ARDC National Fire History Project – 2021 to 2023

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

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Purpose

The ARDC bushfire data commons project: "Aggregated and harmonised bushfire extent fire history data on a national scale", aims to support jurisdictions in providing nationally consistent near-real time operational bushfire and fire history data. This will enable a comprehensive picture of current incidents allowing better informed decision making across Australia.

Near-real-time and fire history data is used across the emergency management sector for operational planning, response and research priorities. This work is aimed at projects that address various State and Federal government recommendations including, the Royal Commission into Natural Disaster Arrangements 2020.

The project is part of the ARDC Stream 1 funding and is broken down into multiple different work packages. Work Package 1 (WP1) is the finalisation of the gap analysis for various fire related datasets including:

- Current bushfire incident mapping and feeds: Capturing burnt area in near real-time and providing feeds for use in Common Operating Pictures (COPs). The Operational Bushfire Boundaries Gap Analysis is attached to this document as Appendix 1.
- Current fire season burnt area: a dataset showing the final extent of fire scars that have occurred in the current fire season.
- Fire history: The final known extent of fires for each jurisdiction prior to the current season (Fire history includes bushfires and prescribed burns).

The current bushfire incident polygon feed from the states and territories is the highest priority piece of work. The next priority is collating the current season to date fire history for jurisdictions from their current incident feeds. Fire History and any subsequent derived datasets then fall into subsequent priorities. This gap analysis focuses on current bushfire data.

Gap Analysis: Current Incident Feeds

Following the 2019-20 'Black Summer' EMSINA undertook an initial gap analysis of current bushfire and fire history data capture and provision capability across Australia. This analysis provided a base line of capability to the Commonwealth and helped initiate this project. EMSINA Gap Analysis - April 2020

The updated gap analysis for 2021-22 identifies the states and territories unable to capture near real-time bushfire extents and provide them as a webservice for national aggregation. Some jurisdictions are missing attributes in their current polygon feed but can provide a majority of attributes identified for the aggregated product. While other jurisdictions need uplift to provide either consolidated multi-agency state-wide bushfire boundaries or some key missing attributes.

The three states found to have capability gaps were Western Australia (WA), Northern Territory (NT) and Queensland (Qld). All other states were able to provide a feed to the national aggregator.

The information contained within Table 1 shows the status of current Incident data including the incident point and polygons (operational bushfire boundaries) and associated products and feeds.

Table 1 - Current incident point and polygon data and feeds

Jurisdiction and Lead Agency	Current Incident point feed	Incident Polygon (near real-time)	Polygon creation for season	Single State Polygon Feed	Public warning system with fire shapes
ACT (ESA)	Yes	Yes	Yes	Yes	Yes
NSW (RFS)	Yes	Yes	Yes	Yes	Yes
NT (PFES)	Yes	No	Yes	No	No
QLD (QFES)	Yes	Partial	Yes	Partial	Yes
SA (CFS)	Yes	Yes	Yes	Yes	Yes
VIC (DELWP)	Yes	Yes	Yes	Yes	Yes
WA (DFES)	Yes	Partial	Yes	No	Yes
TAS (TFS)	Yes	Yes	Yes	Yes	Yes

The primary objective of this project is to enable all Australian states and territories to be able to create and supply a single Bushfire boundary feed in near real-time.

Below is a summary of the capability gaps identified for the states and territories which are not currently supplying a single near real-time data feed.

Western Australia:
- WA has the capability to produce near real-time incident feeds, but previously did not release this data due to data licensing issues.
- The release of bushfire extents is currently being resolved by the WA Government, once this is finalised, bushfire extents will be shared with other jurisdictions.
- The Emergency WA website displays this data publicly.

Queensland:
- Queensland Parks and Wildlife Service and Partnerships (QPWS&P) capture current bushfire extents, but access to this near real-time data is internal only.
- A nightly supply of incident extents is provided to Queensland Fire and Emergency Services (QFES).
- QFES curates the shared data feed and publishes the feed to their COP and for national aggregation.
- QFES capture operational fire boundaries for incidents.
  - Data capture is focused on populated areas.
  - Fires in the remote parts of the state are rarely captured.
- Improvements in data interoperability between the different fire management agencies and their editing functionality could be explored.

Northern Territory:
- NT currently doesn't have a near real-time bushfire extent or data feed. Only a bushfire incident point is available to be shared nationally.

Recommendation

To achieve a complete national operational bushfire boundary feed, it is recommended that:
- Northern Territory and Queensland be funded to enhance aspects of their systems and capability to allow them to capture this bushfire information, share it between agencies and supply a feed nationally.
- All states should be encouraged to work towards alignment with the proposed data dictionary for the national operational bushfire boundary feed.

Gap Analysis Current Incident Information

Current Incident Information review

The following section reviews the identified jurisdictions which had some capability gaps in their ability to capture, edit and provide current bushfire information. Some of the information captured will inform the Fire History Gap Analysis Report (Work Package 1 – Part B).

This additional information provides context on states capabilities and will directly influence the tranche of work on fire history and improving data capture. These areas include:
- Near real-time linescan availability
- Emerging technology: Near real-time airborne vector data
- Field data integration into systems
- Need for software / data processing improvements for mapping systems
- Need for hardware / network updates to improve performance
- Need for additional staff to maintain layers

Table 1 shows the current state of near real-time incident data. Additional interviews captured the current state of jurisdiction systems and identified the gaps in their systems and business processes. This information is captured in the discussion and tables below.

WP3 involves working with the two jurisdictions (NT and Qld), scoping their requirements for capturing, editing and sharing fire boundaries, identifying and proposing improvements to the systems and tools. Work will look at the interoperability of systems and data sharing between agencies within each jurisdiction. The proposed solution should incorporate the data structure developed in WP2 and WP4 for the minimum viable product (MVP) for the operational bushfire boundaries and the fire history feed.

Current incident feed (extent): Minimal viable product

The minimal viable product (MVP) for the current incident feed is a webservice providing a near real-time bushfire boundary. In WP4 the MVP and its associated data dictionary will be proposed for the current operational bushfire web feed and the attributes and data formats will be presented to the jurisdictions.

State current capabilities

Western Australia:

Western Australian fire agencies produce a near real-time operational bushfire boundary dataset. This data could be provided as a web service and it has all the attributes required for national aggregation. Provision of this feed is restricted due to agency licensing however Department of Fire and Emergency Services (DFES) is currently working through these licensing arrangements internally and with the other agencies including Landgate. Once approved the Emergency WA website will provide the current incident (polygon) feed.

Jurisdictional arrangements:

There are multiple agencies involved in fire management in WA. DFES is the lead fire response agency for the state, while Department of Biodiversity, Conservation, and Attractions (DBCA) is responsible for fire management on the Parks estate which includes bushfire response and prescribed burns.

Non-Operational Fire Boundaries:

Fires in remote parts of the state are not mapped by DFES or DBCA, especially if they are not incidents requiring an emergency response.

Fire scars are captured from satellite imagery by the agencies Northern Australia Fire Information (NAFI) and Landgate. This data capture is not near real-time and the data is mainly used for the collation of fire history. NAFI captures remote area fire boundaries. Landgate also capture hot spots in addition to burnt areas, however this data capture is dependent on the return schedule of the satellites. Landgate collates a year-to-date fire scars dataset on their website. Local government carry out prescribed burns in the more remote parts of WA, larger burns are mapped but the burn scars are not supplied centrally to the fire agencies.

Data Sharing:

DFES and DCBA share mapped fire extents. The current incident feed is included with emergency warnings in the Emergency WA website.

Recommendation:

WA is not recommended for funding for the uplift of bushfire boundaries as the data feed will be available once the licencing issues are resolved.
In WP4 the current incident feed would need to be separated from the emergency warning areas to meet the MVP.

Queensland:

A capability exists in Qld to capture, edit and distribute the current operational burnt area as a web service. Queensland Fire and Emergency Services (QFES) and Queensland Parks and Wildlife Service & Projects (QPWS&P) collaborate to ensure a single state bushfire boundary feed is supplied.

Jurisdictional arrangements:

In Qld there are multiple agencies capturing fire extent. QFES is the lead agency for bushfire response. QPWS&P is responsible for fire management on the Parks estate and manage prescribed burns and bushfire response.

Operational fire boundaries:

QFES record an incident location when attending fires and map the extent where possible. Remote fires are not mapped by QFES, particularly in Northern and Western Queensland, where large fires do not require a response. QPWS&P capture bushfire boundaries for parks and provide this feed to QFES. The final combined fire extent is shown on QFES public website.

In Northern Queensland, remote fires are captured by NAFI. The Department of Environment and Science (DES) also use remote sensing to capture fire extents and release a monthly fire scar dataset derived from Sentinel-2, this data is used by NAFI and QFES.

As NAFI doesn't collect remote sensing data in South-East Qld, QFES use other remote sensing platforms in this area. Fires can get mapped by both fire agencies, but QFES triage the data, choosing the best representation of the final fire extent.

Local government, other State agencies and private landholders have some fire management responsibilities. Due to the reliance on satellite imagery in some areas, QFES may not capture low intensity fires, due to the lack of sensitivity of the satellite data for under canopy burns. The responsible land management agency may capture these boundaries by other methods, but the data may not be aggregated through to QFES for inclusion in the state's fire history.

Systems:

Each agency runs their own ESRI enterprise environment, with QPWS&P utilizing DES's portal. QFES use the ESRI platform to capture fire boundaries in conjunction with the FME platform for data processing and data sharing. FME is used to filter out the non-bushfire boundaries such as warnings from the current data feed.

QPWS&P use the vendor product FLAME which is their land management system and this system provides some mapping capability.

Data Sharing:

All agencies share incident locations and fire extents via web services published via ArcGIS Online through a secure sharing group.

The QFES Incident feed is ingested directly from Triple 0 calls and is publicly available. This feed is currently consumed within the national COP, however the incidents are published as points only. QPWS&P have a near real-time point feed for fires occurring on the Parks estate. QPWS&P publish fire extents to QFES nightly through various data translation processes both in-house and through FLAME. QPWS&P burnt area data contains current and historical fires.

Linescan capability and integration:

Utilization of linescan data is manual, data is emailed from the contractor to QFES and then manually uploaded into the GIS system, to allow sharing with other agencies.

Table 2 - Queensland agency fire incident feed capabilities.

Agency	QFES	QPWS&P
Systems	- ESRI enterprise environment 3 agencies Ambulance, Police and QFES share ESRI licencing contract. - QFES maintains its own enterprise environment for emergencies. - ESRI image server not available - ArcGIS Pro - Geocortex - Collector - Avenza	- Flame is ESRI based tool with database integrated with ESRI server - FireOps web app - Avenza - DES manage portal licencing.
Inter-operability	- Operational boundaries are shared between QFES for QPWS&P via web services. Available across platforms. - AGOL data sharing group for all members of Queensland Disaster Management Arrangements (State Government agencies, all 78 Local Governments, Federal Government agencies)	- Process running on server for a daily sync from Flame - DES process data to include ignition date, safe date. - Use RSS feeds to supply QFES. - Access to AGOL through DES. - Use AGOL sharing groups with all agencies
Inter-operability Tools	- Use FME and ETL tasks. - QPWS supply burnt area data nightly. - QFES FME runs check every 5 minutes for data.	- ArcPy scripts on ArcServer. - Future plan for FME in cloud.
Field Collection	- QFES uses Collector (burnt area collection tool) 600 windows tablets deployed with Collector. - Currently only used by air observers. - No AIG capacity - Multiple platforms used for hot spot detection / observation	- Wide use of Avenza on tablets - Convert Avenza data to GPX and ingest into FLAME.
Desktop Editing	Can edit fire shapes in ArcGIS Pro	Only specialists have access to ArcGIS Pro.
Web Based mapping	- Geocortex - ESRI	- ArcGIS Portal - Fire observations web mapping app, twice daily capture for large fires. - FLAME land management tracker with an ESRI mapping interface.
Timeliness of data capture	- Most fires captured - Some remote fires are not captured	Dependent upon fire risk.
Operational fire boundaries	- QFES maintain their own layer - Current fire boundary feed contains bushfire and other data types such as warnings. - Each agency uses different data attributes, FME transformers are used to bring them into a common format. - Remote fires only captured in near real-time when aircraft with appropriate technology deployed.	- QPWS&P maintain their own layer. - Dependent upon risk. - Flame is ESRI based tool, fires are digitised from aerial imagery and the data exported as GPX. - Rangers digitise from supplied imagery. They also import GPX files from Avenza App. - Used for Situation reports, planned burns and wildfire response. - Data is live and synchronised daily.
Linescan capability and integration	- QFES use linescan data for some fires - Linescan process is not automated due to the lack of an image server. - First used in 2019 and now have ongoing capacity. - Processing done in ArcPRO at HQ.	- Use QFES capability - Supplied data integrated in FLAME. - Linescan image used on maps.
Non-operational fire boundaries / data	- Operational boundaries are not collected when there is no response. - Work needed between LGAs, private and industry to collect areas. - Time since last burn and Fire History are key datasets for fire planning. - There is no fire severity capability. - Fire boundaries for remote fires are captured retrospectively from remote sensing.	- Remote areas fires are captured by NAFI. - Situation Report creates a centroid every 10 minutes. - Centroid supplied to FME in QFES every 5 minutes by RSS feed.

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Agency	QFES	QPWS&P
Satellite data capture	▪ Sentinel-2 data. ▪ Himawari-8, (Plumes, hotspots). ▪ NASA fires (hot spots). ▪ Need an image server for a range of image processing ▪ Last time burnt uses (Landsat, Modis, Sentinel, ArcGIS) ▪ No burn severity tool. ▪ No AIG capability.	▪ Planet imagery for smaller burns. ▪ DES capture Sentinel 2 imagery and create a monthly fire scar dataset published as web feature service.
Lead Agency	Y	N
Training	▪ Set up training for ground observers.	▪ Priority in South-East Qld. ▪ IMT Resourcing issues especially for mapping specialists

Recommendation:

Queensland is recommended for funding to support system enhancement and capacity building in the development of a MVP data feed.

- QFES lead the development, automation and ongoing maintenance of a combined near real-time feed.
- Investigate a centralised fire mapping capability for QFES which can integrate and be utilised by other agencies and local governments across Qld.
- Investigate current infrastructure and interoperability between agency systems to improve data sharing.
- Investigate improvements to security to allow data sharing and access to enterprise systems.
- Investigate cloud-based mapping solution.
- QPWS&P investigate an alternative solution for providing timely operational fire boundaries.
- Develop a training program for IMT mapping officers and ground-based observers for prescribed burns and bushfire incidents.

Northern Territory:

Currently joint capability is being developed in the Northern Territory (NT) to capture, edit and maintain a current operational bushfire boundary. Fires are captured in urban areas predominantly, there is some data sharing between the agencies but no current capability to supply a polygon feed nationally.

Jurisdictional arrangements:

In NT, there are multiple agencies involved with fire management. NT Police, Fire and Emergency services (PFES) who are a tri-service organisation. The NT Fire and Rescue Service (NTFRS) provides urban and bushfire response predominantly around major urban centres within the NT Emergency Response Areas (ERAs). Bushfire NT is the lead agency for rural bushfire response and is part of larger Department of Environment, Parks and Water Security.

The majority of NT land area and bushfire responsibility falls on private land managers. Australian National Parks, Indigenous land management agencies and corporations and Department of Defence (DoD) are all major land managers. None of these organisations either map bushfires or provide data back to a central system. Carbon capture projects (in the Kimberley and Cape Yorke Peninsula) carry out wide-spread prescribed burning, but the mapped extents are not supplied to fire management agencies. Bushfire NT provides support to these projects in planning their prescribed burn programme, provision of this data would allow a more holistic and coordinated approach to prescribed burn planning.

Northern Australia Fire Information (NAFI) is a federally and state funded body, that captures fire scars and hot spots from satellites.

Operational Fire Boundaries:
During bushfire response for large incidents there is no dedicated mapping team centrally. Bushfires NT have limited GIS capacity and there is no pool of mapping staff from other agencies available to provide mapping support.
Firemapper has recently been purchased for use by Bushfires NT and PFES to help address this gap and capture fire boundaries and collaborate and share fire information between agencies via the app and desktop instances.

Satellite data capture:
NAFI is the main agency for satellite data capture for bushfires across NT. High resolution imagery is captured only for Northern Australia using MODIS, while lower resolution imagery is captured more frequently over the whole of NT (NOAA). NAFI automate their fire scar mapping and have a dashboard for fire scar analysis. But this data is dependent on the satellite return rate. Sentinel imagery is captured every 1-2 weeks, for Darwin, Katherine, Kakadu and Arnhem Land, due to the time delay, this imagery is mainly used for fire history compilation.
The carbon capture projects are capturing satellite imagery 2-3 times per week, but currently this data isn't being shared back to the fire agencies.

Data Sharing:
A single agency Department of Infrastructure, Planning and Logistics (DIPL) supports the whole of NT government ICT infrastructure. The current incident point data is supplied by Bushfires NT to PFES for the public facing web map. PFES is currently investigating the use of the "Fires Near Me" mobile application to provide incident information to the public in a more accessible manner.
NAFI provide hotspots and fire scars to other agencies. NAFI uses the Bushfire NT data to determine fire risk and their potential to impact on urban areas.

Table 3 – Northern Territory agency fire incident feed capabilities

Agency	PFES	Bushfires NT	DIPL
Systems	- ESRI - AGOL - Fire Mapper - different enterprise agreement to Bushfires NT. - Use hosted Gov't shared services NT Land Information Systems - PFES has separate service for sensitive information. - PFES domain ring fenced	- ESRI - Fire Mapper - different enterprise agreement to PFES. - Bushfires Emergency Management System (BEMS) (WebEOC) - Fire Incident Map (PFES)	DIPL is the central IT agency which provides data and geospatial services across government. It is central to the future solution for NT.
Inter-operability	NT LIS infrastructure services could be used by BushFires NT and PFES	- FireMapper – Can export operational markups in a range of formats. - FireMapper uses national standard symbology - BEMS – Can't export between FireMapper or ESRI software to BEMS directly.	
Inter-operability Tools	NT LIS have access to FME not currently utilised by PFES.	Upload fire extent via API (BEMS to Fire Incident Map) – within 10 minutes	

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	▪ FireMapper API could be shared with other agencies. ▪ PFES and Bushfires NT share data in FireMapper.		
Field Collection	▪ FireMapper capability in IMT.	▪ FireMapper is limited to areas where you can get reception to upload. ▪ FireMapper used to capture fire incident boundaries – some accuracy issues.	
Desktop Editing	▪ Using a desktop version of FireMapper. ▪ Hotspots annotated on screen.	▪ Need for direct export and edit functionality between FireMapper, ESRI products and BEMS. ▪ ArcMap ▪ Google Earth	
Web Based mapping	▪ Dashboard for fire scars. ▪ FireMapper is web based.	▪ AGOL ▪ BEMS	
Timeliness of data capture	▪ Remote areas fires are not captured. ▪ Some data needs sign off to be released.	▪ Remote area fires rarely captured. ▪ In Fire Protection Zone based on resourcing availability and remoteness.	
Operational fire boundaries	▪ Only attended fires are mapped. ▪ Urban areas (ERAs). ▪ NAFI data shared into FireMapper.	▪ Extents are drawn based on resource availability by ground or air operations.	
Linescan capability and integration	▪ Using drones with RPAS in some responses. ▪ Provides good operational assistance to hotspots. ▪ No linescan or AIG capability.	▪ No capability currently. ▪ Potential for a service during the NAFC contract period. ▪ No integration set up.	
Non-operational fire boundaries / data	▪ Using Firemapper for Prescribed Burns. ▪ Other Land Managers including commercial operations capture data for carbon credits. ▪ This data is not currently shared.	▪ NAFI captures fire scars	
Satellite data capture	▪ Satellite imagery major source of fire shapes. ▪ NAFI capture data every couple of days in fire season (Sentinel-2, Modis). ▪ Looking at Arora Tech and micro satellites.	▪ Dependent upon Satellite imagery. ▪ There is little incident mapping outside of priority areas.	
Lead Agency	▪ Y - PFES put out the feed for points. ▪ To be determined.	▪ To be determined.	
Training	▪ Informal Training for volunteers. ▪ No training packages.	▪ Informal training provided for FireMapper users. ▪ No further formal training established for this capability within Bushfires NT. ▪ Build capability through the 'spatial support group' peer-supported training.	

Recommendations

The Northern Territory is recommended for funding to support system enhancement and capacity building in the development of a current operational bushfire boundary feed.

- Northern Territory fire agencies need to agree on which agency will be the lead agency in supplying the combined feed.
- Investigate hosting options and targeted data collection.
- Investigate current infrastructure and interoperability between agency systems to improve data sharing.
- Investigate improvements to security to allow data sharing and access to enterprise systems.
- Investigate opportunities to increase the use of desktop mapping in the department.

- Develop mapping officer training program across the wider NT government agencies.
- Automate daily capture of satellite imagery and processing the fire scars.
- Investigate integration of field data collection (Firemapper) and satellite imagery into incident management or mapping systems (BEMS and Fire Incident Map (FIM)).
- Investigate how to improve reception in remote locations for data sharing.
- Integrate prescribed burn data from all agencies across the NT including carbon capture projects.

Appendix 1: Operational Bushfire Boundary Gap Analysis

Table **4** - Current Incident Information

P = Partial, * = Limitations

Jurisdiction /Agency	ACT	NSW RFS	NSW NPWS	Bushfire NT	PFES	QFES	QPWS&P	SA CFS	SA DEW	TAS NRE	TFS	DELWP	DFES
Current Incident point feed	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Current burnt area as a feed	Yes	Yes	Yes	Yes	No	Yes	Yes	P	P	Yes	Yes	Yes	No
Public warning system with fire shapes (eg Fires Near Me app)	Yes	Yes	Yes	No	No	P	No	P	P	Yes	P	Yes	No
Near real-time linescan availability	Yes	Yes	Yes	No	No	P	Yes	No	No	No	P	Yes	Yes
Field data integration into Systems	P	P	P	No	No	P	No	P	P	P	P	P	Yes
Need for Software/ data processing improvements for mapping systems	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Need for Hardware/ network updates to improve performance	P	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	P	Yes
Need for additional staff to maintain these layers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Create /show planned burns areas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	P
Operational/ unvalidated Fire history available season to date	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	P	Yes	P
Validated Yearly fire history - fire scar	Yes	Yes	Yes	Yes	No	P	Yes	Yes*	P	Yes	Yes	Yes	P
Validated Yearly fire history - severity	P	Yes	Yes	No	No	No	No	P	No	No	Yes	Yes	No
Validated Single State - combined agency - fire history	Yes	No	No	No	No	P	No	No	Yes*	Yes	Yes	Yes	No
Is satellite imagery available to create burnt area	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	P	P	Yes	P
Automated Fire Severity available	No	P	P	No	No	No	No	No	No	No	No	P	No

Definitions

Current Incident point feed: Agency/State has an incident point feed for all current bushfires - across their jurisdiction in near real-time.
Current burnt area as a feed: Agency/State has an incident polygon for all current bushfires - across their jurisdiction in near real-time.
Public warning systems with fire shapes: Agencies/State which have a publicly available app or website which shows current fire shapes and warnings in near real-time.

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Appendix 2: Agency Names

Table 5 - Agency Acronyms and Names

Acronym	Agency Full Name
ACT ESA	Australian Capital Territory Emergency Service Agency
ACT PCS	ACT Parks and Conservation Service
ARDC	Australian Research Data Commons
EMSINA	Emergency Management Spatial Information Network Australia
NAFI	Northern Australia Fire Information
NSW RFS	New South Wales Rural Fire Service
NSW NPWS	New South Wales National Parks and Wildlife Service
NT DIPL	Northern Territory Department of Infrastructure, Planning and Logistics
NT PFES	Northern Territory Police Fire & Emergency Services
NT FRS	Northern Territory Fire Rescue Service
BFNT	Bushfires Northern Territory
QLD DES	Queensland Department of Environment and Science
QLD FES	Queensland Fire and Emergency Services
QLD PWS&P	Queensland Parks and Wildlife Service and Partnerships
SA CFS	South Australian Country Fire Service
SA DEW	Department for Environment and Water SA
TAS NRE	Department of Natural Resources and Environment Tasmania
TAS TFS	Tasmania Fire Service
VIC CFA	Victorian Country Fire Authority
VIC DELWP	Department of Environment, Land, Water and Planning
WA DFES	Department of Fire and Emergency Services WA
WA DBCA	Department of Biodiversity, Conversation and Attractions WA

Appendix 3: Consultation Dates

Table 6 - Jurisdictional Consultation Dates

Date	State	Agency
03/08/2021	NSW	NSW NPWS, NSW RFS
10/08/2021	NSW	DPIE, NSW NPWS
18/08/2021	VIC	DELWP, VIC CFA
16/09/2021	TAS	DPIPWE, TFS
22/09/2021	ACT	ACT PCS
22/09/2021	WA	Landgate, DFES, DBCA
23/09/2021	NT	PFES, Charles Darwin University – NAFI, Bushfire NT
22/09/2021	SA	DEW, CFS
01/10/2021	QLD	QFES
11/10/2021	QLD	QFES
10/11/2021	NT	Charles Darwin University - NAFI
24/01/2022	SA	DEW
27/01/2022	QLD	QFES, DES, QPWS&P
04/02/2022	NT	DIPL, PFES
07/04/2022	QLD	QPWS&P
13/04/2022	QLD	QPWS&P, DES
26/05/2022	NT	Bushfire NT
27/05/2022	NT	PFES
06/06/2022	NT	Bushfire NT
22/06/2022	NT	Bushfire NT
30/06/2022	QLD	QFES, DES, QPWS&P