Australia's National
Science Agency

GISERA | Gas Industry Social and Environmental Research Alliance

Project Variation

Identifying drought refuges for terrestrial species in the Cooper Basin

Background

In April 2024, the GISERA QLD Research Advisory Committee approved the 'Identifying drought refuges for terrestrial species in the Cooper Basin' project. This project was intended to: use existing information to identify the potential location of drought refuges of focal threatened species; undertake field surveys at potential locations to confirm the presence of the target species; measure habitat attributes at each occupied drought refuge in order to quantify habitat condition; and develop approaches for assessing habitat quality condition for each species that can be used by the gas industry when assessing potential sites and when monitoring habitat condition over time.

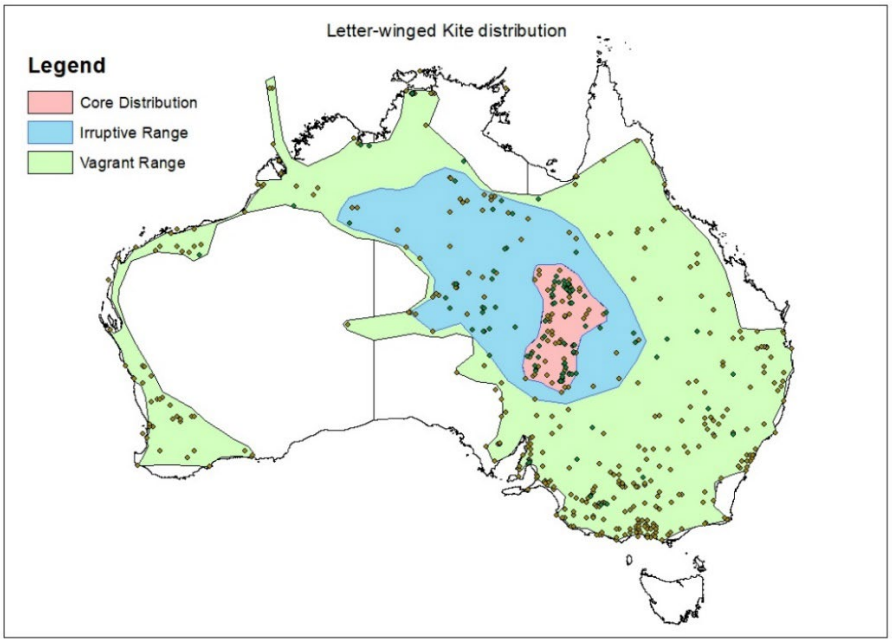
This is the link to the originally approved Project Order.

Current status

The research for this project was set-up to explore the habitat of a group of focal species during dry periods in the arid Cooper Basin of Queensland with a view to developing scientific understanding of habitat condition and ongoing management. The focus was on drought refuges. Although the study system is known to experience boom-bust dynamics, driven by unpredictable rainfall and the resultant peaks in primary productivity, the majority of time (upwards of 80%) the region experiences dry (bust) conditions. Therefore, a focus on drought refuges seemed appropriate. However, significant rain events and associated flooding in March-June 2025 have transformed the environment in the region bringing a large pulse in primary productivity and boom conditions. These conditions are expected to persist for 18-24 months i.e. well beyond the life of the current project.

As a consequence of the wet conditions, a project that examines drought refuges is no longer possible. Therefore, the intention is to pivot the research to focus on habitat of a subset of the focal species during periods of high productivity. In particular this will examine breeding habitat. The map below is included to illustrate the change in focus. It represents records of one of the focal species, the letter-winged kite, *Elanus scriptus*. The map shows the core distribution of the species (focused on the Cooper and Diamantina Basins) during dry periods and contrasts it with the range during boom periods (referred to as the irruptive range on the map). The range expands during boom times partly because more of the environment becomes suitable for the

kites (and many other species) but also because of the continuous breeding that occurs. Plentiful food means that a higher proportion of young survive and disperse into surrounding areas. This dispersal of maturing individuals contributes significantly to the expansion of the species' geographic range.



The intention of the revised project is to take advantage of this pulse in resource availability and capture information on important breeding sites for a subset of the focal species. Task 1 considered all species present in the Cooper Basin and came up with a short-list of 36 potential species (31 vertebrates, 5 plants). A final list of 6 focal species was decided on. This list consisted of: grey grasswren, letter-winged kite, plains wanderer, yellow chat, kowari and kultarr. The first four of these species are birds, the other two are mammals. For the purposes of this revised project the two species of mammal have been removed from consideration. The reason for this is that small mammal populations are initially negatively impacted by large flood events. The water physically impacts refuge sites and it is likely that animals will have to move to avoid floodwaters. Small mammals do respond strongly after flooding and big rain events but there is inevitably a lag of up to nine months. This lag does not fit with the timing of the project, so kultarr and kowari have been excluded from further consideration.

A second aim of the revised project is to seek to gain an understanding of the presence of threatening processes at breeding populations of the focal species during a period of high resource availability. Several threats are most prevalent during or soon after the conclusion of resource pulses. These threats include the number of feral house cats and introduced red foxes present, the stocking rate of cattle and the number of feral herbivores (including wild pigs, goats and horses) present. Invasive plants may also emerge as an issue. Undertaking this work while breeding is occurring will provide an understanding of the magnitude of threats during highly productive periods.

A final aim of the revised project is to examine habitat during a resource pulse. This work will focus on grey grasswren because their main habitat – lignum swamp – is inundated during flood events. Therefore, it is likely to show a strong positive response during wet periods and the contrast in habitat condition between boom and bust periods is predicted to be greatest in the floodplain environment.

Proposed changes to scope

Original task description/objectives/deliverables	Proposed task description/objectives/deliverables
Task 1: Identify focal plants and animals	**No change. Task delivered**
Task 2: Desktop delineation of potential refuge habitat	**No change. Task delivered**
Task 3: Undertake field surveys of potential drought refuges of focal species. **OVERALL TIMEFRAME:** 11 months (31 March 2025 - 28 February 2026) **BACKGROUND:** The desktop assessment in task 2 will identify the geospatial location of a number of potential drought refuges for each species. Field surveys in each location are needed to determine whether the species is present. These need to be undertaken during periods of low primary productivity (dry periods), hence the long duration of this task. The study design will include multiple visits to each location. Surveys will be undertaken using methods that are appropriate for the target species at each location. These methods will vary and depend on the composition of the final list of focal species but are likely to include active searches, call playback, trapping and spotlighting. **TASK OBJECTIVES:** To undertake field surveys to determine whether the target species is currently occupying each of the potential drought refuges. **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** Knowledge of the location of drought refuges of focal species within the study area in the Cooper Basin. A specific deliverable will be geospatial data on the spatial extent of each drought refuge identified during this task. These data will be supplied to the company that is the holder of the exploration licence for each location.	**Task 3: Undertake field surveys of potential breeding habitat of focal species.** **OVERALL TIMEFRAME:** 11 months (3 November 2025 - 30 September 2026) **BACKGROUND:** Field surveys will be undertaken to look for breeding sites of grey grasswren, letter-winged kites, and the other focal species. The desktop assessment in task 2 identified the geospatial location of a number of potential breeding sites for each species. Field surveys in each location are needed to determine whether the species is present and to record characteristics of the breeding habitat. The study design will include multiple visits to each location. Surveys will be undertaken using methods that are appropriate for the target species. These methods will vary but will include active searches, call playback, spotlighting, and remote acoustic detection. In particular, because of timing issues and the onset of warm weather in November, there will be an emphasis on using remote acoustic detection to determine the presence of grey grasswren. **TASK OBJECTIVES:** To undertake field surveys to determine whether the focal species are breeding in the study region. **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** Knowledge of the location of breeding sites of the focal species and their occurrence within the region during a resource pulse. A specific deliverable will be geospatial data on the spatial extent of breeding sites.

Original task description/objectives/deliverables	Proposed task description/objectives/deliverables
Task 4: Measure habitat attributes and assess habitat condition of drought refuges. **OVERALL TIMEFRAME:** 12 months (1 May 2025 - 30 April 2026) **BACKGROUND:** To facilitate future efforts to find the focal species, especially during environmental assessments for onshore gas development, it is important to characterise the key components of the drought refuges for each species that are identified in task 3. At each drought refuge a range of environmental variables will be measured including: • structural and floristic components of the vegetation; • soil type and condition; • fire history; and • disturbance regime including presence of potential threats. This will enable common features of drought refuges to be recognised and will assist in future survey work. These measurements should be taken as soon as possible after the target species is located at a site. **TASK OBJECTIVES:** There are two objectives as follows: • To determine common features of the drought refuges of each focal species and, thus, to build a model of how to identify drought refuges of that species; and • To assess habitat condition at each individual drought refuge. **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** The main output from this task will be a detailed description of the characteristics of the drought refuges of each focal species.	**Task 4: Measure the magnitude of threats at breeding sites of focal species** **OVERALL TIMEFRAME:** 11 months (3 November 2025 - 30 September 2026) **BACKGROUND:** Several of the major threatening processes faced by species such as letter-winged kites and grey grasswrens are most prevalent during (or soon after) boom periods when primary productivity is high. These threats include predation by introduced carnivores (cats and foxes), cattle impacts through trampling and grazing of habitat, and impacts of feral herbivores causing habitat degradation. Undertaking this work while breeding is occurring will provide an understanding of the magnitude of threats during highly productive periods. **TASK OBJECTIVES:** To undertake field surveys at known breeding sites of the focal species to determine the presence and magnitude of threatening processes especially introduced predators, feral herbivores and domestic cattle. **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** Information on the presence and magnitude of threatening processes to be included in the final report. Geospatial data on the occurrence of introduced species within the study area.

Original task description/objectives/deliverables	Proposed task description/objectives/deliverables
Task 5: Develop a methodology for assessment of habitat quality condition at drought refuges for each focal species. **OVERALL TIMEFRAME:** 4 months (1 March 2026 - 30 June 2026) **BACKGROUND:** Habitat quality assessment is integral to assessing both environmental impacts from a proposed development and the suitability of offset proposals. While existing, established methodologies exist for some species, the majority of threatened species prioritised in the GBA Cooper assessment are not adequately accounted for by existing habitat assessment methods. The Environment Assessment branch of the Australian Government's Department of Climate Change, Energy, the Environment and Water (DCCEEW) acknowledges that this results in protracted negotiations with proponents and suboptimal environmental outcomes. Given that the majority (probably all) of the focal species to be selected in task 1 of this project will not be accounted for by existing habitat assessments and the need for this information for both proponents and regulators of the onshore gas industry, this task has been added to here. **TASK OBJECTIVES:** To produce a habitat quality assessment methodology, focussed on dry period habitat, for each focal species covered in this project that is also listed nationally as threatened. In other words, the methodology will be written for each species that could trigger a referral under the *Environment Protection and Biodiversity Conservation Act* (EPBCA). **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** A series of habitat quality assessment methodologies prepared at a sufficient level of detail to be submitted for potential use to the Australian Government (Environment Assessment Queensland branch, Nature Positive Regulation Division, DCCEEW).	**Task 5: Measure habitat attributes and assess habitat condition of breeding sites.** **OVERALL TIMEFRAME:** 5 months (1 May 2026 to 30 September 2026) **BACKGROUND:** To facilitate future efforts to find the focal species it is important to characterise the key components of the breeding sites for each species that is located breeding during task 3. At each site several environmental variables will be measured including: • structural and floristic components of the vegetation; • soil type and condition. At sites with grey grasswren present there will be a focus on measuring lignum cover and height. Lignum is the main attribute of relevance for grey grasswren. **TASK OBJECTIVES:** To describe and quantify habitat condition at each individual breeding site of the focal species. This will enable comparison with conditions at previous sites and inform future surveys. **TASK OUTPUTS AND SPECIFIC DELIVERABLES:** The main output from this task will be a detailed description of the characteristics of the breeding sites of each focal species.
Task 1: Project reporting	No change in scope, but delivery date pushed back to 15 November 2026.
Task 2: Communicate findings to stakeholders	No change in scope, but delivery date pushed back to 15 November 2026.

Revised project title

Original project title	Revised project title
Identifying drought refuges for terrestrial species in the Cooper Basin	Breeding response of focal threatened species to a resource pulse in the Cooper Basin