CALL FOR EXPRESSION OF INTEREST

FRM20 – DEVELOPING A DATA-TO-MODEL PIPELINE FOR GENERATING COMPREHENSIVE SPECIES FIRE RESPONSE MODELS

PROPOSALS DUE 5:00PM AEST, 5 AUGUST 2025 TO research@naturalhazards.com.au

SUMMARY

INTRODUCTION

Natural Hazards Research Australia (hereafter the Centre), in conjunction with our client, the Department of Energy, Environment and Climate Action (Victoria) (DEECA) is seeking Expressions of Interest for the following project.

FRM20 - Developing a data-to-model pipeline for generating comprehensive species fire response models

PROJECT AIMS AND OBJECTIVES

This project aims to produce a set of faunal species fire response models to support the implementation of the Species Post-Fire Habitat Suitability (SPFHS) metric in bushfire management planning by the Victorian Government's Department of Energy, Environment and Climate Action (DEECA). The project has the following specific objectives:

1. Use the most representative set of DEECA survey datasets to produce a comprehensive set of statistical models of species response to time-since-fire.
2. Develop a system (i.e. R package, app or software) that inputs survey data and outputs a set of statistical models and predictions compatible with the Fire Analysis Module for Ecological values (FAME), which enables DEECA to reproduce the models or update them with new data.
3. Develop products that support the training of DEECA staff in the operation of the system.
4. Ensure the above are done with scientific rigour and are transparently documented.

Importantly, the project team will work closely with the DEECA project lead, the DEECA Forest and Fire Ecosystem Science Team and the Community Ecology team in Arthur Rylah Institute (ARI) in the co-design, co-delivery and co-authoring of the project, with the ARI team ensuring that statistical models are provided in a way that generates a comprehensive dataset that can be incorporated into FAME.

BUDGET

The total maximum budget for this project is $272,727 (excl. GST) and all work must be completed by March 2027.

RESPONSE

Any research proposal once submitted will be treated as commercial in confidence. Applications must be submitted to: research@naturalhazards.com.au by 5:00pm AEST, 5 August 2025.

Research teams responding to this Call for Expression of Interest are required to submit a project proposal (4-6 pages) clearly addressing the requirements of the specifications set out in this document and a project budget including details of any in kind contribution from the research organisation.

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Natural Hazards Research Australia (hereafter the Centre), in conjunction with our client, the Department of Energy, Environment and Climate Action (Victoria) (DEECA) is seeking expressions of interest for the following project.

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BACKGROUND AND CONTEXT

Technical context

DEECA has developed a suite of ecosystem resilience metrics to guide the planning, reporting and evaluation of bushfire management. One of these metrics is SPFHS metric, which estimates the amount of habitat that is currently suitable for individual fire-sensitive animal species within

a defined area based on their fire-age responses[1] (Haslem et al. 2024). The calculation for this metric is performed in the Fire Analysis Module for Ecological Values (FAME) app, which is developed in R Shiny. Calculating SPFHS require three critical input files: fire history, binary threshold species distribution models and species fire response models. This project aims to update the species fire response models used in FAME.

In general, species fire response models aim to capture the change in some quantification of population (e.g. abundance or presence) relative to attributes of the fire regime (e.g. time-since-fire, fire severity) or environmental variables related to the fire regime (e.g. post-fire vegetation succession). In DEECA, the Fauna Fire Occupancy (FFO) dataset is the default dataset for calculating SPFHS in FAME. This dataset comprises expert-estimated fauna relative abundance for each vegetation post-fire growth stage[2] , stratified by vegetation type and fire type. Over the years, this dataset has been evaluated for the accuracy of individual species fire responses, and while accurate for some species, it has shown moderate performance for others, requiring DEECA staff to generate multiple updated datasets to support decision making. However, the FFO dataset still represents the most comprehensive state-wide dataset developed with a consistent and repeatable methodology. It provides data on the largest number of species across the greatest geographic area of all fire response datasets in Victoria.

DEECA and ARI have explored using different sources of survey data as well as different statistical methods for modelling, such as using the Victorian Biodiversity Atlas (VBA) for generalised additive models. These projects have yielded interim fire response datasets of variable breadth and quality, which are not resolved enough to use as inputs into the statewide SPFHS metric. DEECA also has established a state-wide ecosystem resilience monitoring program (ERMP), which has collected empirical data on species' occurrence and abundance across a chronosequence of post-fire vegetation ages in 11 vegetation classifications (ecological fire groups) across Victoria. The first tranche of this monitoring data is now becoming available.

This project will consolidate and build upon the species survey datasets and modelling approaches DEECA has developed and produce a system that will generate a comprehensive species fire response dataset. This system must have the capacity to draw on a range of datasets, clean and format the datasets as necessary, apply the appropriate modelling approaches to generate species fire response models, select the best-performing model and/or eliminate models which fall below a minimum quality threshold.

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[1] Haslem, A., Radford, J. Q., Bennett, A. F., Watson, S. J., Chick, M. P., Huang, J., ... & Clarke, M. F. (2024). Measuring the ecological outcomes of fire: metrics to guide fire management. *Fire Ecology*, *20*(1), 99.
[2] MacHunter, J., Menkhorst, P., & Loyn, R. H. (2009). *Towards a process for integrating vertebrate fauna into fire management planning*. Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg, Victoria.

The resultant set of models must be formatted for input into the FAME app. Preferably, this system should have some capacity for customisation and be future-proofed against foreseeable changes in the fire ecology program (such as changes in fire severity or vegetation classification, or the addition of climate or soil variables). This project will include a case study to develop models using an alternative set of fire and environmental variables for a subset of species and landscapes. By the end of the project, the operations of this system would be transferred to DEECA, to enable DEECA to update its species fire response dataset as more survey data becomes available.

The project team will work in close collaboration with the policy leads (Forest and Fire Ecosystem Science Team) and ARI's Community Ecology team, which has extensive involvement in the development of present fire ecology systems. ARI team members relevant to this project are Angie Haslem (co-designed the suite of ecosystem resilience metrics), Cindy Hauser (developed criteria for evaluating the suitability of input datasets and output models), Nevil Amos (developed and maintains FAME software) and Josephine MacHunter (developed FFO dataset, co-designed FAME software). The Community Ecology Team would be able to provide linkage to datasets and other resources, contribute to scaling up and testing model-building processes, review the final outputs and facilitate the integration of output into FAME, among other things.

Policy context

Biodiversity management

- Victoria has functioning plant and animal populations, improved habitats and resilient ecosystems, even under climate change (*Biodiversity 2037*).
- Identify priority areas relating to the interaction of fire regimes and threatening processes (such as invasive species, drought) to target management (*Biodiversity 2037*).
- Improve management effectiveness through new knowledge and ability to measure direct change at the appropriate scale (Monitoring, Evaluation and Reporting Framework; *Biodiversity 2037*).
- Guarantee that all taxa of Victoria's flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild *(Flora and Fauna Guarantee Act, 1988)*.
- Refer proposed action that will likely have a significant impact on listed threatened species and endangered communities for Federal approval (*Environmental Protection and Biodiversity Conservation Act, 1999*).

Fire management

- To maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water, carbon storage and forest products (Code of Practice for Bushfire Management on Public Land, 2012).

- Use the learnings from science and monitoring and evaluation to test and refine scientific and other models that support decision making (Code of Practice for Bushfire Management on Public Land, 2012).
- Improved bushfire management strategies and actions (Code of Practice for Bushfire Management on Public Land, 2012).
- Science, data and technology. 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 (Safer Together, 2015).
- Continue to invest in new science to address knowledge gaps and reduce uncertainties in our bushfire modelling (Safer Together, 2015)

SCOPE

INCLUSIONS

The appointed service provider will be required to complete the following tasks:

- Regular meetings with the DEECA project lead and the ARI Community Ecology team, to facilitate the co-design, co-delivery and co-authoring of the project.
- Cleaning and preparation of survey datasets as needed for modelling.
- Development of a curated set of faunal species fire response models, which is based on the most representative set of survey datasets, in a format compatible with FAME software. Metadata must be included.
- Development of a modelling system (e.g. app, software, R package) which inputs survey data and outputs a curated set of faunal species fire response models, to enable DEECA to reproduce the models or update them with new data. This modelling system will have addressed the following questions:
    - What types of input data are needed for modelling?
    - Which statistical method is most appropriate for each data type and survey method?
    - How to implement a sensible model selection process?
    - How to evaluate model performance at scale?
- Development of a case study using an alternative set of fire and environmental variables to model species response to fire regime for a subset of species and landscape, contingent upon availability of data.
- Resources to enable DEECA staff with minimum coding knowledge to independently operate the modelling system, input new data and generate updated models.
- A final report documenting the objectives, methods and outcomes of the project.

EXCLUSIONS

The following tasks are excluded from the project:

- Curation of a new survey dataset that is not available within the first four months from project commencement.
- Engagement or consultation with stakeholders outside of the specified project leads and partners.
- Training of DEECA staff outside of the specified project leads and patterners on the use of the model-building system.
- Ongoing operation of the model-building system.
- Dissemination and implementation of new species fire response data.

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:

Key steps	Lead	Due date
1. Project initiation andonboarding	Research partner	1 September 2025
2. Project planning	All*	30 September 2025
3. Obtaining, selecting, cleaning and collating input data	All	31 December 2025
4. First modelled outputs	Research partner/ARI	30 April 2026
5. Developing and implementing model selection process – Hard deadline to inform planning processes	Research partner/ARI	30 June 2026
6. Review of processes	All	30 July 2026
7. Finalise modelled outputs	Research partner/ARI	30 August 2026
8. Package processes and write user manual	Research partner/ARI	30 November 2026
9. Draft final report	Research partner/ARI	31 December 2026
10. Review of final report	All	31 January 2026
11. Project closure approved by the PCB	DEECA/NHRA	30 March 2027

EXPECTED OUTPUTS

1. Regular meetings with DEECA team lead and ARI project team to ensure methods and outputs align with project objectives and all deliverables are in the required format.
2. A comprehensive and ecologically robust dataset of faunal species responses to time-since-fire.

3. A model-building system (e.g. app, software, or R package) which meets the project objectives, packaged in a manner that is transparent, repeatable and easily operable by DEECA staff.
4. A set of guidelines for fauna surveys (incl. minimum sample size, data quality, dataset schema, etc.), so that data from future monitoring projects could feed directly into the modelling system.
5. A user manual of the project that would guide DEECA users to operate the system.
6. Training materials (such as user manual, instructional videos or workshop content) to enable DEECA staff with minimum coding knowledge to independently operate the modelling system.
7. A case study of modelling species fire responses using an alternative set of fire and environmental variables, documented through an R script or equivalent and 2-page report.
8. A written report of the project, detailing the methodology, the rationale behind key decisions and a description of the key outputs, reviewed by ARI team and DEECA team lead.
9. Transfer of all materials (including scripts, processed datasets and spatial layers) associated with modelling and analyses to DEECA

QUALITY CONTROL

Final report and other project outputs

It is the expectation of the Centre and our client DEECA 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) be submitted to the Project Control Board's 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 DEECA. Research organisations are required to ensure an internal peer review process is undertaken prior to the draft final report being submitted for DEEECA consideration.

Before the final report is submitted to the Project Control Board for approval it must also have been professionally proof read and copy edited.

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

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 DEECA 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 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 DEECA Research Lead as part of the planning process.

PROJECT MANAGEMENT AND PROCESSES

CONTRACTUAL ARRANGEMENTS

This project is being delivered under an Agreement in place between Natural Hazards and Disaster Resilience Research Centre Ltd, t/as Natural Hazards Research Australia (the Centre), and the Department of Energy, Environment and Climate Action (DEECA) in the State of Victoria. Under this Agreement the Centre is responsible for the delivery of a number of bushfire, ecological and compliance related research projects. The contract put in place between the Centre and the research organisation selected to undertake this work will reflect the terms of the Agreement between DEECA and the Centre.

A draft copy of the contract between the Centre and 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 Centre. 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 the Centre has been advised by DEECA 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 the Centre and DEECA.

While the contractual relationship for the delivery of this project will be between the research organisation and the Centre, there will also be a strong relationship between the research team and DEECA staff. Communication is an important element of the success of this project and Researchers will be required to maintain strong links with both the DEECA Research Lead and the Centre Project Manager throughout 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 DEECA 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 DEECA template. This plan must be approved by the DEECA Research Lead and will become an attachment to the contract. The project plan must be approved within three 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 DEECA group during the life of the project.

Research organisations will also be required to:

- provide a fact sheet within three months of signing the contract between the research organisation and the Centre (DEECA/Safer Together template)
- provide detailed progress reports on a quarterly basis
- contribute to the Project Evaluation Report.

Dates for submitting Quarterly Progress Reports:

Period covered	Report required
1 July to 30 September	Second week of October
1 October to 31 December	Second week of January
1 January to 31 March	Second week of April
1 April to 30 June	Second week of 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 DEECA and the Centre and as such there is very limited scope to make changes to the draft contract.

The total maximum budget for this project is $272,272 (excl. GST) and all work must be completed by March 2027.

Any research proposal once submitted will be treated as commercial in confidence.
Applications must be submitted to research@naturalhazards.com.au by 5:00m AEST, 5 August 2025.

EVALUATION CRITERIA

After the closing date the Centre along with the DEECA Research 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 in the table below.

You will be advised by the end of August if your application has been accepted and it is expected work on the project will commence upon signing of the contract.

The decision of the Centre and our client DEECA will be final. The Centre 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 criteria	% weighting
Research capability The capacity and capability to deliver an excellent applied research project in a Victorian environment	20
Project proposal 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 **Quality control** Clear documentation of quality control processes including proposed internal and external reviewers anddentification of copy editors and proof readers.	50
Industry engagement 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 **Victorian focus** Ability to undertake research in Victorian environments individually and/or in cooperation with land and fire managers	10
Value for money 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 can be found here.