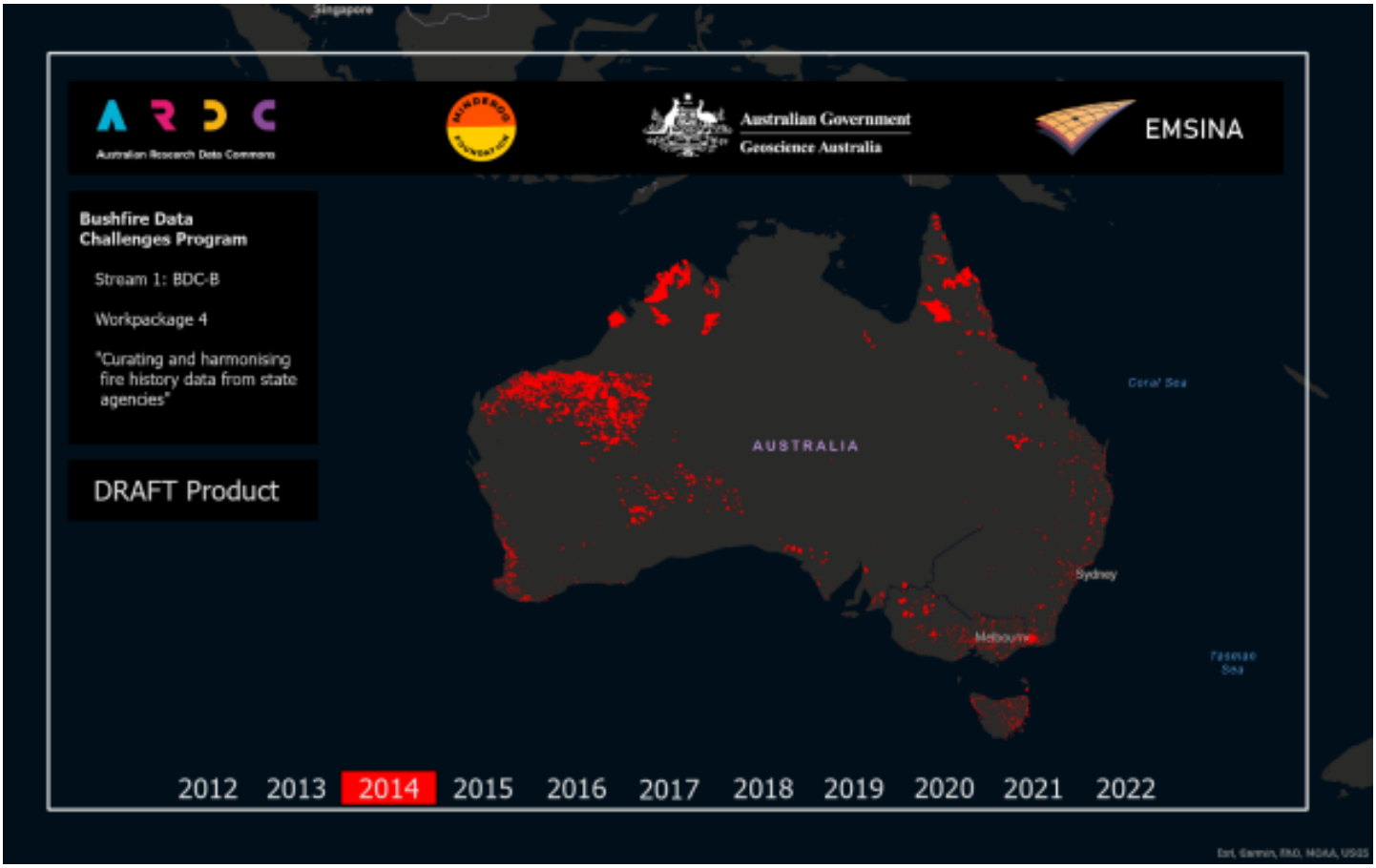
ARDC - Bushfire Data Commons Forum

ARDC - Bushfire Data Commons Forum

Understanding Bushfire Behaviour

Kane Orr

"Aggregating a harmonised burnt extent fire history data on a national scale"



Introduction

Presentation Purpose: ARDC Forum#4

Date: 17 May 2023

Project: Aggregating an harmonised burnt extent fire history data on a national scale

Timeframe: 01 September 2021 to 15 June 2023

Sub-Projects: 5

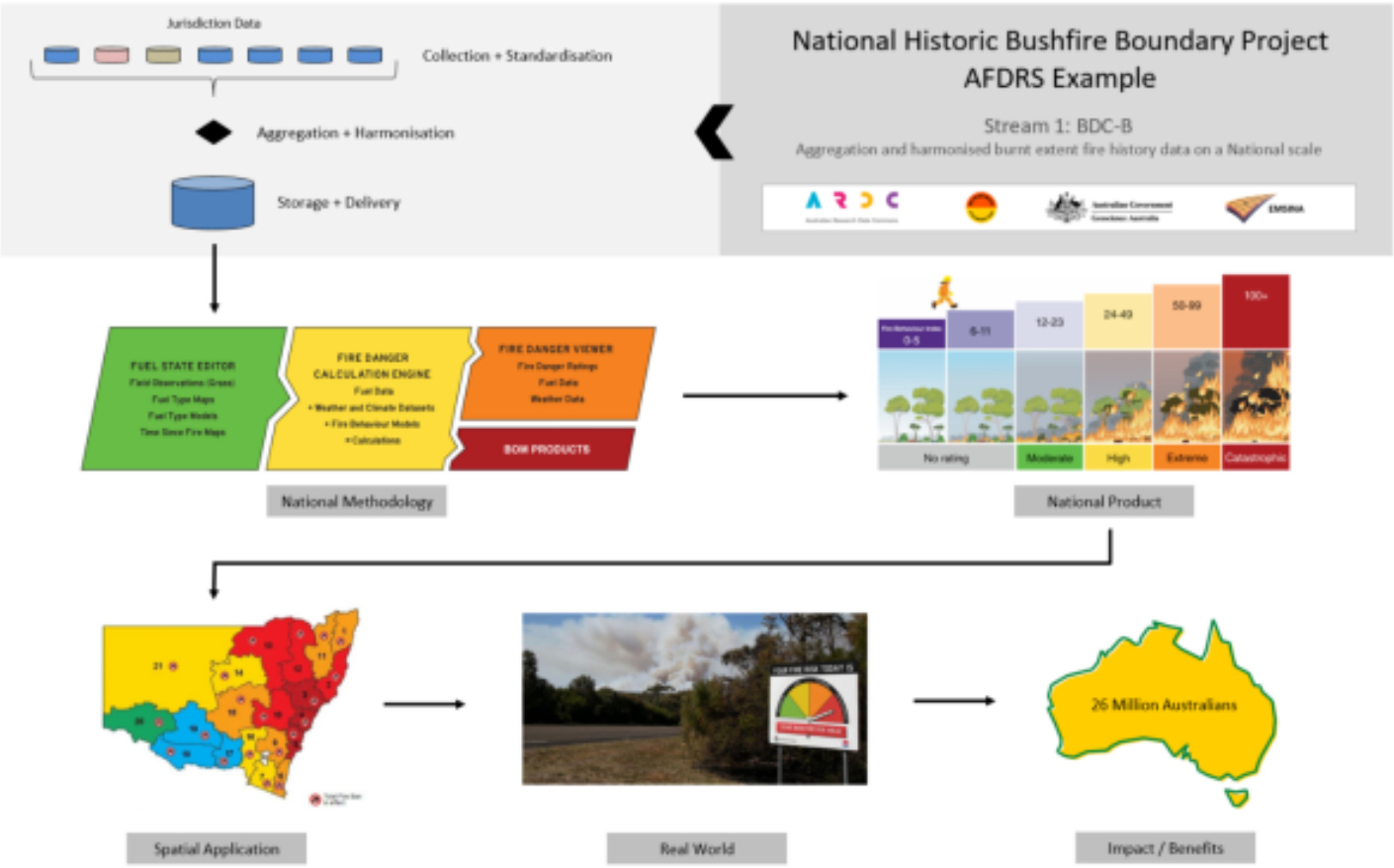
Work Packages: 7 + 1 Stretch Project

Project Lead: Geoscience Australia

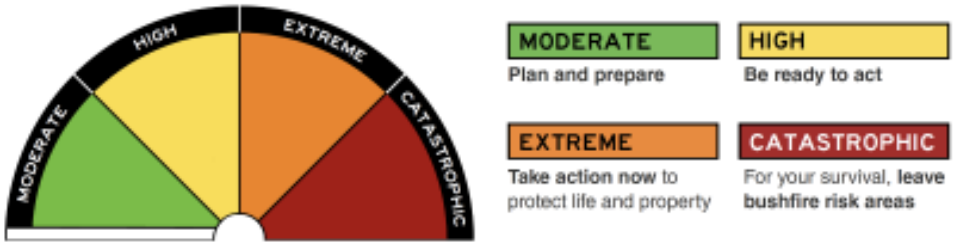
Partners: EMSINA Member Agency's and Members, Geoscience Australia

Project Webpage: https://www.emsina.org/bushfire-history-project

Who will benefit from this work



User Examples

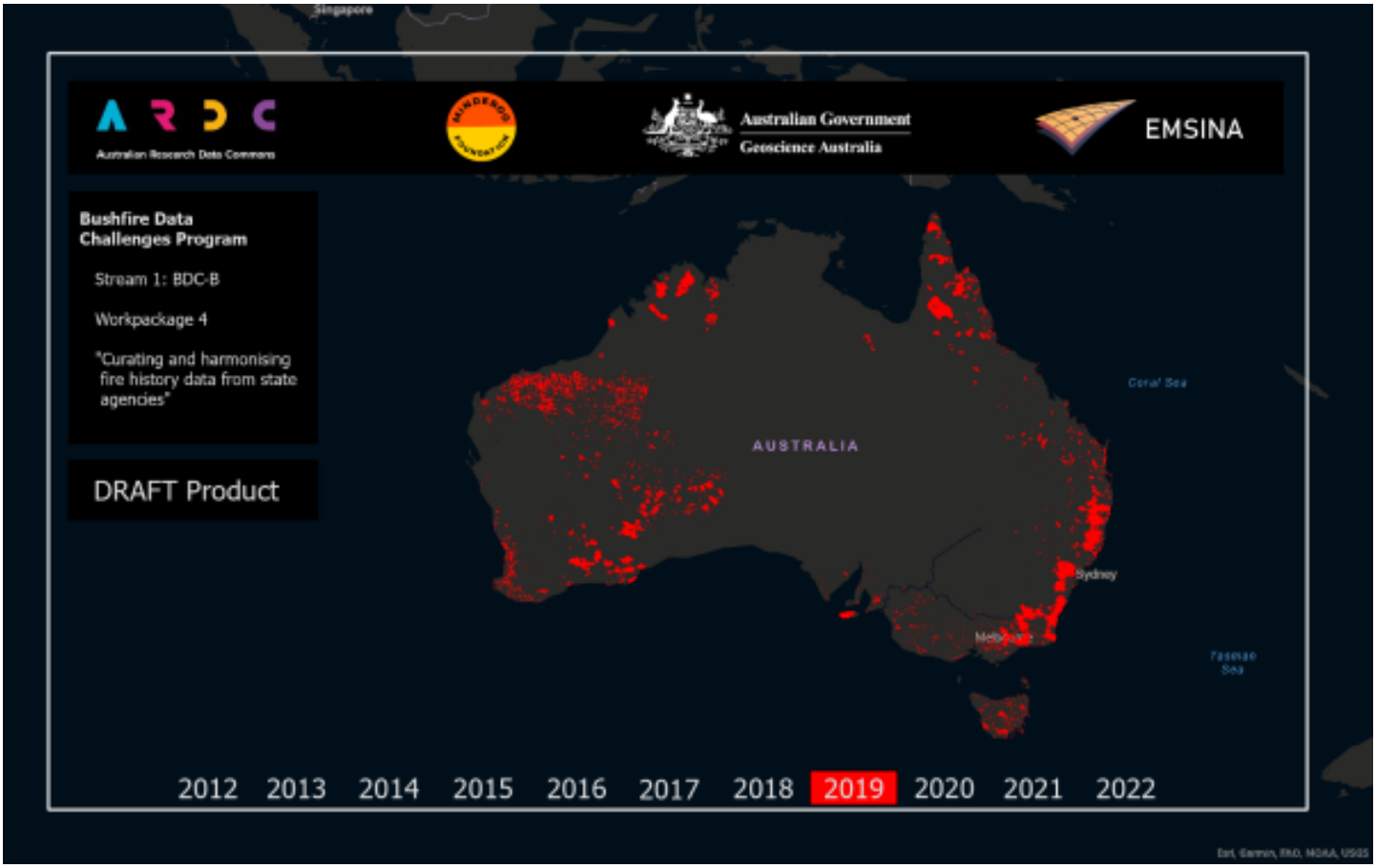


Australian Fire Danger Rating System

Role: Fire Behavior Analyst

My Task: To calculate the new National Bushfire Danger Ratings the modelling requires accurate, up-to-date and standardised data about historical bushfire across the continent.

Impact: Access to this dataset will enhance my model outputs. The result will be a more informed population as to their current and future risk or potential impact of bushfires.



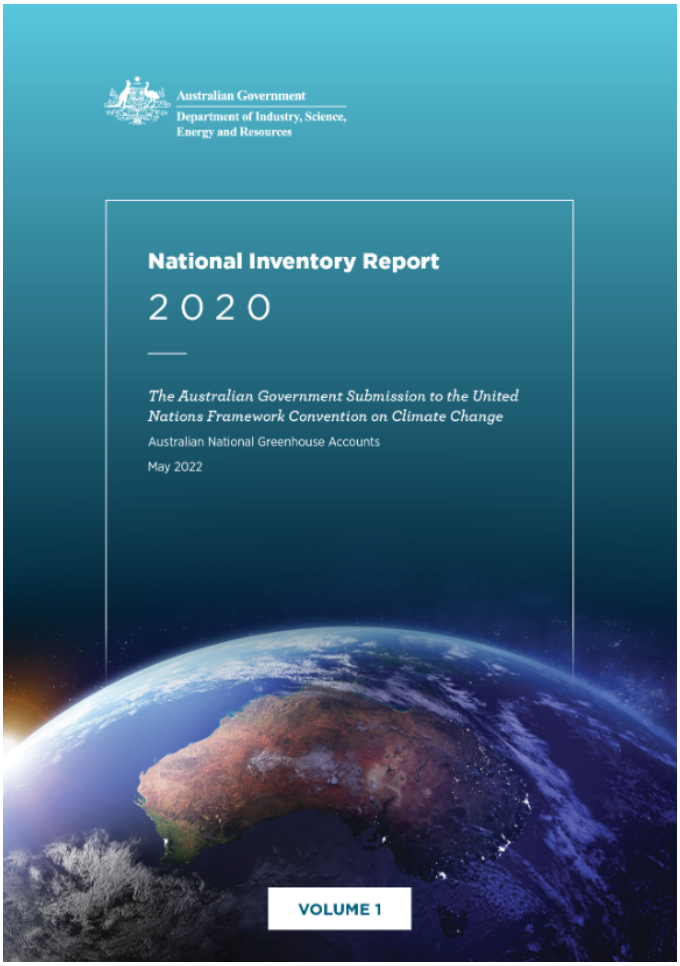
Disaster Recovery Agency

Role: Federal Recovery Officer

Task: The government relief and recovery agencies require a consistent and accurate understanding of where and when

bushfire's have impacted Australian communities and businesses and infrastructure.

Impact: The National bushfire boundaries dataset will help the Disaster Recovery Agencies understand and identify when Australian communities have been impacted by bushifre. The data will also allow Officer's the opportunity to identify which communities have been impacted by multiple events over a specified period of time.



Carbon Account Officer

Role: Policy Officer

Task: Each calendar year my Department is required to report on the total amount of carbon moving through the environment. Utilising the historic bushfire boundaries dataset will enable a more accurate determinaton of the amount of carbon released by fire in the Australian landscape.

Impact: As a party to the United Nations Framework Convention on Climate Change (UNFCCC) and subsidiary agreements, Australia has agreed to meet targets to reduce emissions. Measuring and tracking emissions and removals and projecting future emission levels assists the Australian Government to:

- meet its international reporting obligations;
- monitor progress towards achieving its emission reduction commitments; and
- develop and implement policies and programs to meet emissions reduction commitments.

Indigenous Land Management

Role: Indigenous Land Manager

My Task: I am tasked with ensuring the flora and fauna are effectively managed and maintained on my traditional lands.

Impact: Along with my knowledge of the environment having accurate burn history data and maps will compliment my ability to identify areas that may require more / less frequent burning than previously thought.

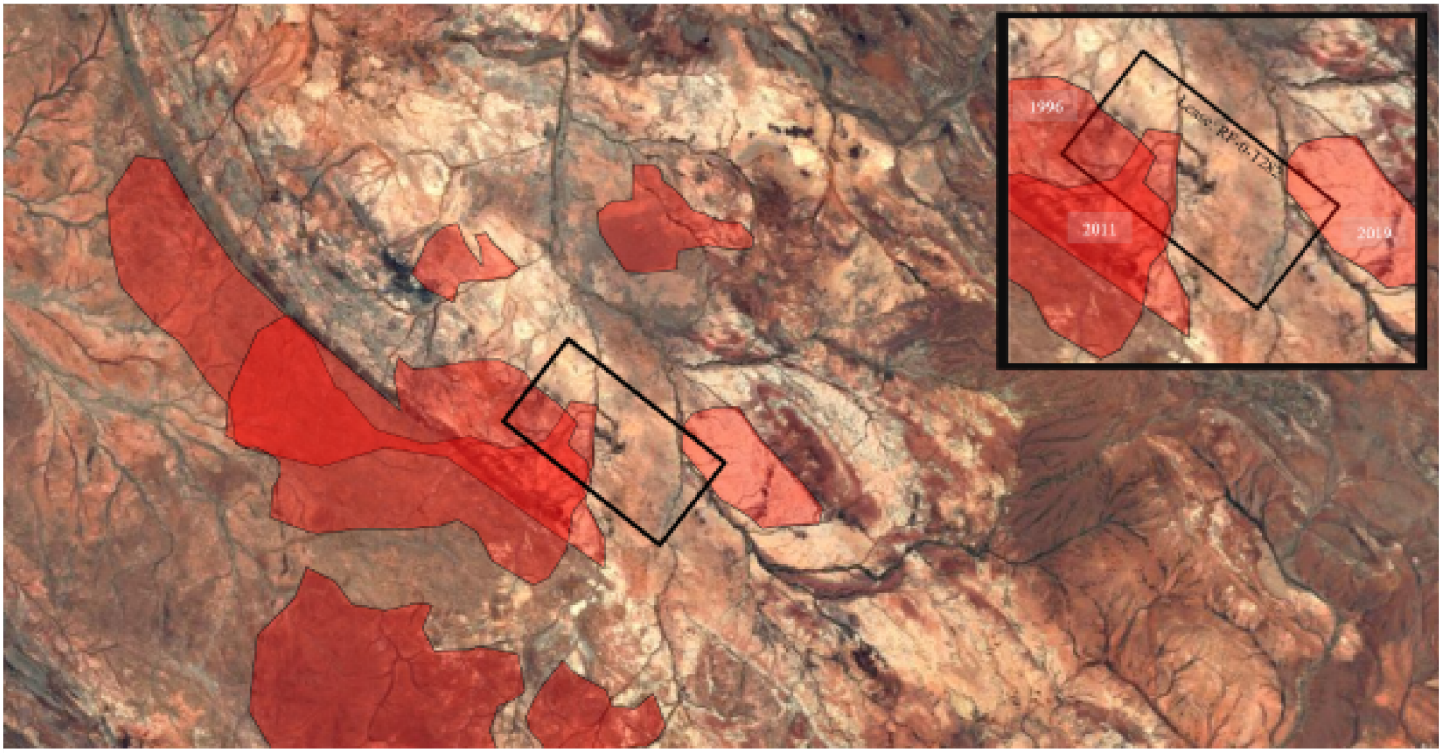
Water Utility Manager

Role: Water Catchment Officer

My Role: A series of bushfire events over the last 5 years has progressively degraded the drinking water in a major dam. I

am tasked to determine key areas within the catchment where the vegetation is still recovering from hese fire events.

Impact: Having access to historic bushfire boundary data will help in identifying areas within a catchment that could still be prone to post-fire soil erosion. Identification of these areas will assist our Agency in mitigating sediment movement and the siltation of our dam.



Northern Australia Frontier

Role: CEO of a small mining company

My Task: I am looking at acquiring a mining lease within Northern Australia to expand my lithium business. To help me understand the risk and frequency of bushfires at this location I want to visualise where and when bushfires have impacted this lease.

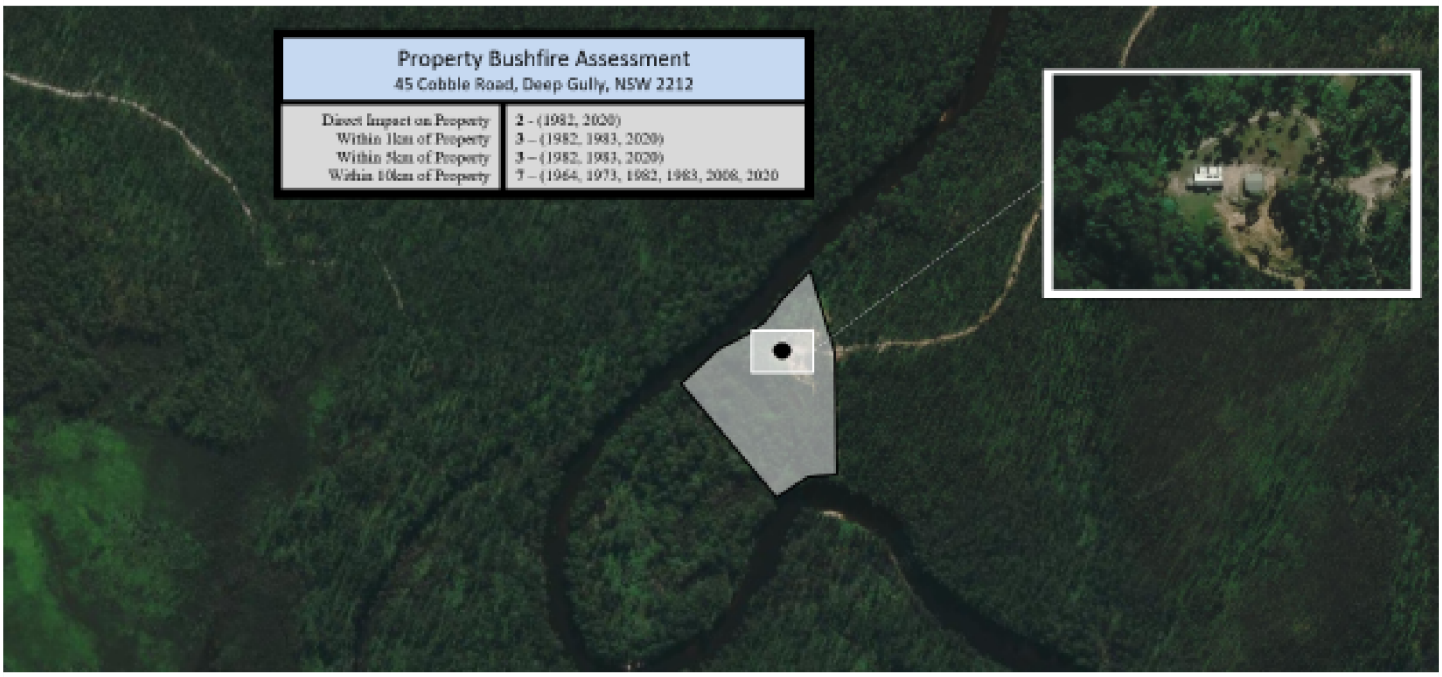
Impact: Overlaying the dataset over this lease will assist my company to identify the historical bushfires that have impacted this area. It will assist us in making a more informed financial decisions about where and when bushfires have impacted this area in the past and where mitigation may be required.

Urban Planning

Role: Urban Planner, Local Government

My Task: I need to determine the threat of bushfire risk at a proposed new subdivision site that my local government is planning.

Impact: Access to a dataset that shows the location and frequency of bushfires will aid my decision of where to place the subdivision and what mitigation and prevention strategies need to be put in place.

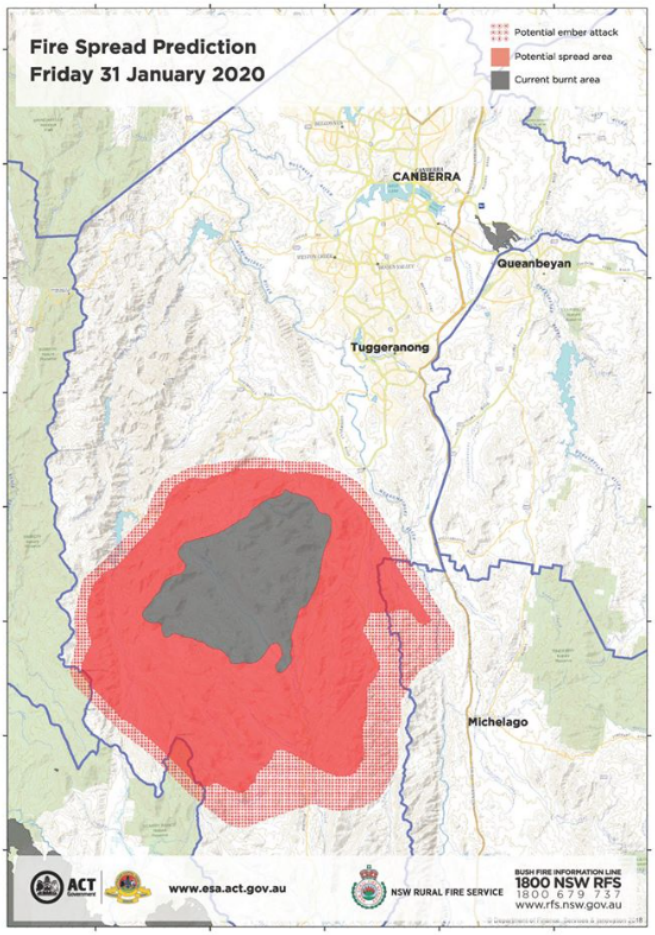


Insurance Agency

Role: Risk Manager, Insurance Company

My Task: In an attempt to avoid exposing the insurance company to undue risk I need to access the frequency and proximity of bushfires at a prospective clients address.

Impact: Having access to historic bushfire information will aid my agents to make more evidence based decisions around the provision of insurance at high risk locations.

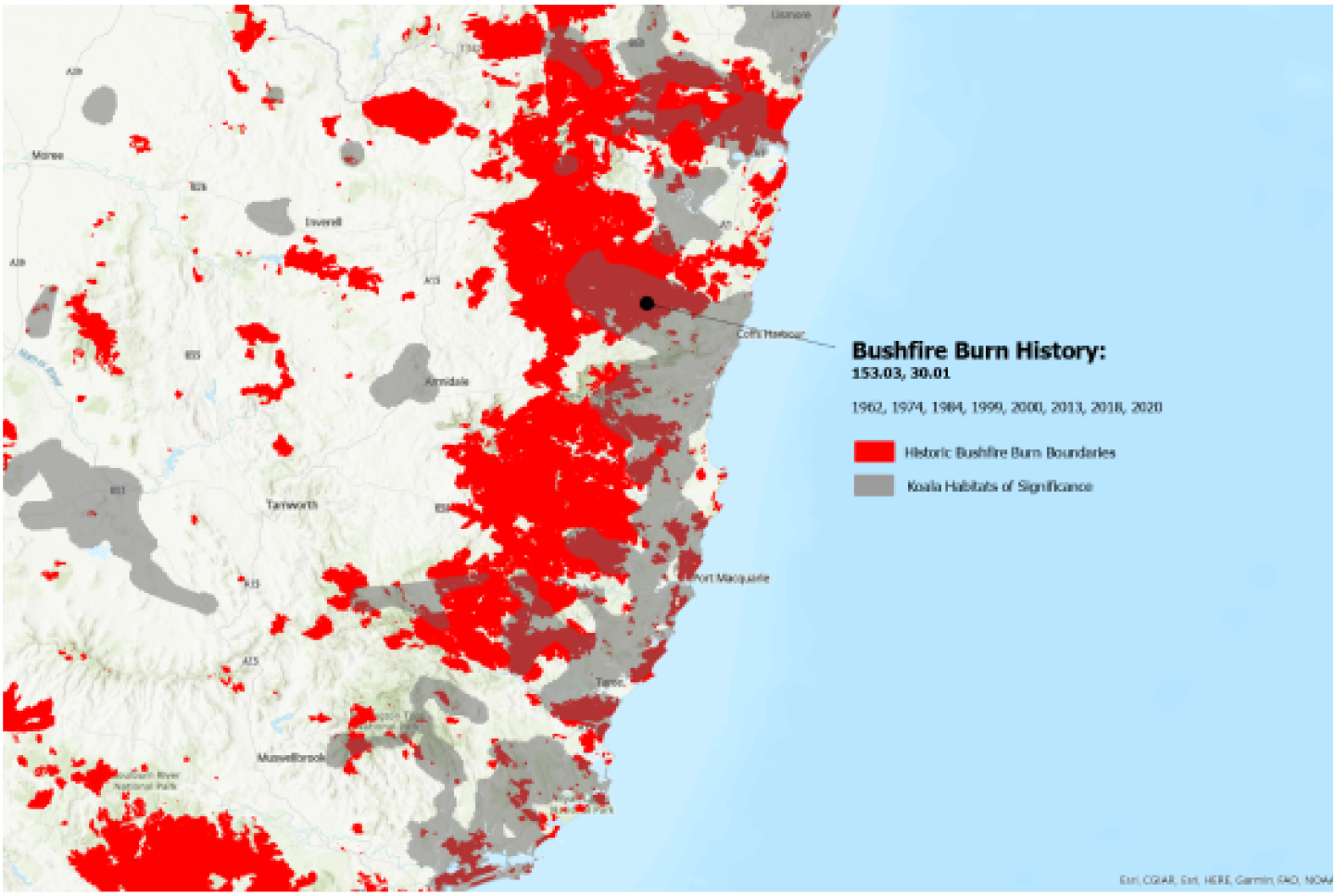


Bushfire Analyst

Role: Bushfire Behaviour Analyst

Task: I am responsible for the predicting the behaviour, severity and movement of a bushfire currently threatening communities. To ensure my models have inputs that best represent the conditions on the ground I require access to consistent and standardised bushfire history data.

Impact: Having a curated and authoratative source of bushfire history data will enable the modelling our Emergency Management Authority use to make more accurate assessments of what might occur in this community in the minutes, hours and days to come.

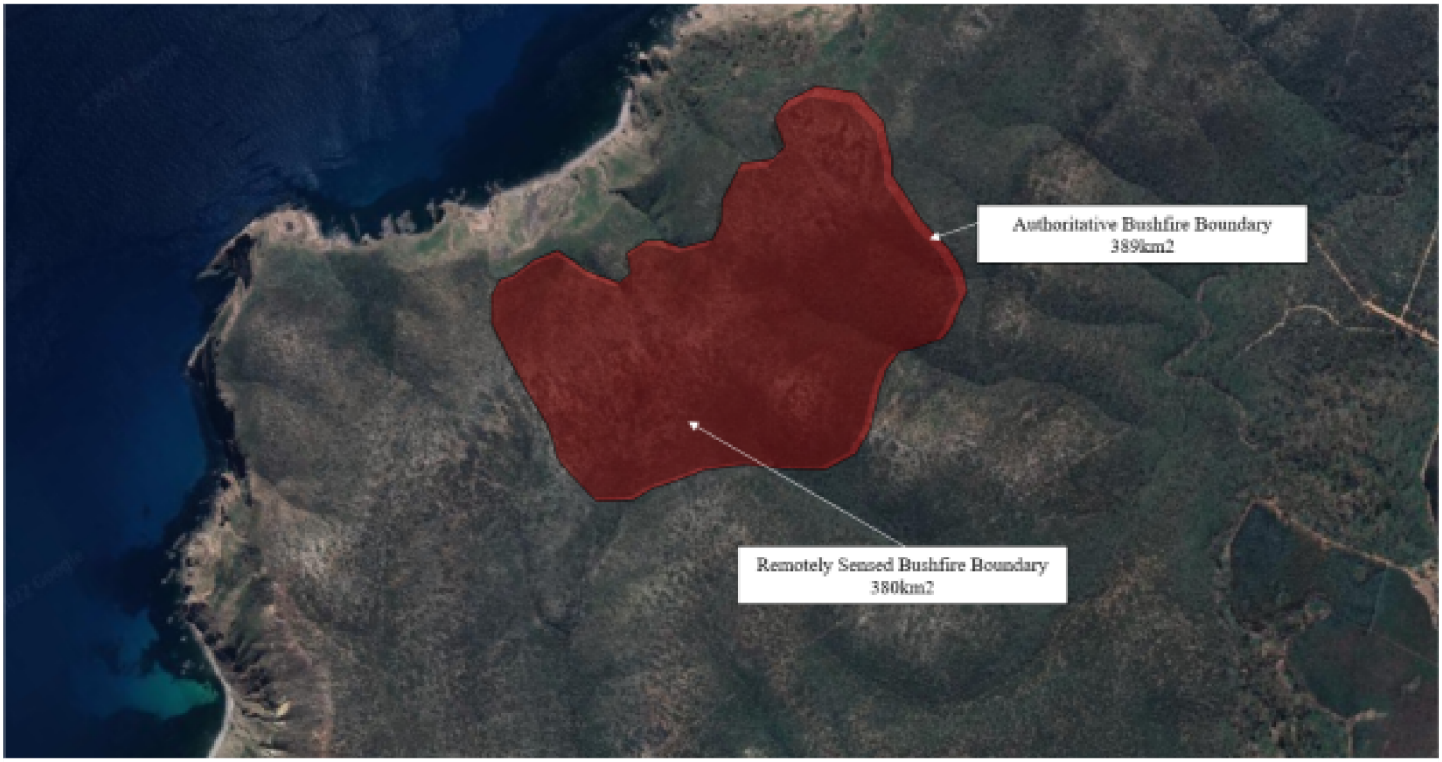


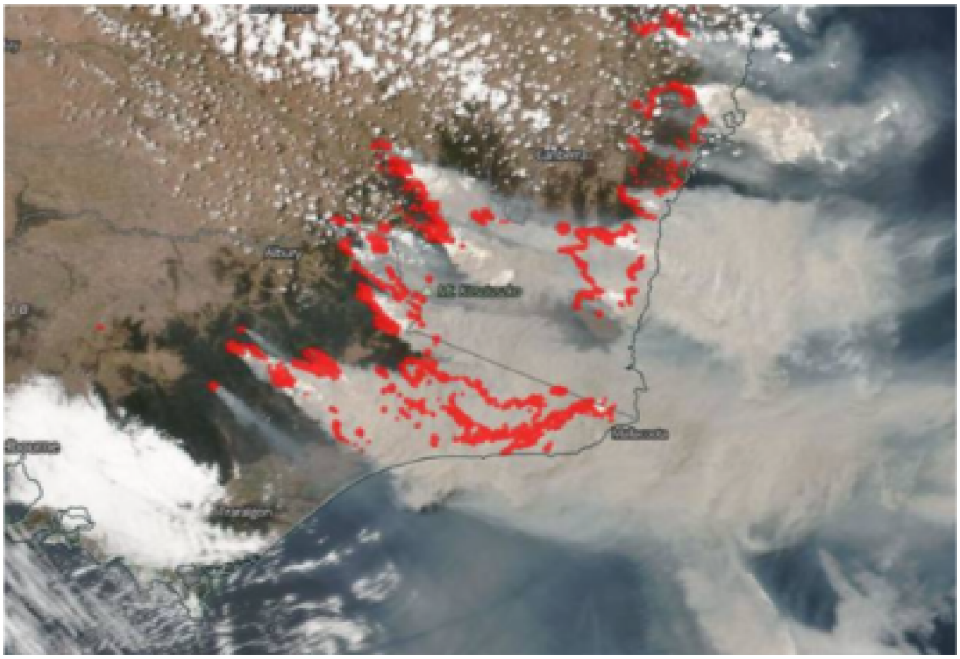
Species Protection

Role: Species Protection Officer

Task: To help develop mitigation strategies I need to understand the frequency of bushfires at a well known Koala habitation site.

Impact: Understanding the frequency of bushfires at this location will enable my department to make evidence based decisions on whether to encourage more koloa's into this site or remove the breeding population to a safer location.





Bushfire Research

Role: Remote Sensing Specialist

Task: I need access to authoritative bushfire burnt data to train and validate my remote sensing models.

Impact: Having the ability to access and utilise authoritative bushfire data from all areas of Australia will help the research community edge closer to creating accurate remotely sensed boundaries without having to rely on traditional labour intensive methods.

Achievements so far?

2021

03

EMSINA Capabilities Day - Click here

Bushfire Challenges Project introduction and ARDC Project Proposal put to EMSINA and Geoscience Australia

09

Bushfire Challenges Project agreement 'Stream 1' signed

Work Packages Leads for 1 through 5 identified

Communication to relevant State/Territory agencies stating Project intention

Work Package 1a and 1b - Bushfire Sector Business Analyst hired

Project work begins across all Work Packages

2022

04

Project Communications - website created and hosted through EMSINA

06

Work Package 1a and 1b - Work undertaken by the Business Analyst delivered

Work Package 1a - Report delivered to Steering Committee for review and endorsement

AFAC22 Conference - Initial discussions around Project sustainability with NBIC

Work Package 5 - Methodology document delivered to Steering Committee for review and endorsement

Work Package 2 - Report Delivered to Steering Committee for review and endorsement

07

Mid Year Report Delivered

09

Work Package 3 - Technical Architect Contract Issued

Work Package 4 - Communication of a significant Northern Terrirtory issue to the Steering Committee.

11

Work Package 3 - Technical Architect and Leads undertake targeted scoping and uplift discussions with Northern Territory and Queensland governments

Discussions around Project Sustainability with NBIC and GA

NBIC Presentation to EMSINA National Group

12

Bushfire Data Challenges Forum - No 3

Work Package 1a and 2 and 5a Reports published online

2023

01

Work Package 3 - Technical Uplift Report Delivered to Steering Committee and applicable State's for review

Work Package 4 - Sample data made available on EMSINA website:

Project Sustainment - Discussions with CSIRO enter the planning phase

02

Work Package 3 - Targeted State uplifts identified

03

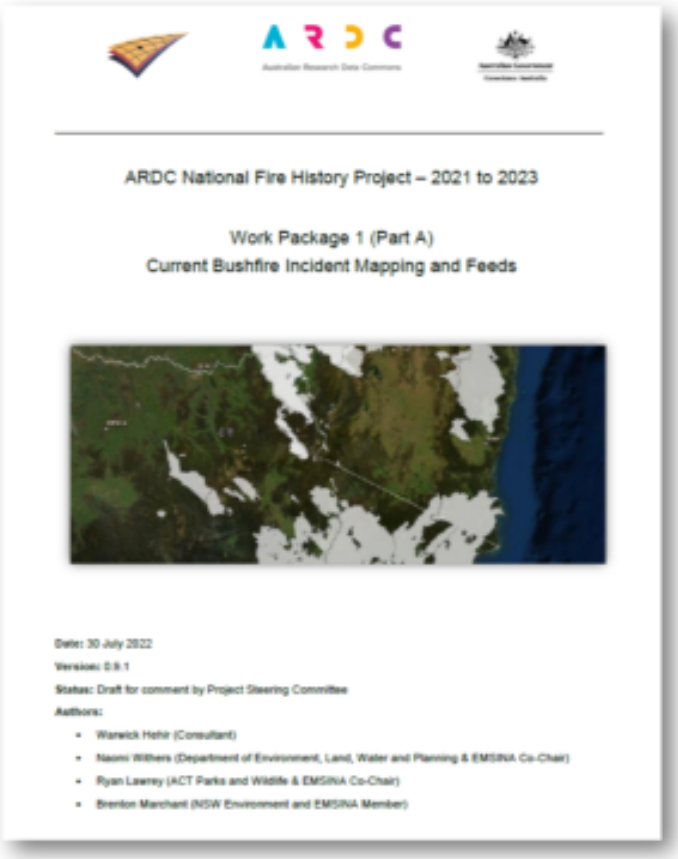
Work Package 4 - Final Data Product delivered to ARDC for review and endorsement

Work Package 4 - Report published and data/metadata made available: GA's existing infrastructure and GA's new Digital Atlas of Australia initiative.

EMSINA Meeting Hobart - Group update including presentation of final deliverables and NBIC Project status.

Work Package 3 - Targeted State uplifts proposals received and reviewed

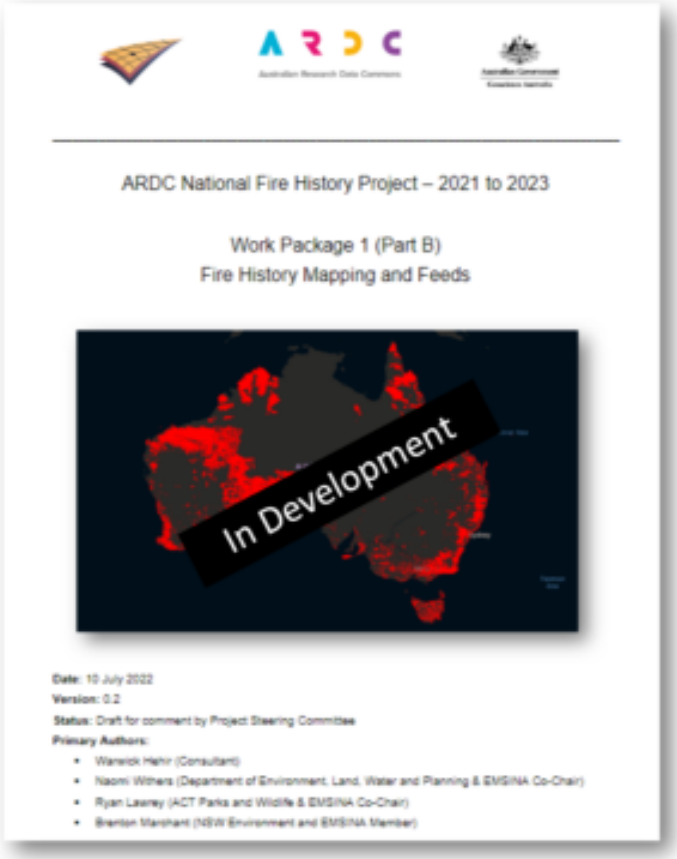
Summary of each work package...


ARDC National Fire History Project – 2021 to 2023

Work Package 1 (Part A)
Current Bushfire Incident Mapping and Feeds

Date: 30 July 2022
Version: 0.9.1
Status: Draft for comment by Project Steering Committee
Authors:

- Warwick Hehir (Consultant)
- Naomi Withers (Department of Environment, Land, Water and Planning & EMSINA Co-Chair)
- Ryan Lawrey (ACT Parks and Wildlife & EMSINA Co-Chair)
- Brenton Marchant (NSW Environment and EMSINA Member)



ARDC National Fire History Project – 2021 to 2023

Work Package 1 (Part B)
Fire History Mapping and Feeds

Date: 10 July 2022
Version: 0.2
Status: Draft for comment by Project Steering Committee
Primary Authors:

- Warwick Hehir (Consultant)
- Naomi Withers (Department of Environment, Land, Water and Planning & EMSINA Co-Chair)
- Ryan Lawrey (ACT Parks and Wildlife & EMSINA Co-Chair)
- Brenton Marchant (NSW Environment and EMSINA Member)

Work Package 1

Name: Gap Analysis

Objective: Assessment of the current status of the datasets including attribution, supply process, metadata and tools plus

the associated context of technology, organisation and resourcing barriers for data supply by agencies.

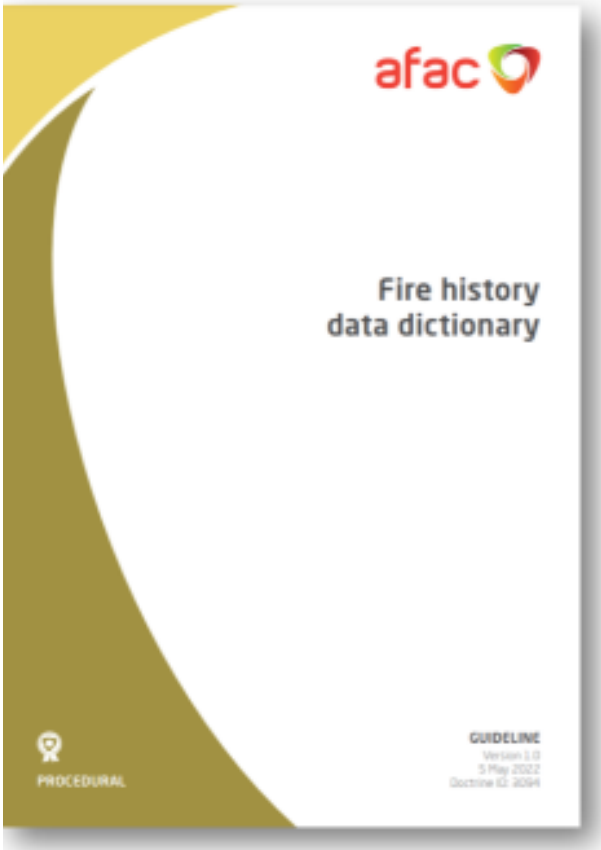
Major Deliverables:

- Current Fire Areas Gap Report - Completed
- Year-to-Date Fire Area Gap Report - Due early June

Current Leads: Naomi Withers (Department of Environment, Water, Land and Planning), Victoria and Ryan Lawrey (ACT Parks and Conservation), Australian Capital Territory

Former Lead: Brenton Marchant (NSW Department of Environment and Heritage), New South Wales

Business Analyst: Warwick Hehir (NSW Rural Fire Service), New South Wales



Work Package 2

Name: Continuation of the AFAC fire history dataset review to identify and agree on [the] proposed national framework.

Objective: Develop a national framework with agencies for the delivery and maintenance of a nationally aggregated Fire History dataset.

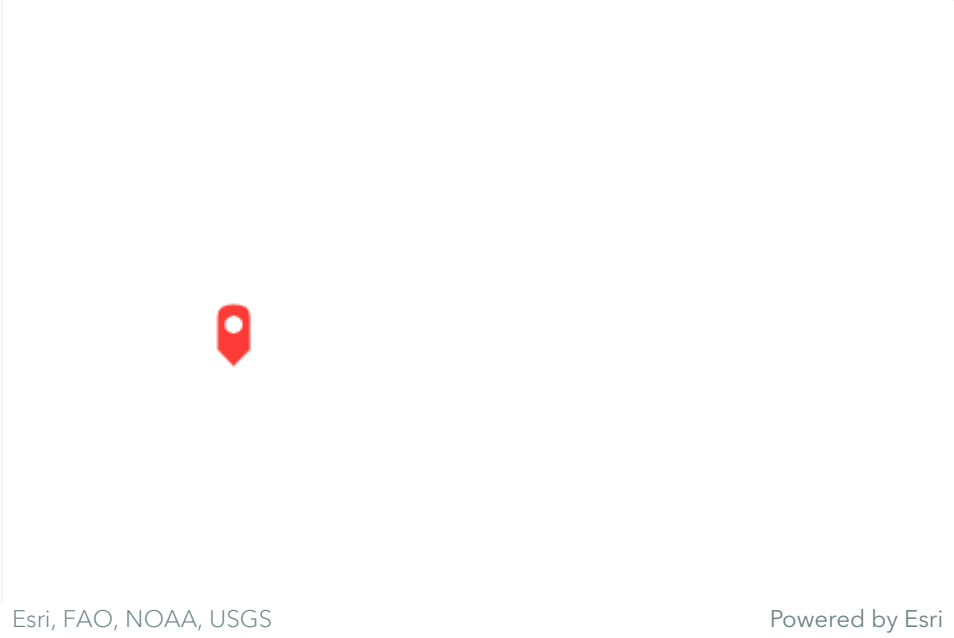
Major Deliverable:

- Data Dictionary - Completed: https://www.afac.com.au/insight/doctrine/article/current/fire-history-data-dictionary

Additional 'Stretch' Deliverable:

- Operational Incidents (Bushfire Boundary) Data Dictionary - Under Review by PSG

Current Lead: Agnes Kristina (Department of Fire and Emergency Services), Western Australia



Work Package 3

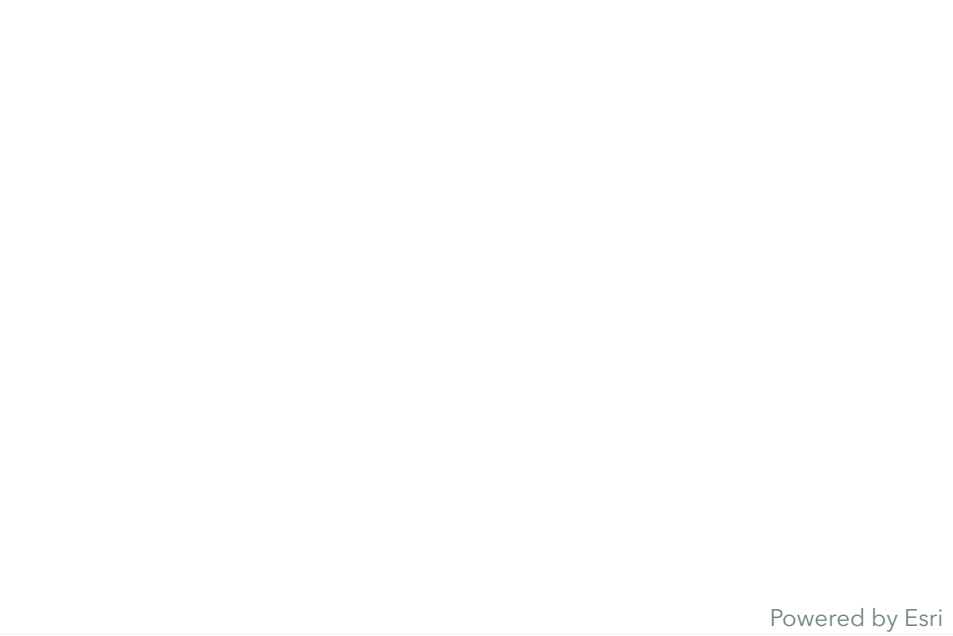
Name: State/Territory Capability Uplift

Objective: Development of agency level capability to support the supply of data into aggregated National [Bushfire] datasets. Governance, prioritisation and delivery of data sharing from agencies.

Former Lead: Brenton Marchant (NSW Department of Environment and Heritage), New South Wales

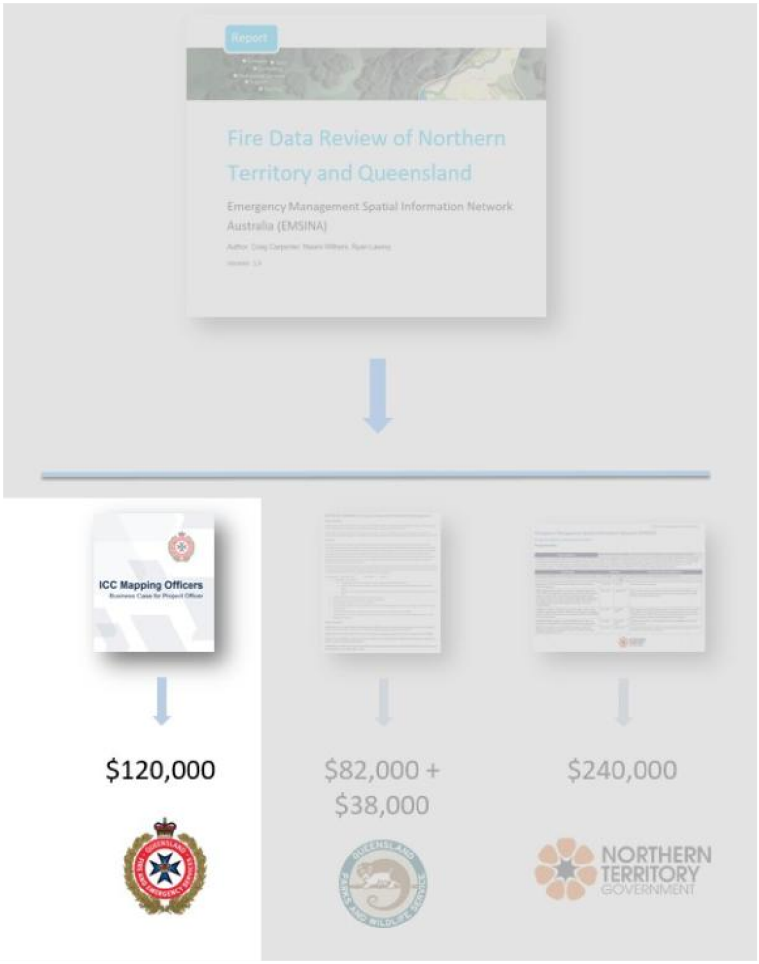
Current Leads: Naomi Withers (Department of Environment, Water, Land and Planning), Victoria and Ryan Lawrey (ACT Parks and Conservation), Australian Capital Territory

Lead Contractor: Craig Carpenter (Esri Australia), Western Australia



Major Deliverables:

- Technical Assessment Document - Completed
- Technical Uplift Project 1 to 4 - Update next Page


Report
Fire Data Review of Northern Territory and Queensland
Emergency Management Spatial Information Network Australia (EMSINA)
ICC Mapping Officers
$120,000
$82,000 + $38,000
$240,000
NORTHERN TERRITORY GOVERNMENT

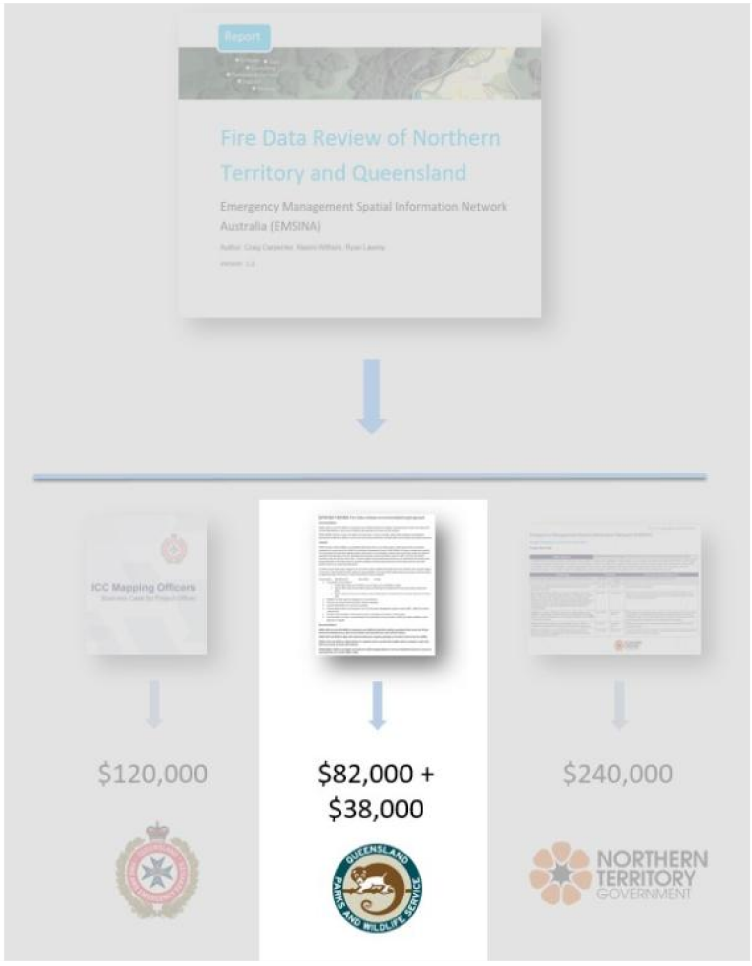
Work Package 3 - Proposal 1

Agency: Queensland Fire and Emergency Service

Proposal Name: ICC Mapping Officers

Timeframes: 1 Year

Cost: $120,000



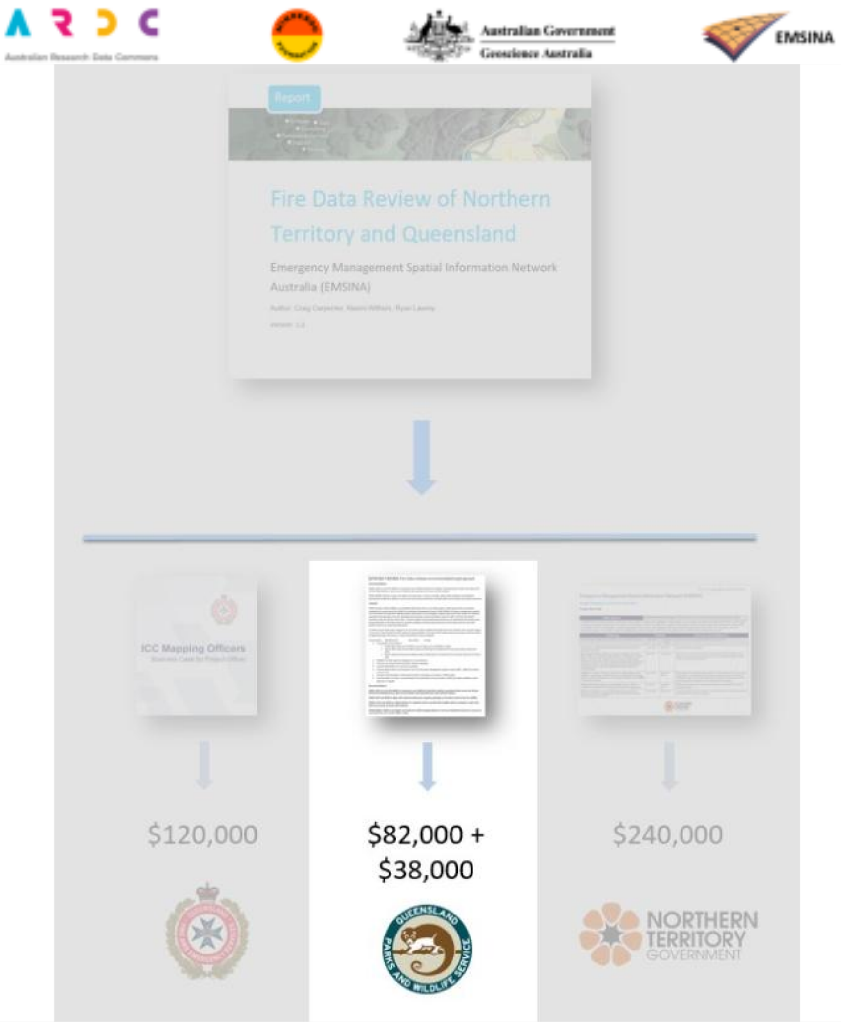
Work Package 3 - Proposal 2

Agency: Queensland Parks and Wildlife

Proposal Name: Data Modeller

Timeframes: 45 days once contract is in place

Cost: $82,000



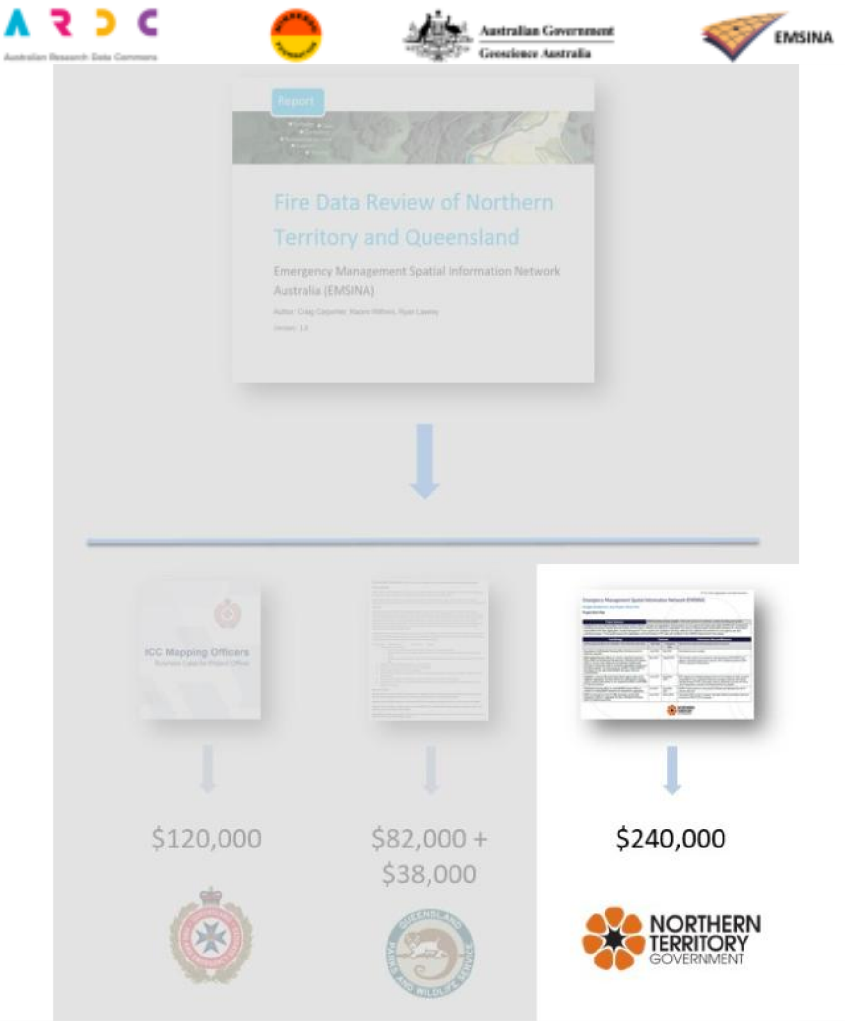
Work Package 3 - Proposal 3

Agency: Queensland Parks and Wildlife

Proposal Name: Field Mapping Software

Timeframes: 5 days once contract is in place

Cost: $38,000



Work Package 3 - Proposal 4

Agency: Bushfires NT & NT Department of Environment, Parks and Water Security

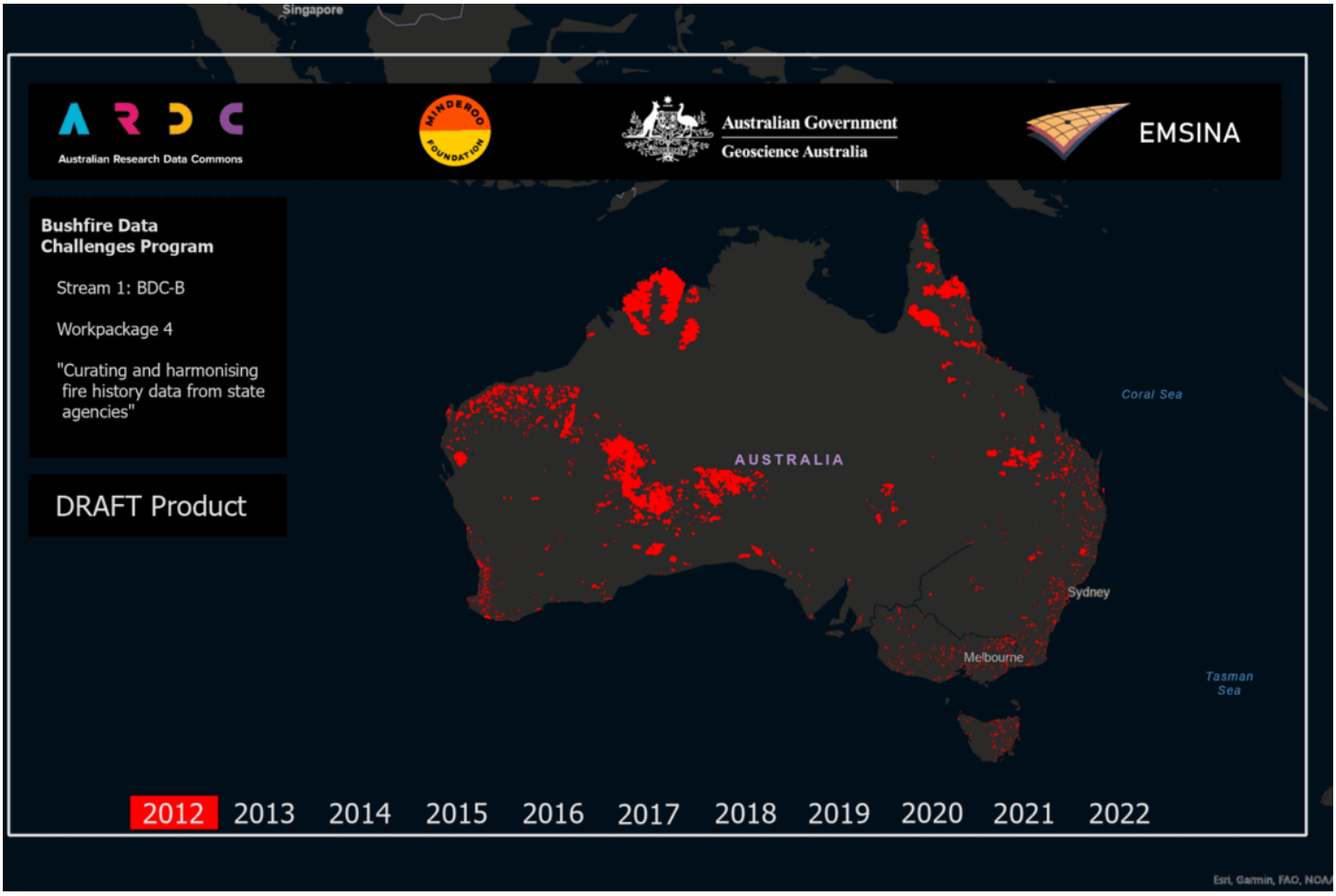
Proposal Name: x

Objective: x

Benefit: x

Timeframes: 1 Year

Cost: $240,000 + $100,000 co-contribution



Work Package 4

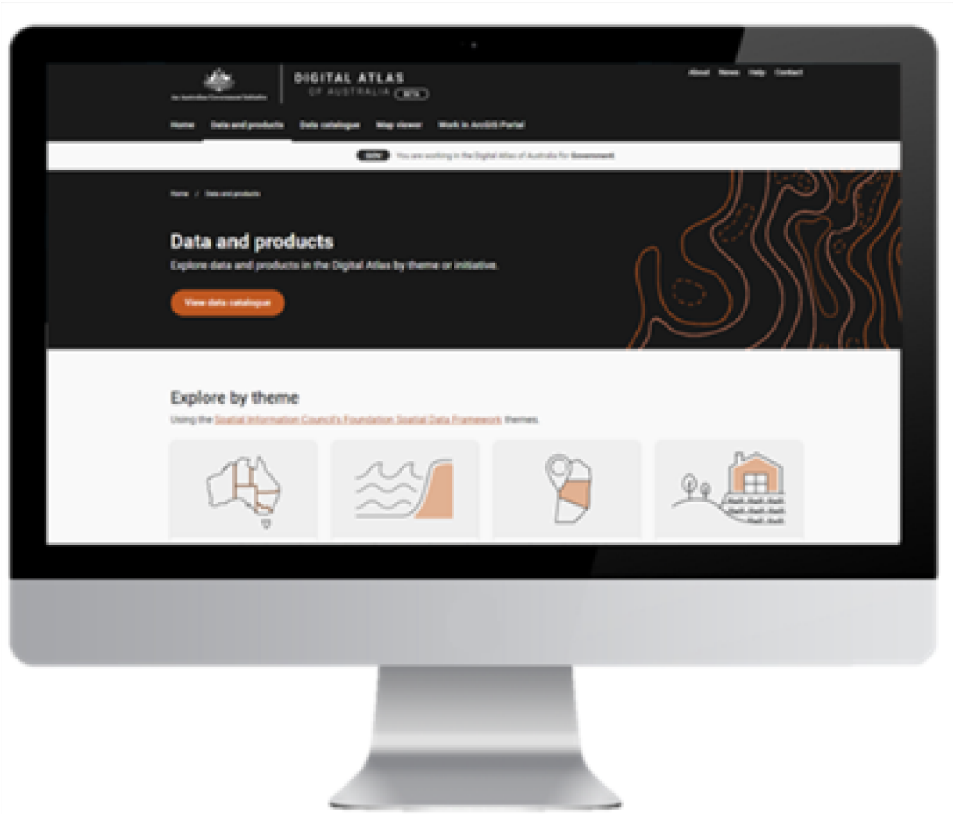
Name: Curating and harmonising fire history data from state [territory] agencies

Objective: Develop [a] system that aggregates the agency fire history into a National Wildfire History dataset(s).

Major Deliverables:

- Nationally Aggregated Bushfire History Dataset - Completed
  - Harmonising the fire history data from the States [territories]
  - Aggregating the State [Territory] fire history data
  - Curating the fire history data from the State/Territory
- Static Dataset now available here: https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/147763
- Webservice to be released in May 2023

- Accessible soon within Digital Atlas Australia

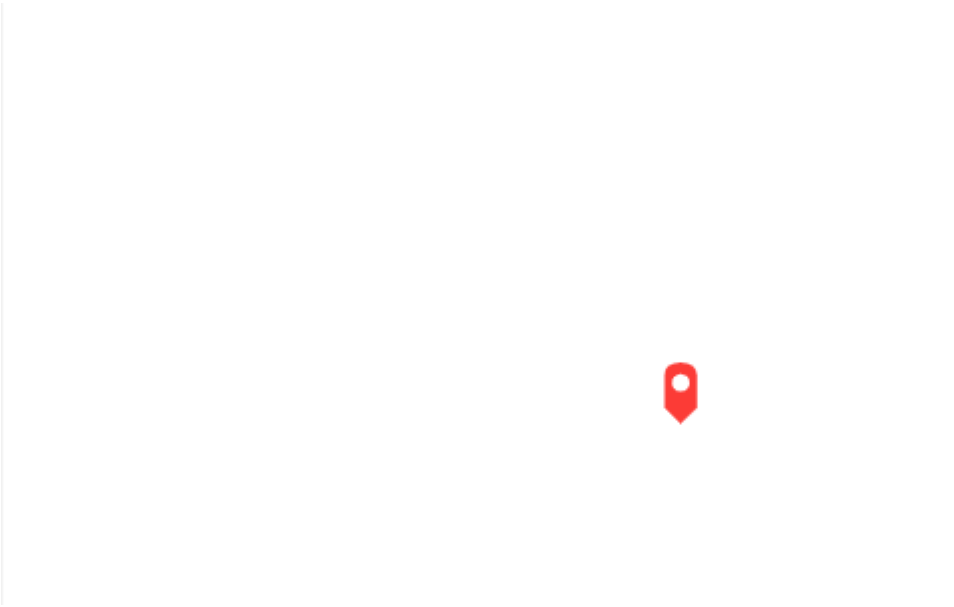


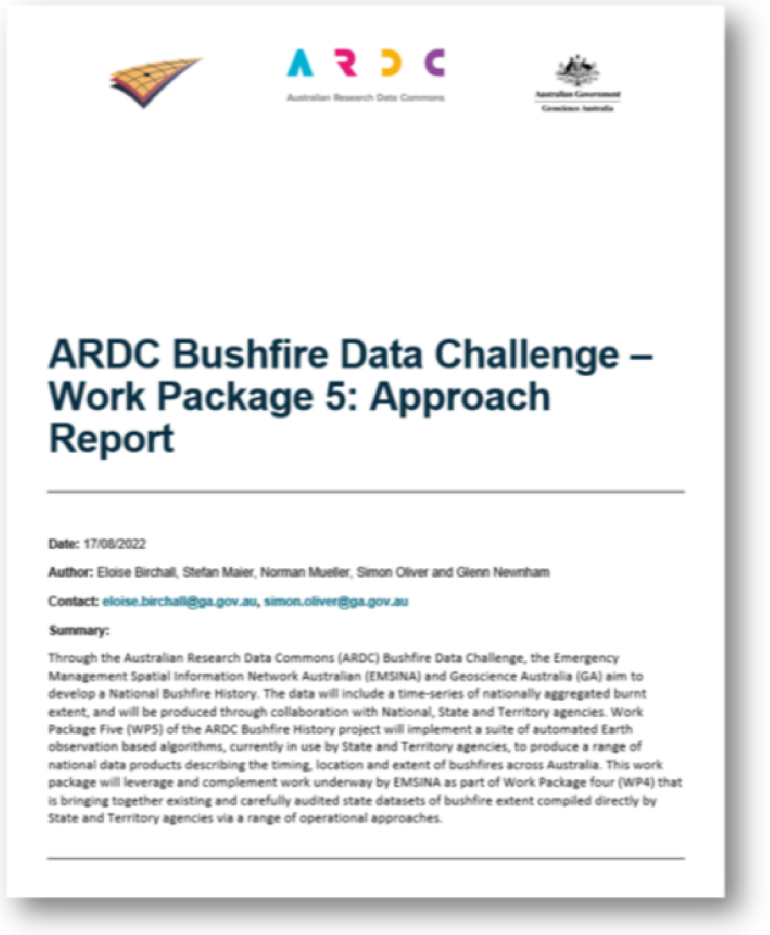
Digital Atlas of Australia

Major Issue Encountered:

- Northern Territory Issues Paper (September 2022). Please see Project website to read document and the position the Project Team have taken.

Current Lead: Kane Orr (Geoscience Australia), Australian Government





ARDC Bushfire Data Challenge – Work Package 5: Approach Report

Date: 17/08/2022

Author: Eloise Birchall, Stefan Maier, Norman Mueller, Simon Oliver and Glenn Newnham

Contact: eloise.birchall@ga.gov.au, simon.oliver@ga.gov.au

Summary:

Through the Australian Research Data Commons (ARDC) Bushfire Data Challenge, the Emergency Management Spatial Information Network Australian (EMSINA) and Geoscience Australia (GA) aim to develop a National Bushfire History. The data will include a time-series of nationally aggregated burnt extent, and will be produced through collaboration with National, State and Territory agencies. Work Package Five (WP5) of the ARDC Bushfire History project will implement a suite of automated Earth observation based algorithms, currently in use by State and Territory agencies, to produce a range of national data products describing the timing, location and extent of bushfires across Australia. This work package will leverage and complement work underway by EMSINA as part of Work Package four (WP4) that is bringing together existing and carefully audited state datasets of bushfire extent compiled directly by State and Territory agencies via a range of operational approaches.

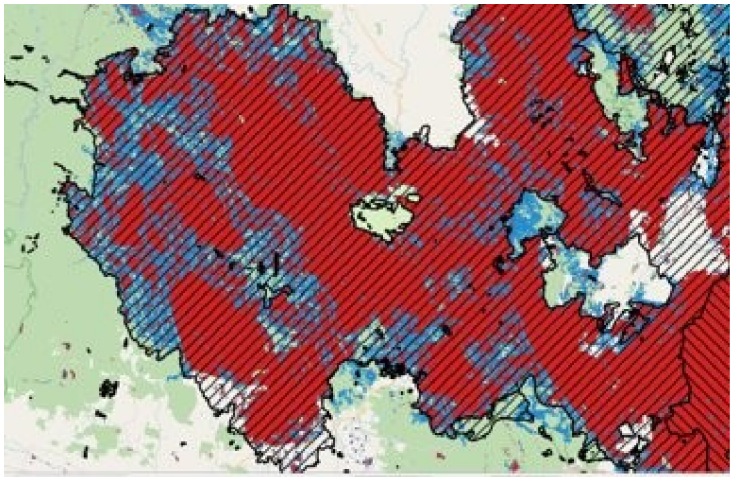
Work Package 5

Name: National burnt area products

Objective: Develop the satellite imagery analysis and services for the provision of validated burnt area assessment.

Major Deliverables:

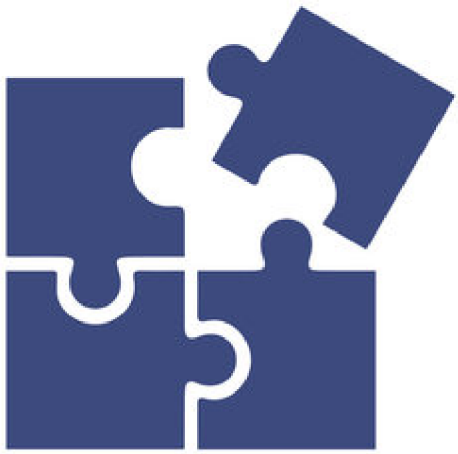
- Burnt area mapping approach report - Completed
- Re-aligned routine, automated, satellite-based burnt area assessment (September 2023)



Comparison between burn cube and authoritative data

Current Lead: Erin Telfer (Geoscience Australia), Australian Government

Former Leads: Simon Oliver (Geoscience Australia), Norman Mueller (Geoscience Australia), Eliose Birchall (Geoscience Australia), Australian Government



What are the next steps?

2023

05

Work Package 3 - Queensland and Northern Territory Uplift Contracts put in place

Work Package 1b - Report delivered to Steering Committee for review and endorsement

Work Package 1b - Report Published

Start - Capability Technical Transition Project's (pending formal agreements with NBIC)

Communication of our deliverables throughout the EM Sector

06

End - Capability Technical Transition Project's

Final ARDC Project Report Submitted to ARDC Project Officers

June 15th

Formal 'End of Project'

June 16th

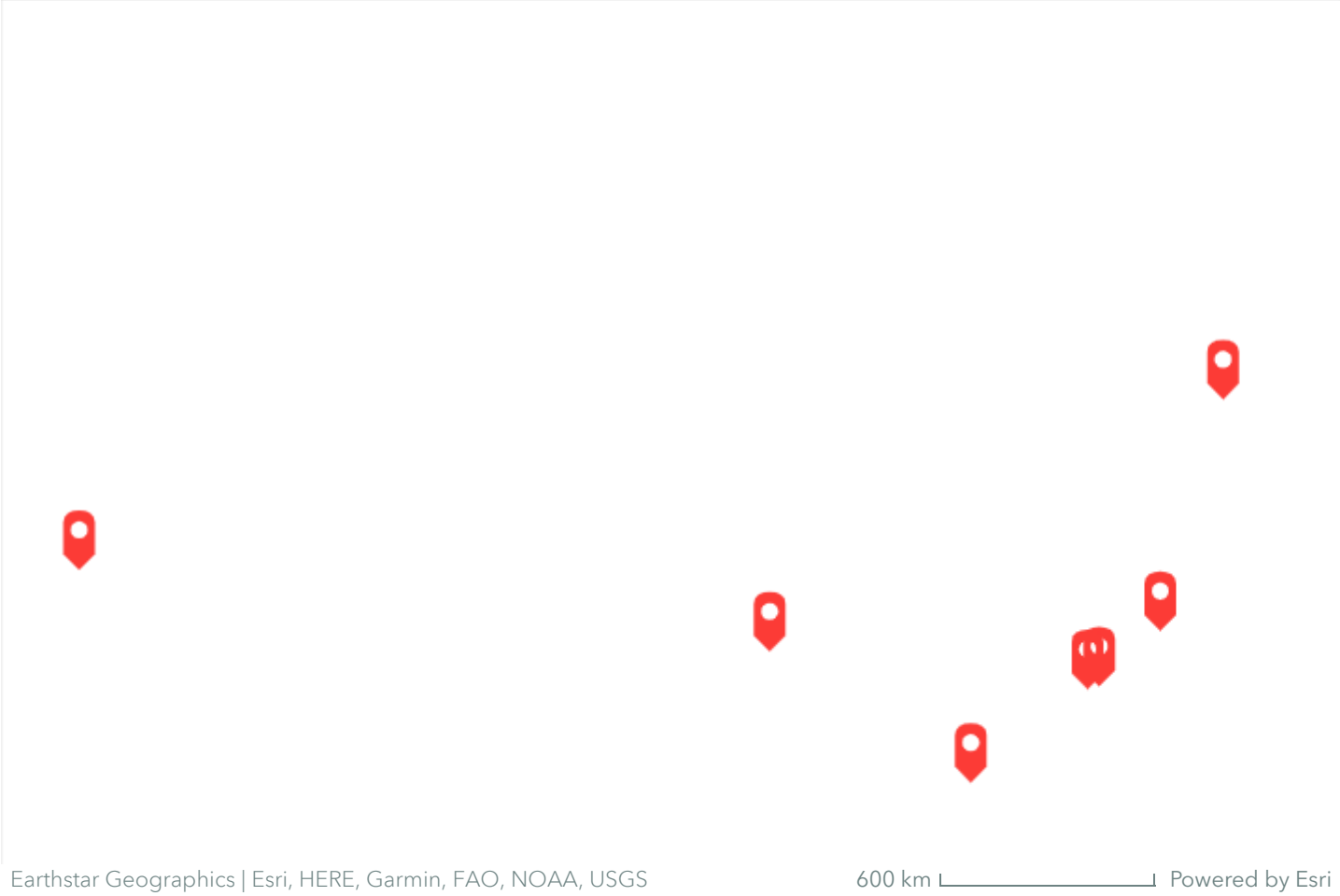
Work Package 5 - Conditional Extension Period

09

Work Package 5 - Final Data Products delivered to Steering Committee for review and endorsement

Work Package 5 - Final Report published and data/metadata made available

End of Project



Recognition

This Project wishes to thank the following people for their time, effort and subject matter expertise in helping us deliver a successful outcome for Australia...

ACT

ACT Parks and Conservation: Ryan Lawrey *(Work Package 1 and 3 and EMSINA Co-Chair*), Adam Mclachlan **ACT Emergency Service Authority:** Richard Verkuylen (EMSINA), Katherine Jenkins

NSW

NSW Environment and Heritage: Brenton Marchant (*former EMSINA Co-Chair*), Warwick Hehir (*Project Business Analyst*) (EMSINA), Heidi Mawbey **NSW Rural Fire Service:** Nick Sharp (EMSINA) **NSW Forestry:** Rob Kirwood (EMSINA) **NSW Parks and Wildlife Service:** Greg Summerall, Heidi Mawby, Felipe Aires **Department of Planning and Environment:** Matt Adams

NT

Bushfires Northern Territory: Akshy Athukorala, Magi Towers, Andrew Turner, Tony Fuller, Natalie Chester, Nathaniel Staniford, Kelly Benham **Northern Territory Police, Fire and Emergency Services:** Joshua Fischer, Alex Godfrey (EMSINA), Rebecca Hockey **Charles Darwin University:** Patrice Weber, Rohan Fisher, Peter Jacklyn, Andrew Edwards, Jay Evans **Department of Infrastructure, Planning and Logistics:** Matthew Winston, Tony Gill, Phillip Rudd (EMSINA), Richard Smith, Phil Hickey **Charles Darwin University NAFI:** Peter Jacklyn, Andrew Edwards **Maitec Pty Ltd:** Stefan Maier

Qld

Queensland Parks and Wildlife Service: Jane Browne (EMSINA), Bluey Harris, David Clark, Shaun Kolomeitz, John Atkinson **Queensland Fire and Emergency Service:** Simon Webster (EMSINA), Peter Timmers (EMSINA), Lidia Dudina, Tony Johnstone, James Haig, Paul Storrs, Andrew Wynnejones, Jack Emelus, Russell Stephen-Peacock **Queensland Department of Environment and Science:** Deanna Vandenburg, Rebecca Farrell, Dan Tindall, Leo Hardtke **HQ Plantations:** Mark Jones, Adrian Knight

SA

Department of Environment and Water: Nick Severin (EMSINA), Matthew Miles, Mike Wouters, Simeon Telfer (EMSINA)

Tas

Department of Primary Industries, Parks, Water and Environment: Bryn Roberts
Department of Natural Resources and Environment: Aaron Cashion (EMSINA), Rob Meijers (EMSINA), Lindsay Mitchell
Tasmania Fire Service: Sam Ferguson (EMSINA), Dan Hoar, Rochelle Richards

Vic

Department of Environment, Water, Land and Planning: Naomi Withers (*Work Package 1 and 3 and EMSINA Co-Chair*), **Country Fire Authority:** Teena Speirs (EMSINA), Nick McCarthy

WA

Department of Fire and Emergency Services: Agnes Kristina (*Work Package Lead*), Rod Nowrojee (EMSINA), Aaron Thorn **Landgate:** Matt Adams, Adrian Allen
Department of Biodiversity, Conservation and Attractions: Mike Meinema, Shane French (EMSINA)

Federal

Geoscience Australia: Con Charalambou (*Work Package 4 Lead*), Grace Ryu, Simon Oliver, Norman Mueller (EMSINA), Erin Telfer (*Work Package 5 Lead*), Eloise Birchall, Tracy Fan, Paul Rossiter, Cate Kooymans, Belle Tissott, Margaret Harrison, Kane Orr (*Project Lead*) (EMSINA)
Department of Defence: Josh Clancy, Freederick Ford **CSIRO NBIC:** Justin Leonard, Neil Cooper, Glenn Newnham
CSIRO / TERN: Matt Stenson, Tom van Niel

Other Agencies

ARDC: Sheida Hadavi and Mihail Staicu (*Business Analyst*), **ESRI Australia:** Craig Carpenter, Mark Wallace, Brendon Rappa

More Information

All Project information and contacts can be found on our Project's webpage: https://www.emsina.org/bushfire-history-project

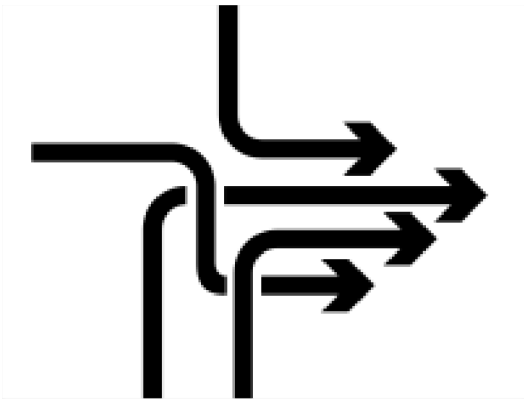
or

You can also subscribe to the EMSINA RSS for major Project updates through our News Feed: https://www.emsina.org/blog-feed.xml

Lessons Learned

Ownership 'Challenge'

The work that we are, and will achieve under this programme has advanced us to toward the objective. However, our advances must now be consolidated and owned by somebody long term.



Path to the Objectives

The objectives we set out at the beginning of this project still hold true today. However, the pathes in which we have got there and the intrium products we have produced have in some cases had to slightly vary from our original plans. Factors such as the aftermath of the Black Summer Fires, the prolonged Australian Floods and persistent Covid-19 lockdowns have all influenced how the Teams have managed their deliverables.

Good Will

One of the most remarkable traits of the Emergency Management Sector is the never ending 'good will' of the community. We found that when given direction and a clear goal to work towards there was a untapped and geniune willingness to help progress our projects.

'Australia' a continent of 8 countries

No matter how hard, the goal of obtaining national consistency across our EM spatial products is definately a goal worth persuing. However, as the COVID pandemic clearly showed every Australian this goal of a 'united' Australia is incredibly difficult to achieve; even at the highest levels of Government. For these types of projects to succeed it needs effective negotiation skills, clear and unambiguos reasons but most of all it needs that National Leader.

High Risk Season

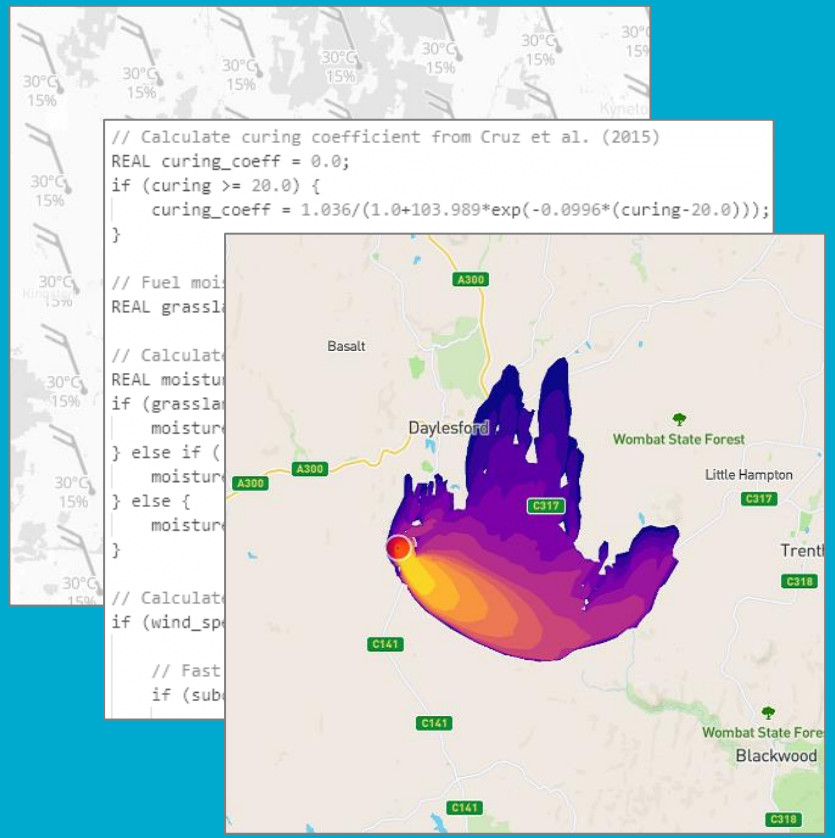
Our Project is reliant on bushfire experts whom have operational positions within their respective governments. As we enter the Summer months we will see disruptions, work will be delayed and our priorities will be elsewhere. We are aware that some of our products are critical inputs to your work. Rest assure we are trying our best to deliver ahead of time.

Spark wildfire modelling platform

Presented by James Hilton.

Spark team: William Swedosh, Richard Hurley, Nikhil Garg, Simon Knapp, Bella Robinson, Laura Guillory and Natalie Clark.

17th May, 2023



Acknowledgement of Country

I would like to begin by acknowledging the Traditional Owners and Custodians of the land on which I am hosting this presentation, the Peoples of the Kulin Nation. I also pay my respects to their Elders past and present.

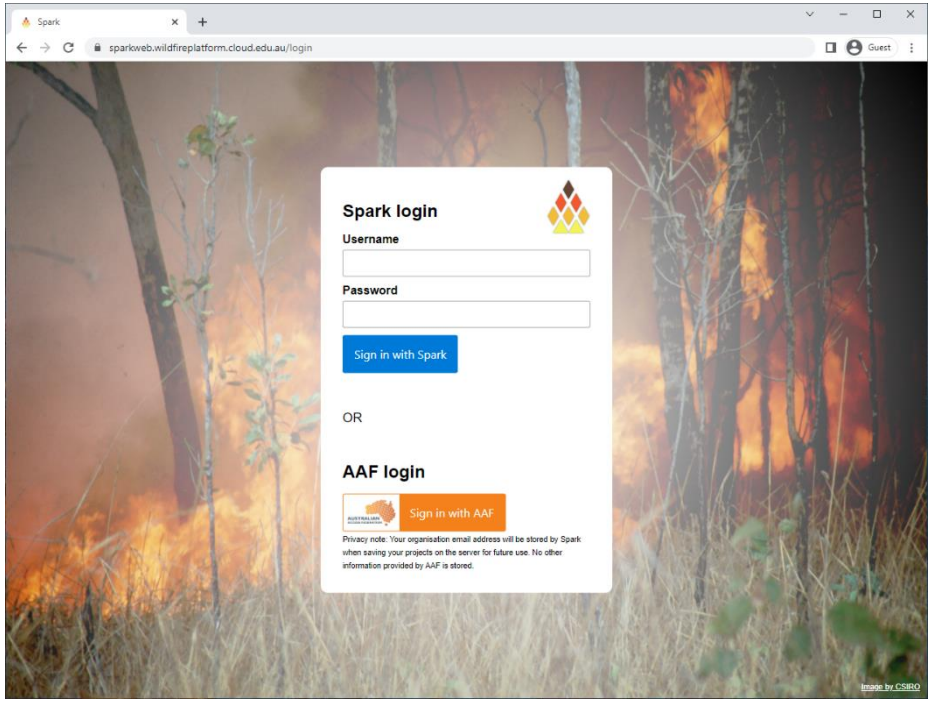
Introduction

- Wildfire is a multi-disciplinary area
- Challenges with translation of research into operational use:
  - How can new research be tested with existing wildfire models?
  - How can a new wildfire model be tested in an operational system?
  - How do models interact with each other?
  - How can we demonstrate predictive improvement?
- Idea of Spark wildfire platform:
  - Open web-based platform for researchers
  - Common sandbox for trialling new data and models for Operational Spark
  - Models/data can be tested in the system in isolation, or as part of larger modelling environment
- Based on open-source Geostack framework

https://gitlab.com/geostack/library

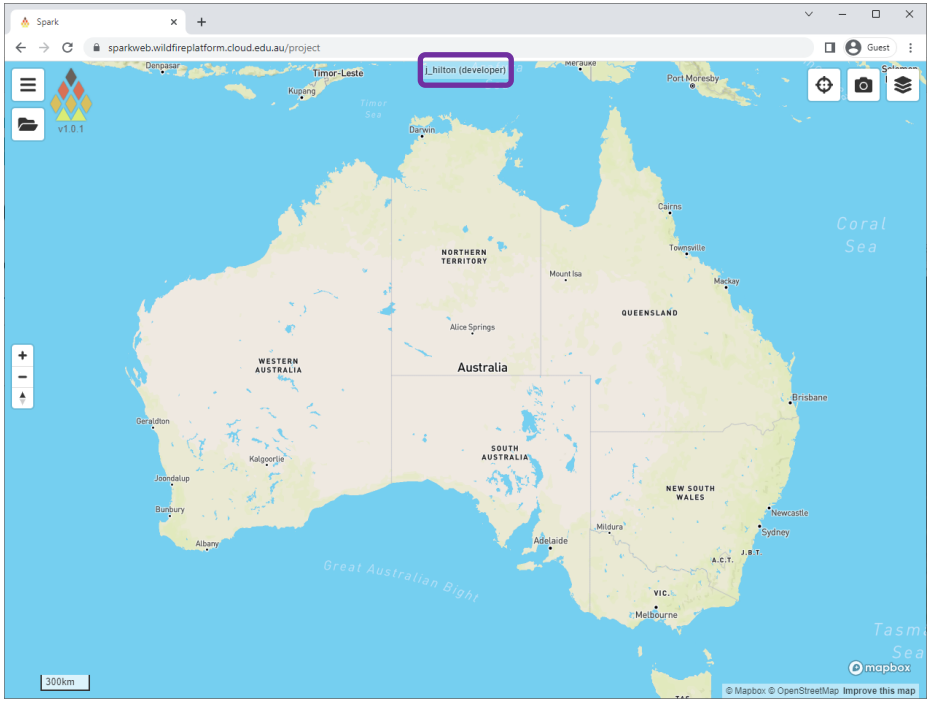
Wildfire platform

- Accessible at: https://sparkweb.wildfireplatform.cloud.edu.au/
- Spark logins can be requested (please email spark@csiro.au)
- Supports AAF logins for institutional access.



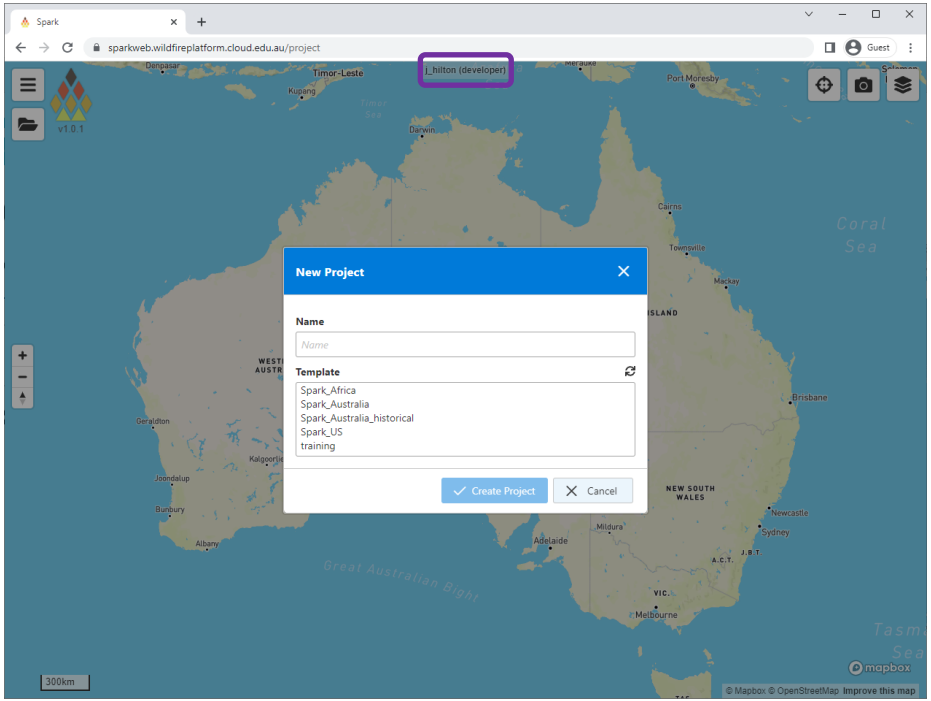
Wildfire platform

- Accessible at: https://sparkweb.wildfireplatform.cloud.edu.au/
- Spark logins can be requested (please email spark@csiro.au)
- Supports AAF logins for institutional access.
- Research users are *developers* by default – allowing access to all functionality.



Wildfire platform

- New simulation projects can be created from templates:
  - Australia with time series forecast
  - Australia with historical gridded weather
  - Africa with historical gridded weather
  - US with time series forecast



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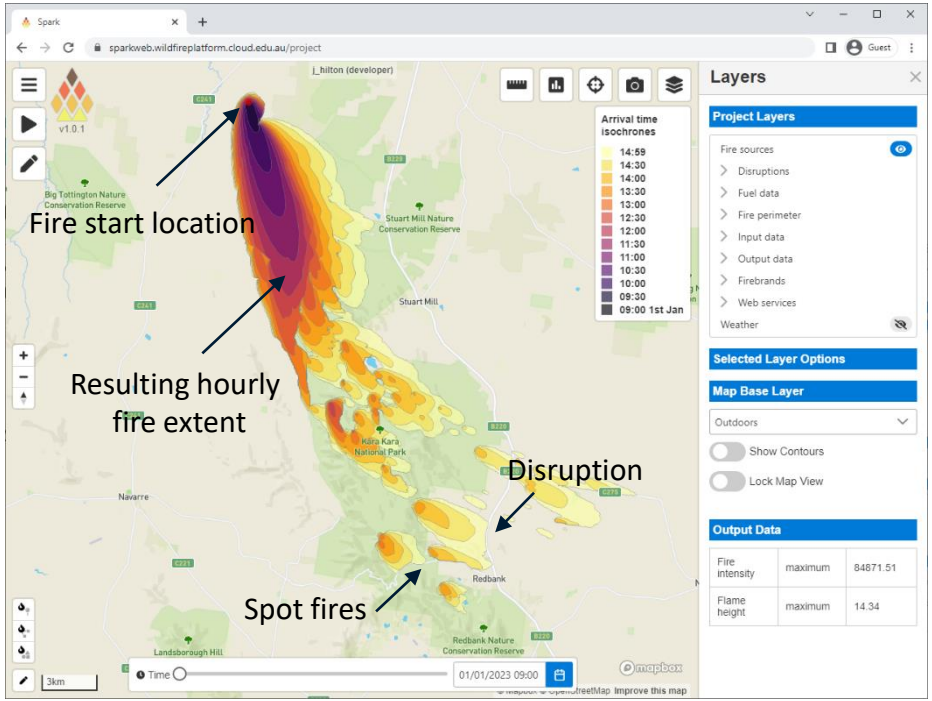

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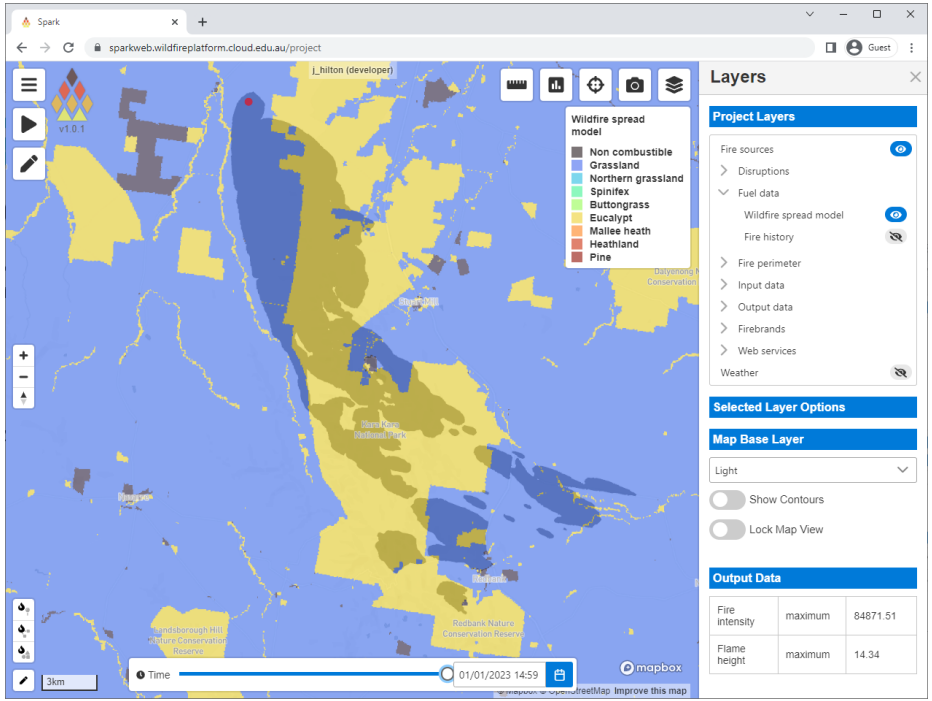

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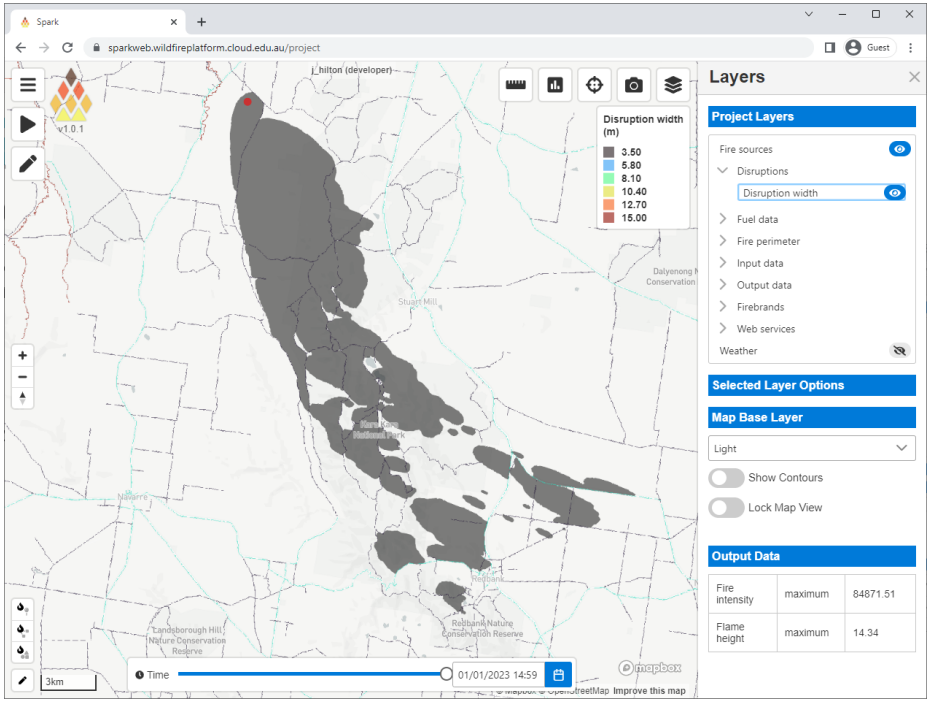

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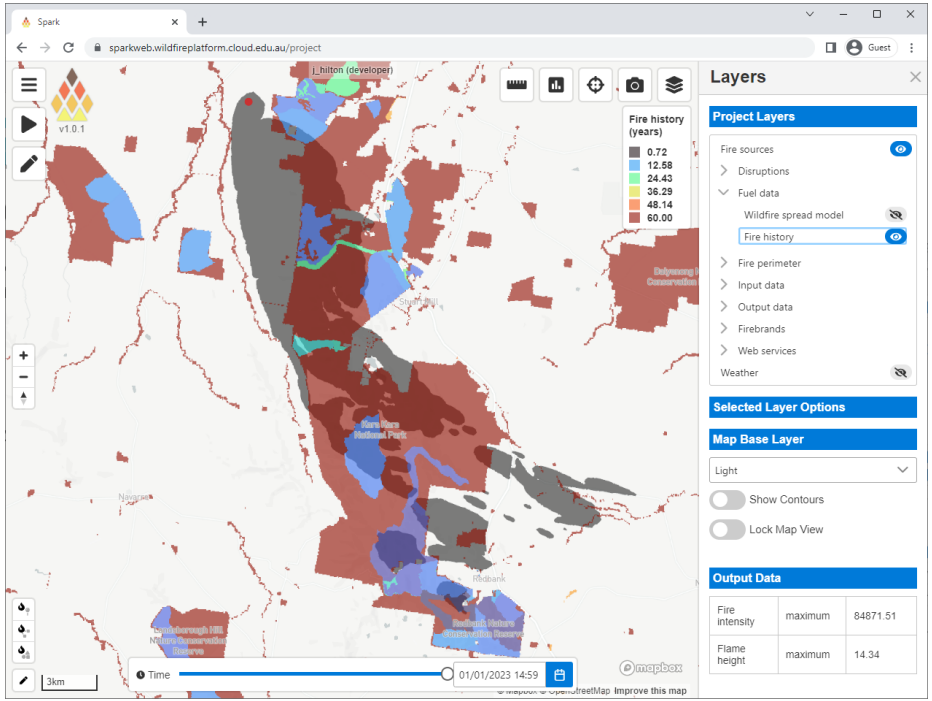

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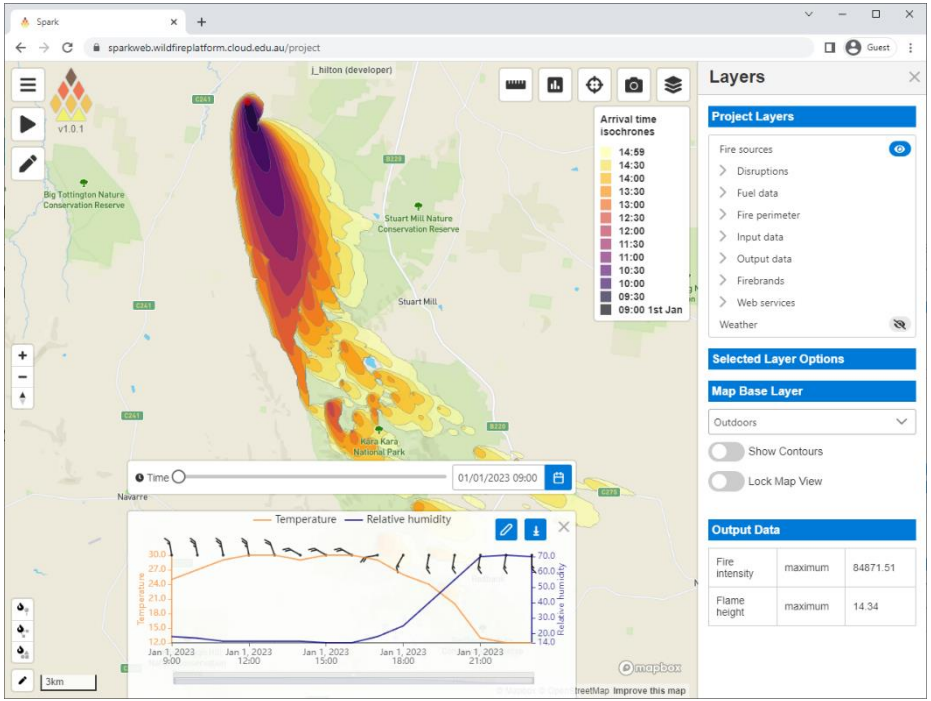

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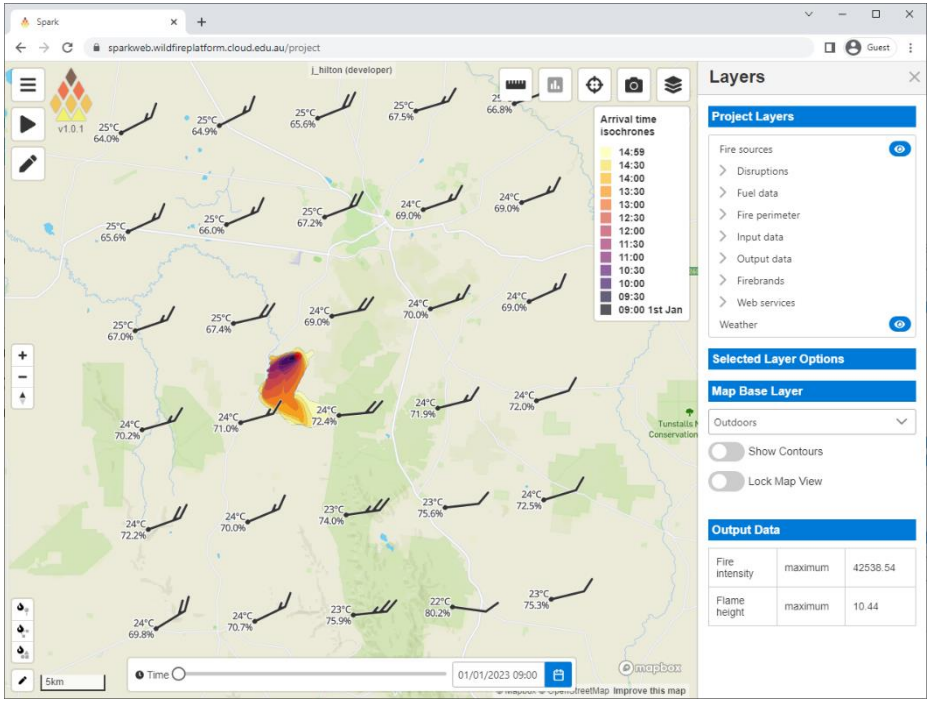
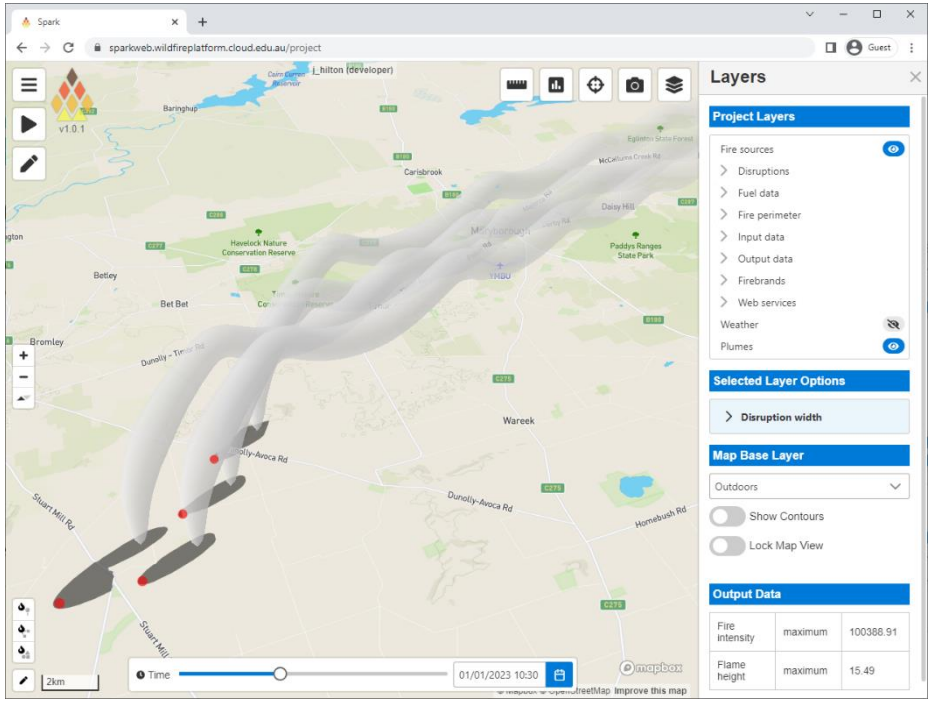
  - Synthetic weather timeseries (editable in GUI)
  - Historical gridded weather from BoM NCI archive



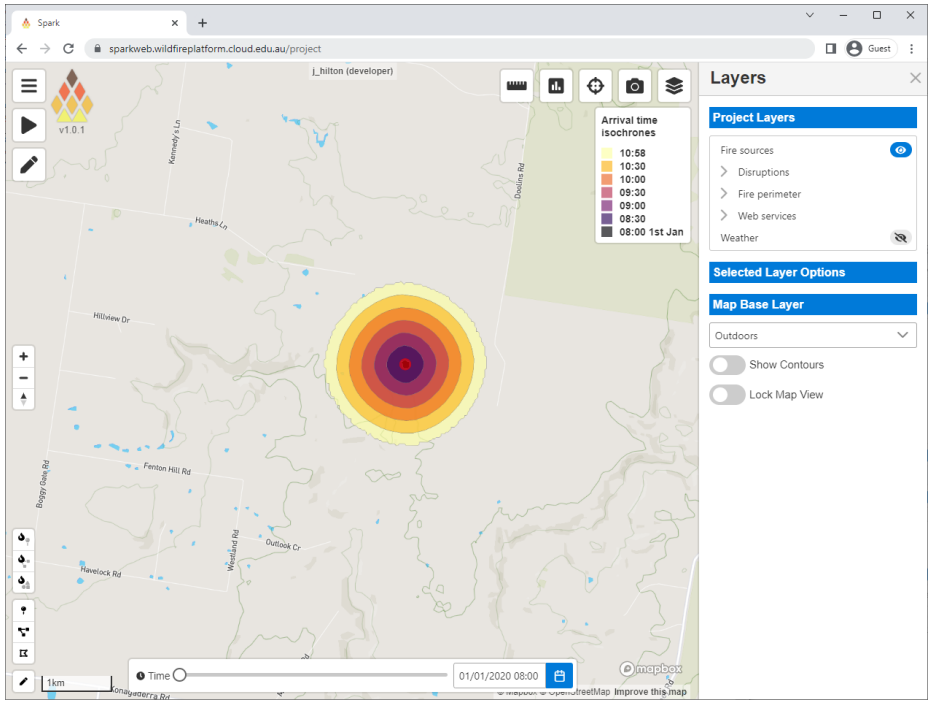
Wildfire modelling

- All fire behaviour is configurable with text scripts to define:
  - Mapping of input data into the simulation
  - Wildfire rate of spread in different fuel types
  - Flame height/fire intensity/any other spatial metric
  - Ensemble simulations
  - Post processing
  - Firebrand transport and modelling
  - Plume modelling



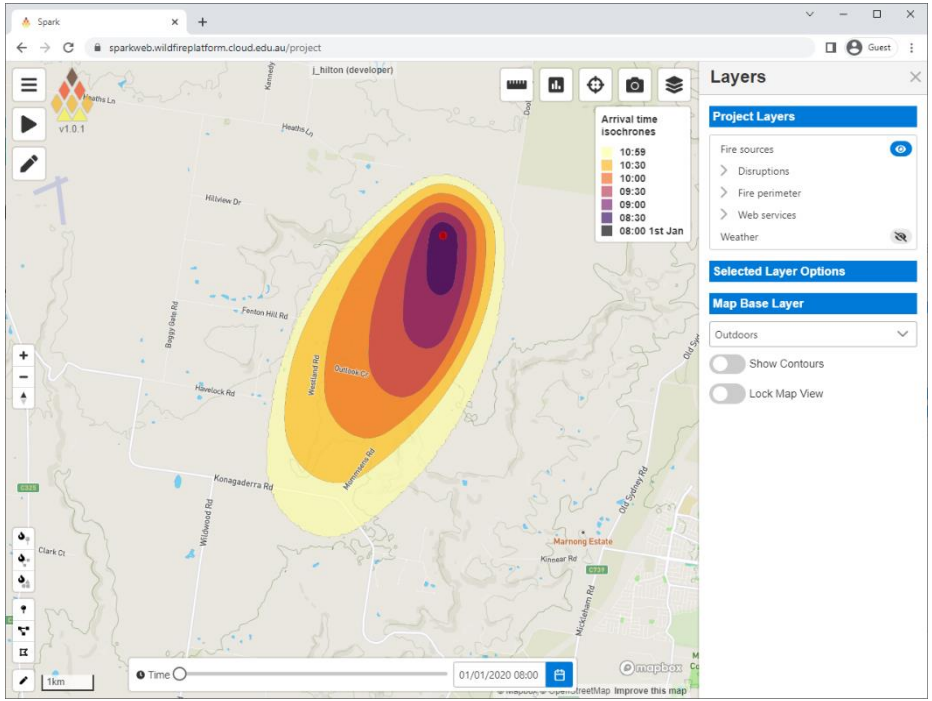
Wildfire modelling

- Scripts are compiled on-the-fly and executed for each simulation
- Example RoS script: `speed = 0.1`
  - Fire moves radially outwards at 0.1 ms^{-1}



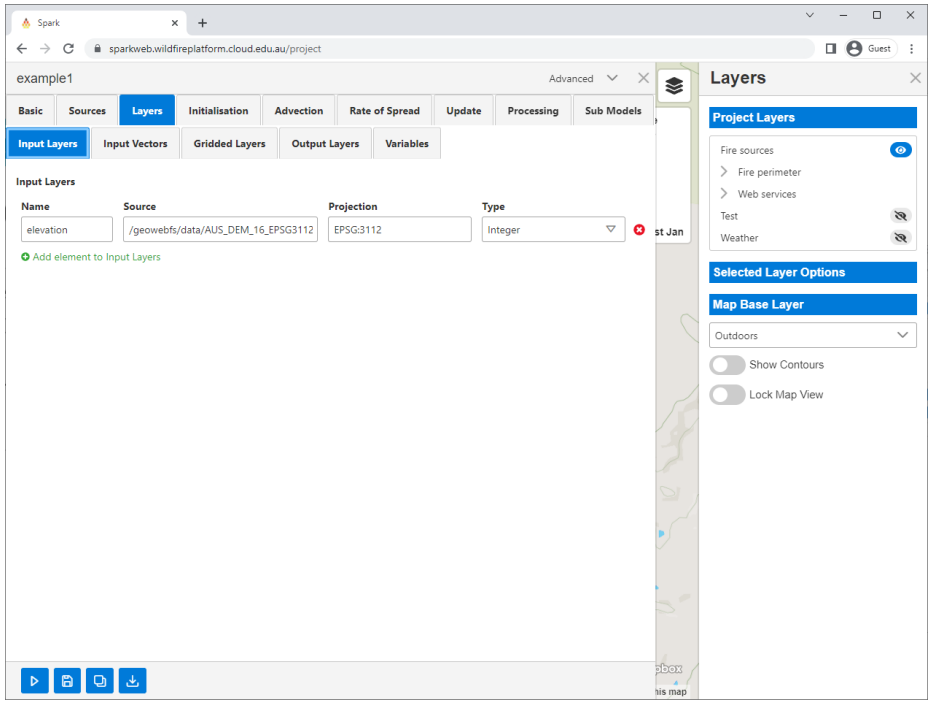
Wildfire modelling

- Scripts are compiled on-the-fly and executed for each simulation
- Example RoS script: `speed = 0.1`
  - Fire moves radially outwards at 0.1 ms^{-1}
- Include wind: `speed = 0.1+0.5*wind`
  - Fire uses wind component (dot product) in direction of travel, speed at front is 0.6 ms^{-1}



Wildfire modelling

- Scripts can use any raster/vector input data
  - Reprojection/rasterisation is carried out on-the-fly

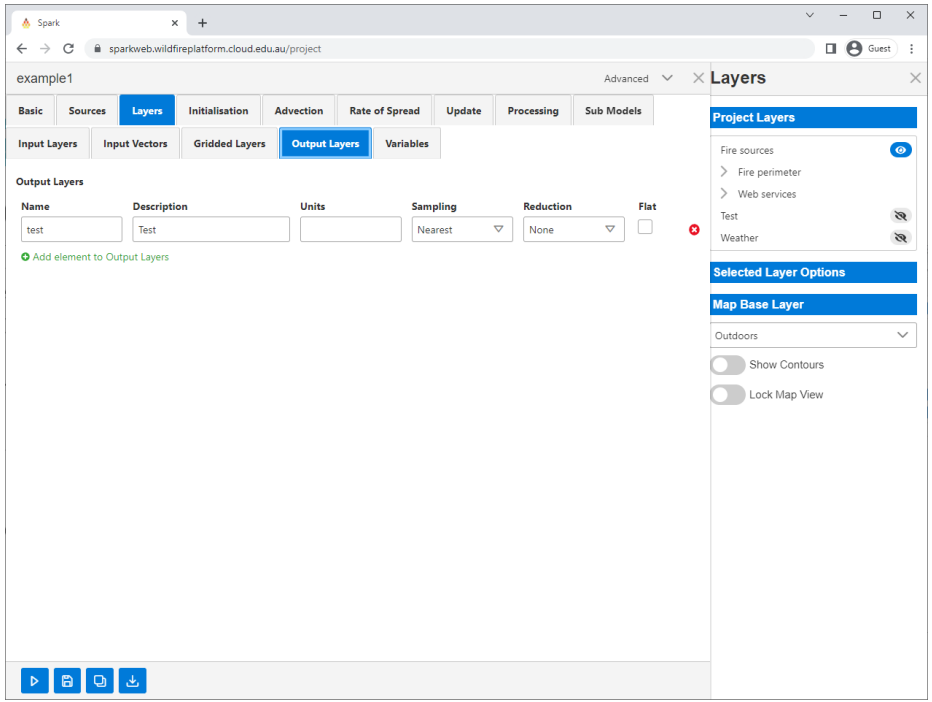


Wildfire modelling

- Scripts can use any raster/vector input data
  - Reprojection/rasterisation is carried out on-the-fly
- New layers can be defined:

```
test
```

  - Named layer appear in GUI



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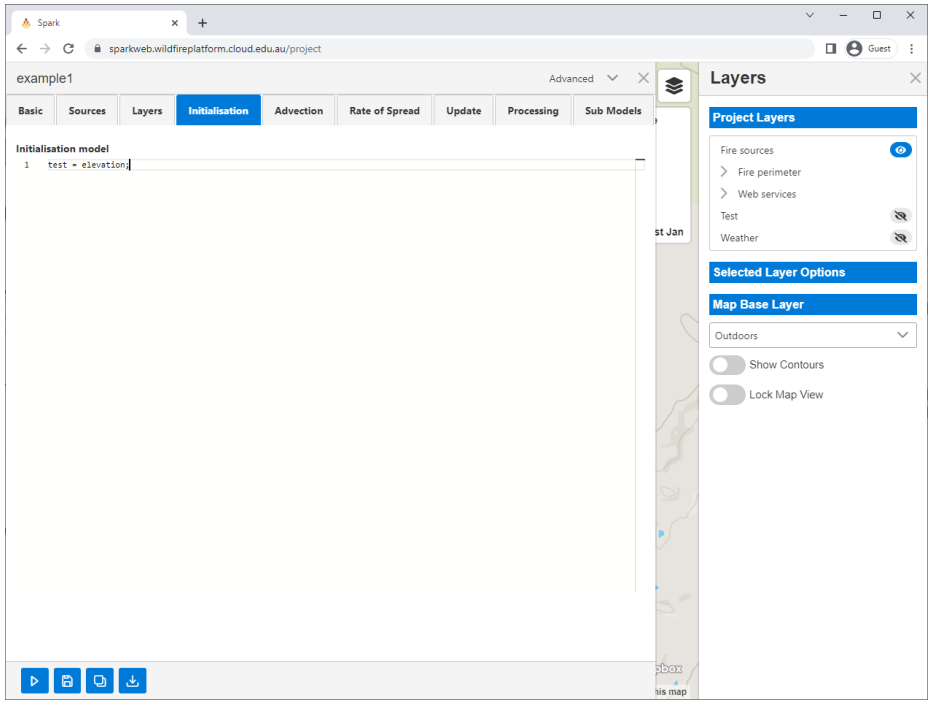
- Layers can be calculated/mapped:

```
test = elevation
```



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```
test
```

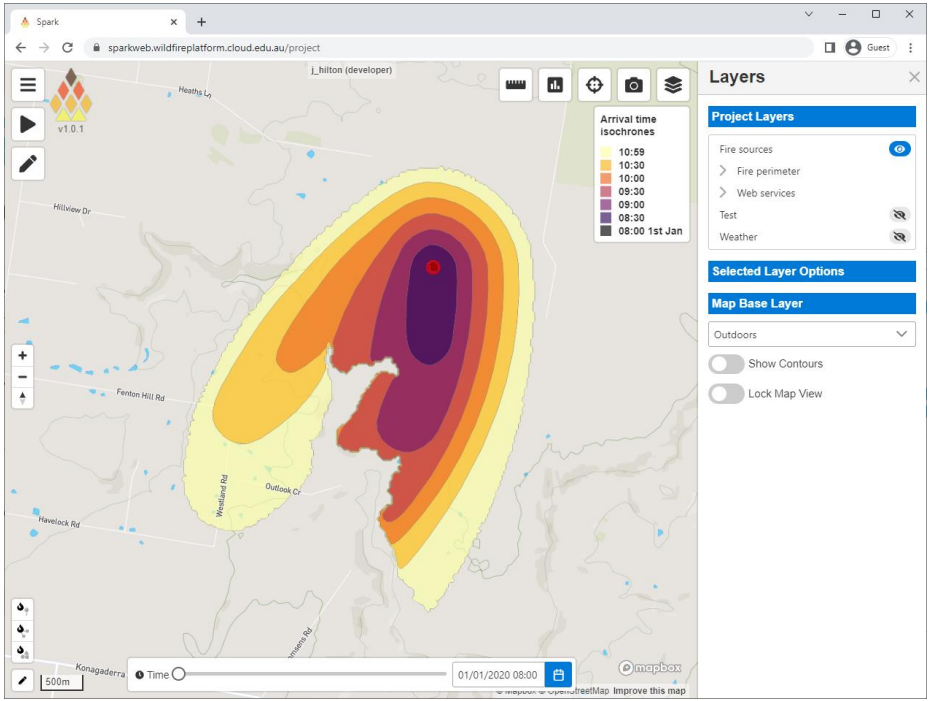
  - Named layer appear in GUI
- Layers can be calculated/mapped:

```
test = elevation
```

- Used in models:

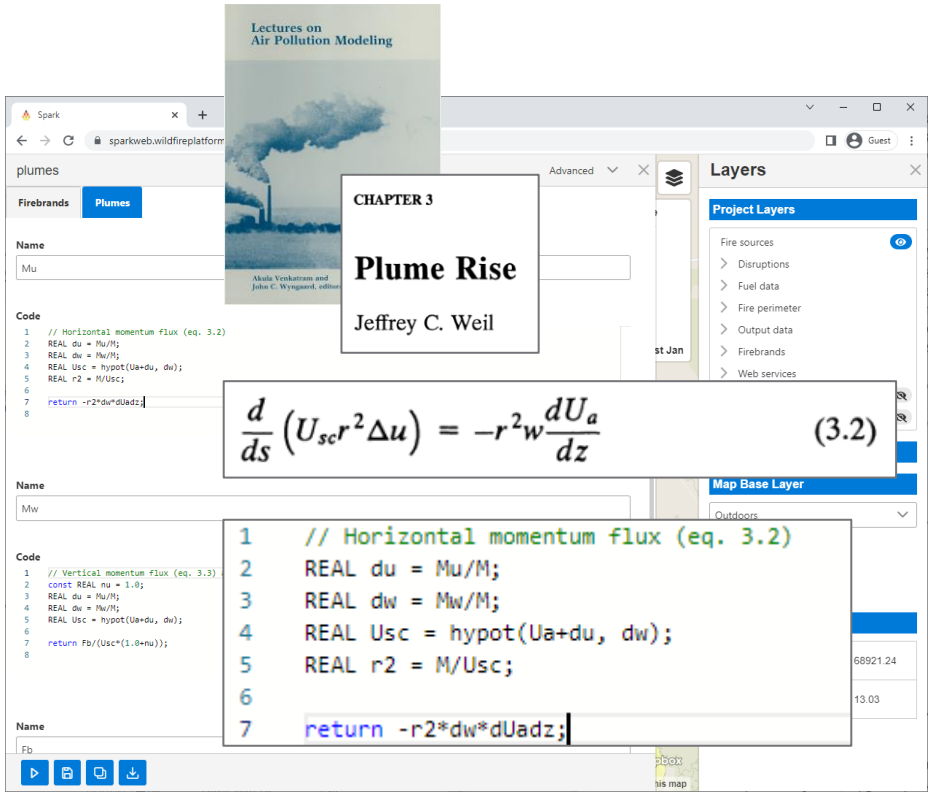
```
if (test < 225) state = 0;
```

  - This (example) stops the fire if the value of ‘test’ in a cell (equal to land elevation) is less than 255 m above sea level



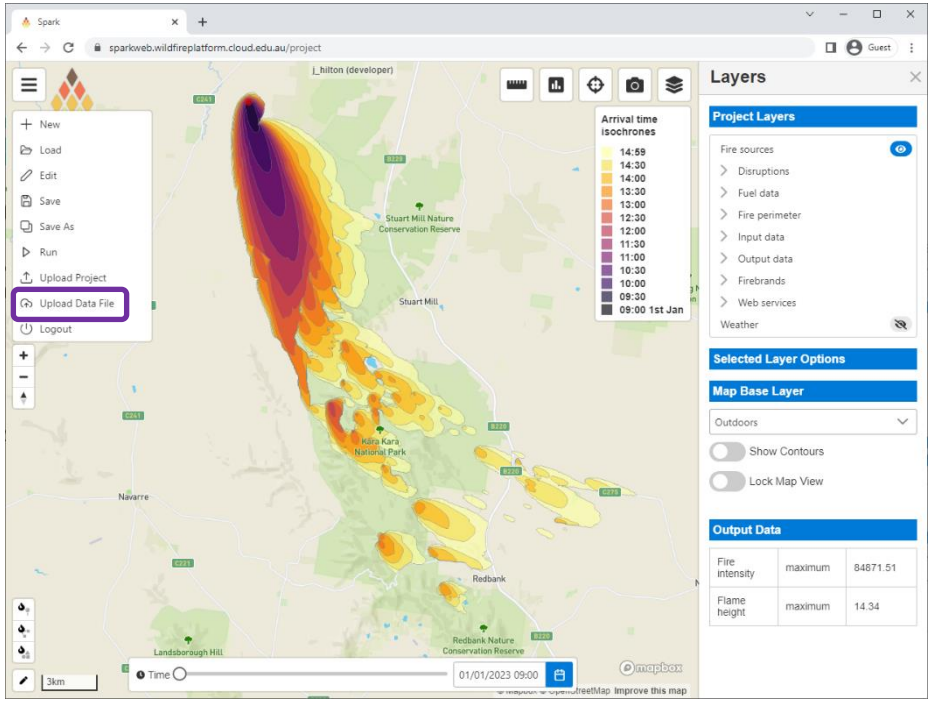
Wildfire modelling

- *All* models in Spark are expressed as scripts
- For example: plume model allows set of ODEs for a plume to be programmatically defined and calculated
- ODEs are complied at run-time and calculated for every patch of fire
- Complete flexibility to develop/test new modes



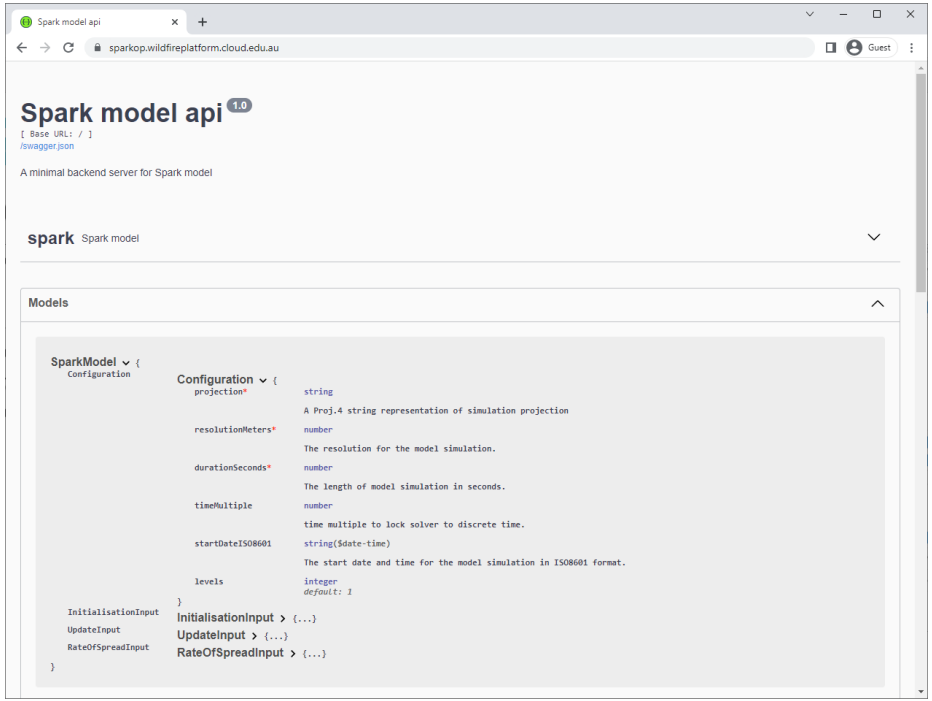
Wildfire modelling

- Projects can be downloaded as json, with all fire behaviour included as scripts
- Scripts can be shared and uploaded by other users
- Test data can be uploaded using the platform (< 250 Mb)



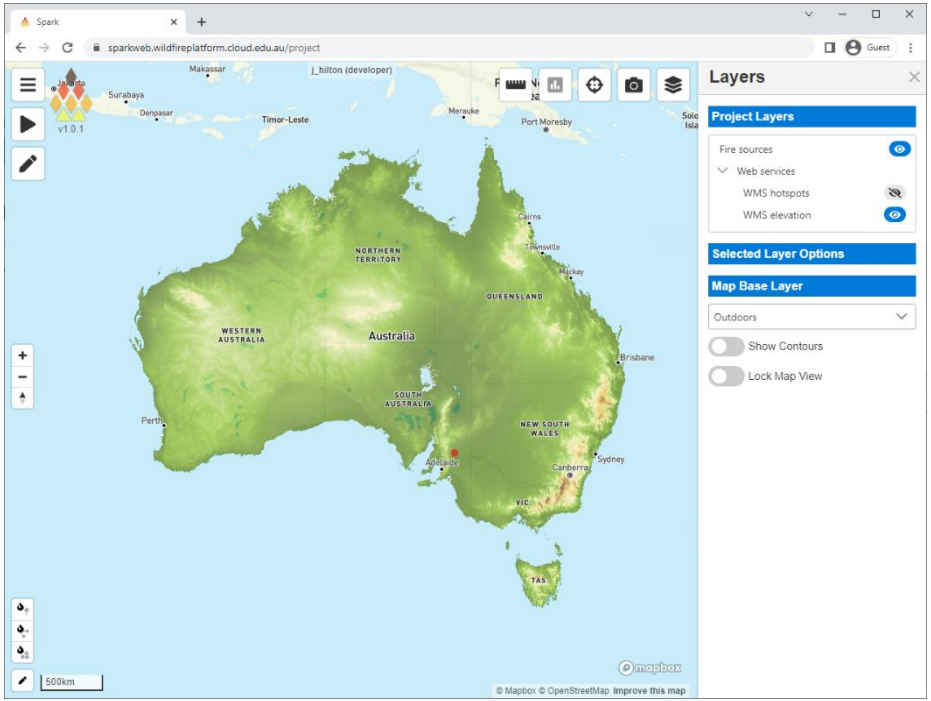
Wildfire API

- Spark uses API based on REST architecture
- Accessible at: https://sparkop.wildfireplatform.cloud.edu.au/
- API can be directly called for testing/risk model development/ML model outputs
- API call list:
  - Configuration
  - Set remote/local raster and vector sources
  - Set met data
  - Set scripts and output layers
  - Execution
  - Get output layers



Wildfire WMS layers

- Under development, due end of project
- Scripts for national wildfire calculations run on nightly basis
- Served as WMS layers into platform
- Infrastructure created, awaiting data feed from BoM.
- Examples:
  - FFDI
  - NFDRS
  - Remote sensing processing
  - Hotspots (GA hotspot layer shown)
- Placeholder 30 GA DEM used, generated nightly



Thank you!

Contact:

Spark team: spark@csiro.au

ARDC

BDC05

Framework for sharing bushfire data and tools between jurisdictional agencies

AFAC is the National Council for fire and emergency services

BDC05:Framework for sharing the bushfire data and tools between jurisdictional agencies

Project objective and vision:

- To deliver a robust and enduring framework to facilitate the development of new understanding of bushfire behaviour through simple access to core datasets.

This project is linked to BDC01 Aggregated and harmonised burnt extent fire history on a national scale, led by EMSINA and GA.

The governance framework will also be used to develop data sharing arrangements for BDC06, Aggregated and Harmonised Fuel Data on a National Scale (and other datasets)

What is AFAC

- The Australian and New Zealand National Council for fire, emergency services and land management.

- a collaborative network that supports the sector to make communities safer and more resilient.

AFAC publishes a suite of doctrine publications that are:

- evidence-based
- drawn from academic research and the collective expert knowledge of member agencies.
- constantly reviewed
- the official view of AFAC National Council and sector leaders.

Why does AFAC need a Data Governance Framework?

AFAC already independently collects and curates data from member agencies into national data sets:

- Australian Incident Reporting System (AIRSNAT) database to support national reporting on fires
- National Resource Sharing Centre database to support interstate and international deployments.
- Australian Fire Danger Rating System (AFDRS)
- Spark Operational bushfire fire spread simulator

Growing need to develop national data sharing and data hosting arrangements to :

- support national projects effectively and efficiently, and remove the need for each project to develop its own data sharing arrangements.
- provide researchers with access national collections to provide better research outcomes rather than separately obtain (sometimes inconsistent) jurisdictional data sets.

SCOPE

- lists the approach to data governance, and describes the legal, ethical and safe management of datasets, recognising the legislation, roles and responsibilities, policies and tools to deliver effective data governance.
- covers data governance for all of the AFAC data sets where data is collected from AFAC members and other sources to develop national datasets.
- does not include how agencies manage data within their own agencies, nor how data management is undertaken by AFAC as a business entity (e.g. HR data, finance data).

The Data Governance Framework is designed to:

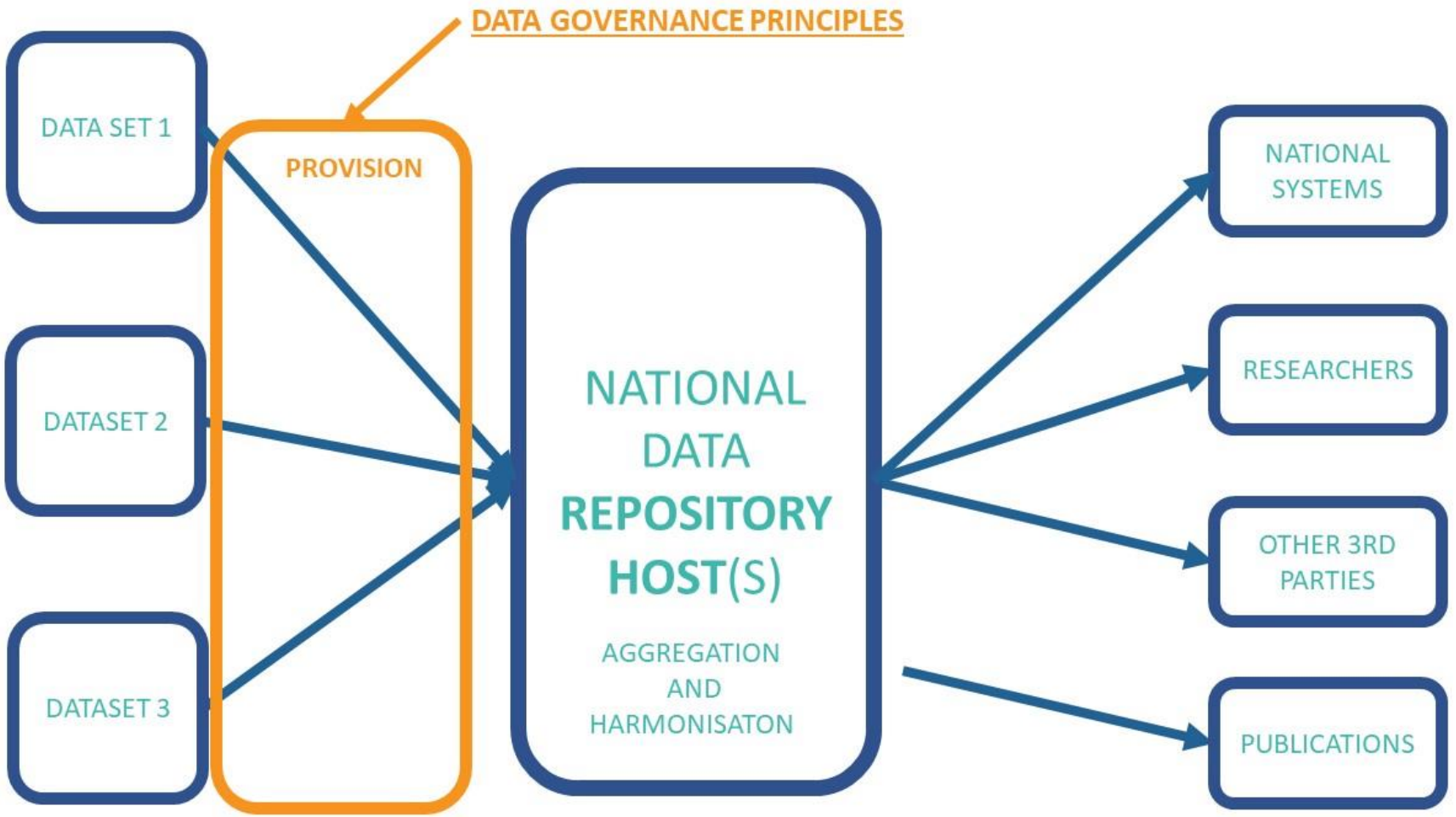
1. provide information to AFAC member agencies (and other organisations) who provide data to AFAC national data collections about the governance arrangements for the national data collections.
2. outline the governance requirements for sharing national data collections with AFAC members, researchers and third parties via licencing agreements
3. provide guidance to AFAC office members and any data hosts engaged by AFAC on their roles and accountabilities for the management of the national data collections

The Framework will ensure:

- strategic alignment of AFAC's data assets to current and emerging emergency service business and operational requirements
- compliance with relevant legislation, policies, procedures and standards
- confidence in the data used to inform decisions
- effective assurance and control of data management processes
- formalised roles and responsibilities
- protection of the data through documented policies and procedures, and ongoing communication, education and monitoring.

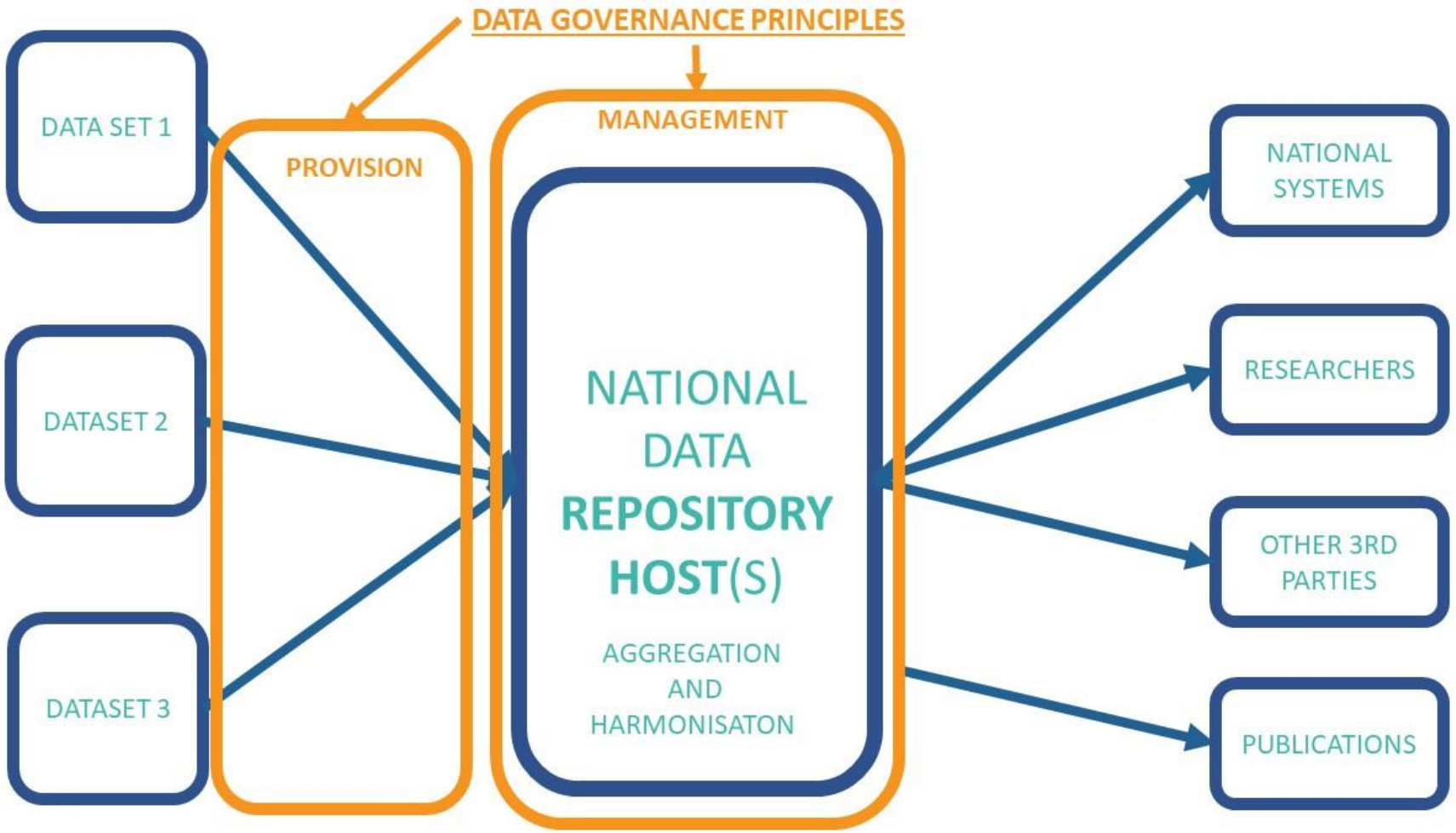
Framework specifies what considerations are required:

1. for the provision of data for national collections to either AFAC and onto the Data Host, or to the Data Host directly.



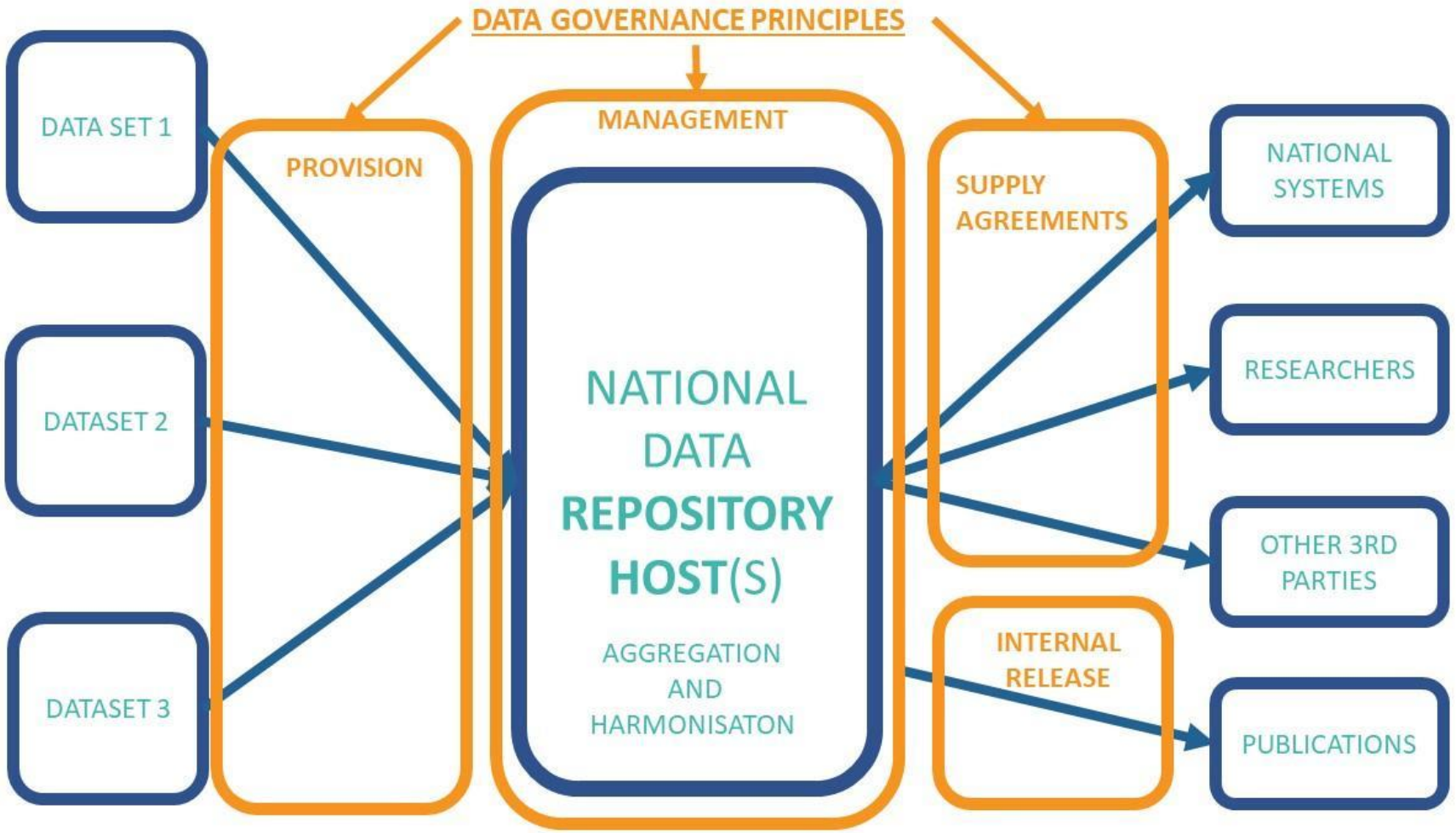
Framework specifies what considerations are required:

2. For the management of the national collections by AFAC or the Data Host



Framework specifies what considerations are required:

3. For the supply of data from the national collections through data sharing to third parties (e.g. national operational systems, researchers, etc) and release via publications



Framework describes:

- **Data Governance Principles**
- **Legal, Regulatory and Governance Environment AFAC Structures and Roles In Data Governance**
- **Systems and Tools to Support Data Governance**
- **AFAC Data Policies, Guidelines and Procedures**
  - **Creating a new National Collection**
  - **Provision of data by jurisdictions**
  - **Management of National Collections**
  - **Data Security**
  - **Data Sharing and Release**
  - **Data archiving, return, Collection Retirement and Destruction**
- **Compliance**

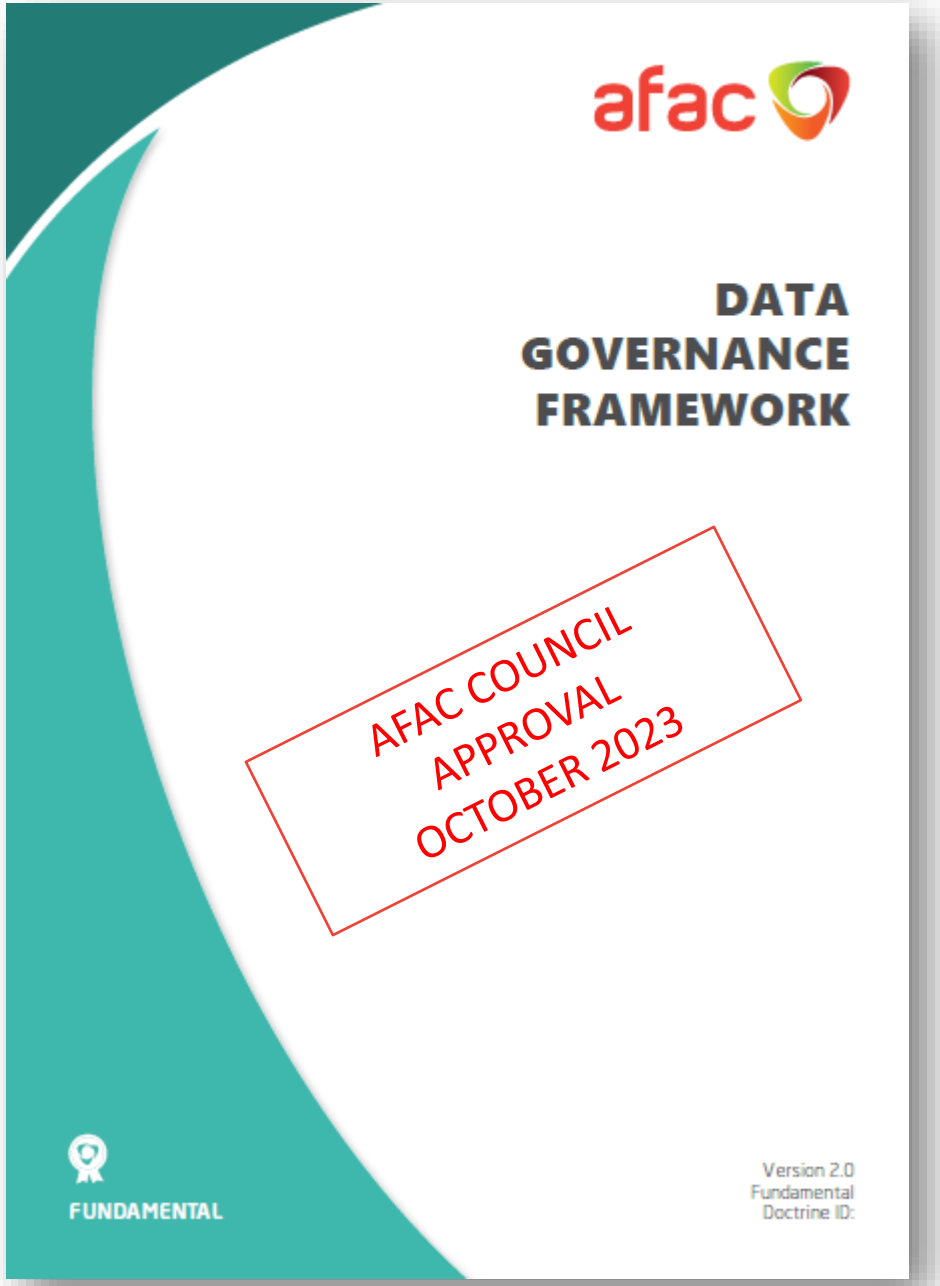
Other supporting doctrine

The Data Governance Framework will be supported by the following other AFAC doctrine:

- Data Management Guidelines (in prep)
- Data Quality Assessment Guideline
- Data dictionaries, including:
  - National Damage Assessment Data Set and Dictionary for Phase 2 Assessments
  - Landscape Fires Performance Measures Data Dictionary
  - Fire History Data Dictionary
  - Bushfire Fuels Data Dictionary (in prep)
  - Current Incident Feeds (Extent) Data Dictionary (in prep)
  - AIRS National Database Data Collection Specification July 2022 Version 4.0

Where are we at?

- Draft circulated to:
  - AFAC Predictive Services Data Working Group
  - EMSINA (Emergency Management Spatial Information Network Australia,
  - AFAC Operational Performance Technical Group,
  - Natural Hazards Research Australia.
- Revision currently underway
- Endorsement by AFAC Predictive Services Group
- Approval by AFAC Council (October 2023)



Impact

Bushfire Data Commons Forum #4

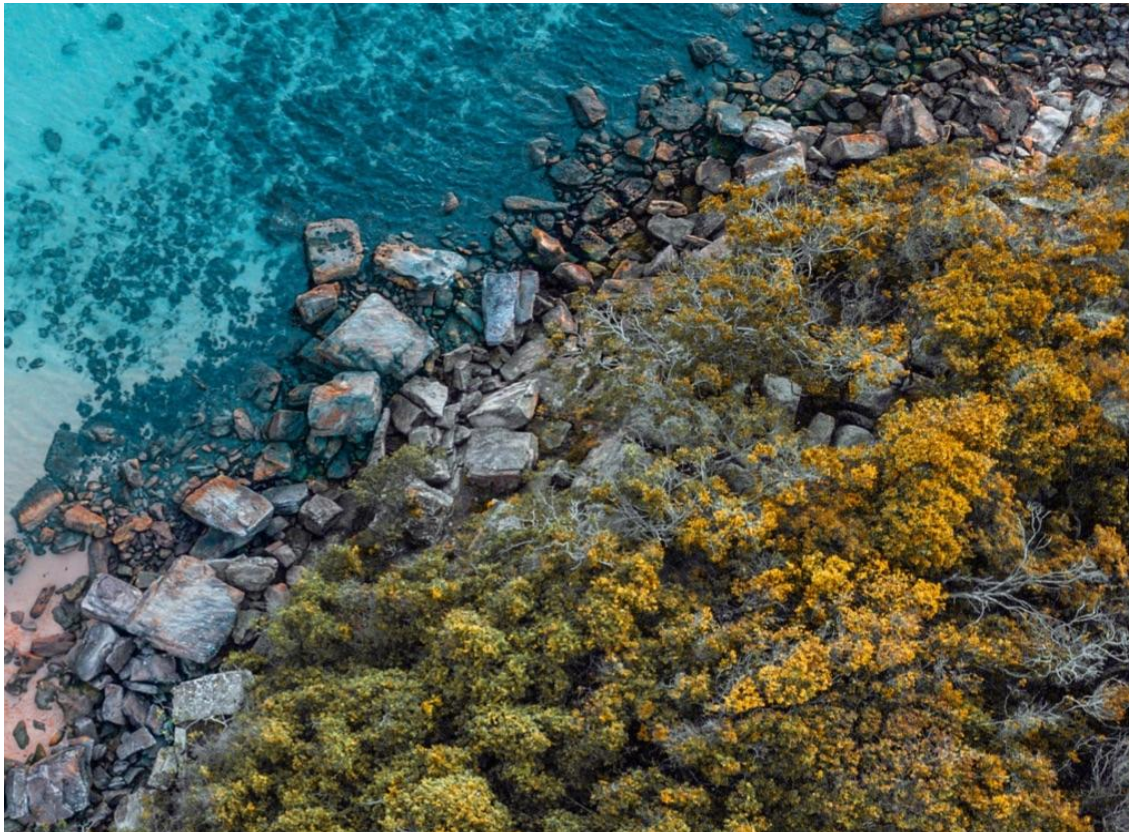
17 May 23

PRESENTED BY

Kylie Black
Liv Shanahan

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge and celebrate the First Australians on whose traditional lands we meet, and we pay our respect to their elders past, present and emerging.



The what and why of Impact?

Why should we plan, measure and evaluate impact?

- Accountability
- Allocation
- Analysis
- Advocacy

"An effect on, change or benefit to the economy, society, and environment, beyond those contributions to academic knowledge"

- CSIRO

"Intended and unintended long-term effects of activities using the resources or outputs of a research infrastructure or work performed by research infrastructure staff"

– Griniece, E, et.al, RI-PATHS

Impact pathway

Impact pathway

- Resources to deliver activities

- People
- Funding
- Equipment/facilities
- Partners

Impact pathway

- Resources to deliver activities

- Actions or work
- Utilise inputs
- Achieve outputs

- People
- Funding
- Equipment/facilities
- Partners

- Programs, projects
- Collecting data and samples
- Developing platforms, materials
- Providing expertise

Impact pathway

- Resources to deliver activities
- Actions or work
- Utilise inputs
- Achieve outputs
- Project deliverables
- From completed activities

- People
- Funding
- Equipment/facilities
- Partners
- Programs, projects
- Collecting data and samples
- Developing platforms, materials
- Providing expertise
- Creation of new research infrastructure
- New uses for existing infrastructure
- Reports

Impact pathway

- Resources to deliver activities
- Actions or work
- Utilise inputs
- Achieve outputs
- Project deliverables
- From completed activities
- Short and medium term
- Changes resulting from outputs

- People
- Funding
- Equipment/facilities
- Partners
- Programs, projects
- Collecting data and samples
- Developing platforms, materials
- Providing expertise
- Creation of new research infrastructure
- New uses for existing infrastructure
- Reports
- Data infrastructure uptake
- Capacity and capability change
- Building awareness
- Policy/strategy change
- Practice change
- Reputation and trust

Impact pathway

- Resources to deliver activities

- People
- Funding
- Equipment/facilities
- Partners

- Actions or work
- Utilise inputs
- Achieve outputs

- Programs, projects
- Collecting data and samples
- Developing platforms, materials
- Providing expertise

- Project Deliverables
- From completed activities

- Creation of new research infrastructure
- New uses for existing infrastructure
- Reports

- Short and medium term
- Changes resulting from outputs

- Data infrastructure uptake
- Capacity and capability change
- Building awareness
- Policy/strategy change
- Practice change
- Reputation and trust

- Longer term change or benefit
- Economic, environmental, or social

- Economic: eg local, national, or global level
- Environmental: eg ecosystems, land, air, & water
- Social: eg improved human health & wellbeing

Today’s focus: indicators/measures

How will you know when you have achieved these outcomes?

- Focus on indicators/measures to get data to report on outcomes, which lead to long term impact
- May be qualitative or quantitative, ongoing or point in time
- Where possible, set up automated systems during the project
- Capture baseline data

After the break - developing indicators in topic groups

- Miro board for each group of projects
- Pre-populated with each group's outcomes (=use cases from the project documentation) and outputs (=work packages)
- Task 1 - consider long-term impacts of projects
- Task 2 - edit/update the outcomes and outputs and add any more outcomes/outputs
- Task 3 (main goal for today) - determine the measures/indicators needed to provide evidence of those outcomes
- Briefly report back to the other groups

Breakout rooms

1 - Species (Jo)

- Curated biodiversity data, ALA
- Reference Genome Atlas, ALA
- Invertebrate species traits, Invertebrates Australia

2 - Air quality, health, fire history (Kylie)

- Burnt extent fire history, GA
- Air Quality, NATAG
- Health outcomes, AIHW

3 - Fuel (Liv)

- Observation and research fuel data, TERN
- Remote sensing fuel data, ANU
- States fuel data, AFAC

4 - Platforms (Sheida)

- Bushfire behaviour modelling platform, CSIRO
- Bushfire Impact platform, University of Melbourne

5 - Frameworks (Stefanie)

- Sharing data and tools between jurisdictions, AFAC
- Research Data Management Plans, NHRA

Stakeholders external to the project working groups are welcome to choose any breakout room to attend, if they wish.

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