



Woodstock Environmental Offset Project Stage 2

Bi-Annual Progress Report

October 2022

*Report prepared for Budadee Aboriginal Corporation and Pilbara Environmental
Offset Program by Terra Rosa Consulting*

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We acknowledge the Traditional Owners and custodians of country throughout Australia and their continuing connection to land, waters, and community. We pay our respects to the people, the cultures, and the Elders past, present and emerging.

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1. Project Background

For full Project Background refer to the Tharra Rehabilitation Plan: Weed Control Plan.

Since 2021, Budadee Aboriginal Corporation (BAC) in partnership with Terra Rosa Consulting (TRC), have undertaken environmental planning, monitoring and rehabilitation works across the Woodstock Abydos Protected Reserve (WAPR), as a part of the Woodstock Environmental Offset Program (WEOP). The objective of the Woodstock Environmental Offset Program, funded by the Pilbara Environmental Offset Fund (PEOF), is to enhance environmental health of Tharra (the Traditional name of the Palyku Native Title Determination Area within the WAPR), based on both cultural and conservation values. The program is currently in its second year (Stage 2).

BAC's team identified introduced weed species as a priority threat to the environmental and cultural values of the WAPR, and management of priority weed species was targeted as the focus for the WEOP. The focus for Stage 1 (2021 - 2022) was to collect information to inform future weed management actions within the riparian zones in Tharra, the exchange of botanical knowledge between Traditional Owners and scientists and to inform the design of a vegetation monitoring approach and riparian weed control plan to guide Stage 2 of the project (known as the *Tharra Rehabilitation Plan: Weed Control Plan*). During Stage 1, Weed of National Significance (WONS) Rubber tree (*Calotropis procera*) was identified as a primary weed species of concern for Budadee, as its recent increase in density and distribution directly threatens the rich environmental and cultural values within Tharra, particularly those within the riparian zones of the reserve.

The main objective of Stage 2 of the WEOP is to implement the *Tharra Rehabilitation Plan: Weed Control Plan*, of which the key outcome will be the improvement of condition of at least 1000 ha of vegetation within Tharra. The objectives of the *Tharra Rehabilitation Plan: Weed Control Plan* are as follows:

- Implement a targeted *Calotropis procera* management program, informed by field observations collected during Stage 1 and Traditional Knowledge and values;
- Continue mapping the distribution of weeds within the riparian zones of Tharra, to track the progress of targeted weed control program;
- Collect vegetation condition assessment data within the riparian zones of Tharra, including *Calotropis procera* density estimations, in line with established monitoring and evaluation framework methodology*;
- Further improve the capacity of the Budadee Ranger team to conduct rehabilitation and monitoring activities as per DWER's Monitoring and Evaluation Framework*; and
- Facilitate leadership from Traditional Owners in the delivery of the above objectives and ensure that traditional knowledge and values influence decision-making and that cultural protocols are observed on-country.

Upon direction from DWER's PEOF Team, two of the above objectives were postponed to better align with DWER's Vegetation Monitoring Framework (under development). The varied objectives are denoted with an asterisks.

2. Project Logic

For full Project Logic refer to the Tharra Rehabilitation Plan: Weed Control Plan.

Budadee operates on a Caring-for-Country model. Leadership from Traditional Owners is integrated into the planning and delivery of all work programs, including the WEOP, to ensure Traditional Knowledge and values influence decision making and cultural protocols are observed while on country. The collaboration and exchange of knowledge between Traditional Owners and environmental consultants ensures that management strategies provide the best outcomes culturally and ecologically.

The objectives and trip timing outlined in the *Tharra Rehabilitation Plan: Weed Control Plan* were adapted due to the development of DWER's Vegetation Monitoring and Evaluation Framework, accommodation availability, heavy rainfall events and logistical considerations.

Five on-country field trips and a PEOF Consultation Workshop were carried out between June and September 2022. These field trips focused on targeted *Calotropis* surveys and control within the riparian areas of Tharra, with broad-scale weed mapping conducted alongside the targeted survey efforts.

The specific objectives of the five on-country field trips were as follows:

- Conduct targeted *Calotropis* surveys within the rivers systems of Tharra;
- Control all *Calotropis* plants encountered during the targeted surveys, and record the number of *Calotropis* individuals encountered and controlled;
- Map the distribution of *Calotropis* within the river systems of Tharra;
- Continue to conduct broad-scale mapping of non-target weed species during the targeted survey effort.

The field data collection methodology was as follows:

- Track logs recorded on three handheld GPS;
 - "GPS 1" recording from the start of the work day until the end (Survey Route),
 - "GPS 2" recording while within river systems (Survey Effort),
 - "GPS 3" recording in areas where *Calotropis* is present (*Calotropis* distribution).
- The number of *Calotropis* individuals within each occurrence area were counted and recorded;
- Non-target weed species distribution recorded as point data using the ArcGIS Application QuickCapture.

On-country field trips were held from the 26th June – 1st July (Trip 1), 1st August – 5th August (Trip 2), 15th August – 18th August (Trip 3), 10th September – 15th September (Trip 4) and 26th September - 30th September (Trip 5). Trip 3 included an on-country PEOF Consultation Workshop, where Budadee Elders, Seniors and Rangers met with DWER, DBCA and TR representative to discuss management priorities within the Tharra and the greater WAPR, and opportunities for future collaborations and projects to protect

the cultural and ecological values of Tharra (see *Appendix 3 - PEOF Consultation Workshop* for meeting notes).

Targeted *Calotropis* surveys were conducted within the three major rivers/creeklines of Tharra, the Yule River, the Coorong Creek and the Turner River, and some of their minor tributaries. Wherever feasible, targeted surveys were undertaken as light vehicle reconnaissance. All *Calotropis* individuals encountered during these targeted surveys were recorded and controlled as per established methodology (see *Preliminary Findings - Targeted Calotropis surveys and control works*). Broad-scale weed mapping was also conducted throughout the project, to map the distribution of non-target weed species within the WAPR. Individual instances of weeds as point data using the QuickCapture App.

Multiple GPS units were used to record the distribution of *Calotropis procera*, the survey effort and all movements within Tharra. Relative density was calculated as the number of *Calotropis* plants recorded and controlled.

Photos, GPS data and track logs were backed up at the end of each trip, and these will be provided to the PEOF team via their preferred method.

Table 1: Project participants and trip dates.

Project participants				
Trip 1	Trip 2	Trip 3 (incl. workshop)	Trip 4	Trip 5
26th June – 1st July	1st – 5th August	15th – 18th August	10th – 15th September	26th - 30th September
Stephen Stewart Snr. (28/6)	Damien Ball	Stephen Stewart Snr. (workshop only)	Margaret Stewart (11/9 – 13/9)	Biddy Norman
Margaret Stewart (28/6)	Michael Coffin	Irene Roberts (workshop only)	Damien Ball	Stephen Stewart Snr.
Stanley Ball Snr.	Danika Penson	Stanley Ball Snr.	Stanley Ball Jnr.	Margaret Stewart
Stanley Ball Jnr.	Drew Hatswell	Margaret Stewart (workshop only)	Amanda Stream	Amanda Stream
Damien Ball		Elizabeth Coffin	Michael Coffin	Damien Ball
Danika Penson		Michael Coffin	Davis Hicks (11/9 – 13/9)	Danika Penson
James Dolin		Davis Hicks (workshop only)	Danika Penson	James Dolin
		Danika Penson	James Dolin	
		Drew Hatswell		

3. Preliminary Findings

Targeted *Calotropis* surveys and control works

Targeted *Calotropis* surveys were conducted in the river systems of Tharra over five on-country trips throughout 2022. The Yule River, Coorong Creek, Turner River and several minor tributaries were surveyed in light vehicles and all *Calotropis* plants encountered were recorded and controlled using established methodology (see *Appendix 1 – Maps* for map of survey effort). While undertaking targeted *Calotropis* surveys within the riparian zones of Tharra, track logs were recorded on *GPS 2* to document survey effort. 106.2 km of targeted survey effort within riparian habitat was conducted over the five on-country trips (see *Table 2*).

Table 2: Track logs (km) recorded in riparian zones during targeted Calotropis surveys.

	Yule River	Yule River Tributary	Coorong Creek	Coorong Creek Tributary	Turner River	Turner River Tributary
Trip 1	17.3	14.5	15.9	-	-	-
Trip 2	4.1	24.0	-	-	3.0	-
Trip 3	-	-	-	3.7	0.9	-
Trip 4	-	-	-	4.1	8.1	-
Trip 5	-	-	-	-	10.01	0.55
ALL TRIPS	21.4	38.5	15.9	7.8	22.0	0.55

When a *Calotropis* plant or infestation (multiple *Calotropis* plants in the same area) was observed, the location of the plant or extent of the infestation was recorded as a track log on *GPS 3*, the number of plants and any observations were recorded in a field notebook and the plant(s) was controlled by the ranger team. Small *Calotropis* individuals or plants growing in loose, sandy soil were pulled out by hand, and larger *Calotropis* plants were controlled using the 'cut and paint' method.

The 'cut and paint' method entailed severing trees at their base, using either loppers or saws, and immediately 'painting' the stump with the gel herbicide Vigilant. Vigilant herbicide (active ingredient 4.47 g/L aminopyralid, 44.7 g/L picloram) was used throughout majority of this year's control efforts, as it has been shown to be the most effective control method (Jo Williams, Pilbara Mesquite Management Council, 2021 on-country training). In particularly dense infestation areas of the Turner River the herbicide Raizon (active ingredient 300 g/L triclopyr, 100g/L picloram) was used as a more cost-effective alternative. Vigilant and Raizon herbicides are recommended by the Department of Primary Industries and Regional Development for the chemical control of *Calotropis procera* (DPIRD, 2016).

Plate 1: Targeted Calotropis surveys being conducted in light vehicles.



Plate 2: Ranger Margaret Stewart (L) ready to apply Vigilant herbicide as Damien Ball (R) uses loppers to cut a Calotropis plant.



Plate 3: Amanda Stream pulling out Calotropis seedlings growing within creekline vegetation and debris in a Turner River tributary.



Plate 4: Ranger Michael Coffin (L) using QuickCapture to map weed distribution and Ranger Stan Ball Jnr. (R) tallying *Calotropis* plants.



Calotropis procera was encountered and controlled within the Yule River, Coorong Creek, Turner River and two minor tributaries throughout the 2022 targeted survey effort, and a total of 1424 *Calotropis* plants controlled across the five field trips (see *Appendix 1 – Maps* for a map of *Calotropis* distribution). Majority of the *Calotropis* plants observed were within the main body and a minor tributary of the Turner River; with a total of 1211 *Calotropis* plants recorded controlled in the main body of the Turner River and 159 plants controlled in a Turner River tributary.

Table 3: Number of *Calotropis procera* plants controlled in creeklines within Tharra in 2022.

Creekline	<i>Calotropis procera</i>
Yule River	8
Yule River Tributary	0
Coorong Creek	43
Coorong Creek Tributary	3
Turner River	1211
Turner River Tributary	159

The most dense *Calotropis* infestation encountered this year was south of Pulkunah Spring in the Turner River; a total of 800 *Calotropis* plants were controlled within a 1.5 km stretch of creekline, with 703 of these plants growing within a 550 m stretch of creekline. A high instance of regrowth following control was observed within this infestation, with majority of the mature *Calotropis* plants within this dense infestation having regrown from cut stumps (previously controlled in 2021). The same level of regrowth following control was not observed at any other infestation, and regrowth of *Calotropis* plants following control was only observed within the Turner River.

Plate 5: Dense Calotropis infestation in the Turner River, south of Pulkunah Spring, prior to control.



Plate 6: Dense Calotropis infestation in the Turner River, south of Pulkunah Spring, following control efforts on Trip 4.



Plate 7: A Calotropis plant, south of Pulkunah Spring, re-controlled on Trip 4 after regrowing following control last year.



An in-depth summary and analysis of the data collected during this year’s targeted *Calotropis* surveys and control, along with field observations and management recommendations, will be provided in the upcoming Annual Progress Report. This will include comparisons to data collected during *Calotropis* control works conducted in 2021.

Broad-scale weed mapping

Broad-scale weed mapping was conducted opportunistically during light vehicle reconnaissance and on foot during targeted *Calotropis* surveys, and when moving between sites. Observed instances of weeds were recorded as point data using the ArcGIS application Quick Capture. This point data indicates the presence of a weed species in the location of the record, however due to the opportunistic nature of the data collection in the field it does not represent total distribution. Additionally, observations numbers are not representative of the number of individuals encountered for each weed species.

Currently, only the QuickCapture data from Trip 3, 4 and 5 are presented. Broad-scale weed mapping data (along with visualisations of said data) from all five field trips will be presented in the upcoming Annual Progress Report.

Six weed species were identified and recorded, across a total of 651 observations, within Tharra over PEOF Trips 3, 4 and 5 in 2022 (see *Table 4*). A total of 651 observations were recorded across Trip 3, 4 and 5, with the most frequently recorded species being *Cenchrus ciliaris* (290 observations) followed by *Calotropis procera* (224 observations) and *Aerva javanica* (104 observations).

Table 4: Weed species and observation frequency recorded in the WAPR on Trip 3, 4 and 5.

Introduced species	Observations
<i>Aerva javanica</i>	104
<i>Calotropis procera</i> (WONS)	224
<i>Cenchrus ciliaris</i>	290
<i>Cenchrus setiger</i>	8
<i>Chloris virgata</i>	20
<i>Vachelia farnesiana</i>	2
<i>Phoenix dactylifera</i>	3

Plate 8: An example of how Buffel Grass (*Cenchrus ciliaris*) can take over the understorey along river banks, photo taken in the Yule River.



Other environmental data

Priority species *Gymnanthera cunninghamii* was observed and recorded several times during the targeted *Calotropis* surveys within both the Turner River, Coorong Creek and a Coorong Creek tributary. This plant is listed as Priority 3 (P3) on the Declared Rare and Priority Flora List. The locations of *Gymnanthera cunninghamii* occurrences were recorded as GPS Waypoints, and population estimates were made wherever time permitted. Data relating to the number of *Gymnanthera cunninghamii* individuals and populations observed, along with their distribution throughout the river systems of Tharra, will be provided in the upcoming Annual Progress Report.

Plate 9: *Gymnanthera cunninghamii* (P3) observed in tributary of the Coorong Creek within Tharra.



4. Summary

Infestations of *Calotropis* were found within all surveyed river systems of the Woodstock Abydos Protected Reserve (Yule River including Coorong Creek, Turner River) during 2022 works. Observed patterns of *Calotropis* distribution and density remained consistent with the findings in 2021, with high levels of infestation recorded within the Turner River, and comparatively scarce instances of *Calotropis* within the Yule River and Coorong Creek. Within the Yule River and Coorong Creek, *Calotropis* plants were generally young plants or saplings, suggesting many of these were coloniser individuals in the area.

In the Turner River, mature plants controlled in 2021 were found to have a high propensity for re-shooting after treatment and required secondary control in 2022. Only plants that had transitioned from herbaceous to woody stems were found to re-shoot. Re-shooting was only observed within the Turner River infestations and highest rates of re-shooting was observed within the large infestation south of Pulkunah Spring. Areas with mature plants and re-shooting have been flagged for priority follow-up monitoring and control next year. Additional recommendations based on field observations and feedback from Budadee Rangers and Elders will be presented in the upcoming Annual Progress Report.

5. References

Department of Primary Industries and Regional Development, 2016. *Calotropis* control. Available at: <https://www.agric.wa.gov.au/herbicides/calotropis-control> (Accessed 18 October 2022).

Plate 10: Budadee Rangers and TR Consultants pose for a photo the last day of Trip 5. From left to right: Bidy Norman, James Dolin, Margaret Stewart, Stephen Stewart Snr, Danika Penson, Amanda Stream and Damien Ball.



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