

The Auditor-General
Audit Report No.22 2009–10
Performance Audit

Geoscience Australia

Australian National Audit Office

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of Australia 2010

ISSN 1036-7632

ISBN 0 642 81106 7

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Canberra ACT
11 February 2010

Dear Mr President
Dear Mr Speaker

The Australian National Audit Office has undertaken a performance audit in Geoscience Australia in accordance with the authority contained in the *Auditor-General Act 1997*. I present the report of this audit and the accompanying brochure. The report is titled *Geoscience Australia*.

Following its presentation and receipt, the report will be placed on the Australian National Audit Office's Homepage—<http://www.anao.gov.au>.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Ian McPhee'.

Ian McPhee
Auditor-General

The Honourable the President of the Senate
The Honourable the Speaker of the House of Representatives
Parliament House
Canberra ACT

AUDITING FOR AUSTRALIA

The Auditor-General is head of the Australian National Audit Office (ANAO). The ANAO assists the Auditor-General to carry out his duties under the *Auditor-General Act 1997* to undertake performance audits and financial statement audits of Commonwealth public sector bodies and to provide independent reports and advice for the Parliament, the Australian Government and the community. The aim is to improve Commonwealth public sector administration and accountability.

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Abbreviations and Glossary

Accessibility	The degree to which Geoscience Australia's data and information products can be obtained by the public
Acreage Release	The term given to the annual release of petroleum exploration leases in certain offshore regions as designated by the Australian Government
AGSO	Australian Geological Survey Organisation
ATWS	Australian Tsunami Warning System is operated by Geoscience Australia as part of the Joint Australian Tsunami Warning Centre in conjunction with Bureau of Meteorology
AGIMO	Australian Government Information Management Office, part of the Department of Finance and Deregulation
AUSLIG	Australian Survey and Land Information Group
Bathymetry	The measurement of the depth of bodies of water
Carbon Capture and Storage (CCS)	The storing of carbon dioxide (CO ₂) to prevent it from entering the atmosphere. CCS is generally taken to mean geological storage, that is, injecting CO ₂ into deep underground formations
CEIs	Chief Executive Instructions
CEO	Chief Executive Officer
Cost recovery	The charging regime used to recover the costs of providing services, in particular, in government
Discoverability	The ability to find information, particularly on the Internet, to facilitate accessibility
Geoscience	The sciences dealing with the Earth, including geology, geophysics, and geochemistry

GPS	Global Positioning System. The Australian Regional GPS Network consists of a network of permanent geodetic quality global position system receivers, on geologically stable marks, in Australia and its Territories, with eight stations within Australia
ICT	Information and Communications Technology
Interoperability	The ability of data to be read, manipulated and used by multiple software applications
Intellectual property	The property created by the mind or intellect, which is often expressed as rights. For example, intellectual property can be covered by patents, copyright and trademarks
Inventory	Listing of contents for items held by a business. In other words, documentation of items held
IFCI	International Forest Carbon Initiative
KPIs	Key Performance Indicators
Licensing of rights	A common method of exploiting intellectual property. Licensed rights can be exclusive or non-exclusive and give the licensee the right to use (but not own) the copyright, patent, trade mark or design
Metadata	Data about data, which facilitates its discovery through search engines as well as assisting in identifying it and describing the limitations of the data
Online access	The ability to obtain data and information via the Internet
OSDM	Office of Spatial Data Management
PBS	Portfolio Budget Statements

Prince2	PRojects IN Controlled Environments, which is a process-based project management methodology < www.prince2.com >
RET	Department of Resources, Energy and Tourism
SDAP	Spatial Data Pricing and Access Policy
Spatial information	Information related to a position of an object or point in reference to the Earth
SPOT	Single Point of Truth is defined as a dataset that is authentic, authoritative and accurate
Topography	The study or detailed description of the surface features of a region

Summary and Recommendations

Summary

Introduction

1. Geoscience Australia was established in 2001 following the merger of the Australian Geological Survey Organisation (AGSO)¹ and the Australian Surveying and Land Information Group (AUSLIG).² Geoscience Australia has responsibility for geoscientific and geospatial data and information and provides products, services and advice to Australian Government agencies, industry sectors and the general public.³
2. The annual budget for Geoscience Australia in 2008–09 was some \$174 million, of which \$31 million was for services provided. Geoscience Australia has a range of data and information holdings and physical collections accumulated over many years and, in 2008–09, expended \$53 million on the acquisition of new geoscientific and geospatial data. It also has in excess of 32 000 products available on its website or on request.
3. Geoscience Australia is a prescribed agency under the *Financial Management and Accountability Act 1997* (FMA Act) within the Resources, Energy and Tourism portfolio. The Chief Executive Officer (CEO) is responsible for the financial management of Geoscience Australia under the FMA Act, and reports to the Minister for Resources and Energy. The CEO is also responsible under the *Public Service Act 1999* (PS Act) to the Secretary of the Department of Resources, Energy and Tourism (RET).

The role of Geoscience Australia

4. Geoscience Australia uses geoscientific research and information for the economic, social and environmental benefit of Australia. In November 2009, Geoscience Australia identified its core capabilities as providing advice to government agencies and information:

¹ AGSO was formerly the Bureau of Mineral Resources, which was established in 1946.

² AUSLIG was established in 1987 following a merger of the Australian Survey Organisation (ASO) and the Division of National Mapping, which had previously incorporated the Australian Centre of Remote Sensing.

³ Geospatial refers to any features and phenomena related to the Earth and geoscience refers to any of the various sciences that deal with the Earth, its composition, or any of its changing aspects, including geography, geology, geophysics, hydrogeology and meteorology.

- to the energy and minerals sectors to enhance wealth and energy security;
- on the state of the land and marine jurisdictions for environmental, economic and social purposes;
- on natural hazards and risks for community safety and resilience; and
- on groundwater for environmental, economic and social purposes.

Providing advice to government agencies

5. Geoscience Australia provides technical advice to government agencies across the spectrum of geoscience disciplines to better inform policy decisions. A main focus for this advice is on the minerals and energy resources sectors. It also provides advice on areas ranging from the location of Australian maritime boundaries to the geology of Australia and the best locations for carbon capture and storage.

Providing information

6. Each year, on behalf of RET, Geoscience Australia provides pre-competitive information to industry on the petroleum potential of offshore Australian basins, as part of the release of exploration areas.⁴ Geoscience Australia also has a delegated responsibility under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*⁵ to store data, information and the physical samples generated by prospecting companies through drilling and exploring Australia's offshore basins.

7. Geoscience Australia conducts a range of scientific research and surveying activities to enhance its knowledge of Australia's land and marine jurisdictions, including mapping Australia's topography, measuring the sea depth and capturing satellite imagery. Its work also contributes to increased community safety by providing advice to emergency services agencies and through its studies of earthquakes, tsunamis, floods, cyclones and landslides. In early 2009, it supported the Victorian bushfire relief by providing specialised staff and maps and operates the 24 hour, seven day per week

⁴ Pre-competitive information is scientific data and analyses provided to all interested parties to assist in the tender process as part of the offshore acreage release.

⁵ The Act gives the Minister certain powers to collect information. Each state and territory has similar legislation respective to their jurisdiction. These powers are delegated by the respective State and Territory Minister to Geoscience Australia.

Tsunami Warning System as part of the Joint Australian Tsunami Warning Centre.

Audit objectives and scope

8. The objective of the audit was to assess how effectively Geoscience Australia provides geoscientific and geospatial information and services to assist the Australian Government and key stakeholders. Particular emphasis was given to:

- the collection and management of geoscientific and geospatial data and information, including accessibility;
- the provision of products and services; and
- governance arrangements.

9. The ANAO examined a number of datasets and product and service projects to assess Geoscience Australia's performance in providing geoscientific and geospatial information and services.

Overall conclusion

10. As Australia's specialist geoscientific and geospatial agency, Geoscience Australia provides research and technical advice relating to minerals and energy exploration, environmental issues and community safety. The data and information it produces, acquires and maintains, underpins its products and services.

11. Geoscience Australia is effectively providing geoscientific and geospatial services and products to government agencies, industry sectors and the public. Examples of this work include implementing the Australian Tsunami Warning System, updating Australian surface geology maps and datasets, releasing pre-competitive data for petroleum exploration and developing a model to predict the effects of inundation in Australia's coastal areas. Feedback from government agencies and key industry stakeholders confirmed that Geoscience Australia's work is valued and often essential to their outcomes.

12. Notwithstanding this positive feedback, Geoscience Australia's website, its key interface with customers, is complex to use and more data and information could be made publicly available. In addition, the management of many product and service projects lacked project plans, risk assessments and key performance indicators. Geoscience Australia could more effectively report

its achievements by aggregating project-level key performance information such as time, cost, client satisfaction and outcomes.

13. Geoscience Australia's geoscientific and geospatial products and services rely on effective information management. There has been no assessment of Geoscience Australia's information management environment (as part of developing the Strategic ICT Framework) and little focus on the strategies and activities needed to address current and emerging information management issues. In addition, there is no inventory that documents the purpose, extent and nature of Geoscience Australia's data and information holdings and physical collections. It is therefore not well positioned to appropriately maintain and store its data holdings or make informed decisions about the accessibility of this data. Developing an inventory would provide the opportunity for Geoscience Australia to assess the importance and relative priority of its legacy data and information holdings.

14. Overall, Geoscience Australia has a sound governance framework but there is scope to enhance its strategic planning process. The agency's current strategic plan identifies the agency-wide goals and strategies required to strengthen its internal capabilities. However, it does not include current (or future) Australian Government priorities and medium and longer term goals for its research activities, products and services. Revising its strategic plan will enable Geoscience Australia to communicate its strategic directions and goals and to identify the relative priorities and risks associated with its research activities, products and services. It will also provide a stronger framework to measure and report Geoscience Australia's performance and achievements.

15. The ANAO has made four recommendations aimed at improving strategic planning, information management, government client-relationships and performance reporting.

Key findings by chapter

Strategic Direction (Chapter Two)

16. An effective strategic planning process should enable Geoscience Australia to think through and document its strategic directions, supported by specific measurable goals and targets that are consistent with its mandate and government priorities. Strategic directions and goals should reflect Geoscience Australia's environment, identified risks and the financial and operational implications of achieving these goals.

17. Geoscience Australia's strategic plan (*Strategic Directions 2006–2011*), approved by the Executive Board in February 2006, identifies four agency-wide enabling goals and the strategies required to strengthen its internal capabilities. Government priorities and the medium and longer term goals for Geoscience Australia's research activities, products and services are not identified in this plan or in its operational plan, the Annual Work Program.

18. There would be considerable benefits in Geoscience Australia revising its strategic plan. Developing a strategic plan that builds on its core capabilities and communicates to key stakeholders its medium to longer term strategic directions, goals and priorities would enable Geoscience Australia to:

- identify the government mandates that are expected to drive the organisation for the next three to five years, and the respective sources of funding;
- identify the relative priorities and risks associated with its scientific research, data acquisition, mineral and petroleum resource identification and mapping activities;
- align its Annual Work Program with the agency's strategic directions and priorities; and
- measure performance over time, through setting medium and long term goals and targets and regularly monitor progress.

Information communications technology strategic framework

19. In 2008, Geoscience Australia developed its *Information Communications Technology (ICT) Strategic Framework for 2008–11*. Within this framework, information management was incorporated into the concept of ICT, in recognition of the integrated nature of information technology, information services and information management and the merging of different technologies.

20. The ICT strategic framework was not informed by an assessment of Geoscience Australia's current information management environment. Consequently, there was little focus on strategies and activities to address current and emerging information management issues and no strategic information management plan was developed. While the need for a strategic ICT plan was identified as part of the ICT framework, it is yet to be developed.

21. Information management was recognised as a core competency to be developed in the current strategic plan. However, like other elements of the plan, progress against this goal was not monitored or reported against after July 2007. At that time, the Executive Board was advised that the information management goal had been achieved. Given the complexity of the information management issues that Geoscience Australia was facing (and continues to deal with) such as the lack of an inventory, devolved information management practices and insufficient storage for data and information, this assessment appears to be premature. Rather, as identified in the previous *Strategic Information Management Plan 2003–2008*, information management requires a greater corporate focus.

Managing Data and Information (Chapter Three)

22. Fundamental to Geoscience Australia’s stewardship role is the effective management of its data and information. Key elements of information management are: the acquisition of new data; documenting data and information; appropriately maintaining and storing data and information; maintaining data security; and making data and information accessible. Information management for Geoscience Australia means knowing: what its data and information holdings are, including physical collections; appropriately maintaining and storing data and information; and making the data and information accessible.

Acquisition of new data

23. Geoscience Australia acquires new data through its scientific and surveying activities and via third parties including contracts to purchase data and joint projects. Quality assurance processes were in place for each type of dataset reviewed by the ANAO.⁶ These processes were governed by standards or generally accepted methodologies, which assist in ensuring that the quality of the data is maintained. Where appropriate, work instructions dictate the quality assurance approaches to be used.

⁶ The ANAO examined the following datasets: bathymetry; topography; satellite archive; onshore seismic; Australian surface geology; Petroleum Data Repository; and the seismology network.

24. The development of metadata⁷ is also part of the quality assurance process for data that is to be made available through the Geoscience Australia website. The ANAO noted that quality assurance and the development of metadata is only applicable to current acquisitions. Existing and legacy data holdings may not meet current quality and metadata standards.

Documenting data and information

25. Geoscience Australia has not documented the extent of its existing and legacy data holdings. Without an inventory of its data and information holdings and physical collections, it is difficult for Geoscience Australia to demonstrate a clear understanding of its holdings or that they are being properly managed.

26. Geoscience Australia provides instructions to staff on the importance of managing data and information through its *Chief Executive Instruction (CEI) No. 38 Information Management*. CEI No. 38 sets out the requirements for an information plan for every project or operational activity that produces an information output. There were no information management plans for the sample datasets examined by the ANAO.

Maintenance of data and information

27. Data that are being actively used by Geoscience Australia staff are maintained, either through checking the consistency of existing data or through quality assurance processes as new data are added. However, datasets that are no longer used, and whose custodians have moved on to other projects, may remain on corporate systems with little information available to ascertain their importance or to assist in deciding whether they should be archived.

28. There are data and information holdings on paper, CDs and DVDs or in analogue format that are yet to be fully assessed to determine whether they should be maintained and copied to new storage media, made accessible by incorporating them into existing holdings, or archived. Geoscience Australia also has physical collections that require assessment, documentation and appropriate maintenance and storage to allow them to be accessed more readily. A cost-benefit approach, that is based on the importance and relative priorities of the data and information for Geoscience Australia, could be

⁷ Metadata is data about data which facilitates its discovery through search engines as well as assisting in identifying it and describing the limitations of the data.

applied to the assessment of legacy data. Preparing an inventory will assist in identifying data maintenance requirements because it will identify the purpose, extent and nature of the legacy data holdings.

Storage of data and information

29. Currently, Geoscience Australia does not have sufficient storage space in its corporate systems to store and back up its data and information holdings. An interim arrangement was implemented in June 2008, which increased data storage capacity from 20 terabytes to 120 terabytes. There is also a Mass Storage Project underway, which is designed to put in place a scalable and sustainable storage solution.

Security of data and information

30. To be secure, data and information need to be appropriately stored within Geoscience Australia's corporate systems and physical security arrangements. At the time of the audit, the IT Disaster Recovery and IT Business Continuity Plans were out of date. The Information Service Branch had recently completed a Business Impact Analysis, which is a precursor to disaster recovery planning. The IT Security Plan was also in the process of being updated (and was last reviewed 2005). Geoscience Australia advised that these documents are expected to be finalised shortly.

Delivery of Services and Development of Data Products (Chapter Four)

31. Geoscience Australia's Annual Work Program sets out the projects it will undertake to deliver services to government agencies, the products it will produce and the scientific research it will conduct. To assess how effectively Geoscience Australia is delivering its services and products, the ANAO examined a sample of seven services and four products in the 2008–09 Annual Work Program.

Establishing agreements

32. Three of the seven services (projects) examined by the ANAO⁸ had a formal arrangement in place through a Memorandum of Understanding or contract with its client.⁹ For two of these projects, the National Collaboration Framework¹⁰ was used as the basis for developing the agreements between the two agencies and schedules for the projects were included. For the third project, Geoscience Australia used a collaborative research agreement. For the remaining four services, the relationships with client agencies were not as clear. Project planning material consisted of internal work flow documents and the Annual Work Program. There were no project plans, information plans, strategies for future delivery or clearly articulated quality measures. The risks associated with providing the service had also not been assessed. Establishing formal agreements with key clients would provide a clearer understanding of roles and responsibilities, project costs, outcomes and quality of service.

Costing of services

33. For services with no formal agreement in place, the costs associated with the project were not calculated or communicated to client agencies. Where major services are to be provided to client agencies, it would be beneficial to calculate the costs associated with the provision of the service and take them into consideration when making management decisions about setting organisational priorities and the allocation of resources.

Project planning and management

34. Geoscience Australia has developed guidelines and methodologies to assist in its project management. However, the level of project planning and compliance with these guidelines was variable for the services reviewed by the ANAO. This was particularly evident for those projects involving data products and where services were being provided without an agreement being in place.

⁸ The Australian Tsunami Warning System (ATWS), the International Forest Carbon Initiative (IFCI) project and the Western Australian Inundation Modelling project.

⁹ Because Australian Government agencies are part of the same legal entity, they cannot enter legal agreements with each other and therefore use other agreements such as MoUs to manage their relationships.

¹⁰ The National Collaboration Framework is the Australian Government's guideline on how government agencies should interact with other agencies.

35. In eight of the 11 projects reviewed by the ANAO, the information in the Annual Work Program was the only formal project management documentation available. While the details in the Annual Work Program capture the requirements of the guidelines at a broad level, they are more of a project description than a detailed project management plan. Broader implementation of the project management guidelines, supported by ongoing training, across the organisation would enhance Geoscience Australia's project management performance.

Client and stakeholder feedback

36. Currently, Geoscience Australia receives ad hoc feedback from its stakeholders and clients but does not regularly seek formal feedback. The ANAO consulted key industry stakeholders and government clients to gain an appreciation of whether Geoscience Australia's products and services were meeting their needs. Generally, government agencies commented that the services provided were both valuable and necessary for them to undertake their activities. Feedback from major industry and professional association stakeholders rated Geoscience Australia's performance highly, but did identify some areas where improvement could be made. For example, comments suggested that there was a need for more detailed up-to-date maps and for further development of geothermal databases.

Client Access to Data and Information Products (Chapter Five)

37. To assess whether Geoscience Australia is providing effective access to its data and information, the ANAO examined a sample of eight datasets, available to government agencies, industry sectors and the public. For these datasets, each had its own approach to displaying and distributing its products.

38. Barriers to data accessibility included poor information management and the size of datasets. Poor information management has restricted Geoscience Australia's ability to provide maximum access to its data. While all new data are required to have metadata, for older data, metadata is often inaccurate and needs to be reviewed and corrected. Without accurate metadata it is difficult for users to search and access products.

39. The size of some datasets precludes them from being accessible online as current Internet speeds are insufficient to carry the load. Although it is not practical for Geoscience Australia to make all of its data available online, there is still considerable scope for it to increase its provision of data through the

Internet. An internal review identified that only a small proportion (some 14.5 per cent) of Geoscience Australia's data and products were available to the public via the Internet; and there was a lack of coordination and governance around product delivery and many products were misclassified in product delivery systems. Geoscience Australia could undertake an assessment of what data and information it could reasonably make available through its website. Developing a target for how much data and information it makes accessible online and monitoring the extent to which this data and information is accessed by users would provide a basis for measuring improvement.

Geoscience Australia's website

40. Geoscience Australia's website, its key interface with customers, is complex to use and each of the sampled areas displayed their products in a different way. Geoscience Australia has developed online tools that enhance the public access of data. However, these tools were developed independently of one another and the product delivery review identified that there was substantial duplication in web applications, with some 105 applications providing access to data.

41. To address the issues relating to accessibility, Geoscience Australia is undertaking a number of initiatives including a Product Delivery Enhancement project and redeveloping its website. However, previous projects to enhance accessibility did not achieve their objectives and the new projects would benefit from incorporating the lessons learned from these earlier projects. In addition, a strong governance framework and regular monitoring of the resources, milestones and deliverables is necessary if these projects are to succeed.

Reporting and Measuring Performance (Chapter Six)

External reporting and performance measures

42. Geoscience Australia could better demonstrate that it is achieving its PBS outcome. The KPIs for the 2009–10, and previous PBSs, are not specific and the performance targets are restatements of the KPIs. Reporting would be improved if specific quantitative and qualitative performance targets were identified in the PBS and reported against. As the majority of Geoscience Australia's work program is project based, it would be appropriate and feasible for the agency to aggregate the time, cost, client satisfaction and other quality measures at the project level into corresponding agency-wide performance information and targets.

Summary of agency response

43. Geoscience Australia (GA) welcomes the ANAO's audit and welcomes the ANAO's overall conclusion that GA is effectively providing geoscientific and geospatial services and products to our stakeholders, that our stakeholders value our work and that our governance framework is sound.

44. Since the formation of GA from the amalgamation of the Australian Geological Survey Organisation and AUSLIG in 2001, and becoming a Prescribed Agency, GA has undergone much change. The volumes of data that GA manages are increasing exponentially. Our role in providing technical advice to government agencies across the spectrum of geoscience disciplines has also grown substantially. GA has and continues to respond to these changes by providing quality geoscience to support informed policy decisions. All of the issues identified in the ANAO's report are a reflection of the changing and increasingly complex environment in which we operate.

45. GA welcomes the opportunity provided by the ANAO's report and its recommendations to focus even more attention on addressing the issues identified and we are pleased to advise that we have a range of processes and programs in place to ensure a positive outcome.

46. GA would also like to thank the ANAO for the professional manner in which it carried out the audit and for its open, communicative approach to our staff and management.

Recommendations

Recommendation No.1 To improve its strategic planning, the ANAO recommends that Geoscience Australia develops:

Para 2.27

- (a) a strategic plan that outlines its strategic directions, government priorities, and specific, measurable medium and longer term goals for its research activities, products and services;
- (b) an information communications technology strategic plan that is aligned with the agency's strategic plan; and
- (c) a strategic information management plan that identifies and prioritises information management initiatives.

Geoscience Australia response: *Agreed*

Recommendation No.2 To provide a basis for the effective management of its data and information and physical collections, the ANAO recommends that Geoscience Australia:

Para 3.32

- (a) prepares an inventory of its data and information and physical collections; and
- (b) undertakes an assessment of its legacy data to prioritise maintenance, storage and archival requirements.

Geoscience Australia response: *Agreed*

**Recommendation
No.3**

Para 4.23

To provide a clear understanding of roles, responsibilities, the standard of services to be delivered and reporting requirements, the ANAO recommends that Geoscience Australia:

- (a) establishes formal arrangements, such as a heads of agreement or Memoranda of Understanding with each major Australian Government agency client, including the Department of Resources, Energy and Tourism, where such arrangements do not already exist; and
- (b) documents the costs of major services delivered.

Geoscience Australia response: *Agreed*

**Recommendation
No.4**

Para 6.20

To improve its monitoring and measurement of performance, and subsequent annual reporting, the ANAO recommends that Geoscience Australia:

- (a) develops a suite of performance information and targets, which indicate the extent to which the agency is achieving its Portfolio Budget Statements outcome and delivering its Annual Work Program; and
- (b) supplements its current ad hoc client and stakeholder feedback with structured, periodic surveys.

Geoscience Australia response: *Agreed*

Audit Findings and Conclusions

1. Background

This chapter provides a brief background of Geoscience Australia and outlines the objective, criteria, methodology and scope of the audit.

Introduction

1.1 Geoscience Australia was formed in 2001 following the merger of the Australian Geological Survey Organisation (AGSO)¹¹ and the Australian Surveying and Land Information Group (AUSLIG).¹² Geoscience Australia has responsibility for Australia's geoscientific and geospatial data and information and provides services and advice to the Australian Government agencies, industry and the general public.¹³ The annual budget for Geoscience Australia in 2008–09 was some \$174 million, of which \$31 million was for services provided.

1.2 Geoscience Australia is a prescribed agency under the *Financial Management and Accountability Act 1997* (FMA Act) within the Resources, Energy and Tourism portfolio. The Chief Executive Officer (CEO) is responsible for the financial management of Geoscience Australia under the FMA Act, and reports to the Minister for Resources and Energy. The CEO is responsible under the *Public Service Act 1999* (PS Act) to the Secretary of the Department of Resources, Energy and Tourism (RET).

1.3 The current organisational structure (as shown in Figure 1.1) is delineated along similar lines to the functions of the previous organisations, and includes three divisions: Onshore Energy and Minerals; Petroleum and Marine; and Geospatial and Earth Monitoring.

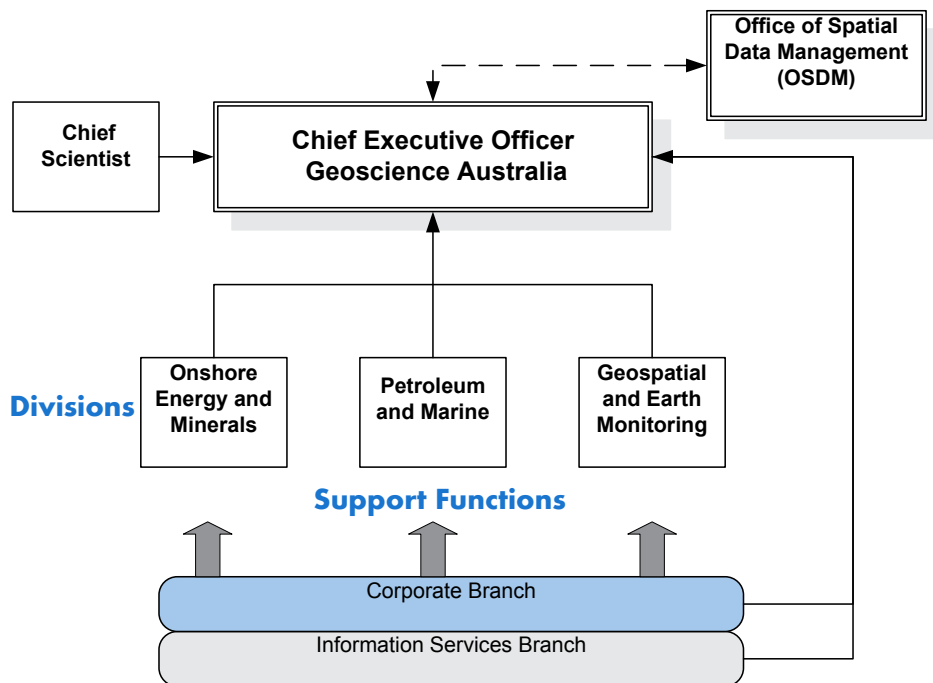
¹¹ AGSO was formerly the Bureau of Mineral Resources, which was established in 1946.

¹² In 1987, AUSLIG was formed after the merger of the Australian Survey Organisation (ASO) and the Division of National Mapping, which had previously incorporated the Australian Centre of Remote Sensing.

¹³ Geospatial refers to any features and phenomena related to the Earth and geoscience refers to any of the various sciences that deal with the Earth, its composition, or any of its changing aspects, including geography, geology, geophysics, hydrogeology and meteorology.

Figure 1.1

The organisational structure of Geoscience Australia



Source: ANAO based on analysis of Geoscience Australia data

1.4 Geoscience Australia does not have specific enabling legislation to undertake geoscience-related activities. Previous and current decisions of government direct and inform Geoscience Australia as to the services and activities it should undertake. The activities and funding for Geoscience Australia are outlined annually in its Portfolio Budget Statements (PBS). In addition, responsibilities under the *Offshore Petroleum and Greenhouse Storage Act 2006* have been delegated to Geoscience Australia.¹⁴

1.5 A purpose-built building, designed to be a national showpiece for energy efficiency, accommodates Geoscience Australia’s staff, specialised laboratories, equipment and data storage facilities in Canberra. A small number of staff are also located in Alice Springs and Perth. The Office of Spatial Data Management (OSDM), which coordinates the implementation of

¹⁴ Under ss712-713 Geoscience Australia is delegated responsibility for the storage of data, core samples, cutting and other exploratory related material.

the Australian Government's policy on spatial data access and pricing, is collocated within Geoscience Australia.¹⁵

The role of Geoscience Australia

1.6 Geoscience Australia uses geoscientific research and information for the economic, social and environmental benefit of Australia. In November 2009, Geoscience Australia identified its core capabilities as providing advice to government agencies and information:

- to the energy and minerals sectors to enhance wealth and energy security;
- on the state of the land and marine jurisdictions for environmental, economic and social purposes;
- on natural hazards and risks for community safety and resilience; and
- on groundwater for environmental, economic and social purposes.¹⁶

Providing advice to government agencies

1.7 Geoscience Australia provides technical advice to government agencies across the spectrum of geoscience disciplines to better inform policy decisions. A main focus for this advice is on the minerals and energy resources sectors. It also provides advice on areas ranging from the location of Australian maritime boundaries to the geology of Australia and the best locations for carbon capture and storage.

Providing information to the energy and minerals sectors

1.8 Each year, on behalf of RET, Geoscience Australia provides pre-competitive information to industry on the petroleum potential of offshore Australian basins, as part of the release of exploration areas.¹⁷ Geoscience Australia also has a delegated responsibility under the *Offshore Petroleum and*

¹⁵ Secretariat, Interdepartmental Committee on Spatial Data Access and Pricing, *A Proposal for the Commonwealth Policy on Spatial Data Access and Pricing*, AUSLIG, Canberra, June 2001.

¹⁶ These five capabilities are a refinement of core functions identified in an internal review undertaken in February 2009.

¹⁷ Pre-competitive information is scientific data and analyses provided to all interested parties to assist in the tender process as part of the offshore acreage release.

*Greenhouse Gas Storage Act 2006*¹⁸ to store data, information and the physical samples generated by prospecting companies through drilling and exploring Australia's offshore basins. The purpose of this legislation is to ensure that this valuable scientific data and information is available to advance the exploitation of Australia's energy resources for the benefit of the Australian community. This collection, which spans more than forty years of exploration, is stored in Geoscience Australia's Petroleum Data Repository.¹⁹ Recently, Geoscience Australia released new radiometric and magnetic maps of Australia that provide more information to identify mineral deposits.

Providing information on the state of the land and marine jurisdictions

1.9 Geoscience Australia conducts a range of scientific research and surveying activities to enhance its knowledge of Australia's land and marine jurisdictions by:

- mapping Australia's topography;
- measuring sea depth and coastal boundaries;
- improving the available knowledge of the marine environment;
- managing the Australian Global Positioning System (GPS) and geodesy networks;
- refining the knowledge of Australian surface and subsurface geology; and
- capturing remote sensing data and information (satellite imaging of the Australian continent).

Providing information on natural hazards and risks

1.10 Geoscience Australia contributes to increased community safety by providing advice to emergency services agencies and through its studies of earthquakes, tsunamis, floods, cyclones and landslides. In early 2009, Geoscience Australia supported the Victorian bushfire relief by providing specialised staff and maps. It also manages a web-based national bushfire

¹⁸ The Act gives the Minister certain powers to collect information. Each state and territory has similar legislation respective to their jurisdiction. These powers are delegated by the respective State/Territory Ministers to Geoscience Australia.

¹⁹ This data and information is subject to non-disclosure periods. Depending on the type of information or sample and the date of the collection, the data must be held from two to five years. Also in operation are conditions for the Joint Petroleum Development Area, administered by the Timor Sea Designated Authority (TSDA), which imposes its own non-disclosure periods.

monitoring system, Sentinel, that provides timely information about hotspots to emergency service managers across Australia.²⁰ Figure 1.2 shows an image from this system, which is available on the Geoscience Australia website.

Figure 1.2

An image from the Sentinel bushfire monitoring system



Source: Geoscience Australia

1.11 Geoscience Australia also operates the 24 hour, seven day per week Tsunami Warning System as part of the Joint Australian Tsunami Warning Centre. Advice of a tsunami-generating earthquake is passed to the Bureau of Meteorology, which then issues a warning to state and territory emergency management services, the media and the public.²¹

Providing information on groundwater

1.12 Geoscience Australia delivers a range of key groundwater resource-related projects in collaboration with Australian and State Government agencies. These include the Broken Hill Managed Aquifer Recharge project and the Water for Australia's Arid Zone—Identifying and Assessing Palaeovalley Groundwater Resources project. Geoscience Australia also

²⁰ The mapping system allows users to identify fire locations that present a potential risk to communities and property. Sentinel is available from <<http://sentinel.ga.gov.au>> or <<http://www.ga.gov.au>>.

²¹ For example, a magnitude 7.8 earthquake off Invercargill, New Zealand, triggered the Joint Australian Tsunami Warning Centre to issue a tsunami alert for Australia's east coast on 16 July 2009.

provides advice to various departments about the relationships between groundwater and the resource sector for a number of specific sites.

Geoscientific and geospatial data

1.13 Geospatial data is of growing importance due, in part, to technological improvements that see geospatial information being used across a wide range of functions and sectors. For example, the transport, logistics, asset management, agriculture, resource and environment management, town planning, emergency management and telecommunications sectors all rely on geospatial data.

1.14 Geoscience Australia is the custodian of Australia's geographical and geological data, information and physical collections and is responsible for creating, maintaining and disseminating this data and information. The acquisition of new data and the maintenance of existing data, underpins many of the products, data, information and services provided to government, industry sectors and the general public. In 2008–09, Geoscience Australia expended \$53 million on the acquisition of geoscientific and geospatial data. It also has in excess of 32 000 products available on its website or on request.

1.15 Scientific data has a potentially longer life cycle than other data. For example, geological data remains relevant indefinitely because the Earth changes so slowly. Data collected at one point in time may be useful in itself or as a set of data (time series). The development of new techniques and technology has also meant that data can be reinterpreted. For example, the Geoscience Australia archive of satellite imagery, covering thirty to forty years of images, can now be used to analyse and study changes to the Australian continent by applying algorithms to make these time series images comparable.

Audit objective and criteria

1.16 The objective of the audit was to assess how effectively Geoscience Australia provides geoscientific and geospatial information and services to assist the Australian Government and key stakeholders.

1.17 The audit followed three key lines of inquiry:

- **Geoscientific information management and research**—Does Geoscience Australia effectively manage the collection and storage of its geoscientific and geospatial information and research, ensuring that

it is secure, accessible and useful to Commonwealth agencies and, more broadly, the Australian community?

- **Provision of Products and Services**—Does Geoscience Australia deliver products and services to its clients to a quality standard and within allocated budgets and timeframes?
- **Governance**—Does GA have governance arrangements that support the management of information and delivery of services to clients?

Audit methodology

1.18 The ANAO examined a number of datasets and product and service projects to assess Geoscience Australia’s performance in providing geoscientific and geospatial information and services. In addition, the audit examined Geoscience Australia’s governance framework.

The audit methodology included:

- an examination of policy documents, reports, guidelines and operational documents, including emails;
- interviews with senior division managers, project managers and administrative staff;
- consultation with selected key stakeholders;
- qualitative and quantitative analyses of the management (including data management) and delivery of a sample of Geoscience Australia’s products and services.

1.19 The audit was conducted in accordance with the ANAO’s Auditing Standards at a cost of approximately \$480 000.

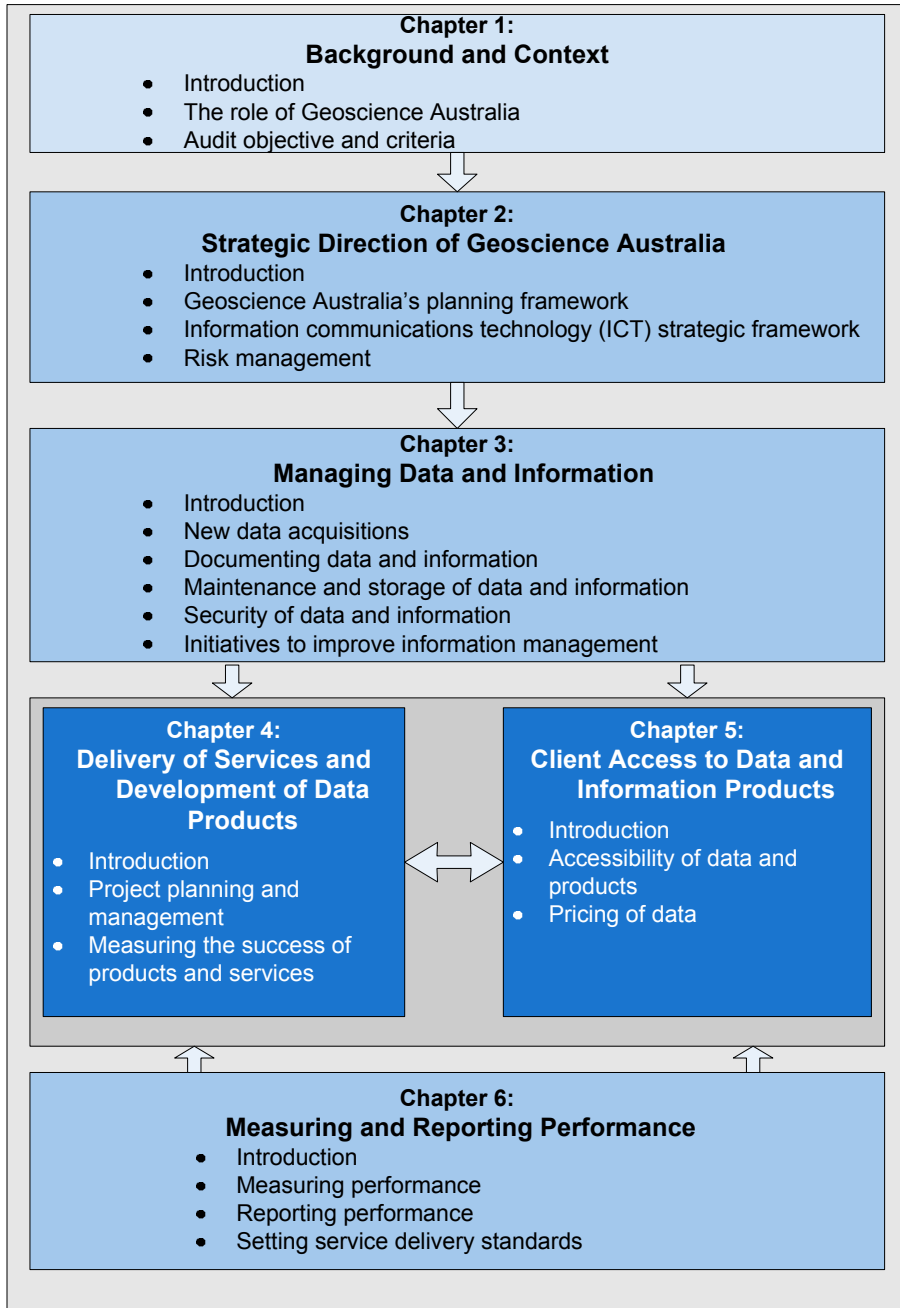
Acknowledgements

1.20 The ANAO wishes to thank the management and staff of Geoscience Australia for providing invaluable assistance during the audit.

1.21 The structure of the report is illustrated in Figure 1.3.

Figure 1.3

Structure of the report



Source: ANAO

2. Strategic Direction of Geoscience Australia

This chapter discusses Geoscience Australia's strategic planning and risk management processes.

Introduction

2.1 As previously noted, Geoscience Australia is a prescribed agency under the *Financial Management and Accountability Act 1997* (FMA Act). Its Chief Executive Officer (CEO) is accountable to the Minister for Resources and Energy for the agency's performance. The CEO's responsibilities include determining and implementing the agency's strategic direction, ensuring that objectives are achieved, risks are managed and resources are used responsibly.²²

2.2 The CEO has established an Executive Board to assist in discharging the agency's governance responsibilities.²³ The Executive Board's charter includes a focus on strategic issues and the agency's performance measures. Geoscience Australia also has a number of standing committees, including an Audit and Risk Committee.²⁴ Figure 2.1 outlines Geoscience Australia's governance framework.

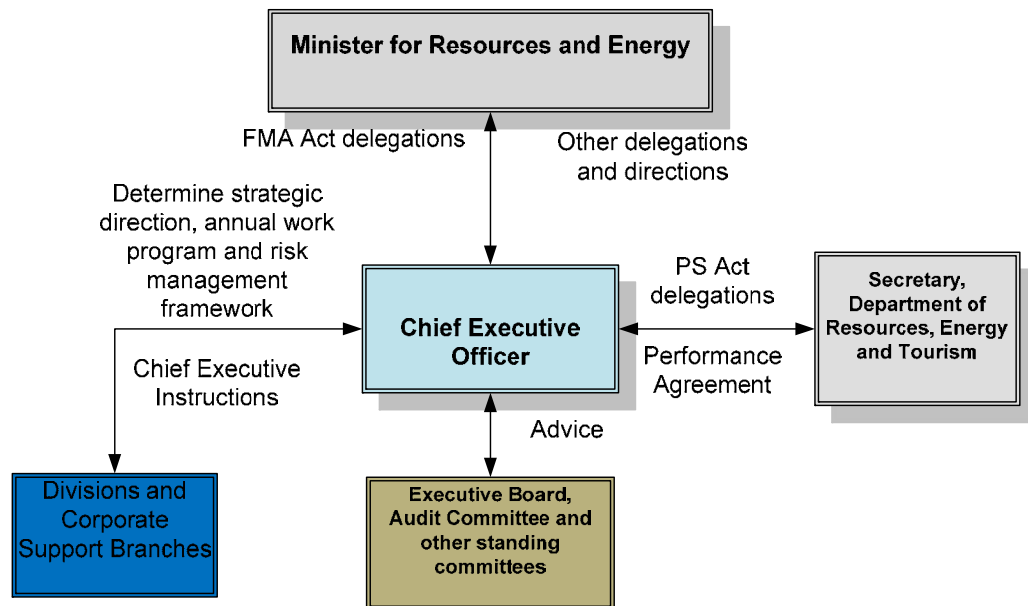
²² ANAO Better Practice Guide—*Implementation of Programme and Policy Initiatives*, 2006, Canberra, p. 13.

²³ The Executive Board comprises the agency's CEO, Chief Scientist, Chief Finance Officer, Chief Information Officer, General Managers of Corporate Branch and Office of Spatial Data Management, Divisional Heads, and the newly created position of Planning Manager.

²⁴ The establishment of a standing Audit Committee is required under section 46 of the FMA Act. The Executive Board and the standing committees can only provide advice, and not direction, to the CEO of an FMA agency.

Figure 2.1

Geoscience Australia’s governance framework



Source: ANAO based on Geoscience Australia’s information

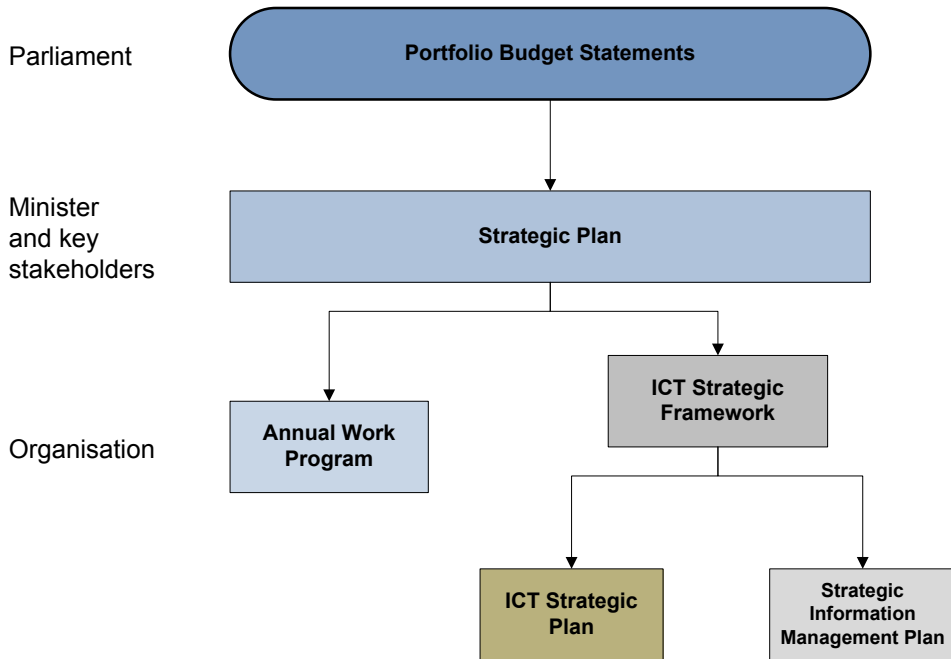
2.3 In undertaking the audit, the ANAO assessed the following elements of Geoscience Australia’s governance framework:

- strategic and operational planning, including the statement of clear goals, an assessment of current and future priorities and alignment between planning documents;
- risk management (at agency, division and project levels); and
- performance reporting (both externally and within the agency).

2.4 The first two elements are discussed in this chapter, and the third is covered in Chapter 6 (Measuring and Reporting Performance).

Geoscience Australia’s planning framework

2.5 Setting the strategic direction for an agency and driving the delivery of its outputs and outcomes requires a strong focus on strategic planning and risk management. A planning framework that identifies clear goals, objectives and measurable outcomes also provides the basis for meeting external reporting and other governance obligations. Figure 2.2 illustrates Geoscience Australia’s planning framework.

Figure 2.2**Geoscience Australia's planning framework**

Source: ANAO

2.6 Geoscience Australia undertakes planning at the strategic and operational levels. The strategic plan outlines its vision and strategic directions and the Annual Work Program sets out the projects and activities it will undertake at the operational level.

Strategic planning

2.7 Geoscience Australia's PBS outcome for 2009–10 is an overarching statement that encompasses the agency's wide-ranging functions:

Informed government, industry and community decisions on the economic, social and environmental management of the nation's natural resources through enabling access to geoscientific and spatial information.

The strategic direction statement in the 2009–10 PBS describes the agency's key work priorities for that year (see Appendix 2).

2.8 An effective strategic planning process should enable Geoscience Australia to think through and document its strategic directions, supported by specific measurable goals and targets that are consistent with its mandate and government priorities. Strategic directions and goals should also reflect

Geoscience Australia's environment, identified risks and the financial and operational implications of achieving these goals.

2.9 Geoscience Australia's government priorities and the medium and longer term goals for its research activities, products and services are not identified in its strategic plan or the Annual Work Program. Its current strategic plan (*Strategic Directions 2006–2011*) was approved by the Executive Board in February 2006 and identifies the following four agency-wide enabling goals and the strategies required to strengthen internal capabilities:

- integrating information management as a core competency;
- building the capability of our people and culture to meet future needs;
- increasing influence with our stakeholders; and
- identifying and addressing emerging issues.

There is no direct alignment with between the strategic plan, PBS outcome or the Annual Work Program.

2.10 A strategic plan is also important for communicating the agency's mission, vision and strategic goals to stakeholders and staff. For the plan to remain relevant, it should be regularly reviewed. While the strategic goals were placed on Geoscience Australia's Intranet when the plan was approved by the Executive Board, the (new) mission and vision statements were confined to the Executive Board's papers and not properly promulgated to staff. In addition, the previous (superseded) strategic plan was still the version displayed on the agency's Internet website.

2.11 An internal audit of the strategic plan and its implementation was undertaken in 2006–07 (Geoscience Australia, *Strategic Planning Audit, Internal Audit Review 2006–07*, July 2007). The internal audit report noted responsibility for implementation had not been assigned, although these responsibilities were subsequently determined. Like the 2006–07 internal audit, the ANAO also found there were significant shortcomings in documentation for some key review and decision-making processes, and that there were no formal procedures for applying the outcomes from the strategic planning activities conducted across the agency. The Executive Board's minutes also indicate that

there has not been a review of progress against the strategic plan or any consideration given to updating or augmenting it since June 2007.²⁵

2.12 Geoscience Australia undertook an internal review in February 2009 and identified for the first time a number of core capabilities.²⁶ It has continued to refine these core capabilities and they were approved by the Executive Board in November 2009. The new core capabilities align well with Geoscience Australia's PBS outcome.

2.13 There would be considerable benefits in Geoscience Australia revising its strategic plan. Developing a strategic plan that builds on its core capabilities and communicates to key stakeholders its medium to longer term strategic directions, goal and priorities would enable Geoscience Australia to:

- identify what government mandates are expected to drive the organisation for the next three to five years, and the respective sources of funding;
- identify the relative priorities and risks associated with its scientific research, data acquisition, mineral and petroleum resource identification and mapping activities;
- align its Annual Work Program with the agency's strategic directions and priorities; and
- measure performance over time, through setting medium and long term goals and targets and regularly monitor progress.

Operational planning

2.14 Geoscience Australia's Annual Work Program is its operational plan. It is a composite of the work programs developed by each of the three operational divisions to deliver their geoscientific products and services. In the individual work programs for 2009–10, each division identified its own priorities for the current year. However, Executive Board minutes and other agency documents do not provide any information on how these division and

²⁵ The 2006–07 internal audit *Strategic Planning Audit, Internal Audit Review 2006–07* recommended an annual review of progress in implementing the strategic plan.

²⁶ These core capabilities are providing advice to government and information: to the energy and mineral sectors, on the state of the land and marine jurisdictions; on natural hazards and risks for community safety; and information on groundwater for environmental, economic and social purposes.

agency level priorities were determined and approved, what proportion of the agency work program they represent or their relative importance.

2.15 The Annual Work Program for 2009–10 template captures the various geoscientific products and services (denoted generically as ‘projects’) each division planned to deliver for that year. The template includes a brief description of each project, its outputs and delivery time frames, and specifies the links to the PBS outcome and the proposed performance indicators.

2.16 The template provides a very practical way of summarising information for more than one hundred diverse geoscientific products and services being delivered at any one time. However, performance indicators had not been developed for most of these products and services and no budget information was included. The importance of identifying agency-wide performance indicators, which can be measured by aggregating project level information already captured by the template, is discussed further in Chapter 6. There is also scope for improving management decision making and reporting by including additional project attributes such as the links with the agency’s recently identified core capabilities, the type and source of funding, the agency’s budget allocations, key clients and any specific mandates.

Information communications technology (ICT) strategic framework

2.17 The delivery of Geoscience Australia’s geoscientific and geospatial products and services relies on the effective management of its data and information as well as on the technical and scientific expertise of its staff. In 2008–09, Geoscience Australia expended approximately \$53 million on data acquisition, which is approximately 30 per cent of its annual budget.²⁷ Responsibility for the acquisition and management of data and information is devolved to the respective divisions where the data and information are collected and/or created.

2.18 In 2008, Geoscience Australia developed its *Information Communications Technology (ICT) Strategic Framework for 2008–11*. Within this framework, information management was incorporated into the concept of ICT, in recognition of the integrated nature of information technology, information

²⁷ These are gross figures based on information supplied by Geoscience Australia.

services and information management and the merging of different technologies. The need for a strategic ICT plan was identified as part of the ICT framework. To date, this plan has yet to be developed. An effective strategic ICT plan would also benefit from being aligned with a forward-looking strategic plan.

Strategic information management

2.19 The ICT Strategic Framework recognised that information management had been a devolved and shared responsibility across Geoscience Australia's divisions and support areas. However, the ICT strategic framework did not include any assessment of Geoscience Australia's current information management environment. Consequently, there was little focus on strategies and activities to address current and emerging information management issues, and no business plans to support the framework were developed.

2.20 The importance of information management was recognised by Geoscience Australia in 2003, when it developed a strategic information management plan. The *Strategic Information Management Plan 2003–2008* included an analysis of the difficulties Geoscience Australia faced because of its 'massive information assets and relatively complex information technology environment'. The plan also noted that, following the AGSO/AUSLIG merger in 2001, Geoscience Australia had improved its information management but progress had been disjointed, reflecting the organisational boundaries that existed prior to the merger. Also, information management policies and procedures had not kept pace with the progress of technological change. Therefore 'a more focussed, corporate approach...' was needed.²⁸

2.21 The 2003–2008 plan assigned corporate responsibility for information management to a Chief Information Officer (CIO). This plan was reviewed in 2004 (*Strategic Information Management Plan 2004–2009*). The information management arrangements were then superseded in 2006, following an organisational restructure and the establishment of the Information Services Branch.²⁹

²⁸ Geoscience Australia Internal Document, *Information Management Strategic Plan 2003–2008*, p. 6.

²⁹ The former CIO advised that the intention was to include information management within the responsibilities of the Information Services Branch.

2.22 The former CIO and manager of the Information Services Branch (ISB) advised that, in practice, corporate responsibility for information management had not been fully incorporated into the responsibilities of ISB. Instead, the corporate focus for ISB has been on critical and key information technology infrastructure issues.³⁰ As a consequence, previous information management plans had not been reviewed and no new plans had been developed and implemented.

2.23 Information management was recognised as a core competency to be developed in the current strategic plan. However, like other elements of the plan, progress against this goal was not monitored or reported against after July 2007. At that time, the Executive Board was advised that the information management goal had been achieved. Given the complexity of the information management issues that Geoscience Australia was facing (and continues to deal with) such as the lack of an inventory, devolved information management practices and insufficient storage for data and information, this assessment appears to be premature. Rather, as identified in *Strategic Information Management Plan 2003–2008*, information management requires a greater corporate focus.

Conclusion

2.24 Geoscience Australia's current approach to strategic planning is focussed on its enabling activities. The recent identification of its core capabilities will assist Geoscience Australia to develop a strategic plan that includes a clearer framing of the agency's Annual Work Program within the context of the government's mandates and priorities. Medium to long-term goals for the delivery of geoscientific and products and services could be identified; and an appropriate set of qualitative and quantitative performance measures and targets developed and monitored.

2.25 Geoscience Australia's processes for developing its Annual Work Program are generally sound. However, management reporting of the Annual Work Program could be improved by including project budgets and measurable performance indicators. It would also be good governance practice for the agency to formally record, but not necessarily publish, how it had identified its PBS work priorities, at both division and agency levels.

³⁰ For example, establishing an ICT Task Force and ICT Governance Framework, and developing and delivering the Mass Storage Project.

Geoscience Australia would then be better placed to explain those decisions to the portfolio Minister and the Parliament, if required.

2.26 Although Geoscience Australia has developed an *Information Communications Technology (ICT) Strategic Framework for 2008–2011*, there is a need for a strategic ICT plan, which aligns with the agency's strategic plan. Previous information management plans have not been reviewed and no new information management plans were developed as part of this framework. Dealing with critical information technology infrastructure has taken precedence over information management. Geoscience Australia continues to have information management issues and devolved data management practices. Developing a separate strategic information management plan, at least in the short term, would enable Geoscience Australia to properly identify, prioritise and resource its information management requirements.

Recommendation No.1

2.27 To improve its strategic planning, the ANAO recommends that Geoscience Australia develops:

- (a) a strategic plan that outlines its strategic directions, government priorities, and specific, measurable medium and longer term goals for its research activities, products and services;
- (b) an information communications technology strategic plan that is aligned with the agency's strategic plan; and
- (c) a strategic information management plan that identifies and prioritises information management initiatives.

Geoscience Australia Response:

2.28 *Agree.* Geoscience Australia's Executive Board has revisited its strategic planning processes. A new role/capability statement has already been developed for the agency. This Statement will inform the update of our strategic planning information.

2.29 Additionally, an ICT Strategic Plan aligned with the Capability Statement and evolving GA strategic plan will be completed by 1 April 2010. Along with the Product Delivery Enhancement Program, it will cover all of the strategic information management issues.

Risk management

2.30 Risk management, particularly the identification, assessment and management of risks, supports effective strategic planning. In July 2008, Geoscience Australia's Executive Board approved a risk management policy statement, which 'defines the relationship between the agency's risk management philosophy, process and procedures'. The ANAO reviewed the following components of this framework, which is monitored by the agency's Audit and Risk Committee:

- an enterprise risk management (ERM) template, which identifies the agency level (termed 'first order') risks the Executive Board considers need to be managed;
- additional risk management practices required at the project management level; and
- an internal audit program, which addresses key governance issues, including risk management.

Agency level risk management

2.31 The Executive Board identified the following three first order agency-level risks for 2008–09 and 2009–10:

- loss of trust of the minister;
- loss of agency relevance; and
- loss of reputation.

2.32 These first order risks are captured in the ERM template. Each division is required to augment these first order risks with the (second order) risks applicable for their particular contributions to the agency PBS outcome. The divisions are then required to take all identified risks (which constitute their overall risk profiles) into account when developing and implementing risk mitigation strategies as part of their operational planning. In addition, these risk profiles and mitigation strategies are to be reviewed at least quarterly.

2.33 The ANAO examined a range of Audit and Risk Committee, division and project level documents for 2008–09 to determine whether the ERM template had been used across the agency as directed by the Executive Board. In particular, the Audit and Risk Committee has been proactive in ensuring the divisions were complying with this direction. Also, the guidance materials for

staff on the application of the ERM template are well signposted on the agency's Intranet and generally up to date.³¹

Business continuity planning

2.34 The Audit and Risk Committee's charter includes responsibility for 'reviewing whether a sound and effective approach has been followed in establishing business continuity planning arrangements'. However, the ANAO was advised this responsibility does not include identifying the need for, and directing the subsequent development of, particular business continuity plans (BCPs), which is a divisional-level responsibility. In November 2009, Geoscience Australia advised that it has established a Business Continuity Management Committee to oversee this function.

Project level risk management

2.35 Geoscience Australia's Intranet provides staff with a comprehensive set of internally and externally produced guidance materials for managing the project-level risks associated with the delivery of geoscientific products and services. This guidance clearly conveys to staff the importance of incorporating risk identification, assessment, mitigation and monitoring into project management practices. However, as discussed in Chapter 4, these requirements have not been implemented consistently across divisions.

2.36 The guidance materials include a generic six-step risk assessment treatment (RATS) template, which has to be completed for all projects. Five generic adverse outcomes, termed areas of impact, provide the focus for identifying, assessing and mitigating project delivery risks. Alignment of the RATS areas of impact and the ERM first order risks is not explicit. The usefulness of the RATS could be enhanced by improving the alignment of the areas of impact and the agency's ERM first order risks.

Program of internal audits

2.37 The ANAO reviewed the Audit and Risk Committee's charter, minutes and related documents for the period since 2005–06. The ERM template provides a key reference point for the development of the agency's three-year rolling program of internal audits. More generally, the agency's program of

³¹ The Executive Board updated the 2009–10 ERM template in February 2009 but it was not formally signed off and promulgated to staff until the end of May. By contrast, the divisions commenced developing their annual work programs in March.

internal audits has been framed, implemented and documented to a high standard. As far as its charter allows, the Audit and Risk Committee has been proactive in ensuring internal audit recommendations are acted on across the agency.

Conclusion

2.38 Geoscience Australia's risk management framework is robust and the Audit and Risk Committee has been proactive in ensuring staff understand the importance of implementing it. However, as discussed later in the report, implementation by the divisions has not always been carried out at the project level.

2.39 The Enterprise Risk Management template provides project team members with an agency-level perspective on the range and type of risks they should take into account when designing, managing and reporting on their projects and activities. In addition, staff have been provided with comprehensive guidance material for managing project-level risks, including a Risk Assessment Treatment template. Greater alignment between the structure of the templates would improve their usefulness.

3. Managing Data and Information

This chapter discusses the management of a number of Geoscience Australia's data and information holdings and physical collections.

Introduction

3.1 Geoscience Australia's stewardship role includes the acquisition and management of its data and information on behalf of the Australian Government. This means ensuring that comprehensive, accurate and credible information is available as appropriate for use and re-use.³²

3.2 Geoscience Australia's predecessor agencies created and inherited material generated through their scientific, surveying or mapping activities.³³ These include legacy data holdings, such as analogue files, paper files or data and reports on visual media (CDs and DVDs). Geoscience Australia's physical collections include the: Commonwealth Paleontological Collection; Thin Section collection³⁴, rock sample collection; and mineral collection.³⁵

3.3 As part of its normal operations, Geoscience Australia adds to its existing data holdings and refines existing data. For example, for the Australian surface geology dataset, Geoscience Australia used its existing datasets and states' and territories' maps to recast them to a resolution of 1:1 million. Similarly, the 2009 Australian bathymetric and topography grid was based on existing data holdings. New data was collected and older data corrected to provide a new and more refined dataset.

³² Department of Finance and Deregulation, *Why Do We Need An Information Interoperability Framework?* [Internet] Canberra, April 2006, p. 2. <<http://www.finance.gov.au>> [Accessed on 21 July 2009].

³³ For example, Geoscience Australia has a large collection of aerial photographs, some from surveys undertaken in 1938, and scientific reports from the 1940s.

³⁴ The Thin Section collections are microscope-scale observations obtained from polished and transparent, thin sections of rocks.

³⁵ The extent to which these other physical collections are documented and managed was not assessed by the ANAO.

Key elements of information management

3.4 To assess how effectively Geoscience Australia acquires and manages its data and information, the ANAO based its examination of the agency's practices on the following key information management elements (also illustrated in Figure 3.1):

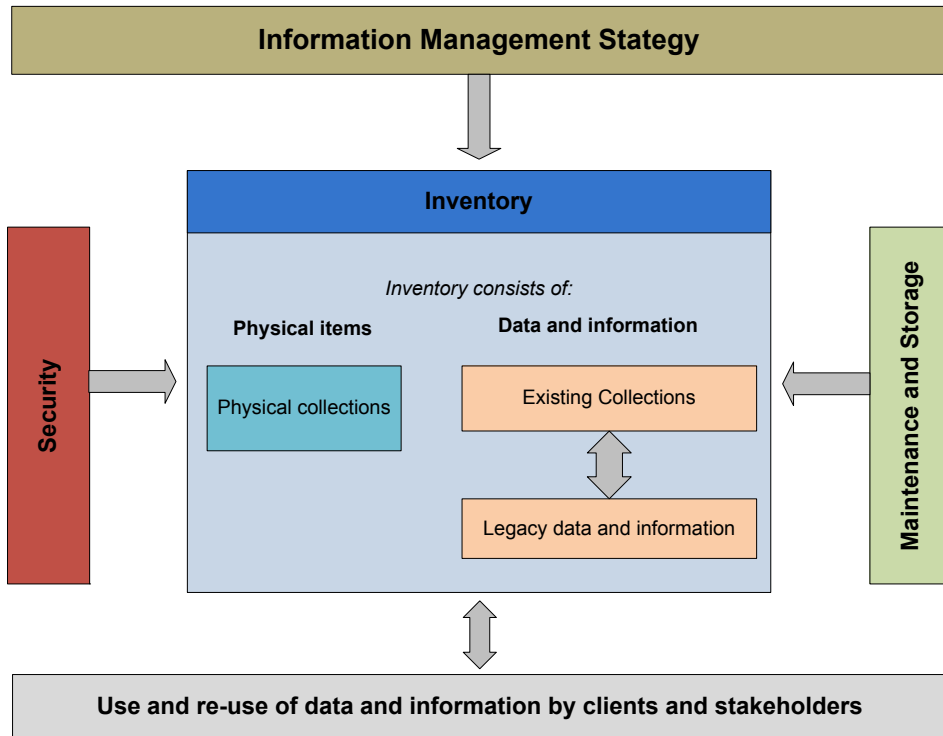
- acquisition of new data;
- documenting data and information holdings in an inventory;
- appropriately maintaining and storing data and information;
- maintaining data security; and
- making data and information accessible.

Information management for Geoscience Australia means knowing: what its data and information holdings are, including physical collections; appropriately maintaining and storing data and information; and making the data and information accessible.

3.5 The first four elements are discussed in this chapter. Accessibility of data and information is discussed in Chapter 5. The ANAO examined the following datasets: bathymetry; topography; satellite archive; onshore seismic; Australian surface geology; Petroleum Data Repository; and the seismology network. A description of these datasets and the respective collection methodologies are contained in Appendix 3.

Figure 3.1

Key elements of information management



Source: ANAO

New data acquisitions

3.6 Geoscience Australia acquires its new data through:

- direct collection, that is using field staff;
- third parties, who collect specific data as part of a contractual arrangement;
- gathering existing data through agreements, joint projects or via the Internet; and
- purchasing data.

3.7 For example, new data is acquired for the Petroleum Data Repository when petroleum exploration companies lodge data, information and samples with Geoscience Australia, as required by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

3.8 Quality assurance processes were in place for each type of dataset reviewed by the ANAO. These processes were governed by standards or generally accepted methodologies, which assist in ensuring that the quality of the data is maintained. Where appropriate, work instructions dictate the quality assurance approaches to be used. For example, for the surface geology dataset, corporate work instructions detail the quality testing procedures.

3.9 The development of metadata³⁶ is also part of the quality assurance process for data that is to be made available through the Geoscience Australia website. The ANAO noted that quality assurance and the development of metadata is only applicable to current acquisitions. Existing and legacy data holdings may not meet current quality and metadata standards. As a corporate initiative, Geoscience Australia also introduced a Single Point of Truth (SPOT) process for datasets.³⁷ The SPOT process is discussed further in paragraphs 3.26 to 3.28 and had been applied in part to two of the datasets examined.

Documenting data and information

3.10 The first step in managing data and information is knowing its purpose, extent and nature. This is essential for ensuring adequate storage, security and accessibility. In addition, information about a dataset and its relative importance and use adds value to the dataset and also assists in ensuring that it is appropriately maintained, stored and archived. Geoscience Australia has not documented the extent of its existing and legacy data holdings. Without an inventory of its data and information holdings and physical collections, it is difficult for Geoscience Australia to demonstrate a clear understanding of its holdings or that they are being properly managed.

3.11 Geoscience Australia provides instructions to staff on the importance of managing data and information through its *Chief Executive Instruction (CEI) No. 38 Information Management*.³⁸ CEI No. 38 sets out the requirements for an information plan for every project or operational activity that produces an information output. There were no information management plans for the sample datasets examined by the ANAO.

³⁶ Metadata is data about data which facilitates its discovery through search engines as well as assisting in identifying it and describing the limitations of the data.

³⁷ A SPOT is defined as a dataset that is authentic, authoritative and accurate.

³⁸ Introduced in May 2007.

3.12 The ANAO was informed that an attempt was made to prepare formal information management plans in 2007–08 but these plans are no longer completed. The template used for the information management plan was technical rather than business or information management focused. Although technical aspects are important, data and information management planning should also take into consideration other key questions, including:

- the risks associated with the data. For example, if lost can the data be replaced or recaptured?
- how important is the data to Geoscience Australia’s business?
- what is its nature, static or dynamic?
- what is its source (raw or manipulated data)?
- if data is captured in the field, what plans are there to ensure that it is transferred to Geoscience Australia’s preferred storage media?
- how long will the data be maintained online?
- is the data to be made available to the public?
- where will it be stored? and
- will the data need to be archived?

3.13 Geoscience Australia advised that CEI No 38 is currently being revised. The information management points raised in this report could be considered as part of this review. Monitoring the implementation of this revised CEI will reinforce the importance of information management planning as well as contribute to documenting Geoscience Australia’s data and information holdings, that is, an inventory. Better information management planning would also facilitate the development and implementation of a minimum standard across the organisation for the collection of data and information.

3.14 When Geoscience Australia has documented its collections, consideration could be given as to how the various collections are to be treated from a financial accounting perspective.³⁹

³⁹ Some of Geoscience Australia’s data and information holdings may fall under the Australian Accounting and Assurance Standards’ criteria for intangible assets, including internally generated software. The physical collections may come under the classification of heritage and cultural assets.

Maintenance and storage of data and information

Maintenance of data and information

3.15 Data maintenance is the process applied to data, and the media it is stored in, to keep it relevant and useable. This may include:

- applying corrections to a dataset as a means of maintaining its accuracy and usability;
- copying data to new media so that it can be read by contemporary software; and
- digitising paper records so that they can be preserved for future reference as well as searched electronically.

3.16 Data that are actively being used by Geoscience Australia staff are maintained, either through checking the consistency of existing data or through quality assurance processes as new data are added. However, datasets that are no longer used, and whose custodians have moved on to other projects, may remain on corporate systems with little information available to ascertain their importance or to assist in deciding whether the datasets should be archived.

3.17 There are data and information holdings on paper, CDs and DVDs, or in analogue format that are yet to be fully assessed by Geoscience Australia to determine whether these records should be maintained and copied to new media, made accessible by incorporating them into existing holdings or archived. Geoscience Australia also has physical collections that require assessment, documentation and appropriate maintenance and storage to allow them to be accessed more readily. The ANAO was advised that each division has an unknown quantity of legacy data that has yet to be documented and assessed.

3.18 A cost-benefit approach, that is based on the importance and priorities of the data and information for Geoscience Australia, could be applied to the assessment of legacy data. An assessment of the deterioration of these records and the ability of the data to be recaptured would also help determine their importance and priority. Preparing an inventory will assist in identifying data maintenance requirements because it will identify the purpose, extent and nature of the legacy data holdings.

Storage of data and information

3.19 Information technology enables digital data to be stored for immediate and later use or for back up and storage. Currently, Geoscience Australia has insufficient storage space in its corporate systems to store and back up its data and information holdings. An interim arrangement was implemented in June 2008, which increased the data storage capacity from 20 terabytes to 120 terabytes. A Mass Storage Project is also underway to address storage requirements in the longer term.⁴⁰

3.20 A data profiling process was undertaken as part of the Mass Storage Project. The report on this process stated that Geoscience Australia is currently experiencing data growth well in excess of the average for public and private sector agencies. Its current storage infrastructure was not capable of scaling up to meet the anticipated data growth.⁴¹ It is anticipated that the Mass Storage Project will put in place a scalable and sustainable storage solution. Geoscience Australia's profile report also stated that there are further complexities in understanding and managing Geoscience Australia's data and information. Geoscience Australia allows users to create their own unique file extensions, which has created a larger ratio of unique file extensions compared to traditional automated environments.⁴² Significant file duplication was also detected, consuming storage space and adding to back up costs.⁴³

3.21 The project report noted that it was difficult to quantify the volume of data stored offline, and therefore, not being managed as corporate records. Geoscience Australia estimated that this offline data would increase demand for online data storage by a further 100 per cent. Current management arrangements for the corporate networks means that information held on individual hard drives is not backed up. So while staff are encouraged not to store data on individual personal computer hard drives, at times it is necessary to do so, given the large size of the data files. This practice increases the risk

⁴⁰ The Mass Storage Project is a multi-stage and multi-year process that involves the assessment of Geoscience Australia's current and future data and information storage requirements, evaluation of options, tender processes and ultimately migration to a new storage system. Final transition is expected to be completed in mid-2010.

⁴¹ Internal documents, Geoscience Australia Mass Storage Phase 2 a-Data Profiling-findings report, version 1.00.

⁴² Traditional office automation environments are where data holdings are developed in the MS Office products, with file extensions such as .doc, rft, and xls.

⁴³ The report estimated 10 798.85 gigabytes of duplicate files.

that data may be lost if it is not stored on the corporate systems. In addition, practices where data is stored on CDs and DVDs, which are not archival quality storage media, increase the risk of data loss as they are held outside the corporate backup and storage arrangements. The scalable and sustainable storage solution to be delivered by the Mass Storage Project should address these storage problems and associated risks.

Security of data and information

3.22 To be secure, data and information need to be appropriately stored within Geoscience Australia's corporate systems and physical security arrangements. In addition, assessing the relative importance of data and information holdings is a necessary component of disaster recovery and business continuity planning so that business functionality can be restored after an adverse event.

3.23 As already noted, not all of Geoscience Australia's data is held on the corporate systems and there has not been an assessment of the relative importance of its data holdings. At the time of the audit, the IT Disaster Recovery and IT Business Continuity Plans were out of date. The Information Service Branch had recently completed a Business Impact Analysis, which is a precursor to disaster recovery planning. The IT Security Plan was also in the process of being updated (and was last reviewed 2005). Geoscience Australia advised that these documents are expected to be finalised shortly. There would also be benefit in Geoscience Australia reviewing the work practices that allowed these key documents to lapse. For example, ensuring that there is a review date for the documents and allocating responsibility for, and resources to, maintaining the documents.

Physical collections

3.24 The Petroleum Data Repository is a large physical collection that was included in the datasets examined by the ANAO. It contains core cuttings and samples and data tapes from petroleum exploration accumulated over 40 years. Although there has not been a comprehensive stocktake of the Petroleum Data Repository, smaller stocktakes of different elements of the physical collections housed within the repository warehouse have been undertaken. However, there is not a rolling program of stocktakes or a methodology that will provide for an overall assessment of the collections across a five to ten-year period. There is also no reporting structure requiring the condition and status of the physical collections to be regularly monitored.

3.25 The ANAO tested the current inventory management systems in the Petroleum Data Repository for the data tapes and the physical store, which includes core cuttings and samples. The system for managing data tapes was found to be satisfactory. However, the physical store had dual systems for inventory management. One was a card system that originated in the Bureau of Mineral Resources and the other was a more recently developed database. Neither of these systems passed audit testing as a number of the items sampled could not be located.

Initiatives to improve information management

3.26 As part of Geoscience Australia's strategic information management planning in 2003 and 2004, a number of projects were proposed to address information management issues. In 2006, two major information management initiatives were commenced. The Single Point of Truth (SPOT) process and its sister project Discovery and Delivery Toolsets. A SPOT is defined as a dataset that is authentic, authoritative and accurate. The SPOT taskforce was to design and manage the development of the authoritative data sources for all data used and generated within Geoscience Australia. The Discovery and Delivery project was to build applications and toolsets to maximise accessibility to Geoscience Australia data, making it easily discoverable and readily obtainable to staff and clients across the Internet. Some information about these projects was made available on Geoscience Australia's Intranet, however, this information was not maintained and final reports on the projects were not available.

3.27 The SPOT project delivered a set of templates and methodologies, which was one of the project's objectives. The SPOT concept was to be incorporated as part of future projects but was not mandated. The level of take up and implementation of this methodology across Geoscience Australia's divisions was unclear. An evaluation of SPOT's usefulness and an assessment of how widely it has been used for Geoscience Australia's datasets would provide an indicator of the project's value and lessons learned for future information management-related initiatives.

3.28 The Discovery and Delivery Toolkit project encountered problems because of issues with Geoscience Australia's metadata. There were also issues with project delivery involving, among other things, staffing, software and the project's communication strategy. The project has now been subsumed into the new Product Delivery Enhancement Project. This project is to incorporate a

wide range of information management and product-related issues and is discussed further in Chapter 5.

Conclusion

3.29 Geoscience Australia does not know the purpose, nature and extent of all its data and information. It has not documented the extent of its existing and legacy data holdings. Without an inventory of its data and information holdings and physical collections, it is difficult for Geoscience Australia to demonstrate a clear understanding of them or that they are being properly managed. A cost-benefit approach, that is based on the importance and priorities of the data and information for Geoscience Australia, could be applied to the assessment of legacy data.

3.30 Although it has effective processes for collecting data and information, including quality assurance mechanisms, the planning for information capture is variable. Chief Executive Instruction (CEI) No.38, which requires information management plans to be prepared and approved for all projects producing data and information, has not been effectively implemented. Updating CEI No. 38 to reflect both technical and information management principles would assist Geoscience Australia to account for and document its holdings. The information management plans will also provide a corporate standard for collecting new data and information.

3.31 Geoscience Australia does not have sufficient capacity in its corporate systems to back up its data and information. To address this shortfall, Geoscience Australia has initiated a project to provide additional corporate storage. Preparing an inventory, assessing and prioritising data maintenance requirements, particularly for legacy data, and effectively managing its information management projects to achieve the expected outcomes will help to ensure that data maintenance and storage processes are identified and properly managed.

Recommendation No.2

3.32 To provide a basis for the effective management of its data and information and physical collections, the ANAO recommends that Geoscience Australia:

- (a) prepares an inventory of its data and information and physical collections; and
- (b) undertakes an assessment of its legacy data to prioritise maintenance, storage and archival requirements.

Geoscience Australia Response:

3.33 *Agree.* Geoscience Australia recognises the importance of the effective management of its data, information and physical collections. This is now clearly articulated in our revised agency Capability Statement.

3.34 Geoscience Australia's Product Delivery Enhancement Program, which commenced some six months ago, will address these complex issues. We anticipate that full implementation of the program will take several years.

4. Delivery of Services and Development of Data Products

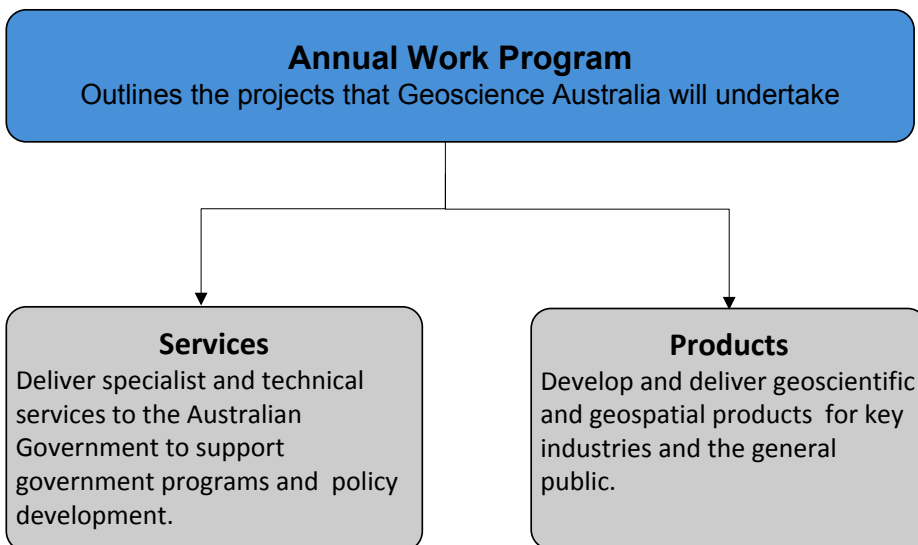
This chapter discusses whether Geoscience Australia is delivering services and products to its clients and stakeholders to a quality standard and within allocated budgets and timeframes.

Introduction

4.1 Geoscience Australia provides technical advice to government agencies and delivers data and information products to industry and the public. As outlined in Chapter 2, the Annual Work Program sets out the projects it will undertake to deliver services to government agencies, the products it will produce, and the scientific research it will conduct. Figure 4.1 shows the relationship between Geoscience Australia’s Annual Work Program and its products and services.

Figure 4.1

Geoscience Australia’s Annual Work Program outputs



Source: ANAO

Geoscience Australia's products and services

4.2 Geoscience Australia currently has 15 direct service delivery relationships with Australian Government agencies, including its portfolio department, RET, which is a significant user of Geoscience Australia's services.⁴⁴ The funding for these services is through budget appropriations and from the agencies themselves; providing approximately \$10 million in revenue per annum.⁴⁵ Also, Geoscience Australia produces datasets and information (products) for a broad customer base including:

- petroleum and minerals exploration companies;
- geospatial industries including, mapping companies, GPS providers and logistics companies;
- researchers, students and teachers;
- other government departments; and
- the public.

4.3 The ANAO examined a sample of seven services and four products outlined in the 2008–09 Annual Work Program to determine whether Geoscience Australia:

- develops clear objectives, plans and milestones for projects, including establishing appropriate agreements with client agencies to define requirements and standards of service;
- delivers projects within agreed timeframes and budgets; and
- evaluates the usefulness of its services and products.

The ANAO's sample was selected to represent a cross section of Geoscience Australia's activities, types of clients and size of projects and is outlined in Table 4.1.

⁴⁴ Geoscience Australia also provides services to state and territory governments. A list of all Australian Government clients is outlined in Appendix 4.

⁴⁵ Based on figures for 2008–09.

Table 4.1

Services and products examined by the ANAO

Product/Service	Cost of service	Partners, Clients and Stakeholders	Funding
Services			
Satellite Mapping for the International Forest Carbon Initiative	\$3.9 million over 2 years	Department of Climate Change	Funded by client
Carbon dioxide capture and geological storage advice to government	\$11 million over 5 years	Department of Resources, Energy and Tourism	Funded by Geoscience Australia appropriations
Australian Tsunami Warning System (ATWS)	\$14.8 million over 4 years	Bureau of Meteorology Attorney-General's Department	Funded by Geoscience Australia appropriations
Border Protection Command satellite identification trial	\$91 800	Australian Customs and Border Protection Service	Funding shared
Advice to government agencies on sea boundaries	\$273 000 per annum	Attorney-General's Department Australian Fisheries Management Authority	Funded by Geoscience Australia appropriations
Inundation modelling for the West Australian coast	\$360 000 over 4 years	The Western Australian Government	Funded by client
Petroleum acreage release project	\$1.26 million per annum	Department of Resources, Energy and Tourism	Funded by Geoscience Australia appropriations
Products			
Revision of the bathymetric grid	\$410 000 over 4 years ¹	State and territory governments Petroleum exploration companies Recreational fisherman	Funded by Geoscience Australia appropriations
The 1:1 million Australian surface geology map	Unknown project spans 9 years	Geologists The mining industry	Funded by Geoscience Australia appropriations
The mines atlas	\$506 000 over 2 years	The mining industry	Originally funded by clients but now funded by appropriations
Seismic acquisition program	\$11.2 million over 5 years	Mining exploration companies	Funded by Geoscience Australia appropriations

Note 1: Based on salary figures only.

Source: ANAO

Project planning and management

4.4 Geoscience Australia's Annual Work Program project template requires a brief project description, project outcome(s), and has tick boxes to link the project to the agency's KPIs and relevant PBS priorities, although these are not identified. Resources are allocated through a separate internal budgeting system, however, the total costs of each project are not included in the Annual Work Program.

Project planning

4.5 Geoscience Australia's project management guide outlines the organisation's policy and requirements for managing projects, including:

- developing a project plan and information management plan; and
- identifying the:
 - purpose, outcomes, outputs, key risks and estimated cost of the project;
 - strategic alignment for the project with division and branch business plans;
 - project's key stakeholders and their requirements, including customers who receive direct benefits from the project; and
 - evaluation strategy for the project, such as time, cost and quality performance measures.

Geoscience Australia also advised that, when undertaking information technology projects, the Prince 2 project management methodology is used.⁴⁶

4.6 While Geoscience Australia has developed guidelines and methodologies to assist in project and risk management, for the services reviewed by the ANAO, the level of project planning and compliance with Geoscience Australia's project management guidelines was variable. In eight of the 11 projects examined by the ANAO, the information in the Annual Work Program was the only formal project management documentation available.

⁴⁶ According to the Prince 2 foundation website <www.prince2.com> PRINCE 2—PRojects IN Controlled Environments—is a process-based method for effective project management. It is a de facto standard used extensively by the UK Government and is widely recognised and used in the private sector internationally.

This was particularly evident for internally developed products and where services were being provided without an agreement being in place. While the details in the Annual Work Program capture the requirements of the guidelines at a broad level, they are more of a project description than a detailed project management plan.

4.7 Geoscience Australia has suitable project management policies and guidelines in place but these are not supported by training for staff in the specific guidelines applicable to their projects. Such training would assist staff to understand when project management guidelines and policies apply to their work and what activities fit within the definition of a project. From the sample reviewed, there was a lack of clarity over what projects were ‘real projects’ (that is, well defined activities with a specific objective and timeframe) and what activities were ongoing or program-focussed. For example, the advice areas examined—carbon capture and storage and marine boundaries—had numerous small requests from multiple clients rather than a major deliverable.

4.8 During the latter stages of the audit, the Australian Government Information Management Office (AGIMO) conducted a pilot Portfolio, Program, and Project Management Maturity Model (P3M3) review of Geoscience Australia. The AGIMO study also highlighted the need for ongoing project management training, noting that a risk for Geoscience Australia was that many of its staff with strong project management skills were contractors. In addition, the AGIMO P3M3 study suggested that Geoscience Australia could better differentiate between projects, programs, and business as usual activities.

Establishing agreements

4.9 A key element of project planning is ensuring that appropriate documented agreements are developed for the services provided to external agencies and that these agreements include project objectives, resources, timelines, milestones and quality standards.⁴⁷ It is also important to define the roles and expectations of the service provider and the client. The National Collaboration Framework (NCF) is the Australian Government’s guideline on how government agencies should interact with other agencies. It provides a tiered approach to developing agreements and guidance on managing the

⁴⁷ As data and information products are developed for general consumption, specific agreements are not necessary.

governance, legal, financial, business rules and technical aspects of relationships between agencies. The tiers of the framework represent the levels of involvement between agencies—from an in-principle agreement through to detailed project agreements. As a minimum, the guidelines outline that agreements should establish:

- what is to be delivered, including the level and quality of services;
- the responsibilities of all entities;
- the funds to be contributed by each entity;
- the nature of the relationship;
- how the risks to delivery will be managed and shared; and
- who will control intellectual property rights.

4.10 Three of the seven services examined by the ANAO⁴⁸ had a formal arrangement in place through a Memorandum of Understanding or contract with its client.⁴⁹ For two projects, the NCF was used as the basis for developing the agreements between the two agencies and schedules for the projects were included. For the inundation project, Geoscience Australia used a collaborative research agreement.

4.11 For the remaining four services, the relationship with client agencies were not as clear. Project planning material consisted of internal work flow documents and the Annual Work Program. There were no project plans, information plans, strategies for future delivery or clearly articulated quality measures. The risks associated with providing the service had also not been assessed.

4.12 Geoscience Australia's most significant relationship, with RET, is predominantly informal. For example, for the Petroleum Data Repository and the petroleum acreage release product there is no agreement or service standards set between RET and Geoscience Australia. The acreage release product, which is a major output for Geoscience Australia each year, is managed through a timeline schedule agreed by the two agencies. This

⁴⁸ The Australian Tsunami Warning System (ATWS), the International Forest Carbon Initiative (IFCI) project and the Western Australian inundation modelling project.

⁴⁹ Because Australian Government agencies are part of the same legal entity, they cannot enter legal agreements with each other and therefore use other agreements such as MoUs to manage their relationships.

schedule outlines the dates for activities to be completed but it does not outline the quality standards to be met, the expected budget or the outcomes for the project. A more effective arrangement would be to use the NCF to establish an agreement, incorporating key project management fundamentals, such as budget, objectives, roles and responsibilities, milestones and key performance indicators.

Costing services

4.13 Understanding the costs involved in providing a service, regardless of whether it is separately funded, is essential for management decision making and the setting of priorities, particularly where there is competition for resources.

4.14 Geoscience Australia has a cost recovery model, based on Department of Finance and Deregulation guidance.⁵⁰ This model outlines the charge-out rates and how to calculate the full costs of a service. Until recently, it was not mandatory for divisions within Geoscience Australia to use this model. In June 2009, the Minister for Resources, Energy and Tourism endorsed these cost recovery guidelines that also include when costs are to be recovered.⁵¹

4.15 For services with no formal agreement in place, the costs associated with the project were not calculated or communicated to client agencies. At the request of the ANAO, Geoscience Australia costed the service component of the acreage release project and the marine boundaries advice area. For the acreage release project, costs were spread across multiple areas and these had to be tracked to calculate the full costs. For advice on marine boundaries only part of the responsible group's overall budget was related to service delivery and that proportion had to be identified to calculate the costs involved in the project.

4.16 Where major services are to be provided to client agencies, there would be benefits in Geoscience Australia calculating the costs associated with the project and taking these into consideration when making management decisions about organisational priorities and the allocation of resources. Where

⁵⁰ Geoscience Australia has also undertaken cost recovery reviews as required by the Department of Finance and Deregulation.

⁵¹ The guidelines state that cost recovery should be sought in instances where Geoscience Australia provides a service that is not core to its business. The pricing policy also states that Geoscience Australia can choose not to charge an agency full costs where there is the potential to develop a new line of business.

a decision is made not to recover the costs associated with major services, costs should still be calculated and included in the project plan.

Managing projects

4.17 For the three services that were externally funded, project plans reflected the requirements of the project management guide and included objectives, budgets, milestones and key performance indicators (KPIs).⁵² Prince 2 methodology was used for the International Forest Carbon Initiative project. There were also sound risk management practices in place. Where milestones existed, these were tracked as the projects progressed and were delivered in accordance with their timelines in the Annual Work Program or formal agreement. Feedback from those clients who contributed funding, indicated that projects were completed on time and within budget.

4.18 As previously noted, there were no project or information plans for the other four services reviewed.⁵³ In addition, for three of the four product projects examined, it was difficult to assess whether they were delivered on time and within budget as there were no scheduled product release dates and the Annual Work Program did not specify milestones.⁵⁴ These were the Australian surface geology project, commenced in 2000, and the update of the bathymetric grid delivered in 2009.⁵⁵ The mines atlas, which previously had strong planning and reporting documentation, has now reverted to the Annual Work Program for its project documentation. For the onshore seismic acquisition program, currently underway, budgets and milestones were both monitored.

4.19 There are extensive internal reporting arrangements to monitor the activities undertaken by Geoscience Australia's project teams. Traffic light reporting for PBS priority projects can signal where a project may be falling behind schedule and remedial action can be taken. This reporting compensates in some way for the lack of extensive detailed project planning. However, the

⁵² Projects included the Australian Tsunami Warning System, Inundation Modeling for the West Australian Coast and the Satellite Mapping for the International Forest Carbon Initiative.

⁵³ These were the Border Protection Command satellite identification trial, advice to government on sea boundaries, carbon dioxide capture and geological storage advice to government, petroleum acreage release.

⁵⁴ These were the revision of bathymetric grid, the 1:1 million Australian surface geology map and the mines atlas.

⁵⁵ The bathymetric grid was last released in 2005.

absence of milestones and KPI's for most of the projects examined limits Geoscience Australia's ability to assess the success of these projects.

Conclusion

4.20 Geoscience Australia's project management guidance outlines the requirements for effectively managing projects. However, these have not been implemented consistently across the organisation. Broader implementation of the guidelines, supported by ongoing training, would enhance Geoscience Australia's management of its projects.

4.21 Where there was a formal agreement in place, Geoscience Australia delivered its services on time and to the specifications of the client agency. However, for a number of the service projects examined, there were only informal agreements between Geoscience Australia and its clients, which has led to varying approaches to managing client services and projects. Establishing formal agreements with key clients would provide a clearer understanding of roles and responsibilities, project costs, outcomes and quality of service. There would be benefit in Geoscience Australia reviewing its government agency relationships and, for those relationships where key government programs and outcomes are involved, developing an appropriate agreement based on the National Collaboration Framework guidelines.

4.22 For some of the major service projects examined, services were not properly costed by Geoscience Australia. Calculating the costs of services regardless of whether they are to be cost recovered will assist management decision making, the setting of organisational priorities and allocation of resources, particularly where there is competition for limited resources.

Recommendation No.3

4.23 To provide a clear understanding of roles, responsibilities, the standard of services to be delivered and reporting requirements, the ANAO recommends that Geoscience Australia:

- (a) establishes formal arrangements, such as a heads of agreement or Memoranda of Understanding with each major Australian Government agency client, including the Department of Resources, Energy and Tourism, where such arrangements do not already exist; and
- (b) documents the costs of major services delivered.

Geoscience Australia Response:

4.24 *Agree.* As noted in the ANAO's report, agreements with several of Geoscience Australia's key stakeholders already exist. We will continue our efforts to establish formal agreements with all of our major Australian Government clients. We are pleased to advise that we have recently completed an MOU with the Department of Resources, Energy and Tourism related to carbon capture and storage.

4.25 Geoscience Australia's existing performance reporting systems are being enhanced to capture the costs of major services delivered. This enhancement will provide an important additional perspective to Geoscience Australia's Executive Board for the effective management of the agency.

Measuring the success of products and services

4.26 Obtaining feedback, undertaking formal project reviews and reporting internally against performance measures and outputs will enable Geoscience Australia to assess whether it has provided effective services and products to its government clients and, more broadly, to the community. Without adequate performance information, the success of projects cannot be assessed. Measuring performance is discussed further in Chapter 6.

Evaluating the services provided

4.27 Of the 11 projects examined, four had been evaluated either by Geoscience Australia's Chief Scientist or the client agency. These projects were:

- the Western Australia coast inundation modelling, where Geoscience Australia developed a model to calculate the impact of a tsunami on selected areas in Western Australia;

- the Border Protection Command satellite identification trial, where Geoscience Australia used satellite imagery to detect bow waves of ships in Australian waters;
- the Australian Tsunami Warning System, where Geoscience Australia implemented the 24 hour seven day a week service and the associated additional seismographs and other communications equipment; and
- the mines atlas, which is an online access tool to assist in providing information on mining activities and mineral deposits in Australia.

Overall, the evaluations determined that projects had achieved their respective goals and the reports contained assessments of the value of the projects.

4.28 The Chief Scientist evaluated the WA coast inundation modelling project, examining the deliverables and the key impacts of the project.⁵⁶ The evaluation report noted that the project was an Australian first and had delivered a model to assist in emergency management planning that could be used Australia wide. The evaluation also highlighted the effectiveness of Australian and State governments in sharing resources and information to deliver projects.

4.29 The remaining three evaluations were conducted jointly with clients:

- the evaluation of the Border Protection Command Satellite Identification project concluded that the trial was successful. It was able to demonstrate that radar satellites, in wider resolution modes, can successfully detect many types of vessels in Australian waters and could be a viable option for future trials. The review also noted that Geoscience Australia's 'professionalism, cooperation and assistance were of the highest order';
- the ATWS project was tested and evaluated in June 2009 through the exercise Ausnami by the Attorney-General's Department. The evaluation found that the system was effective and able to detect and verify tsunami threats within 30 minutes; and
- the evaluation of the mines atlas focussed on completion of the goals of the program. The evaluation included information on uptake of the

⁵⁶ The evaluation also considered the broader tsunami risk modelling activities that GA undertakes but focussed on the WA inundation modelling project.

atlas though web statistics and feedback but did not comment on the overall impact of the product.

4.30 The Chief Scientist generally evaluated the scientific value of Geoscience Australia projects. However, this position is now part time with no support staff. As a consequence, these evaluations are no longer being conducted. Given the benefits that can be gained by evaluating projects, the ANAO suggests that Geoscience Australia consider continuing an independent review function, at least for major and innovative projects, either through the Chief Scientist position or from other areas across the organisation.

4.31 For data and information products downloaded from the website, Geoscience Australia surveys clients and seeks their feedback on the usefulness of the products supplied. This user survey is discussed further in Chapter 5. Stakeholder consultation and client surveys could also be used to evaluate the usefulness of services provided and whether they have met expectations.

Client and stakeholder feedback

4.32 Currently, Geoscience Australia receives ad hoc feedback from its stakeholders and clients but does not regularly seek formal feedback. The ANAO consulted stakeholders and government clients to gain an appreciation of whether Geoscience Australia's products and services were meeting their needs. The stakeholders consulted included major minerals, petroleum and spatial industry bodies, geoscientific professional organisations and Australian and State government agencies.⁵⁷

4.33 Generally, government agencies commented that the services provided were both valuable and necessary for them to undertake their activities. For example, the Attorney-General's Department advised that Geoscience Australia's contribution to mapping the continental shelf was essential and world class. In addition, it indicated that without Geoscience Australia's assistance the outcomes of government initiatives could not have been achieved.

4.34 Overall, feedback from major industry and professional association stakeholders rated Geoscience Australia's performance highly. These

⁵⁷ Their views were sought on Geoscience Australia's performance regarding customer service, data collection, and data accessibility and pricing.

organisations considered that Geoscience Australia had a very good understanding of their industry and their members obtained considerable commercial benefits from its data and information products. Geoscience Australia was very responsive, budget constraints permitting, to requests for further data and information. Informal meetings and phone contact with Geoscience Australia staff were highly valued by stakeholders. Geoscience Australia's performance in delivering pre-competitive advice to the petroleum industry and recent initiatives such as the 250,000:1 scale map data were highly regarded. Several associations also considered there were gaps in the agency's current range of products and services. For example, comments suggested that there was a need for more detailed up-to-date maps (at the 100,000:1 scale), and for further development of geothermal databases. Funding constraints were acknowledged to be a major limitation to Geoscience Australia providing these products.

Conclusion

4.35 Feedback sought by the ANAO from key stakeholders and clients indicated that the products and services Geoscience Australia delivers are valued and, in many cases, necessary to delivering government programs and developing policy. Four of the projects examined by the ANAO were also evaluated for their scientific value and quality. These evaluations generally noted that projects had achieved their respective goals. Continuing to evaluate the quality of the services and products will enable Geoscience Australia to measure and report the success of projects and incorporate any lessons learned into future projects.

5. Client Access to Data and Information Products

This chapter discusses the accessibility of Geoscience Australia's data and information products for its major stakeholders and the general public. The Australian Government's policy on access and pricing of data is also discussed.

Introduction

5.1 The increased use of geospatial data and geoscientific information both in the government sector and in the broader community is driving demand for access to data and improved interoperability of data.⁵⁸ The *Australian Spatial Data Pricing and Access Policy 2001* (SDAP) specifies what spatial data is to be publicly available and the price to be charged for this information.⁵⁹ The principle underlying this policy is to maximise the benefits to the community from increased access to spatial data. In addition, there are government initiatives to increase the availability of non-sensitive information⁶⁰ to the public, and AGIMO provides guidance to agencies to facilitate appropriate access to information holdings.⁶¹

5.2 Geoscience Australia has in excess of 32 000 individual products that it distributes to industry and the general public.⁶² These products include raw data, maps, research publications, images, interpreted data and tools to display or download data. Only a small proportion of Geoscience Australia's overall budget revenue is from the sale of products. In 2008–09, around \$2.5 million (some two per cent of its overall appropriation) was received from the sales of standard and custom data and products.

⁵⁸ Interoperability refers to the ability of data to be read, manipulated and used by multiple software applications.

⁵⁹ The Office of Spatial Data Management, within Geoscience Australia, is responsible for promoting and monitoring this policy.

⁶⁰ Non-sensitive means data that is not affected by privacy or security constraints.

⁶¹ Department of Finance and Deregulation, *Why Do We Need An Information Interoperability Framework?* [Internet], Canberra, April 2006, p. 20. <<http://www.finance.gov.au>> [accessed 30 October 2009].

⁶² The products and data provided though the petroleum data repository are not included in this figure.

5.3 To assess whether Geoscience Australia is providing effective access to its data and meeting the expectations of its stakeholders, the ANAO examined a sample of eight datasets⁶³ and assessed whether Geoscience Australia's data and products were:

- accessible, including being:
 - easily discovered through Geoscience Australia's website and promoted to customers; and
 - available to the public.
- priced in accordance with Commonwealth data pricing policies.

Accessibility of data and products

Distribution

5.4 Products are distributed by one of three areas within Geoscience Australia, which operate independently of each another:

- **the sales centre**—distributes the majority of Geoscience Australia's physical products (reports, CDs, DVDs and maps) and manages an online catalogue of products. The sales centre distributed products for six of the areas examined;
- **the satellite imagery section**—distributes satellite imagery data and images, predominantly custom products on request; and
- **the Petroleum Data Repository**—releases data collected under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and other offshore petroleum data held by Geoscience Australia, on request.

5.5 For the eight datasets examined by the ANAO, each had its own approach to displaying and distributing their products. For example, the topography area sells products through the sales centre, has an outsourced distribution network for its maps and has data available for download on the website. The Petroleum Data Repository has an online searchable database and an onsite data room where customers can search current acreage release information.

⁶³ This included the seven data areas examined in Chapter 3: Bathymetry; Topography; Satellite Archive; Onshore Seismic; Australian Surface Geology; Petroleum Data Repository; and the Seismology Network as well as the Mines Atlas—a database of information about Australia's mines and mineral resources.

5.6 Geoscience Australia does not have internal policies that outline how divisions and groups should provide access to their data. The sales centre recently introduced a standardised checklist to manage the release of new products. New products and datasets are advertised through its regular newsletter 'AusGeo news'. However, unlike other information organisations such as the Australian Bureau of Statistics, Geoscience Australia does not publish a product release schedule.

Availability

5.7 The level of access to data and products varied considerably across the areas examined. From the sample, and more generally across the organisation, most of Geoscience Australia's data were available to the general public on request but only some of the products and data were available online. The ANAO identified three key barriers to data accessibility:

- **Information management**—Poor information management has restricted Geoscience Australia's ability to optimise access to its data. While all new data are required to have metadata⁶⁴, for older data, metadata are often inaccurate and need to be reviewed and corrected. Without accurate metadata it is difficult for users to search and access products.
- **Size of dataset**—For particular areas including the onshore seismic, satellite imagery areas and the Petroleum Data Repository, the volume of data are too large to be transferred across the Internet and datasets are better delivered through physical media such as portable hard drives. Providing data manually is both costly and time consuming; and
- **Licensing**—One area examined, bathymetry, indicated that it could not release some of its data as it did not have the appropriate licenses to cover the use of the data. The Office of Spatial Data Management (OSDM) licensing process that is used by Geoscience Australia does not have the ability to restrict the production of derivative products or only allow the non-commercial use of their data. The OSDM licences also

⁶⁴ Metadata is data about data which facilitates its discovery through search engines as well as assisting in identifying it and describing the limitations of the data.

require online registration, which is an additional step and may deter users who are unwilling to register their details.

5.8 Issues with product delivery were also noted in a recent internal review in June 2009. The review identified that only a small proportion (some 14.5 per cent) of Geoscience Australia's data and products were available to the public online. There was also a lack of coordination and governance around product delivery and many products were misclassified in product delivery systems.

5.9 The size of some datasets precludes them from being accessible online as current Internet speeds are insufficient to carry the load. Although it is not practical for Geoscience Australia to make all of its data available online, there is still considerable scope for it to increase its provision of data through the Internet. Geoscience Australia could improve its performance by undertaking an assessment of what data and information it could reasonably make available through its website and develop a target to work towards. Developing a target for how much data and information it makes accessible online and monitoring the extent to which this data and information is accessed by users would provide a basis for measuring improvement.

Geoscience Australia's website

5.10 The Geoscience Australia's website, its key interface with customers, is complex to use, and each of the areas reviewed by the ANAO displayed their products in a different way. The product search application on the website only displayed some of the available products. Feedback obtained by the ANAO from major Geoscience Australia stakeholders indicated that, while staff were very helpful in assisting to locate information, the Geoscience Australia website was not intuitive and information was often hard to locate.

5.11 Geoscience Australian periodic data user's survey for 2008⁶⁵, which is sent to online registered users, indicated that the majority of users, (83 per cent of respondents) found the data was suitable or very suitable for their

⁶⁵ The 2008 survey emailed 3164 individuals that had registered under the 'free data downloads' section of the Geoscience Australia website. The survey had 529 respondents, which is a response rate of 16.7 per cent.

purposes.⁶⁶ However, comments from individual users in the survey also indicated that GA could improve its delivery and accessibility of data.

5.12 While there are problems with displaying and delivering some data, Geoscience Australia has developed tools that enhance public access to particular data. Examples of these online tools are outlined in Table 5.1.

Table 5.1

Online access tools

Tool	Description
Mines Atlas mapping tool	Displays the locations of all the mines across Australia. It allows users to examine the geological and geographical features near mines.
Sentinel	Sentinel is a national bushfire monitoring system is designed to provide timely information about hotspots to emergency service managers across Australia. The mapping system allows users to identify fire locations with a potential risk to communities and property.
MapConnect	MapConnect is an online version of the national map at the 1:250 000 scale. Users can use the tool to produce their own custom topographic maps.

Source: ANAO

5.13 These tools were developed independently of one another yet present similar functionality and display similar layers of data. Geoscience Australia's product delivery review identified that there is substantial duplication in its web applications, with some 105 applications providing access to data. Developing a limited number of data display tools that capture much of Geoscience Australia's available data would reduce the duplication and the costs associated with managing so many applications.

Addressing barriers to accessibility

5.14 To address the current issues with accessibility, Geoscience Australia is undertaking a number of initiatives. These include:

- a Product Delivery Enhancement project;
- the redevelopment of its website; and
- implementing a Creative Commons licensing system.

⁶⁶ 14 per cent responded that it was partially suitable and three per cent rated it either not suitable or did not comment.

Product Delivery Enhancement project

5.15 Geoscience Australia advised that it is developing a business case for a Product Delivery Enhancement project. The proposal aims to align product development to core business strategies; improve product development and release processes; and transform the customer experience to being a simple and dependable activity across all customer interfaces. To achieve this, the proposal for a business case identifies that Geoscience Australia needs to:

- create reliable and user-friendly product delivery and discovery interfaces; and
- implement consistent customer and product delivery management processes, including a Geoscience Australia-wide relationship management system.

5.16 If this project is successful it will address many of Geoscience Australia's current accessibility issues and substantially increase public access to products. As mentioned previously in Chapter 3, a similar project was initiated in 2006; the 'Discovery and Delivery Toolset' project. This project was also to deliver a client focussed web-based searching interface. However, this project did not achieve the expected outcomes and has been rolled into the new Product Delivery Enhancement project.

Redevelopment of the website

5.17 Geoscience Australia initiated a redevelopment of its website in 2007, which identified new information architecture for the website and involved detailed analysis and client consultation. However, little progress was made in delivering the new website because of staff turnover. As a consequence, in July 2009, the project was re-scoped and new resources were dedicated to the project. Currently, the project is one year behind schedule. The business case for the redevelopment project indicated that:

- the website is reaching its used-by date in terms of functional hardware and supporting technology; and
- a lack of coordinated governance for the website has led to it being developed haphazardly, largely from short term requirements rather than taking into account the business value of pages and their true costs and benefits.

5.18 If implemented successfully, the website redesign project should go some way to enhancing the accessibility of Geoscience Australia's data and data products. Simplifying the portal and standardising the presentation of the various areas of Geoscience Australia will enable customers to more easily locate the information that they are looking for. Careful scoping and regular monitoring are required to ensure that this important project achieves results.

Creative Commons licensing

5.19 To address issues with licensing, Geoscience Australia introduced Creative Commons licensing⁶⁷ in November 2009, for all its products. This approach is also used by the Australian Bureau of Statistics and replaces the requirement for users to register (as was the case under the OSDM licences). Findings from a Geoscience Australia trial of Creative Commons indicated that:

- ownership and attribution were dealt with easily and consistently;
- there were no administrative requirements, which saves staff time; and
- it was easy to use and understand from the users' perspective.

The removal of the registration requirement and the consistency of a single licensing system across the organisation should help to improve accessibility.

Pricing of data

5.20 Pricing of data and information can also be a barrier to access. If prices are higher than necessary, customers are less likely to purchase and use Geoscience Australia's products. As previously noted, the Spatial Data Access and Pricing policy (SDAP) specifies the price range that Australian Government agencies should charge for all standard datasets listed on the policy schedule. The policy states that fundamental geospatial data should be priced at the marginal cost of transfer and should be free when accessed over

⁶⁷ According to the Creative Commons website <<http://creativecommons.org/about/what-is-cc>>—Creative Commons is a free online licensing system that allows large companies and institutions a simple, standardised way to grant copyright permissions to their creative work. The Creative Commons licenses enable people or organisations to easily change their copyright terms from the default of 'all rights reserved' to some rights reserved.

the Internet.⁶⁸ The SDAP schedule includes 66 Geoscience Australia's datasets and maps.

5.21 Geoscience Australia offers far more data on its website than is listed on the schedule. From the ANAO's sample, all data areas except the Petroleum Data Repository had items listed on the schedule.⁶⁹ However, the listing of datasets was not comprehensive. Most areas reviewed by the ANAO used the SDAP as the basis for determining prices for standard data products whether they were included on the schedule or not.

5.22 For most hard copy products examined by the ANAO, such as interactive DVDs, and data CDs, Geoscience Australia charges a fee of \$99, which is the maximum identified in the SDAP. While this flat fee makes the pricing of data easy, it may not meet the requirements of the SDAP. According to the spatial data pricing policy, the amount charged cannot be more than the marginal cost of transfer, which includes variable costs such as the media used and time taken to copy each standard product. It is possible that Geoscience Australia's costs and overheads may have changed since the introduction of the SDAP in 2001.

5.23 While the SDAP has guidance on what to charge for physical products, it does not outline how specific organisations, such as Geoscience Australia, should calculate their prices. Geoscience Australia has also not developed any internal guidance for determining prices. To help ensure that it is consistently applying the SDAP across the organisation, it would be timely for Geoscience Australia to review the pricing of its geospatial data and products.

Conclusion

5.24 Discoverability and accessibility of Geoscience Australia's data by key stakeholders and the public could be improved. Currently, only 14.5 per cent of Geoscience Australia's data is available online. While it is not practical to make all of its data and information available, Geoscience Australia could undertake an assessment of what data and information can reasonably be

⁶⁸ The policy also emphasised the need to improve coordination across the government sector and reduce duplication in the creation or purchase of geospatial data by encouraging government agencies to work together. The effective sharing of information is critical to the success of the whole of government outcomes.

⁶⁹ For example, there is only one product for the satellite imagery area, (the Landsat 7 picture mosaic) listed and there are at least five sets of current satellite data that are not listed on the schedule. These included the Landsat 5, Resource Sat 1, MODIS, ALOS and ASTER satellites.

made available online. This assessment could include the setting of targets so any improvements to the accessibility of data and information can be measured. Setting release dates for new and updated datasets and publishing a product release schedule would also facilitate access to data and products.

5.25 Geoscience Australia's Product Delivery Enhancement and website redevelopment projects, if successful, should help to make data and information more easily accessible. It will be important to incorporate the lessons learned from the earlier projects and put in place a sound project management and governance framework for the initiatives.

5.26 It is also timely for Geoscience Australia to review the pricing of products to ensure that they are in line with the Spatial Data Access and Pricing policy. This review could be incorporated into the Product Delivery Enhancement project.

6. Measuring and Reporting Performance

This chapter discusses the way in which Geoscience Australia measures and reports on its performance, including incorporating feedback from clients and stakeholders.

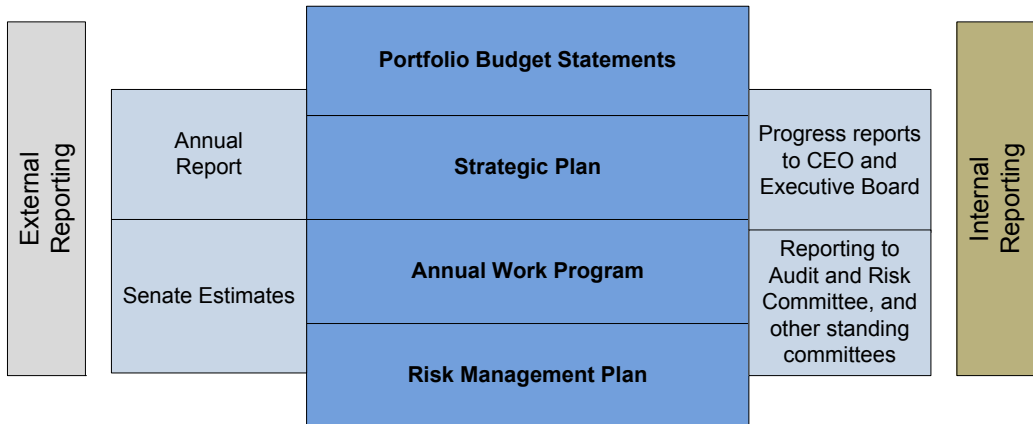
Introduction

6.1 Like other FMA agencies, Geoscience Australia's PBS outcome statement provides a key reference point for the agency's annual reporting of performance to the portfolio Minister and the Parliament. For this statutory reporting, Geoscience Australia relies on the information obtained through its internal reporting processes.

6.2 Geoscience Australia reports to the portfolio Minister and the Parliament through a chapter in the annual report of the agency's portfolio department.⁷⁰ Annual reporting by Australian Government agencies is meant to align with the structure of their PBS, including a high degree of compatibility and a 'clear read' between the performance indicators in these two documents.⁷¹ Geoscience Australia's planning and reporting framework is illustrated in Figure 6.1.

⁷⁰ The Department of Resources, Energy and Tourism has been the portfolio department since 2007–08. The Department of Industry Tourism and Resources was the previous portfolio department.

⁷¹ Department of the Prime Minister and Cabinet, *Requirements for Annual Reports*, June 2009, <<http://www.dpmc.gov.au>>. Geoscience Australia's PBS outcome, KPIs and targets for 2009–10 are slightly different from those for 2008–09. The ANAO considers these differences do not affect the observations made in this chapter.

Figure 6.1**Geoscience Australia's planning and reporting framework**

Source: ANAO analysis of Geoscience Australia information

6.3 In assessing how Geoscience Australia measures and reports on performance, the ANAO examined whether its:

- PBS incorporates key performance indicators (KPIs) and appropriate targets;
- annual reporting to the portfolio Minister and the Parliament is aligned with its PBS outcome;
- internal reporting processes and existing performance information adequately support its statutory reporting obligations; and
- practices for setting and monitoring service delivery standards and obtaining feedback from clients and stakeholders are appropriate.

Measuring performance

6.4 Geoscience Australia could better demonstrate that it is achieving its PBS outcome. The KPIs for the 2009–10, and previous PBSs, are not specific and the performance targets are restatements of the KPIs. Geoscience Australia's current PBS outcome, three KPIs and targets are reproduced in Table 6.1.

Table 6.1

Geoscience Australia’s 2009–10 PBS outcome and key performance indicators

PBS Outcome 2009–10	
Informed government, industry and community decisions on the economic, social and environmental management of the nation’s natural resources through enabling access to geoscientific and spatial information	
Key Performance Indicators (KPIs)	2009–10 Targets
Resource companies’ activities influenced by Geoscience Australia’s research and information products	Evidence that resource companies are utilising Geoscience Australia’s outputs
Government agencies, companies and individuals concerned with environmental management, land use decision making and regional development are influenced by Geoscience Australia’s research and information products	Evidence that government agencies, companies and individuals are utilising Geoscience Australia’s outputs
Government agencies involved in community safety and the protection of critical infrastructure are influenced by Geoscience Australia’s research and information products	Evidence that government agencies are utilising Geoscience Australia’s outputs

Source: Geoscience Australia’s Portfolio Budget Statement 2009–10

6.5 Geoscience Australia has not established any other agency-level performance measures or targets. Although endorsed by the Executive Board, an internal audit recommendation in 2005–06 to formally identify indicators and the information to measure them was not implemented.⁷²

6.6 Reporting would be improved if specific quantitative and qualitative performance measures were identified in the PBS. As the majority of Geoscience Australia’s work is project based, it would be appropriate and feasible for the agency to aggregate the time, cost, client satisfaction and other quality measures at the project level into corresponding agency-wide performance information and targets. Table 6.2 provides examples of how such performance information and targets could improve reporting against current KPIs.⁷³

⁷² Geoscience Australia 2005–06, *Internal Audit Review: Strategic Outputs and Outcomes*.

⁷³ These examples are consistent with Appendix A of Department of Finance and Deregulation, *2009–2010 Budget: Portfolio Budget Statements Constructors Kit, 2009*, <http://www.finance.gov.au/budget/budget-process/docs/2009-10_PBS_Constructors_Kit.pdf>.

Table 6.2

Examples of possible KPI performance information and targets

PBS Key Performance Indicators 2009–10	Possible performance information and targets
Resource companies' activities influenced by Geoscience Australia's research and information products	<p>1. <i>Activity reported for 2008–09:</i> 75 offshore oil and gas acreage release information packages issued</p> <p><i>Possible performance information and targets:</i> comparison with a target number of packages, based on number of potential bidders for new exploration permits; numbers and proportions of bidders and successful bidders using packages; degree of client satisfaction with products and services</p> <p>2. <i>Activity reported for 2008–09:</i> number of updated charts produced for key basins on the northwest margin.</p> <p><i>Possible performance information and targets:</i> comparison with number of charts planned; proportion delivered on schedule and to budget; number of charts used by clients; degree of client satisfaction with products and services</p>
Government agencies, companies and individuals concerned with environmental management, land use decision making and regional development are influenced by Geoscience Australia's research and information products	<p>1. <i>Activity reported for 2008–09:</i> 93 requests for marine boundary advice from Australian Government agencies responded to</p> <p><i>Possible performance information and targets:</i> proportion of requests meeting agreed time frames and budgets; extent to which response met clients' expectations or better</p> <p>2. <i>Activity reported for 2008–09:</i> 1000 satellite images provided to support monitoring of regional deforestation</p> <p><i>Possible performance information and targets:</i> extent to which work met agreed time frames; proportion fully meeting clients' expectations or better</p>
Government agencies involved in community safety and the protection of critical infrastructure are influenced by Geoscience Australia's research and information products	<p>1. <i>Activity reported for 2008–09:</i> 48 potentially tsunamic and 400 earthquakes within continental Australia reported to Attorney-General's Department</p> <p><i>Possible performance information and targets:</i> proportion of reports meeting pre-determined response time targets and quality standards; extent to which responses met clients' expectations or better</p>

Source: ANAO analysis of information in Department of Resources, Energy and Tourism, *Annual Report 2008–09*, Chapter 6—Geoscience Australia (Canberra).

Reporting performance

6.7 Recent annual reports include some project level and service performance targets and information. However, these reports provide only diffuse and fragmented information on Geoscience Australia's delivery of its PBS outcome and KPIs.⁷⁴ An assessment of progress against its Annual Work Program would provide an indication of how effective Geoscience Australia is in delivering its products and services.

Internal reporting

6.8 Geoscience Australia has well-established reporting within the agency. In summary, the:

- divisions and branches provide the agency's weekly senior management team meeting with written progress reports for their parts of the agency's PBS work priorities, which includes a selected number of projects.⁷⁵ These reports also cover other current activities and emerging issues relating to the agency's wider Annual Work Program. Senior management team members report back to their staff on the resulting discussion;
- divisions provide the CEO with monthly and more detailed six-monthly written progress reports for their parts of the agency's PBS work priorities and the Annual Work Program;
- Executive Board receives monthly reports from Standing Committees, the Chief Finance Officer, and also for the critical stages of major geoscience projects; and
- divisions provide the CEO with quarterly written reports on feedback received from clients and stakeholders.

Internal reporting against PBS work priorities and the Annual Work Program

6.9 The standard 'traffic lights' template used by divisions provides a clear and structured summary for the weekly senior management team meetings

⁷⁴ For example, the agency reported that in 2008–09 'seismic and well data loans to industry totalled approximately 189 Terabytes, an increase of 18 per cent over 2007–08'. Clients using these data may appreciate the significance of this increase whereas other stakeholders would benefit from predetermined performance standards or targets.

⁷⁵ The PBS Work priorities for 2009–10 and 2008–09 are summarised in Appendix 2. In 2008–09 there were 14 projects listed and in 2009–10 there are ten projects listed.

and monthly reporting to the CEO on the progress in delivering each of the agency's PBS work priorities.⁷⁶ The traffic lights are also then provided to the Secretary of RET and the Minister. The reporting by the divisions and branches is less clear in summarising the progress of the remaining projects in the agency's Annual Work Program because it lacks a consistent structure and is obscured by a significant amount of detail.

6.10 Geoscience Australia does not systematically collect performance information at the agency level to support the achievement of its KPIs. Reporting by divisions includes qualitative and quantitative performance information (as distinct from a description of activities) for particular projects. As such, it would be possible for Geoscience Australia to develop project based performance information and targets, at both division and agency levels. Where appropriate, this information and targets could be incorporated in Geoscience Australia's internal reporting.

6.11 With very few exceptions, reporting by divisions on progress in delivering geoscientific projects does not incorporate corresponding budget status reports. These two reporting streams are essentially separate within Geoscience Australia. However, the joint reporting of progress in delivering geoscientific products and services and performance against budget would allow more holistic management reporting, at least for the larger projects identified in the agency's PBS and Annual Work Program.⁷⁷ Geoscience Australia currently records variations to project budgets in its Oracle database.

⁷⁶ Six codes are used, ranging from: 1 (target met/output completed) through to 5 (target is very much at risk of not being achieved and 6 (CEO has given approval to no longer pursue delivery of this output). Typically, codes 1 and 2 predominated in the traffic light reports examined by the ANAO.

⁷⁷ For example, present reporting by divisions does not indicate whether a particular project identified in the agency's Annual Work Program is on track to deliver its outputs but is running over budget.

Setting service delivery standards

6.12 Geoscience Australia has a Service Charter which outlines its general commitments to clients and stakeholders.⁷⁸ The Service Charter also states that the agency will evaluate and report annually against the Service Charter standards for its products and services.

6.13 Geoscience Australia's Service Charter is based on the Australian Government's client service charter principles, issued by the Public Service Commission in 2000. Most of Geoscience Australia's publicly available products and services are delivered through a centralised customer service area. Common agency-wide delivery time performance standards (targets) have been established for these products and services. For example, 95 per cent of public orders will be dispatched within three working days from receipt of order. Earth monitoring group (geodesy) has developed additional data quality standards applicable for their particular products and services. Other work areas that experience high levels of demand for data, such as the Petroleum Data Repository and onshore seismic areas, have not developed similar additional data quality standards.

6.14 Geoscience Australia stated in its 2008–09 annual report that all its Service Charter targets were met. However, where targets existed, few of these had been monitored. Only three of the five work areas with specific service standards actively monitored their performance.⁷⁹ When requested by the ANAO to provide details, the other two areas were unable to demonstrate that their charter standards had been met. As noted in Chapter 5, Geoscience Australia periodically seeks feedback from registered users of its geospatial data. It also monitors feedback logged on its website. However, these results are not assessed against Service Charter standards, and are not included in the agency's annual report.

Obtaining client and stakeholder feedback

6.15 Each quarter, the divisions report their client and stakeholder feedback to the CEO. This feedback is mostly informal and ad hoc and is not summarised in Geoscience Australia's annual reports. The annual reports do

⁷⁸ This charter is available on Geoscience Australia's website at <http://www.ga.gov.au/about-us/corporate/service-charter>. A broader discussion of the Service Charter and delivery of client services is contained in Chapter 4.

⁷⁹ The three areas that monitored their service standards were the library, sales centre and web services.

not adequately convey the agency's considerable, and generally highly regarded efforts to consult with and respond to, the needs and expectations of, its major clients and stakeholders (see Chapter 4).

6.16 In addition, the feedback Geoscience Australia obtains is not suitable for assessing either the agency's delivery of the Service Charter or its achievement of the 2006–11 strategic plan's objective to increase influence with clients and stakeholders.

6.17 As previously noted, the ANAO sought feedback from major clients and stakeholders on Geoscience Australia's performance using a standard set of questions. These questions covered the agency's performance regarding customer service, data collection, and the accessibility and cost of its products and services. Geoscience Australia could use a standard set of questions as part of more formal surveys of its major clients and stakeholders. The quantifiable results from such a survey would assist Geoscience Australia in reporting its client and stakeholder satisfaction.

Conclusion

6.18 Geoscience Australia's PBS for 2009–10 does not identify specific performance information or targets for the agency's KPIs and subsequent annual reporting. In addition, Geoscience Australia has not identified, and does not report externally, against any other agency-level performance information and targets. While Geoscience has well-established internal practices (including 'traffic light' reporting) for monitoring its delivery of the agency's PBS outcome and supporting Annual Work Program, its internal reporting also does not incorporate agency-level performance information. As a consequence, Geoscience Australia's annual reporting does not provide a clear and succinct summary of the agency's delivery of its PBS outcome and has the potential to undervalue the agencies' performance.⁸⁰

⁸⁰ Department of the Prime Minister and Cabinet, *Requirements for Annual Reports*, June 2009, states at paragraph 11 that the annual report must include succinct reporting of actual results against the specific performance standards for the outcomes and the outputs set out in the PBS, and 'descriptions of processes and activities should be avoided'. <<http://www.dpmmc.gov.au>>

6.19 Similarly, Geoscience Australia has not been able to adequately demonstrate the extent to which the agency has met the performance standards and targets specified in its Service Charter and Portfolio Budget Statements. To enable it do so, Geoscience Australia could undertake structured regular surveys of client and stakeholder satisfaction and over time track trends and exceptions in service delivery performance.

Recommendation No.4

6.20 To improve its monitoring and measurement of performance, and subsequent annual reporting, the ANAO recommends that Geoscience Australia:

- (a) develops a suite of performance information and targets, which indicate the extent to which the agency is achieving its Portfolio Budget Statements outcome and delivering its Annual Work Program; and
- (b) supplements its current ad hoc client and stakeholder feedback with structured, periodic surveys.

Geoscience Australia Response:

6.21 *Agree.* Geoscience Australia's Executive Board will develop an expanded set of performance information for the 2009–10 Portfolio Budget Statements. This performance information will be a product of the agency's revisited strategic planning processes.

6.22 Structured client/stakeholder surveying is a key element of the Product Delivery Enhancement Program mentioned in our response to Recommendation 2.



Ian McPhee
Auditor-General

Canberra ACT
11 February 2010

Appendices

Appendix 1: Agency response



Australian Government
Geoscience Australia

27 January 2010

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Mr Matt Cahill
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Dear Mr Cahill

Geoscience Australia Audit

Thank you for providing the proposed ANAO Geoscience Australia Audit for comment.

Geoscience Australia (GA) welcomes the ANAO's audit and welcomes the ANAO's overall conclusion that GA is effectively providing geoscientific and geospatial services and products to our stakeholders, that our stakeholders value our work and that our governance framework is sound.

GA accepts the audit recommendations and thanks the ANAO for identifying areas where GA has opportunities to improve. We are pleased to advise that there are processes in place to address all of the recommendations.

GA's detailed response to audit is included in Attachment 1.

Yours sincerely

Dr Chris Pigram
Acting CEO

GA Summary

Geoscience Australia (GA) welcomes the ANAO's audit and welcomes the ANAO's overall conclusion that GA is effectively providing geoscientific and geospatial services and products to our stakeholders, that our stakeholders value our work and that our governance framework is sound.

Since the formation of GA from the amalgamation of the Australian Geological Survey Organisation and AUSLIG in 2001, and becoming a Prescribed Agency, GA has undergone much change. The volumes of data that GA manages are increasing exponentially. Our role in providing technical advice to government agencies across the spectrum of geoscience disciplines has also grown substantially. GA has and continues to respond to these changes by providing quality geoscience to support informed policy decisions. All of the issues identified in the ANAO's report are a reflection of the changing and increasingly complex environment in which we operate.

GA welcomes the opportunity provided by the ANAO's report and its recommendations to focus even more attention on addressing the issues identified and we are pleased to advise that we have a range of processes and programs in place to ensure a positive outcome.

GA would also like to thank the ANAO for the professional manner in which it carried out the audit and for its open, communicative approach to our staff and management.

Recommendation No. 1 Para 2.27	To improve its strategic planning, the ANAO recommends that Geoscience Australia develops:
	<ul style="list-style-type: none"> a) a strategic plan that outlines its strategic directions, Government priorities, and specific, measurable medium and longer term goals for its research activities, products and services; b) an information communications technology strategic plan that is aligned with the agency's strategic plan; and c) a strategic information management plan that identifies and priorities information management initiatives.
Agency Response <i>Agree</i> <i>Geoscience Australia's Executive Board has revisited its strategic planning processes. A new role/Capability Statement has already been developed for the agency. This Statement will inform the update of our strategic planning information.</i> <i>Additionally, an ICT Strategic Plan aligned with the Capability Statement and evolving GA strategic plan will be completed by 1 April 2010. Along with the Product Delivery Enhancement Program, it will cover all of the strategic information management issues.</i>	
Recommendation No. 2 Para 3.32	To provide a basis for the effective management of its data and information and physical collections, the ANAO recommends that Geoscience Australia:
	<ul style="list-style-type: none"> a) prepares an inventory of its data and information and physical collections; and b) undertakes an assessment of its legacy data to priorities maintenance, storage and archival requirements.

<p>Agency Response <i>Agree</i></p> <p><i>Geoscience Australia recognises the importance of the effective management of its data, information and physical collections. This is now clearly articulated in our revised agency Capability Statement.</i></p> <p><i>Geoscience Australia's Product Delivery Enhancement Program, which commenced some six months ago, will address these complex issues. We anticipate that full implementation of the program will take several years.</i></p>	
<p>Recommendation No. 3 Para 4.23</p>	<p>To provide a clear understanding of roles, responsibilities, the standard of services to be delivered and reporting requirements, the ANAO recommends that Geoscience Australia:</p>
	<p>a) establishes formal arrangements, such as a Heads of Agreement or Memorandum of Understanding with each major Australian Government agency client, including the Department of Resources, Energy and Tourism, where such arrangements do not already exist; and</p>
	<p>b) documents the costs of major services delivered.</p>
<p>Agency Response <i>Agree</i></p> <p><i>As noted in the ANAO's report, agreements with several of Geoscience Australia's key stakeholders already exist. We will continue our efforts to establish formal agreements with all of our major Australian Government clients. We are pleased to advise that we have recently completed an MOU with the Department of Resources, Energy and Tourism related to carbon capture and storage.</i></p> <p><i>Geoscience Australia's existing performance reporting systems are being enhanced to capture the costs of major services delivered. This enhancement will provide an important additional perspective to Geoscience Australia's Executive Board for the effective management of the agency.</i></p>	
<p>Recommendation No.4 Para 6.20</p>	<p>To improve its monitoring and measurement of performance, and subsequent annual reporting, the ANAO recommends that Geoscience Australia:</p>
	<p>a) develops a suite of performance information and targets, which indicate the extent to which the agency is achieving its Portfolio Budget Statements outcomes and delivering its Annual Work Program; and</p>
	<p>b) supplements its current ad hoc client and stakeholder feedback with structured, periodic surveys.</p>
<p>Agency Response <i>Agree</i></p>	

Geoscience Australia's Executive Board will develop an expanded set of performance information for the 09-10 Portfolio Budget Statements. This performance information will be a product of the agency's revisited strategic planning processes.

Structured client/stakeholder surveying is a key element of the Product Delivery Enhancement Program mentioned in our response to Recommendation 2.

Appendix 2: Geoscience Australia's Program Budget Statement priorities, 2008–09 and 2009–10

	2008–09	2009–10
1	Deliver the geoscience component of the Australian Tsunami Warning System	Provide support for the 2010 offshore petroleum acreage release
2	Provide support for the 2009 offshore petroleum acreage release	*Continue assessments of the energy potential of south-west Western Australia and remote eastern frontier basins
3	*Assess the hydrocarbon potential of basins in south-west Western Australia	**Acquire datasets to better assess potential for new energy resources
4	*Assess the petroleum potential of remote eastern frontier basins	**Provide technical advice in relation to uranium, thorium, petroleum and geothermal energy
5	**Provide technical advice in relation to uranium, thorium, petroleum and geothermal energy	Identify regions for the capture and geological storage of carbon dioxide
6	Provide advice on Australia's estuaries and offshore marine environment	Complete an assessment of Australia's energy resources, jointly with ABARE
7	Develop and promote a carbon dioxide capture and storage (CCS) program	Support AusAid's disaster risk reduction initiatives in the Australasian region
8	**Deliver the third year of the five-year Onshore Energy Security Program	Undertake Critical Infrastructure Protection modelling in several key sectors
9	Deliver the first year of the government's Critical Infrastructure Modelling and Analysis Program	Develop and implement a 'proof of concept' Commonwealth Spatial Data Integration technical pilot project
10	Promote the minerals prospectivity of Australia at key industry conventions	Deliver the agreed program of geospatial data capture and delivery to DIGO
11	Complete large-scale topographic mapping to support emergency management mitigation	
12	*Complete Phase 2 of the new industry Petroleum Data Access Facility	
13	Coordinate and also deploy the agency's own component of the Global Navigation Satellite System	
14	Provide spatial data under the Landsat Contingency Plan	

Notes: * Work undertaken as part of the government's Offshore Energy Security Program. ** Work undertaken as part of the government's Onshore Energy Security Program.

Source: ANAO summary of key priorities identified in Department of Resources, Energy and Tourism, Portfolio Budget Statements, 2008–09 and 2009–10.

Appendix 3: Sample datasets and collection methodology

Name of dataset	Description	Collection methodology
Bathymetry	The measurement of the depth of the ocean floor from the water surface Australia and region.	Data is collected from a range of sources, including multiple and single beam raw data collected from research ships contracted to Geoscience Australia or other research ships with access to data free of charge on the Internet. In addition, data is derived by digitising pre-existing maps and hydrographic charts, and derived depths from satellite remote sensing.
Topography	The natural and constructed features on the Earth's surface.	Most information on a map is derived from satellite or aerial imagery photos, which may be verified by field staff. Geoscience Australia field crews, who undertake surveys, collect and verify data. In addition, contractors acquire data with quality assurance undertaken by Geoscience Australia.
Satellite archive	Text and imagery from earth observation satellites for Australia and region.	Images and data downloaded from satellite providers, distributed to clients and then stored at Geoscience Australia for future reference.
Onshore seismic	Provides information about the underlying structures of the sub-surface of Australia.	Data is acquired by third-party providers, using equipment that runs over the ground and produces echo-sounding waves to generate raw data. Geoscience Australia has staff on hand to cleanse this data at source.
Australian Surface Geology	Geological features of Australia as a national dataset.	Maps and data from individual states and territories are transformed into a seamless national baseline dataset at a scale of 1:1 million. This dataset captures improvements in geology, including regolith mapping using remote sensing techniques, and replaces much older datasets.
Petroleum Data Repository	The collection of seismic surveys, reports and physical samples such as cores, cutting and distillate.	Information and samples are sent to Geoscience Australia from exploration companies where they are stored in a large, specialised warehouse.
Seismology network	Data collected and transmitted from seismographs located in Australia and the region.	Data is collected through a network of seismographs. The first use of this data is to measure, locate and report on an earthquake occurring in the region. Stored seismology data may also be used for scientific research to better understand earthquakes and their impact on the built environment.

Source: ANAO based on information supplied by Geoscience Australia

Appendix 4: Geoscience Australia client agencies

1. The Department of Resources, Energy and Tourism
2. The Department of Defence
 - a. The Defence Imagery and Geospatial Organisation
 - b. Australian Hydrographic Service
3. The Australian Customs Service
4. The Attorney-General's Department
5. Australian Fisheries Management Authority
6. The Department of Environment, Water Heritage and the Arts
 - a. Australian Antarctic Division
7. The Department of Climate Change
8. The Department of Infrastructure, Transport, Regional Development and Local Government
9. CSIRO
10. Department of Foreign Affairs and Trade
11. Australian Aid Organisation (AusAid)

Four Commonwealth Research Centres

12. Antarctic Climate and Ecosystems CRC
13. CO2 CRC⁸¹
14. Commonwealth Environment Research Facilities (CERF)
15. CRC for Spatial Information

⁸¹ The CO2 CRC undertakes research and projects relating to carbon dioxide capture and storage.

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