Australian Academy of Science

SUBMISSION TO THE AUSTRALIAN NATIONAL AUDIT OFFICE PERFORMANCE AUDIT: SUPPORTING AUSTRALIA'S ANTARCTIC PROGRAM

FROM THE AUSTRALIAN ACADEMY OF SCIENCE / APRIL 2015

Australian Academy of Science | GPO Box 783, Canberra ACT 2601 | 02 6201 9401 | science.policy@science.org.au

Submission to the Australian National Audit Office Performance Audit: Supporting Australia's Antarctic Program

Executive summary

The Australian Antarctic Division has in the past provided excellent support to scientists to undertake their research. That support is, however, now in decline in several key areas due to the reduced funding received from the Australian Government, and this has resulted in a weakening of science activity and output. Most notably, support to scientists is suboptimal in the following areas:

- physical access to and time available on the continent, and notably deep-field capability
- capacity and flexibility at research stations
- Antarctic and Southern Ocean shipping dedicated to marine science
- delays in awarding direct grants and the award of logistic support through the Australian Antarctic Science Program
- lack of coordination between the Australian Antarctic Science Program process and grants from other agencies such as the Australian Research Council
- uncertainty and delays in support, which makes necessary international collaboration difficult and puts Australian science leadership at risk.

Ready recovery from the situation would be assisted by:

- improving marine science research time to a minimum of 40 days per year at sea.
- improving access to Antarctica for research for longer and more flexible periods and for larger numbers of scientists.
- providing logistic support for research undertaken with support from grants awarded by alternative funding agencies, particularly the Australian Research Council.
- improving or revising the current process used for providing grants and logistic support through the Australian Antarctic Science Program.

Introduction

The Australian Academy of Science welcomes the opportunity to respond to the Australian National Audit Office Performance Audit: *Supporting Australia's Antarctic Program*.

The Australian Academy of Science promotes scientific excellence, disseminates scientific knowledge, and provides independent scientific advice for the benefit of Australia and the world. The Academy is made up of more than 470 of Australia's leading scientists, each elected for his or her outstanding contribution to science. The Academy has a long and substantive history of involvement in the development of Australia's Antarctic science programs, dating back to the Academy's foundation in 1954. Last year the Academy provided an extensive submission[1] to the *20 Year Australian Antarctic Strategic Plan* (the Press inquiry)[2], and provided oral evidence to the Senate Foreign Affairs, Defence and Trade References Committee inquiry into *Australia's future activities and responsibilities in the Southern Ocean and Antarctic Waters*[3]. The points made in this submission summarise the points of relevance made in the Academy's submission to the Press inquiry. To assist the Australian National Audit Office a copy of this submission is attached, along with the final reports of both inquiries which are of relevance to this performance audit.

In response to the invitation by the Australian National Audit Office to provide comments 'on the support that the Australian Antarctic Division provides to scientists to undertake their research', this submission provides a view on general logistic support and direct granting through the Australian Antarctic Science Program, and on integration with other national granting systems, specifically Australian Research Council grants. The Academy has not provided comments about science support arrangements that are largely internal to the Australian Antarctic Division.

Australia has significant strategic and scientific interests in Antarctica. Given the arrangements of the Antarctic Treaty System, the two are closely linked. Although, as an original signatory to the Antarctic Treaty, Australia cannot lose its decision-making or consultative status in the Antarctic Treaty, its ability to influence affairs in the region is dependent on its scientific credibility. Those countries that are not original signatories to the Treaty only achieve decision-making status by conducting *substantial research activity in the region*. This demonstrates that science leadership in the region is the key to strategic influence. Australia is rapidly falling behind developing nations that are taking an increasingly high interest in the Australian Antarctic Territory, particularly China, Russia and India.

Science in and about Antarctica and the Southern Ocean is conducted by a range of organisations in Australia, including universities and agencies such as the Australian Antarctic Division, Geoscience Australia and CSIRO. Australian Antarctic and Southern Ocean research is funded directly by these organisations, and by the Australian Research Council. Given the international scope of research in the Antarctic region, some research endeavours are supported by other countries through research collaborations or direct grants to associated investigators. However the majority of support for Antarctic and Southern Ocean science is provided by the Australian Government through the Australian Antarctic Division.

Science support from the Australian Antarctic Division takes three major forms. The first is logistic support for getting to and working either on the continent (and both Macquarie and Heard Islands)

or in the Southern Ocean. It extends to three permanent scientific research stations on the continent, one at Macquarie Island, remote field stations in Antarctica, a range of transport capabilities, and the logistic arrangements to keep the support operational. The second form of support is provided through direct grants to scientists to cover research and some logistic costs (such as medical screening). These scientists are typically university-based and hold projects through the Australian Antarctic Science Program. The Australian Antarctic Science Program also provides a mechanism for enabling access to and prioritisation of logistic support for scientists who apply through the scheme. Scientists from organisations external to the Australian Antarctic Division (and other Commonwealth-funded bodies), such as universities, are eligible to apply for financial grants and logistics support through the Australian Antarctic Science Program. By contrast, investigators from Federal Government organisations can only apply for logistic support, with staff time and running expenses costed as an organisational contribution. The third avenue for support is internal science and logistic support to researchers employed directly by the Australian Antarctic Division.

Science and science policy trends

Australia has long been one of the leading countries conducting science in and about Antarctica, and in consequence also leads diplomacy regarding the region, which is largely based on science. Australia is among the top three nations in terms of submissions of working papers to the Antarctic Treaty Consultative Meetings, which form a key means for directing Antarctic governance decisions. Between 1992 and 2010 Australia also ranked fourth among Antarctic nations in its production of scientific papers, and among the top three when the output is normalised for GDP. It has also been instrumental in science and policy leadership. Australian scientists have twice won the prestigious Martha T. Muse Prize for Science and Policy in Antarctica and were instrumental in the leadership of the recent Antarctic Science Horizon Scan. An Australian currently chairs the Committee for Environmental Protection of the Antarctic Treaty System, and another is the leader of the Scientific Committee on Antarctic Research that provides advice to the Antarctic Treaty.

Several indicators suggest, however, that Australian leadership in science in the region is in recession, and as a result this will impact on Australia's policy influence. Most significantly, scientific activity and output have declined substantially. The number of projects supported by the Australian Antarctic Science Program (or its equivalent) declined from 142 in 1997/8 to 62 in 2014, with no announcements yet made for projects which were to have commenced in 2014. Scientific output measured as publications from the program declined from approximately 200 annually (1999-2006) to now less than 100. In part, this trend is a consequence of changing arrangements in the support of science in the region. This decline in influence was noted in the Press inquiry:

> "However, Australia's standing in Antarctic affairs is eroding because of historical under-investment at a time when new players are emerging in Antarctica. The leadership that Australia has naturally assumed by its proximity, history and experience, risks decline."[4]

Recognising this decline and its impact on Australian Antarctic science and the consequences it has for policy influence in the area, the inquiry recommended that funding for Australian Antarctic Science grants be increased substantially[5].

Logistic support

Logistic support provided by the Australian Antarctic Division is now declining in several key areas, even though the Division has a long history of providing capable support to science in the region.

Physical access to the continent is problematic. An increase in flights to Antarctica was implemented to improve access and reduce travel time, particularly for senior scientists. The potential combined benefits have not, however, been realised. Although air access has improved travel time, it has not delivered reliable access or greater access for science and scientists. Air access has also shortened the season available to complete science, due to its expense. As a result of the sustained funding cuts, Australia has also lost much of its capability for deep field traverses and work. This point was recognised in the 20 Year Australian Antarctic Strategic Plan, which recommended Australia re-acquire deep field traverse capability as a high priority[6].

The stations in the Australian Antarctic Territory and on Macquarie Island are old and require a high level of maintenance to keep them operational. The capacity to accommodate scientists is low and, without effective funding, will remain so. This means sub-optimal numbers of researchers are able to access the region, unlike previous times, when greater access was available to a larger numbers of scientists. The modernisation of these stations was recommended by the 20 Year Australian Antarctic Strategic Plan[7].

The availability of Antarctic shipping for marine science has been significantly reduced since the introduction of the air link. The move to a single ship operation, coupled with a reduction in the number of days available for ship operations (from 240 to 180 or less), means that high priority marine science is not being adequately supported by the Australian Antarctic Division due to a lack of funding and/or lack of flexibility in the shipping schedule. The Government's decision to replace the *RSV Aurora Australis* by 2019 with a new icebreaker is welcome news. The operating model for the new vessel must, however, allow for at least 40 days marine science per year to provide the minimum adequate support for the marine science required. The new Marine National Facility, the *RV Investigator*, is a great addition to Australia's marine research capability but is presently only funded to operate for 180 days per year and is not an ice-capable vessel. It is therefore essential that the new icebreaker is available for marine research.

Across the Australian Antarctic program the competing demands of logistics and science, both supported either entirely (logistics) or partly (science) from the Australian Antarctic Division's budget, leave science vulnerable to financial or other exigencies (government budget changes, fuel price fluctuations, emergencies such as rescues).

These declines in support all affect capability to undertake competitive science across the range of fields in which Australia has long been a leader. They also suggest that Australia will be left behind in addressing the suite of recently-identified priority areas for science in and about the Antarctic region[8].

Direct granting

A primary source of support to Australian scientists from the Australian Antarctic Division is the Australian Antarctic Science Program which provides both direct grant financial support and/or a means to access large logistic support in terms of ship time at sea, field operations and access to station facilities and accommodation. Although the Australian Antarctic Science Program has

provided excellent support to Australian scientists across a range of institutions in the past, that support appears to be faltering.

Direct grants to institutions outside the Australian Antarctic Division are small (ca. $50,000 p.a. maximum over 3-5 years). Because the total amount granted by the Australian Antarctic Division to an investigator must include costs of the mandatory medical assessments for Antarctic field work, and also transport to local training, the actual amounts devoted to the research endeavour are smaller still. Typically, they are insufficient to cover the running expenses of the kinds of high-end scientific research that is required to stay competitive in the Antarctic science arena, let alone Australian leadership in world-class, high-priority Antarctic science. They also don't extend to a single full time equivalent research technician at an appropriate level. In consequence, substantial co-investment from applicant organisations is required. The outcome is that science support is inconsistent and inadequate.

Several investigators have sought to alleviate this constraint by applying for project or similar funding from the Australian Research Council. While this is in part a solution, no formal mechanism exists for coordinating support for an Australian Research Council-supported project with logistics required from the Australian Antarctic Division. In consequence, an investigator may face a situation where they have the required research running and personnel costs, but are unable to secure logistic support because the project has not been supported through the Australian Antarctic Science Program. This is highly inefficient for both the funding agencies and investigators involved.

Elsewhere, straightforward solutions to these barriers to support have been found. For example, in New Zealand, award of a Marsden grant from the Royal Society of New Zealand (a funding scheme in that country equivalent to some Australian Research Council grants) to an investigator to work on Antarctic science immediately opens a dialogue about access to logistic support from Antarctic New Zealand. This applies to other grants too, such as from the New Zealand Antarctic Research Institute and from other entities. The need for a more coordinated approach is outlined in recommendation 14 of the Press inquiry[9].

An important component of the Australian Antarctic Science Program is the access it provides to much greater in-kind logistic support for investigators than direct grants provide. The logistic support, however, needs to be substantially improved to bring science support up to a level that will make Australian research internationally competitive. Moreover, the entire granting process is encountering significant challenges. The most recent granting round opened in March 2014, with calls for submission of project proposals by 12 May 2014. Announcements were expected in October 2014. Indeed, the Australian Antarctic Division webpage continues to list this date[10]. Announcements about grant outcomes have still not been made, and little information has been provided beyond a single e-mail indicating the ranking. Many project time lines had indicated project commencement in late 2014 in keeping with the proposal requirements.

Delays of this kind make any form of planning for research difficult, particularly where research proposals have requested information on field participation and on research delivery timelines. Investigators seldom undertake a single project at any one time, and have to balance personnel allocation commitments, including their own time, to ensure that the research proposed is undertaken and completed to a level that is in keeping with the proposal and at a leading

international level. While planning for negative grant outcomes is routine, given low success rates generally (e.g. about 17% for the Australian Research Council Discovery Projects and about 12% forecast for the current National Health and Medical Research Council round), that planning can be undertaken because announcement dates are generally adhered to.

Delayed announcements of funding and/or logistic support also undermine research projects that involve international collaborators because of the associated uncertainty. One of the key requirements for competitive Antarctic science is extensive international collaboration because of the nature and scale of the work. International collaboration opportunities enable both scientific and strategic benefits to be gained as well as cost sharing. The Press Inquiry stated that as a high priority Australia should continue to engage in, promote and facilitate international collaboration in Antarctic science and governance. However where funding uncertainty is high, international collaborators are typically unprepared to join work. They are unable to provide statements of certainty about joint work with Australian colleagues during their own science funding processes. Even when this problem can be overcome, actual completion of the work is also uncertain. This decline in collaboration means further reductions in support to Australian scientists. It also leaves Australian scientists in a position where they have to 'follow' rather than 'lead' international collaborative work. In consequence, Australian science leadership in the region is compromised.

Conclusions and recommendations

The Australian Antarctic Division has long provided excellent support to scientists to undertake their research. That support is, however, now in recession. Ready recovery from the situation could be assisted by:

- improving research time at sea to a minimum of 40 days
- improving access to Antarctica for research for longer and more flexible periods for larger numbers of scientists
- providing logistic support for research undertaken with support from grants awarded by alternative funding agencies, particularly the Australian Research Council
- improving or entirely revising the current process and timing used for providing grants and logistic support through the Australian Antarctic Science Program.

Attached documents relevant to performance audit

1. Australian Academy of Science (2014) *Submission to the 20 Year Australian Antarctic Strategic Plan*
2. Pres, A.J. (2014) *20 Year Australian Antarctic Strategic Plan*
3. Senate Standing Committees on Foreign Affairs Defence and Trade (2014) *Australia's future activities and responsibilities in the Southern Ocean and Antarctic waters*

---

[1] Australian Academy of Science (2014) *Submission to the 20 Year Australian Antarctic Strategic Plan.* Available at: https://www.science.org.au/sites/default/files/user-content/20yearaustralianantarcticstrategicplan.pdf

[2] Press, A.J. (2014) *20 Year Australian Antarctic Strategic Plan*. P.2. Available at: http://20yearplan.antarctica.gov.au/final-report

[3] The final report of the Senate inquiry is available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/Southern_Ocean_and_Antarctic_waters/Report
[4] Press *Op Cit.* P.2
[5] *Ibid*. See recommendation 16
[6] *Ibid*. see P. 7
[7] *Ibid*
[8] Kennicutt, M.C. & Horizon Scan Authors (2014) 'Six priorities for Antarctic science'. *Nature* 512: 23-25.
[9] Press *Op Cit*. See recommendation 16
[10] See Department of the Environment (2015) *Guidelines at a glance.* Available at: http://www.antarctica.gov.au/science/information-for-scientists/research-guidelines/guidelines-at-a-glance, accessed 25th March 2015.