

Concept Plan SP 2018-074

Remote sensing and spatial analysis for fire management

Remote Sensing and Spatial Analysis

Project Core Team

Supervising Scientist	Katherine Zdunic
Data Custodian	Katherine Zdunic
Site Custodian	

Project status as of Sept. 26, 2018, 2:15 p.m.

Approved and active

Document endorsements and approvals as of Sept. 26, 2018, 2:15 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

Remote sensing and spatial analysis for fire management

Biodiversity and Conservation Science Program

Remote Sensing and Spatial Analysis

Departmental Service

Service 9: Prescribed Burning and Fire Management

Aims

- Improve processes of fire scar identification to enable historical fire regimes to be understood for safety and ecological applications.
- Improve burn security through the development of methodology to detect and communicate post burn hotspot locations.
- Develop techniques to provide inputs for fire behaviour models to enable desktop assessments.
- Provide remotely-sensed spatial and temporal intelligence to assist with bushfire investigations and reporting.

Expected outcome

- Prescribed burning activities are captured accurately and incorporated into corporate data
- Historical fire is captured accurately and incorporated into corporate data enabling analysis of fire patterns and use during fire events
- Continued development of imagery systems to support fire management i.e. thermal camera hotspot detection
- Development of inputs to fire behaviour models based on imagery and calibrated by field data.
- More complete and accurate reporting on bushfires to further the departments understanding of fire behaviour to lower the risks when managing bushfire.

Strategic context

The information that RSSA provides for fire management is aimed significantly increasing the accuracy of reporting and decreasing the risks of fire management activities.

Delivering fire scar mapping and information allows practitioners to make better decisions which leads to more efficient fuel reduction activities.

Some activities that contribute to these:

- Understanding fire behaviour in spinifex grasslands informs prescribed burning and wildfire suppression activities. Unmanned aerial systems (UAS) are aiding in improving fire behaviour prediction by providing comprehensive and accurate measurements of vegetation cover, volume and height, the fuel characteristics of vegetation that influence fire behaviour. Developments in UAS application together with satellite imagery will enable fire managers to more efficiently and accurately map fuel characteristics at a range of scales, greatly enhancing their ability to forecast fire danger and to predict fire behaviour without having to carry out costly ground-based field measurements.
- The Remote Sensing & Spatial Analysis (RSSA) Section has been providing annual fire scar data to the Pilbara Region since 2013. Through the availability and use of this data the application and requirement for fire scar information has grown. Consistent production and attribution of monthly fire scar mapping will result in the compilation of an annual fire scar mapping product with improved date, area and cause attribution.
- Fire management branch remote sensing project work and advice as required including fire recovery, fire chronology and new satellite technology/availability.
- Remote sensing analysis use in response to ministerials, especially with regard to degree and extent of scorch within a bush fire or burn

- Develop the implementation of new technology and tools for fire management e.g. use of Himawari-8 for near-real-time monitoring of fires, Sentinel satellites for more up to date fire scar mapping and assistance with the testing and implementation of the updated spatial support system.
- Development of NBR index with Landgate which will create a whole of state derived product to assist in burn planning for the coming season, especially in the larger regions
- Development of methods for fire scar mapping and QA. This has included the change over from using a more manual method to now mapping with ecognition which has in turn improved the accuracy and greatly improved the time it takes to map a fire scars in the big regions.
- Statistics for specific Kimberley Region Fire Management Areas (FMAs) are provided to KSCS to monitor fire history and patterns over the FMAs and at LCI monitoring sites. This includes annual and seasonal statistics (e.g. burnt area, fire frequency, veg age class, distance to unburnt) are provided each year using NAFI fire scar mapping (determined with MODIS) and ArcGIS models. They assist in managing fire regimes and investigating relationships between fires and populations of mammal species.
- Swan Fire Risk Model - GIS Branch (RSSA) will be the custodian of risk assessment tool. This involves any further development of the tool and annual updates to inform prescribed burn planning.

Expected collaborations

Fire Management Services Branch: meeting requirements for fire scar locations, hotspot detection, mapping, fire behaviour predictions and fire chronology.

Department of Fire and Emergency Services: building relationships where common requirements exist and data sharing.

Landgate: participate in project to develop automated imagery techniques to detect and map fires at the 20 metre scale on a weekly basis.

Proposed period of the project

Jan. 1, 2010 – None

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist			
Technical			
Volunteer			
Collaborator			

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)			
External Funding			