



Unearthing Western Australia

Strategy 2030

Geological Survey of Western Australia

| Our Charter

To provide geoscientific information and advice to the government and the community of Western Australia to enhance understanding of the State's geology and to help support and grow its economy.

| Our Role

As a trusted, world-leading geological survey, the Geological Survey of Western Australia (GSWA) provides objective and authoritative geoscientific data, information and knowledge to support the responsible use of the State's natural resources.

The GSWA produces state-of-the-art databases, books and maps for prospectors, explorers, miners, investors and the general public. This information provides the building blocks that enable the resources industry to design exploration programs that optimise discovery. It also provides the general public and interest groups with the geological knowledge to make informed opinions around mining and resources, and through effective geoheritage and geotourism strategies, informs our stakeholders about the history and importance of our continent. Current and evidence-based information is also critical to government for developing policies and making decisions, particularly in relation to economic and land-use issues. GSWA provides geoscientific advice to regulators, and manages the collection, storage and release of statutory information supplied by the resources sector.

| Our Priorities

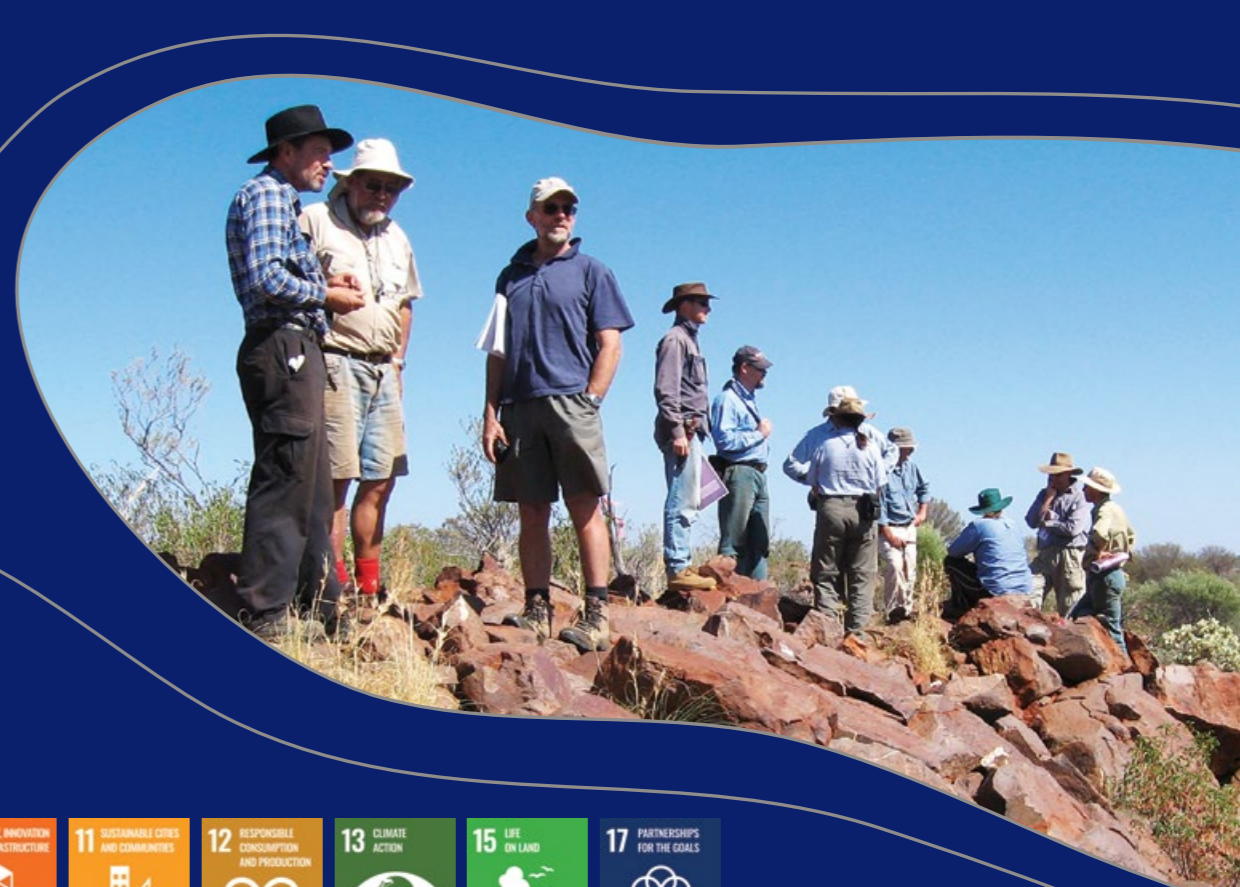
We provide high-quality geoscience information, advice and services to support evidence-based decisions for creating a strong economy, resilient society and a safe and sustainable environment.

The long-term strategic priorities of the GSWA are divided into four main areas:

- **Garnering geoscientific knowledge:** Building our geological understanding of the State by acquiring and synthesising pre-competitive data and utilising collaborative research and strategic partnerships.

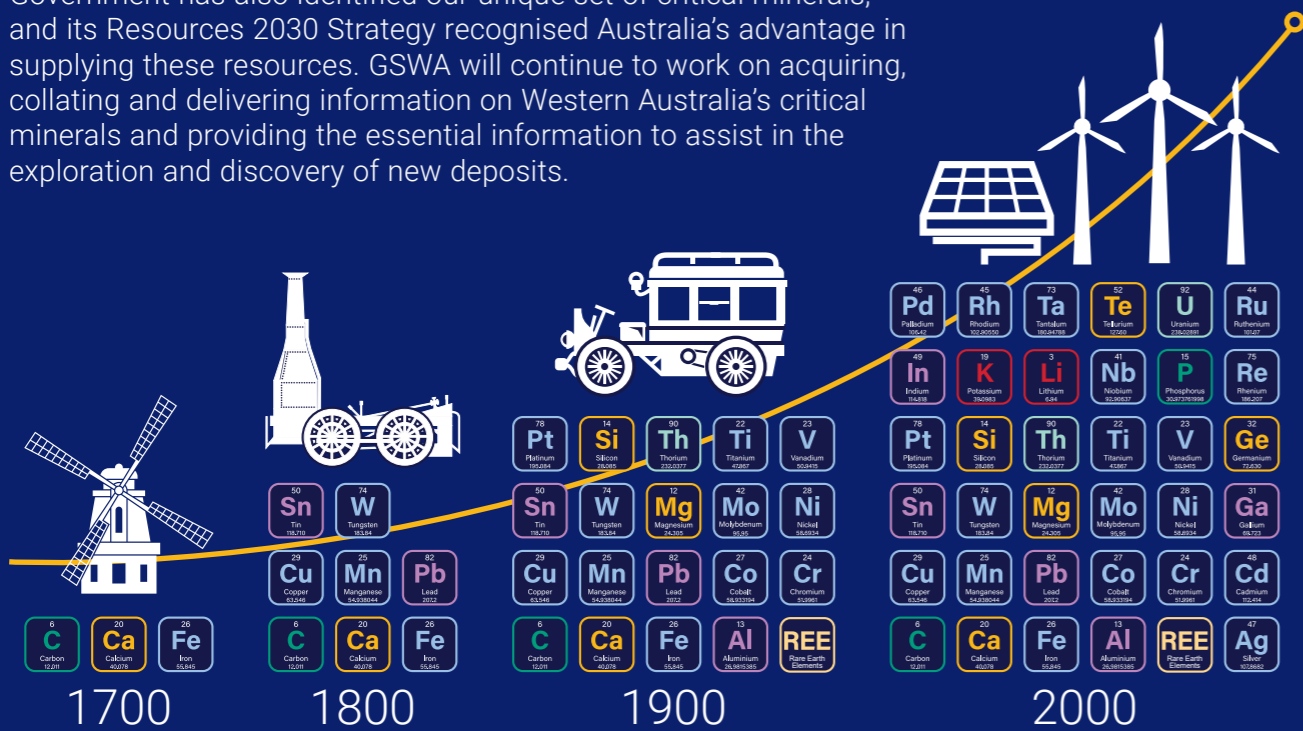
- **Transforming our data:** Modifying the way we store, analyse and deliver our data to ensure it can move fluidly with emerging technology and innovation.
- **Strengthening our team:** Building capacity for a high-performing workforce by attracting exceptionally skilled people, developing and enhancing their capabilities to ensure they have the resources to excel, and encouraging innovation.
- **Providing trusted information:** Delivering trusted geoscientific information and advice to Western Australia's government, community and resources industry.





The decade ahead

As the world moves towards a highly technical, environmentally aware and low-carbon economy, there is a need for an increasing range and quantity of raw materials. The USA, UK, European Union, China, India and other countries have identified a series of “critical minerals” that will allow them to maintain and grow their economies. The Australian Government has also identified our unique set of critical minerals, and its Resources 2030 Strategy recognised Australia’s advantage in supplying these resources. GSWA will continue to work on acquiring, collating and delivering information on Western Australia’s critical minerals and providing the essential information to assist in the exploration and discovery of new deposits.



Western Australia is a major potential source of these critical minerals and has the advantage of encouraging responsible mining.



Garnering Geoscientific Knowledge

Addressing geological challenges and mitigating exploration risk is a major part of what we do. Finding new resources has become increasingly difficult as most of the near-surface Tier 1 deposits have been discovered. However, significant mineral resources remain to be found in less accessible regions and at depth below the surface.

Finding new resources remains a major challenge as most of the near-surface Tier 1 deposits have been discovered but significant mineral resources remain to be found in less accessible regions and at depth below the surface. Western Australia is particularly impacted by deep soil and sand cover, and extensive sedimentary basins.

Another major challenge globally is how we will transition to renewable energy in an environmentally sustainable manner.

GSWA will work in partnership with Geoscience Australia, MinEx CRC and others in developing tools and methodologies to map beneath the overburden cover or regolith.

This can be achieved by understanding:

- the lithospheric architecture and evolution of the Western Australian crust;
- how that architecture influences the timing and location of mineral and petroleum systems;
- the regolith-landform evolution and distribution, including its thickness, age and composition, and to detect the distal footprints of any underlying mineral deposits; and
- the enabling of new energy transition.

We have been managing the pre-competitive geoscience acquisition and mapping programs, which have adjusted in ‘real-time’ as the UNCOVER Road mapping process has developed, particularly in underexplored, greenfields regions. GSWA is a participant in the National Drilling Initiative (NDI), as part of the Mineral Exploration Cooperative Research Centre (MinEx CRC).

Exploration Incentive Scheme

Since its inception in 2009, the Exploration Incentive Scheme (EIS) has proven to be a successful and important component in developing GSWA's knowledge of Western Australia's geology. The scheme includes precompetitive data generated by collaborative research programs, geological, geochemical, geochronological and geophysical data acquisition, and co-funded drilling.

The EIS program has secured long-term funding through mining tenement rents, and we have developed a four-year plan that covers five areas:

- Innovative drilling – including co-funded drilling.
- Geophysical surveys.
- Encouraging exploration through cover.
- 3D prospectivity mapping.
- Promoting strategic research with industry.

Case Study: Nova–Bollinger Nickel, Copper, Cobalt Mine, Albany–Fraser Orogen



This EIS success story had its beginnings in 1998 when GSWA embarked on a regional geochemistry-data collection program, which led to the publication of a nickel-copper-cobalt anomaly in 2000. Ni (271ppm), Cu (39ppm) Co (39ppm).

In 2007, Sirius was granted exploration permit E28/1724. In 2010, GSWA, through EIS funding, flew an aeromagnetic survey, which identified an anomaly proximal to the geochemistry anomaly. The geophysical data, with a high resolution identified "the Eye", and a reverse circulation program was undertaken.

In 2011, the first diamond hole was completed using EIS co-funded drilling monies. Although the diamond hole did not go through the ore body, finely disseminated sulfides in the host and altered rocks encouraged a continuation of exploration drilling. Predictions at the release of the feasibility study to the Australian Stock Exchange (ASX) suggested royalties of \$110 million to the State.

The size of the deposit has increased since then and is still open at depth. The Nova–Bollinger Deposit is considered to be a magmatic nickel sulfide deposit with the sulfides thought to have accumulated by gravitational settling processes related to magma flow. The nickel-copper mineralisation occurs as disseminated and massive sulfides consisting of 80–85 per cent pyrrhotite, 10–15 per cent pentlandite and 5–10 per cent chalcopyrite. One mine discovery will pay back what the State has spent on nine years of the EIS.



Transforming Our Data

One of our core business functions is to provide free pre-competitive geoscience data to reduce the financial risk to explorers, attract new investment into the State and to provide guidance to government in policy and land use decisions.

Discoveries like the Nova–Bollinger nickel, copper, cobalt and Tropicana gold mines in the Albany–Fraser Orogen and Gruyere gold mine in the East Yilgarn, demonstrate the use of pre-competitive data can help develop regional exploration models and identify targets for mineral deposits under cover in Western Australia. Our strategy is to build on this base.

GSWA is a data-rich organisation which holds a wealth of high-quality, state-of-the-art geoscience data, including both legacy and current data that have been generated in-house and externally. The challenge is to make this

data findable, accessible, interoperable and reproducible (FAIR). This not only greatly affects the time needed by stakeholders, including internal users to reconstruct the data, it also increases its effectiveness, particularly in a world where machine learning and data analytics are advancing at an exponential pace.

To deliver a modern, streamlined, open data delivery program, we have a four-year plan that aims to transform, modernise and rationalise our data storage, management and delivery. This will not only help keep pace with modern, digitally enabled exploration demands, but will place the GSWA at the forefront of pre-competitive geoscience data delivery, greatly increasing the State's attractiveness for exploration of its vast untapped mineral and petroleum resources.





Provision of up-to-date spatial information

The provision of accurate, timely spatial information is an important part of our role. It includes tenement and title information, and environmental and cadastre data for use by the resources sector. GSWA, in collaboration with Landgate and Geoscience Australia, will work to maintain up-to-date references to the Geodetic Datum of Australia as revisions are made over time. GSWA will continue to maintain and add spatially referenced geological information as part of its data delivery.



Strengthening Our Team

Producing world-class science requires us to continually renew, strengthen and develop our workforce to be at the leading edge of science, embrace new technologies and provide state-of-the-art geoscience infrastructure such as the Joe Lord and Perth core libraries. GSWA needs to ensure there is the correct balance of broader range skills and key specialisations. This challenge will be met by strategic staffing, continuous learning and collaborating with universities, research institutions, other geological surveys, government agencies and industry. Our new emphasis on “geology for society” means our staff will need to develop further skills in communication, facilitation and mediation.





Providing Trusted Advice

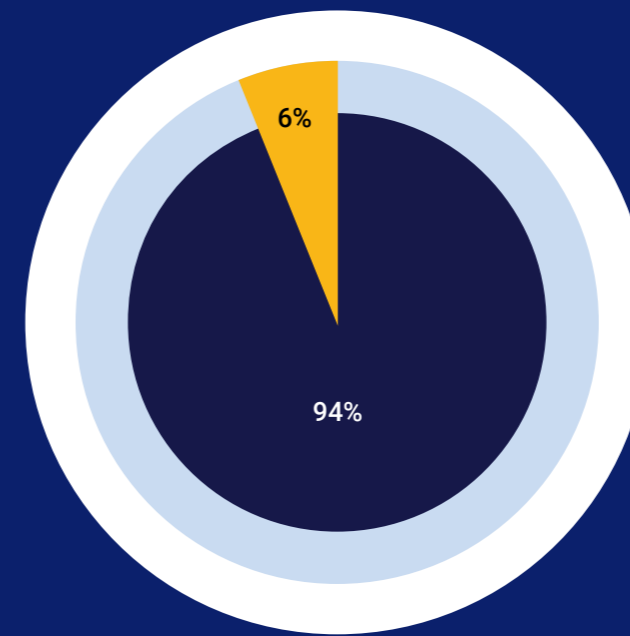
Western Australia's mineral and energy resources are a major contributor to the State's economic growth.

Western Australia has a significant advantage in the production of resource commodities over other jurisdictions. This advantage stems from the rich and diverse mineral and energy endowment, the high quality regional-scale geoscience information that lowers exploration risks, advanced exploration, mining and processing technologies, a skilled workforce, stable economic conditions, an enabling and robust legislative framework and low sovereign risk.

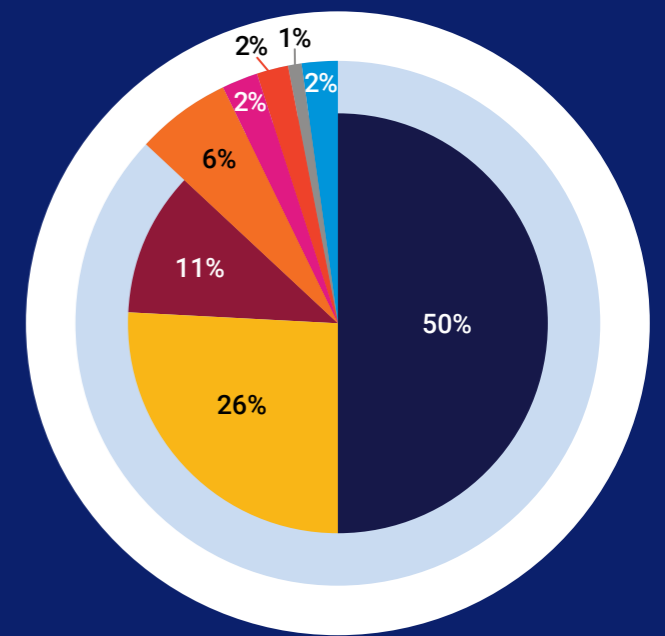
However, the energy and minerals sectors are in a state of transition as global trends towards renewable energy and environmentally sustainable development gain momentum. Understanding Western Australia's available resources is a prerequisite for formulating sound policies on resources, land access and future energy needs.

GSWA supports the responsible development of a diverse resource sector in Australia's low-carbon economy. This includes promoting standards in exploration and mining, on corporate governance, social responsibility and environment.

We will map and understand Western Australia's energy resources. GSWA will stimulate mineral exploration investment, including critical minerals, to open up new mineral and energy producing provinces. We will continue to provide geoscience information to support new mineral and energy exploration technologies and drive new discoveries.



○ Mineral and Petroleum	94%
● Other WA Exports	6%



○ Iron Ore	50%
● Petroleum	26%
● Gold	11%
● Alumina	6%
● Base Metals	2%
● Nickel	2%
● Mineral Sands	1%
● Other	2%



Land Use Planning

By providing relevant geological information and advice to State and Local Government, planners and the public, GSWA contributes to Western Australia's economic sustainability and helps to ensure the interests and rights of all parties are recognised.

GSWA examines proposals for land subdivisions and other land use changes, and assesses the implications for access to mineral and energy resources. We then provide recommendations, advice and, where appropriate, grant approvals.

The services of the GSWA in land use planning include:

- providing geological input and advice to other government activities to support planning policies, strategies and schemes;

- providing approvals and recommendations for proposed land tenure and land use changes throughout the State;
- assisting with the development of land use planning policy across government.
- publishing resource potential for land use planning; and
- mapping basic raw materials, and other strategic mineral and petroleum resources, for inclusion into State planning policies, and regional and local planning strategies and schemes.



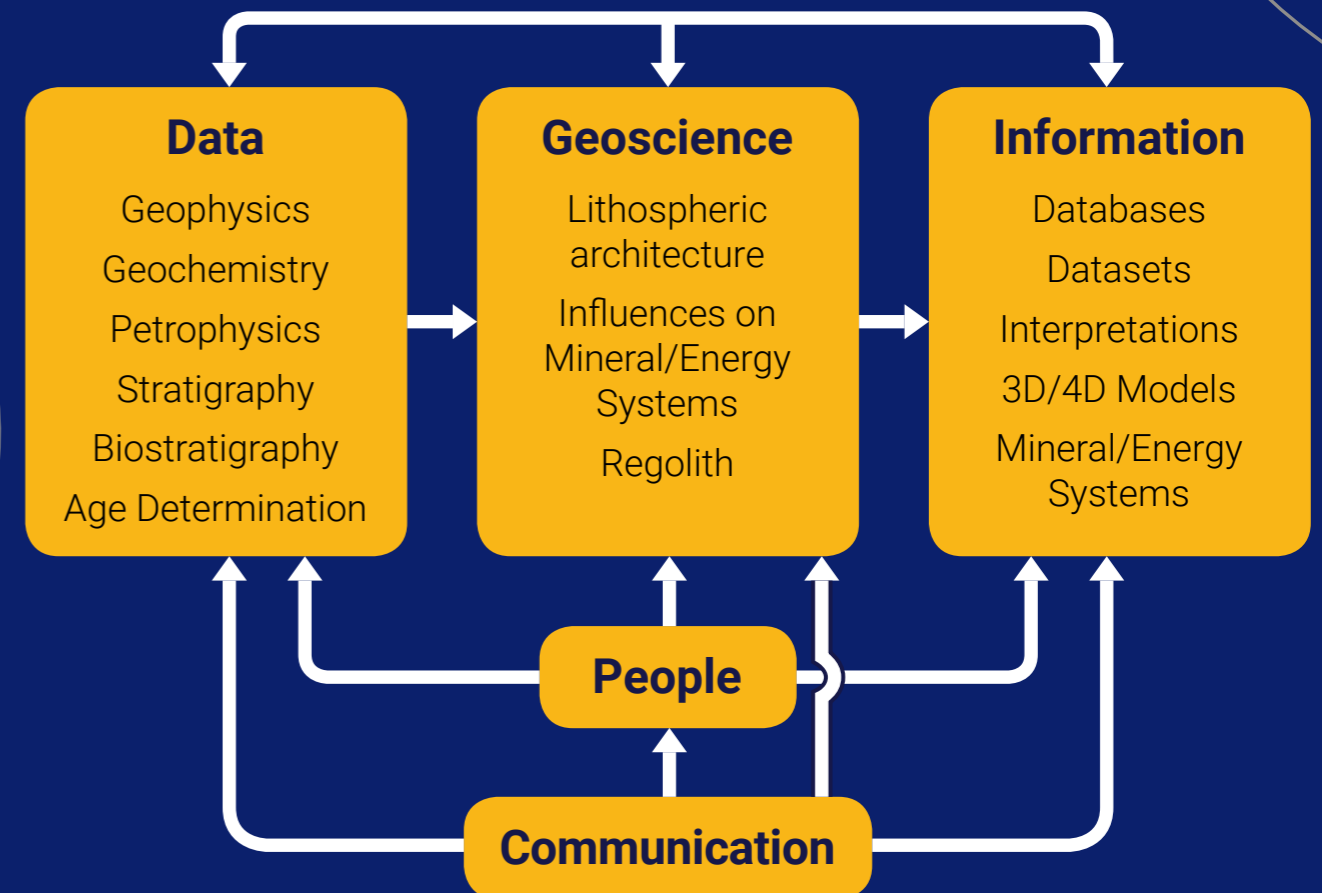
Geoscience Education

GSWA contributes to the knowledge of geology in the community through a number of channels:

- Providing geological information for tourist locations (Geotourism).
- Promoting earth sciences as an integral part of STEM (Science, Technology, Engineering and Mathematics) in secondary schools through Earth Science Western Australia (ESWA).
- Providing objective and authoritative geoscience information.
- Providing relevant geological information on climate change and geohazards.

How it Works

- Implementing GSWA's 2030 strategy requires the four core areas - Geoscience, Data, People, and Information - to work together.



| Our Contributions

The GSWA strategy aligns with and supports global and domestic initiatives:

United Nations – [Sustainable Development Goals \(SDGs\)](#) – we provide information that supports the monitoring of progress against the SDGs.

[Australia New Zealand Foundation Spatial Data Framework](#) United Nations – [Integrated Geospatial Information Framework](#).

We work with Geoscience Australia to provide advice and assistance in the management and the curation of data generated by the resources sector. *Western Australia's Mining Act 1978, Petroleum and Geothermal Energy Resources Act 1969, Petroleum (Submerged Lands) Act 1982* and supporting regulations.

| Our Commitments

We are committed to building an organisation that aligns to State and national science objectives and delivers better outcomes for government, industry and the community. To achieve this goal, GSWA will focus on achieving

science excellence, employing and developing highly skilled staff, ensuring the most effective use of our data, build on and foster supportive stakeholder relationships and enhance our inclusive and positive organisational culture.

| Pursuing science excellence

- We will maintain a thorough knowledge of Earth systems and the science of Western Australia's lands and waters.
- We will provide national and international geoscience leadership.
- We will collaborate internally and externally to improve the quality of our science.
- We will provide authoritative and independent advice to government.

| Our Values

- Respectful
- Responsive
- Forward Thinking
- Transparent
- Fair and Ethical





Ensuring supportive stakeholders

- We will maintain a focus on the needs of our stakeholders.
- We will seek to engage with potential new stakeholders.
- We will respectfully engage and collaborate with Aboriginal and Torres Strait Islanders.
- We will raise the profile of the GSWA with a broader cross-section of society.
- We will increase our reputation with all stakeholders as an essential and trusted source of geoscientific data and advice for the Western Australian Government.



Enhancing a positive organisational culture

- We will be an employer of choice with a workforce that continues to embrace diversity, and is inclusive and supportive of all individuals.
- We will implement the DMIRS Diversity and Inclusion Plan 2019–2023 and be committed to advancing the careers of women in leadership, Aboriginal and Torres Strait Islander people, people with disabilities, youth and young professionals and trans and gender diverse individuals, including achieving equity in decision-making forums.
- We will encourage staff to be their most creative selves, with a supportive environment that will listen to and consider all ideas.
- We will create a secure organisation, committed to protecting staff, property, information and reputation.



| Our Partners

GSWA will build constructive partnerships with research organisations, universities, other geological surveys, cooperative research centres and government agencies to promote excellence in geoscience and research.





Government of Western Australia

**Department of Mines, Industry Regulation
and Safety**

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