National Environmental Science Program

Climate Systems Hub research plan 2025

Version	Date of issue	Author	Comments
1	3 July 2024	DCCEEW Science Partnerships	
2	6 Sept 24	Hub program management team	First draft submitted

Version	Date of issue	Author	Comments
3	1 Nov 2024	DCEEW	Feedback
4	29 Nov 24	Hub program management team	Updated draft based on feedback
5	29 Jan 25	Hub program management team	Further updates based on feedback

Certification of research plan

Hub Leader certification

As the Hub Leader, I certify that:

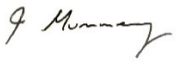
- the research projects contained in the research plan are linked to the Activity Outcomes for the Climate Systems Hub as outlined in the funding agreement
- funds are available to meet all projects included in this research plan
- this research plan was prepared in consultation with the hub steering committee.

Signature:	
Name:	Jaclyn Brown
Position:	Interim Hub Lead, NESP Climate Systems Hub
Date:	6/9/24

Hub Steering Committee Chair certification

As the Hub Steering Committee Chair, I certify that:

- this research plan was prepared in consultation with the hub steering committee
- any issues of concern or matters raised during steering committee meetings or by the department during its assessment process have been adequately resolved, amended or incorporated into this research plan
- this research plan was endorsed by the steering committee on 15 Nov 2024.

Signature:	
Name:	Jo Mummery
Position:	Chair, Hub Steering Committee
Date:	19/02/25

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Introduction

The National Environmental Science Program

The National Environmental Science Program (NESP) is a long-term commitment by the Australian Government to environment and climate research. The program:

- provides evidence for the design, delivery and on-ground outcomes for environmental programs
- helps decision-makers, including from Indigenous communities, to build resilience
- supports positive environmental, social and economic outcomes.

The first phase of NESP invested over **$145 million** (2014–15 to 2020–21) into 6 research hubs and emerging priority research projects. The second phase is investing **$149 million** (2020–21 to 2026–27) into 4 new research hubs. These hubs are:

- Resilient Landscapes Hub
- Marine and Coastal Hub
- Climate Systems Hub
- Sustainable Communities and Waste Hub

NESP is administered by the Department of Climate Change, Energy, the Environment and Water (the department). More information on NESP is available at www.dcceew.gov.au/science-research/nesp

Department role

The 4 NESP hubs have been formed to conduct applied research within their specific themes and lead a cross cutting functional initiative in their area of expertise. Each activity year the department will work with the minister, the hubs and other key stakeholders to identify and refine research priorities and develop projects that align with these priorities.

This annual review and evaluation of current and future research outputs and impact provides the flexibility needed for the hubs to engage in new themes of research in an adaptive manner and ensures that the focus is on the delivery of relevant and practical research. Hubs are responsible for co-design of the research projects in consultation with research-users and in partnership with relevant Indigenous researchers and communities. Hubs are also responsible for monitoring and evaluating the research project outcomes during the life of the hub in line with the NESP program evaluation framework.

The research prioritisation is a rolling process and will be informed by key milestones in each activity year, such as the annual progress report and submission of the following research plan.

Hub role

The Climate Systems Hub is tasked with undertaking research and activities that target 4 research scope areas:

- progress the development of national climate services capabilities and systems
- contribute to the development of the next generation of climate projections

- lead the further development of Australia's global climate model, ACCESS
- advance understanding of Australia's climate systems and processes

In addition to delivering these research outcomes the hub is:

- delivering to the outcomes of 4 cross-cutting initiative research portfolios through co-design and integration of these outcomes in research activities
- investing in and strengthening Indigenous partnerships
- utilising data management for optimal delivery of decision support tools
- communicating research outcomes to end-users across government, industry and communities.

These activities are delivered in support of practical management outcomes required to address the nation's climate change challenges. We are also building collaborative linkages with the other three NESP hubs to deliver these practical outcomes.

The Climate Systems Hub operates on the principals of co-design, incorporating a diverse inclusion of stakeholder and next-user opinions and needs. We will continue to invest in co-design, co-production and co-delivery of outputs with our stakeholders. Ultimately the Climate Systems Hub strives to constructively contribute to the overall success of all 4 hubs and cross-cutting initiatives comprising delivery of the NESP Phase 2 program.

Purpose of research plan

This research plan was developed by the Climate Systems Hub, in consultation with the department and other key stakeholders.

The purpose of the research plan is to outline:

- the research priorities the hub is funded to investigate, including those related to the crosscutting initiative the hub is funded to lead
- the research projects that will address these priorities
- how the research projects will be co-designed and delivered to research-users
- how the outputs of the research will be communicated with key stakeholders
- how hubs will work collaboratively within and across hubs.

This research plan also provides summary information on the management and governance of the hub, including the broad funding profile, key staff and research organisations, and the risks that need to be monitored to ensure success.

Initiatives

In addition to its hub-level research projects, each hub is also responsible for delivering a cross-cutting initiative and contributing research to other initiatives where appropriate. The initiative includes cross-hub collaboration and may include multiple projects to deliver management options, data and information for the themes listed below.

The 4 initiatives are:

Initiative	Lead hub
Protected place management	Marine and Coastal

Threatened and migratory species and threatened ecological communities	Resilient Landscapes
Waste impact management	Sustainable Communities and Waste
Climate adaptation	Climate Systems

Emerging priorities

Each year, specific emerging priorities (EP) may be identified by the department, hubs or third parties for delivery as research projects. If endorsed by the department, the hub will develop research project/s to address the emerging priority.

Hubs will be flexible and adaptable to respond to EP, with the ability to rapidly scale output, bring in external expertise or respond if additional resources are made available. Hubs were required to set aside 10% of NESP funding being spent per calendar year up to and including RP2024 so they could respond to EP; these funds can be rolled into subsequent years if they are not used.

In RP2025, hubs will be required to set aside the following for EP:

- 10% EP funds for 2024 (as per their approved RP2024 Attachment C budget)
- 5% for 2025 **PLUS** funds to make any difference in existing EP budgets **IF** 5% does not cover projected spends on EP projects in 2025
- Nil EP funds in 2026 and 2027 **EXCEPT** to cover projected spends on EP projects as approved

There is a separate process for any EP project proposals. EP projects approved during that process will then need to be added to future research plans Attachments A and C. EP projects must also be included in subsequent annual progress reports.

Research

Research priorities

The Climate Systems Hub is committed to a body of activity that includes short to long term research projects, initiatives and emerging priorities.

Broadly, the research priorities of the Climate Systems Hub are:

- to maintain our world-class capability in multidisciplinary Earth system science and modelling (Projects CS5.1, 5.2, 5.3, 5.4)
- to advance understanding of Australia's climate variability, extremes and associated drivers, including the fundamental drivers of climate risk in the Australian region (Projects CS 5.5, 5.6, 5.7)
- to develop applied decision-making tools and information to inform policy and programs to prepare Australia to manage emerging risks and opportunities (Projects CS5.8, 5.9, 5.10)
- cross-hub coordination for the 'climate adaptation' functional mission to support climate information to program hubs to drive integrated adaptation research across the program to support evidence-based decision-making and improve Australia's climate resilience. (Continuation of Projects CS 2.1, 4.1, 4.3)

Hub research projects

A list of research projects to be funded under the Climate Systems Hub can be found at Attachment A – research project list. For more detail on each specific project, please refer to the hub website (https://nesp2climate.com.au/)

Initiative projects

The Climate Systems Hub is leading the Climate Adaptation initiative.

Broadly, the research priorities of the initiative are:

- Support integrated research across the program to improve the evidence base for adaptation decision making for climate resilience;

Each project in the Research plan has a Knowledge Brokering component involving co-design with end users and a plan to deliver communications products. Further, the Adapt Land and Sea Project CS4.3 continues into the next Research plan as a unified way to deliver the best of our scientific insights to users. This Portal is a way to integrate knowledge across this hub and the others as a central point to aid adaptation. The other three NESP Hubs are also contributing their climate insights to the Adapt Land and Sea Portal as per their Research Plans.

- Marine and coastal ecosystem management for sea-level rise and ocean acidification;

Research through the life of the Hub has included a focus on sea-level rise and coastal inundation. In this final phase we are including a project that directly addresses how to ensure this knowledge arrives in the hands of decision makers in a usable format.

- Building traditional cultural knowledge into climate understanding and working with indigenous communities to help them adapt to the changing climate.

The First Nations Peoples Platform on Climate Change continues to be supported by the Hub with The Gathering being held in October 2024. The outcomes of the Gathering, the advice from the Steering Committee of the Platform and our Senior Indigenous Facilitator will continue to aid in our shared learnings on traditional knowledge on climate and efforts to adapt to climate change. Project CS5.10 will directly engage with Indigenous Communities in the development of products that can contribute to IPCC Assessments. The project will draw on the outputs and researchers in each of our other projects.

Research projects falling under the initiatives are also identified in Attachment A – worksheet Research projects. For more detail on each specific project, please refer to the hub website (https://nesp2climate.com.au/)

Expected outcomes and outputs

The expected outcomes of NESP are to produce research that:

- enhances our understanding of Australia's environment and climate
- is communicated clearly to relevant stakeholders and the public
- is discoverable and accessible
- informs decision-making and addresses environmental priorities.

Research under NESP is expected to inform the department's policy and program delivery. More broadly, it will engage and inform key stakeholders with an interest in the outputs of environmental and climate science research, including state and local governments, business and industry, community groups, Indigenous and non-Indigenous land managers, Indigenous communities and education institutions.

Hub outcomes and outputs

The suite of projects that will make up our effort in 2025 and 2026 directly map to the four Research Priorities of the Hub (listed above) and are outlined according to this structure below.

The envisaged Outcomes and Outputs of the program that we expect from these Research Priorities are outlined in Figure 1.

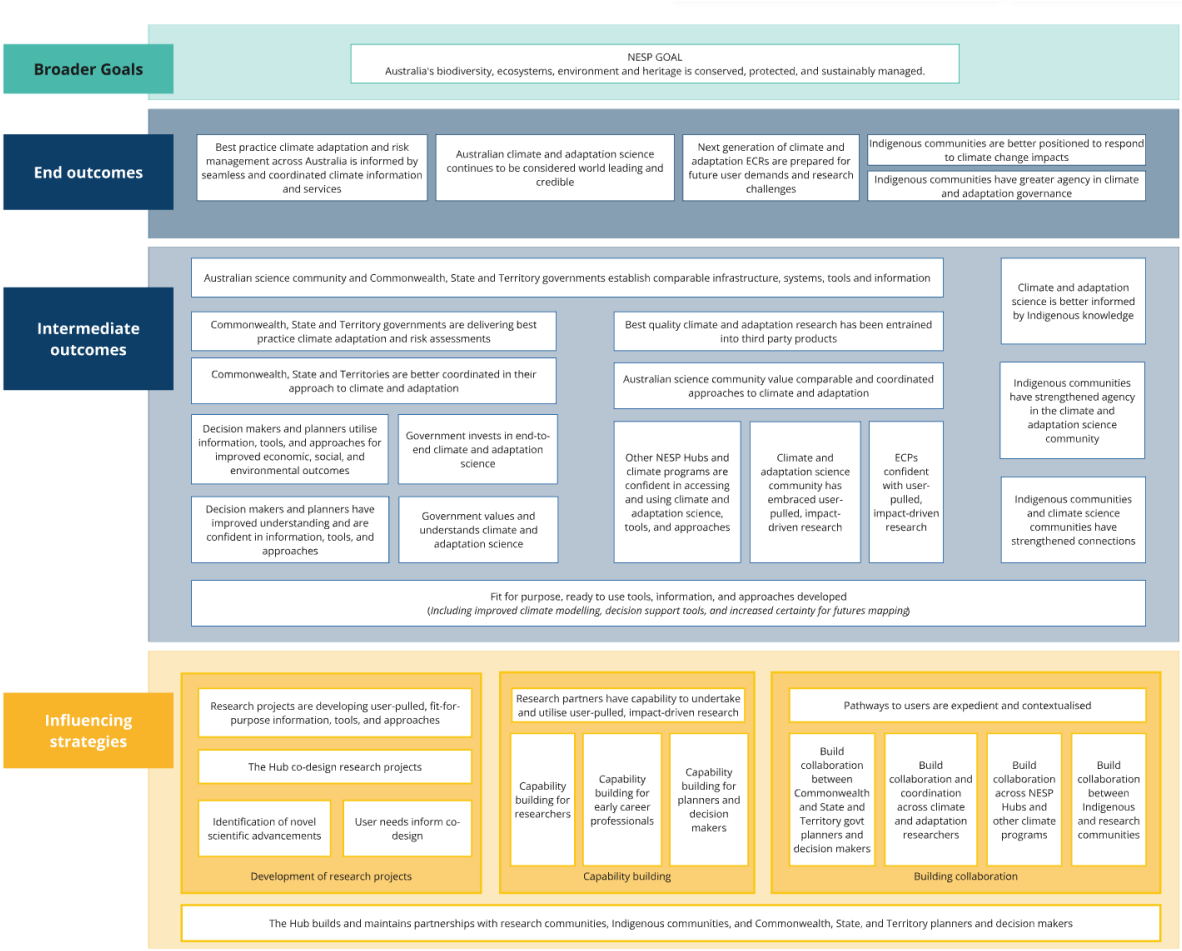

Figure 1. Updated theory of change for the Climate Systems Hub illustrating how our research activities are intended to deliver to end outcomes.

Projections of Australia's Carbon and Climate: to maintain our world-class capability in multidisciplinary Earth system science and modelling (Research priority 1).

CS5.1 ACCESS Development and Delivery to CMIP7

CS5.2 Global Carbon Budgets and the role of Terrestrial Carbon Sinks

CS5.3 Uncharted Climate Futures

CS5.4 Projection Verification

We develop Australia's future earth system models, to understand current and future climate and carbon balances, and explore how well these systems capture the extreme events that cause large impacts on Australia. In parallel we explore the climate projections not captured by climate models (including tipping points) and how these can be accounted for in our planning. While the work is pitched at international bodies and policy making, details of the implications of the findings at the local scale will be shared with stakeholders. In collaboration with the Australian Climate Service, we will be engaging with business and industry on CS5.3 Uncharted Climate Futures. The work delivers on the outcome to world leading and credible in the climate science field. It also builds the next generation of scientists as it is home to most of our Postdocs and will focus on their development. This is the largest section of our Research Portfolio, driven primarily by the need to contribute to the CMIP7 effort which is also supported by CSIRO and other partners. Without this contribution, the CMIP7 submission could not occur.

Science of Climate Hazards and Risk: to advance understanding of Australia's climate variability, extremes and associated drivers, including the fundamental drivers of climate risk in the Australian region (Research priority 2).

CS5.5 Marine Heatwaves

CS5.6 Extreme rainfall in Compound Events

CS5.7 High-resolution Rainfall Extremes

Driven by the concerns of our stakeholders, we focus on the issues of marine heatwaves and destructive rainfall events. We explore how they are changing and how they will continue to change in the future. Closely co-designed with stakeholders to prioritise the aspects of these climate risks that most affect them. Learnings are delivered to end users through the co-design and workshop process but also through the CS4.3 Adapt Land and Sea portal . The scientific progress has been designed to map to development needs in the Australian Climate Service. By focusing on user driven hazard research, and collaborating with the Australian Climate Service, we are aiming for seamless and coordinated risk information for Australia.

Capacity Building and Climate Literacy: to develop applied decision-making tools and information to inform policy and programs to prepare Australia to manage emerging risks and opportunities (Research priority 3).

CS5.8 Building for the Future

CS5.9 Communicating Coastal Floods

CS5.10 Indigenous-led Literature and Products to Inform National and International Processes on Climate Action.

We focus our Knowledge Brokering skills in building capacity and climate literacy in our community. We broker conversations within the development of the construction code, and we ensure that the latest understanding of coastal inundation is delivered to decision makers in ways it can be used. Strong co-design principles here ensure effective information for climate risk management. Additionally, here we work with Indigenous Communities for two-way knowledge sharing to provide IPCC relevant literature to represent our First Nations People. While this project is focused on writing papers for the international platform via the IPCC – it does this by drawing on the researchers in this and previous research plans, and the strong trust relationships they have been building on Country. Cited literature in the next IPCC assessment will enhance the voice of Indigenous communities.

Adaptation: cross-hub coordination for the 'climate adaptation' functional mission to support climate information to program hubs to drive integrated adaptation research across the program to support evidence-based decision-making and improve Australia's climate resilience (Research priority 4).

CS4.3 Adapt Land and Sea (amendment) (Initiative and Cross-hub)

CS4.1 Adaptation planning approach for protected places (amendment) (Initiative and Cross-hub)

CS2.1 Enabling best practice adaptation (Initiative and Cross-hub)

Our adaptation projects continue from previous years including amendments to grow CS4.3. No new projects were funded in this area in RP2025. These projects represent both Initiative and cross-hub projects. Adapt Land and Sea (CS4.3) provides the portal to adaptation information for a range of stakeholders from research developed across the NESP program. Project CS4.1 has complementary projects in the Marine and Coastal, and Resilient Landscapes Hubs.

Together the projects in the Capacity and Climate Literacy and Adaptation Group deliver to the goals of the Initiative, integrating the research of this hub and the others to decision ready information for stakeholders, delivering insights on coastal inundation, and learning and sharing with Indigenous Communities on Cultural Knowledge for climate change and adaptation. Importantly they also provide a framework for training physical climate scientists on the value and techniques of co-design and user-pull research.

Outcomes not related directly to research projects are also envisaged by the Hub.

The Hub continues to support the **National First Peoples Platform on Climate Change** (https://nesp2climate.com.au/indigenous-partnerships/national-first-peoples-platform-on-climate-change/), facilitated by the Hub's Indigenous Facilitator. The Steering Committee of the Platform is an apolitical advisory body, comprised of Traditional Owners who have been endorsed to participate on the committee. The purpose of the committee is to work with the NESP Climate Systems Hub to provide advice and guidance on developing the research agenda, develop culturally appropriate projects established under the principles of Free, Prior and Informed Consent and Indigenous Cultural and Intellectual Property (ICIP) (this is intellectual Property pertaining to First Peoples Ownership) on climate change. This information will assist First Peoples in caring for Country in a changing climate.

We continue to focus on development of early career scientists through the **Climate College** (https://nesp2climate.com.au/climate-college/). This has to date involved mentoring, webinars, networking events and site visits. The college provides a forum for staff to develop interdisciplinary skills needed to work in climate science and adaptation.

A unique offering of the Climate Systems Hub has been to collaborate more closely with state and territory initiatives via the partnership with the Cross Jurisdictional Community of Practice for Climate Science (CJ CoP CS) to embed Knowledge Brokers in state and territory partner organisations. This has enhanced our ability to deliver Hub outputs directly to state and territory and local governments. It also allows for greater collaboration of climate science efforts between state and federal initiatives.

In response to the rapid escalation of demand for climate information, individual science organisations are responding. This lacks coordination creating confusion for stakeholder. The Climate Systems Hub contributes staff to the development of the **National Partnership for Climate Projections** and development of a unified Australian roadmap (https://www.dcceew.gov.au/sites/default/files/documents/climate-projections-roadmap-for-australia.pdf). This ongoing support contributes to our end outcome goal of seamless and coordinated climate adaptation and risk management across Australia.

After a successful national **Climate Adaptation Conference** in 2023, the hub is preparing to deliver the 2025 conference in Western Australia partnering with the Western Australian government. The 2023 conference was the first national adaptation conference in five years and attracted more than 440 delegates with 11 keynote speakers across six plenary sessions. We expect a similar response in 2025.

Future looking and collaboration - In the time since the Hubs inception there has been growing demand for climate research and climate information and much change in the climate science research and climate services environment. This includes consumer pull such as the roll out of an ISSB-aligned mandatory climate reporting regime in Australia for corporate entities beginning 1st January 2025 and service provision, including the Climate Services for Agriculture Program, state and territory-based programs and importantly the establishment of the Australian Climate Service (ACS). The ACS has undergone various redirections and is now awaiting the Governments response to a major review. A National Climate Risk Assessment is underway and will inform a National Adaptation Plan. The

Climate System Hub has looked to be agile and collaborative to the growing and changing demand for climate information. The hub feels it has an important goal as a mature leader in this climate ecosystem to support coordinated climate adaptation and risk management that can't be achieved if each research program acts alone. We work to collaborate with other federal and state climate programs, and the state and territory embedded Knowledge Brokers play a critical role in coordinating this effort. Project CS2.1 is delivering into the National Climate Risk Assessment providing an important insight into adaptation knowledge and practice in Australia. Project CS2.10 is delivering sea-level rise data into the update of CoastAdapt and CS2.5 contributed a review to support the update of the Australian Rainfall and Runoff Guidelines.

What wasn't funded

The hub received project proposals beyond what it could fund. The following lists projects submitted that were not funded and some background to that decision.

- Stakeholders have expressed a strong interest in **attribution** studies to clearly articulate how extreme events have been altered by climate change. In 2024, Honours students Hannah Bourbon and Francine Machin authored the report *Strengthening Climate Change Attribution for Decision Makers* outlining stakeholder interest in attribution information and how they wanted it could be communicated. The Hub Steering Committee determined that the level of detail that stakeholders sought is not something the science can confidently provide. The original project to deliver attribution has pivoted to build the modelling capability to better deliver attribution claims into the future.
- Global sea-level rise is a critical issue for Australia given our extensive coastline and location in the Southern Hemisphere. It is critical that we maintain this capability in Australia. The CSIRO as the partner organisation submitting the proposal determined this project would not make up part of its portfolio in the hub in RP2025.
- Stakeholders have listed changes to **Tropical Cyclones** as one of their greatest concerns. Unfortunately, we were unable to continue funding this research given competing demands on the CSIRO portfolio in the hub. Some work is being done on Tropical Cyclones within the Australian Climate Service, however not the research on factors such as whether the latitudinal extent of TCs will expand.
- **Terrestrial Heatwaves** are becoming increasingly topical as we break temperature records each year. It is a project that can find funding more easily than other research topics and is now being developed in other climate programs.
- The Hub Steering Committee advised that **drought** research was a lower priority in our portfolio. The focus instead is on extreme rainfall.
- In the hub we invested in understanding what an appropriate communication tool for climate information should look like. From RP2024 we have a deep understanding of these needs and how a tool could be designed and delivered. Wireframes have been developed for a Gateway and Almanac. (Our insights were noted in the Australian Climate Service review). The primary reason for not continuing is the desire of the Australian Climate Service to develop the tool and a reluctance for us to build a competing product – however we anticipate the ACS tool to be based on the extensive user research and design developed in the hub.
- **Threatened Species** and climate adaptation has been an important contribution of the hub to the Threatened and Migratory species and Threatened Ecological Communities Initiative. Given pressures on CSIRO staff allocation of the program we

were not able to include it in this round – however are proud of the significant contribution it has made. Its outcomes are being included in CS4.3 Adapt Land and Sea, and we will explore what additional effort may be included in CS4.1 Adaptation Planning Approach for Protected Places (Kakadu and Gondwana) project in the next two years.

- **Evaluating adaptation** is a follow-up to project CS2.1 focused on building knowledge on monitoring and evaluation for adaptation practice and planning. This is a clear knowledge gap for state, territory and federal governments and received positive support. It is a one-year project that could be reconsidered for RP2026 if funding is available.

Collaboration and partnerships

NESP encourages a collaborative, multi-disciplinary approach to environmental and climate research. Key to the success of the hub will be the capacity to foster partnerships across hubs and with a wide range of decision-makers across the Australian community, including Indigenous communities, to achieve positive environmental, social and economic outcomes.

The Climate Systems Hub comprises 8 partners – two of Australia's foremost climate research organisations, CSIRO and the Bureau of Meteorology, 5 of Australia's leading research universities, and unique to this Hub a collaborative state and territory community of practice – the Cross Jurisdictional Community of Practice for Climate Science (CJ COP CS) (Table 1).

Table 1: Climate Systems Hub partner contributions and capabilities.

Hub Partner	Role, expertise and alignment
CSIRO	"We solve the greatest challenges through innovative science and technology. We are Australia's innovation catalyst, collaborating to boost Australia's innovation performance." Capabilities in CS Hub: Global climate model ACCESS, greenhouse gas budgets, sea level rise and extremes, biodiversity, adaptation and Indigenous partnerships.
Bureau of Meteorology	"The Bureau of Meteorology's mission is to provide trusted, reliable and responsive weather, water, climate and ocean services for Australia – all day, every day. Research in the Bureau is advancing the science behind the Bureau's environmental forecasts, warnings and services, and our Indigenous engagement team are actively building the inclusion of traditional knowledge in all that we do." Capabilities in CS Hub: fundamental climate research, projections information, climate modelling expertise.
Australian National University	"The ANU is Australia's most research-intensive university, and in the 2021 QS University Rankings was ranked 1st in Australia and 21st in the world for Earth and Marine Sciences. ANU was also rated 'well above world standard' for Earth Sciences and for Environmental Sciences in the 2018 Excellence in Research for Australia exercise." Capabilities in CS Hub: climate change processes, and land-based carbon sequestration.
Monash University	"Monash University has one of the strongest research and teaching programs in the country, which is globally competitive. The University boasts a world-leading capability in climate science research, which remains a strategic priority under our Focus Ares of Sustainability in the 2020 Research Agenda. Monash was rated as the top Australian universities in the 2018, ERA Engagement and Impact Assessment. Translating our work to the community is a critical mission at the University." Capabilities in CS Hub: climate extremes, adaptation.

University of Melbourne	“The University of Melbourne has collaborated with the partners in this proposed hub over many years to produce advances in climate science and deliver them to stakeholders. This has occurred through major programs such as the Australian Research Council (ARC) Centre of Excellence for Climate Extremes (CLEX) and the earlier ARC Centre of Excellence for Climate System Science.” Capabilities in CS Hub: understanding climate change and variability, climate projections and adaptation.
University of New South Wales	“Established in 1949, UNSW Sydney is one of Australia’s leading research and teaching universities, renowned for the quality of its graduates and its commitment to new and creative approaches to education and research. UNSW Sydney is one of the founding members of the Group of Eight, a coalition of Australian research-intensive universities, and of Universitas 21, a global network of research universities. In the 2020 QS World University Rankings, UNSW Sydney was ranked as 44th globally.” Capabilities in CS Hub: climate projections and extremes, predictive modelling, machine learning and data science.
University of Tasmania	“UTAS has a mission to be a place-based, globally connected university, with a clear ambition to develop and provide sustainable solutions across its diverse portfolios. While UTAS has diverse and multi-faceted research strengths, the University is also world leading in several areas, including marine and climate, with the Institute for Marine and Antarctic Studies being a Flagship of the University.” Capabilities in CS Hub: ocean research, biodiversity, land management and adaptation.
The Cross Jurisdictional Community of Practice for Climate Science (CJ CoP CS)	“The Cross Jurisdictional Community of Practice for Climate Science (CJ CoP CS) was established in March 2019 to encourage and enhance climate science for stakeholder needs and policy and decision-makers. The CJ CoP CS will support the Climate Systems Hub through an interjurisdictional knowledge brokering team working directly with technical end-users, policy and decision-makers to ensure the development of fit-for-purpose climate science information and a consistent/comparable approach to application and communication of information. Knowledge brokering enables connection to a broad network of end-users across the nation to translate research into informed action. Supported by the NSW Department of Planning and Environment (DPE), the CJ CoP CS represents all the state and territory governments, as well as the Australian government.” Capabilities in CS Hub: knowledge brokering, communication, community of practice.

Inter-Hub relationships

Through the Initiative Lead and Knowledge Brokers, the hub has built several relationships critical to sustaining our role in the climate science and adaptation research ecosystems. This are summarised in Table 1.

Table 2: Climate Systems Hub relationships delivery toward outcomes.

Relationship with	Nature of the relationship	Avenue of engagement	End outcome delivering to
Key stakeholders			
Australian Climate Services	Delivery of NESP research to inform ACS Coordinate activities where possible	Portal meetings Hub Steering Committee Key contacts	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services
Climate Change Policy and Risk Division DCCEEW (incl. National Adaptation Policy Office and Climate Active Risk and Disclosure)	NESP provides research and advice to support activities	Hub Steering Committee Monthly touchpoint meetings Delivery to NCRA Training Review of research plans	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services Australian climate and adaptation science continues to be considered world leading and credible
Nature Positive Division, Biodiversity Division and Director of National Parks Division, DCCEEW	NESP provides research and advice to support activities	Project partnerships and steering committees	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services
State and territory governments		Hub partner National	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services
Research programs			

21st Century Weather	Coordinate activities where possible	Regular catch-up meetings	Australian climate and adaptation science continues to be considered world leading and credible
ACCESS-NRI	Critical partner to deliver CMIP7	Joint meetings, ACCESS-NRI advisory board, shared Knowledge Brokering and Comms.	World leading Earth System model for Australian researchers that is also submitted to CMIP7.
Other Hubs			
Initiative leads	Identify opportunities to deliver into each of the 4 NESP Initiatives	Monthly touchpoint meetings	Australian climate and adaptation science continues to be considered world leading and credible
All Hubs	Co-develop an on-line platform to support adaptation for biodiversity outcomes	Project CS4.3 and RL	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services
Threatened and migratory species and threatened ecological communities Initiative	Scope opportunities to support DCCEEW decision-making under the Nature Positive Plan	Series of collaborative workshops	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services
Resilient Landscapes Hub	Support adaptation planning and uptake in regional locations	Project contributions: *Climate-resilient landscapes: an adaptation case study in NSW's Northern Rivers region; Addressing Kakadu's strategic research needs*	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services

Marine and Coastal Hub	Support adaptation planning and uptake in regional locations	Project contributions: *Addressing Kakadu's strategic research needs*	Best practice climate adaptation and risk management across Australia is informed by seamless and coordinated climate information and services

Indigenous partnerships

Our engagements encompass principles of Free, Prior and Informed Consent (FPIC). We value engagement that is respectful to cultural protocols of the community and their Country. A First Nations reference group – The National First Peoples Platform on Climate Change - supported by the Indigenous facilitator guide implementation of principles of Indigenous-led and co-designed protocols, in accordance with the hub's Indigenous partnerships strategy. They provide high-level guidance and advice to the Climate Systems Hub on opportunities for collaboration and co-design protocols as required. They help ensure our research accords to co-design respecting cultural protocols and safety. There are many peoples and many cultures. We respect the provision and ownership of traditional knowledge. Ensuring cultural safety for all, hub partners will undertake cross-cultural awareness and training at both a broad and specific level, as dictated by project needs.

The establishment of a National First Peoples Platform on Climate Change (NFPPCC) is a significant extension to the Indigenous Partnership seeded in the former hub. Supporting the NFPPCC Indigenous-led decision-making processes, relevant members of the hub provide a secretariat function to ensure key performance indicators are met through co-design phases for the delivery of projects. Primary milestone of the NFPPCC is, the National First Peoples Gathering on Climate Change. A Terms of Reference governing NFPPCC – including its function, roles, responsibilities, key timelines, and scheduled events – has been developed with NFPPCC members and is the primary document guiding the NFPPCC and the hub in its activities.

Indigenous Cultural Intellectual Property (ICIP) is identified as early as possible in the hub's work and where appropriate, in individual projects. ICIP is managed in accordance with the hub's Indigenous partnership and Data management strategies.

Capacity building of Indigenous partners is also considered through the understanding of their legal rights pertaining to ethics and data sovereignty. In RP2025 we plan to extend the number of hub researchers, commencing with project leaders, who engage in 'True Tracks' training around ICIP, and more broadly roll out 'Your Mob Learning Indigenous Cultural Awareness Training' across all hub researchers.

3 Category Approach to Indigenous Engagement

The NESP program uses an updated 3 category approach. In Attachment B we identify the category of all projects in their approach to Indigenous engagement. Below we outline the Climate Systems Hub's approach to each of the 3 categories.

Category 1 - Indigenous led

With a new Indigenous Facilitator hired into the Hub we are pleased to have a Category 1 project in this research plan – CS5.10. This project will draw on the skills of researchers in our full suite of research projects and connect them to First Nations People on Country. Through shared learnings they will develop products that can be referenced in the next IPCC Assessment report amplifying the voice of Indigenous People.

Category 2 - Co-design

Where possible we have endeavoured to lift our Category 3 projects to Category 2. Projects CS5.2, CS5.5 and CS5.9 meet this categorisation.

Potential Traditional Owner participants are identified through several ways, such as:

- a direct approach from a member of a Traditional Owner group via conferences and workshops
- networking within First Nations communication methods
- networking within stakeholder interactions
- existing Traditional Owner relationships and their partners.

Pre-discussions with the Indigenous facilitator and knowledge broker, then initial discussions with the Traditional Owner group governance process identifying their major concerns (often, rapid changes to their environment impacting their Indigenous cultural heritage). These discussions should include the following actions and priorities:

- Consult with the Traditional Owner group to co-design agenda.
- Open a framework of inclusiveness and Indigenous-led priorities - important from commencement.
- Consideration that Traditional Owners need to be empowered and feel empowered as they have cultural authority and agency of their respective Country.

Communication via email and phone calls, are made to:

- acknowledge discussions
- identify an opportunity to meet with key members/representatives of the Traditional Owner group via their respective governance processes
- outline the role of the Climate Systems Hub, including key milestones
- outline the role of the Indigenous facilitator
- outline the role of the knowledge broker
- explain co-design principles
- explain ‘Indigenous-led’.

Category 3 – Communicate

Our remaining Research projects are Category 3. Throughout the development and implementation of the research, all key decisions and strategies are to be outlined in an appropriate communique method to Traditional Owners and relevant stakeholders directly and to the public indirectly (websites – Traditional Owner, local stakeholders and partners, Climate Systems Hub communications, DCCEEW, newsletters, etc.). All desktop studies are outlined to appropriate Traditional Owner groups.

Indigenous Partnerships table of stakeholders

The Climate Systems Hub Indigenous partnerships strategy may from time to time consult with the following list of stakeholders (Table 3) relevant to cultural authority, protocols and processes, policy, and general matters.

Table 3: Climate Systems Hub Indigenous partnerships stakeholders.

Hub	Primary	Secondary

Climate science partners NESP Indigenous Facilitation Network	• National First Peoples Platform on Climate Change • Ipima Ikaya Aboriginal Corporation, Registered Native Title Body Corporate • Indigenous Land and Sea Corporation • Great Barrier Reef Foundation – Traditional Owner Partnership • Yorta Yorta Nation Aboriginal Corporation • Indigenous Desert Alliance • Koinmerburra Aboriginal Corporation • Torres Strait Island Regional Authority • Gur A Baradharaw Kod (GBK) Torres Strait Sea and Land Council, Torres Strait Islander Corporation • Southeast Tasmanian Aboriginal Corporation • Butchalla Aboriginal Corporation • Butchulla Native Title Aboriginal Corporation • Malgana Aboriginal Corporation • Tiwi Resources • Central Land Council • Traditional Owner groups corporations • Registered Native Title Bodies Corporate • Prescribed Body Corporate • Aboriginal Land Councils • Indigenous corporations • Departmental policymakers • Indigenous Advisory Committee • Identified policymakers in other federal and state government departments.	• Peak Indigenous bodies • General public • Environment non-government organisations

Knowledge brokering, communication and data management

The department expects that each hub will engage and communicate research outcomes with research-users and the wider public to facilitate uptake and adoption. As part of this, the program is committed to promoting open access to public sector and publicly funded information, including optimising the use and reuse of data. The department expects that each hub will implement its data management plan to provide timely, open access to the data products and research outputs.

The Climate Systems Hub remains committed to enabling knowledge exchange between our science and Australia's policy and practice environment throughout the life of the Hub (Table 4. This effort is being led by the knowledge brokering team, to:

i) ensure meaningful, continued, and embedded co-design between researchers, practitioners, data-users, and decision-makers

ii) establish collaborative partnerships

iii) ensure that hub-led science directly informs decisions, policies, and adaptation responses.

In this way we can actively shape complex science-policy-practice outcomes we seek to achieve. The Hub has partnered with all of Australia's states and territories through the Cross Jurisdictional Community of Practice for Climate Science (CJ CoP CS) and full- and part-time knowledge brokers are engaged on the project to foster connection across the science-policy-practice landscape.

Continuing this partnership through the CJ CoP CS for the next phase of the Hub will ensure the knowledge brokering team can keep strengthening the relationships between scientists and decision-makers.

Table 4: The Climate Systems Hub's 5-stage approach to research co-design throughout life of program.

Stage	Intent
Explore	Map the broad picture of stakeholder and research landscape.
Analyse	Develop a strategic plan for the hub including key focus areas.
Co-plan	Deeper engagement, scoping, identify topics and projects within themes.
Co-design	Engage policymakers, other NESP hubs, end-users, and next users to design and refine projects for future research plans.
Co-develop and co-produce projects	Project teams establish, plan and conduct projects in a way that considers stakeholder needs, input and up-take

In preparing RP2025, the Knowledge Brokers have engaged with stakeholders to understand their information needs, build partnerships to co-design and co-deliver the proposed projects and guide the development of effective pathways to impact. Along with the Communication Officer, they have also helped inform accessible and useable outputs for each project. An initial milestone in each project plan is to develop a workplan with the Knowledge Brokering

team. This will detail how and when to engage with stakeholders and the products that will be developed.

Going forward, the Knowledge Broker team will continue to support projects to engage with relevant stakeholders, to co-develop and test research approaches and outcomes, and to co-deliver findings in a way that promotes uptake and best-practice science-informed decision making.

In 2024, the knowledge brokering, and communication teams have focused on developing 'impact campaigns' to build the audience for our research and promote uptake of results. This has included a monthly external newsletter, webinar series, factsheets and explainer series. We will continue this approach under RP2025 to build our communication portfolio.

Data Management

The NESP data and information guidelines and the Climate Systems Hub Data Management Strategy detail the fundamental approach to data management and the many aspects projects need to consider, including dealing with Indigenous Cultural and Intellectual Property (ICIP). An approach will be taken that ensures all outputs meet the FAIR data principles – Findable, Accessible, Interoperable, and Reusable – in conjunction with the CARE principles for any ICIP – Collective benefit, Authority to control, Responsibility, and Ethics. Together, these aim to ensure all data are easily shared and reused, but also used ethically. All projects will adhere to principles of ICIP and acknowledge data sovereignty elements in all project outputs for any ICIP.

While it is acknowledged that projects will not know all the details at the outset, how and where project outputs will be made freely and openly available will be considered from the outset. Different types of data and information will require different approaches, and the principles on how different data types will be managed are outlined in the hub's data management strategy.

Funding

The table below summarises the NESP funding available on a calendar year basis Climate System Hub to the cessation of the agreement, and total proposed expenditure of NESP funds. A more detailed budget can be found in Attachment C (Activity budget summary tables).

	2021 Actual	**2022 Actual**	**2023 Actual**	**2024 Budget**	**2025 Budget**	**2026 Budget**	**2027 Budget**	**Total**
	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)	$ (GST excl.)
Balance carried forward	-	1,176,395	6,045,984	6,136,800	4,341,210	2,304,528	333,706	N/A
Income								
NESP funding[1]	3,350,000	9,600,000	6,400,000	6,400,000	6,400,000	5,700,000	700,00	38,550,000
Interest[2]	-	53,566	215,396	200,000	-	-	-	468,962
Total NESP funding[3]	**3,350,000**	**10,829,961**	**12,661,380**	**12,736,800**	**10,741,210**	**8,004,528**	**1,033,706**	**-**
Total NESP expenditure[4]	2,173,605	4,783,977	6,524,580	8,395,590	8,436,682	7,670,823	1,033,706	39,018,962
Balance[5]	**1,176,395**	**6,045,984**	**6,136,800**	**4,341,210**	**2,304,528**	**333,706**	**-**	

1. As per funding agreement milestone payment schedule for 2024–2027.
2. Interest earned on NESP funds held.
3. The sum of the balance carried forward, NESP funding and interest earned on NESP funds.
4. Expenditure figures to be drawn from the Activity budget summary tables (Attachment C).
5. Total NESP funding minus total expenditure.

For any given calendar year, the hub funding for applied science, decision tools and practical management options must total at least 70% of the NESP funds. The balance of the NESP funds can be allocated between knowledge capture (10–20%), communication (5–10%), and administration (5–10%).

In RP2025, hubs will be required to set aside the following for EP:

- 10% EP funds for 2024 (as per their approved RP2024 Att C budget)
- 5% for 2025 **PLUS** funds to make any difference in existing EP budgets **IF** 5% does not cover projected spends on EP projects in 2025
- Nil EP funds in 2026 and 2027 **EXCEPT** to cover projected spends on EP projects as approved

Below is the Climate Systems Hub current allocation of funds to these categories.

Item	Required percentage range	Hub percentage
Applied science, decision tools and practical management options	≥70%	71%
Knowledge capture	10–20%	15%
Communication	5–10%	4%
Administration	5–10%	10%

Under the terms of the funding agreement, the funds paid by the department under NESP must be matched by recipient and other contributions, to a minimum total of 100% contribution **for the life of the program.**

Attachment C presents the activity budget tables for the hub for calendar year 2021 onwards. Budget estimates are provided for current and future years. The tables include recipient and other contributions.

Attachments

The following attachments form part of the Climate System hub 2025 research plan.

- Attachment A –Hub research project list
- Attachment B – Hub project plans
- Attachment C –Hub activity budget
- Attachment D – Hub risk assessment and treatment plan