



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9237/3
Permit Holder:	Shire of Augusta Margaret River
Duration of Permit:	From 15 January 2022 to 15 January 2038

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of road construction or upgrades.

2. Land on which clearing is to be done

Cowaramup Bay Road reserve (PIN 11476612), Cowaramup

3. Clearing authorised

The permit holder must not clear more than 9 native trees within the area cross-hatched yellow in Figure 1, Figure 2, Figure 3 and Figure 4 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 15 January 2028.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

6. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known dieback or weed-affected soil, mulch, fill, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Fauna management – western ringtail possums and south-western brush-tailed phascogales

- (a) In relation to the area cross-hatched yellow in Figure 1, Figure 2, Figure 3 and Figure 4 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect that area, including all trees and tree hollows present, within 24 hours prior to, and for the duration of clearing, for the presence of *Pseudocheirus occidentalis* (western ringtail possum(s)) and *Phascogale tapoatafa* (southwestern brush-tailed phascogales).
- (b) Clearing activities must cease in any area where fauna referred to in condition 7(a) are identified until either:
 - (i) the western ringtail possum(s) and/or south-western brush-tailed phascogale individual has moved on from that area to adjoining *suitable habitat*; or
 - (ii) the western ringtail possum(s) individual(s) has been removed by a *western ringtail possum specialist* and/or the south-western brush-tailed phascogale individual(s) has been removed by a *fauna specialist*
- (c) Any western ringtail possum individuals removed in accordance with condition 7(b)(ii) of this permit must be relocated by a *western ringtail possum specialist* to *suitable habitat*.
- (d) Any south-western brush-tailed phascogale individuals removed in accordance with condition 7(b)(ii) of this permit must be allowed to disperse into adjacent vegetation or must be relocated by a *fauna specialist* to *suitable habitat*.
- (e) Where fauna is identified under condition 7(a) of this permit, the permit holder must provide the following records to the *CEO* as soon as practicable:
 - (i) the number of individuals identified;
 - (ii) the date each individual was identified;
 - (iii) the location where each individual was identified recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020(GDA94/2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iv) the number of individuals removed and relocated;
 - (v) the date each individual was removed;
 - (vi) the method of removal;
 - (vii) the date each individual was relocated;
 - (viii) the location where each individual was relocated, recorded using a GPS unit set to GDA94/2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; and
 - (ix) details pertaining to the circumstances of any death of, or injury sustained by, an individual.

8. Fauna management – black cockatoo habitat

- (a) Within 72 hours prior to undertaking any clearing authorised under this permit within the combined areas cross-hatched yellow on in Figure 1, Figure 2, Figure 3 and Figure 4 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect all *black cockatoo habitat trees* proposed to be cleared for *evidence* of current or past breeding use by *black cockatoo species* listed below:
 - (i) *Zanda lateriosis* (Carnaby’s cockatoo);
 - (ii) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo); and
 - (iii) *Zanda baudinii* (Baudin’s cockatoo).
- (b) Where *black cockatoo habitat tree/s* are identified under condition 8(a), the permit holder must engage a *fauna specialist* to map *black cockatoo habitat tree/s* within the permit area.
- (c) Each *black cockatoo habitat tree* identified must be inspected by a *fauna specialist* for *evidence* of current or past breeding use by *black cockatoo species*.
- (d) Where a *black cockatoo habitat tree* with no *evidence* of current or past use by *black cockatoo species* is identified in accordance with condition 8(a), that tree must only be cleared immediately after the inspection.
- (e) Where a *black cockatoo habitat tree* is identified within the combined areas cross-hatched yellow on Figure 1, Figure 2, Figure 3 and Figure 4 of Schedule 1 and that tree shows *evidence* of current or past breeding use by *black cockatoo species* under condition 8(c), and clearing of that tree cannot be avoided, that tree must be monitored by a *fauna specialist* to determine when it is no longer in use for that breeding season.
- (f) Any *black cockatoo habitat tree* with *evidence* of current breeding use by *black cockatoo species* must not be cleared whilst it is in use for that breeding season as determined by the *fauna specialist* under condition 8(e).
- (g) For each *potential black cockatoo habitat tree* identified that cannot be avoided, the permit holder must install an artificial black cockatoo nest hollow.
- (h) Each artificial black cockatoo nesting hollow required by condition 8(g) must be installed within one month of the commencement of any clearing activities otherwise authorised under this permit.
- (i) The artificial black cockatoo nest hollow(s) required by condition 8(g) of this permit must:
 - (i) be installed within the area cross-hatched red on Figure 5 of Schedule 1;
 - (ii) be designed and placed in accordance with the specifications detailed in Schedule 2; and
 - (iii) be monitored and maintained in accordance with the specifications detailed in Schedule 3, for a period of at least ten years.
- (j) Within two months of clearing authorised under this permit within the combined areas cross-hatched yellow Figure 1, Figure 2, Figure 3 and Figure 4 of Schedule 1, the permit holder must provide the results of the *fauna specialists* inspection to the *CEO*.
- (k) The *fauna specialists* inspection report must include the following;
 - (i) the location of the *black cockatoo habitat tree(s)* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020 (GDA94/GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (ii) the name and amount of each fauna species identified;
 - (iii) whether the *black cockatoo habitat tree/s* identified show current or past use

- by black cockatoo species;
- (iv) the methodology, used to survey the permit area;
- (v) a photo of the black cockatoo habitat tree(s) identified; and
- (vi) a description of the black cockatoo habitat tree(s) identified, including the:
 - (A) species of *black cockatoo habitat tree(s)*; and
 - (B) condition of the *black cockatoo habitat tree(s)*.

9. Offset – tree planting

- (a) The permit holder must, within six (6) months of undertaking clearing authorised under this permit or at an *optimal time*:
 - (i) undertake deliberate *planting* of at least 31 trees within the area hatched red in Figures 6-9 of Schedule 1, to provide foraging habitat for black cockatoos, the western ringtail possum and the south-western brush-tailed phascogale;
 - (ii) the trees planted shall include a combination of *Agonis flexuosa* and *Corymbia calophylla*;
 - (iii) ensure only *local provenance* propagating material is used for *planting* activities;
 - (iv) ensure *planting* is undertaken at an *optimal time*;
 - (v) ensure seedlings are of a suitable size of at least 1 metre in height; and
 - (vi) undertake *weed* control and watering of seedlings for at least three years post *planting*.
- (b) the permit holder must, within 24 months of *planting* the trees in accordance with condition 9(a) of this permit:
 - (i) engage an *environmental specialist* to make a determination that the planted 31 trees will survive;
 - (ii) if the determination made by the *environmental specialist* under condition 9(b)(i) is that any of the planted trees will not survive, the permit holder must plant additional trees that will result in 31 trees persisting within the area hatched red in Figures 6-9 of Schedule 1, in accordance with condition 9(a);
 - (iii) where additional *planting* of trees is undertaken in accordance with condition 9(b)(ii), the permit holder must repeat the activities required by conditions 9(a)(i)-(vi), and 9(b) of this permit.

PART III - RECORD KEEPING AND REPORTING

10. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) The number and species of trees cleared; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric

No.	Relevant matter	Specifications
		<p>Datum Australia 1994/2020 (GDA94/GDA2020), expressing the geographical coordinates in Eastings and Northings;</p> <p>(c) the date that the area was cleared;</p> <p>(d) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and</p> <p>(e) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 6;</p> <p>(f) actions taken to manage and mitigate impacts to western ringtail possums and south-west brush-tail phascogales in accordance with condition 7; and</p> <p>(g) actions taken to plant trees in accordance with condition 9.</p>
2.	In relation to black cockatoo fauna management pursuant to conditions 8	<p>(a) the time(s) and date(s) of inspection(s) of the suitable <i>black cockatoo habitat tree</i> by the <i>fauna specialist</i>;</p> <p>(b) a description of the inspection methodology employed by the <i>fauna specialist</i>;</p> <p>(c) the species name of any fauna determined by the <i>fauna specialist</i> to be occupying the suitable <i>black cockatoo habitat tree</i>;</p> <p>(d) where the suitable <i>black cockatoo habitat tree</i> is determined by the <i>fauna specialist</i> to be occupied by <i>black cockatoo species</i>:</p> <p>(i) the time and date that it was determined to be no longer occupied; and</p> <p>(ii) a description of the evidence by which it was determined to be no longer occupied; and</p> <p>(e) the time and date that the suitable <i>black cockatoo habitat tree</i> was cleared.</p>

11. Reporting

The permit holder must provide to the *CEO* the records required under condition 10 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
black cockatoo breeding trees	means black cockatoo habitat trees that exhibit evidence of current or past breeding use by black cockatoo species.
black cockatoo habitat trees	means trees that have a diameter, measured at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i>) that contain hollows suitable for breeding by black cockatoo species, as identified by a <i>fauna specialist</i> .
black cockatoo species	means one or more of the following species: (a) <i>Zanda lateriosis</i> (Carnaby's cockatoo); (b) <i>Zanda baudinii</i> (Baudin's cockatoo); and/or (c) <i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo).
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
evidence	means showing chew marks or scratchings on the habitat tree representative of the species being surveyed, the presence of the species entering or leaving the habitat tree, and/or the presence of chicks/young.
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
fill	means material used to increase the ground level, or to fill a depression.
Local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.

native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
Optimal time	means the period from May to October for undertaking <i>planting</i> and seeding
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
potential black cockatoo habitat trees	means trees that have a diameter, measured at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i>)
suitable habitat (western ringtail possum)	means habitat known to support western ringtail possums (<i>Pseudocheirus occidentalis</i>) within the known current distribution of the species, typically characterised by abundant foliage, presence of suitable nesting structures such as tree hollows, as well as high canopy cover and continuity. Known habitat includes peppermint (<i>Agonis flexuosa</i>) dominated woodlands, jarrah (<i>Eucalyptus marginata</i>) and marri (<i>Corymbia calophylla</i>) forests, riparian vegetation with a canopy of Bullich (<i>Eucalyptus megacarpa</i>) or flooded gum (<i>Eucalyptus rudis</i>), karri (<i>Eucalyptus diversicolor</i>) forests, sheoak (<i>Allocasuarina fraseriana</i>) dominated woodlands, and other stands of myrtaceous trees growing near swamps, watercourses or floodplains.
Suitable habitat (south-western brush-tailed phascogale)	Suitable habitat for southwestern brush-tailed phascogale is typically characterised by dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.
western ringtail possum specialist	means a <i>fauna specialist</i> who holds a tertiary qualification specialising in environmental science or equivalent, has a minimum of two years of work experience in western ringtail possum (<i>Pseudocheirus occidentalis</i>) identification, surveys of western ringtail possums and capture and handling of western ringtail possums, and holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .

END OF CONDITIONS



Meenu Vitarana
Manager

NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

4 November 2022

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

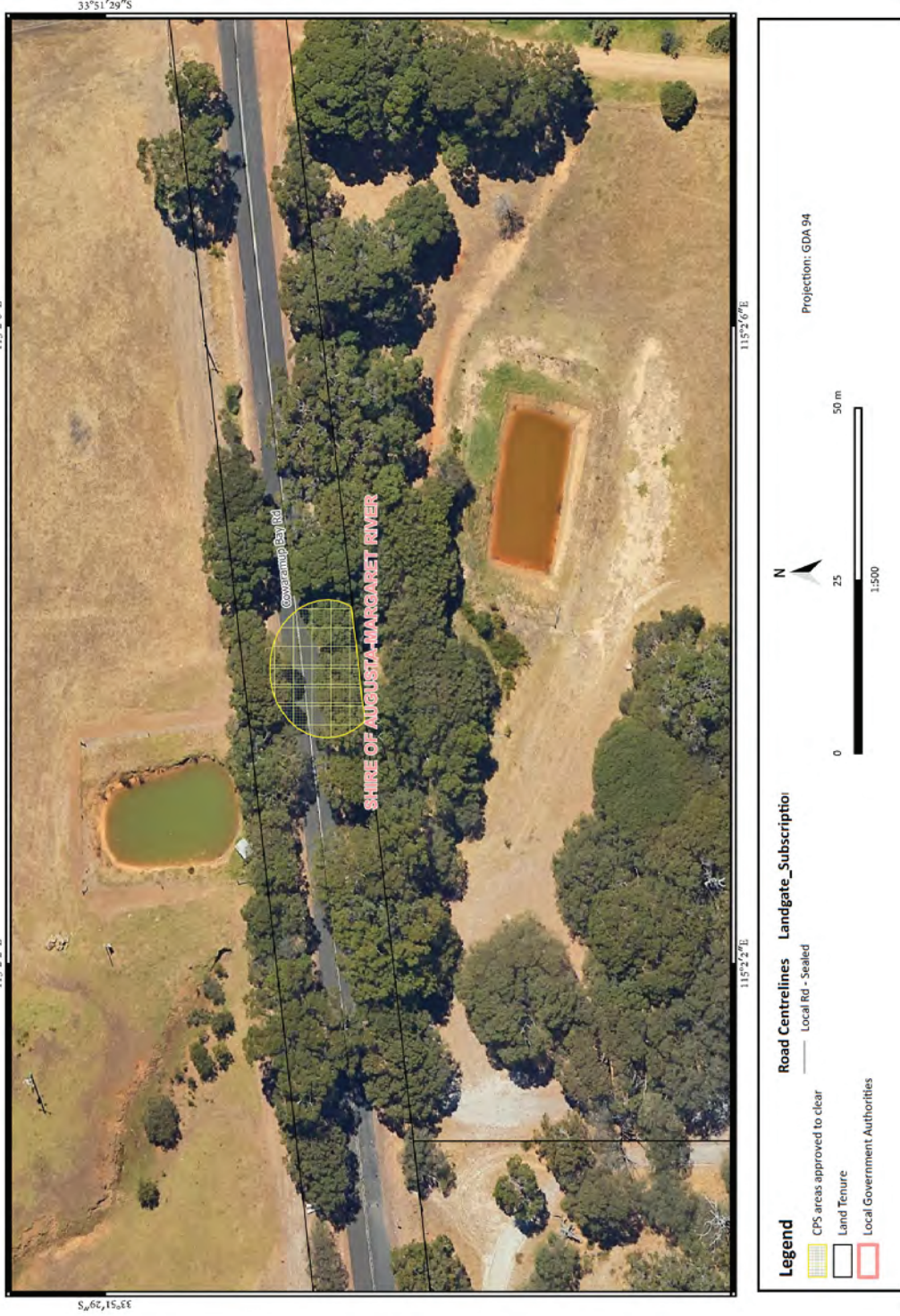


Figure 1: Map of the boundary of the area within which clearing may occur



Figure 2: Map of the boundary of the area within which clearing may occur



Figure 3: Map of the boundary of the area within which clearing may occur



Figure 4: Map of the boundary of the area within which clearing may occur



Figure 5: The boundary of the area within which the artificial black cockatoo nest hollow(s) required by condition 8(g) of this permit applies

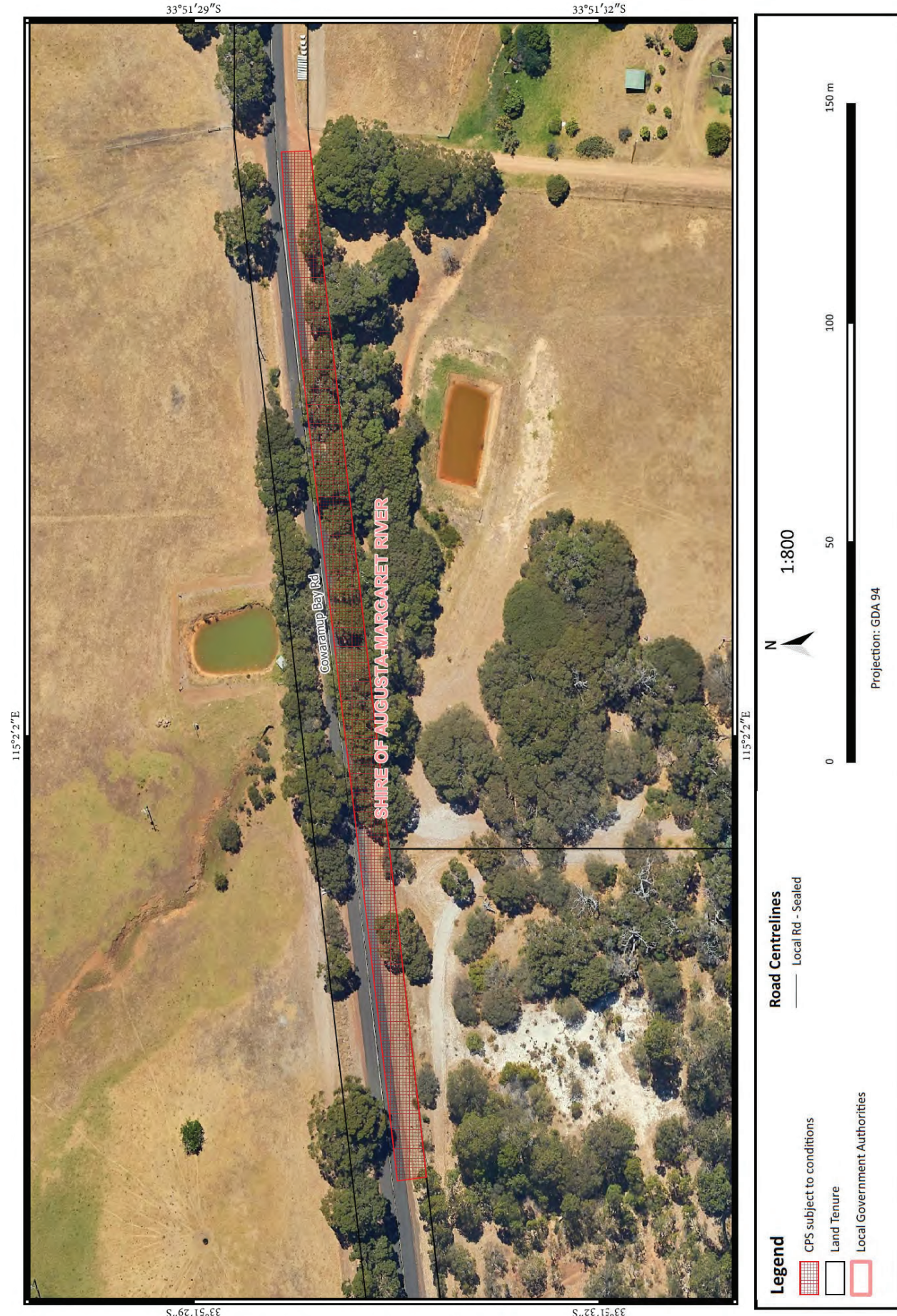
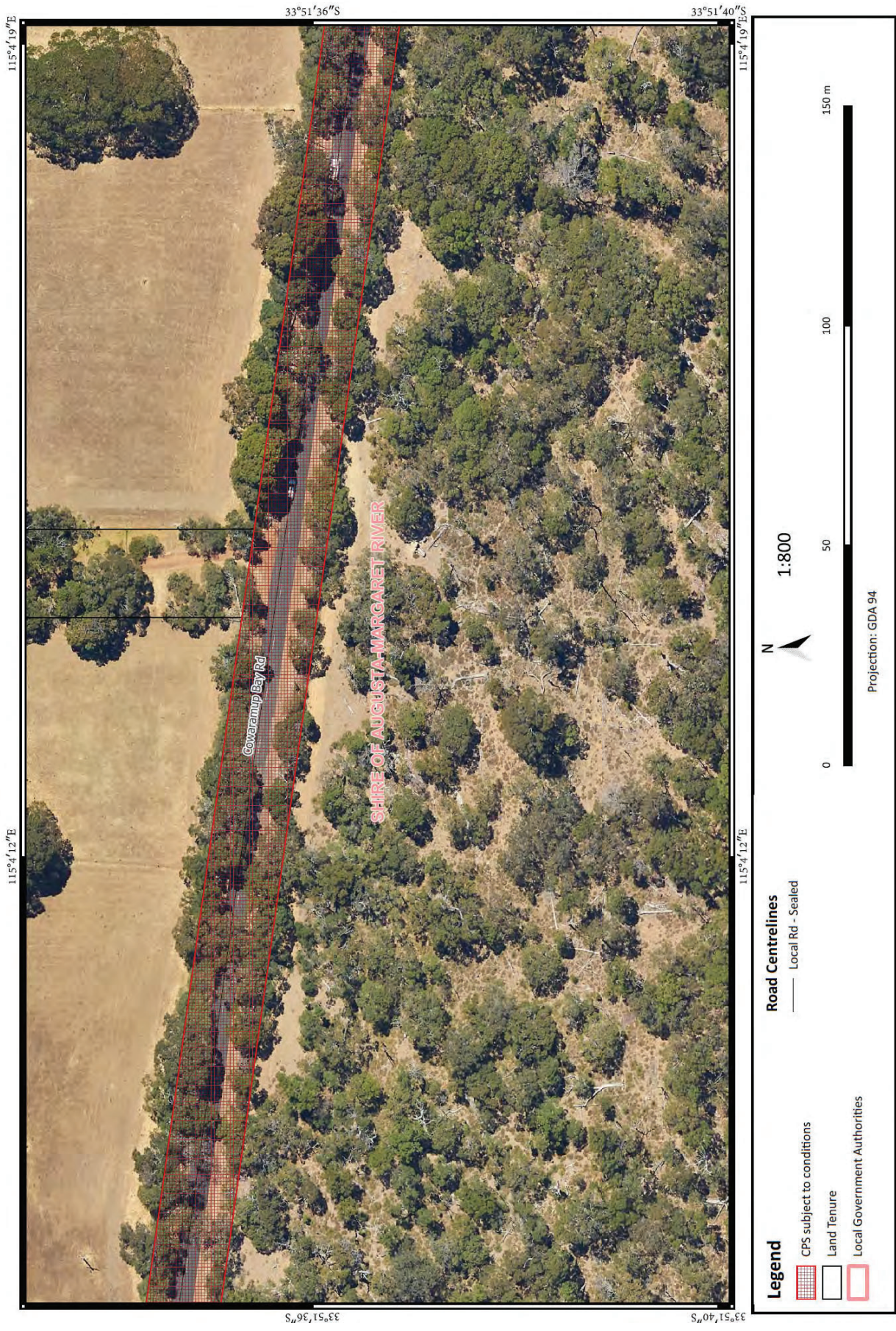


Figure 6: The boundary of the area subject to offset conditions (Condition 9)



Figure 7: The boundary of the area subject to offset conditions (Condition 9)



Legend

- CPS subject to conditions
- Land Tenure
- Local Government Authorities

Road Centrelines

- Local Rd - Sealed

N 1:800

0 50 100 150 m

Projection: GDA 94

Figure 8: The boundary of the area subject to offset conditions (Condition 9)

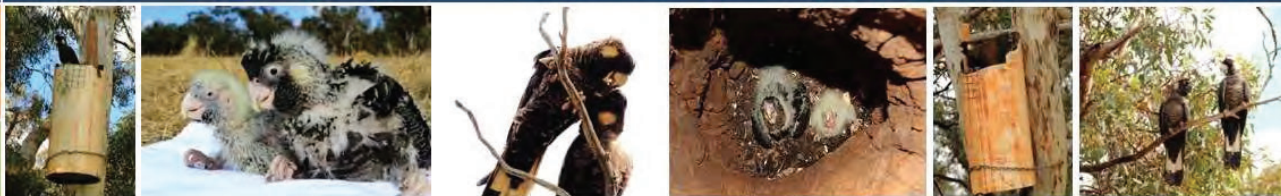


Figure 9: The boundary of the area subject to offset conditions (Condition 9)

Schedule 2 – How to design and place artificial hollows for Carnaby’s Cockatoo



Artificial hollows for Carnaby's cockatoo



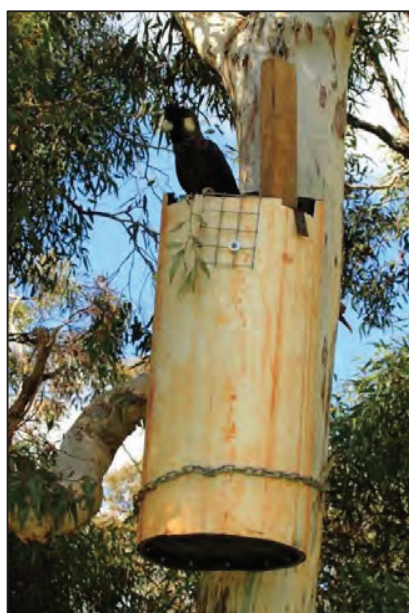
How to design and place artificial hollows for Carnaby's cockatoo

Artificial hollows can be used to help conserve the threatened Carnaby's cockatoo by enabling the cockatoos to breed in areas where natural hollows are limited.

A wide variety of artificial hollow designs have been used with mixed success. Evidence suggests that, while the hollow must meet some basic requirements, other factors such as proximity to existing breeding areas may be more important in determining the success of artificial hollows. Before using this information sheet to construct or install an artificial hollow, you should refer to the criteria listed in the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

This information sheet contains broad guidelines for the design and placement of artificial hollows for Carnaby's cockatoo.

Below are three examples of successful artificial hollows used by Carnaby's cockatoo for nesting. Artificial hollows made from a natural log with cut side entrance (left), white industrial pipe with top entrance (centre) and natural log with natural side entrance (right).



Photos by Christine Groom (left and right) and Rick Dawson (centre)

Walls

The walls of the artificial hollow need to be constructed from a material that is;

- Durable enough to withstand exposure to elements for an extended period of time (i.e. 20+ years).
- Able to simulate the thermal properties of a natural tree hollow.
- Not less than 380 mm in internal diameter.
- Preferably 1.2 m deep overall and 1m deep to top of substrate/nesting material.

Successful artificial hollows have been constructed from sections of salvaged natural hollow, black and white industrial pipe. When using non-natural materials care must be taken to ensure there are no toxic residues and that the materials are safe to ingest.

Base

The base of the artificial hollow must be;

- Able to support the adult and nestling(s).
- Durable enough to last the life of the nest.
- Free draining.
- At least 380 mm in diameter.
- Covered with 200 mm of sterile, dry, free draining material such as charcoal, hardwood woodchips or wood debris.

Do not use:

- Saw dust or fibre products that will retain moisture.

Example materials that could be used for artificial hollow bases include heavy duty stainless steel, galvanised or treated metal (e.g. Zinalume ®), thick hardwood timber slab or marine ply (not chipboard or MDF). The base material must be cut to size to fit internally with sharp or rough edges ground away or curled inwards and fixed securely to the walls.



Carnaby's cockatoo eggs in an artificial hollow.
Photo by Rick Dawson

Entrance

The entrance of the artificial hollow must;

- Have a diameter of at least 270 mm).
- Preferably be top entry which will minimise use by non-target species.

Top entry hollows are unattractive to nest competitors such as feral bees, galahs and corellas. Side entry hollows have been successful in areas where feral bees are not a problem and where galahs and corellas are deterred.

Ladder

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide a ladder to enable the birds to climb in and out of the hollow easily.

The ladder must be;

- Securely mounted to the inside of the hollow.
- Made from an open heavy wire mesh such as WeldMesh™ with mesh size of 30 - 50 mm, or heavy chain.

Do not use:

- A material that the birds can chew.
- Galvanized because the birds may grip or chew the ladder and ingest harmful compounds.

If using mesh for the ladder, the width will depend on the curvature of the nest walls. A minimum width of about 60 - 100 mm is recommended.

Sacrificial chewing posts

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide sacrificial chewing posts. The birds chew material to prepare a dry base on which to lay their egg(s).

The sacrificial chewing posts must:

- Be made of untreated hardwood such as jarrah, marri or wandoo
- Be thick enough to satisfy the birds' needs between maintenance visits.
- Extend beyond the top of the hollow as an aid to see whether the nest is being used.
- Be placed on the inside of the hollow.
- Be attached in such a way that they are easy to replace e.g. hook over the top of hollow or can slide in/out of a pair of U bolts fitted to the side of the hollow.

It is recommended that at least two posts are provided. Posts 70 x 50 mm have been used, but require replacing at least every second breeding season when the nest is active. Birds do vary in their chewing habits and therefore the frequency at which the chewing posts require replacement will also vary.



Bottom of an artificial hollow showing ladder that is fixed to the wall and a chewed sacrificial post which is 200 mm from the floor.

Photo by Rick Dawson

Mountings

The artificial hollows must be mounted such that:

- The fixings used will last the duration of the nest e.g. galvanized bracket or chain fixed with galvanized coach screws.
- It is secured by more than one anchor for security and stability.
- It is positioned vertically or near vertically.

Placement

Sites should be chosen within current breeding areas and where they can be monitored, but preferably not conspicuous to the general public. It is important that artificial hollows are placed where they will be accessible for future monitoring and maintenance. For more detail refer to the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

The height at which artificial hollows should be placed is variable. The average height of natural hollows in dominant tree species in the area is a good guide. Natural hollows used by Carnaby's cockatoos have been recorded as low as 2 m above the ground. If located on private property the hollows can be placed lower to the ground so they are accessible by ladder or a rope and pulley system can be used. Where public access is possible artificial hollows should be placed at least 7 m high (i.e. higher than most ladders) and on the side of the tree away from public view to reduce the chance of interference or poaching.

Carnaby's cockatoo show no preference for aspect of natural hollows, however, it may still be beneficial to place artificial hollows facing away from prevailing weather and where they receive the most shade and protection.

Artificial hollows to be placed in trees require:

- Accessibility of the tree for a vehicle, elevated work platform or cherry picker.
- A section of trunk 2-3 m long suitable for attaching the hollow

If necessary, artificial hollows may be placed on poles, but this may result in excessive exposure to sun during very hot weather. When erected on poles there should be"

- A hinge at the bottom of the pole that can be secured when the pole is in the upright position.
- Access for a vehicle to assist raising the pole.

Safety

Care needs to be taken when placing artificial hollows to ensure safety is considered at all times. Artificial hollows are heavy and require lifting and manoeuvring into position up to 7 m above the ground.

Maintenance and monitoring

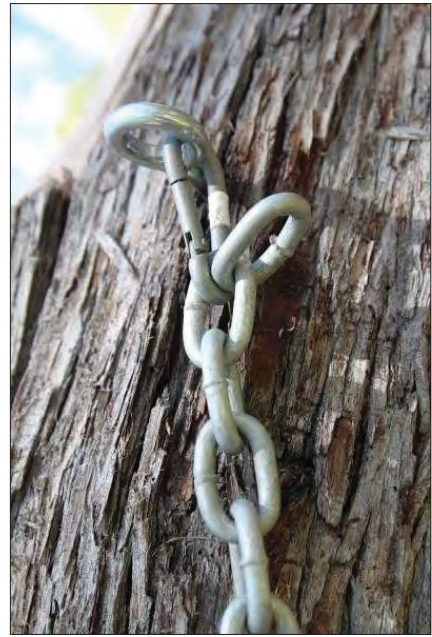
Once artificial hollows have been placed they require monitoring and maintenance to ensure they continue to be useful for nesting by Carnaby's cockatoo. It is important to monitor artificial hollows to determine use by Carnaby's cockatoo, other native species as well as pest species. By undertaking monitoring the success of the design and placement of artificial hollows can be determined and areas for improvement identified for future placement of artificial hollows.

Monitoring can also assess whether any maintenance is required. Without regular maintenance artificial hollows are unlikely to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

For further advice on monitoring and maintenance of artificial hollows please refer to the separate information sheet; *How to monitor and maintain artificial hollows for Carnaby's cockatoo*.



Carnaby's cockatoo female prospecting an artificial hollow.
Photo by Rick Dawson



Example fixing for artificial hollow
Photo by Christine Groom

Acknowledgements

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. Special acknowledgement is made for the contributions of Ron Johnstone from the WA Museum, Alan Elliott from the Serpentine-Jarrahdale Land care Centre and Denis Saunders. This updated version was compiled by Rick Dawson (Department of Parks and Wildlife).

Other information sheets in the series: Artificial hollows for Carnaby's cockatoo

- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:

<http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo>

Further information

Last updated 28/04/2015

Contact fauna@dpaw.wa.gov.au or your local office of the Department of Parks and Wildlife

See the department's website for the latest information: www.dpaw.wa.gov.au

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Schedule 3 – How to monitor and maintain artificial hollows for Carnaby’s cockatoo

Artificial hollows for Carnaby's cockatoo



How to monitor and maintain artificial hollows for Carnaby's cockatoo

It is important to monitor and maintain artificial hollows after they have been erected. Monitoring ensures that the effectiveness of the artificial hollow can be determined. It also means that problems with pest species or any maintenance requirements can be identified and resolved.

Without regular maintenance, artificial hollows are likely to fail to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

Monitoring should be undertaken in order to detect:

- Use by Carnaby's cockatoo
- Maintenance requirements
- Use by other native species
- Use by pest species (e.g. feral bees, galahs, corellas etc.)



Carnaby's cockatoo female prospecting an artificial hollow.
Photo by Rick Dawson

How do I monitor artificial hollows?

Before undertaking monitoring of artificial hollows for Carnaby's cockatoo it is recommended that you seek advice from BirdLife Australia, the WA Museum or the Department of Parks and Wildlife. It is also important to contact Parks and Wildlife, Wildlife Licensing Section, to determine if a scientific licence is required (wildlifelicencing@dpaw.wa.gov.au).

Monitoring artificial hollows requires keen observation and naturalist skills. It is often not possible to observe evidence of breeding directly (i.e. nestlings or eggs) and inferences must be made based on observation. There are many techniques available to monitor artificial hollows. A combination of several is likely to achieve the best results.

Looking for signs of use

Cobwebs covering the entrance to the hollow will indicate that the hollow has not been used recently. This would also apply to other light debris that may have fallen to cover the opening partially. Signs of recent use or interest in the hollow include evidence of chewing.

Observing parent behaviour around the hollow

The behaviour of parent birds around a hollow will indicate an approximate age of young in the nest.

Parent behaviour	Approximate age/stage of young
Prospecting for hollow	Unborn
Male only seen out of hollow	Egg or very young nestling (< 3 - 4 weeks)
Both parents seen entering/exiting the hollow	Nestling(s) have hatched (> 3 - 4 weeks)

Observing feeding flocks

Flocks of all male birds indicate that the females are incubating eggs. When flocks are mixed it suggests the birds have either not laid yet or that the nestlings have hatched and no longer require brooding (approximately 3 - 4 weeks old).

Tapping

When females are sitting on eggs they will usually respond to tapping at the base of their tree (or pole) by appearing at the entrance or flying from the hollow opening. This is not a guarantee of breeding activity, but an indication that it is possibly occurring in the hollow.

Observing insect activity around nest

The faecal matter produced by nestlings in a nest attracts insects, especially flies and ants. The type and number of these insects will help indicate how old any nestlings present may be. Factors such as temperature and humidity will also affect insect activity and so observations of insect activity should only be used as supporting evidence for other indications of age/use. Blowflies around a nest usually indicate that a death has occurred.

Listening for nestlings

With experience it is possible to determine if one or two nestlings are present and a broad estimate of age based on the type and loudness of noises they make.

Looking inside the nest

This can be achieved either with the aid of a telescopic pole and camera or mirror, or with the use of a ladder or other climbing equipment. This method can obtain the most detailed monitoring information for artificial hollows. However it is also the most time consuming and difficult to organise. Special equipment is likely to be needed depending on the height and positioning of artificial hollows. There are also safety issues associated with ladder or rope climbing options to reach nests to undertake observations.

How often should I monitor artificial hollows?

The minimum frequency of monitoring and the techniques used will be determined by the aims of the monitoring and the resources available. It is important to limit disturbance to breeding birds and this should be considered when determining the techniques used and frequency.

How do I maintain artificial hollows?

Artificial hollows require maintenance to ensure they continue to have the greatest chance of them being used by Carnaby's cockatoos. Periodic maintenance checks should be undertaken at least every two years, preferably annually. These checks should be undertaken prior to the breeding season which is between July and January with breeding occurring later in this period in southern areas. It is important to maintain a regime of regular maintenance as long as the artificial hollow is required. It may take several (to many) decades until a natural replacement hollow is available.

Maintenance checks should assess the following as a minimum:

- Condition of chewing posts (if present)
- Condition of attachment points
- Condition of hollow bases
- Stability of tree or pole used to mount the artificial hollow



Artificial hollow base needing repair.
Photo by Christine Groom

Repairing hollows

Any problems identified during maintenance checks should be addressed, and any repairs required done, as soon as possible. If breeding is currently occurring, maintenance may need to be delayed if it is likely to disturb the parents or nestling. Likely maintenance needs include replacement of chewing posts (frequently) or nest bases (occasionally) and repairing of any cracks (infrequently). Maintenance concerns regarding the security of attachment points or the stability of the tree or pole should be addressed as a priority for safety reasons.

For artificial hollows known to be used, spare chewing posts should be taken into the field when undertaking maintenance checks.

Monitoring of artificial hollows:

Monitoring aim	Frequency of visits	Monitoring techniques
To determine possible use by Carnaby's cockatoo	At least once during peak breeding season (i.e. between September and December)	<ul style="list-style-type: none"> • Observing behaviour of adults around hollow • Tapping to see if female will flush from hollow (best undertaken between 10am and 3pm when females most likely to be sitting) • Listening for nestlings • Looking for evidence of chewing • Looking inside nest
To confirm use by Carnaby's cockatoo	At least two visits during peak breeding season (i.e. between September and December)	<p>To observe at least two of the following:</p> <ul style="list-style-type: none"> • Breeding behaviour of adults around hollow or evidence of chewing • Female flushed from hollow • Noises from nestlings in hollow <p>Or to observe:</p> <ul style="list-style-type: none"> • Nestlings or eggs in nest
To determine nesting success by Carnaby's cockatoo	The more visits, the better. Preferably fortnightly visits between July and December. As a minimum, at least 3 visits spread throughout breeding season.	<ul style="list-style-type: none"> • Looking inside nest to observe eggs or nestlings.
To determine use by any species	As often as possible.	<ul style="list-style-type: none"> • Inspection from ground as a minimum. • Looking inside nest for detailed observations.
To determine maintenance requirements	At least every two years and preferably annually if hollow fitted with sacrificial chewing posts, can be longer if without.	<ul style="list-style-type: none"> • A basic maintenance check can be undertaken from the ground. A ladder or elevated work platform will be required for a comprehensive check and to replace sacrificial chewing posts

Acknowledgements

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. The updated version was compiled by Rick Dawson (Department of Parks and Wildlife) with assistance from Denis Saunders.

Other information sheets in the series: Artificial hollows for Carnaby's cockatoo

- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:

<http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo>



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9237/3
Permit type:	Purpose permit
Applicant name:	Shire of Augusta-Margaret River
Application area:	Nine native trees
Purpose of clearing:	Road construction and upgrades
Method of clearing:	Mechanical
Property:	Cowaramup Bay Road reserve (PIN 11476612)
Location (LGA area/s):	Shire of Augusta-Margaret River
Localities (suburb/s):	Cowaramup

1.2. Description of clearing activities

The vegetation proposed to be cleared is nine individual trees within Cowaramup Road reserve (PIN 11476612) for the purpose of road construction and upgrades (see Figures 1-4 in Section 1.5),

1.3. Decision on application

Decision:	Granted
Decision date:	4 November 2022
Decision area:	nine native trees, as depicted in Section 1.5, below.

1.4. Reasons for decision

This amendment relates only to changing a date requirement under the existing permit (CPS 9237/2). Specifically, condition 8 (h) of CPS 9237/2 required the permit holder to install an artificial black cockatoo nesting hollow prior to commencement of any clearing activities otherwise authorised.

The change to this condition under the amended permit CPS 9237/3 provides the permit holder a one-month duration following the commencement of clearing to install an artificial black cockatoo nesting hollow as a result of a request from the permit holder due to a logistical issue in obtaining an artificial nest hollow for installing prior to clearing.

The assessment against the clearing principles has not changed since the assessment of CPS 9237/2, which can be found in Clearing Permit Decision Report CPS 9237/2. The application area remains unchanged and is shown in Figures 1 to 4 below.

1.5. Site maps



Figure 1 Map of the application area

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 2 Map of the application area

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 3 Map of the application area

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 4 Map of the application area

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

2 Site information

Site characteristics

Characteristic	Details								
Local context	<p>The area proposed to be cleared is nine native trees along a road reserve within an intensive land use zone of Western Australia comprising a mix of seven marri (<i>Corymbia calophylla</i>), and two WA peppermint (<i>Agonis flexuosa</i>)</p> <p>The majority of this roadside vegetation is adjacent to cleared paddocks used for agricultural purposes. The proposed clearing area contributes to an ecological linkage in an east west direction between parcels of native vegetation.</p> <p>Aerial imagery and spatial data indicate the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 41 percent of the original native vegetation cover.</p>								
Ecological linkage	<p>The eastern extent of the application area intersects the Southwest Regional Ecological Linkage (Object ID 110). Vegetation within the application area along the roadside is likely to serve an ecological linkage function between parcels of vegetation within the local area on an east west alignment.</p>								
Conservation areas	<table border="1"> <thead> <tr> <th>Name</th> <th>Proximity (m)</th> </tr> </thead> <tbody> <tr> <td>Leeuwin-Naturaliste National Park Conservation Commission Of WA</td> <td>453</td> </tr> <tr> <td>2819/890</td> <td>1125</td> </tr> <tr> <td>Ngari Capes Marine Park Marine Parks And Reserves Authority</td> <td>2819</td> </tr> </tbody> </table>	Name	Proximity (m)	Leeuwin-Naturaliste National Park Conservation Commission Of WA	453	2819/890	1125	Ngari Capes Marine Park Marine Parks And Reserves Authority	2819
Name	Proximity (m)								
Leeuwin-Naturaliste National Park Conservation Commission Of WA	453								
2819/890	1125								
Ngari Capes Marine Park Marine Parks And Reserves Authority	2819								

Characteristic	Details		
		Bramley National Park Conservation Commission Of WA	3283
		Keenan State Forest Conservation Commission Of WA	5522
		North East Margaret River State Forest Conservation Commission Of WA	6591
		Conservation Commission Of WA	7401
		Walburra Nature Reserve Conservation Commission Of WA	7894
		Yelverton National Park Conservation Commission Of WA	9785
Vegetation description	<p>A vegetation survey (Stream Environmental and Water, 2020) indicates that the vegetation complex within the proposed clearing area consists of the following vegetation types:</p> <ul style="list-style-type: none"> • CcAfXp - Woodland of <i>Corymbia calophylla</i> over open woodland of <i>Agonis flexuosa</i> over shrubland of <i>Xanthorrhoea preissii</i> and <i>Bossiaea ornata</i> • CcEmBI - Woodland of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> over open shrubland of <i>Bossiaea linophylla</i> and <i>Xanthorrhoea preissii</i> over shrubland of <i>Hibbertia hypericoides</i> <p>Representative photos and the full survey descriptions and maps are available in the decision report for CPS 9237/1 and CPS 9237/2.</p> <p>This is consistent with the mapped vegetation types:</p> <ul style="list-style-type: none"> • Cowaramup, C2, which is described as open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i>-<i>Banksia grandis</i> on lateritic uplands in perhumid and humid zones. • Cowaramup, CW2, which is described as woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i> on slopes and low woodland of <i>Melaleuca preissiana</i>-<i>Banksia littoralis</i> on depressions in perhumid and humid zones. <p>The mapped vegetation types retain between 20 and 32 per cent of the original extent (Government of Western Australia, 2019).</p>		
Vegetation condition	<p>Vegetation survey (Stream Environmental, 2020) provided by the applicant indicates the vegetation within the application area is in Very Good, Good and Degraded condition (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> • Very Good - Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing. • Good - structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. • Degraded - Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. 		
Climate and landform	<p>Rainfall: between 1100 millilitres per annum and 1200 millilitres per annum Evapotranspiration: 800 millilitres per annum.</p> <p>Geology: Gneiss and Alluvial, shoreline, and eolian deposits and Basic and ultrabasic intrusive rocks.</p>		
Soil description	<p>The mapped soil types within the application area include:</p> <ul style="list-style-type: none"> • Cowaramup flats Phase described as: Flats (0-2% gradient) with gravelly duplex (Forest Grove) and pale grey mottled (Mungite) soils. 		

Characteristic	Details
	<ul style="list-style-type: none"> Cowaramup wet vales Phase described as: Poorly drained flats and slight depressions with pale grey mottled (Mungite).
Land degradation risk	All land degradation risks vary across the different mapped soil types along the application area. The land degradation risk table within the decision report for CPS 9237/2 identifies the mapped risks for each soil type.
Waterbodies	Available databases indicate that a nonperennial watercourse (Cowaramup Brook) intersects the application area at one location.
Hydrogeography	<p>The application area is within the Cape-to-Cape North Surface Water Area (proclaimed under the <i>Rights in Water and Irrigation Act 1914</i>) and the Busselton-Capel Irrigation Area (also proclaimed under the RIWI Act).</p> <p>According to available databases, the groundwater salinity ranges from 1000 to 3000 milligrams per litre total dissolved solids which can be described as brackish to saline.</p>
Flora	<p>There are records of 30 conservation significant flora within the local area. The closest record is a Priority 3 species <i>Boronia anceps</i>, this recording is approximately 853 meters from the application area.</p> <p>There are no records of conservation significant flora within the application area and no conservation significant flora were recorded during a floristic survey of the application area (Stream Environment Water, 2020).</p>
Ecological communities	<p>There are three conservation significant ecological communities within the local area:</p> <ul style="list-style-type: none"> Low shrublands on acidic grey-brown sands of the Gracetown soil-landscape system (P2) Melaleuca lanceolata forests, Leeuwin Naturaliste Ridge (P2) Shrublands of near permanent wetlands in creeklines of the Whicher Scarp (Whicher Scarp community G2) (P1) <p>None of these communities are mapped as occurring within the application area.</p>
Fauna	<p>There are records of 43 conservation significant fauna species the local area.</p> <p>There are no records of black cockatoo roost or breeding trees within the application area. The closest confirmed black cockatoo roost is 25 metres south of the application area on the western end.</p> <p>At the landscape-level there are at least 17 roosts in the local area and the application area provides an east-west ecological linkage.</p> <p>There are no confirmed black cockatoo breeding trees within the application area or local area. The closest confirmed forest red-tailed black cockatoo breeding tree is 23.45 kilometres to the north of the application area and the closest confirmed white-tailed black cockatoo breeding is 21.33 kilometres southwest of the application area.</p>

3 Assessment of impacts on environmental values

This amendment is the result of a request from the permit holder for an administrative amendment on clearing permit CPS 9237/2 which was restrictive on the timeline of installation of artificial black cockatoo nesting hollows.

Therefore, the minimisation and mitigation measures employed by the applicant, the assessment against the clearing principles, and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values, has not changed and can be found in Clearing Permit Decision Report CPS 9237/2.

3.1. Relevant planning instruments and other matters

The assessment against planning and other matters has not changed and can be found within Clearing Permit Decision Report CPS 9237/2.

End

Appendix A. Sources of information

A.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas, and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

A.2. References

Department of Water and Environmental Regulation (DWER) (2022) Purpose permit and decision report: CPS 9237/2. <https://ftp.dwer.wa.gov.au/permit/9237/Permit/>

Shire of Augusta-Margaret River (2021) Purpose permit application form and supporting information for Clearing Permit Application CPS 9237/1 (DWER Ref: DWERDT428477)

Shire of Augusta-Margaret River (2022) Supporting information following Ministers Determination on Appeal. (DWER Ref: DWERDT666058)