Earth Systems and
Climate Change
Hub

National Environmental Science Programme

Communication and Knowledge Brokering Strategy

VERSION 5

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VERSION CONTROL REVISION HISTORY *Communication and Knowledge Brokering Strategy*			
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V2.1	13 Oct 2015	Kevin Hennessy	Comments on pages 1-9 sent to Geoff
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V2.5	7 Mar 2016	Helen Cleugh & Geoff Gooley	Reviewed Karen's edits and updated draft Strategy for submission to HSC
V2.6	16 Aug 2016	Karen Pearce	
V2.6	29 Sep 2016	Helen Cleugh	All changes accepted. This is the final version for RPV2 and will be loaded to the SharePoint. This strategy will be reviewed in January 2017 to align with RPV3
V3.0	8 Mar 2017	Karen Pearce	Updated to align with RPV3 and follow editorial guidelines
V3.1	29 Jun 2017	Karen Pearce	Updated to reference new stakeholder database in section 6.2
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V4.1	19 Feb 2018	Karen Pearce	Key messages from HLT discussion paper included
V4.2	21 Feb 2018	Geoff Gooley	Minor edits on M&E content
V4.3	1 Mar 2018	Karen Pearce	Post-HLT meeting (1/3/18) edit to clarify climate change services key message
V5.0	14 Feb 2019	Sonia Bluhm	Major review and update; inclusion of Target User Group approach to stakeholder engagement
V5.1	22 July 2019	Sonia Bluhm	Restructure and edits/updates

Contents

1. Introduction

1.1 NESP Earth Systems and Climate Change Hub

The Earth Systems and Climate Change (ESCC) Hub is one of six research hubs established under the Australian Government's National Environmental Science Program (NESP).

The Hub's overarching aim is to ensure that policies, plans and associated decision-making relevant to key stakeholders are effectively informed by Earth systems and climate change science now and into the future; thereby supporting the broader NESP outcomes for achieving a productive and resilient Australia.

The ESCC Hub will achieve this by:

- building a national partnership, with world-class capability in delivery of multidisciplinary Earth systems and climate change science, modelling, information and associated products and services
- facilitating the uptake of knowledge, products and services through targeted stakeholder engagement, communication and knowledge brokering.

The ESCC Hub research project portfolio is designed to meet the needs of target next and end-users, featuring the following key research themes (these are the research priorities established by the Department of the Environment and Energy):

- Building the utility of Earth systems and climate change information
- Improved observations and understanding of past and current climate
- Improved understanding of how the climate system may change in the future.

Collectively, the project portfolio has a clearly defined 'path-to-impact' focused on addressing five key national challenges for Australia (which are the Hub's outcome areas):

- Hydroclimate and water resources
- Food security, ecosystems and natural resource management
- Carbon cycle and future warming
- Coastal climate
- Climate extremes and disaster risk management.

Consistent with the Hub's stated aim and intended outcomes, the specific objectives of the Hub are to:

- Advance understanding of Australia's climate variability, extremes and associated drivers and deliver enhanced weather and climate predictions and projections
- Provide relevant information, communications and knowledge products tailored to the needs of target next/end-users
- Develop and strengthen stakeholder relationships and support informed management and evidence-based decision-making through facilitated outreach of relevant products and services.

To meet its stated objectives, the ESCC Hub will deliver a suite of complementary knowledge, information and data products and services to ensure that environmental decision making is informed by an enhanced understanding of Australia's past, current and future climate.

1.2 About this document

The *Communication and Knowledge Brokering Strategy* (C&KBS) outlines:

- the rationale behind the Hub's communication and knowledge brokering activities (why?)
- key stakeholders and target audiences (who?)
- objectives, key messages and products (what?)
- delivery mechanisms, including services and support (how?).

The C&KBS is fully integrated with the closely linked *Indigenous Engagement and Collaboration Strategy*. Both are key components of the Hub's *Research Plan*, which more broadly incorporates overarching ESCC Hub governance arrangements, including the *Data Management Plan*, *Evaluation Planning Framework* and *Hub Risk Register*. These governance documents can be found on the Hub's website at http://nespclimate.com.au/governance-and-reporting/.

1.3 Scope

The ESCC Hub C&KBS encompasses three fundamental areas of activity:

- Communication
- Knowledge brokering
- Stakeholder engagement

1.4 Implementation

The ESCC Hub C&KBS will be implemented through the *Communication and Knowledge Brokering (C&KB) Action Plan*. This plan outlines the timing and purpose for the range of communication, knowledge brokering, and engagement activities undertaken by the Hub. The plan will be updated regularly in response to operational requirements and resources.

Implementation guidelines are provided in relevant Hub protocol and guideline documents, including:

- *Branding and acknowledgement guidelines*
- *Editorial guidelines*
- *Publications, presentations and products protocol*
- *Public comment protocol*

2. Purpose and objectives

The purpose of the ESCC Hub C&KBS is to:

- Guide the development of strategic, proactive communication and knowledge brokering activities with key stakeholders, including target end and next-users and associated decision-makers
- Increase awareness, build support, exchange information and facilitate outreach and maintain engagement with these stakeholders and the broader research and general community in delivery of ESCC Hub projects and activities, and the NESP more generally
- Facilitate development and management of productive stakeholder relationships, including collaborative partnerships where appropriate, in delivery of ESCC Hub research projects and activities
- Facilitate (i) implementation of the ESCC Hub *Evaluation Planning Framework* and associated *Monitoring and Evaluation (M&E) Action Plan*, (ii) adoption of key ESCC Hub outputs by next/end-users, (iii) management of attendant ESCC Hub operational risks, and
- Facilitate realisation of agreed strategic ESCC Hub research outcomes and impacts (i.e. path-to-impact), including successfully meeting and where appropriate adding value to stakeholder expectations.

In this context, the specific objectives of the C&KBS are to:

- Promote and communicate the aim, objectives, activities and outputs of the ESCC Hub research plan through development of clear, targeted and accurate ESCC Hub communication products and services focused on needs of next and end-users and stakeholders [Communication]
- Manage the knowledge generated by the ESCC Hub including relevant data, information and associated products and services in a way that is secure, discoverable and accessible, which meets agreed standards of quality assurance and control, and which meets the needs of targeted end-users [Knowledge brokering]
- Develop and manage key stakeholder relationships and where appropriate collaborative partnerships to ensure that communication and knowledge brokering activities are strategically targeted to facilitate adoption and realisation of specified ESCC Hub outcomes and impacts [Stakeholder engagement].

These objectives will be addressed by the ESCC Hub through undertaking effective and efficient stakeholder engagement featuring regular interactions and information exchange between key internal and external ESCC Hub stakeholders, including:

- Department of the Environment and Energy
- The Hub's identified Target User Groups, and other target next and end-users within government, private sector and the Australian community
- ESCC Hub Steering Committee and Stakeholder Advisory Group, ESCC Hub partner agencies and other NESP Hubs
- The climate change science research community more generally.

3. Governance, linkages and process

3.1 Governance arrangements and links to key stakeholders/partners

A schematic summary of the governance structure for the ESCC Hub, with linkages between internal and external stakeholders and the Hub itself is provided in Figure 1.
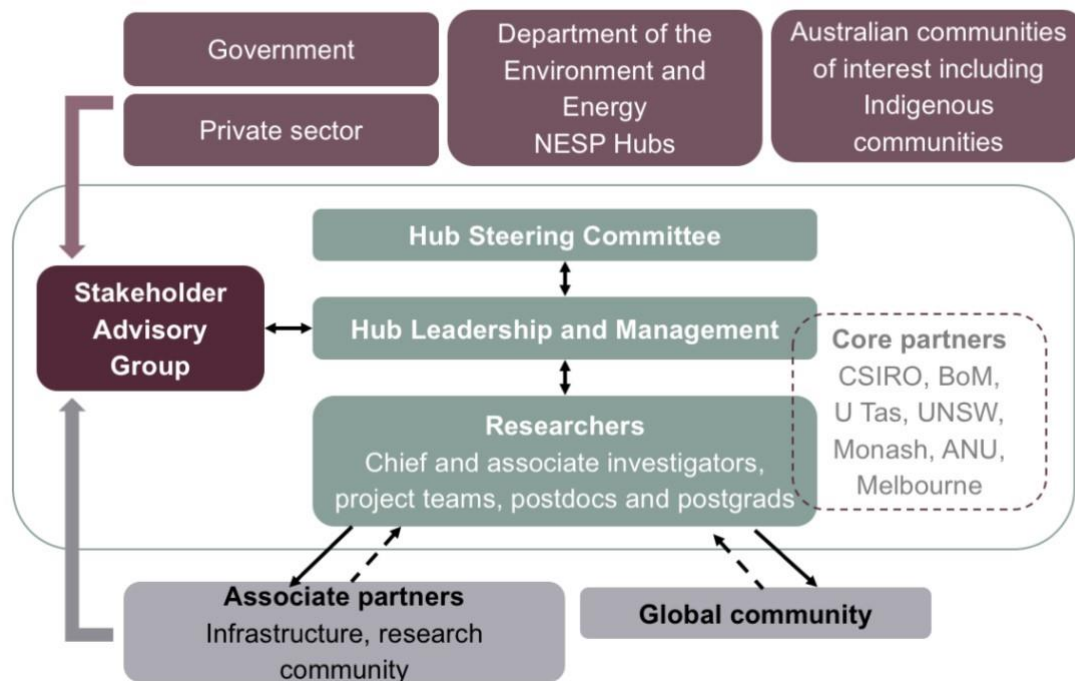

Figure 1: ESCC Hub governance structure and key stakeholder/partner linkages

As part of the ESCC Hub governance arrangements, responsibility for development of the C&KBS in the first instance is with the Hub Leadership Team/Hub Program Management Team (HLT/HPMT), with input from key internal and external stakeholders as appropriate. The strategy has also been formally endorsed by the ESCC Hub Steering Committee (HSC) and Department of the Environment and Energy.

All communication and knowledge brokering functions and activities will be directed, coordinated and undertaken at the Hub level by the HLT/HPMT, consistent with directions of the C&KBS and the Target User Group activity plans within the Hub's Research Plan. Specific *research* related communication and knowledge brokering activities will primarily be undertaken at the project level. This approach will ensure that individual research project outputs are appropriately targeted at next/end-user needs, consistent with broader provisions of the Hub's Research Plan and associated project portfolio. Indeed, all projects will feature specific deliverables designed to contribute to the successful implementation of the Hub's C&KBS and the realisation of the Hub's specified outcomes and a tangible path to impact.

4. Communication

ESCC Hub communication will be resourced at both Hub and project level to ensure responsibility for communication activities are allocated across all relevant ESCC Hub personnel in an effective and efficient manner consistent with stakeholder expectations and needs, requisite expertise and available resources.

All communication activities—at both Hub and/or project level—will be guided by the strategic aims and objectives of the C&KBS. Additional advice and guidelines to assist with the implementation of the C&KBS are provided in guideline and protocol documents.

4.1 Guiding principles

- Hub communication is first and foremost about the Hub, rather than individual partners.
- Only identified spokespeople should speak on behalf of the Hub.
- There should be no surprises for the Department of the Environment and Energy or for Hub partners resulting from communication activities.
- All publications and communication materials must be reviewed/approved by the Hub leader prior to release.
- A copy of all publications and communication materials must be supplied to the HPMT.

All stakeholder engagement, knowledge brokering and communication activities and materials must adhere to the Hub's *Branding and acknowledgement guidelines* and *Editorial guidelines* to ensure a consistent and professional view of the Hub is presented.

4.2 Responsibility for undertaking communication activities

- Delivery of general communication and knowledge brokering activities will primarily be undertaken at the Hub level.
- Specific research-related communication and knowledge brokering activities primarily undertaken at the project level.
- Support will be provided by specialist communicators and associated technical experts from within existing networks across the Hub partners, where appropriate.

4.3 Key messages and themes

The ESCC Hub's key messages emphasise our science, collaboration and impact. The messages serve as standalone statements about the Hub's drivers and direction, and underpin more specific messaging in more detailed communication products and activities.

Table 1. ESCC Hub key messages

Topic	Message
Collaboration	The Earth Systems and Climate Change Hub brings together researchers from Australia's world-leading science agencies and universities. This unique collaboration ensures that Australia has the best possible climate change science to inform policy and decision making.
Value proposition	Australia's geographic position in the southern hemisphere gives rise to a unique series of climate challenges in a warming world. Other countries will not spend time and money understanding our climate and how climate change will play out here. It is up to us to invest in our future.
Risk management	Climate change science provides an evidence basis for identifying and managing climate-related risk. Understanding both climate change and climate variability is essential for determining future risk exposure and the possible consequences.
Science informing services	To deal with a changing climate we need credible, useful and accessible scientific information. Translating our world-leading science to practical, actionable information in the form of climate change services that can be used to inform decision-making for climate adaptation planning, disaster risk management and associated assessments is an important role for the Hub.
Climate change services	Science-based climate data and information and associated products and services are relevant over multi-decadal/climate change timescales. The Hub is a key national platform for development and delivery of climate change services, and for facilitating national level coordination across relevant service providers.
Water resources and hydroclimate	In a changing climate water availability and quality are likely to be affected by changing rainfall patterns and more frequent and/or severe droughts. We are improving our understanding of climate variability and other processes that affect water availability to inform effective water resources planning, management and infrastructure investment.
Food security, ecosystems and NRM	Primary industries and the environment are vulnerable to rising temperature, changes in rainfall and other changes in climate. We are improving our ability to provide primary producers, resource managers and ecosystem managers with information at the timescales needed for effective decision making and planning.
Carbon	Limiting future global climate change requires substantial and sustained reduction in net greenhouse gas emissions. We are improving our understanding of past emissions and predicting future changes to inform mitigation policy responses and help us determine the best way to manage the carbon budget.
Coastal hazards	Most of Australia's population and infrastructure is in the coastal zone. In a changing climate this zone is vulnerable to rising sea levels and more frequent and extreme storms. We are improving our understanding of coastal and climate processes, so planners, developers and decision makers have the information they need to minimise risks and respond to unavoidable impacts.
Extremes and disaster risk management	Extreme events such as bushfires, floods and storms are a feature of Australia's variable climate. In a changing climate, these events are likely to become more severe and/or frequent. We are improving our understanding of how extreme events will change in the future, so disaster risk managers have better quality information for planning responses to these events.

Topic	Message
Climate models	Australia's national climate model, ACCESS, is an important tool for helping us to understand our past, current and future climate. Ongoing development of ACCESS, underpinned by research to better understand the components of the climate system, will ensure that Australia's climate modelling capability remains world-class and that we have the best available tools for planning for the future.
Climate projections	The climate we experienced in the past is no longer a reliable indicator of the climate we will experience in the future. Climate projections narrow down the range of possible future climate conditions, so we can make management, policy and adaptation decisions accordingly.

4.4 Key communication activities and methods

ESCC Hub communication activities fall into four broad categories, identified in Table 2. The table contains representative headline activities, products and services in each category.

Table 2. ESCC Hub headline communication activities

A. General communication activities
• Multi-format publications, including summary reports, brochures, fact sheets, videos, webinars, animations, infographics
• Website and multi-media (including social media) products and content, with emphasis on the ESCC Hub website and links to partner agency and other NESP Hub websites
• Hub newsletters for internal stakeholders (*ESCCapades*), external stakeholders and supporters (*Teleconnections*), and contributions to related newsletters and communiques (e.g. *The Chirp*)
• Target syntheses of research outputs to meet particular stakeholder needs identified in consultation with the ESCC Hub Steering Committee, Stakeholder Advisory Group, the Department, and other NESP Hubs
B. Science/technical communication activities
• Peer reviewed science journal papers
• Technical reports
• Participation in, presentations at and reporting of workshops, conferences and other technical fora
C. Meetings, briefings and events
• Targeted planning and inception workshops and regular meetings for/with NESP Hub Leaders, LCIs, project teams and other key stakeholders
• Use of thematic conferences, seminars, webinars and workshops to facilitate communication of research outputs to target next/end-users and for gaining critical feedback
• Networking and professional development events for young professionals and early career scientists
D. Information management and sharing
• Various climate change services, including online data portal(s) and decision-support and associated management tools, application-ready data and associated visualisation products, and guidance materials

Additional communication activities, products and services may be identified as a result of the development of future research plans, and updated versions of the *Indigenous Engagement and Collaboration Strategy*, *Data Management Plan, Evaluation Planning Framework,* and *Risk Register*.

In addition to this range of headline activities and methods, ESCC Hub communication activities and methods more generally may also include consideration of:

- Brand and reputation management – for recognition and credibility of the products, quick response for risk and issues management
- Public affairs – proactive and responsive media, public websites, response to enquiries, articles for online or printed publications
- Building community and engagement – regular e-Newsletter distributed to project stakeholders, participation in events, networks and engagement activities
- Face-to-face briefings, meetings, presentations
- Promotions – around release of technical products – including marketing techniques to reach broad group of stakeholders with varying interests
- Use of program champions, and other credible third-party endorsements to deliver messages targeted for specific stakeholders
- Social media activities using the platforms of all Hub partners to increase reach nationally and internationally
- Internal communication – to ensure effective interactions across the ESCC Hub, and as an integral part of the NESP Hub program.

5. Knowledge brokering and stakeholder engagement

5.1 Knowledge brokering

Managing ESCC Hub knowledge for delivering to target next and end-users in government, industry, scientific, Indigenous and other identified communities requires deliberate and coordinated planning and resource allocation designed to accommodate the full scope and scale of the Hub's research plan.

In this context, and for the purposes of the C&KBS, knowledge management and associated brokering activities outlined here are intended to fully complement the communication and stakeholder engagement components of the strategy, and include the use of data, information and associated knowledge products and services for stakeholders.

More specifically, key features of the knowledge brokering components of the C&KBS are to:

- facilitate the transformation of Hub data and information into discoverable, accessible and actionable scientific knowledge to benefit target end-users in an effective, efficient and sustainable manner
- continually engage with users of ESCC Hub data, information and knowledge to ensure products and services are tailored to specific needs
- prescribe appropriate knowledge management arrangements, including systems and procedures for collecting, securing and disseminating data and information.

These arrangements are not only aligned with the ESCC Hub research plan but are also consistent with proposed governance arrangements for the Hub, including the *data Management Plan, Evaluation Planning Framework* and *Risk Register*, to ensure delivery is to an agreed QA/QC standard and strategically aligned with identified needs of users; and thereby to facilitate realisation of expected outcomes and pathway to impact for the Hub.

5.2 Stakeholder engagement

Stakeholders are those people, groups, agencies or organisations that influence the implementation of the C&KBS and are affected by its implementation, primarily as the target audience.

The stakeholders for the ESCC Hub include any group or individual who has an interest in, or use for, the best available Earth system and climate change science. This is a broad and ever increasing group of stakeholders with varying interests and levels of technical understanding. They each require thoughtful and targeted engagement depending on the relationship they have with the Hub. To better focus resources, the Hub has identified six key Target User Groups, including federal government, state government, local government, government authority agencies, the financial services sector and Indigenous communities (see section 5.4.1 below for more information). The Hub will work with stakeholders from across each user group to ensure Hub products, information and data are accessible, relevant and used. Outcomes from engagement with these user groups will make up a key element in the Hub's path to impact.

Effective stakeholder engagement is essential to realising the Hub's goals, outcomes and path to impact. The primary purpose of the Hub's stakeholder engagement is therefore to inform the Hub's research project portfolio development and implementation in a way that addresses the prioritised needs of the users of the Hub's research, information products and services.

5.3 Coordination and management

The Hub Program Management Team is responsible for ensuring that relevant knowledge brokering and engagement activities are undertaken across all external stakeholders in an effective and efficient manner, consistent with meeting the Hub's broader strategic objectives. Records of all Hub stakeholder engagements are kept on a central Microsoft Access database that is maintained by the Hub Program Management Team.

These arrangements should also provide appropriate assurance to the Hub Steering Committee, which has oversight of all aspects of the Hub's operations and performance, that such activities are based on appropriate governance in terms of meeting the expectations of stakeholders and adding value where appropriate.

5.3.1 Hub Stakeholder Advisory Group

Dealing with the Hub on behalf of, and in the best interests of the Hub's stakeholder network and Target User Groups, is the Hub Stakeholder Advisory Group (HSAG). The primary role of the HSAG is to have governance oversight of the external stakeholder engagement arrangements of the Hub to ensure that such arrangements are effective, efficient, fair and equitable.

This group comprises of about 10 individuals who have been identified and appointed because of their acknowledged expertise and/or professional interest in those research domains of relevance to the Hub – especially the Hub's designated outcome areas. Meeting on a regular basis, the HSAG facilitates the Hub's engagement with the broader stakeholder community.

The HSAG has an independent chair who also serves on the Hub Steering Committee.

5.4 Approach

The Hub has identified around 200 external stakeholders – mostly institutions and agencies but also some individuals – who meet the above definition of a stakeholder. These stakeholders encompass all levels of government, Indigenous communities, peak bodies, NGOs and private companies; many relevant sectors (including emergency services, environment, agriculture, fisheries, forestry, water, health, energy, defence, transport, infrastructure, finance, insurance, foreign affairs and trade, tourism, resources); research agencies and broader research communities, including other NESP Hubs.

To avoid any confusion, the **Hub's primary focus is those internal and external stakeholders who are one or some combination** of the following points along the 'knowledge value chain':

   a) **End-users** (typically external to the Hub and the NESP more generally) of the Hub's information products and services, which may have been modified and value-added by next-users.
   b) **Next-users** of the knowledge and information delivered by the Hub's research – these are often allied researchers, research projects, programs or agencies (including both internal and external to the Hub and the NESP more generally).
   c) **Providers** (typically external to the Hub and the NESP more generally) of research infrastructure and other inputs to the research undertaken by the Hub.

Responsibility within the Hub for the prioritised allocation of resources for stakeholder engagement will be collectively with the HLT, the HPMT and the project lead chief investigators (LCIs) in the first instance, and will be guided jointly by the Hub's Target User Group activity plans, C&KBS and the *Evaluation Planning Framework*.

5.4.1 End-users

Given that a single forum cannot practically represent or address the interests of the Hub's more than 200 identified stakeholders/end-users, under RPV5 the Hub focused its future stakeholder engagement activities under six Target User Groups:

- Federal Government
- State Government
- Local Government
- Government Authority Agencies
- Financial Services Sector
- Indigenous Communities

These user groups represent the key stakeholder groups with which the Hub currently engages closely and through which the Hub can most effectively deliver impact across its five climate challenge (outcome) areas. The Hub primarily engages with these six user groups at a Hub level through case studies, engagement activities, Indigenous activities and communication activities. The Hub also engages with these user groups at the level of the science capability projects, with Hub-level coordination and oversight.
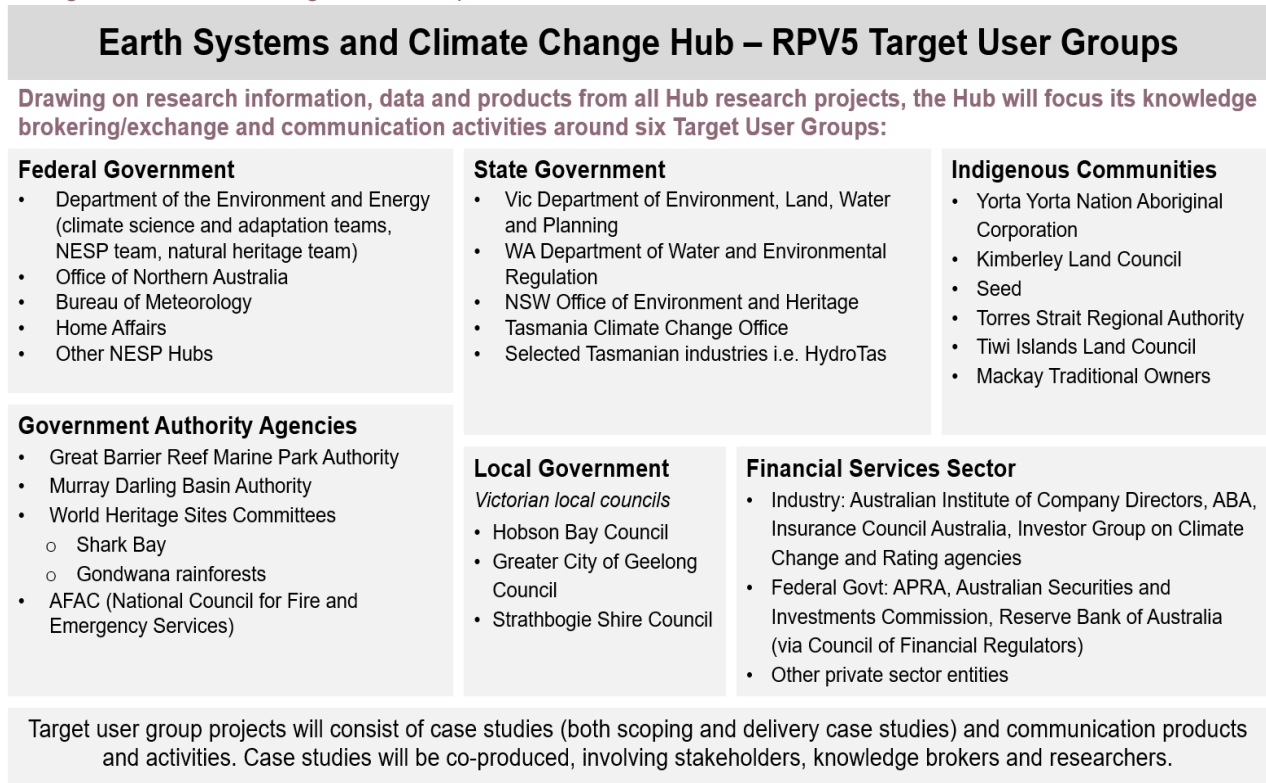
By NESP standards, the research projects being undertaken in the ESCC Hub are relatively long (18 months up to three years), so opportunities to demonstrate impact for stakeholders are more limited than for the shorter projects in other hubs. As a means to facilitate the path-to-impact for the Hub's existing research project portfolio, the ESCC Hub has developed a suite of co-produced case studies and activities – short engagement activities that develop products and services targeted to meet the needs of specific stakeholders under the Hub's Target User Groups. These case studies and activities not only offer a means to demonstrate the path-to-impact of the Hub's science, but also provide the opportunity for meaningful engagement with tangible benefits for the targeted stakeholders. Case studies and activities are identified through engagement with stakeholders.

A suite of tailored outputs or knowledge exchange will be produced through the case studies and activities, based on the existing research produced by the Hub's science capability projects, to address the priority data and information needs of these user groups. This is expected to realise multiple impacts over the short-to-medium term (within the life of the Hub) and also the medium-to-longer term (beyond the life of the Hub).

The expected impact will be the primary (but not only) unit of measurement for the Hub's impact evaluation, which will be implemented according to the Hub's *Evaluation Planning Framework* and associated *M&E Action Plan*.

Figure 2 provides an overview of the Hub's six Target User Groups.

Figure 2. ESCC Hub Target User Groups

Earth Systems and Climate Change Hub – RPV5 Target User Groups

Drawing on research information, data and products from all Hub research projects, the Hub will focus its knowledge brokering/exchange and communication activities around six Target User Groups:

Federal Government
- Department of the Environment and Energy (climate science and adaptation teams, NESP team, natural heritage team)
- Office of Northern Australia
- Bureau of Meteorology
- Home Affairs
- Other NESP Hubs

State Government
- Vic Department of Environment, Land, Water and Planning
- WA Department of Water and Environmental Regulation
- NSW Office of Environment and Heritage
- Tasmania Climate Change Office
- Selected Tasmanian industries i.e. HydroTas

Indigenous Communities
- Yorta Yorta Nation Aboriginal Corporation
- Kimberley Land Council
- Seed
- Torres Strait Regional Authority
- Tiwi Islands Land Council
- Mackay Traditional Owners

Government Authority Agencies
- Great Barrier Reef Marine Park Authority
- Murray Darling Basin Authority
- World Heritage Sites Committees
  - Shark Bay
  - Gondwana rainforests
- AFAC (National Council for Fire and Emergency Services)

Local Government
Victorian local councils
- Hobson Bay Council
- Greater City of Geelong Council
- Strathbogie Shire Council

Financial Services Sector
- Industry: Australian Institute of Company Directors, ABA, Insurance Council Australia, Investor Group on Climate Change and Rating agencies
- Federal Govt: APRA, Australian Securities and Investments Commission, Reserve Bank of Australia (via Council of Financial Regulators)
- Other private sector entities

Target user group projects will consist of case studies (both scoping and delivery case studies) and communication products and activities. Case studies will be co-produced, involving stakeholders, knowledge brokers and researchers.

The organisations identified under these Target User Groups represent a sub-section of the Hub's stakeholder network, as the Hub does not have the resources to engage with all identified stakeholders. The end-users and stakeholders captured under the user groups are actively engaged with the Hub, have identified information, guidance or training needs which the Hub can assist with and/or have been assessed as providing strong path-to-impact outcomes.

In many cases these activities will act as pilot activities, where methodologies, products and guidance are developed and tested. Once developed, these methodologies and products may be rolled out to a broader cross-section of Hub stakeholders. In this way these activities and case studies, which are developed with and for specific and limited stakeholders, can be used by more stakeholders in the future, thereby extending the benefit, value and reach of these activities.

The summary of the desired deliverables and impacts the Hub is seeking with these groups is provided in Table 3 below.

Table 3. ESCC Hub Target User Groups deliverables and impacts

Target User Group	Deliverables and desired impacts
Federal Government	*Deliverables:* • Training and other capability development to enhance understanding and application/use of climate change data and information. • Guidance and guideline materials for using climate change information for risk assessment. • Provision of timely climate science information and communication products for incorporation into government policies, briefings and activities. • Advice and input into strategic climate change science and adaptation policy activities. • Globally consistent scenarios (i.e. 1.5 and 2°C worlds, hotter and drier/hotter and wetter worlds) out to 2030/2050 to inform climate risk assessments. *Desired impacts:* • The Federal Government uses and incorporates relevant and credible climate change science and information in relevant policies, briefings and activities. • Stakeholders are trained in the use of climate change tools and scenarios and are therefore able to provide advice across the Commonwealth on understanding, assessing and acting on climate risks. • The Federal Government routinely factors climate change projections and associated scenarios into long-term strategic business planning in a manner consistent with the global emission targets of the Paris Agreement. • Climate change risks and impacts are considered in the management of Australia's natural and world heritage sites. • The Department uses the ESCC Hub as the first point of call for the provision of climate change science information and advice to ensure their activities are based on credible and accurate evidence. • Climate change is considered as a cross-cutting issue across the National Environmental Science.
State Government	*Deliverables:* • Provision of climate science information and data for incorporation into state government policies, adaptation plans and activities. • Training and other capability development to enhance understanding and application/use of climate change data and information. • Guidance for using climate change information for risk assessment and adaptation planning. • Globally consistent scenarios (i.e. 1.5 and 2C worlds, hotter and drier/hotter wetter worlds) out to 2030/2050 to inform assessments on various climate risk. *Desired impacts:* • State governments use and incorporate relevant and credible climate change science and information in risk assessments and adaptation plans. • State governments start to routinely factor climate change projections and associated scenarios into long-term strategic business planning. • WA Government successfully incorporates climate change projections into hydrology models used to determine state water management practices and policies, and understand the impacts of climate change on farm dam and environmental flows. • Victorian Government understands how to use dynamically downscaled data for land-use planning in local governments. • Tasmanian Government and Tasmanian climate sensitive industries have a collective understanding of the risks posed by climate extremes, have assessed these risks and developed adaptation actions and/or strategies. • The data, tools and guidance developed for identified state government stakeholders (VIC, WA, TAS, etc.) can be used by other state and local

	governments in the future, thereby extending the reach, benefit and value of these activities.
Local Government	*Deliverables:* • Development and delivery of tools, guidelines and guidance for incorporating climate change information into risk assessments and adaptation plans and strategies. • Training and other capability development to enhance understanding and application/use of climate change data and information. • Provision of climate change science information and data for incorporation into policies, plans and activities. • Globally consistent, landscape-scale scenarios out to 2030/2050 to inform climate risk assessments. *Desired impacts:* • Local governments increase their awareness and understanding of climate change and their climate risks. • Local governments understand how to use relevant climate change science information, data, tools and products, and have increased confidence in incorporating climate information into management and adaptation planning purposes. • Local governments start to routinely factor climate change information, projections and scenarios into long-term strategic business planning. • Coastal councils use the coastal hazard data platform to access and use information on projected coastal hazards and impacts for local planning. • The data, tools and guidance developed for identified local councils can be used by other local councils in the future, thereby extending the reach, benefit and value of these activities to Australian local councils more broadly.
Financial Services Sector	*Deliverables:* • Stakeholder needs analysis and initial framing of proposed methods and potential products (initiated in RPV4). • Stock-take of existing inventory and pending (Next Gen update) projections data and information, including ready-reckoner description of model evaluation characteristics, spatial and temporal limitations of data, and associated applications utility. • Globally consistent, national-scale scenarios and associated multi-hazard projections data for both mean and extremes out to 2030/2050 to inform assessments of physical climate risk. • Training and other capability development to enhance understanding and application/use of climate change data and information. • Guidelines for using climate change information for risk assessment and documented case-study communications. *Desired impacts:* • The financial services sector gains enhanced awareness of the availability and utility of science-based data and information, and enhanced capacity for operational applications of climate change services for informing climate risk. • The financial services sector begins to routinely access and apply science-based information as part of new/enhanced methods/frameworks to mainstream assessment and management of physical climate change risk in a transparent and rigorous manner consistent with requisite standards of corporate governance, regulatory obligations and best available science. • The financial services sector begins to meet the expectations of government stakeholders by being seen to be pro-active in managing science-based climate change risk in a manner which is fiscally responsible and in the best interests of the Australian population and economy. • The financial services sector actively engages with the Australian climate change science community in support of developing and applying new scientific

	knowledge to better inform decisions to mitigate new and emerging risks from a changing climate. • The financial services sector starts to routinely factor climate change projections and associated scenarios into long-term strategic business planning in a manner consistent with the global emission targets of the Paris Agreement. • Other sectors of government and industry with related institutional exposure to physical climate impacts leverage off the learnings/experience of the financial services sector to enhance risk management-based governance arrangements (i.e. sectoral transferability/utility and scalability).
Government Authority Agencies	*Deliverables:* • Provision of timely climate change science information data and products for incorporation into management planning, policies and activities. • Training and other capability development to enhance understanding and application/use of climate change data and information. • Guidance for using climate change information and projections for risk assessment. • Globally consistent scenarios (i.e. 1.5 and 2°C worlds, hotter and drier/hotter and wetter worlds) out to 2030/2050/2090 to inform assessments on various climate risks. *Desired impacts:* • Government authority agencies and world heritage site managers use and incorporate credible climate change science and information in relevant policies, management plans and activities. • Agencies understand the impacts a changing climate will have on their operations. • Agencies routinely factor climate change projections and associated scenarios into long-term strategic business planning in a manner consistent with the global carbon emission targets of the Paris Agreement. • Climate change risks and impacts are considered in the management of Australia's natural and world heritage sites. • AFAC is provided with current and future climate change science information, data, maps and products relevant to their fire and emergency management policies, practices and industry guidance materials.
Indigenous Communities	*Deliverables:* • Assessment of Indigenous climate change science information needs resulting from the 2018 National Indigenous Dialogue on Climate Change. • Indigenous-led climate risk assessment framework that combines western and indigenous science knowledge. • Training and other capability development to enhance understanding and application/use of climate change data and information. • Provision of relevant and accessible climate change science information. • Two-way knowledge sharing. *Desired impacts:* • Established ongoing relationships between the Indigenous communities and the Australian climate change science community and NESP program. • Western and Indigenous science knowledge is combined to understand the climate risks relevant to Indigenous communities. • Indigenous researchers and stakeholders are empowered to lead research and knowledge exchange activities and case studies relevant to their communities. • Indigenous communities use tailored climate change information to train and inform their own communities about the changing climate and the potential impacts to their country and people. • The Australian climate change science community values and incorporates traditional knowledge in climate change information and research.

5.4.2 Next users

The ESCC Hub undertakes fundamental and underpinning climate change science research which provides an important contribution to national and international climate change science research efforts. Next-users (defined above as including researchers, research projects, programs or agencies) are therefore an important external stakeholder group for the Hub. For example, model development and simulation runs undertaken through the Hub's ACCESS related projects provides important Southern Hemisphere modelling input into international model intercomparison initiatives, such as the Coupled Model Intercomparison Project (CMIP).

The Hub's primary next users include (but are not limited to):

- Australian universities
- CSIRO
- Bureau of Meteorology
- ARC Centre of Excellence for Climate Extremes
- Australian Antarctic Division
- ACE CRC/ Antarctic Science Collaboration Initiative
- IMOS and TERN
- The *National Computational Infrastructure* (NCI)
- State climate research programs and projects, such as NARCliM and the NCAP
- WCRP (CMIP, Grand Challenges etc.)
- Intergovernmental Panel on Climate Change (IPCC)
- Overseas climate research programs and initiatives (such as SCOR, SCAR, Argo etc.)

The aims and outcomes that the Hub is seeking in interacting and engaging with next-users include:

- The ESCC Hub is positioned as a valuable and reliable source of accessible Earth systems and climate change information, both nationally and internationally
- The Australian research community has access to the latest ESCC science
- The Australian research community is engaged with the ESCC Hub, with open, two-way communication channels in place
- The international climate research community has access to the latest ESCC science
- The international climate research community is engaged with the ESCC Hub, with open, two-way communication channels in place, where appropriate.

5.4.3 Internal stakeholders

The ESCC Hub's internal stakeholders are listed in Table 4, along with a summary of the desired outcomes.

Table 4: ESCC Hub internal stakeholders

Internal stakeholder group	Desired outcomes
Hub staff (Hub Leadership/ Program Management Team and project CIs/teams)	• People working in the ESCC Hub are kept informed about Hub activities
Hub Steering Committee	• The HSC is kept informed about Hub activities
Hub Stakeholder Advisory Group	• The HSAG is kept informed about Hub activities
Hub partner organisations	• ESCC Hub partners are kept informed about Hub activities • ESCC Hub partners have access to the latest ESCC science • ESCC Hub partners are engaged with the ESCC Hub, with open, two-way channels of communication in place

5.5 Business development and the Hub's role in catalysing new opportunities

The Hub also undertakes a strategic and systematic approach to business development as an integral part of our stakeholder engagement strategy. The purpose is to catalyse and facilitate new co-investment opportunities to leverage core Hub funding. In practice the Hub has limited capacity beyond the existing commitment of resources from partner agencies. Therefore, it is deemed most appropriate that new projects and associated co-investment opportunities leveraged off the Hub's existing research projects and stakeholder engagement activities will, for the most part, be addressed by one or more of the Hub's partner agencies, subject to the specific nature of the opportunity and the requisite domain knowledge and associated capability.

The Hub has therefore recognised a new class of 'adjunct' projects for which the Hub has been instrumental in catalysing and facilitating, but for which administratively and operational the implementation is to be the responsibility of the partner agencies. The Hub will seek to realise evidence of path-to-impact of these adjunct projects, in association with the relevant partner agencies.

5.6 Indigenous community engagement

The vulnerability of Indigenous communities to climate-related risks is well understood by the ESCC Hub. The Hub also understands and respects the role that traditional knowledge can play in informing the Hub's research. In turn, through the Bureau of Meteorology, CSIRO and university partners, the ESCC Hub has the potential to leverage off previous work with Australian and Pacific Island indigenous communities in climate science and other technical domains to ensure effective Indigenous engagement that benefits the Hub's Indigenous community stakeholders, including collaborative partners.

Meaningful, thoughtful and appropriately resourced engagement with Aboriginal and Torres Strait Islander peoples will result in benefits to Indigenous Australians and to Australian communities in general.

Genuine engagement and participatory communication and knowledge brokering activities that are sensitive to the culture and needs of Indigenous Australians are essential to build strong, effective and mutually respectful working relationships.

More details on arrangements for ESCC Hub engagement of Indigenous communities are outlined in the ESCC Hub's *Indigenous Engagement and Collaboration Strategy*.

6. Achieving outcomes, measuring impact and managing risk

6.1 Monitoring and evaluation

The Hub's *Evaluation Planning Framework* (EPF) sits within the Hub but otherwise is designed to complement the overarching NESP Monitoring and Evaluation (NESP M&E) Plan relevant to all hubs. Specifically, the ESCC Hub's EPF outlines the process by which both Hub and project level (including stakeholder case studies and activities) evaluation planning is developed and implemented in a way that is outcome focussed, targeted at next-users and end-users, and delivers measureable impact.

The EPF, through design and implementation of a specific Hub-level *M&E Action Plan*, also provides for real-time performance monitoring and management, progress reporting and review, along with how the Hub will assess and report on its strategic path-to-impact across its portfolio of integrated projects and associated case studies.

In this context, the EPF is a key strategic document that is directly linked to the C&KBS and the Indigenous Engagement Strategy, all of which inform the implementation of the Hub's annual Research Plan. As for the C&KBS, the Hub's EPF also underpins the Hub's flexibility and responsiveness (e.g. through the operational development and implementation of annual case studies and activities) to accommodate changing research priorities on an annual basis, in addition to the Hub's commitment to facilitating innovation and continuous improvement in research project-based service delivery.

The Hub-level *M&E Action Plan* is updated by the Hub regularly and therefore also provides the relevant input to facilitate implementation of the NESP M&E Plan, specifically including the delivery of the NESP Biennial Evaluation Report. It also ensures that the Hub's research is continually informed by stakeholder needs

6.2 Data and information management

This strategy is informed by and compliant with the NESP *Data and Accessibility Guidelines V3* (January 2017), and makes specific provision for management of data, information and associated scientific and communication products and other assets used and/or delivered by the ESCC Hub.

These guidelines outline the Department of the Environment and Energy requirements for ensuring NESP outputs are "publicly and freely accessible and available on the internet, for

use by all persons, as required by NESP Programme Guidelines" (p. 4).

The *NESP Data and Accessibility Guidelines V3* promotes open access to data and information consistent with national and international principles and practices and with emphasis on discoverability, accessibility and useability, now and into the future. The stated rationale is that "providing open-access to the data and information products derived under the NESP will provide up-to-date, high quality data and information to decision-makers, environmental managers, other scientists and to the community" (p. 7).

The guidelines are indicative rather than prescriptive, and provide detail on expectations of the Department and to assist NESP providers to identify solutions for achieving open-access for 'research products'. The guidelines refer to all NESP research products, including the following categories:

- publications, including scientific papers, reviews, books and book chapters
- raw data sets, including spatial data
- grey literature, including fact sheets, project profiles and technical reports
- images, maps, photos, videos and animations
- models and other tools (e.g. decision support tools) such as software created by the research process, including value-added components developed for off-the-shelf or open-source software
- websites
- mobile or tablet apps
- unspecified emerging technology.

The guidelines state that licensing of research data will be according to the Australian Government Open Access and Licensing (AusGOAL) framework. This framework provides clarity around permissions, terms and conditions for reuse of data within and across the research community and industry, reducing risk and enhancing efficiency by specifying and standardising the number and type of licence formats. Specifically, research products need to be made publicly available under the latest *Creative Commons Framework* (Creative Commons V4.0 International) using a *Creative Commons Attribution Licence* (CCBY4.0). Exceptions relate only to "…privacy, security or confidentiality reasons" (p. 4).

6.2.1 ESCC Hub Data management Working Group and data Management Plan

The ESCC Hub has formed a Data Management Working Group to provide advice on the development of appropriate protocols to ensure the Hub adheres to the NESP data management guidelines. Researchers are required to make all NESP research outputs publicly available on websites with a persistent and enduring link in compliance with specifications of the Hub's Research Plan and the NESP data management plan. The working group is a representative forum across all of the Hub's partners and research projects, with a focus on encouraging good data management as an essential element of research best practice. The working group developed the Hub's *Data Management Plan*.

The Plan provides an overview of the arrangements for managing and accessing the Hub's research data, information and associated terms of use. It reflects the current state of the discussions, plans and intentions of the ESCC Hub partners, and will be updated on an annual basis as required. The Plan sets the framework for the handling of data produced in

the Hub, from acquisition and curation to dissemination, and assures full lifecycle management of ESCC Hub data beyond the lifetime of the Hub. It therefore describes the life cycle of all modelling, reanalysis and observation data collected and processed as part of the ESCC Hub research project delivery.

Hub leadership will also work with partner agencies to ensure consistency with relevant agency-specific data and information management arrangements.

6.3 Managing risk

Hub risks are identified and updated in each Research Plan; this includes the communication and knowledge brokering risks identified in Table 5 below.

Table 5: Communication and knowledge brokering related risks

Risk	Impact	Existing controls	Risk rating	Proposed risk treatments	Responsible officer/s	Target risk rating
External stakeholders a) Poorly coordinated (inefficient, repetitive, incomplete and/ or ineffective) engagement and/ or inadequate expectation management b) Inadequate approach to the large and diffuse stakeholder group c) Lack of fairness, equity and transparency in undertaking meaningful stakeholder engagement	External stakeholders do not value the Hub, have unrealistic expectations, become fatigued, confused and/or do not think that they have been delivered useful information from the Hub. Therefore the Hub has not delivered effectively in terms of outputs, outcomes and/or impact.	All Partner agencies engage in frequent stakeholder discussions and development of communication products. Skill level and understanding by Partner agencies of this has increased in recent years (e.g. CCIA project). The Hub has developed and implemented a strategically designed and endorsed Communications and Knowledge Brokering Strategy (C&KBS), incorporating stakeholder engagement. The Hub has an outcome focussed Evaluation Planning Framework targeted at needs of next and end-Users, complemented by the C&KBS. Appropriate stakeholder engagement arrangements and associated governance in place and implemented, including the role of the Hub Stakeholder Advisory Group and Hub Steering Committee.	Medium	a) Maintain existing controls b) Further develop and refine stakeholder engagement and knowledge exchange activities under the six identified Target User Groups, each with designated case studies and engagement activities customised to address specific end-user needs to more clearly structure the Hub's existing and future engagement activities to ensure path to impact of the Hub's research. c) Target User Group approach to stakeholder engagement adopted in 2018 allows for flexibility to ensure activities meet stakeholder needs. d) Manage stakeholder expectations through: i) effective and ongoing engagement with key bodies/agencies; and ii) effective communication, and iii) role of the HSAG. e) Develop and implement as part of RPV3, 4 5 and 6, a series of case studies and activities designed to leverage off the key activities and outputs of the research projects to facilitate outreach (communication and knowledge brokering) with target next/end-users f) Appointed a CSIRO Hub Leadership Team representative (Kirono) who has deep experience in stakeholder engagement to complement existing stakeholder engagement experience of the HLT/HPMT. g) Continual updates to the Hubs Comms & KB Strategy, Evaluation Planning Framework and Indigenous Engagement Strategy. h) Formation and implementation of Hub Stakeholder Advisory Group (HSAG) and complementary role of the HSC.	Hub Leader is accountable; but Hub Leadership Team and all Hub researchers have a responsibility, with emphasis on pivotal role of LCIs	Low

Risk	Impact	Existing controls	Risk rating	Proposed risk treatments	Responsible officer/s	Target risk rating
Path to impact a) Failure to achieve tangible Hub level impact. b) Failure to achieve tangible project-level contribution to Hub-level impact.	Outcomes and on-ground impacts not achieved Projects don't comply with milestones Hub doesn't achieve its goals Stakeholders become disaffected with the Hub	Training and assistance to Chief Investigators. Clear and effective governance. Implement Evaluation Planning Framework (EPF) based on associated Program Logic Dedicated resources allocated to implementing the M&E Plan and utilising outputs to inform annual Research Planning process Comms & KB Strategy integrated with the EPF to facilitate support for path-to-impact	Medium	a) Maintain existing controls b) Implementation of appropriate and effective M&E Plan implementation with effective feedback loops to annual Research Planning process, Communications and KB Plans, and governance arrangements: these are used to guide all Hub decision-making. c) Ensure that all Hub research and leadership are aware and understand this (this will require training, awareness raising). d) Project design features clear focus on needs of target Next/End-Users, and resources are allocated to facilitate engagement e) Target User Group approach focuses activities on targeted and engaged stakeholders. f) Associated case studies and engagement activities leverage off the key activities and outputs of the research projects to facilitate outreach (communication and knowledge brokering) with targeted next/end-users, leading to Hub path to impact.	Hub Leader is accountable; but Hub Leadership Team have a responsibility	Low

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