



ecoplanning
ecology | planning | offsets

Pomaderris queenslandica Propagation and Translocation Program



Annual Report 2020

Maules Creek Coal Mine

Prepared for: Whitehaven Coal

15 March 2021 Version: 1.0

PROJECT NUMBER	2020-160-09			
PROJECT NAME	Pomaderris queenslandica Propagation and Translocation Program			
	Annual Report 2020			
PREPARED FOR	Whitehaven Coal			
AUTHOR/S	Brian Towle			
REVIEW	Technical	QA	Version	Date to client
	Angela Bibby		1.0	15 March 2020
ACKNOWLEDGEMENTS	Cover photo taken from WHC (2019)			
LICENCES	Scientific Licence		SL101557	
	Bionet Sensitive Species Data Licence		1115	
	Animal Research Authority Ethics Licence		Fauna Surveys and Monitoring (16/346)	
	Scientific Collection - Aquatic		P19/0009-1.0 & OUT19/2602	

This report should be cited as: 'Ecoplanning (2021). – Pomaderris queenslandica Propagation and Translocation Program - Annual Report 2020. Prepared for Whitehaven Coal.'

Disclaimer: This report has been prepared by Ecoplanning Pty Ltd for Whitehaven Coal and may only be used for the purpose agreed between these parties, as described in this report. The opinions, conclusions and recommendations set out in this report are limited to those set out in the scope of works and agreed between these parties. Ecoplanning P/L accepts no responsibility or obligation for any third party that may use this information or for conclusions drawn from this report not provided in the scope of works or following changes occurring subsequent to the date that the report was prepared.

ECOPLANNING PTY LTD | 74 HUTTON AVENUE BULLI NSW 2516 | P: (02) 4244 2736



Contents

1	Summary	1
2	Introduction.....	2
3	Methods.....	3
3.1	Previous cuttings trial	3
3.2	Translocation trials	3
3.3	Seed collection	6
3.4	Soil seedbank transfer	8
4	Results and discussion.....	10
4.1	Rainfall	10
4.2	Cuttings trial	10
4.3	Translocation trials.....	10
4.4	Seed collection	11
4.5	Soil seedbank transfer	12
5	References	13

Figures

Figure 3.1:	Location of planted <i>Pomaderris queenslandica</i> within Wollandilly Biodiversity Offset.....	5
Figure 3.2:	Survey areas for <i>Pomaderris queenslandica</i> within Pilliga East State Forest, Jacks Creek State Forest and WHC Offset Properties.	7
Figure 3.3:	Location of <i>Pomaderris queenslandica</i> topsoil spreading	9
Figure 4.1:	Monthly rainfall totals for 2020 and mean monthly rainfall (Gunnedah BOM)	10

Plates

Plate 3.1:	Spread <i>Pomaderris queenslandica</i> topsoil within Teston South Offset Property (Source WHC).....	8
Plate 4.1:	Gauze bags installed on <i>Pomaderris queenslandica</i> at Rosevale Offset Property (Source: Fields Environmental).....	11

Glossary and abbreviations

Acronym	Description
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BOA	Biodiversity Offset Area
BMP	Biodiversity Management Plan
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
MCCM	Maules Creek Coal Mine
TFPP	Threatened Flora Project Plan
WHC	Whitehaven Coal

1 Summary

In accordance with s 4.1.2 and s 6.15 of the approved Biodiversity Management Plan (BMP) for Maules Creek Coal Mine (MCCM), a *Pomaderris queenslandica* Propagation and Translocation Program was prepared and included as Appendix D of Maules Creek Coal Mine Biodiversity Management Plan (WHC 2017). This document was superseded by the 'Threatened Flora Project Plan' (TFPP) prepared by EcoPlanning (2020a). The TFPP describes how WHC will undertake monitoring of threatened flora species (including *P. queenslandica*) and implement actions to manage threatened flora species, within and adjacent to WHC mining operations and Biodiversity Offset Areas (BOAs).

In 2020, ongoing monitoring and management of *P. queenslandica* has been in accordance with the Propagation and Translocation Plan and the TFPP including additional germination trials (from seed collected in 2016) which resulted in 34 *P. queenslandica* individuals being planted at designated recipient sites across WHC BOAs. Additionally, successful seed collection occurred in 2020 which will allow for additional future germination trials and future translocations of *P. queenslandica* into WHC BOAs.

2 Introduction

This report has been prepared to document results of management actions and monitoring surveys conducted for *P. queenslandica* in 2020. This report is a summary of quarterly monitoring reports prepared by Ecoplanning (2020b, c, d, e).

Pomaderris queenslandica is a threatened flora species listed as Endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act). It is a medium-sized woody shrub 2–3 m high with whitish stems which are shortly stellate-tomentose with some scattered, longer, simple hairs (PlantNET 2020). In NSW the species is rare, occurring north from approximately the Hunter Valley and becoming more common in Queensland (PlantNET 2020). It is generally found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks (OEH 2020).

The species was identified at MCCM in 2015. Management actions undertaken by WHC to date for *P. queenslandica* have been in accordance with the *Pomaderris queenslandica* Propagation and Translocation Program (MCCM BMP 2017 Appendix D) and the TFPP (WHC 2019; Ecoplanning 2020a), as documented annually in the MCCM Annual Reviews.

The *Pomaderris queenslandica* Propagation and Translocation Program (MCCM BMP 2017 Appendix D) is made up of the following stages:

- Stage 1 – Root architecture study (complete);
- Stage 2 – Seed collection (complete);
- Stage 3 – Cuttings propagation (complete);
- Stage 4 – Seed germination (complete); and
- Stage 5 – Translocation trials (ongoing).

Stages 1 – 4 of the previous *Pomaderris queenslandica* Propagation and Translocation Program (MCCM BMP 2017 Appendix C) have been completed and documented in previous annual reviews (WHC 2019). During 2020, WHC (through its specialist consultants) continued research into Stage 5 of the translocation program.

In 2020 an updated TFPP (Ecoplanning 2020a) and *P. queenslandica* Restoration and Translocation Strategy (Ecoplanning 2020f) were prepared which supersede the previous documents (WHC 2019; MCCM BMP 2017 Appendix D). Ongoing monitoring and management actions outlined within the updated TFPP (Ecoplanning 2020a) and Restoration and Translocation Strategy (Ecoplanning 2020f) for *P. queenslandica* are as follow:

- Ongoing monitoring of the translocated individuals for life cycle/biology analysis.
- Identification of additional natural populations of *P. queenslandica* by further targeted searches in the adjacent State Forest and other WHC managed land. This will allow expansion of the monitoring program to increase measurements of life cycle/biology and seed collection/production monitoring; and
- Further germination trials and propagation of *P. queenslandica* seeds for future translocation.

3 Methods

3.1 Previous cuttings trial

Previous propagation of cuttings found only one successful strike from over 400 cuttings. In November 2017 the single *P. queenslandica* plant grown from a cutting was planted at the Wollandilly Offset site. A drainage line within the upper slopes of the Wollandilly Offset site, which supported regenerating *Eucalyptus albens* and had previously been identified as suitable habitat for *P. queenslandica*, was selected as the planting location for the single successful cutting (**Figure 3.1**). The *P. queenslandica* was planted within the vicinity of large *Eucalyptus albens* (White Box) trees, in a position that would provide shade for the *P. queenslandica*, whilst avoiding competition for soil moisture with the large root systems of the mature trees. A protective enclosure around the *P. queenslandica* was added following damage caused by macropods.

As documented in the 2017 Annual Report for *P. queenslandica* (WHC 2018), the planted *P. queenslandica* was watered weekly. In November 2019, an altered monthly watering regime was established for the planted *P. queenslandica*. Watering was not undertaken when at least 20 mm of rainfall was recorded in the preceding month. In such instances, watering was set to continue the following month.

Inspections of the planted *P. queenslandica* were undertaken quarterly throughout 2019 and 2020 to observe overall condition/health, any new growth and any reproductive features (flowers, seed production).

3.2 Translocation trials

A second seed germination trial by BioBankSeed was commenced during 2019 in accordance with the previous TFPP (WHC 2019). Details of the seed germination techniques are detailed in the 2019 Annual Report (Ecoplanning 2020g). On 6 July 2020, a total of 34 *P. queenslandica* seedlings that germinated as part of the germination trial were planted into five enclosures within WHC Offset Properties (**Table 3.1**).

Recipient sites for the 34 plants planted in July 2020 were selected according to physical, biotic, and management criteria and in locations where environmental variables (vegetation communities, slope, elevation, vegetation structure etc.) matched previously known populations or habitat. These selected recipient sites were sufficiently spread to ensure that any stochastic environmental conditions, such as fire, were unlikely to impact the entire translocated population. Four Offset Properties were selected as optimal recipient sites based on the above features for the successful translocation of 34 *P. queenslandica* plants: Kelso (1 site), Louenville (1 site), Teston South (1 site) and Wollandilly (2 sites; **Figure 3.1**; **Table 3.1**). In July 2020, the 34 *P. queenslandica* plants were planted across the five recipient sites, with seven (7) *P. queenslandica* individuals planted within each recipient site except Kelso (six plants; **Table 3.1**; **Figure 3.1**).

Fences were erected around each recipient site to protect translocated plants from macropods, with a minimum dimension of 10 x 10 m. After initial regular watering following planting, a watering regime has been established which aims to replicate natural periods of wetting and

drying more closely. Continued monitoring in 2020 will observe how the transplanted individuals respond to the translocation and watering regime.

In accordance with the updated TFPP (Ecoplanning 2020a), monitoring of translocated plants is to take place monthly for the first year after a seedling is planted, quarterly for the two proceeding years and biannually after that. Monitoring is to continue for a minimum of five years after planting, dependent on the success of the translocation program and availability of seed for collection during the preceding five years. Monitoring of translocated individuals has included recording of the following data:

- Height / vegetative growth
- Plant health / vigour (**Table 3.2**).
- Reproductive status (**Table 3.2**).
- Observations of herbivory or other damage

Table 3.1: Translocated *Pomaderris queenslandica*

Property name	Location (GDA 94 z 56)		Plant numbers
	Easting	Northing	
Kelso	219156	6610941	32, 33, 34, 14, 15, 16 (six plants)
Louenville	221857	6613685	1, 2, 3, 25, 26, 27, 28 (seven plants)
Teston South	222021	6613131	10, 11, 12, 13, 29, 30, 31 (seven plants)
Wollondilly (west)	228380	6618086	5, 6, 7, 17, 18, 19, 20 (seven plants)
Wollondilly (east)	228859	6618134	4, 8, 9, 21, 22, 23, 24 (seven plants)

Table 3.2: Scale for scoring of plant health and reproductive status

Score	Plant health	Score	Reproductive status
1	Plant dead	1	No flowers (incl. buds) or fruits observed
2	Widespread dieback/damage	2	Isolated flowers or fruits
3	Dieback/damage observed on multiple branches	3	Flowering/fruitleting on 5 - 25% of branches
4	Minor dieback/damage evident on isolated leaves or branches	4	Flowering/fruitleting on 25 - 75% of branches
5	Healthy plant with no signs of dieback/damage	5	Flowering/fruitleting on 75 - 100% of branches

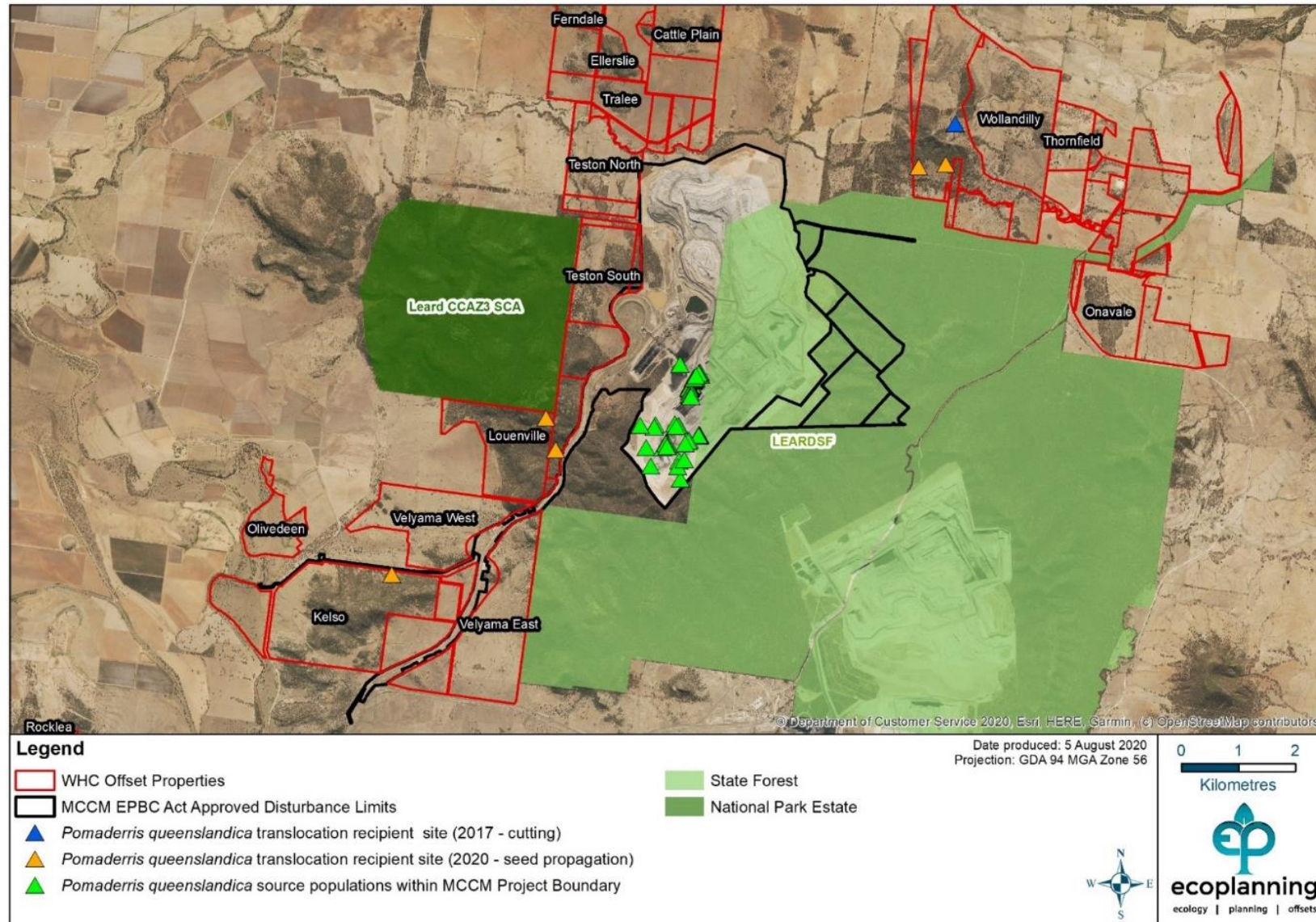


Figure 3.1: Location of planted *Pomaderris queenslandica* within Wollandilly Biodiversity Offset.

3.3 Seed collection

As documented in the updated TFPP (Ecoplanning 2020a) and the *Pomaderris queenslandica* Restoration and Translocation Strategy (Ecoplanning 2020f), translocation via seed collection, propagation and planting, represented the most effective way to achieve the aims of the translocation strategy.

To maximise the probability of collecting seed, plants from known populations were inspected during the flowering period (Spring to Summer) to detect flowering individuals. Inspections of known populations of *P. queenslandica* within Jacks Creek State Forest, Pilliga East State Forest and WHC Offset Properties (Narrabri Onsite Offset, properties of Rosevale, Greylands Rd, Kurrajong Park, West Haven) were undertaken on 17 September 2020 (**Figure 3.2**). Inspections of potential habitat for *P. queenslandica* were also undertaken within Leard State Forest on 14 September, 30 September and 1 October 2020. It is noted that searches for seed within State Forests were limited to those areas covered by Forest Permits and were in accordance with Threatened Species Licence C005930.

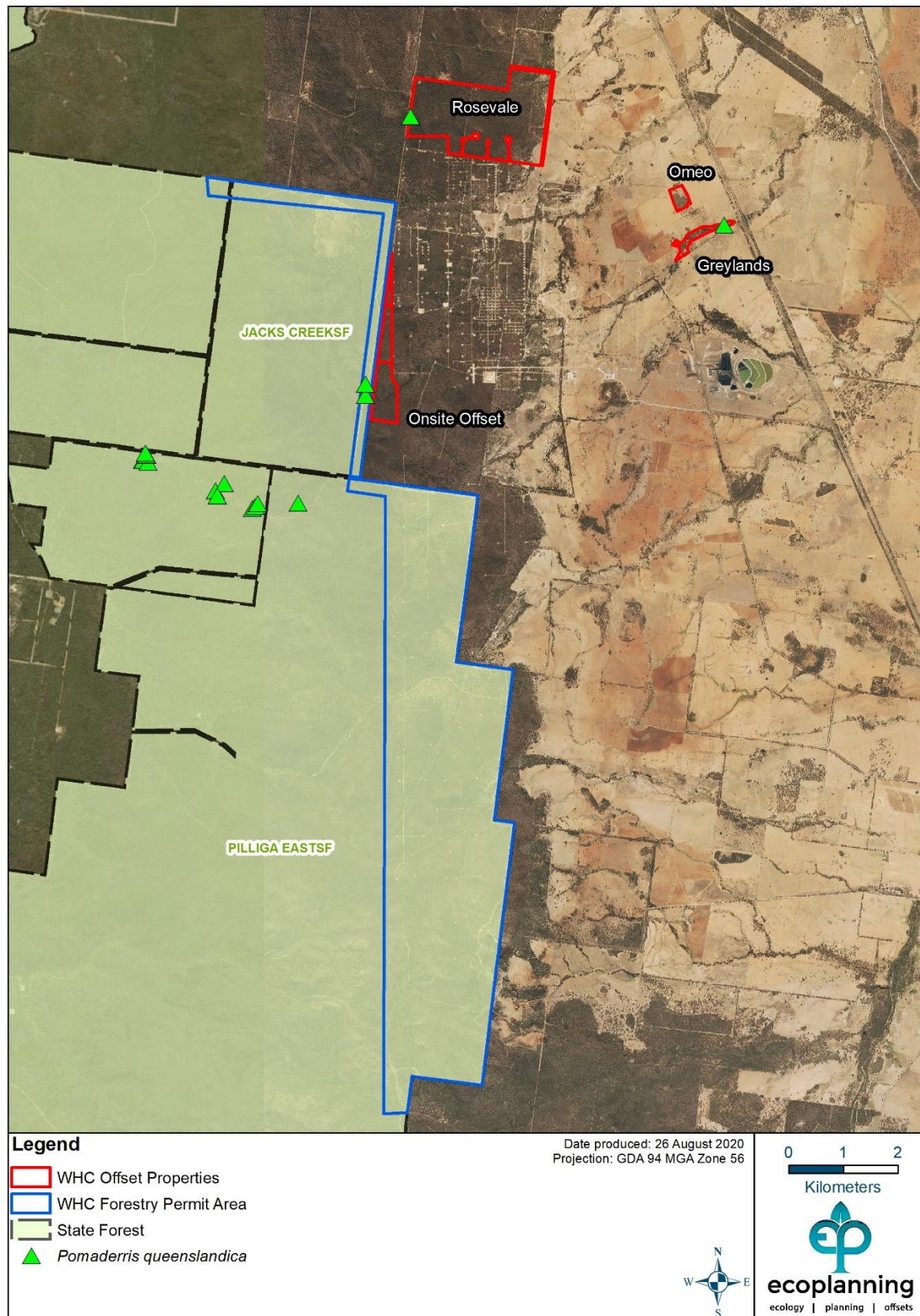


Figure 3.2: Survey areas for *Pomaderris queenslandica* within Pilliga East State Forest, Jacks Creek State Forest and WHC Offset Properties.

3.4 Soil seedbank transfer

In 2015, topsoil was collected from around the *P. queenslandica* populations inside the 2015 MCCM disturbance area and stockpiled. Loose topsoil was scraped off the surface from an area bounded by approximately 1 m outside of the drip line of the outer plants of a population. This topsoil was sieved and searched for seeds. A total of forty (40) seeds were retrieved and these were used in an initial germination trial. Upon final clearing, all the topsoil from around the plants was collected and stored for later transfer to a site suitable for in situ germination. Topsoil was stored in piles no greater than 1 m deep.

On 1 September 2020, this topsoil was spread on the Teston South Offset Property (**Figure 3.3**). The topsoil recipient site selected was located at the interface between previously disturbed and regenerating grasslands and woodland areas whilst also being in proximity to a minor drainage line. This location has been selected so that disturbance to existing woodland areas was avoided during topsoil transfer while ensuring any *P. queenslandica* which germinate are in suitable habitat and afforded some shading from adjacent woodland areas. The location of the soil transfer is shown in **Figure 3.3**.

In preparation for topsoil transfer, the recipient area was fenced, broad-leaved weeds were sprayed with herbicide, vegetation was slashed and the area was lightly ripped along the contours as an erosion control measure and to aid water infiltration and aeration. Existing topsoil was retained (not removed) as the stockpiled soils were considered likely to have undergone nutrient leaching and loss of soil microbe diversity. Topsoil was spread directly from a truck with a limited tray opening, to approximately 10 – 20 cm in depth. This avoided any need to spread any soil with machinery and potentially compact the topsoil.



Plate 3.1: Spread *Pomaderris queenslandica* topsoil within Teston South Offset Property (Source WHC)



Figure 3.3: Location of *Pomaderris queenslandica* topsoil spreading

4 Results and discussion

4.1 Rainfall

Weather and in particular drought conditions, have been identified as the primary influence on monitoring projects in previous seasons (Ecoplanning 2020f). Monthly rainfall data as recorded at the Wollandilly Offset Property (Advitech 2020), indicates that rainfall in 2020 was above average (783 mm recorded in 2020 compared to long-term average of 615 mm). In particular, above average rainfall was recorded from January to April and again in December (**Figure 4.1**). Drier conditions including well below average rainfall occurred in May, June and November while close to average rainfall was recorded from July to October (**Figure 4.1**). The above average rainfall recorded in 2020 is in stark contrast to conditions recorded in previous seasons including below average rainfall from 2017 to 2019 (Ecoplanning 2020f).

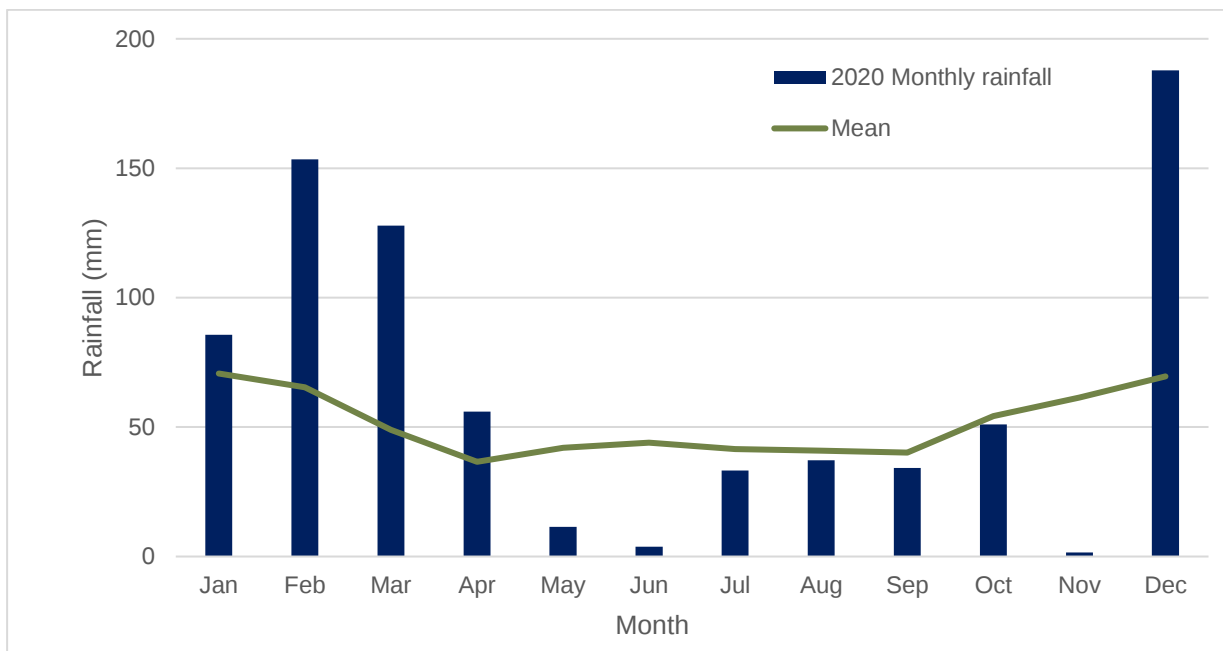


Figure 4.1: Monthly rainfall totals for 2020 and mean monthly rainfall (Gunnedah BOM)

4.2 Cuttings trial

In March 2020, the single *P. queenslandica* plant was recorded as dead, having died since the last inspection in December 2019, with no foliage observed during the March 2020 inspection. Inspections of the plant continued in subsequent quarters of 2020, to detect any signs of resprouting, although none were observed.

4.3 Translocation trials

The 34 individuals of *P. queenslandica* grown by BioBankSeed from seed collected in 2016 were planted on 6 July 2020 across five locations as shown in **Figure 3.1**.

Generally, most (~76 %) of the translocated plants remained in either a healthy condition or had only minor damage at the end of 2020, although a total of eight plants (~24 %) had widespread dieback or dieback across multiple branches (Condition 2 or 3; **Table 3.2**) in

December 2020. While some decline in condition may be due to hotter temperatures and water stress in the hotter summer months, the benefit of a slow-release fertiliser pill has also been trialled for plants with dieback. On 12 November 2020, a slow-release fertiliser pill was buried approximately 30 cm from the base and 50 mm deep, adjacent to Plant 4. The results of this fertiliser application will be reviewed in early 2021 prior to further application on plants which appear stressed.

Flowering of translocated *P. queenslandica* was recorded in 2020. In November 2020, approximately 40% of the plants had some evidence of flowering, although this peaked at approximately 50 % in September 2020. None of these flowers developed into fruits, as recorded during the December monitoring.

4.4 Seed collection

Searches for reproductive material of *P. queenslandica* on 17 September 2020 at known locations found between 15 to 20 plants in flower at the Rosevale Offset Property and additional flowering plants from the Pilliga East / Jacks Creek State Forest populations (**Figure 3.2**).

Seed collection from the Rosevale Offset Property and Pilliga East / Jacks Creek State Forest populations by Fields Environmental commenced on 30 October 2020 and involved placement of synthetic gauze bags and a zip tie on *P. queenslandica* individuals (**Plate 4.1**). Additional seed collections occurred on the 14 and 20 November 2020 and involved collections from approximately 35 individuals comprising 10 % of the total seed on any one plant.

A total of 58 grams equivalent to 60,650 seeds was collected from *P. queenslandica* individuals across October and November 2020 with further potential for additional seed collection from gauze bags in early 2021. This successful seed collection will allow for additional seed germination trials and planting of nursery grown individuals into Whitehaven Offset Properties.



Plate 4.1: Gauze bags installed on *Pomaderris queenslandica* at Rosevale Offset Property (Source: Fields Environmental)

4.5 Soil seedbank transfer

No *P. queenslandica* were recorded within the topsoil transfer site during the reporting period. A number of weed species were identified as emerging within the topsoil transfer site in early November 2020 including *Xanthium occidentale* (Noogoora burr), *X. spinosum* (Bathurst burr), *Datura* sp. (Thornapple) and *Tribulus terrestris* (Caltrop). Manual removal of these weeds commenced in November 2020, with herbicide application avoided due to potential impacts to any germinating *P. queenslandica*. Quarterly monitoring of the topsoil translocation site is to occur in 2021.

5 References

- Advitech (2020). 21045 Bio Monthly Met 202012 (For Issue) Rev1 – Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020a). Threatened Flora Project Plan. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020b). Threatened Flora Monitoring – March 2020. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020c). Threatened Flora Monitoring – Second Quarter 2020. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020d). Threatened Flora Monitoring – Third Quarter 2020. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020e). Threatened Flora Monitoring – Fourth Quarter 2020. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020f). *Pomaderris queenslandica* Restoration and Translocation Strategy. Unpublished report prepared for Whitehaven Coal.
- Ecoplanning (2020g). *Pomaderris queenslandica* Propagation and Translocation Program: Annual Report 2019. Unpublished report prepared for Whitehaven Coal.
- NSW Office of Environment and Heritage (OEH) (2020). *Pomaderris queenslandica* – profile. Available online: <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10656> [last accessed 30 March 2020].
- PlantNET (The NSW Plant Information Network System) (2020). Royal Botanic Gardens and Domain Trust, Sydney. <http://plantnet.rbgsyd.nsw.gov.au> (last accessed 30 March 2020).
- Whitehaven Coal (WHC) (2017). *Maules Creek Coal Mine Biodiversity Management Plan*. Available online: <https://whitehavencoal.com.au/our-business/our-assets/maules-creek-mine/>
- Whitehaven Coal (WHC) (2018). Maules Creek Coal Mine *Pomaderris queenslandica* Propagation and Translocation Program Annual Report 2017. Unpublished report.
- Whitehaven Coal (WHC) (2019). *Threatened Flora Project Plan v 3.2*. Unpublished Report.