

# CALL FOR EXPRESSION OF INTEREST FOR PROJECT ERP 13 – CREATION OF A GFDI DATASET – PART 1

Proposals due **3 September 2018** to [office@bnhcr.com.au](mailto:office@bnhcr.com.au)

## INTRODUCTION

The Bushfire and Natural Hazards Cooperative Research Centre (hereafter the CRC), in conjunction with our client, the Department of Environment Land Water and Planning (Victoria) (DELWP) is seeking expressions of interest for the following project.

### **Creation of a grassland fire danger index (GFDI) dataset**

## PROJECT AIMS AND OBJECTIVES

1. To develop a Grassland Fire Danger Index (GFDI) dataset that will enable fire agencies and communities to:
  - a. understand grassland fire danger across the landscape
  - b. improve understanding of the entirety of Fire Danger Rating (FDR) system, and
  - c. improve rigor of modelled bushfire risk through expanding the selection of fire weather criteria, currently based solely on FFDI
2. The creation of a GFDI dataset would complete the fire weather gridded dataset and would provide fire managers, particularly those from the Country Fire Authority (CFA) who focus on grasslands, a resource that would be useful in fire research, planning and preparedness

## BACKGROUND

### *Safer Together*

1. In November 2015, the Victorian Government released the Safer Together policy platform, setting out the future direction for bushfire management in Victoria. Safer Together is part of broader government reform to Victoria's emergency management sector and sees land and fire management agencies working together, in partnership with local communities to combine fire expertise with local knowledge.
2. A key pillar to Safer Together is science data and technology. The policy specifically states "we use the latest science, data and technology to make sure our actions are targeted at reducing bushfire risk and protecting those things we care about. It also notes under "what we do:" "Commission bushfire science research" (p. 9), "What we

will do: continue to invest in new science to address knowledge gaps and reduce uncertainties in our bushfire modelling.” (p. 17) and “Risk is dynamic and constantly shifting, so we need to keep building on our evidence base. We will continue our investment in science, and in partnership with research institutions, to build knowledge of the relationship between fire and the environment and to better manage risk.” (p. 18)

3. In May 2017 \$23m was announced to fund a two-year Safer Together program. In part these funds were allocated to ensuring that Victoria’s significant investment in bushfire preparedness and response is supported by a systematic and ongoing investment in developing scientific evidence.
4. The implementation of Safer Together is being improved by applying a systematic approach to understanding what some of the key sector knowledge gaps are, the resulting risks they may pose to the achievement of Safer Together objectives and determining how these risks can be mitigated by specific pieces of research.
5. Through being able to clearly articulate what existing research delivers, and where the priority knowledge gaps occur, the sector will be able to respond quickly and consistently in answering questions about resource requirements, in accessing external, collaborative or partnership opportunities, or in leveraging off existing programs.
6. This project is one of nine intended for delivery through the Safer Together program.

## CONTEXT

1. In recent years, the Department of Environment, Land, Water and Planning (DELWP) have commissioned the development of a historical fire weather gridded dataset (from 1972 to 2017) for Victoria (through Monash University and the Desert Research Institute (DRI)). This dataset comprises several weather variables and Forest Fire Danger Index (FFDI) outputs. However, no Grassland Fire Danger Index (GFDI) archive is available due to limited spatial curing data from 1972 to 2000.
2. Without GFDI data, fire agencies and communities have limited understanding of grassland fire danger across the landscape, and limited understanding of the entirety of the Fire Danger Rating (FDR) system. This creates misconceptions around the communication and use of the FDR’s within land and fire agencies. GFDI is an essential component of the FDR system used in Victoria for the declaration of Total Fire Ban days and Incident Control Centre activations so that resources such as aircraft can be prepositioned.
3. Apart from agency operational needs, bushfire risk is modelled or analysed by the Bushfire Risk Assessment Unit (DELWP) and Business Intelligence Unit (CFA), and lacks rigour around the selection of fire weather criteria, which is based solely on FFDI. The creation of a GFDI dataset would complete the fire weather gridded dataset and would provide fire managers (particularly those from the Country Fire Authority (CFA) who

focus on grasslands) a resource that would be useful in fire research, planning and preparedness.

4. The gridded weather dataset has already been utilised for multiple research projects within CFA and DELWP to model Mallee fire spread, with the objective to assess the performance of Phoenix, evaluate Drought indices in determining lightning caused fires (and comparison with BoM soil moisture products), examine escaped burns in relation to weather variables and fire danger period, identify FFDI and drought at ignition points, and so on. Once the GFDI dataset is available, the gridded weather dataset would be complete, providing further applications for research projects
5. This project entails the development of:
  - a. A grassland curing dataset (1972-2017) on a 500m grid derived from satellite data. This will be achieved by completing the following:
    - i. gather historic Landsat imagery (1972 to 2012) and derive NDVI/curing
    - ii. conduct a comparative analysis of Landsat and MODIS (MODerate Imaging Spectroradiometer) NDVI/curing data
    - iii. overcome the sensitivity issues between the two sensors, to ensure a consistent methodology for deriving curing over the time period of 1972 – present
    - iv. ensure the curing data is processed to the required format
    - v. submit a technical report to CFA documenting the development of the curing dataset.
  - b. A GFDI dataset (1972-2017) on a 4km grid derived from grassland curing data and three other input variables: temperature, relative humidity and wind speed (available from the gridded weather dataset). This will be achieved by completing the following:
    - i. calculate the GFDI for a test period, e.g. a fire season (and deliver to DR Harris and Dr Mills- Monash Uni)
    - ii. evaluate the test period (completed by Dr Harris and Dr Mills)
    - iii. submit progress report
    - iv. calculate GFDI for entire study period (and deliver to Dr Harris and Dr Mills- Monash Uni)
    - v. evaluate GFDI dataset for quality and accuracy (completed by Dr Harris and Dr Mills)
    - vi. submit draft of project report to CFA for review
    - vii. submit final report

## SCOPE

### INCLUSIONS

This project includes the development of two datasets (grassland curing and GFDI) and their required documentation.

1. The development of the grassland curing dataset (1972-2017) will entail:
  - a. gathering of historic Landsat imagery (1972-2017) to derive NDVI/curing
  - b. a comparative analysis of Landsat and MODIS NDVI/curing data
  - c. submission of a technical report documenting the development of the curing dataset, including guidance and recommendations for adding future data to the dataset.
2. The development of the GFDI dataset (1972-2017) will entail:
  - a. calculating the GFDI for a test period (fire season)
  - b. evaluation of the test period (completed by Dr Harris and Dr Mills)
  - c. submission of progress report
  - d. calculating GFDI for entire study period (and deliver to Dr Harris and Dr Mills)
  - e. evaluation of GFDI dataset for quality and accuracy (completed by Dr Harris and Dr Mills)
  - f. submission of final report, including guidance and recommendations for ongoing work.

### EXCLUSIONS

1. Future grassland curing data will be derived (nation-wide) from a newer satellite product called VIIRS. The transition from MODIS to VIIRS will be managed by the Bureau of Meteorology (the Bureau).
2. Grassland curing data beyond 31 December 2017. CFA and the Bureau will be responsible for the grassland curing dataset (MODIS-derived and then VIIRS-derived) from 31 December 2017 to the current date.
3. Incorporation of the GFDI dataset into the fire weather gridded dataset (1972 to 2017). Outside of this project, multiple researchers are using the fire weather dataset to analyse trends, percentiles, and temporal variability of weather variables, FFDI, GFDI and FDRs.
4. Development of a new user-interface to allow accessibility of the GFDI dataset to relevant users (as part of the fire weather gridded dataset).

## PROJECT SPECIFICATIONS

### Key Steps

In developing the project proposal to be submitted in response to this Call for Expression of interest researchers should be mindful of the following project requirements.

- A detailed project plan (using the DELWP template) will be required as an early project deliverable.
- Initial meetings between partners to better scope the work and understand constraints and feasibility.
- Gather historic Landsat imagery (1972 to 2012) and derive the NDVI/curing.
- Conduct a comparative analysis of Landsat and MODIS (Moderate Imaging Spectroradiometer) NDVI/curing data.
- Overcome the sensitivity issues between the two sensors, to ensure a consistent methodology for deriving curing over the time period of 1972 – present.
- Ensure the curing data is processed to the required format.
- Submit a technical report to CFA documenting the development of the curing dataset.
- Calculate the GFDI for a test period (and deliver to Dr Harris and Dr Mills – Monash Uni).
- Evaluate the test period.
- Submit a progress report.
- Calculate GFDI for entire study period (and deliver to Dr Harris and Dr mills – Monash Uni).
- Evaluate GFDI dataset for quality and accuracy.
- Submit draft of project report to CFA for review.
- Submit final report.

Key Steps	Responsible Party	Due Date
1. Project commencement	Contractor for Part 1	30/09/2018
2. Gather historic Landsat imagery (1972 to 2012) and derive NDVI/curing	Contractor for Part 1	10/11/2018
3. Conduct a comparative analysis of Landsat and MODIS (MODerate Imaging Spectroradiometer) NDVI/curing data	Contractor for Part 1	10/11/2018
4. Overcome the sensitivity issues between the two sensors, to ensure a consistent methodology for deriving curing over the time period of 1972	Contractor	10/11/2018

– present	for Part 1	
5. Ensure the curing data is processed to the required format	Contractor for Part 1	10/11/2018
6. Submit a technical report to CFA documenting the development of the curing dataset	Contractor for Part 1	10/11/2018
7. Calculate GFDI for a test period (and deliver to Dr Harris and Dr Mills – Monash Uni)	Contractor for Part 1	10/12/2018
8. Evaluate the test period	Contractor for Part 2	10/12/2018
9. Submit progress report	Contractor for Part 1	10/12/2018
10. Calculate GFDI for entire study period (and deliver to Dr Harris and Dr Mills – Monash Uni)	Contractor for Part 1	10/02/2019
11. Evaluate GFDI dataset for quality and accuracy	Contractor for Part 2	10/02/2019
12. Submit draft of project report to CFA for review	Contractor for Part 1	10/02/2019
13. Submit final report	Contractor for Part 1	10/03/2019

### Expected Outputs

1. A state-wide satellite-derived grassland curing dataset (1972-2017) in raster format (on a 500m grid). The rasters (image files) will contain a curing value for every 500m pixel. The rasters will be ordered in chronological order from 1972 to 2017 (inclusive).
2. A technical report describing the methodology and development of the grassland curing dataset.
3. A state-wide GFDI dataset (1972-2017) in NetCDF format (on a 4km grid). This dataset will be derived from grassland curing data and three other input variables: temperature, relative humidity and wind speed (available from the gridded weather dataset). The NetCDF files will also be ordered in chronological order from 1972 to 2017 (inclusive).
4. A progress report describing the methodology of the development of the grassland curing and GFDI datasets, and preliminary results of the evaluation of the datasets.
5. A final report documenting all methods and results of the grassland curing and GFDI datasets. To be peer reviewed within CFA and Monash University

## Quality Control

### Final report and other project outputs

It is the expectation of the Bushfire and Natural Hazards CRC and our client DELWP that the material delivered as part of this project will meet the highest scientific standards and will be suitable for internal and external distribution.

It is a requirement of this project that the final report (and any supporting material) is 'submitted to the States' satisfaction'. To ensure the final report meets this expectation it will be subject to up to two rounds of review (with a minimum of two weeks for each review) by DELWP. Research organisations are required to ensure an internal peer review process is undertaken prior to the draft final report being submitted for DELWP consideration.

Before the report is final report is submitted to the State's representative for approval it must also have been:

- through an independent peer reviewer approved by the Bushfire and Natural Hazards CRC Project Manager
- professional proof read and copy edited.

These steps must be arranged by the research organisation costed as part of project budget and completed within the project timeframe.

**Reports that have not been independently peer reviewed and professionally proof read and copy edited will not be considered final.** A copy of the independent peer review and the researcher response to any comments must be provided to the CRC.

### Communication

To further assist with the quality assurance, it is expected that:

- The project team will utilise a consultative approach when developing the overall framework and data management processes/criteria and will demonstrate this by documenting engagement activities within the relevant reports. This will involve seeking input from DELWP subject matter experts to ensure development of a framework and processes that are fit for purpose.
- The research team leader will give periodic presentations (e.g. annually) to key stakeholder groups (Ecological Risk Assessment Working Group, Landscape Evaluators Working Group) to gain critical feedback on project milestones.

Any further quality control processes that are required for this piece of work, as well as key success measures, will be agreed with the DELWP Policy Lead as part of the planning process.

## PROJECT MANAGEMENT AND PROCESSES

### Contractual Arrangements

This project is being delivered under an Agreement in place between the Bushfire and Natural Hazards Cooperative Research Centre and the Department of Environment, Land Water and Planning (DELWP) in the State of Victoria. Under this Agreement the CRC is responsible for the delivery of a number of bushfire related research projects. The contract put in place between the CRC and the research organisation selected to undertake this work will reflect the terms of the Agreement between DELWP and the CRC.

A copy of the draft contract the CRC will provide to the successful research organisation is provided with this document. This contract should be reviewed as part of the EOI process. This is a standard agreement, and any changes will be at the sole discretion of the CRC. If you would like to request amendments to any of the terms and conditions set out in the proposed contract, details of the proposed changes and the reason the changes are requested must be included with the submitted response. In considering, this contract and proposing changes please note we have been advised by DELWP that (i) changes to provisions relating to the ownership of Intellectual Property will only be varied to take account of substantial in-kind contribution from the successful research organisation/s and (ii) no changes can be made to the publications approvals processes.

### Project Governance

Each project is carried out under the supervision of a Project Control Board (PCB) and in accordance with the governance arrangements agreed between CRC and DELWP.

While the contractual relationship for the delivery of this project will be between the research organisation and the Bushfire and Natural Hazards CRC there will also be a strong relationship between the research team and DELWP staff. Communication is an important element of the success of this project and Researchers will be required to maintain strong links with both the DELWP Policy Lead and the CRC Project Manager though out the project.

A governance plan has been prepared which shows the roles and responsibilities of each of the participants. The successful research team will be required to comply with the processes and expectations as set out in that document.

### Project Planning

The project overview included in this document describes the way the DELWP subject matter experts believe the project can most successfully be undertaken. Alternative approaches can be considered. Any alternative approaches must ensure the delivery of the required outputs including any intermediate outputs identified in this document.

Following acceptance of a project proposal the successful research organisation must prepare a detailed project plan and risk treatment plan **using the DELWP template**. This plan must be approved by the DELWP Policy Lead and will become an attachment to the contract. The project plan must be approved within 3 months of the notification of the acceptance of the project proposal.

### Reporting

The successful research organisation will be required to make at least one presentation (and possibly two) annually to the Project Control Board or other nominated DELWP group during the life of the project.

Research organisations will also be required

- to provide a poster for the annual AFAC/CRC conferences;
- detailed progress reports on a quarterly basis; and
- contribute to the Project Evaluation Report.

Dates for submitting Quarterly Progress Reports

Period covered	Report required
1 July to 30 September	24 October
1 October to 31 December	24 January, following calendar year
1 January to 31 March	24 April
1 April to 30 June	24 July

## SUBMISSION OF EXPRESSION OF INTEREST

### Submission Requirements

Research teams responding to this Call for Expression of Interest are required to submit their response, including:

- A draft project proposal (4-6 pages) clearly addressing the requirements of the specifications set out in this document. Proposals must include achievable timelines, which will be used to monitor progress. A statement of capability demonstrating the ability of the proposed project team to undertake the work. This statement of capability should include the names and experience of key team members and their proposed contribution to the project. (The capability statement should not exceed 4 pages)

- Project budget including details of any in kind contribution from the research organisation. A statement of acceptance of the terms and conditions of the proposed contractual arrangements. If such arrangements are not acceptable details of any changes must be included with the submitted response.

#### **Additional information**

- Research bids from a consortium of research organisations with expertise in the relevant fields are specifically encouraged.
- Attached is a draft contract which we ask your organisation to review. In your response to the EOI you should identify any items in this contract that will require attention /amendment should your organisation be selected to undertake this piece of work. This contract is based on the Head Agreement between DELWP and the Bushfire and Natural Hazards CRC and as such there is very limited scope to make changes to the draft contract.

**The total maximum budget for this project is \$56,500 (excl GST)  
and all work must be completed by 30 March 2019.**

Any research proposal once submitted will be treated as commercial in confidence.

Applications must be submitted to: [office@bnhccrc.com.au](mailto:office@bnhccrc.com.au) by 3 September 2018.

#### **Evaluation Criteria**

After the closing date the Bushfire and Natural Hazards CRC along with the DELWP policy lead will review proposals against the evaluation criteria below and make a recommendation to the State's representative on the most appropriate organisation to undertake this work. The evaluation criteria provide an indication of those matters that should be included in the project proposal and associated documentation. Details are provided below.

Successful applicants will be advised by 14 September 2018 and it is expected work on the project will commence no later than 30 September 2018. Please note these are final dates only, we hope to be able to respond earlier in order to commence work before the end of September.

The decision of the CRC and our client DELWP will be final. The CRC reserves the right not to offer the work, or only allocate a proportion of the available funding, if a proposal does not meet the client's needs. The Project Control Board reserves the right to invite any other specific researchers as it sees fit to submit proposals before or after the closing date.

Evaluation Criterion	% weighting
<b>Research Capability</b> The capacity and capability to deliver an excellent applied research project in a Victorian environment.	15
<b>Project Proposal</b> A clear demonstration that the research team has an understanding of the project scope through the proposed research approach The proposal must also include an indicative timetable of work and interim milestones/project outputs as described in this document  <b>Quality Control</b> Clear documentation of quality control processes including proposed internal and external reviewers. Identification of copy editors and proof readers.	50
<b>Industry Engagement</b> Strong Track record of industry engagement with the ability to support and influence bushfire management in Victoria through interaction with land and fire agency personnel  <b>Victorian Focus</b> Ability to undertake research in Victorian environments individually and/or in cooperation with land and fire managers	15
<b>Value for Money</b> Delivery of required outcome within available budget along with the ability to leverage the funds provided with in-kind contributions or supplementary opportunities.  The evaluation team will consider the membership of the project team and the proposed roles and time commitment.	20

#### ATTACHMENTS

1. Draft Contract
2. Bushfire and Natural Hazards CRC /DELWP Governance Arrangement
3. DELWP Project Plan Template (to be provided)
4. Project Evaluation Report Template
5. Quarterly Reporting Template