

## Project Plan – Biogeochemistry

### 1. **Name and details of the Principal Participants:**

*Principal Participants are the Parties to the Formal Collaboration Agreement, including the Collaboration Delegate. They provide the core Antarctic science capability to deliver on the objectives of this agreement. They are directly involved in the AAPP governance including funding and resource allocation decisions to implement the collaborative Antarctic research partnership. Principal Participants are expected to collectively contribute significant cash and/or in-kind support for AAPP activities. The Principal Participants for this Project are:*

The Commonwealth of Australia represented by the Australian Antarctic Division, a Division of the Department of the Environment and Energy (ABN 34 190 894 983), 203 Channel Highway, Kingston, TAS 7050 (“AAD”)

The Commonwealth of Australia represented by the Bureau of Meteorology (ABN 92 637 533 532), Head Office Melbourne, GPO Box 1289, Melbourne VIC 3001 (“BoM”)

Commonwealth Scientific and Industrial Research Organisation (ABN 41 687 119 230), Castray Esplanade, Battery Point, TAS 7004 (“CSIRO”)

University of Tasmania (ABN 30 764 374 782), Private Bag 3, Hobart, TAS 7001 (“UTAS”)

### 2. **Names of the Associate Participants:**

*Associate Participants provide additional niche and specialist capability to implement the AAPP activities. Through contribution of their additional capability, they provide cash and/or in-kind support to the AAPP. In some instances, they may receive AAPP funds. Where this is the case, they will be required to sign an Associate Participant Agreement including Project Terms, the form of which will be endorsed by the Management Committee, prior to being entered into by the Associate Participant and Collaboration Delegate (at the direction of the Principal Participants). The Associate Participants for this Project are:*

Geoscience Australia (ABN 80 091 799 039) (“GA”)

Department of State Growth (ABN 36 388 980 563)

Integrated Marine Observing System (ABN 30 764 374 782) (“IMOS”)

### 3. **Project Commencement Date:**

01/07/2019

### 4. **Project Completion Date:**

30/06/2029

**5. Project Leader's name and contact details:**

Project Leaders: Elizabeth Shadwick (CSIRO) and Andrew Bowie (UTAS)

Elizabeth Shadwick:

Commonwealth Scientific and Industrial Research Organisation

Castray Esplanade, Battery Point, TAS 7004, Australia

Tel: +61 3 6232 5571

Elizabeth.Shadwick@csiro.au

Andrew Bowie:

University of Tasmania

Institute for Marine and Antarctic Studies

20 Castray Esplanade, Hobart, TAS 7004, Australia

Tel: +61 3 6226 2509

Andrew.Bowie@utas.edu.au

**6. Project Funds required:**

Total funds required for the Biogeochemistry project is \$8,139,837 as per ANNEX 1.

A summary of eligible expenditure by projects for the life of the AAPP is provided in ANNEX 2 with the CSIRO payment schedule listed in ANNEX 3.

**7. Other Contributions required:**

*In-kind staff contributions (FTE/y) (per annum averages over 10 years):*

UTAS: Andrew Bowie (0.5), Philip Boyd (0.1), new appointments (0.15)

CSIRO: Elizabeth Shadwick (0.45), Andrew Lenton (0.18), Bronte Tilbrook (0.16), Bozena Wojtasiewicz (0.1), Kate Berry (0.16), Craig Neill (0.16), Abraham Passmore (0.08)

These CSIRO FTEs are full time commitments to AAPP, with 50% of the funding from CSIRO and 50% from AAPP (as detailed in section 8.)

**8. Justification for the Project Funds requested:**

*Salaries (\$6,935,138):*

- **Postdoctoral Research Associate – Carbon Biogeochemist** [4 FTE-years] Will use shipboard observations and model outputs to quantify regional variations in Southern Ocean carbon uptake and biogeochemical cycling, working closely with Theme 3.
- **Postdoctoral Research Associate – Observational Chemical Oceanographer** [4.0FTE-years] will participate in voyages, and use shipboard observations and autonomous platforms to investigate changes in Southern Ocean air-sea CO<sub>2</sub> exchange, biological carbon uptake and export and ocean acidification, working closely with Project 4 and Theme 3
- **Technical Officer — Carbon Marine Analytical Chemist** [9 FTE-years] To support at-sea biogeochemical sensor calibration, preparation of instrumentation for yearlong deployments, sample analysis, data synthesis, quality control, and reporting and archiving of collected data.

- **Postdoctoral Research Associate – Trace Element Biogeochemist** [5 FTE-years] Will study the sources, sinks, and recycling of iron as the controlling element of Southern Ocean productivity, working closely with Theme 3.
- **Technical Officer — Trace Element Marine Analytical Chemist** [5 FTE-years] To support at-sea trace element sample collection, analysis, data synthesis and quality control.
- **Laboratory Manager** [8 FTE-years] – The laboratory manager will be responsible for oversight of all laboratories used by ASCI staff, including responsibility for OHS&E and quarantine.
- **Research Scientists – Biogeochemistry** [\$2,091,503 worth of FTEs] Co-investment in CSIRO Research Scientists (Shadwick 4.5 FTE, Wojtasiewicz 1 FTE, Tilbrook 1.6 FTE and Lenton 1.8 FTE) and Inorganic Carbon Chemists (4 FTE) to lead the biogeochemistry effort and provide expertise in ocean carbon cycle, biogeochemical processes, biogeochemical observations from ships, floats, moorings and satellites, data quality control and management, biogeochemical modelling, and ocean observing systems.

**Plant Equipment (\$600,000):**

\$600,000 is needed over the lifetime of the project for the addition of biogeochemical sensors to under-ice capable core Argo floats funded through the Oceanography project.

**Research Operating (\$604,698):**

\$308,994 is needed over the lifetime of the project for laboratory and voyage consumables. An additional \$295,704 will be used towards duty at sea allowances payable under relevant EBAs.

**9. How the proposed work aligns to the scientific plans of AAPP:**

Southern Ocean waters are becoming warmer, fresher, less oxygenated and more acidic (“heating up, losing breath and turning sour”). Changes are happening both from the north as warming boundary currents push further southward, and from the south as the Antarctic cryosphere melts. The implications of these changes for global and regional marine productivity, global ocean carbon uptake and in turn atmospheric CO<sub>2</sub> levels, are poorly understood. A combination of sustained observations and models of CO<sub>2</sub> inventories and fluxes, and the physical and biological processes that control them (e.g., iron and nutrient supply, light availability), are urgently required. New tools now make rapid progress possible, including BGC-Argo floats to achieve autonomous year-round observations, vehicles such as Triaxus and gliders to provide high spatial resolution, and new satellite missions to resolve the mesoscale and provide improved observations of phytoplankton. Our conventional wisdom that large-scale climate warming leads to stratification which then limits air-sea CO<sub>2</sub> transfer and reduces productivity by isolating nutrients at depth needs updating - we now recognize that transients in the evolving climate dynamics may well counter this perspective in the coming century. For example, higher SO wind strengths drive eddy dynamics which may enhance CO<sub>2</sub> uptake, and these winds, changing circulation, and melting ice shelves can provide pulses of Fe supply to increase productivity, perhaps even to a level of “greening the

Southern Ocean". We have entered an era which requires new and efficient observational programs tightly coupled to models if we are to understand expected changes this century.

Biogeochemistry is essential to all aspects (except ice sheet stability) of the AAPP Grand Challenge: *How will changes in Antarctica and the Southern Ocean region influence regional and global climate, biogeochemical cycles, marine ecosystems, and the stability of the East Antarctic Ice Sheet.*

In particular, it addresses two specific questions:

**How will Southern Ocean feedbacks (e.g. changes in ocean heat & carbon uptake, sea ice and freshwater) alter the pace of climate change?** The project will assess how and why ocean carbon uptake is changing with time, identify the processes responsible for carbon uptake and their sensitivity to other biogeochemical processes (in both open ocean and ice affected waters), and their feedbacks to atmospheric CO<sub>2</sub> levels and climate.

**How will the changing physics and chemistry of the Southern Ocean and Antarctica influence marine life?** The project will provide quantification of the progress of ocean acidification, de-oxygenation, and availability of iron and other nutrients as inputs to the overall assessment of forthcoming changes in marine ecosystems.

#### 10. **Project Objectives and Outcomes:**

*The key science questions for this project are:*

- What drives the unexpectedly large multi-year and decadal changes in the magnitude of Southern Ocean CO<sub>2</sub> uptake, and how do they affect our understanding of probable future ocean CO<sub>2</sub> uptake?
- What is the specific progress of ocean acidification impacts (lowered pH, reduced carbonate saturation, and higher CO<sub>2</sub> availability) and accordingly which regions in the Southern Ocean and Antarctic coastal waters are likely to be more resilient to ocean acidification?
- Is iron supply or its bioavailability, as key controllers of Southern Ocean productivity, likely to increase over the coming century, and what processes will control this?
- What will be the expected magnitude of change in Southern Ocean primary productivity this century, and what controls this (with Theme 3. Future of Sea Ice, Krill and Ecosystems)?
- How will the transfer of energy from phytoplankton to higher levels in the food web be affected by the impact of biogeochemical change on phytoplankton community structure (with Theme 3. Future of Sea Ice, Krill and Ecosystems)?

*Activities and deliverables*

Years 1 and 2:

- Initial estimation of the role of changing circulation on the magnitude of Sub-Antarctic air-sea CO<sub>2</sub> fluxes
- Contribution to the development of BGC-Argo

- Sustained observations of the biological carbon pump at the Southern Ocean Time Series
- Understanding of iron recycling and bioavailability from aerosol and in-ocean studies of oceanic microbial communities and particle transformation processes.

Years 3 and 4:

- Improved understanding of the drivers of interannual to decadal variability in CO<sub>2</sub> uptake, including identification of regional pathways and assessment of the importance of mesoscale processes.
- Assessment of importance of the deep Southern Ocean iron reservoir for surface productivity
- Resolution of iron and carbon cycles during a full year time series in Antarctic fast ice

Years 5 and 6:

- Maps of the progress of ocean acidification from BGC-Argo, other observations and models, for use in identification of “hotspots” and “refugia” of ecosystem stress
- New insights on how changes in ice shelf-ocean processes impact carbon uptake in coastal Antarctica

Years 7 to 9:

- Understanding of the drivers of decadal variations in CO<sub>2</sub> uptake incorporated into global climate models to allow century scale predictions (e.g. CMIP 6 and further iterations) including their use in IPCC assessments.
- Provision of ocean carbon uptake estimates to the Global Carbon Project to evaluate emissions commitments
- Application of powerful diagnostic tools such as isotopic fingerprinting and bioavailability markers to trace changes in iron supply and their effect on ocean productivity

Year 10:

- Implementation of systematic observations of ocean acidification implemented via multiple platforms (floats, moorings, ships, etc.) to track the progress of this ecosystem stressor and thus meet UN SDG 14.
- Assessment of whether environmental changes are resulting in a ‘greening’ of the Southern Ocean
- Synthesis of long-term coupled physical, chemical and biological changes in the Southern Ocean and their regional and global importance.

**11. Brief review of the science and intellectual property background, including Background IP and any relevant third-party IP:**

High precision autonomous sensor and sampler observation systems for pCO<sub>2</sub>, dissolved oxygen, total dissolved gases, chlorophyll fluorescence, particulate matter from optical backscatter, biomass from acoustic backscatter, underwater light,

nutrients, sediment fluxes, trace elements in dissolved and particulate form in the atmosphere and ocean, etc, and the experience to achieve their quality control.

Algorithms and experience for the decomposition and attribution of carbon and trace element biogeochemical cycling across physical, chemical and biological drivers.

General circulation, climate and carbon cycling models and the ability to apply them to integrate, synthesize, interpret and project change in the marine carbon cycle.

Project participants acknowledge and agree that all project IP forms part of AAPP IP and will be owned and licensed in accordance with the Formal Collaborative Agreement as is outlined in the Project Terms (ANNEX 4).

## **12. Proposed methodology:**

Sustained observations, process studies, experiments, and modelling of Southern Ocean biogeochemical cycles are required to determine how they influence the global carbon budget, respond to climate change, and impact marine ecosystems. Organisation into initial Work Packages is structured by the key science questions of section 10.

WP1. Quantification of the processes controlling CO<sub>2</sub> fluxes in the Southern Ocean and thus atmospheric CO<sub>2</sub> levels

WP2. Quantification of the progress of ocean acidification and de-oxygenation, and implications for marine ecosystems

WP3. Quantification of the mode and magnitude of changing iron and other nutrient supplies and bioavailability

WP4. Assessing the influence of biogeochemical changes on ocean productivity and ecosystem structure and function

WP5. Synthesis of observations, process studies, and modelling to build an integrated view of past and future biogeochemical changes in the Southern Ocean.

Our approach emphasises international coordination, specifically through leadership roles in the following programs and adherence to their methodologies. Additional details on the activities of the Work Packages are provided in the table below, and the timeframes for their science delivery in section 10 above.

**GO-SHIP/GEOTRACES** repeat oceanographic sections as the gold standard for decadal changes in hydrographic properties, ocean carbon inventories and associated acidification, nutrient and trace element distributions, and circulation tracers.

Planned Effort: Repeats of I9S and SR3 sections for carbon, trace elements, oxygen, and nutrients (in concert with Project 4. Oceans).

**BGC-Argo** will expand the Argo profiling float array to include 6 biogeochemical parameters (oxygen, pH, nitrate, chlorophyll, total particles, and light), allowing the controlling processes of net community production, ocean acidification, de-oxygenation and biomass accumulation to be assessed at large scale.

Planned Effort: Deployment of BGC sensor equipped profiling floats; implementation of real-time and delayed-mode quality control procedures (via leadership of the IMOS BGC-Argo Sub-Facility).

**OceanSITES** network time series stations as the unifying network for sustained autonomous observation of air-sea exchange, high-frequency upper ocean processes, and physical-biogeochemical-biological coupling, including sample return missions.

Planned Effort: Continuation of the Southern Ocean Time Series (SOTS) high frequency multi-trophic level observations to address diel, storm, and seasonal frequency effects on air-sea gas exchange, changing transport of carbon and oxygen to the ocean interior in the Sub Antarctic where this is most intense, including specifically targeting optimal interpretation of the broader but more limited observations of the BGC-Argo float array.

**GOA-ON** as the global ocean acidification observing network to meet commitments to UN Sustainable Development Goal 14.

Planned Effort: CO<sub>2</sub> and alkalinity observations at SOTS, on hydrographic sections, and *potentially in coastal Antarctic waters including via autonomous observations (If additional resources are allocated and/or additional funding sources found).*

**Global Carbon Project** for the assembly of carbon budgets, including oceanic uptake from SOFLUX/SOCAT and RECCAP projects.

Planned Effort: Continuation of underway pCO<sub>2</sub> measurements, their augmentation with oxygen and pH measurements, their synthesis into assessments of the changing carbon cycle, and model simulations.

**CMIP6** (and future iterations) coupled model intercomparisons project for the advancement of the incorporation of new insights from observations into the controls on carbon cycling into global climate models

Planned Effort: improved modeling of carbon cycling via inclusion of advances in the understanding of mesoscale processes, pathways of tracer transports, ocean acidification, and their impacts on primary and export production.

**IOCCG** coordination of satellite remote sensing missions to optimize the use of ocean colour measurements in the assessment of ocean ecosystem status

Planned Effort: In ocean observations to optimize the calibration, validation, and interpretation of optical properties measured by satellites, specifically as they inform estimates of productivity and plankton community structure.

The tentative calendar for these fieldwork efforts follows:

Year	Voyage	CSIRO BGC Staff	CSIRO Voyage operating, k\$	UTAS BGC Staff	UTAS Voyage operating, k\$*
1	SOTS	1		1	

<b>Year</b>	<b>Voyage</b>	<b>CSIRO BGC Staff</b>	<b>CSIRO Voyage operating, k\$</b>	<b>UTAS BGC Staff</b>	<b>UTAS Voyage operating, k\$*</b>
2	SOTS	1		0	
2	SOLACE	0		2	
3	GOSHIP/GEOTRACES I9S	4	50	4	50
3	SOTS	1		0	
3	SWOT	0		0	
4	Prydz/Amery	2	100	3	50
4	SOTS	1		0	
4	Shackleton Ice Shelf	1		3	
5	SOTS	1		0	
6	Cook/Balleny	2	50	3	50
6	SOTS	1		0	
7	GOSHIP/GEOTRACES SR3	4	50	4	50
8	SOTS	1		0	
8	Antarctic Shelf process study	0		0	
9	SOTS	1		0	
10	SOTS	1		0	

\*These funds are not currently allocated in the AAPP Project Plan budget.

#### Major Voyage Descriptions:

**SOTS:** IMOS Southern Ocean Time Series Facility year-round autonomous mooring observations for climate and carbon cycle quantification in the Sub-Antarctic Southern Ocean, includes collections of samples for IOCCG satellite remote sensing evaluation, likely to include BGC-Argo float deployments in later years, and is a leading multi-disciplinary component of OceanSITES.

**SOLACE:** carbon system analyses for Southern Ocean Large Area Carbon Export study of links between iron supply and biological carbon sequestration, led Project 7 Ecosystems. Participation will likely be limited to assisting with BGC-Argo float program.

**GOSHIP/GEOTRACES I9S and SR3:** co-led with Project 4 Oceans, repeat hydrographic sections to be analysed for inorganic carbon parameters and trace elements and their isotopes

**SWOT:** led by Project 4 Oceans, survey of upper ocean structure in ACC to aid development of optimal interpretation of Surface Water and Ocean Topography swath altimetry, provision of nutrient and bio-optical sensors, carbon system analyses, possibly BGC-Argo floats, interpretation of links between small scale flows and biogeochemical responses.



Prydz/Amery, Shackleton Ice Shelf, Cook/Balleny are investigations of ocean-cryosphere interactions and their carbon system, iron fertilisation, and biogeochemical responses.

Antarctic shelf process study, led by Activity 1. Oceans, examines trans-shelf heat transport, possible carbon system analyses.

In all years, additional underway carbon system analyses from other voyages, and from BGC-Argo float observations, will support the GCP and GOA-ON. Annual data delivery also from aerosol trace element observations at sea and land-based sites.

**13. Milestones, tasks, any proposed stop/go milestones in relation to deployment and (as applicable) recovery / maintenance of equipment:**

Annual Milestones include:

1. completion of the field programs listed in section 12
2. research outputs from this work
3. its integration with synthesis and modelling.

The SOTS and BGC-Argo components depend on co-funding from IMOS, which has secure funding through to 30 June 2022, and anticipated through to 2030. If it is not received, these efforts will be reconsidered against other priorities and could either cease or replace other field programs.

The trace element laboratory at UTAS will depend on additional or co-funding in order to achieve all major field programs over the duration of the 10-year AAPP. This is because the UTAS BGC budget does not include: 1) annual laboratory operating costs of \$10k pa and 2) voyage operating costs of 4 x \$50k for UTAS participation in each of 4 major voyages (I9S, Prydz/Amery, Cook/Balleny and SR3, as shown in the table above). Current AAPP technical and postdoctoral staff funding for the trace element laboratory is also only for 5 years. In order to extend the duration of the technical officer position (to 6.2 years), this has been co-funded for the first 3 years with an ARC Discovery Project (Chase/Bowie/Strutton). Other staff salary funding options will continue to be explored.

Milestones will be established in project proposals and voyage/activity specific workplans, which will include stop/go progress assessments to inform adaptive project management.

*All partners recognise that logistical arrangements are not the responsibility of a single agency and if any requests set out in this project plan indicate that logistical support will be provided by one or more partners, such logistical support requires administrative processes and approvals by the host agency. It is the responsibility of the Chief Investigators to ensure logistical arrangements are in place to deliver their research projects, including through applications to the AAS, MNF and international collaborators. The partners acknowledge that this plan is not directive and does not override the host agencies' decision regarding provision, or not, of logistical support.*

**14. Deliverables, in relation to availability of near-real-time and delayed mode data (as applicable); plus quality controlled data delivery:**

SOTS sensor data in real time

SOTS sensor and sample delayed mode QC Data 12 months after mooring recovery.

[SOTS sensor and sample details are online in Project Plan at [www.imos.org.au](http://www.imos.org.au) ]

Trace element data 12 months after voyages, conforming to international standards, and delivered to GEOTRACES Data Products

Voyage QC data 12 months after voyages - typically pCO<sub>2</sub>, alkalinity, DIC concentrations, augmented with POC and chlorophyll biomass data for voyages deploying BGC-Argo floats or undertaking ocean productivity and biological carbon pump process studies.

BGC-Argo data in real-time and after delayed mode QC with 12-month latency.

**15. Risk analysis and how identified risks will be managed:**

A risk register has been set up to track project risks. Risks have been analysed to identify the qualitative and quantitative impact of the risks on the project so that appropriate steps can be taken to mitigate them. The risk register is reviewed at least annually with the 'live' risk register located on the [AAPP Teams site](#).

**16. Relevance and benefits, including alignment to the Australian Antarctic Strategy and 20 Year Action Plan explaining what will be provided to end-users and how they will benefit from the outcomes derived from the AAPP Project:**

This Activity provides essential research to deliver on Antarctic Strategic Plan Stream 1.2 (Oceans and marine ice in the Southern Hemisphere), and 3.1 (Marine ecosystem change), and contributes to Streams 1.3 (Atmospheric processes and change) and Theme 4 (Frontier Science). Specifically addresses the following Key Research Questions in the Antarctic Strategic Plan:

KRQ 1.2.1.2 What is the impact of changes on Southern Ocean primary production and ecosystem dynamics?

KRQ 1.2.2.2 What is the impact of changes [in the Southern Ocean] on other parts of the climate system?

KRQ 1.2.4.1 How do Southern Ocean biogeochemical and ecosystem processes feed back to the climate system?

KRQ 1.2.4.2 How will [Southern Ocean biogeochemical] changes affect the rate of carbon dioxide uptake by the ocean?

KRQ 3.1.2 What are the potential ecosystem impacts of observed and predicted physical (e.g. ocean currents, upwelling, sea ice) and chemical change (e.g. ocean acidification, salinity) in the Southern Ocean?

The work aligns with the Antarctic Strategy and 20-year Action Plan by providing leadership and excellence in Antarctic science, conducting world-class scientific research consistent with national priorities, and undertaking a research effort to

address the most pressing of our science needs, particularly around the role of Antarctica in the global climate system.

More generally, it provides significant national benefits. The world has a carbon problem – CO<sub>2</sub> emissions induce dangerous climate warming and cause ocean acidification. Australia has committed to addressing this problem, which requires documenting and verifying emissions and assessing the links between emissions, atmospheric CO<sub>2</sub> levels, and climate responses, as part of supporting national and international policy to limit the impacts of climate change. Observing the Southern Ocean (SO) is central to this effort, because it has a dominant role in the uptake of atmospheric CO<sub>2</sub>.

Specifically, quantification of Southern Ocean CO<sub>2</sub> uptake is required to: reliably forecast decadal and centennial climate change, because CO<sub>2</sub> has been and will continue to be the largest driver of climate over the past and coming centuries. verify our and other nations' commitments to reduce emissions, e.g. as agreed in the UNFCCC 2015 Paris Agreement.

determine the changes associated with increasing ocean acidification to underpin assessment of its impacts on ocean ecosystems, as codified in UN Sustainable Development Goal 14.

Broader research is needed to assess additional issues, including:

- impacts that may arise from crossing biogeochemical boundaries, e.g. decreasing oxygen supply rates that control the expanse of anoxic “dead” zones well beyond the Southern Ocean.
- the potential opportunity of increased Southern Ocean productivity, e.g. as a result of changes in the availability of iron (which limits productivity) and silicon (which influences trophic transfer to krill, fish, and other predators), as well as via changes in light levels from evolving sea-ice extent, intensity of wind mixing, and cloudiness.

*The partners acknowledge a new Australian Antarctic Strategy and 20 Year Action Plan was released in 2022. Consistent with section 5.1 of the Formal Collaborative Agreement the AAPP seeks to enable science under the Australian Antarctic Strategy and 20 Year Action Plan. Upon release of the Strategy and Action Plan, the AAPP management committee will review alignment with the updated Strategy and Action Plan and advise researchers across all partner agencies of any inconsistencies, and the implications of any inconsistencies, between this plan and the Strategy and Action Plan.*

**17. Special Conditions:**

No variation to the project terms as per ANNEX 4.

## ACKNOWLEDGEMENT

The Project Participants acknowledge and agree that, subject to the approval of the project as an AAPP Project, they will participate in and contribute to the AAPP Project under the leadership of the Principal Participants in accordance with this Project Plan and Project Terms.

Signed *University of Tasmania* by an authorised officer

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Signature of officer

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Name of officer

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Office held

Signed *Commonwealth of Australia represented by the Bureau of Meteorology* by an authorised officer

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Signed *Commonwealth of Australia represented by the Australian Antarctic Division* by an authorised officer

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Signed *Department of State Growth* by an authorised officer

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The Program Leader acknowledges and agrees that this project has been approved as an AAPP Project by the Management Committee.

Program Leader at the direction of the Management Committee

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Signature of Program Leader

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Name of Program Leader

Collaboration Delegate

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Signature of Collaboration Delegate

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Name of Collaboration Delegate

## ANNEX 1: PROJECT BUDGET

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

- Biogeochemistry 'Research Operating' budget item addition of \$10,000 per year from year 2 to year 10, total \$90,000 (note that this is matched by CSIRO)

5 May 2021 variation – revised as per Management Committee approval dated 5 May 2021.

Summary of variation(s):

1. Application budget versus revised budget.

4 May 2022 variation – revised as per Management Committee approval dated 4 May 2022.

Summary of variation(s):

1. 'Labour' salaries updated to reflect extensions and promotions (across all Projects).

ELIGIBLE EXPENDITURE		Year 1		Year 1		Year 2		Year 2		Year 3		Year 3		Year 4		Year 4		Year 4		Year 5		Year 5		Year 6		Year 6		Year 7		Year 7		Year 8		Year 8		Year 9		Year 9		Year 10		Year 10		TOTAL		TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Research Associate – Carbon Biogeochemist	4.00	148,714	-	40,263	151,688	-	134,298	154,722	-	142,515	157,816	-	150,067	160,972	-	105,211	164,192					167,476							170,825																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												



## ANNEX 2: EXPENDITURE SUMMARY

A summary of eligible expenditure by projects.

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

- Biogeochemistry ‘Research Operating’ budget item addition of \$10,000 per year from year 2 to year 10, total \$90,000 (note that this is matched by CSIRO)
- Ice Shelves ‘Research Operating’ budget items reallocated with no change in total research operating funds (see Project Plan – Ice Shelves Annex 1)
- Sea Ice ‘Plant and Equipment’ budget item of \$25,000 moved to ‘Research Operating’ budget item
- Ice Cores ‘Labour – Research’ co-investment in CSIRO scientists reduced as the Palaeo-Atmospheric Composition was approved in August 2019 as a UTAS position with 50% co-investment from CSIRO. New budget line item ‘Research Associate – Palaeo-atmos composition’ created reflecting this change including correcting FTE
- Ice Cores ‘Research Operating’ wording changed to reflect clause 8
- Krill and ecosystems ‘Research Operating’ wording changed to reflect clause 8 (note that the funds for activities on the 20/21 SOLACE (\$25,000) and TEMPO (\$161,000) voyages were funded from year 1 (19/20) carry forward from this project and other projects, and the science management project.
- Administration budget item reduced by \$10,000 per year from year 2 to year 10, total \$90,000 to fund Biogeochemistry ‘Research Operating’ (see point 1 above)
- Other Eligible Expenditure ‘Leased High Perf Laptops Replaced ~ 3 yrs’ revised to ‘Software/Licensing’ with no change in budget

5 May 2021 variation – revised as per Management Committee approval dated 5 May 2021.

Summary of variation(s):

1. Application budget versus revised budget.
2. Ice Cores ‘Labour - Technician Ice Core Analysis’ 0.5FTE years 3-6 changed to 1FTE in years 3-4 only.
3. Ice Cores ‘Research Operating’ budget item additional of \$80,300 in year 3 for air sample preparation lines for CO<sub>2</sub> and N<sub>2</sub>O concentrations and isotopes on mass spec.
4. Oceanography ‘Labour – SWOT position’ reduced to 3FTE years with addition of 2FTE ACC Analysis oceanographer position in years 6-7.
5. Revised budget for ‘Other Eligible Expenditure’ items related to data management, general administration expenses, communications, management committee, visiting fellowships, publications, software/licensing, data workshops/conferences, and science conference sponsorship have been reduced by 30% in years 3-8 and 90% in year 2.

4 May 2022 variation – revised as per Management Committee approval dated 4 May 2022.

Summary of variation(s):

1. ‘Labour’ salaries updated to reflect extensions and promotions (across all Projects).

2. Ice Cores 'Research Operating' budget items additional of \$15,000 in year 4 for operation and measurements of new mass spectrometer and freight of ice core samples.
3. Move of Year 2 unspent funds to Year 3 (Projects impacted are: Ice Cores; Ice Shelves; and Sea Ice)

ELIGIBLE EXPENDITURE SUMMARY	Year 1 application budget	Year 1 actuals	Year 2 application budget	Year 2 actuals	Year 3 application budget	Year 3 revised budget	Year 4 application budget	Year 4 revised budget	Year 5 application budget	Year 5 revised budget	Year 6 application budget	Year 6 revised budget	Year 7 application budget	Year 7 revised budget	Year 8 application budget	Year 8 revised budget	Year 9 application budget	Year 9 revised budget	Year 10 application budget	Year 10 revised budget	TOTAL application budget	TOTAL revised budget
	2019/20		2020/21		2021/22		2022/23		2023/24		2024/25		2025/26		2026/27		2027/28		2028/29			
	\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST		\$ Ex GST	\$ Ex GST
Atmosphere																						
Labour – Research	243,609	189,975	400,948	350,228	409,772	380,729	418,795	398,595	321,945	310,884	164,192	325,164	167,476	209,344	170,825	170,825	174,242		177,726		2,649,530	2,335,745
Plant and Equipment																						
Research Operating							25,000	25,000							25,520	25,520					50,520	50,520
Total	243,609	189,975	400,948	350,228	434,772	380,729	418,795	423,595	321,945	310,884	164,192	325,164	167,476	209,344	196,345	196,345	174,242		177,726		2,700,050	2,386,265
Ice cores																						
Labour – Research	358,530	310,932	404,624	279,962	348,773	361,105	356,809	408,053	148,093	195,111	479,439	501,490	334,951	450,161	341,650	341,650	348,483	348,484			3,121,351	3,196,947
Plant and Equipment																						
Research Operating	40,000	33,641	50,800	53,282	51,816	149,357	52,852	67,852	53,909	53,909	54,988	54,987	56,087	56,087	45,947	45,947	46,866	46,866	47,804	47,804	501,070	609,732
Total	398,530	344,573	455,424	333,244	400,589	510,462	409,661	475,905	202,003	249,020	534,426	556,477	391,038	506,248	387,598	387,597	395,350	395,350	47,804	47,804	3,622,421	3,806,679
Ice shelves																						
Labour – Research	130,104	102,184	360,238	428,906	367,442	567,957	374,791	564,298	382,287	440,307	554,125	451,482	565,207	460,512	576,511	469,722	500,921	261,362	66,623		3,878,250	3,746,730
Plant and Equipment																						
Research Operating	80,000	25,189	81,600	51,934	183,232	277,542	183,672	161,992	64,946	69,441	71,245	76,031	82,670	77,552	84,323	79,103	86,010	75,165	87,730	76,668	1,005,428	970,617
Total	210,104	127,373	441,838	480,840	550,674	845,499	558,464	726,290	447,233	509,748	625,369	527,513	647,877	538,064	660,834	548,825	586,930	336,527	154,353	76,668	4,883,677	4,717,347
Biogeochemistry																						
Labour – Research	696,465	596,533	712,242	593,902	883,113	819,569	902,739	891,144	922,812	879,396	820,245	962,865	838,796	926,428	686,953	715,651	352,344	409,497	119,430		6,935,138	6,794,985
Plant and Equipment	300,000	300,000	300,000	300,000	450,000	450,000	450,000	450,000	450,000	450,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	3,200,000	3,200,000
Research Operating	24,320	25,990	36,816	47,740	76,536	86,536	86,024	96,024	56,209	66,209	26,402	36,402	64,643	74,643	87,774	97,774	27,753	37,753	28,222	38,222	514,698	607,293
Total	1,020,785	922,523	1,049,058	941,642	959,649	906,105	988,763	987,168	979,021	945,605	846,646	999,267	903,439	1,001,071	774,727	813,425	380,097	447,250	147,652	38,222	8,049,837	8,002,278
Oceanography																						
Labour – Research	628,273	414,283	642,139	551,958	861,025	681,891	871,415	855,917	879,645	873,332	701,196	966,213	751,342	918,818	730,067	730,067	528,335	702,577	177,726		6,771,163	6,695,055
Plant and Equipment	800,000	800,000	300,000	300,000	450,000	450,000	450,000	450,000	450,000	450,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	3,200,000	3,200,000
Research Operating	20,000	20,000	20,400	20,400	63,144	63,144	51,464	51,464	51,889	51,889	22,082	22,082	52,763	52,763	53,214	53,214	53,673	53,673	23,902	23,902	412,530	412,531
Total	1,448,273	1,234,283	962,539	872,358	1,374,169	1,195,035	1,372,879	1,357,381	1,381,533	1,375,221	873,277	1,138,295	954,105	1,121,581	933,280	933,281	732,009	906,250	351,628	173,902	10,383,694	10,307,586
Sea ice																						
Labour – Research	297,427	110,298	455,063	412,907	464,165	473,393	473,448	496,859	482,917	461,300	492,575	513,622	502,427	528,834	512,475	543,367	174,242	459,236			3,854,738	3,999,816
Plant and Equipment			5,000				5,000														25,000	
Research Operating	50,000		51,000	28,677	52,020	84,343	113,060	118,060	54,122	59,122	115,204	120,204	56,308	56,308	117,434	117,434	58,583	58,583	59,755	59,755	727,486	702,486
Total	347,427	110,298	511,063	441,584	521,185	557,736	591,508	614,919	542,038	520,422	612,779	633,826	558,735	585,142	629,909	660,801	232,825	517,819	59,755	59,755	4,607,224	4,702,302
Ecosystems/Krill																						
Labour – Research	297,427	97,504	303,376	274,115	464,165	336,593	473,448	454,628	482,917	473,289	492,575	515,756	502,427	618,124	512,475	512,475	174,242	392,044	177,726	133,295	3,880,777	3,807,822
Plant and Equipment																						
Research Operating	60,000	6,453	61,200	250,039	62,424	62,424	63,672	63,672	64,946	64,946	66,245	66,245	67,570	67,570	68,921	68,921	70,300	70,300	71,706	71,706	656,983	792,277
Total	357,427	103,958	364,576	524,154	526,589	399,017	537,120	518,300	547,863	538,235	558,820	582,001	569,996	685,694	581,396	581,396	244,541	462,344	249,432	205,001	4,537,760	4,600,099
Scientific Program Management																						
Labour – Project Management	199,938	90,479	203,937	251,870	143,034	264,136	145,895	209,115	148,812	214,998	151,789	221,028	154,824	227,220	157,921	232,824	161,079	237,481	164,301	242,231	1,631,530	2,191,381
Operating – Data Management					45,000	31,500	45,900	32,130	46,818	32,773	47,754	33,428	48,709	34,096	49,684	34,779	50,677	50,677	51,691	51,691	386,234	301,074
Total	199,938	90,479	203,937	251,870	188,034	295,636	191,795	241,245	195,630	247,770	199,543	254,456	203,534	261,316	207,605	267,603	211,757	288,158	215,992	293,922	2,017,764	2,492,454
Travel and Accommodation																						
Travel and accommodation	135,000	16,263	137,700	-2,276	140,454	140,454	143,263	143,263	146,128	146,128	149,051	149,051	152,032	152,032	155,073	155,073	158,174	158,174	161,337	161,337	1,478,212	1,219,499
Total	135,000	16,263	137,700	-2,276	140,454	140,454	143,263	143,263	146,128	146,128	149,051	149,051	152,032	152,032	155,073	155,073	158,174	158,174	161,337	161,337	1,478,212	1,219,499
Administration																						
Administration (incl Admin Labour)	259,829	148,180	265,025	182,278	270,326	254,700	275,732	331,688	281,247	337,849	286,872	349,044	292,609	360,450	298,462	371,261	304,431	410,776	311,222	419,695	2,845,755	3,165,922
Total	259,829	148,180	265,025	182,278	270,326	254,700	275,732	331,688	281,247	337,849	286,872	349,044	292,609	360,450	298,462	371,261	304,431	410,776	311,222	419,695	2,845,755	3,165,922
Audit cost																						
Audit Cost			30,000			5,000	31,212			5,000	32,473			5,000	33,785			5,000	35,150	10,000	162,620	30,000
Total			30,000			5,000	31,212			5,000	32,473			5,000	33,785			5,000	35,150	10,000	162,620	30,000
Other Eligible Expenditure (Excl Research Operating)																						
Management Committee	30,000		30,600	10,000	31,212	14,000	31,836	30,000	32,473	30,000	33,122	30,000	33,785	30,000	34,461	30,000	35,150	30,000	35,853	30,000	328,492	234,000
Visiting Fellowships	48,000	4,819	48,960		49,939	28,000	50,938	28,000	51,957	28,000	52,996	35,000	54,056	35,000	55,137	35,000	56,240	50,000	55,873	20,000	525,587	263,819
Publications	50,000		51,000	16,742	52,020	31,500	53,060	31,500	54,122	31,500	55,204	35,000	56,308	35,000	57,434	35,000	58,583	55,000	59,755	55,000	547,486	326,242
Software/Licensing	21,067		21,067	5,274	21,067	14,747	21,067	14,747	21,067	14,747	21,067	14,747	21,067	14,747	21,067	14,747	21,067	21,067	21,067	21,067	210,666	135,889
Data Workshops/Conferences	50,000		51,000			35,000															101,000	35,000
Science Conference Sponsorship					52,000	5,200	53,040	37,128	54,101	37,871	55,183	38,628	56,286	39,400	57,412	40,188	58,560	58,560	59,732	59,732	446,314	316,707
Staff training	30,000	2,035	30,600	6,890	31,212	31,212	31,836	32,473	32,473	32,473	33,122	33,122	33,785	33,785	34,461	34,461	35,150	35,150	35,853	35,853	328,492	276,817
Scholarships & top-ups			9,000	7,973	24,000	24,000	48,000	48,000	66,000	66,000												

## ANNEX 3: CSIRO PAYMENT SCHEDULE

The CSIRO payment schedule is shown below by project and is to be paid as two equal 6-monthly instalments.

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

1. Project 2 – Ice Cores ‘Labour – Research’ reduced as the Palaeo-Atmospheric Composition was approved in August 2019 as a UTAS position with 50% co-investment from CSIRO
2. Project 5 - Biogeochemistry ‘Operating’ budget item addition of \$10,000 per year from year 2 to year 10, total \$90,000 (note that this is matched by CSIRO)

AAPP-CSIRO PAYMENT SCHEDULE BY PROJECT	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	TOTAL
	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	
	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST
<b>Project 1- Atmosphere</b>											
Labour - Research	94,896	97,573	100,329	103,163							395,961
<b>TOTAL Project 1</b>	<b>94,896</b>	<b>97,573</b>	<b>100,329</b>	<b>103,163</b>							<b>395,961</b>
<b>Project 2 - Ice Cores</b>											
Labour - Research	122,078	125,520	129,069	132,712							509,379
<b>TOTAL Project 2</b>	<b>122,078</b>	<b>125,520</b>	<b>129,069</b>	<b>132,712</b>							<b>509,379</b>
<b>Project 4 - Oceans</b>											
Labour - Research	330,846	338,763	396,861	397,967	396,728	372,812	416,391	388,417	354,094		3,392,879
Plant and Equipment - Research	800,000	300,000	450,000	450,000	450,000	150,000	150,000	150,000	150,000	150,000	3,200,000
<i>Other Eligible Expenditure (incl Research Operating)</i>											
Operating	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902	218,994
Duty at Sea Allowance			42,336	30,240	30,240	0	30,240	30,240	30,240	0	193,536
<b>TOTAL Project 4</b>	<b>1,150,846</b>	<b>659,163</b>	<b>910,005</b>	<b>899,432</b>	<b>898,616</b>	<b>544,894</b>	<b>619,154</b>	<b>591,630</b>	<b>557,767</b>	<b>173,902</b>	<b>7,005,409</b>
<b>Project 5 - Biogeochemistry</b>											
Labour - Research	224,828	231,174	237,701	244,419	251,326	258,427	265,742	273,263	104,622		2,091,503
Plant and Equipment - Research	300,000	300,000									600,000
<i>Other Eligible Expenditure (incl Research Operating)</i>											
Operating	20,000	30,400	30,808	31,224	31,649	32,082	32,523	32,974	33,433	33,902	308,994
Duty at Sea Allowance	4,320	16,416	55,728	64,800	34,560	4,320	42,120	64,800	4,320	4,320	295,704
<b>TOTAL Project 5</b>	<b>549,148</b>	<b>577,990</b>	<b>324,237</b>	<b>340,443</b>	<b>317,535</b>	<b>294,829</b>	<b>340,385</b>	<b>371,037</b>	<b>142,375</b>	<b>38,222</b>	<b>3,296,202</b>
<b>Total</b>	<b>1,916,968</b>	<b>1,460,246</b>	<b>1,463,640</b>	<b>1,475,750</b>	<b>1,216,151</b>	<b>839,723</b>	<b>959,540</b>	<b>962,668</b>	<b>700,142</b>	<b>212,124</b>	<b>11,206,951</b>

## ANNEX 4: PROJECT TERMS

### 1 INTERPRETATION AND DEFINITIONS

- 1.1 Unless otherwise defined in this Agreement, the words and expressions in this Agreement have the same meaning as those in the Australian Antarctic Program Partnership (**AAPP**) Formal Collaborative Agreement.
- 1.2 The interpretation rules set out in Schedule 1 of the Formal Collaborative Agreement apply to this Agreement.
- 1.3 In this Agreement:
- (a) **Agreement** means these Project Terms and the approved Project Plan and includes the schedules and annexures to this Agreement;
  - (b) **Budget** means the budget for the AAPP Project as set out in the Project Plan;
  - (c) **Financial Statement** means a statement of all receipts, income, outgoings and expenditure received, derived or incurred in carrying out the AAPP Project in an Approved Form;
  - (d) **Final Report** means the final report required under clause 9.4 and as specified in clause 9.5;
  - (e) **Formal Collaborative Agreement** means the Australian Antarctic Program Partnership Formal Collaborative Agreement for the establishment and operation of AAPP;
  - (f) **Milestones** means the milestones set out in the Project Plan;
  - (g) **Principal Participant** means the Party leading the AAPP Project and named as the Principal Participant as specified in the Project Plan
  - (h) **Project Background IP** means the Background IP which Project Participants make available for the conduct of the AAPP Project;
  - (i) **Project Funds** means that part of the AAPP Funds that the Management Committee has determined will be made available to the Principal Participant for the conduct of the AAPP Project;
  - (j) **Project Commencement Date** means the commencement date for the AAPP Project as set out in the Project Plan or such other date as the Project Participants agree to in writing;
  - (k) **Project Completion Date** means the completion date for the AAPP Project as set out in the Project Plan or such other date as the Project Participants agree to in writing;
  - (l) **Project Contributions** means the money, assets, personnel, facilities and services to be contributed to the AAPP Project by a Project Participant as detailed in the Project Plan;

- (m) **Project IP** means Intellectual Property arising from the conduct of the AAPP Project;
- (n) **Project Leader** means the person who will lead the AAPP Project and identified as such in the Project Plan;
- (o) **Project Objectives** means the objectives of the AAPP Project as detailed in the Project Plan;
- (p) **Project Participants** means the Parties involved in the AAPP Project and identified as the Project Participants in the Project Plan (and for the purposes of this Agreement, includes the Principal Participant as the context requires);
- (q) **Project Plan** means the Project Plan approved by the Management Committee and any variation subsequently agreed to it;
- (r) **Progress Report** means a progress report as required under the Commonwealth Agreements;
- (s) **Project Term** means the period referred to in clause 15.
- (t) **Special Conditions** means any special or additional terms or conditions agreed by the Project Participants and set out in the Project Plan;

## **2 APPLICATION OF FORMAL COLLABORATIVE AGREEMENT**

- 2.1 The Project Participants acknowledge that the approved AAPP Project forms part of the Activities under the Formal Collaborative Agreement and that it must be carried out in a manner that conforms to the Formal Collaborative Agreement.
- 2.2 The provisions of the Formal Collaborative Agreement that expressly or by necessary implication apply to the conduct of the Activities will apply to the conduct of the approved AAPP Project and to the Associate Participants, national collaborators, international collaborators and other funding parties as if they were Principal Participants under the Formal Collaborative Agreement.

## **3 SPECIAL CONDITIONS**

- 3.1 In the event of any inconsistency between the provisions of this Agreement and the Special Conditions, the Special Conditions will prevail to the extent of the inconsistency.

## **4 TERM**

- 4.1 The AAPP Project will commence on the Project Commencement Date and, subject to the terms of this Agreement, will terminate on the Project Completion Date.

## **5 PROJECT FUNDS AND CONTRIBUTIONS**

- 5.1 Subject to clauses 5 and 20, the Collaboration Delegate must pay the Project Funds to the Principal Participant from the AAPP Funds in the manner set out in the Project Plan.



- 5.2 Each Project Participant must make its Contribution to the AAPP Project for the purpose of pursuing the AAPP Project in the manner set out in the Project Plan or as otherwise reasonably required to ensure the Milestones and Project Objectives are met.
- 5.3 The Principal Participant will enter into any agreements it deems necessary to secure contributions from third parties.
- 5.4 The Collaboration Delegate may, on direction of the Management Committee, withhold a payment to the Principal Participant under clause 5.1 if the Principal Participant is primarily responsible for a Milestone that has not been met or a Deliverable that has not been delivered until such time as the Milestone is met or the Deliverable is delivered to the reasonable satisfaction of the Management Committee.
- 5.5 If AAPP Funds are identified in the Financial Statement provided at the Project Completion Date as unexpended, those funds must be repaid to the Collaboration Delegate.

## **6 BACKGROUND INTELLECTUAL PROPERTY**

- 6.1 Project Background IP remains in the ownership of the Project Participant making it available.
- 6.2 Each Project Participant agrees to make its Project Background IP available to the AAPP Project in accordance with clause 16 of the Formal Collaborative Agreement.

## **7 CONDUCT OF THE AAPP PROJECT**

- 7.1 Each Project Participant will carry out its part of the AAPP Project diligently and in accordance with generally accepted professional, scientific and ethical principles and standards in the conduct of the AAPP Project.
- 7.2 The Project Participants will:
  - (a) cooperate with each other and the Project Leader; and
  - (b) use all reasonable endeavours to ensure;  
the AAPP Project meets the Project Objectives, Milestones and Deliverables as specified in the Project Plan.
- 7.3 The Project Participants acknowledge that the AAPP Project forms part of the Activities and that the AAPP Project will be managed by the Project Leader through the Principal Participant, the Program Leader and the Management Committee.

## **8 COMPLIANCE**

- 8.1 Each Project Participant will ensure that all applicable codes of conduct and guidelines in carrying out the AAPP Project including any codes and guidelines with respect to research involving humans or animals adopted by the National Health and Medical Research Council (including without limitation the National Statement on Ethical Conduct in Research involving humans and the Australian Code of

Practice for the care and use of animals for scientific purposes) and by the Office of the Gene Technology Regulator, are observed at all times.

- 8.2 Each Project Participant will, where necessary or appropriate, undertake research using a relevant ethics committee or committees constituted in accordance with the codes and guidelines referred to in clause 8.1, to oversee all ethical clearances which may be required under those codes and guidelines. In addition to usual approvals/ethics approvals:
- For all projects on Macquarie Island, the approval of the Tasmanian Government is also required;
  - All projects within Antarctica and the Southern Ocean below 60S must comply with the requirements of the Australian Antarctic program for environmental and ethics approvals; and
  - All projects on Australian sub Antarctic islands must comply with the relevant Government requirements. E.g. Macquarie Island Tasmanian Government and Heard and Macdonald Islands (Australian Government laws administered by AAD).
- 8.3 Each Project Participant must comply with all applicable acts, ordinances, rules, regulations and by-laws applicable to the conduct of the AAPP Project in its state or territory including but not limited to State/Territory legislation about working with children and vulnerable people, and will also comply with the Antarctic Treaty and its 4 international agreements including all Commonwealth legislation relating to Antarctica.
- 8.4 When requested by the Program Leader or Collaboration Delegate, each Project Participant must provide evidence of the matters referred to in this clause 8 to the Program Leader or Collaboration Delegate as requested.

## **9 REPORTING**

- 9.1 The Principal Participant will ensure that the Project Leader prepares and provides to the Program Leader the Progress Reports annually or otherwise upon the dates required to enable the Collaboration Delegate to comply with the reporting requirements under the Commonwealth Agreement(s)) on the conduct of the AAPP Project and the Milestones and Deliverables set out in the Project Plan.
- 9.2 Each Progress Report will be in writing and in an Approved Form with a level of detail reasonably acceptable to the Management Committee and will include:
- (a) the name of the AAPP Project and the Project Leader;
  - (b) a description of each Milestone and the date on which it was reached or the reasons why it was not reached;
  - (c) a report on the activities conducted by the Project Participants to achieve the Milestones and Deliverables;
  - (d) details of expenditure incurred to date;
  - (e) any knowledge or discoveries and contributions to end users, including Project IP, made since the last Quarterly Progress Report;



- (f) any variation which the Project Participants would like to make to the AAPP Project's methodology or Milestones; and
  - (g) any further information reasonably requested by the Program Leader.
- 9.3 The Program Leader may reasonably require the Project Leader to provide interim reports. Such interim reports will be in an Approved Form and address matters specified by the Program Leader from time to time. Interim reports must be provided to the Program Leader within 30 Business Days of the Project Leader receiving a request from the Program Leader to provide such a report.
- 9.4 The Project Leader must within 30 Business Days of the Project Completion Date prepare and provide to the Program Leader a Final Report.
- 9.5 The Final Report will be in writing in a format and content to be agreed unanimously by the Management Committee and subject to requirements of the Commonwealth Agreement.
- 9.6 The Final Report will be the final Milestone of the AAPP Project.
- 9.7 The Final Report must be in an Approved Form and in a level of detail reasonably acceptable to the Management Committee.
- 9.8 A Project Participant must promptly give any information it holds in relation to the AAPP Project in the form reasonably requested:
  - (a) to the Project Leader as reasonably necessary to enable the Project Leader to meet the reporting obligations under this Agreement; and
  - (b) to the Program Leader as reasonably necessary to enable the obligations under the Formal Collaborative Agreement and the Funding Agreements to be met.

## **10 RECORDS AND ACCOUNTS**

- 10.1 Each Project Participant will keep full and accurate accounting records of its expenditure of Project Funds and its Contributions to the AAPP Project and will provide copies of those records to the Program Leader on request.
- 10.2 The Management Committee or the Collaboration Delegate may appoint a qualified person to audit the records referred to in clause 10.1 and each Project Participant will give the person undertaking the audit access at all reasonable times to the records and will provide such information and explanations as the person desires for the purposes of the audit.
- 10.3 The Principal Participant will provide to the Program Leader, at the times Progress Reports are required to be provided under clause 9.1, a Financial Statement covering the period since the last Progress Report.
- 10.4 A final Financial Statement must be provided to the Program Leader at the same time as the Final Report.

## **11 VARIATION OF PROJECT**

- 11.1 An AAPP Project may, following a request to vary the AAPP Project from the

Management Committee or from the Principal Participant to the Program Leader, be varied by the Program Leader issuing a Document in Writing to the Project Participants confirming the requested variation or a variation substantially in compliance with the requested variation.

## **12 OWNERSHIP OF PROJECT IP**

- 12.1 The Project Participants acknowledge and agree that all Project IP forms part of AAPP IP and will be owned and licensed in accordance with the Formal Collaborative Agreement.
- 12.2 Not Used
- 12.3 Each Project Participant must ensure that all Project IP is disclosed to the Project Leader as soon as practicable after its creation.

## **13 INDEMNITY AND INSURANCE**

- 13.1 The Project Participants must maintain adequate product liability, third party liability and other reasonable insurance cover, including professional indemnity insurance, for the conduct of the AAPP Project for the Term and for a reasonable run-off period after expiry of the Term.
- 13.2 Each Project Participant (the Indemnifier) hereby releases and indemnifies and agrees to keep released and indemnified the other Project Participants and their respective officers and employees agents and representatives (the Indemnified) from and against any Loss howsoever arising that the Indemnified may directly suffer, incur or sustain as a result of any breach of this Agreement by the Indemnifier or any unlawful or negligent act or omission of the Indemnifier or any of its officers employees agents or representatives arising out of the conduct of the AAPP Project.
- 13.3 The liability of the Indemnifier under clause 13.2 will be reduced having regard to the extent to which the Indemnified contributed to the Loss in respect of which it seeks indemnity.
- 13.4 The obligations under this clause 13 will survive expiration or earlier termination of this Agreement.
- 13.5 Clause 13.1 does not apply to a Project Participant which is an agency or instrumentality of the Commonwealth or a State or Territory which self-insures.

## **14 CONFIDENTIALITY**

- 14.1 A Project Participant's Confidential Information may only be:
  - (a) disclosed to another Project Participant's officers, employees and students who need access to the Confidential Information for the conduct of the AAPP Project and to another Project Participant's financial or legal advisers provided that they are subject to a legal obligation to maintain the confidentiality of the Confidential Information; and
  - (b) must only be used for the purposes of the AAPP Project.

- 14.2 The obligations under this clause 14 will survive expiration or earlier termination of this Agreement.
- 14.3 Despite clause 14.1, a Party or a Minister may disclose a Project Participant's Confidential Information to Parliament, Cabinet or a Parliamentary or Cabinet committee or subcommittee.

## **15 TERM AND TERMINATION**

- 15.1 This Agreement will commence on the Project Commencement Date and, subject to this clause 15, terminate on the earlier of:
- (a) the Project Completion Date; or
  - (b) the termination of the Principal Participants Agreement.
- 15.2 The Management Committee may terminate the AAPP Project on 20 Business Days written notice to the Principal Participant if:
- (a) a Milestone has not been met by the due date and is not met within 20 Business Days after the Program Leader gives written notice to the Principal Participant;
  - (b) a Deliverable has not been supplied by the due date and is not supplied within 20 Business Days after the Program Leader gives written notice to the Principal Participant; or
  - (c) in the reasonable opinion of the Management Committee, the Project Objectives are unlikely to be met.
- 15.3 If the AAPP Project is terminated under clause 15.2 and there are sufficient Project Funds, the Collaboration Delegate will reimburse each Project Participant from the Project Funds for its reasonable expenses, as agreed by the Management Committee, necessarily incurred because of the early termination of the AAPP Project.
- 15.4 A Project Participant who is reimbursed under clause 15.3 must take reasonable steps to mitigate the expenses it incurs.
- 15.5 The total amount paid to each Project Participant must be no more than the balance of the Project Funds payable to the Project Participant if the AAPP Project had not terminated.
- 15.6 If there are insufficient Project Funds to reimburse all expenses, each Project Participant will be reimbursed on a pro rata basis.
- 15.7 Termination of the AAPP Project for any reason is without prejudice to the continuing enforceability of any rights and obligations of the Project Participants existing at the termination date.
- 15.8 The obligations in relation to confidentiality, indemnities, Project IP and any other obligations that expressly or by implication are intended to survive the operation of this Agreement will continue beyond termination of this Agreement.

## **16 EXPULSION OF A PROJECT PARTICIPANT**

16.1 The Management Committee may expel a Project Participant from an AAPP Project if Due Cause exists and is not remedied within 20 Business Days after the Program Leader gives written notice to the Project Participant.

16.2 In clause 16.1, 'Due Cause' means:

- (a) not making Project Contributions;
- (b) unauthorised use of Project IP, Project Background IP or Confidential Information;
- (c) any other material breach of the Principal Participants Agreement or this Agreement in conducting the AAPP Project, including not meeting Milestones;
- (d) a change or proposed change of personnel that is likely to adversely affect the Project Participant's participation in the AAPP Project; or
- (e) not resolving to the Management Committee's reasonable satisfaction, a conflict of interest in relation to the AAPP Project.

16.3 A Project Participant who is expelled from an AAPP Project ceases to be a Project Participant from the date on which the expulsion takes effect under clause 16.1.

16.4 The expulsion of a Project Participant from an AAPP Project does not affect:

- (a) the enforceability of other obligations of the Project Participant under the Formal Collaborative Agreement or other AAPP Projects;
- (b) rights against the Project Participant accrued at that time or arising from the withdrawal or expulsion;
- (c) the obligation on the Project Participant to supply its Project Background IP for the AAPP Project; or
- (d) the obligations on the Project Participant in relation to confidentiality, indemnities, Project IP and any other obligations that expressly or by implication are intended to survive the operation of this Agreement.

16.5 The withdrawal or expulsion of a Project Participant from the AAPP Project does not relieve the other Project Participants of their obligations under this Agreement.

## **17 NOTICES**

17.1 The addresses for service of Notices to the Project Participants are those set out in the Project Plan.

## **18 FURTHER ASSURANCES**

18.1 Each Project Participant must do all things and execute all documents necessary to give effect to the provisions and intent of this Agreement.

## **19 NO AGENCY OR PARTNERSHIP**

- 19.1 The Project Participants enter into this Agreement as independent contractors and nothing in this Agreement will result in a Project Participant being constituted as an agent or partner of another Project Participant.

## **20 GST**

- 20.1 Unless otherwise expressly stated, all amounts payable under this Agreement are expressed to be exclusive of GST.
- 20.2 If GST is payable on a Taxable Supply, the amount payable for that Taxable Supply will be the amount expressed in this Agreement plus GST.
- 20.3 If GST is payable on a Taxable Supply made by one party to another party, then that other party will not be required to pay any amount to the first party in respect of that Taxable Supply unless it has first received a Tax Invoice.
- 20.4 For the purposes of this clause 20, the terms GST, Taxable Supply and Tax Invoice have the meaning given to those terms in the A New Tax System (Goods and Services Tax) Act 1999 (Cth).