

Department of the Environment, Water, Heritage and the Arts

Volume 1

Outcome 2

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Australian Government

Department Environment, Water, Heritage and the Arts



Outcome 2
Antarctica



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Antarctica



Introduction

The Department of the Environment, Water, Heritage and the Arts is responsible for advancing Australia's interests in Antarctica by supporting Antarctic and Southern Ocean programs, participating in international forums, and conducting scientific research.

The department's Australian Antarctic Division is responsible for leading Australia's Antarctic program.

Main responsibilities for this outcome

- Antarctic Treaty System
- Antarctic and Southern Ocean environment protection
- Australian Antarctic Territory and Territory of Heard Island and McDonald Islands administration
- Antarctic and Southern Ocean research

Australian
Antarctic Division

Highlights

- The first official flight of the department's new Antarctic Air link touched down on the blue ice runway at Wilkins Aerodrome in Antarctica at 2:46 am (Australian Eastern Summer Time) on 11 January 2008.
- The November 2007 meeting of the Commission for the Conservation of Antarctic Marine Living Resources was highly successful, with a number of Australian initiatives being adopted.
- The International Polar Year (IPY) activities included the Australian led projects: 'Sea Ice Physics and Ecosystem Experiment'; 'Collaborative East Antarctic Marine Census'; 'Climate of Antarctica and the Southern Ocean'; and 'Aliens in Antarctica'.
- The Mawson's Huts Historic Site Management Plan was completed and approved by the Minister for the Environment, Water, Heritage and the Arts, The Hon Peter Garrett AM MP.

Objectives

Antarctic policy

- Maintain the Antarctic Treaty System, to enhance Australia's influence in it and enhance international protection for Antarctica as a zone of peace and science.
- Protect the environment of Antarctica, the Southern Ocean and the Territory of Heard Island and McDonald Islands, including its marine living resources and seabirds.

Antarctic science

- Improve understanding of Antarctica's role in the global climate system.
- Conduct and support science to protect the Antarctic environment and Southern Ocean ecosystems.
- Support practical and important Antarctic scientific research.
- Provide data to Australian and international institutions and support them in undertaking research.

Results

- During the 2007-08 austral summer season a total of 13 flights were conducted to Antarctica using a specially modified Airbus A319 aircraft, as part of the inaugural year of operation of Australia's Antarctic Air Link.
- The Wilkins Aerodrome was officially opened by the Governor General via telephone link on 24 January 2008.
- During the Commission on the Conservation of Antarctic Marine Living Resources Meeting in November 2007 substantial advances were made on a number of significant issues, including the orderly development of the krill fishery, improved vessel safety measures and revised catch limits.
- At the June 2008 Antarctic Treaty Consultative Meeting, held in Kiev,

Ukraine, the Australian delegation exercised leadership on a broad range of legal, policy and environmental protection matters under consideration by the Antarctic Treaty Consultative Meeting and the Committee for Environmental Protection. Australia tabled eight working papers and eight information papers.

- As part of Australia's contribution to the International Polar Year the following projects—all led by Australia—were successfully undertaken:

- Sea Ice Physics and Ecosystem Experiment
- Collaborative East Antarctic Marine Census
- Climate of Antarctica and the Southern Ocean
- Aliens in Antarctica.
- Australians presently convene three of the four working groups established by the Agreement on the Conservation of Albatrosses and Petrels Advisory Committee. This body was established to implement the work program under the main Agreement. The Australian-led working groups address taxonomy, seabird bycatch, and population status and trends.
- Australia has undertaken the legal and administrative action necessary to ratify an agreement, negotiated in 2006, with the parties to the Agreement on the Conservation of Albatrosses and Petrels. A permanent international Secretariat has been established in Hobart.
- The Antarctic science program supported 112 projects, which led to 265 publications including 125 in peer-reviewed journals.
- The Australian Antarctic Division's logistics system moved 402 passengers and 1,385 tonnes of cargo during 2007-08.

- The management plan for the conservation of Mawson's Huts at Commonwealth Bay underwent an extensive public consultation process and received Ministerial approval during the reporting period.
- Major construction activities were focused on Australia's Antarctic stations Casey and Davis, including new Air Link transit accommodation at Casey. At Davis progress was made towards the construction of new living quarters, installation of a new overflow lounge/library and field store, removal of the old station and replacement of the sewage outfall.
- Significant logistic support was provided to the Antarctic programs of Italy, France and China, during the 2007–08 Antarctic Season.

Strategies

Australia demonstrates its interests in the Antarctic region by a strategy of active contribution to the development and implementation of Australian Government Antarctic policy. It takes a leading role in the Antarctic Treaty System and its associated forums. As the leader of Australia's Antarctic program, the department's Antarctic Division plays an important role in protecting and advancing Australia's Antarctic interests. It also supports and undertakes Antarctic science of national and international significance.

Antarctic policy

As an active Treaty member Australia is committed to maintaining the Antarctic Treaty System and consulting on the use of the continent. Australia is intent on ensuring that it does not become a scene or object of international discord but remains an example of international cooperation. Australia encourages and supports mutual assistance and cooperation

amongst Treaty partners in research, information exchange and in protecting the Antarctic environment.

Australian proposals influenced discussions at the Thirty-first Antarctic Treaty Consultative Meeting held in Kiev, Ukraine in June 2008. These included:

- proposals for a strategic approach to the developing Antarctic tourism industry
- measures to improve the management of tourism
- measures to improve ship safety, following the loss of the tourist ship *MV Explorer* in the summer of 2007–08.

The meeting also agreed to a number of new proposals for Antarctic protected areas, including the areas nominated by Australia. Australia's proposals for a review of Annex II to the Treaty's environmental protocol were also well received and will be the basis for further negotiation at the next meeting. A member of the Australian delegation, Mr Ewan McIvor, was elected Vice-Chair of the Treaty's Committee for Environmental Protection.

Australia is committed to valuing and protecting Antarctica, demonstrating this commitment by: developing, implementing and managing ways to minimise the effects of human activity; restoring past work sites; and undertaking research designed to ensure that management of Antarctica and the Southern Ocean is based on sound scientific principles and the best available scientific knowledge. Australia's research also contributes to understanding environmental systems and the effects of global climate changes. Australia has a significant role in combating illegal, unreported and unregulated fishing of subantarctic marine living resources, by proposing new measures to prevent pirate fishing and market access for such catches.

Antarctic science

Australia continues to undertake scientific research in accordance with the Science Strategy for Australia's Antarctic program (2004–05 to 2009–10), Australia's National Research Priorities and the nation's policy interests and associated government goals. This priority science supports Australia's interests in environmental protection, determining the role that Antarctica plays in the global climate system and gaining an understanding of how organisms and ecosystems are adapting to an extreme and changing environment.

In 2007–08, the first International Polar Year, Australia undertook a highly collaborative and internationally based scientific program. The following was achieved during the year:

- A total of 112 projects from 35 institutions were undertaken as part of Australia's Antarctic program. They involved collaboration with a further 220 institutions from 27 countries.
- A total of 169 scientists utilised Australia's logistic system in 2007–08, including 117 marine scientists. In its inaugural season the new Antarctic Air Link transported 20 scientists to Antarctica to undertake research at Australia's Casey and Davis stations.
- Of the 169 scientists, 131 were from Australia, including 34 from the department's Australian Antarctic Division, and 38 scientists from overseas (13 from France, 9 from the United States, 5 from the United Kingdom, 3 from Japan, 2 each from Germany and Norway, and 1 each from Finland, India, Ukraine and New Caledonia).
- The Australian Antarctic program supported 134 higher degree students, including 94 PhD students.
- During the 2007 calendar year a total of 265 publications were produced under the auspices of the Australian Antarctic

program. This total includes 125 that were published in peer-reviewed international literature. A further 35 contributed to supporting Australia's position in both the Commission for the Conservation of Antarctic Marine Living Resources and the International Whaling Commission.

The Antarctic Division was also actively involved in conducting research in high priority areas of Antarctic science. These included climate change, sustainability and environmental protection, and providing a depository and primary source of Australian Antarctic information. The department also took a lead role in coordinating and managing logistic support for the Australian Antarctic program, including permanent stations, marine science field bases, transport, communication and medical services.

International Polar Year activities

Australia played a major role in the 2007–09 International Polar Year by leading and participating in a wide range of domestic and international projects. These projects provided a significant contribution to the achievement of Outcome 2 objectives in the areas of Antarctic Policy and Antarctic Science. Australia's role in the projects fostered international collaboration and strengthened Australia's position in the Antarctic scientific community and Antarctic Treaty System.

Major scientific activities undertaken under the banner of the International Polar Year were:

Sea Ice Physics and Ecosystem Experiment

- The Sea Ice Physics and Ecosystem Experiment expedition included 45 scientists from 8 different countries, each focused on a particular project dealing with the Antarctic sea ice zone. Using the vessel RV Aurora Australis the marine science voyage explored the sea ice

zone around Antarctica, with the aim of investigating the relationships between the physical sea ice environment and the structure of Southern Ocean ecosystems.

Collaborative East Antarctic Census

- The Collaborative East Antarctic Census involved scientists and research vessels from Australia, Japan and France working together as part of the International Polar Year's 'Census of Antarctic Marine Life' project, which is being coordinated by Australia. The main aims of the project were to understand the processes that have led to the evolution and survival of marine life existing on the continental shelf, the sea-floor in the deep waters, and in the water column from the surface downwards. The data will help scientists predict how these organisms will respond to future climate-related environmental changes.

Climate of Antarctica and the Southern Ocean

- During the Climate of Antarctica and the Southern Ocean marine science voyage, 25 individual projects involving scientists from 18 nations were undertaken. The overall project aim is to provide the first circumpolar snapshot of the physical, biogeochemical, atmospheric and ecological environments in the Southern Ocean region. The work contributes to an understanding of how the Antarctic and Southern Ocean regions drive much of the global ocean circulation and confirms earlier findings that the deep Antarctic waters continue to become fresher and cooler.

Aliens in Antarctica

- During the annual transit of scientists, support personnel and tourists to the Antarctic over the 2007–08 summer season, the Australian Antarctic Division-led project 'Aliens in Antarctica' examined the clothing that people wear in

Antarctica through vacuuming in pockets, around seams and in Velcro fasteners. The aim of this research is to provide a unique snapshot of the number of spores, seeds, invertebrates and eggs transported to the continent by human activity. The project involves representatives from 20 national programs and over 30 tourism operators.

Antarctic operations

The major field programs conducted and led by Australian scientists during the 2007–08 Antarctic season occurred principally in the Southern Ocean. Three projects were under the auspices of the International Polar Year 2007–08:

- (1) Sea Ice Physics Experiment
- (2) Collaborative East Antarctic Marine Census
- (3) Climate of Antarctica and the Southern Ocean.

In addition, Australia led the International Polar Year project 'Aliens in Antarctica'. All projects achieved significant results and involved many scientists from overseas.

During the 2007–08 Antarctic season the Australian Antarctic Division conducted a range of shipping, air, training and infrastructure activities in support of the Australian Antarctic program, including:

- equipping, training and moving 402 people to Antarctica
- undertaking 130 days of marine science research
- completing 16 capital works projects
- operating, maintaining and developing our four permanent research stations
- supporting the conservation of Mawson's Huts
- shipping 1,385 tons of cargo by sea and air
- flying from Hobart to Antarctica 13 times by Airbus A319.

Case studies

Sea Ice Physics and Ecosystem Experiment

The Sea Ice Physics and Ecosystem Experiment was organised jointly by the Antarctic Climate and Ecosystems Cooperative Research Centre and the Australian Antarctic Division, and carried out in October and November 2007. Eighty-six scientists from eight nations used a suite of cutting-edge technologies to study processes on the sea-ice surface, within and under the ice in the region east of Australia's Casey Station. Two helicopters, equipped with laser and radar altimeters, were used to measure the height of the snow and ice surfaces above sea level. The data were complemented by information gathered from ice coring and other work directly on the ice. The combined information will help validate satellite altimetry data, which will soon be used to monitor changes in sea ice thickness around Antarctica.

Sea-ice researchers also made the first measurements of the fluid permeability—the ability of fluid to flow through channels in the ice—of the seasonal Antarctic sea-ice pack. With permeability affecting polar biology and oceanography, these initial data will have important implications.

Biologists combined classical ice coring techniques with a remotely operated underwater vehicle, to study the underside of the sea-ice and map the distribution of ice algae—microscopic plants that live in and on the underside of the ice. Observations from a remotely-operated vehicle showed high concentrations of Antarctic krill living at the underside of the sea-ice as well as in cracks between ice floes. Using trawls and underwater cameras, the biology team mapped the distribution and condition of the krill. Krill found in and around the ice were in better condition than those found in areas of open water, suggesting a better quality

of food available to them. Other scientists worked on ice algae physiology and sea-ice biogeochemistry, to better understand what happens in the Antarctic sea-ice zone during the transition from winter to summer.

Oceanographers studied the water mass properties and currents beneath the sea-ice and found that, contrary to what was expected, the patterns of sea-ice drift appear to be affected more by ocean currents than by wind.

Collaborative East Antarctic Marine Census

The Collaborative East Antarctic Marine Census involves scientists and research vessels from Australia, Japan and France, and forms part of a major Australian Antarctic Division-led International Polar Year project, the 'Census of Antarctic Marine Life'. Field work, utilising three ships, was undertaken from mid-December 2007 to the end of February 2008.

Work aboard the RV *Aurora Australis* from December 2007 to late January 2008 focussed on the diversity of fish and sea-floor-dwelling (benthic) organisms living below 200 metres and the environmental conditions in which they live. The use of high definition underwater video equipment allowed outstanding pictures to be taken of complex marine assemblages living at depths of up to 2000 metres.

The French supply ship, *l'Astrolabe*, and the Japanese training ship *Umitaka Maru* also participated in this collaborative project, studying the biodiversity of the open ocean, concentrating on plankton and mid-water fish.

Together, the three voyages investigated the diversity of the open-ocean and sea-floor fauna, from gene to habitat level, and will compare these with similar studies in other parts of the Southern Ocean. This will help scientists understand the whole community

composition and structure, which in turn will help them understand the effects of climate change and how marine communities have adapted to the unique Antarctic environment. The aim is to establish a benchmark against which future ocean change can be assessed.

Grounded Icebergs, Adelle penguins
Photo: Hosung Chung, courtesy of AAD



Focus of work	Performance indicator
<p><i>Antarctic policy</i> Antarctic Treaty System</p> <p>The degree to which Australia's policy interests are advanced through international forums, particularly: (i) the Antarctic Treaty Consultative Meetings; (ii) the Commission for the Conservation of Antarctic Marine Living Resources; and (iii) the Committee for Environmental Protection</p>	<p>Australia actively participated in annual and out-of-session meetings of the Antarctic Treaty Consultative Meeting, the Commission for the Conservation of Antarctic Marine Living Resources, and the Committee for Environmental Protection.</p> <p>(i) At the Antarctic Treaty Consultative Meeting Australia played an active role in discussions on proposals about Antarctic tourism and ship safety. Australia also tabled a proposal to review Annex II to the Antarctic Treaty's environmental protocol, which was well received and will form the basis of negotiations at the next meeting.</p> <p>(ii) Through the Commission for the Conservation of Antarctic Marine Living Resources, Australia was successful in achieving beneficial outcomes on the orderly management and development of the krill and toothfish fisheries; safety standards for vessels fishing in the Southern Ocean; and on the establishment of Marine Protected Areas.</p> <p>(iii) Australia participated extensively as part of the Committee for Environmental Protection, with a number of new proposals for Antarctic specially protected areas being accepted and an Australian being appointed as the new Vice-Chair.</p>
<p>Illegal, unregulated and unreported fishing</p> <p>The extent of Australia's influence within the Commission for the Conservation of Antarctic Marine Living Resources on measures to combat illegal fishing for toothfish</p>	<p>Australia continued to play a lead role within the Commission for the Conservation of Antarctic Marine Living Resources in developing measures to combat illegal, unreported and unregulated fishing of toothfish. At the September 2007 meeting of the Commission, Australia was successful in gaining approval for additional research into toothfish populations on BANZARE¹ Bank. In addition, Australia was successful in seeking the adoption of improvements to vessel safety standards; including survival equipment and communication devices. These standards are in line with the current requirements set by the Australian Maritime Safety Authority for Australian operators.</p>

International seabird conservation

The extent of Australia's influence in discussions on the Agreement on the Conservation of Albatrosses and Petrels and in reducing the number of albatrosses caught by fishing gear

Australia is a major contributor of research and other work on seabird conservation issues central to work under the Agreement on the Conservation of Albatrosses and Petrels. It has worked closely with several other Agreement Parties. Notable Australian contributions have:

- helped to establish population levels and trends for species protected under the Agreement
- helped to develop new and improved measures to reduce or avoid seabird bycatch in longline fisheries (which are the single biggest threat to the global conservation of albatrosses and petrels) and publicise them to national and international fisheries managers
- provided policy and technical inputs to assist in developing co-operative relationships under the Agreement with regional fisheries management organisations
- assisted the Agreement Secretariat to develop its administrative capacity, including data handling and storage.

Protecting the Antarctic environment

Trend in the number of plants, invertebrates and diseases introduced to Antarctica and the Heard Island and McDonald Islands

There are no new records of introduced plants, invertebrates or diseases. There were six reports of discoveries of single insects in cargo and food. These were contained, reported and returned to Australia to provide information on possible vectors for introductions.

Awareness programs and improvements to provedoring² packing and cargo continue. Independent inspections of fresh fruit and vegetables by Australian Antarctic Division scientists along with Quarantine inspections assist in preventing introductions.

Ongoing monitoring indicates that the fungus gnat is still present in very small numbers (<20) in one location at Casey Station in the underfloor of the main living quarters. These are caught on fly traps and eradication efforts are continuing.

Number of environmental incidents unresolved after six months

Ten environmental incidents remain unresolved after six months due to:

- ongoing monitoring to detect and prevent introductions of alien species into the Antarctic
- development of formal procedures not yet finalised to check the bund in the Flammable Goods Store and to dispose of sea water at Kingston
- lack of funds to expand the Sample Tracking Database
- extra training for fuel transfer operations not occurring until the 2008–09 season
- work progressing to develop memorandum of understanding with Australian Maritime Safety Authority in the event of a marine fuel spill.

<p>Number and extent of oil spills and remediation action taken</p>	<p>Four very minor oil spills. Of these, the most significant was only 15 litres. This spill was from the fuel tank of a crane and was noticed within 15 minutes. Remediation action was taken immediately, that is, a team of expeditioners deployed the spill gear and commenced the clean up within 30 minutes. This involved shovelling 81 kg of rock and dust into buckets and burning them the same day. The oil absorbent cloth used to mop up small pools of oil and the earth absorbent dust and pellets used to absorb oil on rocks (i.e. a fine dust and coarse pellets worked into the surface with a broom and allowed to sit for about 4 hours before being swept up) were also burnt. The ash was later returned to Australia for disposal. The final inspection afterwards showed little evidence of fuel staining.</p>
<p>Number of environmental impact assessments: (i) completed by the department; (ii) submitted by third parties and assessed by the department; and (iii) audited under Australia's Antarctic Environmental Management System, as a percentage of total completed</p>	<p>(i) 49 (16 science, 19 non-science, 14 tourism/non government), and 10 variations were authorised.</p> <p>Additionally, 25 authorisations were current from previous years.</p> <p>A total of 151 science and 34 non-science projects submitted.</p> <p>(ii) 14 tourism/non-government</p> <p>(iii) 75% (i.e. 6 of the 80 active authorisations. Note that all near-station activities are subject to routine scrutiny by Antarctic Treaty Environment Protection Act inspectors and most authorisations are subject to other reporting requirements).</p>
<p><i>Antarctic science</i> Support for Antarctic science</p>	
<p>Successful completion of the elements of the Antarctic Science Strategy 2004–05 to 2009–10</p>	<p>112 projects from 35 institutions undertaken to address 4 priority areas: 58 projects address the ice, ocean, atmosphere, climate priority area, 38 the Southern Ocean ecosystems, 41 adaptations to environmental change and 28 projects the effects of human activity in Antarctica. Many projects addressed more than 1 priority area.</p>
<p>Number of peer-reviewed scientific papers produced by scientists participating in the Antarctic science program</p>	<p>125</p>
<p>Number of scientific papers presented to the scientific and technical committees of the Antarctic Treaty system</p>	<p>35 (including the International Whaling Commission)</p>
<p>Extent to which science outcomes lead to achievement of Antarctic policy goals</p>	<p>Australian Antarctic program scientists undertook significant research in support of policy goals. Major scientific contributions were made in support of Australia's activities in the Commission for the Conservation of Antarctic Marine Living Resources, in the area of fish stocks. Other work contributed to advancing Australia's climate change interests in the United Nations Intergovernmental Panel on Climate Change.</p>

Number of scientists active in Antarctic and Southern Ocean science	117
Australia-Antarctic Airlink	
First operational flights commencing in 2007–08 with full service introduced in 2008–09	The Australian Antarctic Division commenced regular flights between Australia and Antarctica during the 2007/08 austral summer using a commercial twin-engine jet.
Outputs 2.1 Antarctic policy and 2.2 and Antarctic science	
95% of briefs and correspondence meet department quality control standards	–
Percentage of Antarctic Science Grant Scheme payments that are consistent with the terms and conditions of funding (Target: 100%)	100%
Percentage of participants in the Australian Antarctic program whose participation is consistent with the terms and conditions of logistic support (Target: 100%)	100%
<i>Price</i>	See Resources table below

¹ British Australian New Zealand Antarctic Research Expedition

² The supply of foodstuffs to seagoing vessels.

Outcome 2 Antarctica

Departmental outputs	Budget prices \$000's	Actual expenses \$000's
Output 2.1 Antarctic Policy	41 665	48 957
Total (Output 2.1: Antarctica Policy)	41 665	48 957
Administered items		
Decisions taken but not yet announced	3 000	-
Australian Antarctic Division Heritage Collections	-	224
Total (Administered)	3 000	224
Departmental outputs	Budget prices \$000's	Actual expenses \$000's
Output 2.2: Antarctic science	88 536	87 039
Total (Output 2.2: Antarctica Science)	88 536	87 039