

CALL FOR EXPRESSION OF INTEREST FOR ERP 16 – USE OF EMERGING TECHNOLOGIES FOR NATIVE WILDLIFE POPULATION ASSESSMENT AND MANAGEMENT

Proposals due **3 August 2018** to office@bnhcrc.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.

Use of emerging technologies for native wildlife population assessment and management

PROJECT AIMS AND OBJECTIVES

1. To improve DELWP's ability to efficiently assess wildlife populations and habitat conditions through approaches including emerging technologies such as unmanned aerial vehicles, visual and non-visual sensors.
2. Develop survey standards, systems and methods that can be used by DELWP to undertake ecologically sound, repeatable and reliable assessments of wildlife populations and habitat conditions in diverse accessible and remote habitats.

BACKGROUND AND CONTEXT

1. Accurate and timely assessments of native wildlife are needed for many purposes. This includes:
 - Monitoring to support biodiversity conservation programs and the effectiveness of management strategies,
 - the rapid identification and management of threats such as predation and disease,
 - the rapid assessment of natural hazards (such as bushfire, floods and heat waves), and emergency events (oil spills) on native wildlife,
 - the management of habitat health in instance where wildlife numbers can exceed the carrying capacity of the habitat, require leading to the need to control population numbers to prevent irreparable damage,

- management of wildlife reportedly damaging pastures and crops,
 - management of wildfire taken as game where population numbers and species compositions are needed to set sustainable hunting levels, and manage differential closures (e.g., closure of wetlands with high levels of threatened species of duck).
2. Survey methods that provide robust evidence that can be used to support critical wildlife decisions points such as relocation, control or take no action, are often contested, because of questions around the accuracy of the evidence, the cost, difficulty and time required to undertake reliable studies and the timing of when studies were undertaken.
 3. Emerging technologies such as compact remote sensing technology (including visual and a non-visual, passive and active, satellite imagery and multi-spectral images), unmanned aerial vehicles (UAVs or Drones), rapid digital image processing and machine learning technologies provide opportunities to improve the efficiency and accuracy of wildlife population and habitat/ impact assessments
 4. While these approaches show promise, they are not yet widely applied as most studies have focussed on proof of concept. These studies typically show promise in the ability of these technologies to improve wildlife and habitat monitoring, but have not provided sufficient evidence to confidently support their use
 5. Robust program design and application of emerging technologies requires not only calibration of imagery and development of algorithms, but the design of survey methods and standards with known levels of accuracy and precision across a range of habitats and vegetation types.
 6. These efforts require significant applied research and development. For example, some studies indicate the development of algorithms via machine learning methods; a single species requires at least 1000+ images with individuals being accurately identified and marked. Games birds are highly mobile, and over 20 species of ducks and geese need to be incorporated into a comprehensive system.
 7. In some instances, the species of wildlife being assessed may not be easily observed using visual wavelengths. For example, koalas in blue gum plantations are not readily observable in the dense forest canopy. Efforts to use infrared sensors have been confounded because the spectral signature for blue gum canopies is similar to the spectral signature for koalas. Research into seasonal and diurnal variations in planation blue gum physiology (transpiration and respiration) suggest the spectral signature for blue gums may alter throughout the year and overnight, giving rise to a spectral difference. Many similar issues about wildlife behaviour and observability need to be considered when assessing population numbers and distribution. DELWP, Queensland University of Technology and Arthur Rylah Institute have done some work testing drones to identify koalas and developing algorithms.
 8. Further, understanding sensor accuracy does not equate to understanding survey accuracy, sample patterns and intensities, and environmental factors that influence the behaviour of the species being surveyed come into play.

9. The development of repeatable and reliable techniques for native wildlife and habitat/damage surveys using emergent technology is not a simple technology issue (and these are rarely simple anyway). Solutions require both technology and systems development, underpinned by good ecological and sampling theory to support management decision making – as such the solutions need to be more cost effective than current approaches.
10. This project aims to move beyond proof of concept assessment, to the development of new approaches for population and habitat assessment of priority species. Initially this will include ducks, koala’s and kangaroos. For other species not covered it will detail the steps and processes required to develop assessment algorithms and survey methods for population and habitat/impact assessment so that field data can be collected and used to cover a wider range of species.

SCOPE

INCLUSIONS

1. Collection and identification of species imagery – note this will be supplemented by field data from environmental compliance personnel.
2. Collection and analysis of habitat condition data.
3. Development of algorithms and systems that enable managers to interpret population and habitat/impact data collected – includes any licencing of third party systems use for the research component
4. Provision of data on reliability and reproducibility of the proposed approaches in a range of habitat and vegetation environments
5. Training of DELWP staff in operational use of the proposed approach, including written training guides

EXCLUSIONS

1. Development of operating standards and procedures for UAV use – This will be done by the UAV for Compliance Project being managed by the ASU for the environmental compliance branch.

PROJECT SPECIFICATIONS

Key Steps

Key Steps	Lead	Due Date
1. Development of detailed project plan.	Provider	1 mths
2. Review current science and practice for wildlife population and habitat/impact assessment using field and remote sensing technology.	Provider	4 mths
3. Refine project methodologies (inc field assessment), evaluation criteria, systems	Provider	6 mths

(sensors, algorithms, software etc) for trial and data management protocols.		
4. Initiate trials on species identification, population assessment and habitat identification.	Provider	6 mths
5. Complete report on end to end solution for priority (but relatively simple species) refine and improve methods and process for species, population and habitat assessment	Provider	12 mths
6. Train DELWP staff to undertake assessments and to collect data further species, population and habitat data to develop systems for additional species.	Provider	12 mths
7. Develop solutions for agreed number and type of priority, but more complex species (eg. Ducks).	Provider	18 mths
8. Assist DELWP to fully operationalise systems and process – including systems, standards and procedures for use and development and training	Provider	24 mths
9. Complete project reporting and documentation.		30 mths

Expected Outputs

1. Review current science and practice for wildlife population and habitat/impact assessment using field and remote sensing technology
2. A report providing a complete set of imagery with all species collected and identified.
3. Research report describing development of algorithms, and survey standards for population and habitat/impact assessments – includes estimates of uncertainty.
4. Algorithms and systems that enable managers interpret population and habitat/impact data collected and documented survey methods

5. Documented processes for extending the technology to other species.
6. Initial, progress and project communications materials, including briefs and presentations developed - partners and stakeholders informed.

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 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 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/BNHCRC conferences;
- detailed progress reports on a quarterly basis; and
- 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.

The total maximum budget for this project is \$540,000 (excl GST) and all work must be completed by 31 January 2021.

Any research proposal once submitted will be treated as commercial in confidence. Applications, must be submitted to: office@bnhcrc.com.au by 3 August 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 27 August 2018 and it is expected work on the project will commence no later than 17 September 2018.

The decision of the BNHCRC and our client DELWP will be final. The BNHCRC 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
Research Capability The capacity and capability to deliver an excellent applied research project in a Victorian environment.	15
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. Identification 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	15

Victorian Focus Ability to undertake research in Victorian environments individually and/or in cooperation with land and fire managers	
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
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