

## Australian Antarctic Division funding

Simon W Wright and Andrew T Davidson

### Authors' experience and qualifications

**Dr Simon Wright**, retired Principal Research Scientist, was employed 35 years with AAD (1978-2013), and continues involvement as research advisor to postgraduate students and as Adjunct Senior Lecturer at the Institute for Marine and Antarctic Studies, University of Tasmania.

**Dr Andrew Davidson**, retired Senior Research Scientist, was employed 26 years with AAD (1991 – 2017)

Both authors worked in marine biology, studying the phytoplankton of the Southern Ocean, their role in ecosystems and in climate change.

### Summary

The Australian Antarctic Division (AAD) is facing a funding shortfall of \$25 M, some 16% of its operating budget, and the Antarctic science program is reportedly expected to bear the brunt of these cuts. This will be a further blow to the science staff at the AAD, their collaborators, and Australia's standing in the Antarctic community, as well as the AAD's future science capability. These cuts come on top of an accelerating decline in science capability over the past two decades. They are apparently due to cost overruns in the operations budget rather than any decline in overall budget allocation. Yet the axe will fall hardest upon Science because the AAD has financially structured itself such that science funding has become discretionary, whilst the budgets for operations, and development of capability and infrastructure are not. This reflects the relative influence of these Branches within the AAD, despite Science purportedly being the justification for Australia's occupancy of Antarctica and its sovereign claims to 42% of the continent. We identify serious structural and management issues within the AAD. The provision of increasingly lavish infrastructure and Capability at the AAD has led to a massive operational drain on AAD resources, the absence of infrastructural flexibility and large number of permanent Operations staff having been employed to support fixed term projects. Meanwhile, Science has been allowed to deteriorate to a program precariously dependent on short-term contractual staff and external collaborators to provide core research capabilities while exposed to ephemeral funding. We ascribe these issues partly to national confusion regarding the priorities of science vs the capability/infrastructure to justify our sovereignty claim and provide examples of how science capability has been affected. We make 5 recommendations to address the current shortfall and to achieve the scientific goals of the Australian Antarctic Science Strategic Plan more effectively and economically, namely that the Government should: 1. Provide an emergency funding boost to allow completion of current projects; 2. Clarify the purpose of the AAD; 3. Implement a multi-year project funding model that suits the vicissitudes of Antarctic research; 4. Identify core AAD science functions and guarantee their support; 5. Survey scientists within the AAD to identify both problems and solutions.

## Introduction

For decades there has been a saying amongst the Antarctic science community, “When AAD funding gets a sniffle, Science gets pneumonia”. This reflects structural characteristics of Australia’s Antarctic program that make science particularly vulnerable to budget cuts. The current *de facto* cut of \$25M at the AAD will have devastating, long-term consequences for science. We use the term “*de facto* cut” to reflect our understanding of the situation, which is that, although the promised \$804.4 M may be delivered, the science budget will be cut to compensate for cost overruns elsewhere in the AAD (see below).

These cuts will be devastating. Australia’s Antarctic science program is already seriously threatened. It has been desperately under-resourced for many years, with progressive loss of staff, capability, and levels of morale that is extremely low and worsening – even before the current cuts were announced.

Our submission addresses the eight terms of reference below. But first we feel it important to outline the underlying structural issues, the decisions that have led to this situation, and their consequences.

The underlying issues faced by the Antarctic science program are:

1. Confusion at the highest level regarding the purpose and goals of Australia’s role in Antarctica – in particular, the relative priorities of the commitment to science versus infrastructure in support of sovereignty.
2. Long-term structural problems within the AAD and DCCEEW brought about by the lack of clear strategy for Australia’s Antarctic presence. These have allowed different goals for the science and operations arms of the AAD, and construction of crippling expensive high-maintenance infrastructure with massive overheads.
3. Appointment of administrative staff in permanent positions for fixed term projects (most recently the so-called Modernisation Project) while science projects only receive fixed-term contract positions, even for core roles, in the name of flexibility. Permanent positions (including our own) lost through attrition are not refilled – or are replaced by temporary positions, which are subsequently lost in funding cuts.

These problems leave the science program particularly vulnerable to the even the smallest funding cuts – for although science is the justification for Antarctic presence, operational costs are seen as immutable while science is seen as discretionary when resources are tight. Projects are cut, temporary staff are lost – and with them, critical capability. Approved projects that have been years in development frequently have been unexpectedly left under-resourced and compromised, even while people are in the field.

A further problem is that projects are seen as “successful” when the expedition returns – there is no commitment of continued support to analyse samples and publish the findings.

These underlying issues, coupled with rising costs, are central to the Antarctic science program’s current predicament. We provide more detail and some examples under *term of reference (i) “any other related matters”*. They mean that simply maintaining the AAD’s overall budget will result in a real cut to science capability. Given the urgent requirement to better understand what’s driving the recent rapid environmental changes in Antarctica, such cuts would be devastating.

In the following section, we respond to the terms of reference to help understand the nature of the current threats to science funding as well as the implications for capability of the program, for international programs, and Australia’s national interest.

In the final section, we make 5 recommendations to deal with the current shortfall and to refocus the Antarctic program to more effectively and economically achieve the scientific goals of the Australian Antarctic Science Strategic Plan.

## Responses to terms of reference

### (a) revelations that the AAD is pursuing cuts worth roughly 16% of its operating budget;

We believe that there will be a de facto cut in science even though there has been no budget cut – due to the inflexible structure of the AAD and its operations, as described below.

There is apparent confusion about the situation. Senator Bilyk stated, “There has been no reduction in the AAD’s operational funding whatsoever” (Hansard 8/8/23). In contrast, an email sent to all staff by head of division on July 10 stated that “the AAD won't be able to afford all current positions” (ABC News 29/7/23) and a department spokesperson stated that “we will review any fixed-term employment contracts .....The focus will be on finding areas where work performed by those on fixed-term contracts can be incorporated into the work of ongoing staff.” (The Guardian, 28/7/23). The latter statement is of course public-service speak for “temporary staff will be sacked”.

We understand that massive overheads have been incurred with commissioning of the new icebreaker, RSV Nuyina, and sourcing replacement shipping when the Nuyina was unavailable. These expenses have persisted beyond the period that the AAD received funding support for the project. The costs cannot be borne by a budget that is no longer supplemented to cover such project overruns. Science staff and projects are the main area of discretionary spending and there is widespread expectation and alarm that they will bear the brunt of cuts (e.g. Nature 16/08/23, The Guardian 01/08/23, 19/08/23, 22/08/23, Mercury 19/08/23).

As a result, cuts to science projects are expected despite there having been no reduction in funding allocated by Government.

### (b) the direct and indirect impacts of cuts to public funding of Australia’s Antarctic activities, including on full-time, part-time and contract AAD jobs;

The threatened cuts will severely impact Science Branch staff (permanent and contract), collaborators (particularly postgraduate students) and long-term capability. We address these issues below and describe the fate of our own former program as an example.

#### *Permanent staff*

Most permanent research staff have already lost much of their support and are extremely frustrated by the inability to undertake fieldwork, while seeing extravagant spending on infrastructure in their name. We hear that morale is at an all-time low. The departmental spokesman’s statement, “work performed by those on fixed-term contracts can be incorporated into the work of ongoing staff” shows no appreciation of the working conditions faced by these staff.

For years, our colleagues have complained of overwork, loss of staff, lack of support for critical roles, as well as an increasing overload of administration that greatly reduces their ability to conduct research. To suggest that they can take on the work of their former assistants without their work suffering is fanciful. Conversely, if the intention is that non-science staff (trades or administration) are expected to assume roles in sample collection and preparation for later analysis, the commitment to sampling is compromised, the quality of those sampling procedure is unknown and questionable, and the ability to modify sampling protocols in response to changes in the samples or environment is negated. By comparison, would the AAD get scientists to do the work of trades people?

#### *Contract staff and students*

Much of the science in the AAD and in universities is done by contract staff (predominantly post-doctoral researchers, often on a treadmill of short-term contracts) and postgraduate students. These early-career scientists are very vulnerable. To have a future in science, they must maintain a constant stream of research papers, and their expertise is very specialised and often not readily transferrable. Students may have their projects cancelled or lose their supervisors. If their programs are cut, it will be devastating to them and may curtail their careers.

AAD has had a long history of employing scientists on contracts, often in roles that are vital to core programs. Those staff have critical capabilities and expertise invested in them and those capabilities are jeopardised or lost when they are sacked due to budget cuts.

### *Collaborators*

Conducting AAD field research increasingly requires establishing collaborations, whether to engage in large-scale multinational programs, or simply to bolster the critical mass of funding, manpower and expertise lost during previous cuts to AAD science.

National and international collaborators are often untenured, many are higher degree students, and invariably their participation has far-reaching effects on their other research priorities, publication rate and ranking, career prospects, and standing amongst their scientific peers.

If the research is cancelled or delayed, the AAD's credibility as a reliable enabler of science is lost. The delay or loss of the project jeopardises the collaborators careers and they must refocus their priorities, meaning they are often unavailable for this project, or other projects in the future. The AAD may now be unable conduct future research because there aren't collaborators to enable it.

### *Science Capability*

Capability has already been lost due to long-term squeezing of the science program, non-replacement of permanent staff or conversion of their positions to temporary, and subsequent loss of temporary positions.

To its detriment, the Antarctic science program relies on contract staff. Many have been brought in to provide particular expertise or have been trained to perform core research roles, due to the lack of permanent staff. Inducing the AAD/Government to employ permanent staff to perform these crucial roles has proved impossible. When such staff are lost due to funding cuts, so too is their corporate knowledge and research capability. This compromises the capacity to fully answer the research questions, or even conduct the research at all. Collaborators then need to be found to fill the capability gaps. If funding improves, new staff have to be trained at great expense, and almost invariably end up on new short-term contracts, which suffer the same risk of dismissal in further cuts.

The effect of such cuts can be demonstrated by the cuts that occurred to our own program, starting from 2011.

We were responsible for all AAD research into marine phytoplankton and microbes. They are the base of the food chain, directly or indirectly providing the food for everything else in the ocean; they are the critical first step in the biological draw-down of carbon dioxide from the atmosphere, and are themselves sensitive biological indicators of global change. Our group was at the core of all ecosystem research field projects.

Despite the program's importance, over a period of 6 years from 2011 to 2017. The program lost both its permanent research scientists (SW and AD) without either being replaced. It also lost two permanent technical officers (one resigned and the other was employed in infrastructure support) and four contract staff (one reemployed in infrastructure support). None were replaced. One permanent technical officer remains to support this entire capability. As a result, millions of dollars of cutting-edge research equipment has either been disposed of or sits idle on benches, including an electron microscope suite that was converted to offices. Thus, a research program that was both highly productive and highly internationally regarded has been lost, greatly limiting the AAD's ability to study carbon uptake by the Southern Ocean and determine climate-induced changes in biodiversity.

The zooplankton program suffered a similar fate, going from 1 PRS + 3 technical support staff to 1 technician. Overall, plankton research has gone from 2 Principal Research Scientists, 1 senior Research Scientist, and 10 technical support staff, to 2 technicians.

Turnover in key positions such as Director and Chief Scientist means corporate memory of what went before is lost and reduced staff numbers become the new norm. Do they wonder about the empty labs and idle equipment? How can the remaining staff ask for sixfold increases in staff to restore capability?

And this was BEFORE the current cuts.

### **(c) the ramifications for Australia's international commitments and obligations;**

Australia has a proud history of punching above its weight in Antarctic affairs. It was driving force behind the Madrid Protocol and has contributed to other decision-making and policy innovations (**Antarctic Magazine Issue 27, 2014**). Australia's Antarctic Strategy and 20 Year Action Plan states that Science remains the primary justification for Australia's presence in Antarctica. Expanding logistical capability is mentioned once, in the context of expanding critical research. But Australia's influence over the frozen continent has become a pale shadow of the past because our investment in science has deteriorated. In the past Australia did good science to justify our national claim to 42% of Antarctica. Instead, sovereignty over Antarctica is increasingly validated by the magnitude of spending on shiny new capability which, without the expressed intent of conducting science, is seen as an empty gesture.

The cuts to the program were a topic for alarm at the recent SCAR meeting in Christchurch. The journal *Nature* published an article entitled, "Australia's Antarctic budget cuts a 'terrible blow for science'" on 16<sup>th</sup> August. There is no doubt that Australia's reputation will be damaged by this news. And of course it will come as an extreme embarrassment for Australian scientists who have joined collaborative projects or encouraged other scientists to join ours.

### **(d) the internal compilation of a list of at least 56 existing projects, programs and research activities that could be cut and/or terminated;**

As we are no longer employed at AAD, we can't speak directly on the which aspects of the research program will be affected. However, each project will have been through an exhaustive selection process assessing both scientific merit, strategic relevance, operational practicality, and cost effectiveness. Given the selection process, all the agreed science proposals are important to fulfilling the Antarctic Strategic Plan.

Most will have external collaborations at national and international level, and collaborators will have had to obtain funding through ARC or international bodies, with their own time frames that cannot be deferred. Many have already been deferred due to late delivery of RSV Nuyina and its subsequent problems.

### **(e) the extent of the Albanese Government's involvement in, and response to, these cost-cutting plans;**

The Albanese government has inherited a mess that was decades and several governments in the making due to lack of strategic clarity from the top, coupled with the political desire to have demonstrable physical evidence of funding, and empire building within the AAD (as described under *term of reference (i)*).

We accept that the government's statement, "There has been no reduction in the AAD's operational funding whatsoever" may well be true. However, the Minister should understand that the science portion of the budget is threatened due to cost overruns in other parts of the AAD.

The announcement by the AAD Director that the AAD can't afford the current positions and projects will be halted should ring alarm bells in the Minister's office. The resulting continued deterioration of Science, the principal reason for our occupancy of Antarctic and justification for our territorial claim, will be devastating. It's not enough to say that you got the money that was promised.

Senator Bilyk stated that “this government is committed to continuing its support for world-class research carried out by the AAD” (Hansard 8/8/23). That statement was to support research, not budgeted funding levels. If there is an actual commitment, then the government needs to step in to fund the current science projects while they work out what to do with the AAD budgetary mess.

**(f) the consequences of funding cuts to Australia’s Antarctic program for our country’s geopolitical and strategic international interests;**

We have already addressed the critical role of science in Australia’s standing in Antarctica and the progressive decline in this influence that corresponds to the declining investment in AAD Science under term of reference (c).

We should also add that much of the science from Southern Ocean research will feed directly into Australia’s stance in international fora on controlling climate change and for fisheries protection. These include the effect of ice melt on sea levels, the uptake of carbon dioxide through the ecosystem and via ocean circulation, and determining the sensitivity of Southern Ocean ecosystems to climate change.

**(g) complications that the proposed \$25 million worth of cuts will cause for the full delivery of the Australian Antarctic Science Strategic Plan, the Australian Antarctic Strategy, the 20-year Action Plan, and the extra \$804.4 million Antarctic funding package delivered by the Morrison Government in early 2022;**

Technically, the \$804.4 million was a Liberal election promise that appears to have been delivered by the Labor government. If our interpretation of events is correct, the present funding shortfall would also have occurred under a Coalition government due to the structural problems within the AAD.

However, as mentioned above, we are no longer AAD employees and are not privy to the strategies planned to address these cuts. Thus we are unable to assess their impact on achieving the immediate and long-term science strategic goals.

**(h) the widespread view, including among numerous Antarctic science experts, that funding cuts of this scale and nature are catastrophic for Australia; and**

There is no doubt that Antarctic science is important to Australia's interests. We know that Australia’s coastlines will be impacted by rising sea-levels due to ocean warming and ice melt, but at what rate? We know that there is a close match between sea-salt in ice cores and rainfall in Australia. We know that the Southern Ocean circulation oxygenates the deepest layers of the world’s oceans and absorbs and transfers enormous quantities of heat, and that the ecosystems are very important sinks for atmospheric carbon dioxide and support significant fisheries. We know that all of these things are impacted by climate change and in turn impact climate, but by how much? We also know that a million-year climate record lies still preserved in the ice – what will it show about previous climate change?

This year we had the minimum sea ice cover ever recorded, yet we can’t study what’s happening and thus understand the causes and likely consequences. We also need to determine the condition of the ocean and impacts on ecosystems and their role in carbon drawdown.

If ever there was a critical time for Antarctic research, it is now ....

**(i) any other related matters.**

In this section, we discuss the long-term structural problems within the AAD that make Antarctic operations unnecessarily expensive and the science program hyper-vulnerable to funding cuts, and provide examples.

## 1. Confusion at the highest level regarding the purpose and goals of Australia's role in Antarctica – in particular, the relative priorities of the commitment to science versus infrastructure in support of sovereignty.

Any discussion of Australia's Antarctic presence is always centred around the conduct of science, with the phrase, "Science is the currency of the Antarctic Treaty system" often touted in policy announcements. However, with 42% of the continent at stake, sovereignty has never been far from mind for the Commonwealth Government. But material presence is increasingly replacing science as the vehicle for achieving this influence in Antarctic affairs without an explicit change in the Government's strategy to achieve its policy goals. Is the shift intentional?

As a result of this confusion, spending on capital works is seen as an end in itself, Antarctic stations are permanent edifices rather than convenient beachheads for science. During previous cutbacks, the option to close stations over winter was merely politically unpalatable, now it is effectively impossible due to construction of buildings that require continuous operation.

Flag-waving projects are dropped from on high in the name of science. The Casey and Davis air links provide clear examples. The first we heard of the Casey air link was when we received emails asking scientists, "If we had an air link, what science could you do?" Then a month or so later, there was another email, "Come on guys, if we had an air link what science could you do?". A month later, there was a statement, "The scientists are demanding an air link!". Of course the Casey air link went ahead, and is used, but was it a good investment? It replaced a much cheaper but serviceable intra-continental link from McMurdo, it requires a massive team and expense to maintain the airstrip and service the aircraft, and major equipment still must be brought in by ship – so ship-time hasn't been saved for marine science and most programs are still subject to the vagaries of ship access. RSV Nuyina is currently on a medivac mission to rescue a sick expeditioner because the airlink can't be used in winter. But this is an example of how the Antarctic program has come to rely on improvements in infrastructure and logistic capability to justify Australia's sovereignty claims.

An even more stark example was the proposed paved runway at Davis station. This was opposed by all scientists we know. At a likely cost of at least \$800 M, the runway would have required wholesale transformation of the Vestfold Hills, flattening ~400,000 m<sup>2</sup> of land, laying 150,000 m<sup>2</sup> of runway, and installing storage for 500,000 L of fuel. Aircraft flight paths would have threatened two Antarctic Specially Protected Areas with nesting seabirds. The construction would have involved a massive multi-year operation to get heavy equipment and concrete onto the site – our rough calculation suggests 116 trips of RSV Nuyina for concrete alone – plus an on-going requirement to deliver fuel, while also consuming most of the station accommodation and thus preventing science projects – not that anyone would want to study the disturbed area.

Fortunately, the Davis airstrip project was aborted. But if scientists had been asked, "What science could you do for \$800 million?", NO-ONE would have answered, "Build an airstrip!". Yet we assume that a huge administrative cost went into preparing plans and that people permanently appointed to manage the project are still on the payroll, forestalling appointment of scientists.

## 2. Long-term systemic structural problems within the AAD and DCCEEW

The lack of clarity regarding the purpose and goals of Australia's Antarctic program has resulted in serious problems for the conduct of science.

### *1. Conflict/competition between science and operations*

The AAD has created an operational monster that they can't sustain. Without clear directions to support science, the Operations Branch has become a self-serving Empire, flourishing while science withers. While most staff in the operations branch are undoubtedly well-intentioned, the Branch has apparently set its own goals, unencumbered by budgets, producing enormous high maintenance stations that can't be winterised, an air link of questionable value to science, and overseeing construction of the RSV Nuyina, whose massive size is itself a problem, while those in the science



branch were advocating two smaller ships to provide the flexibility we once had from the 1980s till 2000s.

There has always been competition amongst the various elements of the AAD for funding and influence. The capability providers wield immense power and influence when it comes to AAD budgets. These capabilities are expensive to purchase and maintain and the costs are widely seen by AAD management as immutable. Why? Because stations must be manned, maintained, resupplied, expanded and all the other capabilities (ships, aircraft, vehicles, heating plumbing, chefs, electricians, diesel mechanics, plumbers, ...) are required to enable this.

#### *ii. New branch*

This is a relatively new development, but we were appalled to learn that the Science Support section was no longer administered by the Science Branch, but had been elevated to an independent Assets and Technology Branch – this makes no strategic sense and can only lead to further empire building.

#### *iii. Inappropriate centralisation of functions in Canberra*

Since the days of the Howard government, there has been an increased tendency to manage much of the administration of the AAD from Canberra, where staff have no experience in Antarctic operations, little apparent investment in the Antarctic program and a high turnover rate. In contrast, administrative staff at the AAD Kingston headquarters tend to stay in similar roles for decades, many have direct experience in Antarctic expeditions, they understand real deadlines like ship departures, they know the scientists and operations staff personally, and they have pride and engagement with the program. They know that it doesn't make sense to always buy the cheapest gear when you are relying on it to function and be serviceable under Antarctic conditions. Nor does it make sense to have a standardised public service structure to manage the program.

### **3. Misclassification of staff positions.**

There is a history of appointing permanent staff to temporary projects within the administrative and operations branches, while science branch struggles to get anything other than temporary staff, even for core functions. For scientists, management favours flexibility, even though this is sadly lacking in the operation branch. These temporary science staff are the first to go during cutbacks due to the perceived immutability of operational costs (see above).

## **Recommendations**

We make the following recommendations to deal with the current shortfall and to refocus the Antarctic program to more effectively and economically achieve the scientific goals of the Australian Antarctic Science Strategic Plan.

#### *1. Emergency funding boost*

The government should immediately announce an emergency funding boost of \$25 M to allow currently approved projects to proceed, while addressing the structural problems within the AAD.

If the government is “committed to continuing its support for world-class research carried out by the AAD” (Hansard 8/8/23), this boost should follow automatically. Recently promises of \$200 M for a football stadium in Hobart and an extra \$220 M for women's sport suggest there is not a dire funding emergency to prevent it.

#### *2. Clarify the purpose of the Australian Antarctic Division*

The government should make an explicit declaration that the purpose of the AAD is to sustain Australia's sovereign claim to Antarctica primarily by implementing the Australian Antarctic Science Strategic Plan, and direct that the AAD resources and structures should be dictated by the requirements of achieving this Plan.



### *3. Multi-year funding model*

Funding and staff levels should be allocated for approved projects on a multi-year basis from the time of acceptance to the time of completion.

Conducting science in the Antarctic is not suited to unreliable year-to-year funding, especially given the reliance on external agencies and international collaborations, the multi-year preparation time for projects, and the vicissitudes of Antarctic operations where ships may get stuck, weather may delay experiments, or operations may be cancelled due to medical emergencies.

Prior commitment of support would have prevented the current crisis, it would make Australia a more reliable collaborative partner in international programs, and it would save enormous amounts of wasted time and resources on cancelled or unfinished projects. It would ensure returns on the massive infrastructure investment in the program.

This of course differs from the normal public service funding model, but if we can forward-commit to weapons or stadiums, why not commit to science?

### *4. Identify and guarantee core science functions*

Some core science functions can best be done by government agencies. A prime example is long-term monitoring, which is vital for understanding the patterns and changes in environments and ecosystems that may occur over multi-year or even decadal timescales. Such monitoring demands a long-term commitment and is unsuited to researchers from external institutions with unreliable funding.

For monitoring of marine ecosystems, overall patterns of some parameters can be measured by satellite, but determining the reasons for those patterns requires observations of species and productivity that can only be done from ships. Such sampling can be very cheap (e.g. dragging a continuous plankton recorder behind the ship or sampling some water for phytoplankton) yet very valuable – the most recent satellite calibration functions for remote sensing of Southern Ocean chlorophyll were based almost entirely on samples our program collected and analysed from 2002 – 2013 and are instrumental to more accurately estimating plankton abundance in Antarctic surface waters. With ship time costing over \$120K per day, it makes no sense to not perform under-way sampling. It requires only some analysts to examine the samples on return.

Such core science functions should be identified, provided with permanent staff and funded appropriately to ensure that we can detect changes in the system.

### *5. Survey of scientists*

Our knowledge of the internal workings of the AAD is out of date, although we have picked up tidbits as colleagues expressed their frustrations over recent years. But our colleagues made it clear that they could not give us direct information for this submission, and we carefully avoided compromising them. Clearly, they have been directed to remain quiet.

Thus we suggest that a much better picture of the current situation could be obtained through a confidential survey of scientists and other staff within the Antarctic Division, to be conducted by an independent agency, with open questions that allow feedback on management, and delivered straight to the Inquiry without being filtered by AAD management. This would provide a better basis for strategic decisions.

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We thank the Senators for the opportunity to help restore the capability of the Antarctic Science program.