



Courtesy of Shaan Herbert

OZRI 2018

Incendo

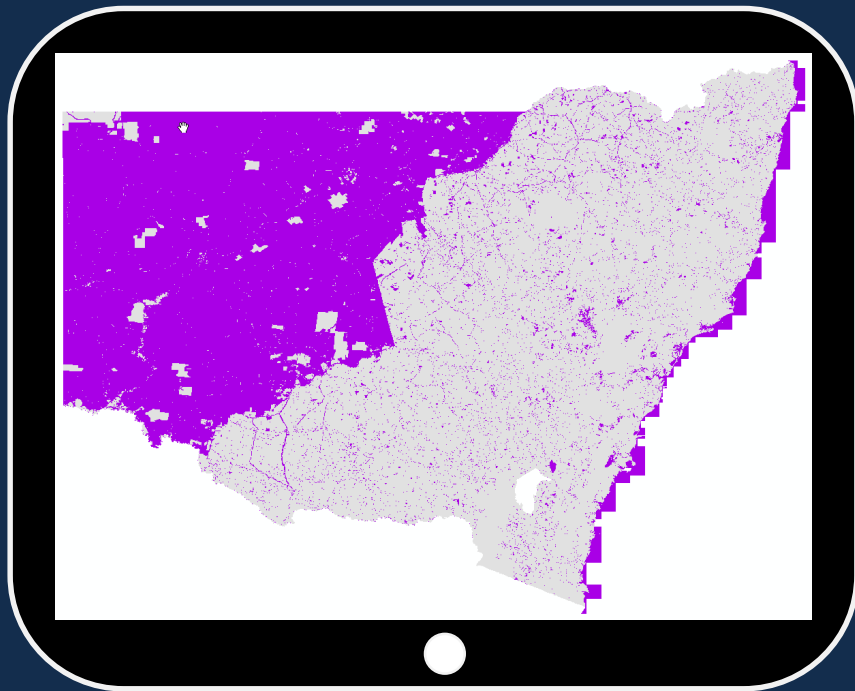


Innovating on a Grand Scale to Manage and Mitigate Bushfire Risk

About Us

Responsible for:

- 42% of NSW is Crown Land
- 35,000 Crown reserves & 54,000 Leases & Licences
- Includes: Parks, Reserves, Roads, Waterways, Cemeteries, Minor Ports, Walking Tracks, Camping Areas



Iconic Crown Land

Bondi Beach



Living Desert Sculptures



Hyde Park



Government House



Penrith Stadium



Bushfire Management

- Manages 170,000 hectares for bushfire mitigation
- Area for bushfire mitigation changes constantly
- Support role for trusts, lessees and licence holders of crown land



Bushfire Management

- Maintaining Fire Trails & Asset Protection Zones (APZ's)
- Strategies developed to protect assets through BFMC's
- Scheduling work, hazard reduction activities
- Annual Bushfire Risk Management Plan and Bushfire Mitigation Works Program
- 750 projects this financial year across NSW at \$6 million
- 450 of those projects are APZ works

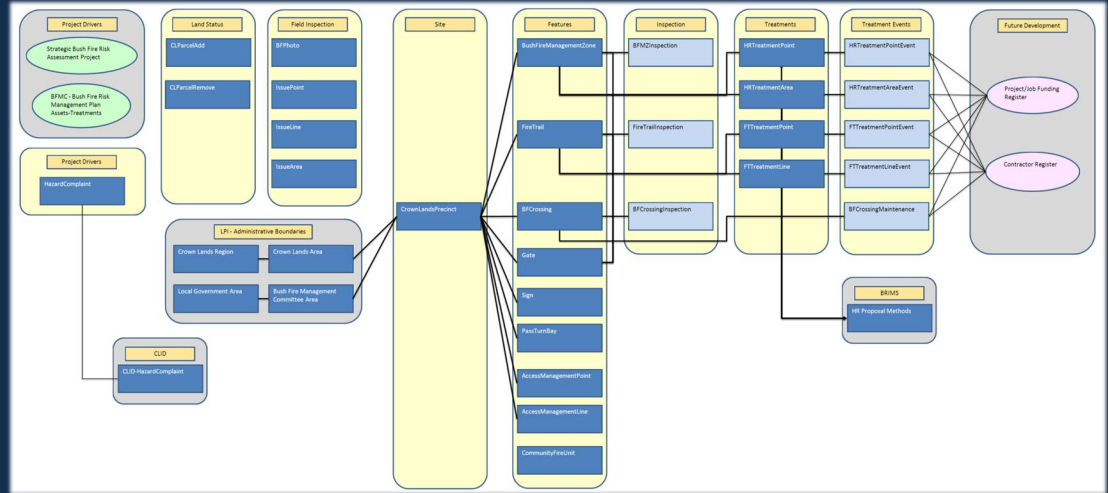


Courtesy of Anton Gorlin <https://antongorlin.com>

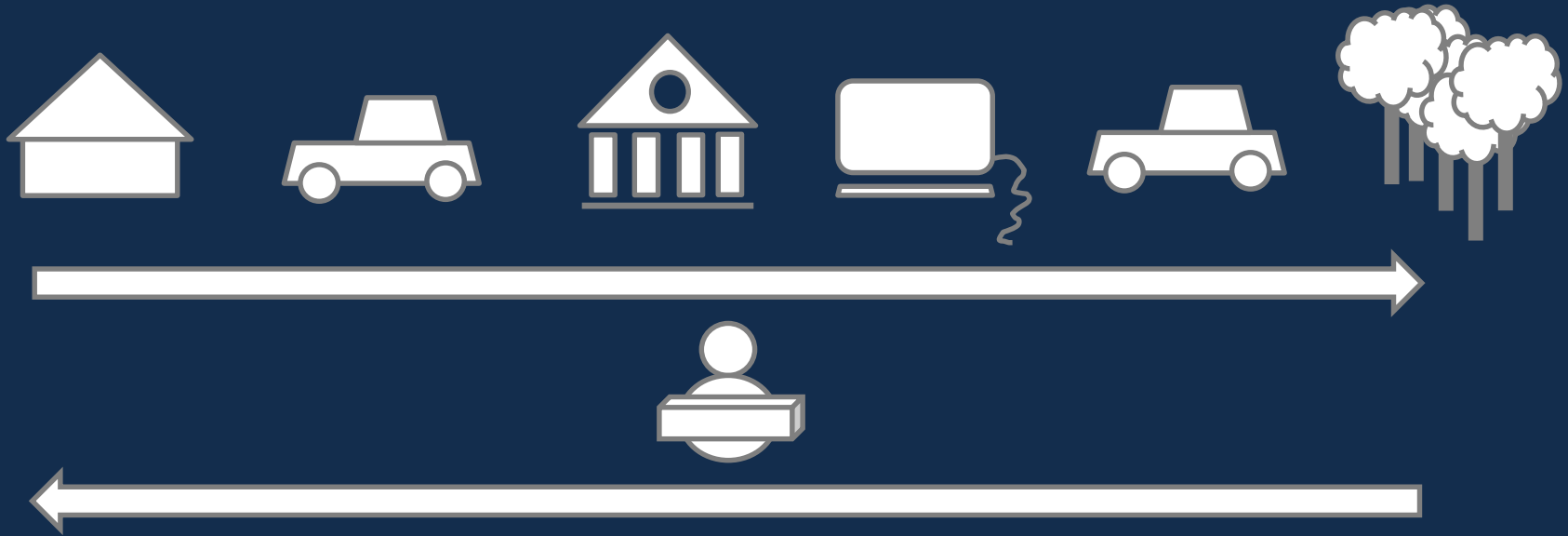
Past Issues

- Crown Operational Geodatabase (COG)
- GIS experience required for ArcMap & ArcPad
- Performance of ArcMap in regional areas
- Updating data in the field cumbersome
- Limitations on reporting

- Unfinished data schema



Past User Story



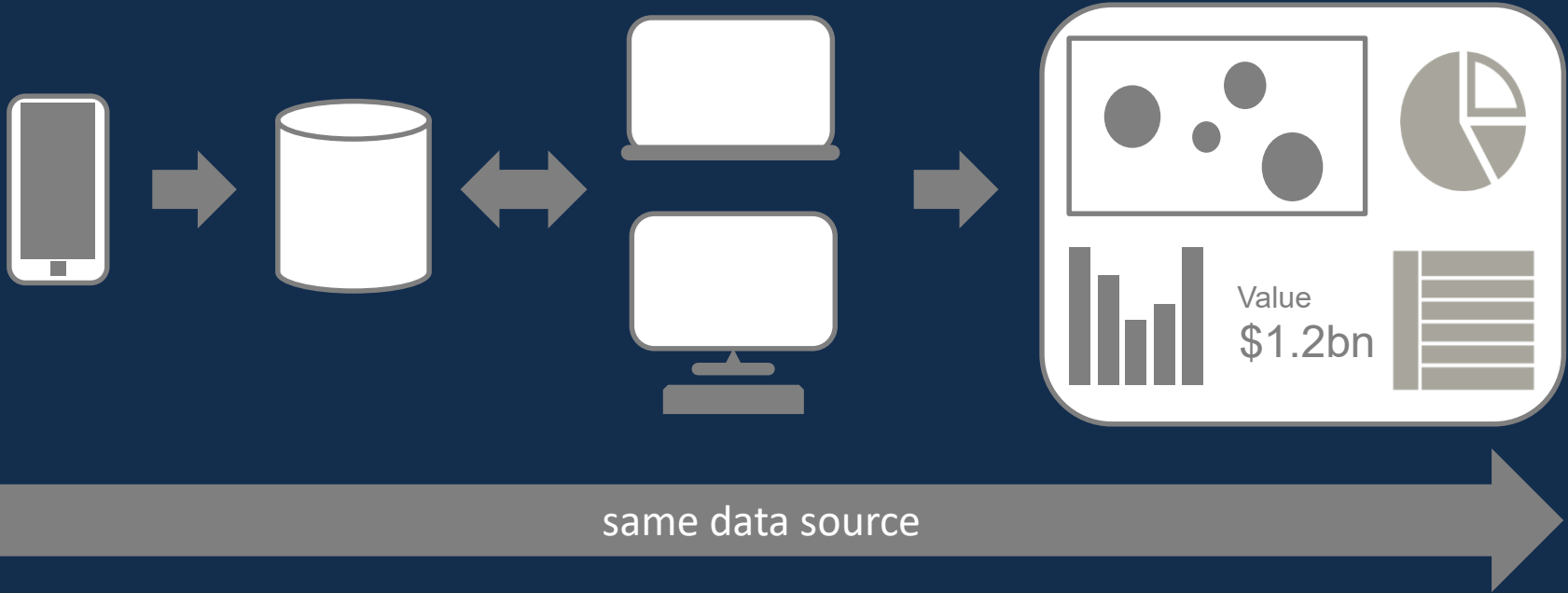
Where We Want To Be

collect

store

analyse/edit

report



Our Requirements & ArcGIS Online

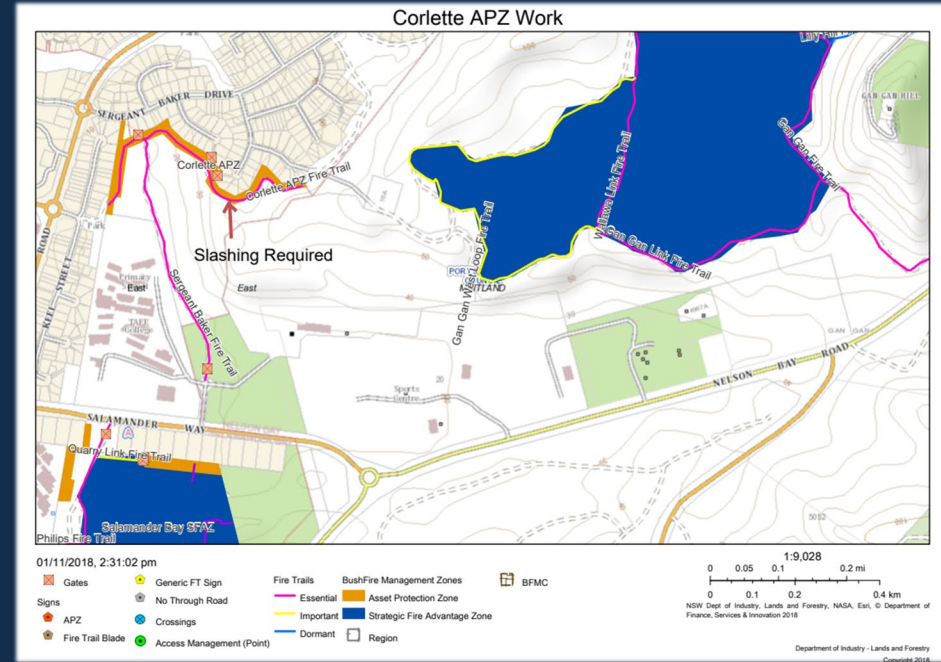
A review of bushfire asset principles that guide the use of spatial data

- Migrate data to Industry databases
- Access for multiple agencies
- Improve data collection
- Simplify creation & editing tools
- Reporting capability
- Live Dashboards



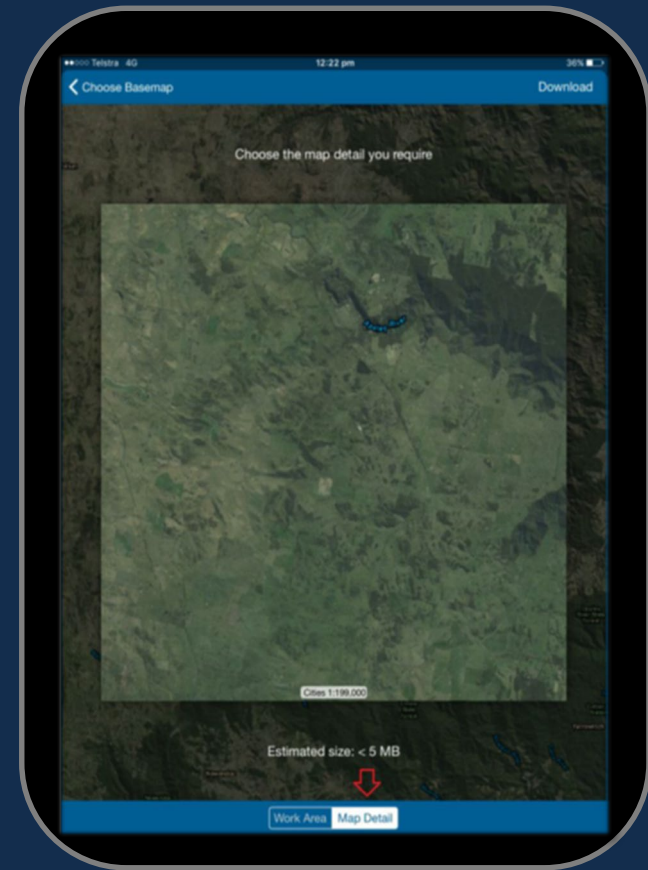
Our Requirements & ArcGIS Online

- Recording inspections & treatments
- Spatial record of assets & issues
- Displaying data for use in prioritising & planning
- Import & export data
- Viewing multiple data sources
- Print Maps



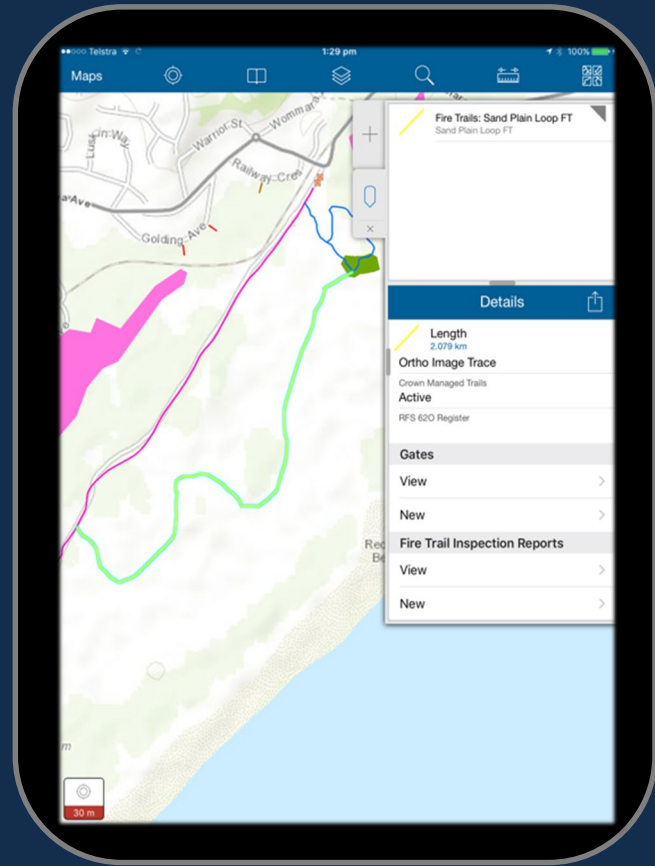
Incendo Mobile

- Incendo Collector App
- Used by contractors & Soil Conservation Service
- View variety of base maps & datasets
- Inspections & Treatments
- Simplified data collection & editing



Incendo Mobile

- Download maps & data for offline use
- GPS functionality (stream movements)
- Add geotagged photos to features
- Live data updates (online database)

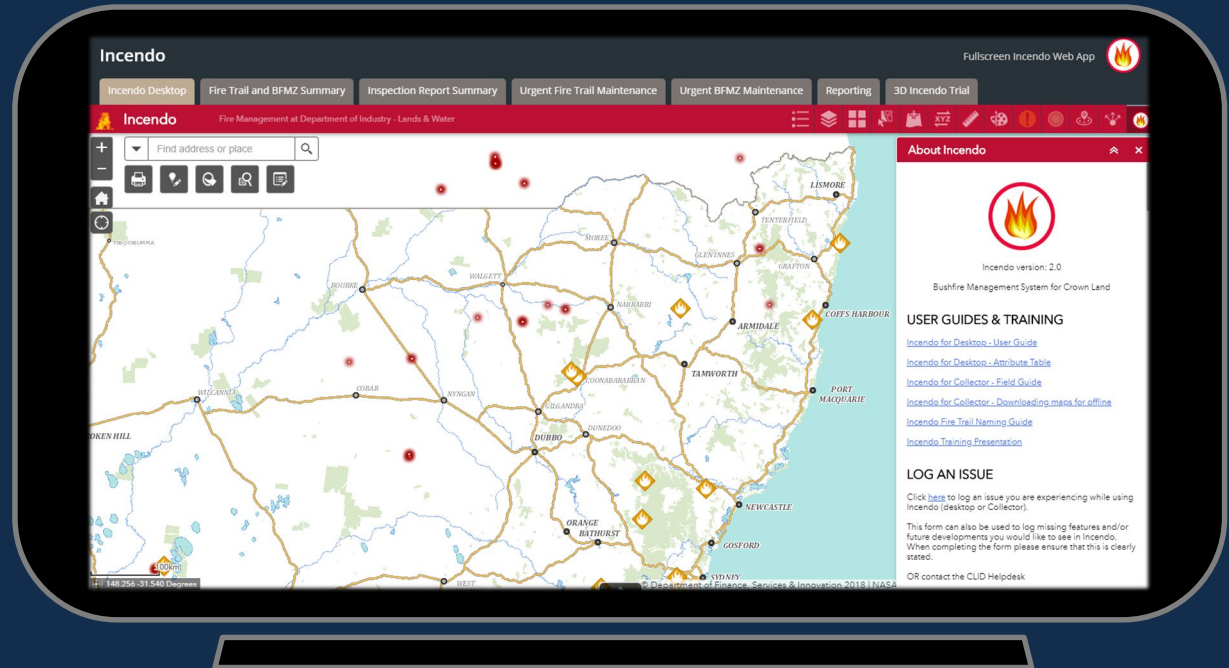


Incendo Web App

Web-based mapping application uses latest spatial technologies to deliver a fast, secure & user friendly interface.

Multiple Tabs

- Main Screen
- Dashboards
- Reporting
- 3D Map




Incendo Web App


Widgets Toolbar



- Summary tools
- Mark ups & measurements
- Share screen
- Co-ordinate conversion
- Search near me



Infrastructure Summary			⌵	✕
	Gates	50		
	▼			
	Signs	13		
	▼			
	Crossings	6		
	▼			
	Pass Turn Bays	2		
	▼			



Search Near Me

⌵ ✕

Search for an address or locate on map

Show results within 5 Kilometers

0 100

◀ Hazard Complaint

Information

Directions

Approximate Distance: 2.47 km

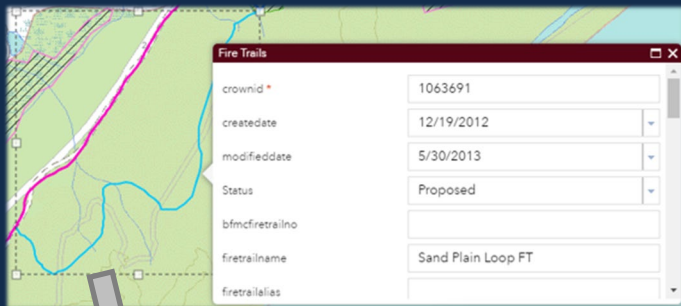
Hazard Complaint: rubbish

Create Date (pre migration) 7/30/2016, 12:48 AM

Complaint No rubbish

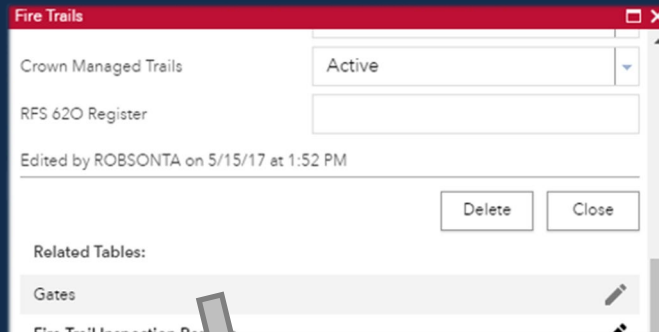
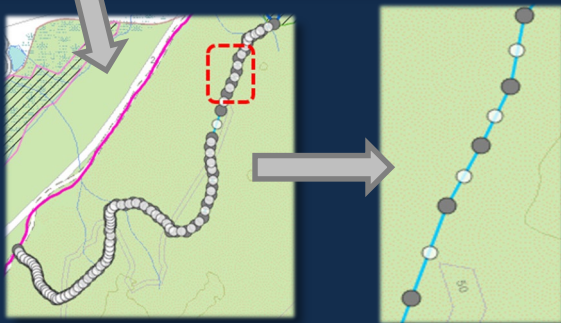
Incendo Web App

Creating & Editing Features



Fire Trails

crownid *	1063691
createdate	12/19/2012
modifieddate	5/30/2013
Status	Proposed
bfmcfiretrailno	
firetrailname	Sand Plain Loop FT
firetrailalias	



Fire Trails

Crown Managed Trails: Active

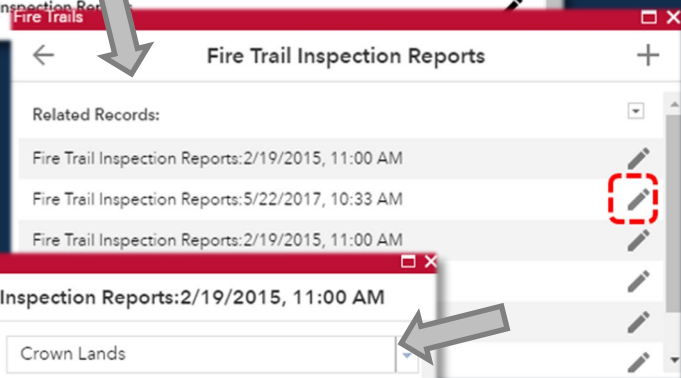
RFS 62O Register:

Edited by ROBSONTA on 5/15/17 at 1:52 PM

Delete Close

Related Tables:

Gates



Fire Trail Inspection Reports

Related Records:

- Fire Trail Inspection Reports:2/19/2015, 11:00 AM
- Fire Trail Inspection Reports:5/22/2017, 10:33 AM
- Fire Trail Inspection Reports:2/19/2015, 11:00 AM



Fire Trails

Fire Trail Inspection Reports:2/19/2015, 11:00 AM

Inspection Agency: Crown Lands

Inspector: C Frew & A Swan

Surface Condition: Good

Works Required: No work required

Incendo Web App

- Interactive attribute tables
- View related tables
- Filter / Sort / Zoom to features

Filter

+ Add expression + Add set

Display features in the layer that match all of the following expressions

Status (Number) is Completed

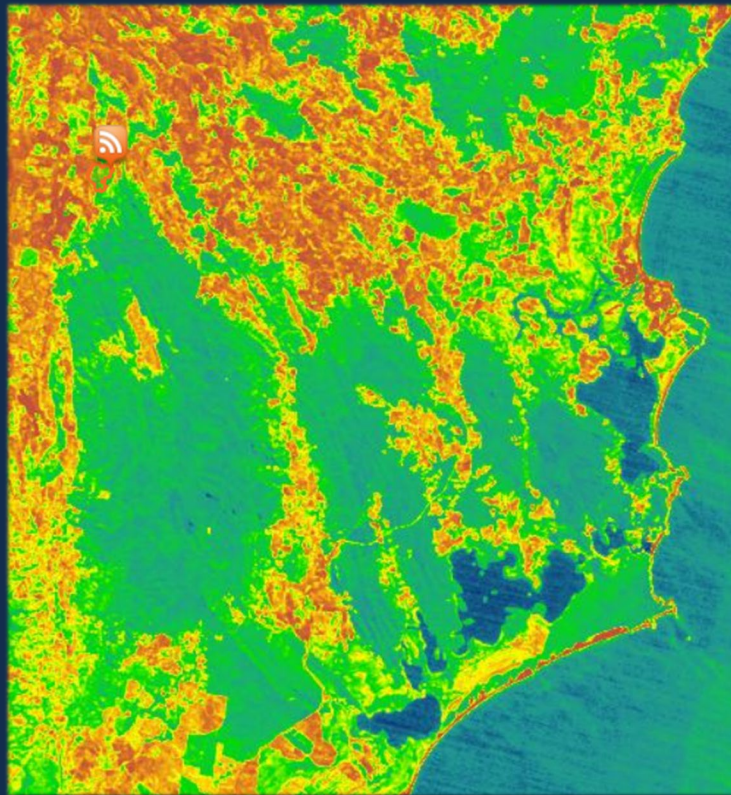
BFMZ Type (Number) is

- Asset Protection Zone
- Strategic Fire Advantage Zone
- Land Management Zone
- Fire Exclusion Zone

Gates	Signs	Pass Turn Bays	Crossings	Access Management (Point)	Access Management (Line)	Issue (Point)	Issue (Line)	Issue (Area)	Hazard Complaint	Treatments - Fire Trail (Point)	Treatments - Hazard Reduction (Point)	Treatments - Fire Trail
Options	Filter by map extent	Zoom to	Clear selection	Refresh								
crowid	Create Date (pre-migration)	Modified Date (pre-migration)	BFMZ Type	BFMZ name	Location Description	File Reference	Status					
1,036,939	12/21/2011, 7:05 PM	10/20/2016, 12:16 AM	Asset Protection Zone	Saville Row APZ, Kandos	Kandos Crown St	11/11169	Completed					
1,036,940	12/21/2011, 7:05 PM	10/20/2016, 12:16 AM	Asset Protection Zone	Saville Row (2) APZ, Kandos HR	Kandos	11/11169	Completed					
1,036,961	12/21/2011, 7:05 PM	10/19/2016, 11:46 PM	Strategic Fire Advantage Zone	Russell St SFAZ, Portland	Portland - Pt Lot 6 & 7/19/758855	10/15137	Proposed					
1,036,962	12/21/2011, 7:05 PM	10/19/2016, 11:45 PM	Strategic Fire Advantage Zone	Lawson St Portland SFAZ	Portland - Lots 8-14/17/758855 & Pt Lawson, Humphrey, Corlette sts.	OE06A2/10/15137	Proposed					
1,036,963	12/21/2011, 7:05 PM	10/19/2016, 11:46 PM	Strategic Fire Advantage Zone	Williwa St HR	Portland - Lots 7019/7020 DP 1073314, Williwa St, Portland	10/15606	Proposed					
1,036,964	12/21/2011, 7:05 PM	9/6/2016, 9:59 PM	Strategic Fire Advantage Zone		1-4 & 8-12/26/758891, Crown	10/15130	Proposed					

Data Types

- Polygon, Line & Point features
- Inspection & Treatments relationship classes
- Live RFS incident & fire detection feeds
- Landsat & MODIS Burn Scars
- Sentinel satellite imagery, Infrared & burn ratio



Reporting

- Customised tools created through Model Builder or Python script
- Published as Geoprocessing services
- Reporting assets within admin areas



The figure displays four screenshots of the Fire Management Decision Support System (FMDSS) interface, arranged horizontally. Each screenshot represents a different functional area:

- Infrastructure Summary:** Features a red circular icon with a white mountain and river. The toolbar includes 'Office', 'LGA', and 'BFMC' buttons.
- Treatment Summary:** Features a yellow icon of a bulldozer. The toolbar includes 'Office', 'LGA', and 'BFMC' buttons.
- Wildfire Summary:** Features a red icon of a wildfire. The toolbar includes 'Office', 'LGA', and 'BFMC' buttons.
- Inspection Summary:** Features a blue icon of a clipboard with a green checkmark. The toolbar includes 'Office', 'LGA', and 'BFMC' buttons.

Each interface includes a title bar with a close button (X), a header with the summary title and icon, a toolbar with 'Office', 'LGA', and 'BFMC' buttons, and a main area with 'Input' and 'Output' tabs, a 'Help' link, and an 'Execute' button.



Reporting

- Customised location reporting
- Data exports

Feature Reports

Bushfire Crown Land Issues

Select area to report on

Select draw mode

Choose selectable layers

Buffer distance (optional)

Show results within

0 Kilometers

Report Start Over

Data Export

Data Export Tool

Input Output

Select area to extract layer/s from*

Select layer to export*

☐ Fire Trail

☐ Bushfire Management Zone

☐ Treatments - Hazard Reduction (Area)

☐ Treatments - Hazard Reduction (Point)

☐ Treatments - Fire Trail (Line)

☐ Treatments - Fire Trail (Point)

☐ Crown Land

[Help](#)

Execute

Bushfire Management Zones

#	Name	Type	Status	Area(km²)
1	Three Hills	Land Management Zone	No Data	0.91
2	Barneys Reef Road	Land Management Zone	Current	0.59
3	Belmore Steet Crown Land HR	Asset Protection Zone	Current	0.03
4	Glen Rock Break	Strategic Fire Advantage Zone	Investigate	0.02
5	Railway Street Crown Land HR	Asset Protection Zone	Current	< 0.01
6	No Data	Strategic Fire Advantage Zone	Investigate	< 0.01
7	Cooks Gap Crown Land APZ	Asset Protection Zone	Current	< 0.01
8	Worobil Ridge APZ	Asset Protection Zone	Completed	< 0.01
9	Worobil Ridge APZ	Asset Protection Zone	Completed	< 0.01

Gates

#	Type	Status	Count
1	Light Swing Gate	Completed	1

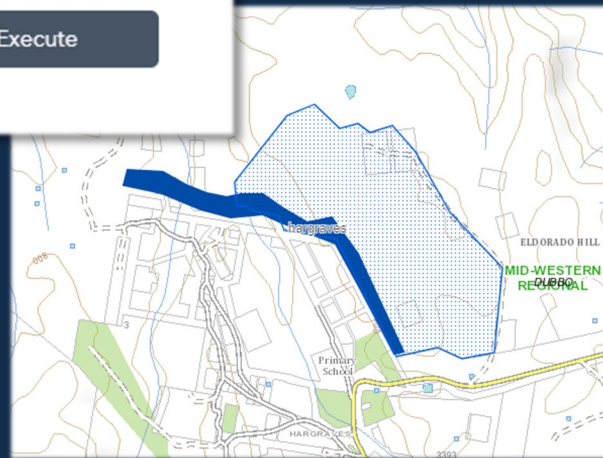
Signs

#	Type	Condition	Status	Count
1	Fire Trail Blade	No Data	Proposed	7
2	Fire Trail Blade	Good	Completed	4

Geoprocessing

Geoprocessing tool for data export

- Exports in custom shapefile format
- Projection & files adjusted
- Compatible with Rural Fire Service applications



Dashboards

Total Area of Bushfire Management Zones Managed by Crown Lands

74,574

Hectares

Last update: a few seconds ago

Total Length of Actively Managed Fire Trails by Crown Lands

647

Kilometres

Last update: a few seconds ago

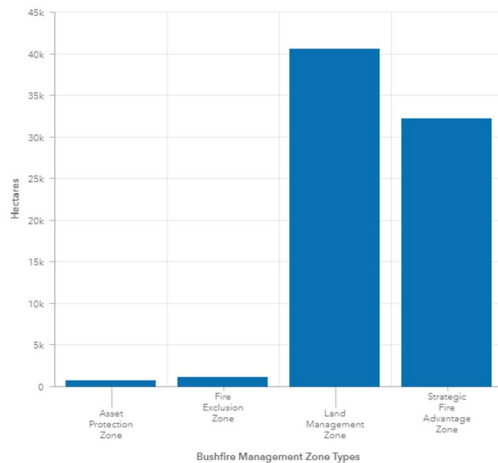
Total Length of Fire Trails on Crown Land

2,770

Kilometres

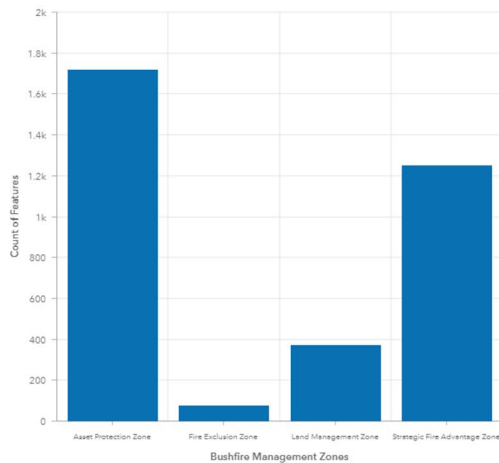
Last update: a few seconds ago

Total Area (ha) for Bushfire Management Zone Types



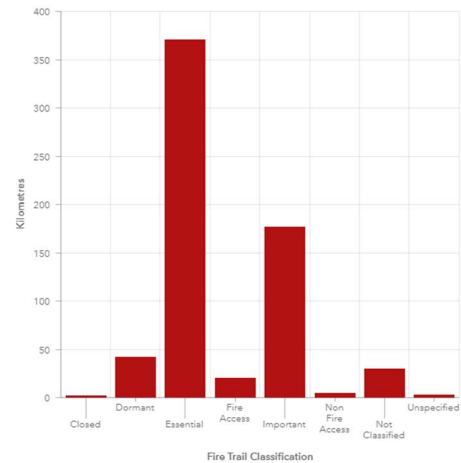
Last update: a few seconds ago

Total Count of Bushfire Management Zone



Last update: a few seconds ago

Total Length of DoI-Lands Actively Managed Fire Trails

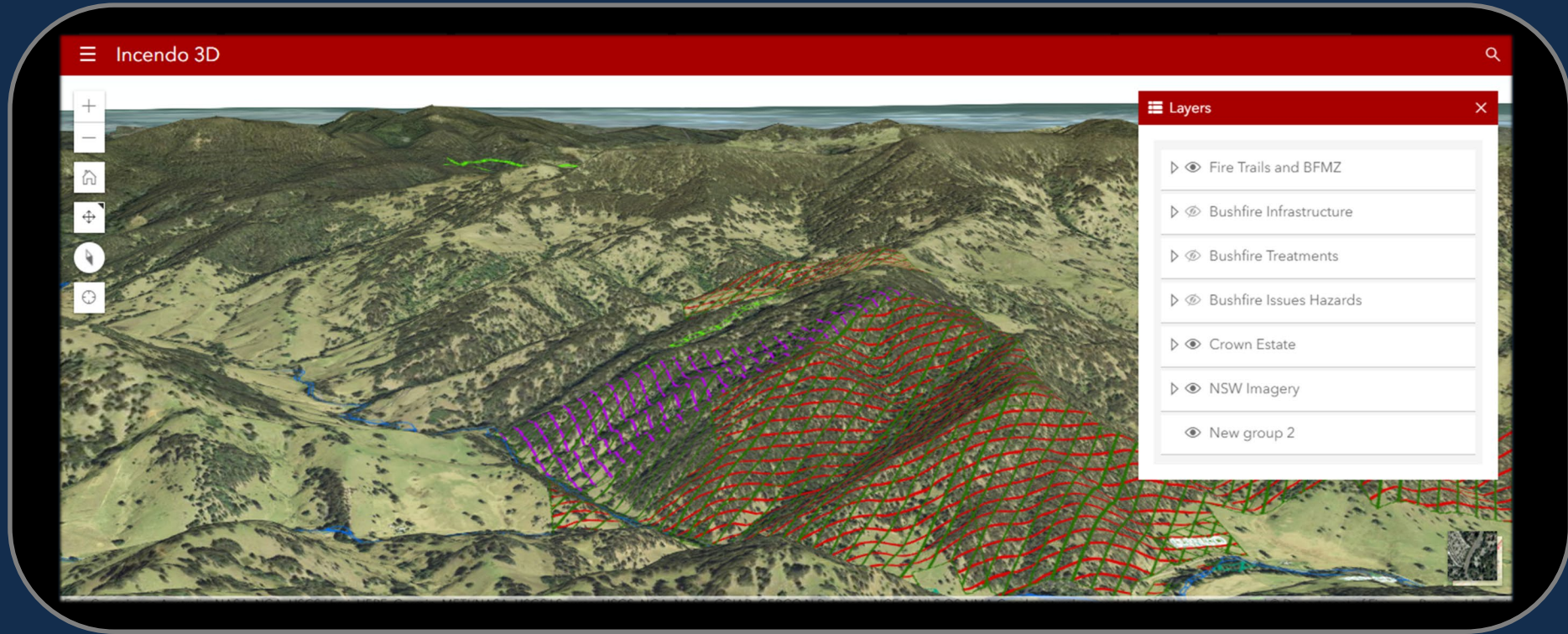


Last update: a few seconds ago

Dashboards



3-Dimension Map

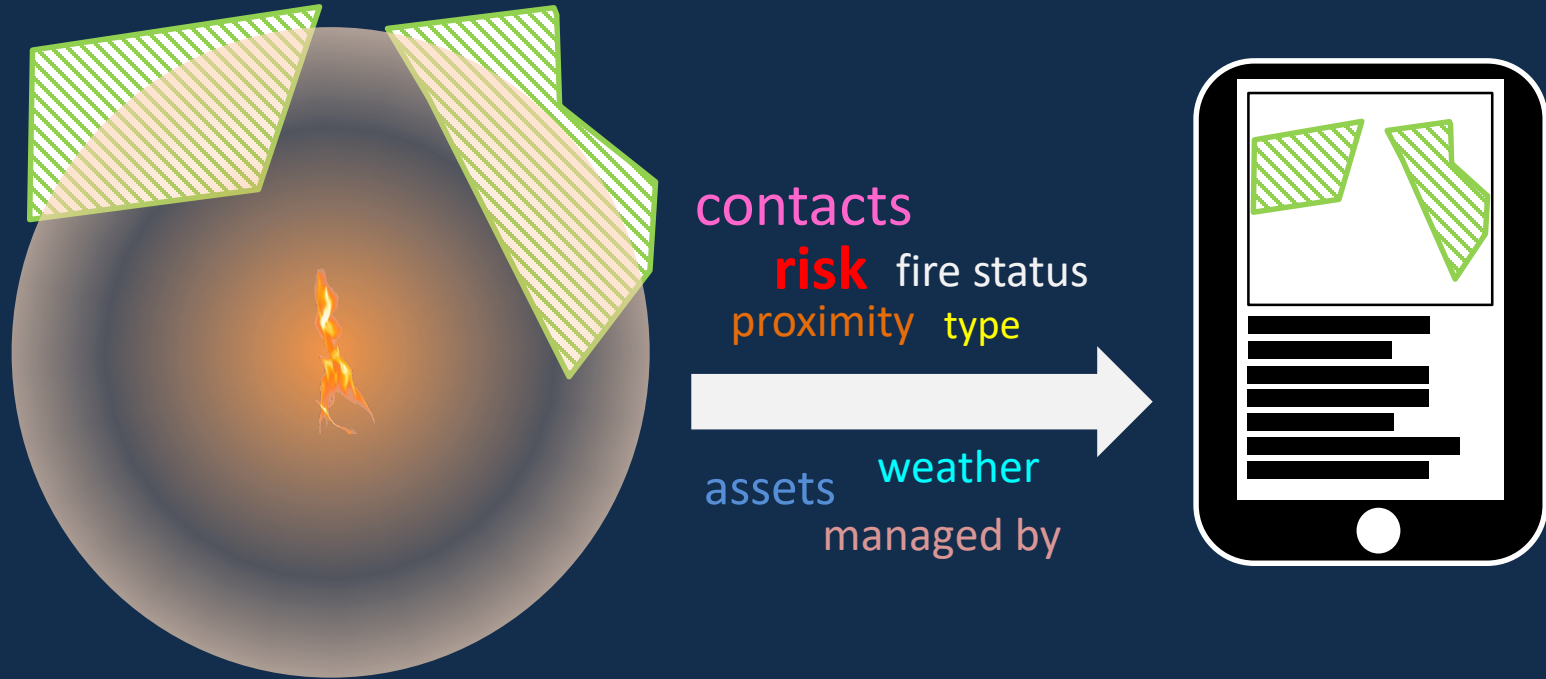


Integration

- All data is available via OGC and ESRI REST secured services
- In-app tools allow for export of data for external applications (BRIMS)



Future Improvements: Incident Alert System



Lessons Learnt

- ArcGIS Online provides a rapid “out-of-box” solution
- Story maps are great for multi-window applications
- Mapped business processes are the key to successful end-to-end applications
- Data schema must meet the growing needs for field and offline editing
- Live dashboards expose your data gaps and integrity – plan for reporting
- Training – we have a diverse workforce
- The better you do, the more they want!

Questions ??