

# National Environmental Science Program

Sustainable Communities and Waste Hub  
**Emerging Priority** – Hub Indigenous-led Project-  
variation to an approved project



# Emerging Priority –Hub Indigenous-led Project (HIP): Plant and Plastic Wastes in Regional and Remote Communities

<b>Project type:</b> Emerging Priority Project - Hub Indigenous-led project (Category 1 under Three Category Approach)	
<b>Project status:</b> Approved Emerging priority project	
<b>Cross-cutting initiative:</b>	No
<b>Project start date:</b> 12/05/2025	<b>Project end date:</b> 10/04/2026
<b>Project leader details:</b>	<p>Name: Victor Steffensen Role: Project Lead Organisation: Firesticks</p> <p>Name: Dr Peta-Marie Standley Role: Assistant Lead Organisation: Firesticks, Research Design Lead</p> <p>Name: Professor Veena Sahajwalla Role: Hub Project Lead Organisation: UNSW Sydney</p> <p>Name: Dr Rumana Hossain Role: Hub Assistant Project Lead Organisation: UNSW Sydney</p>

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# Project description

## Project summary

This is a collaborative partnership between project leader Firesticks Alliance Indigenous Corporation and Sustainable Communities and Waste Hub researchers from Impact Priority 2 (Plastics and other wastes) from the University of New South Wales's SMaRT Centre to analyse the properties and viability of several species of plants, being strategically removed for the betterment of the total ecosystem, along with locally "on country" collected waste plastics. This Emerging Priority project is seeking approval for the initial phase of the project to qualify, quantify and provide initial pathways for the problem.

The current practice for disposing of these species, once cleared, involves their incineration. The objective of this project is to redirect this waste away from burning and integrate it into a resource stream. This bio-waste will be assessed for its potential as a resource to support community-driven land restoration and sustainable development.. The dual benefit of restoring the land from specific species and reinstating native grasses contributes to a more sustainable environment.

Simultaneously, leveraging the bio-waste from this process to create new products and foster economic opportunities within local communities, promotes a circular economy and yields positive outcomes for communities.

The project will quantify and analyse materials of plant biomass that is being harvested from Country to assess the potential of these plant-based materials for sustainable regional applications that could be used in housing and other infrastructure opportunities by local Indigenous communities associated with the country concerned. With the project being Indigenous led, it will be Category 1 under the new NESP Three Category approach for Indigenous engagement.

This project is guided by national priorities including the current policies and programs to improve the lives of all Aboriginal and Torres Strait Islander people, as well as "The National Waste Policy 2018" and the "2019 National Waste Policy Action Plan" and supported by further plans including modernisation of recycling and manufacturing capability; and sustainable protection of national materials supply (critical materials). As [stated](#) by the 2019 review of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), 'environmental management is inadequate without incorporating the knowledge, land and sea management practices of Indigenous Australians'

Firesticks is a not-for-profit Indigenous network that aims to activate and increase the use of cultural learning pathways to fire and land management and support Indigenous leadership to protect, conserve, and enhance cultural and natural values of people and Country through cultural land management practices.

This project relates to each of the Hub's three overarching thematic areas: Rural and regional solutions; waste resources; and sustainable communities.

## Project description

The HIP initiative seeks to extract problematic plant species from landscapes to aid in environmental restoration and preservation. Additionally, the initiative involves the collection of waste, particularly plastics, from these areas. The objective is to redirect this bio-waste away from incineration and towards utilisation as a valuable remanufacturing resource. This bio-waste resource will be assessed for its potential use in supporting sustainable land management and regional development opportunities. The HIP project intends to assist communities to conduct feasibility studies for potential harvesting programs that tie land management opportunities with social enterprise. This will be an important process of activating innovation within Indigenous knowledge into mainstream solutions for

environmental restoration, improving agriculture, and Aboriginal advancement for employment and cultural practice revival. The process will be taking plant samples from involved Indigenous communities that are currently working with Firesticks fire mentorship program and have expressed permission and interest to undertake the opportunity.

This initial phase will include the quantification and harvesting of samples and examination of their properties. The initial phase of the research collaboration exploring potential viability.

## **Emerging Priority – Hub Indigenous-led Project (HIP): Plant and Plastic Wastes in Regional and Remote Communities**

### **The problem**

Indigenous communities are endeavouring to reintroduce cultural land management practices in Australia, to ensure greater sustainability for both the land and local communities. Firesticks is a well-known and successful Aboriginal organisation at the forefront in leading the charge of First Nations peoples to help ensure better land management and local community sustainability.

Landscapes across the country have significantly altered due to various land practices and the absence of local Aboriginal land management knowledge. Firesticks is endeavouring to use Aboriginal land practices and knowledge to better manage specific species including both native and non-native. Furthermore, wastes of various types – and in particular plastics – pollute many of the land areas. Firesticks is endeavouring to help restore and protect.

### **Our response**

The HIP initiative seeks to extract invasive native and introduced plant species from landscapes to aid in environmental restoration and preservation. Additionally, the initiative involves the collection of bio-waste and plastics, from these areas. The objective is to redirect this bio-waste away from incineration and towards utilisation as a valuable remanufacturing resource to support culturally informed land management and ecological repair. The approaches employed involve the incorporation of Aboriginal land management practices for ecological healing in conjunction with cultural fire techniques implemented across diverse geographical regions throughout Australia. The extensive proliferation of mono-cultures consisting of invasive plant species, spanning tens of thousands of hectares within individual regions, has resulted in significant environmental degradation, leading to the erosion of ecosystem integrity.

The initial phase of the program intends to assist various local communities by conducting feasibility studies for potential harvesting programs that tie land management opportunities with social enterprise. The studies will also determine the scale of the challenges and opportunities in regional and remote locations.

This will be an important process of activating innovation within Indigenous knowledge into mainstream solutions for environmental restoration, improving agriculture, and Aboriginal advancement for employment and cultural practice revival, i.e., more sustainable communities. The process will be taking plant samples from involved Indigenous communities that are currently working with the Firesticks fire mentorship program and have expressed permission and interest to undertake the opportunity.

This initial phase will include the harvesting of samples and examination of their properties.

## **Methodology**

Step 1 - To develop cultural protocols around the process of applying Indigenous knowledge and IP.

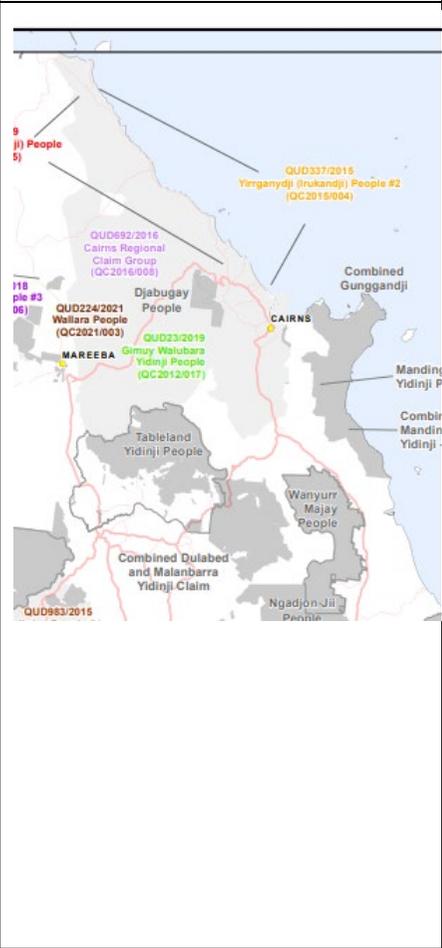
Step 2 – Literature survey and sampling. A literature survey will be conducted to quantify the problem and validate the target species. Based on literature and expertise in Firesticks, appropriate sampling kits will be procured that will be used for the process as to SMaRT Centre requirements. All parts of each selected species will be collected and clearly marked as ICIP-sensitive due to their cultural and ecological significance. Collect all parts of each sample species to send down for analysis. This will also include the training and involvement of the community practitioners to collect the samples and the presentation of information.

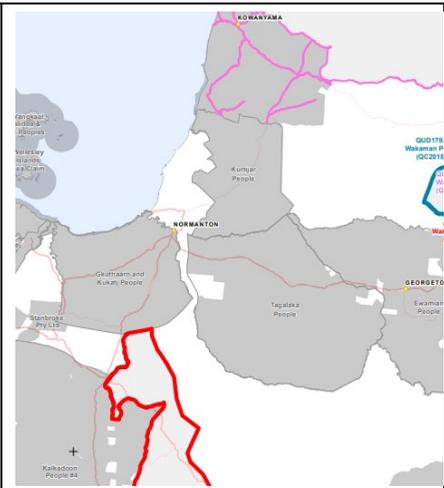
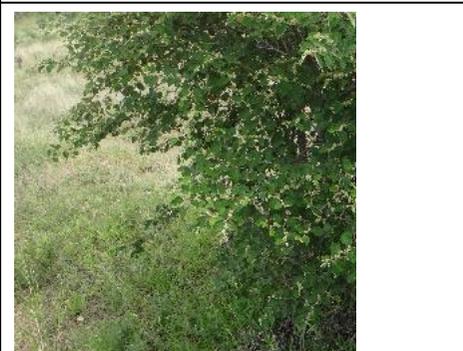
### *Definition and Detail of Invasive Species*

*Note: Consultation from ecologist or related expert should be sought before deciding target species. Removal of any naturalised species from an environment will impact biodiversity.*

*“An invasive species is a species occurring, as a result of human activities, beyond its accepted normal distribution and which threatens valued environmental, agricultural or other social resources by the damage it causes.” (DCEEW, 2023)*

Specimens will be collected from the region tabled below.

Location	Indigenous Communities	Website	Map	Target Species	Threatening Distribution	Impacts
Far North QLD:	Djabugay dji, Bulwanydji, Nyagali, Yirrganydji, Guluny dji			 <p data-bbox="1037 502 1503 542"><i>Lantana camara</i></p> <p data-bbox="1037 542 1503 598"><a href="https://weeds.org.au/profiles/lantana-common-kamara/">https://weeds.org.au/profiles/lantana-common-kamara/</a></p> <p data-bbox="1037 598 1503 638"><i>Lantana montevidensis</i></p>	<p data-bbox="1503 188 1727 311">Listed as a weed in all mainland states and territories.</p> <p data-bbox="1503 311 1727 671">Infestations east of the Great Dividing Range from Bermagui, NSW to Cape Melville, QLD, and some isolated colonies in northern NT, Perth, and Lord Howe Island</p>	<p data-bbox="1727 188 2110 671">Regarded as one of the most pernicious weed species in Australia, it warrants significant concern. This plant has the propensity to establish dense, impenetrable thickets, displacing native vegetation and encroaching upon pastures and forests, thereby exacerbating fire hazards by accumulating fuel. Furthermore, it poses a significant threat as it is poisonous to both livestock and humans. Additionally, its presence negatively affects the diversity and health of soil fauna and fungi.</p>
				<p data-bbox="1503 671 1727 710">NSW, NT, QLD</p> <p data-bbox="1503 710 1727 837">Declared weed in NSW, NT, QLD, WA</p> <p data-bbox="1503 837 1727 1029">Scattered in coastal regions, from Cairns, QLD, to Nowra, NSW.</p> <p data-bbox="1503 1029 1727 1136">Some colonies in Tamworth (NSW), Texas (QLD), some towns in NT</p>	<p data-bbox="1727 671 2110 1029">Less detrimental than the Common Lantana, this species attains a height of only half a meter and lacks thorns. However, it possesses the potential to exhibit similar aggressiveness as the Common Lantana due to its drought resistance. Moreover, it is noteworthy that this plant is toxic to livestock and has the capacity to supplant native grasses and shrubs.</p>	

<p>Northern Gulf: Tagalaka Aboriginal Corporation</p>	<p>Representing peoples of the gulf savannahs surrounding Croydon, Normanton, and East Hayden</p>	<p><a href="#">General 6 — Tagalaka Aboriginal Corporation</a></p>		 <p>Acacia Shirleyi (Lancewood) Kuu Mbae</p>	<p>Tropical and subtropical regions of Australia</p>	<p>Can become dominant in disturbed or drought-stricken parts of country where not naturally found</p>
			 <p><i>Ziziphus mauritiana</i> Lam. (Indian Jujube/Chinee/Chonky Apple) <a href="https://profiles.ala.org.au/opus/weeds-australia/profile/Ziziphus%20mauritiana">https://profiles.ala.org.au/opus/weeds-australia/profile/Ziziphus%20mauritiana</a></p>	<p>Tropical and subtropical woodlands and savannas</p>	<p>Chinese Apple (<i>Ziziphus mauritiana</i>) is a large shrub or small spreading tree to 8–10 m high that is a native of southern Asia, eastern Africa and many islands of the Indian Ocean. It forms dense impenetrable thickets if left uncontrolled. One tree can produce 8 000–10 000 seed in one year. If left unchecked, it is likely to have significant environmental effects on tropical and subtropical woodlands and savannas.</p>	



*Petalostigma pubescens* (Quinine)  
<https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2906115>

Tropical and subtropical woodlands and savannas

Quinine species are known to increase and thicken the understorey of woodland systems. They can also encroach on grassland areas



*Petalostigma F. Muell* (Quinine)  
<https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2902711>

Tropical and subtropical woodlands and savannas

Quinine species are known to increase and thicken the understorey of woodland systems. They can also encroach on grassland areas



*Petalostigma banksii* (Smooth leaf Quinine)  
<https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2900608>

Tropical and subtropical woodlands and savannas

Quinine species are known to increase and thicken the understorey of woodland systems. They can also encroach on grassland areas



*Grevillea pteridifolia* (Golden Wattle)  
<https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2910744>

Tropical and subtropical woodlands and savannas

Tasmania	Tasmanian Aboriginal Centre	<a href="http://tacinc.com.au">Tasmanian Aboriginal Centre – About Us (tacinc.com.au)</a>		 <p>Hakea rugosa (Wrinkled or dwarf Hakea)  <a href="https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2907428">https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2907428</a></p>	Tasmania, infestation by mainland species	Competition for soil resources and space, disruption of local indigenous habitat.
NSW South Coast	Yuin Peoples			 <p>Pittosporum undulatum (Sweet Pittosporum)  <a href="https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2904297#overview">https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2904297#overview</a></p>	<p>Declared a weed in areas of NSW, Victoria and WA. Dangerous in and outside its native habitat, including in SA, TAS, VIC and WA.</p> <p>It is most problematic in areas with &gt;700mm annual rainfall.</p>	Can form dense thickets of foliage in disturbed habitats. Foliage shields undergrowth from sunlight and changes soil nutrient load due to rich leaf litter.

Step 3 - Development of case studies (written and multimedia) with each sample of how the harvesting assists in healing landscapes through the indigenous lens, supports cultural fire aspirations, and benefits the broader community and vision towards resilience.

***Linkages***

Linkages to IP2 (plastics and other wastes) and possibly after consideration IP1 (nature-based connections), IP4 (air quality) and IP5 (waste management initiatives).

**Is this a cross-hub project?**

No.

**Does this project contribute to a cross-cutting initiative?**

No.

# Pathway to impact

## Outcomes

The ultimate outcome of this research over the course of the NESP program will be to create more sustainable land practices and communities and an increase in materials circularity in Indigenous, rural, regional and remote Australian communities.

### **Informing policy and frameworks**

This outcome will contribute to the delivery of national priorities, policies and programs to improve the lives of all Aboriginal and Torres Strait Islander people, assist in emerging Indigenous land management practices, as well as National Waste Policy 2018 and the National Waste Policy Action Plan.

This new knowledge is expected to inform future policy discussion and considerations at all levels of government on enhancing Indigenous land management practices, enhancing Indigenous economic and social opportunities, and addressing waste management, including by reducing bio-waste burning and microplastics in regional and remote communities.

### **Community benefits**

The research projects will identify ways in which local communities can benefit from regional technological solutions to transform waste materials into new products. The benefits may include local jobs, improved environment (understanding microplastics), and local education.

### **Economic Benefits**

The project's outcomes promise to catalyse supply chains and create new markets. This work will lead to opportunities for Australian Indigenous, remote, regional and urban communities to embrace circular economy solutions to drive social and economic benefits.

### **Environmental Benefits**

The project will divert bio-waste from burning, into an economic resource., supporting the development of circular resource strategies based on Indigenous-led bio-waste recovery and land restoration. It will inform the Department's policy design and decision making via community co-designed solutions and on-ground success.

### **Partnerships & Collaboration**

Building partnerships between Indigenous communities, the Hub, SMEs, all levels of government through Indigenous project leadership and Hub support, to reduce the impact of bio and other waste materials.

Research-user	Engagement and communication	Impact on management action	Outputs
<p>Various Indigenous communities via Firestick Indigenous project leadership</p> <p>Local communities and land councils</p> <p>Local councils and other related community organisations</p> <p>DCCEEW and its Indigenous links</p>	<p>Research-users are to be engaged in the development and design of project and outputs through Indigenous-led co-design discussions.</p> <p>Findings and outputs to be communicated via project workshops, project update emails and presentations.</p> <p>Key stakeholders will continue to be engaged through regular briefings to ensure alignment of workplans and outputs to ensure mutual benefits.</p> <p>Researchers will continue to work closely with industry, scientific and regulatory bodies to meet the aims of the project.</p> <p>The researchers will work closely with the Knowledge Broker, Industry and Impact Manager, Data Wrangler, Senior Indigenous Facilitator and Communications and Media Manager of the SCaW Hub for capturing and transferring the knowledge created in this project.</p> <p>Research outputs as knowledge products will be communicated through industry media, the SCaW Hub website, via social media and workshops and events.</p>	<p>Initial Research completed during in accordance with this Emerging Priority proposal will be used to direct operations including finding fit-for-purpose technological solutions for regional and remote communities.</p> <p>Will assist industry and non-government stakeholders to make decisions regarding business and investment for remanufacturing in remote areas.</p>	<p>A final report on project outcomes and findings and recommendations for full year research plan.</p>

# Indigenous consultation and engagement

Australian Aboriginal and Torres Strait Islander peoples have integral physical and cultural connections with land and sea environments and their sustained protection and care. However, land management, and invasive species as well as waste streams such as plastics, tyres, glass, metal, textiles litter the landscape of regional and remote areas of Australia. Based on preliminary discussions with Aboriginal organisation Firesticks, greater action is needed to address this issue. Firesticks is committed to leading this project, initially as an Emerging Priority and then as a Hub Indigenous-led Project within RP2024.

This project proposal is a result of ongoing discussions between Firesticks and IP2 researchers from the UNSW SMaRT Centre, with the aim of both improving land management practices using Indigenous knowledge.

This Hub Indigenous-led Project's research goals are aligned to the Environmental Science Program Indigenous partnership principles and the Hub's Indigenous Partnership Strategy, which include respect and mutual benefit, a right to Indigenous cultural and intellectual property, co-created research, Indigenous lead governance, and relationships-focused and an individual approach.

This project fit into **Category 1 of the new NESP Three Category Approach**, that is it is Indigenous led. This project will draw upon the knowledge of all project partners. In addition, all non-Indigenous project team members are required to undertake the Our Mob cultural awareness training and Indigenous Cultural and Intellectual Property (ICIP) True Tracks training to ensure engagement with Aboriginal and Torres Strait Islander communities is appropriate. The project activities will be co-designed and built on respect and mutual benefit.

In 2023, the Hub will be developing an interactive visual dashboard of Indigenous research across Australia, led by the Senior Indigenous Facilitator. The dashboard will allow the capture and exploration of research relevant to the SCaW remit, including for this project to inform co-design activities for RP2024 and beyond. It is anticipated that this will assist in identifying existing or proposed research relevant to the project and communities affected by the project, providing an opportunity to collaborate with Indigenous researchers or build upon their work.

Which Three-category approach the project meets	<b>1. Indigenous led</b> <input checked="" type="checkbox"/>	<b>2. Co-design</b> <input type="checkbox"/>	<b>3. Communicate</b> <input type="checkbox"/>
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# Project milestones

<b>Milestones</b>	<b>Due date</b>	<b>Responsible person/s</b>
Milestone 1 – EP inception meetings/discussions	12 <sup>th</sup> May 2025	<b>Victor Steffensen / Veena Sahajwalla</b>
Milestone 2 – Develop cultural protocols around the process of applying Indigenous knowledge and IP	30 <sup>th</sup> July 2025	Victor Steffensen
Milestone 3 – Collect all parts of each sample 4 species to send down for analysis by SMaRT Centre. Samples are to be marked as ICIP due to nature of Traditional Ecological Knowledge of Plant Species to be analysed	28 <sup>th</sup> September 2025	<b>Victor Steffensen / Dixit Prasher</b>
Milestone 4 – SMaRT Centre to provide Firesticks lab characterisation reports for Indigenous native and invasive species submitted in Milestone 3	28 <sup>th</sup> November 2025	<b>Victor Steffensen / Dixit Prasher</b>
Milestone 5 – Submit Stage one report including analysis	10 <sup>th</sup> April 2026	<b>Victor Steffensen</b>

# Data and information management

Knowledge products generated during the project phase, co-designed with stakeholders and the Hub knowledge broker, may be publicly accessible via the Hub website. This dissemination will align with the Hub's data management and communication strategies and will be contingent upon ethics approvals and relevant Indigenous Cultural and Intellectual Property (ICIP) arrangements. The data products developed in the EP will be co-designed with the Senior Indigenous Facilitator, Data Wrangler and Knowledge Broker to meet the FAIR and CARE guiding principles.

Project output	Data management and accessibility
Reports	<p>Subject to approval by DCCEEW, these will be made publicly available on the Hub website, in accordance with the Hub Data Management Strategy.</p> <p>Where Indigenous knowledges are included in project outputs, the management and accessibility of those outputs will be subject to the Ethics approvals, FAIR (Findable, Accessible, Interoperable, Reusable) and CARE (Collective benefit, Authority to Control, Responsibility, and Ethics) principles and any specific Indigenous Cultural and Intellectual Property (ICIP) arrangements developed with the communities involved. We will handle the data that emerges from these discussions according to Article 31 of the United Nations Declaration on the Rights of Indigenous Peoples, which Australia has endorsed, and affirms that:</p> <p><i>Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.</i></p>

# Location of research

The table below describes the planned locations where the majority of the research will be conducted. These locations are preliminary and may be expanded or refined as the project progresses.

Sample collection will be conducted at a number of regional and remote locations including Far North Queensland. Prototyping and laboratory work relating to materials analysis will be undertaken at the UNSW Sydney Kensington Campus.

<b>Emerging Priority – Hub Indigenous-led Project (HIP): Plant and Plastic Wastes in Regional and Remote Communities</b>			
<b>At which spatial scale is the project working</b>	<b>National</b>	<b>Regional</b>	<b>Local</b>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Location(s) – gazetted region / place name</b>	Lab Work: UNSW Sydney, Kensington Field Studies: Far North Queensland, Southern Yuin, South East and West Queensland. Locations will be co-designed and refined with end-users and Firesticks.		
<b>Aboriginal or Torres Strait Islander nation or traditional place name(s)</b>	Lab Work: Eora Nation Field Studies: Djabugay, Mandandanji, Kooma, Gunggari, Bigambul, Yuwaalaraay, Southern Yuin. Locations will be co-designed and refined with end-users and Firesticks.		

# Project keywords

Aboriginal land management practices, Indigenous cultural practices, invasive plants, waste/s, , bio-waste, waste resources, sustainable communities, circular economy, regional/remote