Koala Beach Glossy Black-cockatoo habitat

Monitoring Report

November 2019

Glossy Black-cockatoo male feeding in Forest Oak at Koala Beach

Photograph by Irene Timmins

Prepared for

Tweed Shire Council

by

Mark Fitzgerald

Ecological Consultant

P.O. Box 237 Mullumbimby NSW 2482

EXECUTIVE SUMMARY

The 2019 Koala Beach Glossy Black-cockatoo monitoring was the ninth such event undertaken since 1994.

Monitoring commenced with a check of artificial hollows in June 2019. The reserved Glossy Black-cockatoo habitat was searched for birds and feed sign in August, October and November 2019. Tweed Coast locations outside Koala Beach were also searched.

Low usage of the reserved Koala Beach habitat was evident with 358 chewed cones found under six Forest Oaks, and with 470 chewed cones found under four Black She-oaks at two locations south of Pottsville.

No evidence of Glossy Black-cockatoos was found at known feeding locations at Cudgen Headland (Horsetail She-oak) or Hastings Point, (Black She-oak) or in the Tweed Bicentennial Environmental Park (Black She-oak).

No birds were observed in the course of 2019 monitoring, but 3 birds were recorded and photographed at Koala Beach by Irene Timmins.

Monitoring provides evidence of the ongoing importance of habitat at Koala Beach for the local Glossy Black-cockatoo population. The condition of Forest Oak stands in the reserved habitat and reservoir stands was similar to that observed in previous monitoring, with minimal weed presence and a low rate of senescence of mature trees, but several instances of trees shedding large branches, and one tree fall. Very dry conditions in 2019 had resulted in a dense layer of Forest Oak cladodes on the ground.

Amendments to the Koala Beach Glossy Black-cockatoo Plan of Management to reflect variations in the timing of monitoring, and of provision of printed reports are suggested.

eBird sightings on the Tweed Coast provide insights into patterns of habitat use and demography of Glossy Black-cockatoos in the Tweed Coast area.

GLOSSARY

Cladode: foliage of she-oaks (*Casuarina* and *Allocasuarina* species) also termed 'needles' are rod-shaped branchlets with tiny reduced leaves arranged around the branchlet.

Cone crop: The number of cones present on each Forest Oak at the time of survey.

Feed sign: chewed cones, usually on the ground beneath a feed tree.

Feed tree: she-oak or Forest Oak with feed sign beneath it.

Preferred feed tree: feed tree with history of repeated or large-scale use by Glossy Black-cockatoos.

ACKNOWLEDGEMENTS

Thanks to: Anneliese Simke and Irene Timmins for photographs and sighting records; Marama Hopkins, Tanya Fountain and John Callaghan for supplying Glossy Black-cockatoo records.

The eBird database provided important information on patterns of occurrence of Glossy Black-cockatoos on the Tweed Coast, including at Koala Beach. Thanks are due to: the thirteen observers who contributed their sighting data to the eBird database, and to the Cornell Ornithology Lab.

The Glossy Black Conservancy website provides important ecological information on the species.

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1.0 INTRODUCTION

1.1 THE PLAN OF MANAGEMENT

A Plan of Management for reserved Glossy Black-cockatoo habitat at the Koala Beach Estate prescribes monitoring of the reserved habitat and of use of the habitat by Glossy Black-cockatoos *Calyptorhynchus lathami*. Recommendations in the 2017 monitoring report included modification of the plan to reflect seasonal variability observed in recent monitoring. Suggested amendments to point 1 and point 3(a) are highlighted below

Specific requirements for monitoring in the plan are:

Project: Carry out monitoring of Glossy Black-cockatoo habitat at Koala Beach; provide an annual report of monitoring results; and recommend revisions to the Plan of Management if deemed necessary.

Monitoring is to be undertaken in accordance with the current adopted Glossy Black-cockatoo Plan of Management.

1. Monitor use of the Glossy Black-cockatoo habitat area and adjacent Forest Oak Allocasuarina torulosa habitat every second year. ~~between March and September~~. ~~Monitoring should include 2 surveys comprising one day each in July and August, preferably separated by 20-30 days.~~ ***Monitoring should take place when preliminary surveys or sightings indicate use of the reserved habitat.***

1(a) Search for Glossy Black-cockatoos in the Glossy Black-cockatoo habitat area and adjacent Forest Oak habitat. Mid-morning traverses of the Forest Oak stands listening for sounds of feeding and calling birds, use binoculars to count birds and identify pairs and immatures.

1(b) Search for, quantify and record the location of feed sign (chewed Allocasuarina cones) in the Glossy Black-cockatoo habitat area and adjacent Forest Oak habitat. The area for searches is indicated in Figure 2 in the Plan of Management.
2. Assess the condition of the Glossy Black-cockatoo habitat area and adjacent Forest Oak habitat and provide information including but not restricted to: general tree health and any

tree death; recruitment of Forest Oak Allocasuarina torulosa; and disturbance e.g. tree removal, branch lopping, dumping of garden wastes, fire, and weed development. Report on condition of plantings, if any.

3. Provide a report of monitoring results and recommend revisions to the Glossy Black-cockatoo Plan of Management if deemed necessary.

3(a) The report should be provided ~~on disk~~ as a Word document, ~~and as a printed hard copy.~~

3(b) Copies of the report should be provided to:

- *Koala Beach Wildlife and Habitat Management Committee;*
- *Biodiversity and Conservation, Department of Planning Industry and Environment.*

4. Collate and review any sighting records collected by residents and forwarded to the Koala Beach Wildlife and Habitat Management Committee (a standard survey form will be distributed to residents by the committee to report fauna sightings).

1.2 OBJECTIVE OF THE GLOSSY BLACK-COCKATOO PLAN OF MANAGEMENT

The principal objective of this management plan is;

- to preserve habitat value for Glossy Black-cockatoos by maintaining the reserved Forest Oak *Allocasuarina torulosa* stands, roost trees and potential or actual nest trees at Koala Beach.

Monitoring and collation of local sightings incidentally provides a measure of the local abundance and habitat use of Glossy Black-cockatoos.

1.3 STRUCTURE OF THE 2019 REPORT.

The 2019 report is presented as a condensed version of previous reports, for the sake of brevity and clear communication. Technical details dealing with the geology and vegetation of the reserved habitat, design of artificial hollows *inter alia* are provided at Appendix A.

2.0 METHODS

2.1 MONITORING PROCEDURES

Monitoring procedures undertaken during field work for the current report included:

- Checking occupation of artificial hollows;
- Searches of the reserved habitat and vicinity;
- Quantification of feed sign;
- Identification of trees used;
- Recording the occurrence of weeds in the reserved habitat, and
- Surveys of sites on the Tweed coast where Glossy Black-cockatoos have previously been recorded feeding on Black She-oak and Horsetail She-oak.

2.2 CHECKING OCCUPATION OF ARTIFICIAL HOLLOWS

Artificial hollows were checked using a pole camera (Brightstar, Victoria) with extendable poles.

2.3 SEARCHES OF THE RESERVED HABITAT AND VICINITY

This search area has been determined by the concentration of Forest Oaks in the reserved habitat area, and history of feed tree use detected since 1994. Occasional reconnaissance beyond this area has resulted in the discovery of additional individual feed trees. Searches involved looking for and quantifying feed sign beneath trees, as well as looking for and listening for Glossy Black-cockatoos.

2.4 QUANTIFICATION OF FEED SIGN

Feed sign is counted (when < 20 chewed cones were present) or estimated when more numerous, in order to provide an index of Glossy Black-cockatoo foraging effort.

2.5 IDENTIFICATION & TAGGING OF INDIVIDUAL TREES USED

Feed trees encountered on Koala Beach have been identified by the application of a numbered stainless steel tag attached to stainless steel wire and fixed permanently into the

trunk surface at breast height. Only one new feed tree was identified in 2019, which will be tagged in future fieldwork. Trees outside Koala Beach have not been tagged.

Tagging began in 1994, with 187 feed trees tagged over the course of monitoring, however occasional tags have been lost, and in one case the wire remained embedded, but the tag has been manually removed.

2.6 RECORDING WEEDS IN THE RESERVED HABITAT

Weeds were noted as encountered during searches for birds and feed sign.

2.7 SEARCHES OUTSIDE KOALA BEACH

Areas with She-oaks were searched outside Koala Beach due to the absence of any feed sign in the reserved Koala Beach habitat in the first August 2019 search. These included two locations south of Pottsville, the Hastings Point Landcare area, Tweed Bicentennial Environmental Park (Cudgera Creek) and Cudgen Headland (identified in previous reports as Sutherland Point).

Areas known to be used by Glossy Black-cockatoos for foraging and previously searched near Bogangar had been burnt in 2017, and were not searched in 2019.

2.8 COLLATION OF RECORDS FROM LOCAL OBSERVERS

Records of Glossy Black-cockatoos were sought from local ecologists. A significant resource of sightings is the eBird data base, which included 85 records from the Tweed Coast in 2018-2019. These records are analysed and discussed later in this report.

3.0 RESULTS—2019 GLOSSY BLACK-COCKATOO MONITORING

Two searches in August 2019 found no chewed cones at Koala Beach, Cudgen Headland, or Hastings Point. Feed sign (250 chewed cones) was found under 3 Black She-oaks near Peters Ct., south of Pottsville.

In October 2019 feed sign (188 chewed cones) was found under 5 Forest Oaks at Koala Beach.

In November 2019 feed sign (210 chewed cones) was found under 3 Forest Oaks at Koala Beach, and (400 chewed cones) found under 3 Black She-oaks near Peters Ct. and 70 chewed cones under 1 Black She-oak near McKenzie Ave., south of Pottsville.

Feed sign counts need to be considered in light of repeated samples, for example the 400 cones under trees at Peters Court in November likely includes the 250 chewed cones found in August.

Comparison with previous monitoring indicated that the 2019 results are the lowest feed sign and feed tree counts in monitoring at Koala Beach so far.

Figure 1: Feed Sign/chewed cones recorded in reserved Koala Beach habitat in monitoring from 1996 to 2019

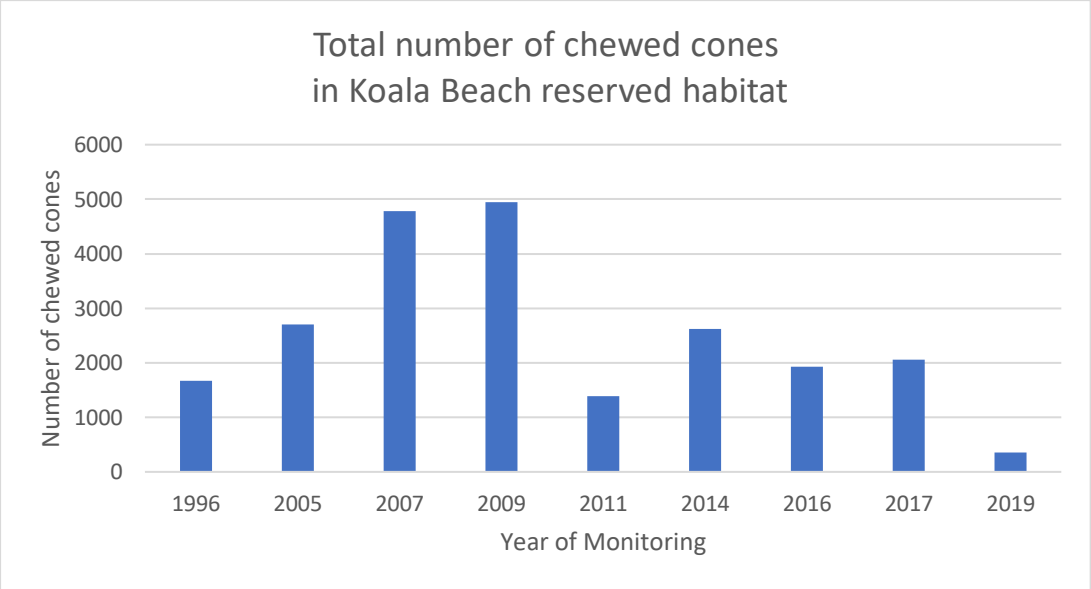
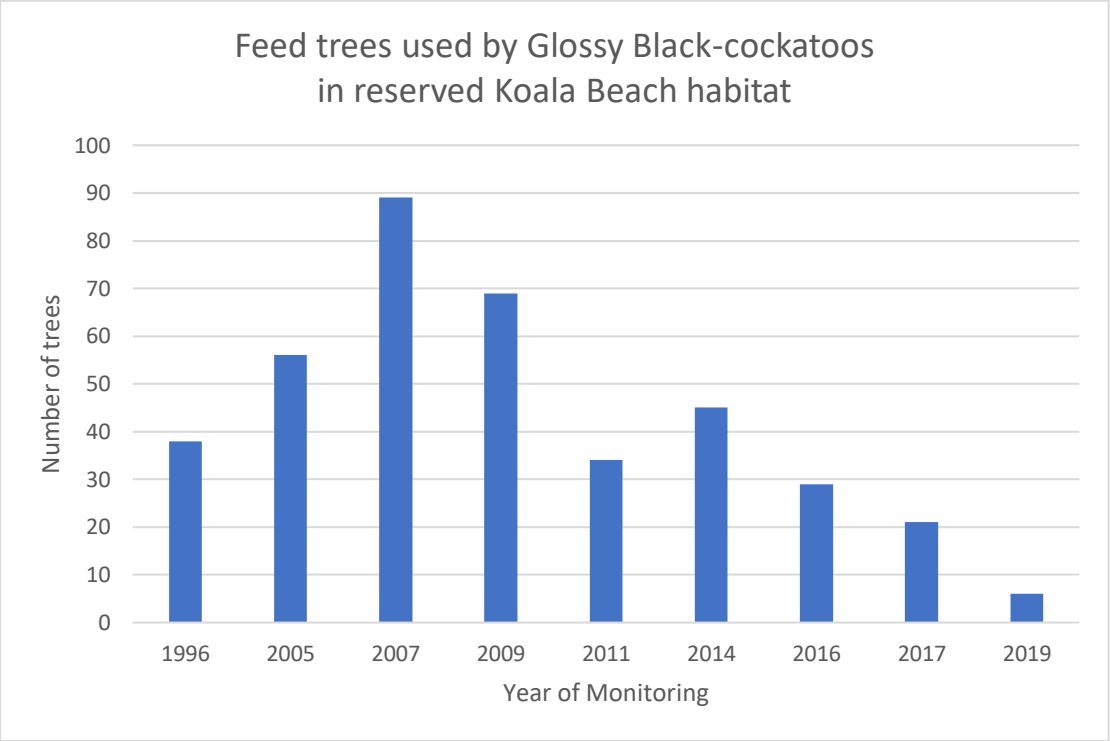


Figure 2: Feed Trees recorded in reserved Koala Beach habitat in monitoring from 1996 to 2019



3.1 INSPECTION OF ARTIFICIAL HOLLOWS

Artificial hollows were occupied by Maned Ducks *Chenonetta jubata* and clutches of eggs of this species were found in most hollows. A single white egg which may have been that of a cockatoo was observed in a bed of chewed bark in one hollow, which was later seen occupied by nesting Eastern Rosellas (See photographs at Appendix B). It is possible that competition for hollows between species results in failure of Glossy Black-cockatoos to successfully use the artificial hollows.

Fidelity of Glossy Black-cockatoos to existing nest tree hollows (GB Conservancy), and likely low recruitment rates in this population may retard the rate at which they take up use of artificial hollows. The Glossy Black Conservancy website states that female Glossy Black-cockatoos produce a single egg only every second year, which also may influence the rate at which they take up use of artificial hollows.

Continued annual monitoring of the artificial hollows is recommended. As the breeding season is given as between late January and early June (GB Conservancy), monitoring should take place between these dates.

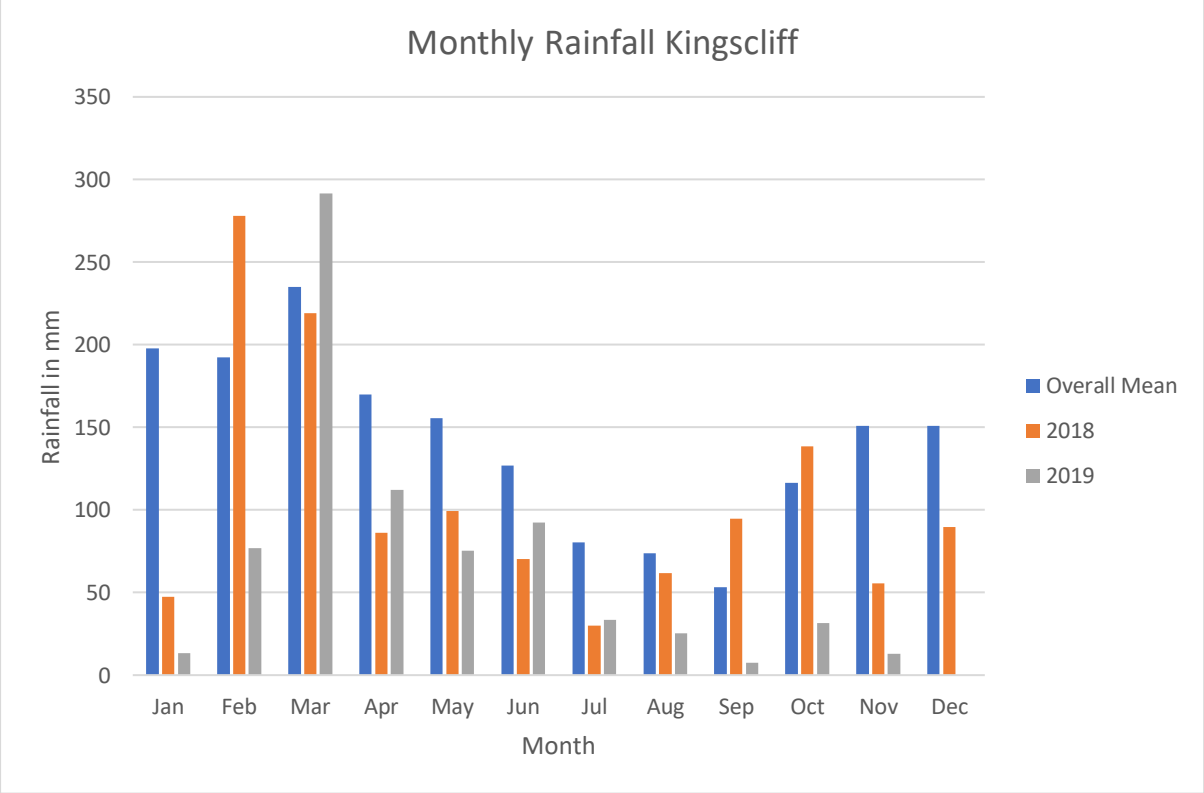
3.2 OCCURRENCE OF WEEDS IN THE RESERVED HABITAT

Few weeds were noted in the reserved Glossy Black-cockatoo habitat, with evidence of recent herbicide application present, and extremely dry conditions.

3.3 CONDITIONS AT THE TIME OF MONITORING IN 2019

Record dry and hot conditions were prevalent during and leading up to the 2019 round of monitoring. Annual rainfall in 2018 (1270mm) was significantly lower than mean annual rainfall (1703mm) recorded for the nearest weather station (Marine Parade, Kingscliff). Rainfall for the year to date in 2019 was significantly lower: 772mm being <50% of mean annual rainfall.

Figure 3: Rainfall (mm) 2018, 2019 and overall historical mean.



3.4 CONDITION OF THE RESERVED HABITAT

Reserved habitat at Koala Beach was noted to show signs of stress, presumed to result from severe lack of rain. Numerous large branches had been dropped, a mature tree had fallen out by the roots (no tag could be found, but this was likely a recorded feed tree). Other trees in this area were severely affected by the drought, with a mature Brush Box showing total canopy stress, discoloured and drooping leaves.

Paradoxically, a tendency for dry rainforest species to develop in the understorey of the reserved habitat over the 25 years since monitoring began was also evident, with Celerywood *Polyscias elegans*, Tuckeroo *Cupaniopsis anacardioides*, Geebung *Persoonia sp.*, Bleeding Heart *Homalanthus populifolius*, Barbed Wire Vine *Smilax australis* and Pink Euodia *Melicope elleryana* noted to be present, and also stressed from lack of moisture.

3.5 RECORDS/SIGHTINGS KOALA BEACH ESTATE 2019 MONITORING

Three birds were observed feeding in a Forest Oak at Koala Beach by Irene Timmins on October 28th 2019 (I. Timmins, pers. comm.). Feed sign and a pair of birds were observed in Koala Beach in April and May respectively by John Callaghan, ~900m north of the reserved habitat (J. Callaghan, pers. comm.). Michael Banks provided a record of a pair of birds in December 2019. Anneliese Simke provided several records of birds in the Koala Beach estate, and a record of 3 birds from Wooyung.

The numerous sighting records for 2018-2019 registered on the eBird database are discussed below.

3.6 FEED SIGN QUANTITIES

Accounting for repeat counts under trees, a total of 358 chewed cones were found under six Forest Oaks at Koala Beach. A total of 460 chewed cones were found under 4 Black She-oaks at two locations south of Pottsville.

3.7 THREATENED SPECIES RECORDS

A single Pink Nodding Orchid *Geodorum densiflorum* was located in August in the reserved habitat at Koala Beach, but the species was not observed in later monitoring.

A dead Grey-headed Flying-fox *Pteropus poliocephalus* was observed suspended in foliage south of Pottsville.

4.0 THE eBIRD DATABASE—SIGHTING LOCATIONS

Records of Glossy Black-cockatoos on the eBird website from the Tweed Coast dated 2018 and 2019 were examined (*n* = 87). Sightings were predominantly (>80%) from Koala Beach where one observer (Anneliese Simke) contributed 59 sightings for the period (67.8%).

Sightings are clearly not random, reflecting the activity of motivated individuals (13 observers). However, the absence of records from intervening areas where potential feed trees (Horsetail She-oak, Black She-oak) are abundant, is important, reflecting the consistent selectivity of Glossy Black-cockatoo habitat use and feeding preferences.

Summarising the location of 87 sightings for 2018-2019, the importance of Koala Beach and the Kingscliff area is evident as provided below;

LOCATION	SIGHTINGS
Koala Beach & vicinity (Christie's Creek)	71
Kingscliff & Casuarina	14
Bogangar	1
Pottsville	1
TOTAL	87

4.1 SIGHTING ATTRIBUTES: NUMBER OF BIRDS

In 2018 with 54 sightings, the number of birds recorded varied from 1-9 with a mean of 2.7 birds per sighting.

In 2019 with 33 sightings (to November), the number of birds recorded varied from 1-6 with a mean of 2.9 birds per sighting. The overall mean number of birds per sighting for both years combined is 2.7.

4.2 FEED TREE SPECIES

Records were often of birds heard but not seen, or of birds flying overhead, and feed trees were only recorded on 6 occasions, all of which were Horsetail She-oak. However, the majority of sightings which were recorded at Koala Beach likely reflect use of Forest Oaks, and 2019 monitoring results indicate use of Forest Oak and Black She-oak.

Swamp Oak (*Casuarina glauca*) seeds are also recorded being eaten by Glossy Black-cockatoos, but this species was not recorded being used during this monitoring period.

4.3 TIME OF DAY

The majority of sightings (66 of 87) were in the afternoon, but it is unclear whether this reflects the pattern of use of the habitats, or the activity patterns of observers, or both.

The earliest sightings were at 521 and the latest at 1940 (EST: Eastern Standard Time).

5.0 DISCUSSION—GLOSSY BLACK-COCKATOO USE OF THE KOALA BEACH RESERVED HABITAT

Monitoring confirms the continued use of the reserved Koala Beach habitat by Glossy Black-cockatoos, although at a considerably reduced level, possibly reflective of reduced resource abundance, but also of the local population demographics.

Cone crops observed in the reserved habitat were variable, but moderate in a small sample (18 trees), with a mean crop score of 2.3 (max. possible 3) and cone sizes were small, with a mean score of 1.4 (max. possible 3). A notably productive younger Forest Oak with large crops of large cones in the reserved habitat has not so far been observed being utilised, providing further evidence of the selectivity of use of feed trees by Glossy Black-cockatoos.

5.1 FEED TREE RESOURCES OUTSIDE KOALA BEACH

No cones were observed in the Cudgen Headland Horsetail She-oaks in 2019 monitoring. Black She-oak cone crops in the Hastings Point Landcare site, Tweed Bicentennial Environmental Park and south of Pottsville (*n* = 79 trees) were moderate to heavy, but of these, only the south of Pottsville trees were utilised by the birds.

Black She-oaks in the Hastings Point Landcare site exhibited high levels of mortality or senescence: with ~50% of trees on the sampled walking trail noted as being dead in the November sample. The other Black She-oak sites (south of Pottsville & Tweed Bicentennial Environmental Park) showed minimal mortality of this species.

Feed trees observed south of Pottsville were located in and adjacent to Asset Protection Zones, and some had lateral branches recently pruned, presumably to reduce fire risk. These trees are at risk of removal in event of a fire, and would be unlikely to be replaced at these sites.

5.2 NUMBER OF BIRDS SIGHTED

The mean number of sightings of 2.7 birds in combined 2018-2019 data reflect the predominance of sightings of pairs (35), and of pairs with a single juvenile (19). Twelve (12) sightings were of individual birds, and 21 sightings were of larger groups (4-9). The largest two sightings of 9 birds at Cudgen Headland were both in January 2018.

Monitoring indicates the persistence of Glossy Black-cockatoos in the Tweed Coast area, but low levels of use potentially indicate a decline in the local population. The mobility of birds means that they could be foraging elsewhere, however widespread drought in eastern Australia, and in New South Wales, may have affected food resources for this species. The Glossy Black Conservancy website states daily movements of birds over 10 and 15km to feed. A scarcity of regional records from *e.g.* the Tweed hinterland in 2018-2019 suggests that the coastal records are likely to be a true indication of the local population's abundance.

5.3 ADEQUACY OF THE POM AND CURRENT MONITORING

The plan of management objective is to preserve habitat value for Glossy Black-cockatoos by maintaining the reserved Forest Oak *Allocasuarina torulosa* stands, roost trees and potential or actual nest trees at Koala Beach.

This has largely been fulfilled. No nest trees have been located, and some plantings have been successfully established to counter the low rate of senescence of Forest Oaks. The tendency for the reserved habitat to develop rainforest species in the absence of fire was predicted and is largely benign, in that competition with feed trees is not evident.

While a managed fire could potentially be considered as an appropriate tool to favour regeneration of She-oaks, the practicality of this in a residential landscape is highly questionable, and could result in the total loss of the reserved habitat.

Amendments to the PoM to reflect the increasing variation in seasonal use of the reserved habitat, and the use only of digital media for reporting are included in Section 1.1.

6.0 CONCLUSION

Drought appears to affect the reserved Koala Beach Glossy Black-cockatoo habitat at the time of writing. However, a food resource for the birds was present in the reserved habitat and elsewhere on the Tweed Coast. The quantity of feed sign found suggests a low number of birds were feeding. The tendency for fewer feed trees recorded in monitoring since 2014 also suggests possible population decline: see Figure 2, p11. Review of the eBird sightings also suggests that the current population level may have declined from previous years.

The maximum number of birds in a sighting in the last two years was 9 in January 2018. For 2019 the maximum number of birds in a sighting so far was 6. This suggests small family groups; 2 pairs with individual juveniles, or 3 pairs at each sighting. It is not possible to determine how many family groups, pairs or birds are represented in the 87 sightings.

The Glossy Black Conservancy website states that birds may travel up to 15kms in a day to feed. If birds are simply foraging elsewhere, this is not indicated by the pattern of eBird

records. NSW OEH Bionet Atlas records withhold location data, but include only 2 records for the Tweed LGA from the 2018-2019 period.

The absence of recruitment of Forest Oaks in the reserved habitat is a normal consequence of the ecology of the She-oaks, where dense layers of shed cladodes inhibit or prevent establishment of seedlings. In the absence of fire (which can kill adult trees) seedling development is poor.

While She-oak plantings have been successfully established in the reserved habitat, and some recruitment of Forest Oak and Swamp Oak has occurred in the reserved habitat and nearby, there is no evidence from monitoring of these trees being used for foraging.

7.0 RECOMMENDATIONS

The value of local observers reporting sightings of Glossy Black-cockatoo to the eBird website has been critical to gaining some understanding of the local demographics of the local Glossy Black-cockatoo population, and its possible decline.

- Encourage local residents to contribute sightings, including where possible, the number, sex and life stage of birds, feed and roost tree species, watering sites and any behavioural observations.

- Continue biennial Glossy Black-cockatoo monitoring at Koala Beach and Tweed Coast in 2021.

- More Forest Oak plantings are recommended at Koala Beach, and She-oak plantings elsewhere on the Tweed Coast are encouraged where appropriate. Seed from known feed trees should be used to provide seedlings for plantings.

- A whole of estate survey is recommended for Koala Beach to identify areas of She-oaks outside the reserved habitat, and their condition.

REFERENCES

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APPENDIX A: METHODOLOGIES

(i) Installation and monitoring of artificial hollows

Six artificial hollows, based on designs used successfully for Glossy Black-cockatoos on Kangaroo Island, were installed in two clusters of three each at Koala Beach on February 25th 2010. Hollows were constructed and installed by Graeme Lloyd (WildlifeServices, Terranora) after selection of potentially suitable trees on February 15th 2010. Tree selection was determined by descriptions of nest trees in literature (*e.g.* GBC 2010) as being large living or dead eucalypts with diameter at breast height > 40 cm. Tree selection was also influenced by the proximity of trees to the reserved Forest Oak habitat stands, and to a known watering site.

Monitoring occurs annually using a pole camera to investigate occupancy of the artificial hollows.

(ii) Reserved Glossy Black-cockatoo habitat at Koala Beach

Reserved Glossy Black-cockatoo habitat at the Koala Beach Estate comprises 2.26 ha of the north-facing slopes of a low ridge (<50 m AHD) of metamorphic geology, which is oriented from southwest to northeast. The ground surface is rocky and sloping, with small patches of grassland. Two small gullies are present which divide the habitat into 3 identifiable stands (west, central, northeastern). Buffers to the reserved habitat extend the area reserved to a total of 6.16 ha. The reserved habitat is contiguous with a large block of forested land to the north which is zoned 7(l) Environmental Protection (Habitat), and with an area to the south-east reserved as habitat for the threatened Common Blossom Bat *Syconycteris australis*.

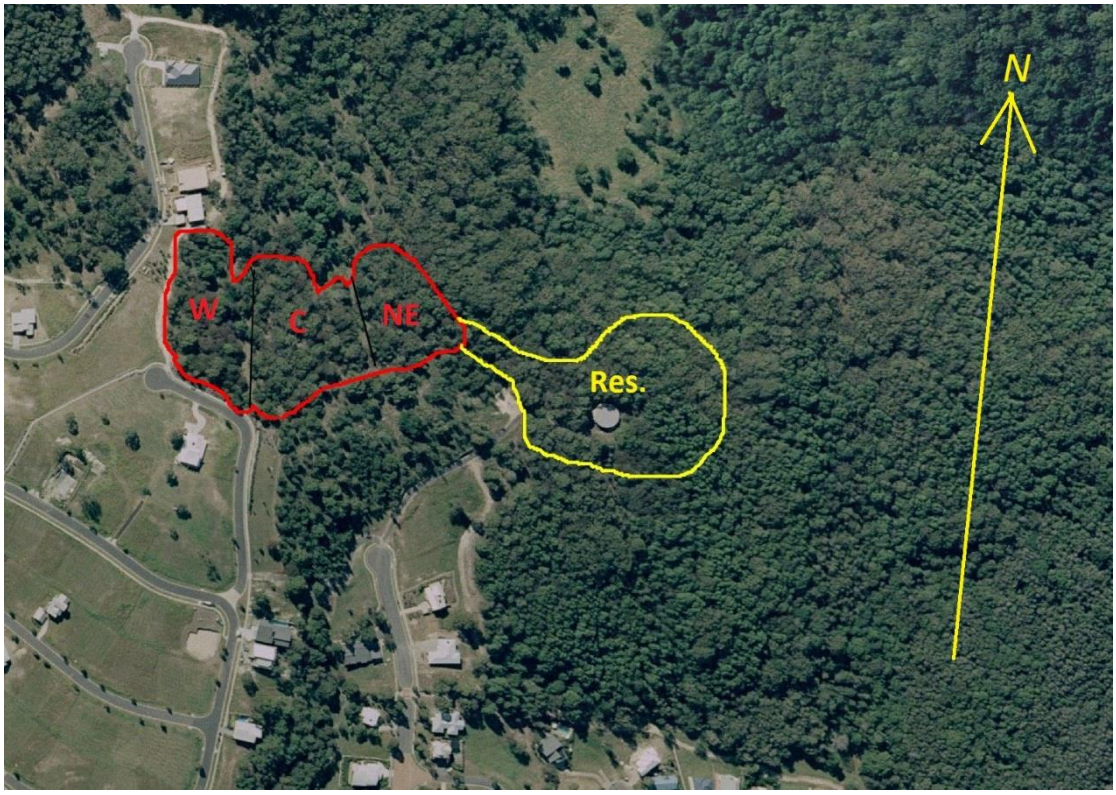
The dominant vegetation and principal canopy tree in the reserved habitat is Forest Oak, *Allocasuarina torulosa* and the overall stand height is low (<15m). Occasional emergent Northern Grey Ironbark *Eucalyptus siderophloia* and Pink Bloodwood *Corymbia intermedia* are present; taller Swamp Oak *Casuarina glauca* are also present, mainly in the lower slope and around gullies. A suite of dry rainforest species is developing in the mid-layer: with Celerywood *Polyscias elegans*, Tuckeroo *Cupaniopsis anacardioides*, Geebung *Persoonia sp.*, Bleeding Heart *Homalanthus populifolius*, Barbed Wire Vine *Smilax australis* and Pink Euodia *Melicope elleryana* noted to be present, and also stressed from lack of moisture.

Coast Banksia *Banksia integrifolia* occurs on the ridge top above the reserved habitat stands, but has been adversely affected by drought.

Forest Oaks are also the dominant and co-dominant canopy species in a similar stand to the near northeast, extending around the water reservoir site (reservoir stand: see Figure 1). Vegetation of the reserved Glossy Black-cockatoo habitat and the reservoir stands thus differs from habitat elsewhere on the Koala Beach Estate, where Forest Oak generally occurs as a minor component of the mid-layer vegetation beneath eucalypt open forest and woodland, where the canopy layer is dominated by taller sclerophyllous species such as Blackbutt *Eucalyptus pilularis*, Northern Grey Ironbark, Grey Gum, *E. propinqua*, White Mahogany *E. acmenoides* and Pink Bloodwood *Corymbia intermedia*.

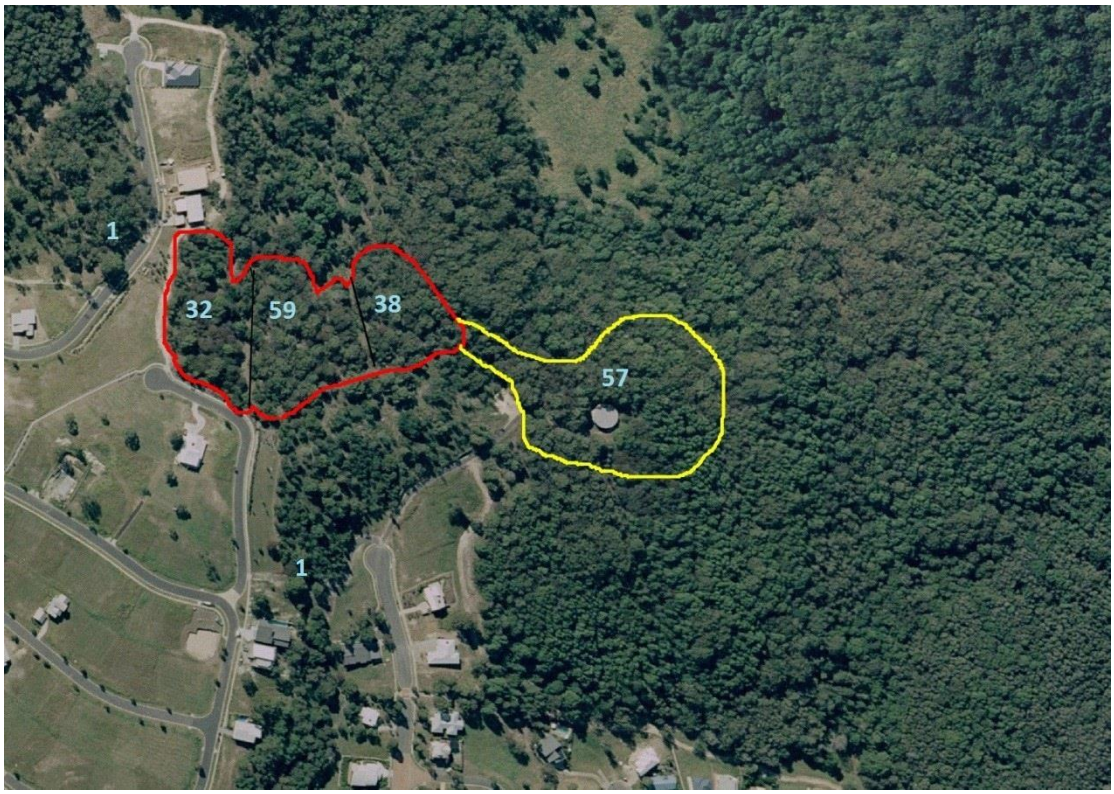
Figure 1 below depicts the reserved habitat Western (W), Central (C) and Northeast (NE) stands in red and the Reservoir (Res.) stand in yellow.

Figure 1: Reserved Koala Beach Glossy Black-cockatoo habitat and Reservoir stand



Source GoogleEarth. Scale = ~1: 5 600

Figure 2: Distribution of feed trees at Koala Beach: 1996-2019



(iii) Feed Sign Data: 2019 Monitoring

Date	Tree tag no.	Location & Feed Tree Species	No of chewed ones
15/8/19	--	Near Peters Ct, Pottsville: Black Sheoak	250
29/10/19	182	Koala Beach; Lomandra Ave; Forest Oak	3
	185	Koala Beach Reserved Habitat; Forest Oak	25
	86	Koala Beach Reserved Habitat; Forest Oak	120
	61	Koala Beach Reserved Habitat; Forest Oak	15
	62	Koala Beach Reserved Habitat; Forest Oak	25
18/11/19	--	Melia Ave Park Forest Oak, new feed tree	10
	61 & 62	Koala Beach Reserved Habitat; Forest Oak	200
	--	Near Peters Ct, Pottsville: Black Sheoak	400
	--	McKenzie Rd., Pottsville Black Sheoak	70
TOTAL			1118

(iv) 2019 Monitoring Activities

Date	Location	Activities
18/6/19	Koala Beach	Artificial hollow check
13/8/19	Koala Beach	Artificial hollow check, search of the reserved habitat
15/8/19	Tweed Coast: Cudgen Headland, Hastings Point, south of Pottsville	Search of She-oak stands
29/10/19	Koala Beach	Search of the reserved habitat & vicinity
18/11/19	Koala Beach	Search of the reserved habitat & vicinity
18/11/19	Cudgen Headland, Hastings Point, south of Pottsville & Tweed Bicentennial Environmental Park	Search of She-oak stands

APPENDIX B: PHOTOGRAPHS

(i) Glossy Black-cockatoos at Koala Beach: ? Adult feeding juvenile
Photograph by Irene Timmins

(ii) Trunk collapse of Feed Tree #70; Forest Oak, Reservoir stand, Koala Beach

(iii) Tree fall, Forest Oak in reserved habitat Koala Beach

(iv) Branch collapse in reserved habitat, Koala Beach

(v) Littering in reserved habitat, Koala Beach

(vi) Glossy Black-cockatoo feed sign/chewed cones reserved habitat, Koala Beach

(vii) Cockatoo egg (?) in chewed bark: artificial hollow, Koala Beach

(viii) Maned Duck egg clutch in artificial hollow, Koala Beach