

## Submission to the Inquiry into Australian Antarctic Division funding

Prof Dana M Bergstrom

Honorary Senior Fellow, University of Wollongong | Honorary Professorial Fellow, University of Johannesburg, South Africa | Chair and Chief Scientist, Pure Antarctic Foundation Inc.

### Background

I'm an applied ecologist specializing in Antarctic and subantarctic ecosystems, with a four-decade affiliation with the Australian Antarctic Division (AAD) and the Australian Antarctic Program. My journey with the AAD commenced in 1983 when I embarked on an expedition to Macquarie Island as an MSc student at the age of 21. In 2001, I transitioned to the AAD after an 18-year university academic career, ultimately retiring as a Principal Research Scientist in August 2023, having also spent 12 months in program leadership roles. Throughout my career, I've led various international Antarctic science programs and national projects, contributing significantly to the field. My involvement extends to being the Australian delegate to the international science body, the Scientific Committee for Antarctic Research (SCAR); represented Australia on multiple SCAR committees; Chaired the Academy of Sciences' National Committee for Antarctic Research; been a member of past national committees (Antarctic Science Advisory Committee, Antarctic Research Assessment Committee. I've assisted shaping national Antarctic Science Plans and Implementation plans. I was honoured with the Eureka Prize for Leadership in Innovation and Science in 2021.

### Current state of Antarctica

After decades immersed in Antarctic science, I have learned that physical and biological changes rarely occur smoothly. More often than not, they unfold in sharp steps. Right now, Antarctica's climate and ecosystems are experiencing disturbing changes.

Antarctica matters. Much of this past winter's sea ice did not form<sup>1</sup> or formed very late. A crucial ocean current<sup>2</sup> is slowing down, and glaciers and ice shelves are disintegrating<sup>3</sup>. On land, fragile Antarctic moss and subantarctic tundra ecosystems are collapsing<sup>4</sup>. Iconic emperor penguins may be heading for extinction<sup>5</sup>, and recent scientific findings reported the death of tens of thousands of chicks through early sea ice breakout<sup>6</sup>. Pollution from human activity in Antarctica has also left a toxic legacy<sup>7</sup>. It's almost certain things will get worse<sup>8</sup>.

What happens in Antarctica affects global weather patterns and sea levels. Record-breaking stored heat<sup>9</sup> in the ocean is melting ice shelves from underneath, setting off a chain reaction. Without the buttressing of the ice shelves, glaciers flow faster to the sea. In West Antarctica, the Thwaites "doomsday" Glacier is melting faster than predicted<sup>10</sup>. In East Antarctica, lesser-known ice shelves have collapsed<sup>11</sup> and glaciers are shrinking, adding to sea-level rise.

Hundreds of Antarctic scientists have expressed concern we are in a climate crisis and have a narrow window to act<sup>12</sup> to reduce greenhouse gas emissions and urged for expansion of science to aid our understanding<sup>13</sup>. Scientific observations<sup>14</sup> and research is crucial in the face of these threats, to help better understand these changes now and over the longer term, and to feed into policy interventions.

### Budget shortfall

With so much at stake, it was surprising that a small budget shortfall appears to have inadvertently derailed so much planned scientific activity this coming summer in Antarctica. It was partly unanticipated, considering the recent increased investment in Antarctic activities, but not a shock. (Note: I believe the AAD were aware that a subsidy for the 2<sup>nd</sup> ship would fall away once *RSV Nuyina* was fully operational). For the multiple decades that I have been involved in the Australian Antarctic Program, science has always come off second best when there is a pull from logistics, such as extra shipping costs, increasing fuel costs or the expense of just keeping the lights on at our stations. Compared to other national programs, Australia is a major player with four major stations to maintain, but compared to other national programs the number of scientists was always less than of support staff and has been shrinking. Australian scientists spending the winter in Antarctica is almost unheard of. Our presence, however, is commensurate with our claim of 42% of the continent, but needs significant investment.

One could contend that the recent substantial increase in commitment (~\$800 million over 10 years) is noteworthy. However, a significant portion of these funds is allocated towards the vital task of renewing infrastructure<sup>15</sup>, which has suffered from a prolonged lack of investment over the past few decades, severely impeding its capacity for renewal. Much of the expansion of funds can effectively be considered as catch-up. Furthermore, the *RV Nuyina* is very large ship, the largest amongst Antarctic nations (25.5K tonnes) and is very expensive to run (~2 x fuel use of *Aurora Australis*). The ability to exploit the ship's capacity to resupply two stations in one voyage to minimise fuel usage, I imagine, will take some time to bed down into seasonal planning.

What appears to have evaporated, in the short term at least, is funding for over 40 flagged new, non-management, science positions. With these proposed (and some even advertised) positions the established AAD Science programs just barely had a chance to catch up with needed science delivery (e.g. 6 new positions to form a much-needed ice sheet and sea level rise section; and 5 new positions to establish the A Cleaner Antarctica Project to address our legacy waste issues across the AAT). However, without these new positions AAD Science will either have to drastically reduce the scientific tasking and hence capacity to provide advice or continue to slide into the margins of science delivery, i.e., become a space holder for future scientific action, at the expense of the claim to deliver world-leading science. The flagged new positions, did not yet address areas of needed expansion, identified in the O'Kane review.

It is also worth remembering that cuts to the AAD budget in 2014, led to the loss of 60 staff (and associated brain drain), one third of which were in the Science Branch. Coupled with the impact of the pandemic, rebuilding, the aviation program, the new ship, its major hiccups and commissioning, a new ITC upgrade, increased trades support, HQ support, and increased field personnel support, science support and the number scientists on the ground, has been decreasing over the decades, for want of money, berths on station and space within logistics. For example, a project that I am an investigator on, assessing Emperor penguin colonies in the Australian Antarctic Territory was approved for support in 2018. Over this time, logistic support to fly the coastline of the AAT to assess all 20+ Emperor penguin colony status has not yet eventuated. Assessment of our Emperor penguin numbers is currently being done through satellite imagery, but ground truthing is essential to ensure quality of remote-sensed data. Furthermore, the chief investigator of the project is on substantial long-service leave and a replacement for this role has not been filled.

For the thirty years between (1989 – 2010), the AAD supported on average over 100 science project per year. This year there are approximately 50 projects on the AAD books including 2 university led mega-projects, but at least 12 of those involve previously collected samples, satellite data or expert elicitation in Australia or rely of remote equipment established on the station. Of the 38 or so projects that require field support, only a handful projects are being supported this summer, including a catch-up project that was approved in 2019, and two remote campaigns. Additionally, colleagues inform me that some projects have now received late support after being announced that they would not receive patronage for the summer. This last-minute change of heart has put enormous pressure on these teams to again, prepare for the field season. Contract staff, including scientists, have also not had contracts renewed, meaning in-train work in critical areas has stalled, including research on rapid glacier retreat on World Heritage Heard Island.

In my view, critical AAD-led work that is not being supported this summer includes sea ice science, fundamental baseline biodiversity and comprehensive contaminated site assessment work to support clean-up of legacy wastes at Mawson, fundamental baseline biodiversity work in near shore habitats and critical seabird research and monitoring in Prydz Bay, sea level research, and a 20-day marine science voyage on the Southern Ocean ecosystems. Much of this work feeds into essential regulatory work that is the bread and butter of AAD scientists and requires long-term commitment.

The project I was leading prior to my retirement, East-Antarctic Nearshore and Terrestrial Observing System, has two, state-of-the-art long-term monitoring towers awaiting deployment. The project was curtailed for want of trades support and berths for 2 scientists/ engineers to install the equipment over a 2-week period. Sadly, this failure of support will potentially impact Australia's international reputation as leaders and a nation committed to Antarctic science. The installation of these sites was flagged this year, in a multinational paper (including Australia) presented at this year's Antarctic Treaty Meeting<sup>16</sup>. This 10- year approved project, to lead the world in long-term monitoring to detect the impact of climate change is now 2 years behind in planned, approved field work and has no substantial staffing and no budget confirmed, apart from this year's CAPEX purchase.

University science being curtailed includes finishing the acquisition of drone imagery of Antarctic Specially Protected Areas near Casey that was initiated last year and, fundamental science on the extent of the presence of novel bacteria in the Vestfold Hills that can eat methane.

All this science can be considered 'critical' as it feeds into various international obligations, assists Australia conserve Antarctic and Southern Ocean diversity, and provides fundamental knowledge to help Australia refine climate change policy and plan for climate change impacts.

Budget shortfalls also affects the local Tasmanian community more than big ticket items like ship and fuel. For example, the reduction in the use of helicopters this season will impact local business and then the local spend within the community.

Failure to fully support such vital Antarctic science, regardless of the cause of the shortfall, in a rapidly unfolding climate emergency, in my view, is unwise, somewhat puritanical in approach and will ultimately harm the nation.

#### **Additional problems**

- The Antarctic Division is the midst of major cultural change in response to the Russel Review and the Nash Report, as well as other complexities within the organisation. Flipping an APS Division into budget-management chaos restricts the capacity for the AAD to follow through with these much-needed changes, as focus shifts to costs, staff become competitive for resources and are under renewed stress. Many contract staff not having their contracts renewed or are now under a cloud of contracts ending, are mid-career women. Any further brain drain during a fiscal surplus may be considered counterproductive to the nation and Tasmania.

#### **Future directions and potential recommendations**

The funding and support model for Antarctic science is anything but uniform. The current multiple lines of funding; AAD and other government entities, ARC, joint partnerships, is chaotic with fiscal cliffs and abrupt project endings looming for the university sector at various times over the next seven years. There has also not been a call for smaller Antarctic science projects through the AAD science grant scheme for some years, as the AAD attempts to play catch up and support those from previous rounds, all the way back to 2018, so unaligned University scientists have not had the chance to participate in the AAP for some time. Considering that the big University projects were created through shoulder-tapping to create teams, this situation may not serve the nation and is inequitable. Furthermore, inclusion of the heads of the large university consortia as members of the Australian Antarctic Science Council<sup>17</sup>, sets up potential conflicts of interest. It would be in the best interest of the AAP, if these consortia reported to, and not sat on, the council determining priorities.

Furthermore, I feel the location of the AAD in DCCEEW, within a portfolio that contains Energy, and a department that has approved new coal mines and methane gas and LPG production, places the AAD in permanent conflict with the Department's Outcome 1 (Climate Change and Energy) based on the conclusions of Antarctic derived science and policy positions. This year Australia, through the Antarctic Treaty System, with other Antarctic nations committed to the *Helsinki Declaration on Climate Change and the Antarctic*<sup>18</sup>, which among other significant statements, stated:

*Acknowledging that by further delaying concerted global action on climate change mitigation and adaptation, we risk missing the window of opportunity to secure a liveable and sustainable future for all;*

and Antarctic Treaty Nations are:

*Deeply concerned that multiple meters of sea level rise resulting from ice-sheet loss that is irreversible for centuries to millennia would have devastating to catastrophic impacts, particularly on millions of people living in low elevation coastal zones;*

## Summary of recommended reforms/ commitments

- **Australia must land a long-term consistent funding model for Antarctic science, both for AAD science and non-AAD science.**
- **Improve planning and logistics support for existing approved science projects.**
- **If Policy and Science are the priorities for the AAD, then moving to some system where the ratio of scientists to support staff at Antarctic stations is guaranteed is required (e.g. 3 scientists: 2 support/trades).**
- **AAD internal science support budget must be quarantined from other expenses, so that science, including AAD science is always supported. Reverse the budget shortfall and the curtailment of science recruitment at the AAD. The brain-drain from 2014, and more recently, is still impacting the country.**
  - Although staff numbers have increased again at the AAD, the significant loss of knowledge and expertise has not been replaced. There is a serious shortage of Antarctic expertise in the organisation in every sector.
- **If science really is a major priority for the AAP, consider moving the AAD into a statutory body overseen by both the Environment and Science portfolios.**
- **For the AAD to determine and announce both internal and external science project commitments for 2024/25 by February 2024 to allow effective planning for a full season of supported science, as well as support and funding back in Australia.**
- **Re-evaluate the membership of the Australian Antarctic Science Council, to remove the potential for bias from specific university programs.**

### Footnotes

<sup>1</sup> <https://theconversation.com/antarctica-is-missing-a-chunk-of-sea-ice-bigger-than-greenland-whats-going-on-210665>

<sup>2</sup> <https://theconversation.com/torrents-of-antarctic-meltwater-are-slowing-the-currents-that-drive-our-vital-ocean-overturning-and-threaten-its-collapse-202108>

<sup>3</sup> <https://theconversation.com/antarctic-tipping-points-the-irreversible-changes-to-come-if-we-fail-to-keep-warming-below-2-207410>

<sup>4</sup> <https://theconversation.com/existential-threat-to-our-survival-see-the-19-australian-ecosystems-already-collapsing-154077>

<sup>5</sup> <https://theconversation.com/antarcticas-emperor-penguins-could-be-extinct-by-2100-and-other-species-may-follow-if-we-dont-act-196563>

<sup>6</sup> [https://www.theguardian.com/world/2023/aug/25/emperor-penguins-thousands-of-chicks-in-antarctica-likely-died-due-to-record-low-sea-ice-levels?CMP=share\\_btn\\_link](https://www.theguardian.com/world/2023/aug/25/emperor-penguins-thousands-of-chicks-in-antarctica-likely-died-due-to-record-low-sea-ice-levels?CMP=share_btn_link)

<sup>7</sup> <https://www.theguardian.com/world/2023/aug/10/pollution-at-australias-largest-antarctic-research-station-exceeded-guidelines-for-almost-20-years>

<sup>8</sup> <https://www.theguardian.com/world/2023/aug/08/drastic-action-needed-to-limit-worsening-extreme-events-in-antarctica-scientists-warn>

<sup>9</sup> <https://www.abc.net.au/news/2023-08-21/ocean-temperature-records-2023/102701172>

<sup>10</sup> <https://abcnews.go.com/International/images-antarcticas-doomsday-glacier-show-melting-below/story?id=97269226>

<sup>11</sup> <https://theconversation.com/conger-ice-shelf-has-collapsed-what-you-need-to-know-according-to-experts-180077>

<sup>12</sup> <https://www.theguardian.com/world/commentisfree/2023/aug/04/antarctica-heatwaves-sea-ice-levels-melting>

<sup>13</sup> <https://soos.aq/soos-symposium-2023>

<sup>14</sup> <https://public.wmo.int/en/media/news/polar-scientists-call-urgent-action-view-of-rapid-arctic-and-antarctic-change>

<sup>15</sup> <https://www.antarctica.gov.au/antarctic-operations/airp/>

<sup>16</sup> SCAR, NZ, Australia, Italy, Korea, USA (2023), Antarctic Near-Shore and Terrestrial Observing System (ANTOS) Working Paper 49

Committee for the Environmental Protection, ATCM45. Helsinki <https://www.ats.aq/devAS/Meetings/Documents/95>

<sup>17</sup> <https://www.antarctica.gov.au/science/information-for-scientists/australian-antarctic-science-strategic-plan/australian-antarctic-science-council/>

<sup>18</sup> The Helsinki Declaration on Climate Change and the Antarctic [https://um.fi/current-affairs/-/asset\\_publisher/gc654PySnjTX/content/helsinki-declaration-on-climate-change-and-the-antarctic](https://um.fi/current-affairs/-/asset_publisher/gc654PySnjTX/content/helsinki-declaration-on-climate-change-and-the-antarctic)