that our scientific activity is unbiased and objective, and that it can be demonstrated to be so.

• There is an increasing demand for transparency in decision making processes, with organisations required to justify why they made certain decisions or provided certain advice. If organisations are to continue using our information, we have to support them to do this.

• Additionally, by openly sharing our work we create a platform that supports further innovation in the tradition of scientific discovery.

Strategies

• Ensure that all of our data and procedures are accessible, verifiable, and can be used by other investigators to test results, and innovate.

Key Enablers

• All data, methods, and results, have a documented audit trail that tracks their origin and provenance, and are stored and managed so as to enable transfer to new platforms as new technologies emerge.

• Standard operating procedures used to capture, analyse and store data are defined and available.


It is critical that our scientific activity is unbiased and objective and that it can be demonstrated to be so.
Principle 5—Communicated science

Context

• To be valued by external stakeholders, Geoscience Australia’s information needs to be understandable. However, science can be complex and uses its own language to deal with that complexity.
• The greater the background knowledge stakeholders have the easier it will be to communicate complex ideas to them.

Strategies

• We make every effort to communicate our ideas at every stage of the process using plain language, without losing scientific integrity.
• We promote understanding and application of geoscientific knowledge to policy makers, industry and the broader community, especially school students and educators.

Key Enablers

• Scientific communication conducted in line with our communication strategy based on an understanding of Government priorities and stakeholder requirements.
• Science liaison function to facilitate and coordinate knowledge transfer to non-scientific stakeholders.
Principle 6—Sustained science capability

Context

- To undertake scientific activities, we need access to capability.
- Capability can be retained in-house and/or accessed through collaboration and engagement with the broader research community.
- The type and level of capability we retain in-house is inherently controlled by strategic demands and available budget.
- To ensure that we can responsively leverage external capability, there is a need to retain certain, strategic, science capability in-house.
- The ability to engage in scientific activity is now completely dependent on capabilities other than pure science such as, information management, ICT, engineering, and communication.

Strategies

- Retain the core scientific capability we require in-house, and develop an adaptable and flexible workforce with both science and fundamental information management skills required to effect our responsive and collaborative business model.
- Engage with the broader research community to promote development and maintenance of the capability we are likely to require access to.
- Identify future data requirements and promote acquisition, curation, and sharing of that data by ourselves and others.

Key Enablers

- People strategy, information management and ICT strategies that establish plans for developing and retaining the required capabilities.
- The required non-science capabilities are given the same emphasis and focus as the required science capabilities.
- Strong and effective science leadership.
# Appendix 1

## Relationship to other documents

This document forms part of the agency’s suite of strategic planning documents. The following table identifies key linkages to those other documents.

<table>
<thead>
<tr>
<th>Document</th>
<th>Purpose</th>
<th>Linkages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Plan</td>
<td>Defines the agency’s role, vision, mission, strategic objectives and long-term priorities.</td>
<td>The strategic plan provides the reference point for why and when we would invest in scientific activity.</td>
</tr>
<tr>
<td>Annual Work Plan</td>
<td>Defines the activities the agency will undertake and the outputs (information) it will produce in a given year.</td>
<td>The work plan defines what activity, including scientific activity, we will undertake. The science principles describe how such activity would be undertaken.</td>
</tr>
<tr>
<td>Data Management Principles</td>
<td>Define the principles adopted by the agency to ensure that data collection, management and distribution support delivery of the strategic plan.</td>
<td>Most scientific activity involves the use and creation of data. The data management principles describe how those aspects of any scientific activity are to be approached.</td>
</tr>
<tr>
<td>Catalogue Principles</td>
<td>Defines how the agency will ensure it has a product catalogue that enables anybody to find and understand its information.</td>
<td>Most scientific activity uses and results in the creation of information. The catalogue principles describe how it will be catalogued and referenced.</td>
</tr>
<tr>
<td>Data Management Strategy</td>
<td>Describes when, why and how the agency manages its data.</td>
<td>Identifies how the agency will manage its data in a way that supports it to operate in accordance with the principles.</td>
</tr>
<tr>
<td>People Strategy</td>
<td>Describes when, why and how the agency develops its workforce.</td>
<td>Identifies how the agency will achieve the workforce required to operate in accordance with the principles.</td>
</tr>
<tr>
<td>Communication Strategy</td>
<td>Describes when, why and how the agency communicates with its clients.</td>
<td>Scientific activity involves communication and creates products that must be communicated to clients if they are to be used.</td>
</tr>
<tr>
<td>ICT Strategy</td>
<td>Establishes the enterprise direction for Information and Communication Technology investment.</td>
<td>Determines what ICT capability will be delivered to support the scientific activity the agency undertakes.</td>
</tr>
</tbody>
</table>

(All strategies are under development.)