Sustainable Communities and Waste

National Environmental Science Program

Sustainable Communities and Waste Hub

An integrated approach to delivering sustainable communities focusing on healthy environments, future jobs and prosperity

IP4: Air Quality

Amanda Wheeler and Fay Johnston

Nodes

UNSW SYDNEY

CSIRO

MONASH University

Curtin University

UNIVERSITY of TASMANIA

Agenda

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- Acknowledgement of Country
- Introductions
- Update since 2021 activities
- Project 1 - Amanda Wheeler
- Project 2 – Kathryn Emmerson
- Project 3 – Fay Johnston
- Project 4 – Donna Green
- Questions

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Sustainable people-environment interactions (IP1)

- Links between human wellbeing, and environmental and ecosystem health

Reduced impact of plastics and other materials (IP2)

- Reducing the impact of plastics through the development of the foundational science of microplastics to minimise environmental harm and practical on ground interceptions
- Supporting the adoption of fit-for-purpose waste recycling and reforming technologies for regional and remote communities to create systems change delivering economies of purpose

Management of hazardous waste, substances and pollutants (IP3)

- Understanding the chemicals in current and emerging wastes
- De-risking the future through safe waste reuse and resource recovery
- Enhancing information flows and assessment for improved outcomes and governance on hazardous wastes

Improved air quality, forecasting and assessment (IP4)

- Explore how air quality in Australia, while generally good, continues to cause significant health impacts from bushfire smoke, planned burns, wood-heaters, and local industrial pollution.

Waste Impact Management Initiative (IP5)

- To provide information, data and management tools
- To inform design for repurposing waste and circular economy
- To inform the institutional and governance needs of community-based resource recovery and circular economy initiatives and to work on waste management and resource recovery opportunities for Indigenous communities

IP4 Improved air quality, forecasting, assessment

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Co-leads:
Dr Amanda Wheeler (CSIRO) and Prof. Fay Johnston (UTAS)

- **Vision**
  - Improved air quality and reduced exposure to poor air quality
- **Motivation**
  - While air quality in Australia is generally very good, we continue to see significant health impacts from bushfire smoke, planned burns, wood-heaters, vehicle emissions and local industrial pollution.
  - Government departments who are responsible for air quality, fire management and public health urgently need better information for planning and response
  - This information needs to be made available in a timely fashion and in forms that are usable by all, particularly community members at higher risk because of age, occupation, social disadvantage, or existing medical illness.

How did we start?

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- Research Plan 1
  - October 2021-March 2022
- State of knowledge
  - synthesis of current and emerging research on the use and understanding of air pollution information
  - identifying priorities for health impact assessments
- Co-design future research plans
  - Round tables
  - Survey – 12 topics
  - Workshop – December 2021
    - 45 individuals representing 28 organisations

IP4: Air Quality Activities

Designed to understand what should we be doing

- Stakeholder and partner survey of key air quality challenges and opportunities
  - 86 responses used to prioritise projects
  - Privacy database restrictions apply
- December 2021 Stakeholder and partner workshop
  - 45 attendees from 28 organisations
  - Generated a Workshop report (https://doi.org/10.25919/kw52-6e06)
  - Information and resources available on SCaW Hub website https://www.nespsustainable.edu.au/research/impact-priority-4-air-quality

Workshop Approach

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Session 1: Understanding priorities

- Are the top topics identified in the survey the right issues for the Hub to focus on?
- Are there any issues that are a priority to you that are missing?

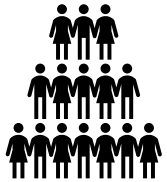
Session 2: Understanding knowledge gaps

- What projects/data has been collected previously relating to these areas?
- What relevant projects are currently underway? What is their focus, timing for results, where are they operating?
- What are the upcoming policy, programs and management activities that could be informed by research?
- Where do we still have data gaps/ future needs that will strengthen management and decision making?

Session 3: Research needs

- What research in these gaps would be most useful to you/your organisation?
- Is there scope to leverage off existing activities to progress addressing these gaps?
- What else is needed to address these gaps?
- The following workshop results have been grouped by the breakout room questions and, where relevant, include responses from each of the three group themes.

2021 Survey Results



79 Anonymous responses

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Topic	Proportion of respondents who selected 'Most Important'
Health impacts from planned and unplanned fire smoke	67%
Changing climate and emissions reduction	58%
National air quality forecasting system	54%
Health productivity and economic impacts	54%
Optimise air pollution policy and regulation	54%
Improve public understanding of air quality information	53%
Exposure to wood heater smoke	49%
Optimise local urban planning for waste management and air pollution	49%
Develop tools for local and state governments to obtain, interpret and apply air quality information from low-cost sensor network data	49%
Emissions estimates and inventories	46%
Evaluate interventions and new technologies	44%
Exposure to dust and dust storms	24%

Workshop Findings

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- A large number of ongoing and planned research was identified which should be leveraged to ensure continuity of the science rather than replication.
- Any new research that is supported by the hub should ensure that it can directly impact policy.
- The recommendation is that the hub ensures ongoing engagement for co-design opportunities as the program progresses.

Workshop Recommendations

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- Emissions and forecasting data for evaluating the introduction of new technology.
  - Climate change actions and improved management of air quality will rely on new technology. The ability to model scenarios and their potential economic benefits was identified as being key to targeting appropriate activities.
- Smoke emissions from landscape fires, bushfires, wood heaters and backyard firepits.
  - The actions recommended for further investigation includes the need to encourage behaviour change, the evaluation of new technology and the efficacy of interventions to reduce exposures and consequent health impact.
- The use of low-cost sensor networks to understand local air quality issues.
  - Many stakeholders were either trying to set these networks up or were struggling to evaluate their usefulness.

- Hub priority to support Indigenous engagement
  - Understand the national research activities on Indigenous health and air quality

Projects

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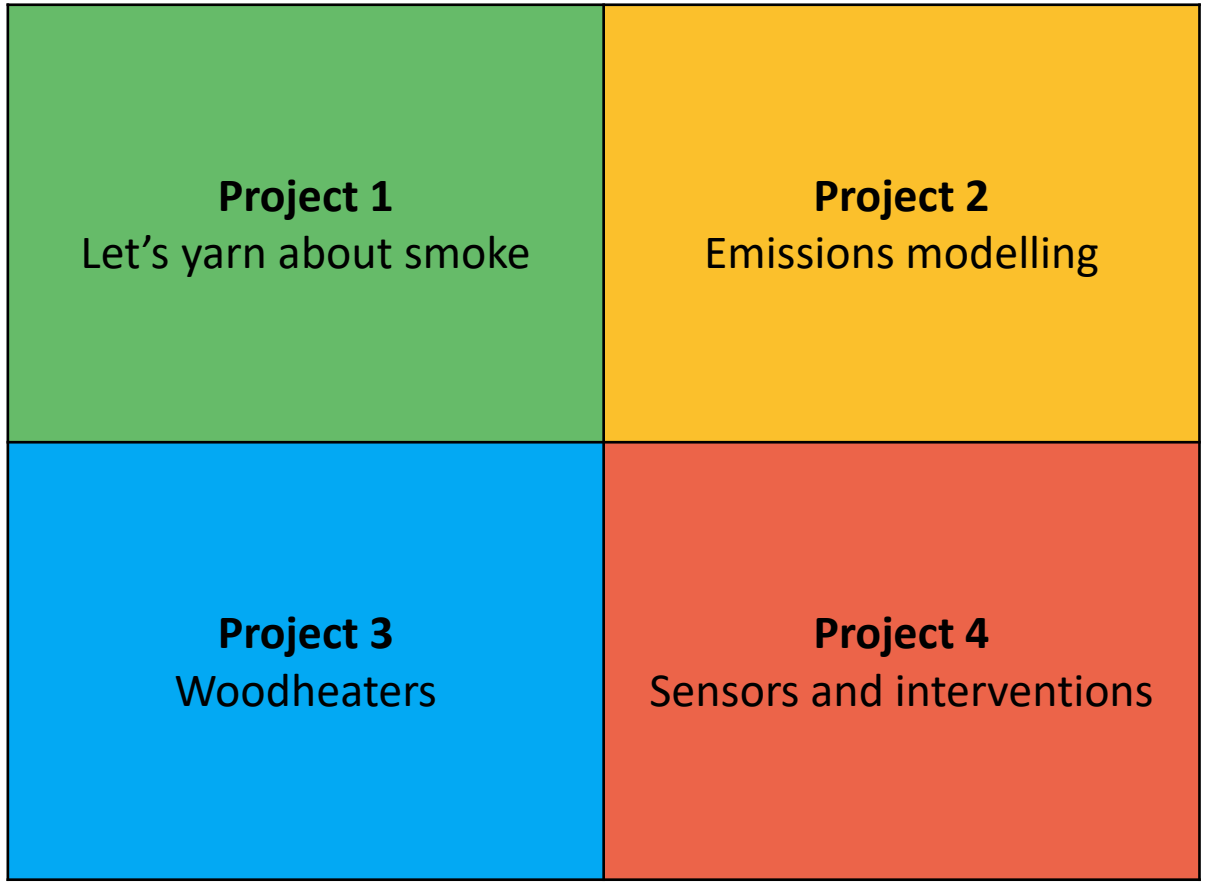
Project 1 – Let's yarn about smoke –to build new partnerships with Indigenous researchers, community groups and individuals to start a conversation about Indigenous perspectives of landscape fire smoke

Project 2 Emissions modelling in response to climate change – to understand future impacts of climate change and emission reduction actions on air quality

Project 3 – Woodheaters developing and testing novel solutions to a persistent problem

Project 4 – Low-cost sensor (LCS) networks and interventions to develop guidance on use of LCS and evaluate air quality interventions



Project 1 – Let's yarn about smoke

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- **Goal**: Build new partnerships among Indigenous researchers and communities and the air quality research community.
- **Relationship Building**:
  - Reviewed the existing research landscape
  - Liaised with the NESP Indigenous Advisory Committee,
  - Healthy Environment and Lives (HEAL) Network, and
  - NESP Climate Systems Indigenous Reference Group

- Support Indigenous leadership / co-leadership through contributing to co-design of a broad scope of Indigenous identified research priorities and frameworks for knowledge sharing.
- Develop and support opportunities to connect project leaders with stakeholders through meetings, workshops and hub communications and networks.
- With guidance from the SCaW Indigenous Advisory Group develop a plan for appropriate training programs for the IP4 Team to undertake.
  - Completed Your Mob training, discussing appropriate ethics and data management strategies including ICIP

Project 1 – Let's yarn about smoke

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- Key Thinkers Forum in Sydney (March 28th 2023) Air Quality, Asthma and Indigenous Health chaired by Professor Tom Calma AO
  - Identified key researchers
  - Established relationships with research networks supporting Indigenous research activities e.g. HEAL
  - Ongoing regular meetings (bi-weekly)

- A follow-up to the Key Thinker's Forum was hosted in October 2023.
  - This provided attendees of the original Forum to regroup, provide updates and share future plans.

- Supporting a MRFF Indigenous Health funded study with Indigenous communities (Lead: A/Prof Supriya Mathew)
  - Air in East Arnhem: Crowdsourcing Air Quality, Temperature, and Health Data with Yolngu Citizen Scientists (https://www.menzies.edu.au/page/Research/Indigenous_Health/)

- CSIRO Indigenous Research Grant
  - Partnership with Djurali Centre, University of Sydney, UTAS and HEAL network
  - Smoke Messaging and AQFx - Indigenous communities

Projects

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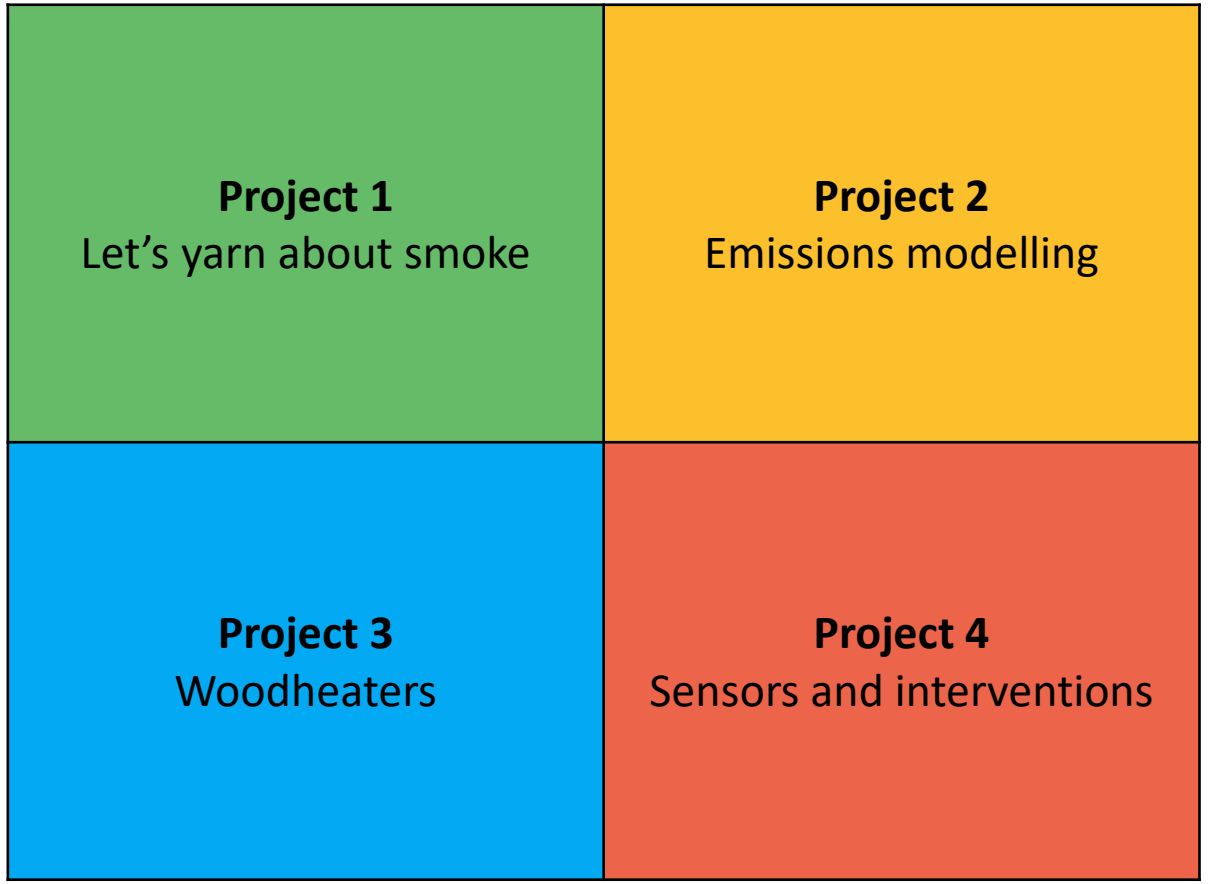
Project IP4.02.01 – Let's yarn about smoke –to build new partnerships with Indigenous researchers, community groups and individuals to start a conversation about Indigenous perspectives of landscape fire smoke

Project IP4.02.02 Emissions modelling in response to climate change – to understand future impacts of climate change and emission reduction actions on air quality

Project IP4.02.03 – Woodheaters developing and testing novel solutions to a persistent problem

Project IP4.02.04 – Low-cost sensor (LCS) networks and interventions to develop guidance on use of LCS and evaluate air quality interventions



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Thank you

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